MIT Communications Futures Program

Information, Identity, Privacy: Social TV as a case study

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Venice, Italy, May 14, 2009

Outline

- Identity and Privacy: close coupling
- Identities in Social TV
- The challenges to integration and coordination of multiple identities
- Information as the substrate

Our Approach

- Specific use cases
  - Social TV as a problem area of identity, privacy, and policy
- Architectural view
  - What are common architectural patterns that could lead us to a framework for identity and privacy?
  - Relate these patterns to
    - Current Internet
    - A Possible Future Internet (more later)

Identity and Privacy

- Privacy is about retaining control over information about oneself
- Identity (of humans) is about linking information with an individual
- Challenges:
  - Understanding how information is linked to humans (modes of mapping from between human and information)
  - Being able to determine policies for control of privacy
  - Being able to enforce policies
  - Being able to trust enforcement of policies

Identities in Social TV: Online social network

- "Users" are individual people
  - Name and other components of identification (address, affiliations, roles, etc.)
  - Photos, video
  - Posted text
    - On wall
    - To Friends only
- Information ownership
  - Issues of who owns information managed by OSN
  - Issues of who owns definition of identities in the OSN
- Information control of access
  - Family
  - Friends
  - Groups

Who defines the access control and who enforces it?

Identities in Social TV: the TV customer

- "Users" are paying "customers", often a household
  - Type of service
  - Context or geographic region (region sensitive content delivery)
- Some instantiations may organize end-devices as peering servers
- Who "owns" the information about what a "user" watches?
  - Content provider (e.g. Comcast, TWC, Netflix)
  - Storage server owner (e.g. peering servers)
  - Network service provider (e.g. Comcast internet service)

Identities in Social TV: the affiliation membership (WGBH, home shopping, etc.)

- "user"
  - Maybe individual, couple, family, household
  - Name
  - Membership identifier
  - Privileges (might be based on frequency of participation, funding/spending level, etc.)
  - Expressed interests (antique jewelry)
  - Behaviors (participates in certain kinds of organized travel, looks at certain webpages, etc.)
  - Payment: credit cards, billing address, etc.

Social TV:
from Klym/Montpetit paper

- Context
  - Personalization of devices
  - Storage and delivery: P2P networking among STBs
- Vision
  - Integration of social networks with video value chain
  - New user experience
  - Impact on TV and video providers

Identities in Social TV: hypothetical composition

- "user"
  - Name & TV customer id
  - Affiliations
    - Friends
    - Groups (from OSN, maybe from membership org such as Public TV in US)
    - Region/location
- Shared information
  - Some personal
  - Some submitted (e.g text, photos, etc.)
  - Some gleaned from friends, groups, location, and actions (e.g.what is/was watched, related activities in membership role, such as travel)

WHO the user is

- Name and other identification components
- In social context: friends, groups
- In physical world: location, physical context
- In organizational world: member of affiliation group, participant in certain activities (Home shopping network frequent shopper or WGBH member), content provider

-> *a concept of relationships*

-> *based on a set of different ontologies*

Challenges

- Defining an ontology itself (inlight of global scaling and heterogeneous interests)
- Ontology convergence
  - Information structure
  - Functional convergence
  - Interaction: maintaining invariant
- Ontology Challenges
  - Imperfect convergence, surprises
    - How to deal with imperfect convergence?
  - *A priori* definition allows for standardization of ontology, not individual definitions
    - How sustainable is standardization when the number of potential ontologies (i.e., stakeholders) increases?

Challenges (2)

- Context convergence
  - Expression of underlying ontology
  - Dealing with imperfect convergence
- Policy challenges
  - Composite identification may enable linking of personal identity information across boundaries: more than the sum of the parts
  - Integrity violations, if only parts of an underlying identity structure are exposed
  - How to handle imperfect convergence?
    - Separation by default?
    - User interaction to resolve conflicts?

Challenges (3)

- Identifier
  - One of existing choices or a new and distinct one
  - Separation or convergence with original identities
  - Problems of identities not mapping one-to-one
  - Separation of semantics across layers
    - Vertical ontologies, I.e., identifier concepts inherent concepts from underlying domains
    - Horizontal ontologies, I.e., identifier concept overlays

  Can we envision a 'basic information ontology' that allow for overlaying (all) other ontologies?

  Can we envision a system that implements such basic ontology in a generic and scalable way?

