Building a Social Networking Future Without Big Brother

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Vision: 3-Tier Architecture

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

Personalize the generic PC, borrow the power, display, keyboard, memory, etc

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

天
Tian
(Heaven)

人
Ren
(Man)

地
Di
(Earth)
The Omniscient Monopoly
What’s happening today ...

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
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.
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
PrPl Infrastructure

- iPhone
- Android
  - Mobile client API

- Photo Sharing
- Personal Yelp
- Movie Date
- Music
- Guest Services

- Device Manager
- GUI
- Data Manager
- Semantic Web Index
- AAA

- Personal Cloud Butler

- Server plug-in APIs

- Data Steward API
  - imap
  - facebook
  - Yelp

- Directory Service

- Friends’ Butlers

Butler
Infrastructure
PrPl
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)
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
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

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

Privacy is key
In-situ social networking
Separate access and ownership
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
- Development Platform
  - Distributed Datalog
  - Info Flow Control
  - Privacy Preservation
- Compute Utility
  - Tian Di Ren 3-Tier Arch