Building a Social Networking Future Without Big Brother

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Vision: 3-Tier Architecture

天
Tian
(Heaven)

人
Ren
(Man)

地
Di
(Earth)

My key, cache, window into my digital cloud:
ID, personality, assets, and the internet

PC, TV
at home, on the road, in hotels, on the plane

servers
data

Personalize the generic PC,
borrow the power, display, keyboard, memory, etc
The Omniscient Monopoly
Facebook party ends in chaos after 60 gatecrash event
Last Updated: 7:04PM GMT 20 Dec 2008

Police use Facebook to nab burglar
Wed Jan 14, 11:30 am ET

September 13, 2008 4:58 PM PDT
Apple blocks competitive products from iPhone App Store--surprised?

The Very Curious Microsoft–Facebook User Data Relationship
by Michael Arrington on November 14, 2008

February 17, 2009 11:08 PM PST
Facebook backs down on privacy terms
Mission

To create choice.
Solution: Decentralization

Infrastructure & API:
Open, horizontal, modular, enabling individuals

vs.
vertical, monopolistic
Technical Challenges

Distributed systems have not made it!

End user: Easy to use, deploy, manage, secure
App developers: Easy to write apps
Adoption Challenge

Make Sharing with Privacy Easy.

Make Privacy Fun.

Make Privacy Pay.
Social Networking 1.0

Application-centric design
- Facebook, MySpace, LinkedIn, Yahoo, Google, Apple, ...
- Flickr, Shutterfly, Picasa, Adobe, Ning, ...
- Twitter, Tumblr, Crowdvine, Friendfeed, ...
- Hi5, WAYN, Friendster, Frengo, Bebo, Plaxo, ...
- 3Jam, Zintin, Loopt, ...

Strengths: convenience, available everywhere, free

Weaknesses
- Data lock-in, loss of data ownership and privacy
- Disparate data sources
- Inconvenient to upload data and relations
- Inefficient, hard to scale
Person-Centric, In-Situ, Decentralized Social Networking

Unified personal cloud
- Unified view of all my stuff accessible on any device
- Federated storage system

Multiple identities
- Fine-grain access control

In-situ social networking
- Connects via normal actions (email, sms, phone, playing music)

Distributed servers ↔ Personal Cloud Butlers
- Home servers (like Tivo)
- Passive encrypted back up
Personal-Cloud Butler

Privacy and confidentiality
- Lives at home
- Knows all confidential info

Intelligent assistance
- Saves you time
- Shows discreetness, suggests ideas

Social networking
- Gossips and negotiates with other Butlers
- Mediates all accesses
- Provides plausible deniability
Distributed apps are hard to write!

Development Platform

Many applications: (distributed) database query + GUI
Database: access rights embedded with every tuple
Distributed Datalog query: abstracts away distribution
  supports recursion, persistence, incrementality

Example:
• FOAF(?p) :- FRIEND(?p)
• FOAF(?p) :- FRIEND(?x), FOAF[?x](?p)
Butler: Target of Attacks

InvisiType: Object-Oriented Security Policies

- 3rd party plug-ins, mobile code
- Object-oriented safety checks
  - Taint for SQL injection, XSS
  - Access control
- Enforced by language runtime
  - No changes to 3rd party code
- Implemented for Python
- Ex: MoinMoin wiki engine
  - 92K lines of code + 200 extensions
  - Added 150 lines of code
  - < 1% overhead
  - 11 XSS and 3 access control bugs
Adoption Challenge

Make Sharing with Privacy Easy.
Make Privacy Fun.
Make Privacy Pay.
Making Friends in a Snap

Meet.

Greet.

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In Situ Linked-In Demo

1. Auto weighted social graph
   - Privacy is key
   - In-situ social networking
2. Butler has my contacts, photos, music
3. Access hosted as a Facebook app
   - Separate access and ownership
4. Make a new friend with a snap
   - Connect cyberspace with physical space
5. Auto upload photos to butler
6. Distributed Datalog query to see friends’ photos
   - App development platform focus

No Big Brother
Themes

- In-situ social networking
- Privacy is key
- No Big Brother
- Connect cyberspace with physical space
- Viral

Apps

- **E-Mail Mining**
  - In Situ Linked-In
- **Digital Handshake**
  - Digital Payment
- **Social App**
  - Music Jukebox

Infrastructure

- **HCI**
  - Semantic Web Display
  - Interactive Front Page
- **Representation**
  - Caching
  - Semantic Web Web
- **Development Platform**
  - Distributed Datalog
  - Info Flow Control
  - Privacy Preservation
- **Compute Utility**
  - Tian Di Ren 3-Tier Arch