An Observation: Information as the basic substrate

- Identity is not the same as identification
  - May have complex structure
    - richer model of distinction than identifiers
  - May be context sensitive
    - structure and content driven by context
  - Represents (particular) concepts of relationships!
- Formality of information
  - Syntax
  - Semantics
  - Relationships

  -> based on an ontology to represent the concepts
- Place to hang things
  - Policies
  - Behavioral requirements (storage, delivery, etc.)
  - Tussle negotiation

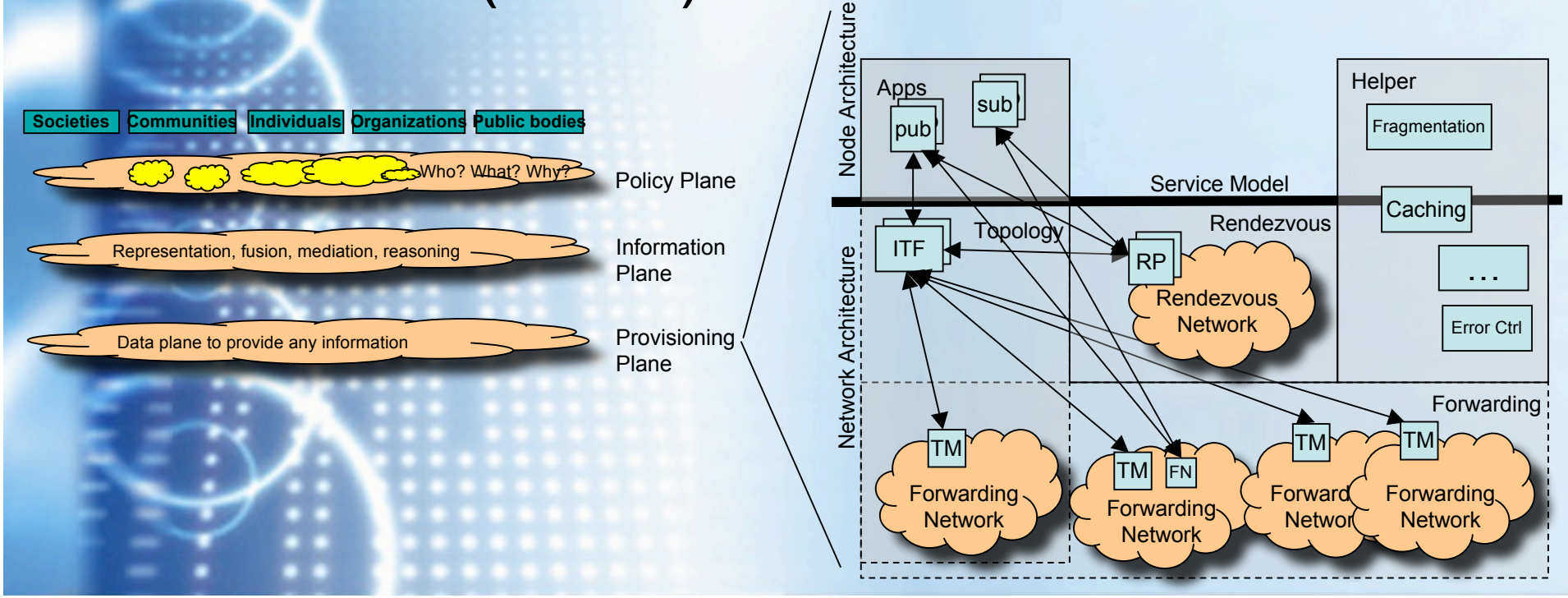
Our Architectural Thrust

- Current Internet
  - What are current efforts to identity framework?
  - Where have they worked?
  - Why have they failed?

-> can we give guidance as to improve the situation?

Our Architectural Thrust (2)

- How could identity frameworks look like in a very different (future) Internet?



Questions (1)

- Where to place the complexity?
  - Timing
  - Usability
  - User understandability
  - Design or (runtime) implementation

Questions (2)

- In STV setting, who can know what user has watched?
  - In TV delivery, relationship is only between user and provider, so information (watching habits, etc.) control points are at only these two points
  - In OSN, service provider provides a content summarizing service that categorizes users to friends.
- Are privacy policies only a composite of underlying policies or might they reflect new information and function capabilities of new domain?

Looking forward at WG work

- Report on workshop from late 2008
- White paper on Identity and Privacy in Social TV: a case study
- A second case study (several candidate topics)
- Longer range: Architectural white paper, outlining potential identity and privacy frameworks
  - Extends on the first whitepaper on *'Identity in Information Networking'*

Finding the working group

http://cfp.mit.edu/

and select “Privacy and Security”

Wiki workspace restricted to members

privsec@cfp.mit.edu

(restricted to members of the list)

Any employee of a member company can join: see website under “Members”