Personal Cloud Computing

Monica Lam, Stanford University

Seok-Won Seong, Sudheendra Hangal, Chris Brigham, Debangsu Sengupta, Greg Bayer, Jiwon Seo, Matthew Nasielski, Michael Fischer, Ben Dobson
Opportunity for a Clean-Slate Approach

mainframe → mini → workstation → PC → laptop → phone

10x cheaper, 10x more users
Convergence of CE, PC, phone & Networks

- Computation
- Internet
- Media
- Games
- Communication
Tian Di Ren (Heaven-Earth-Man) 3-Tier Architecture

My key, cache, window into my digital ID, digital personality, digital 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
Background: First Approximation

- NSF-funded Stanford Collective project, Moka5
- LivePCs: managed virtual machines in the cloud
- PCs: generic computing platform
- Phone: mobile access, write-through cache, network accelerator
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, Zinth, 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, difficult to scale
The Omniscient Monopoly

In year 2024 ...
WILL MYFACE’S IPO MEET THE DEMAND?
Safe Harbor
How Longshoremen Keep Global Wind At Their Backs
As Trade Soars, Union Workers Prosper by Staying Up With Technological Change

Threat of a Day Without Ports

BY ANNE MARIE SUGG

Charleston, S.C. - Next week, a union of longshoremen will celebrate its 100th anniversary, and union leaders say they are as strong as ever. The union has 100,000 members in the U.S. and Canada, and it is one of the largest and most powerful labor unions in the world.

But for the longshoremen, the threat of a day without ports is a real possibility. The union is facing a number of challenges, including the increasing use of automation and technology that could lead to job losses. The union is working with lawmakers to ensure that new technologies do not put workers at risk.

What's News

Business and Finance

World-Wide

Hugh O'Neil: in 2002, he created the basic concept of MySpace

Direct Marketer Succeeds in Hostile MyFace Takeover Bid

By STEPHEN PAGAN WRIGHT

Two months ago, Buacht and Lulu Inc., a social networking site, announced that it would acquire MyFace, a similar site. Now, the two companies are working together to integrate their products and services.

Buacht's CEO, John Smith, said that the acquisition will allow the company to expand into new markets and offer more features to its users. He also said that the acquisition will help the company to lower its costs and increase its profits.

MyFace's CEO, Jane Doe, said that the acquisition will give her company access to new technologies and resources. She also said that the acquisition will help her company to expand its customer base.

The acquisition has been met with mixed reactions. Some analysts have said that the acquisition is a strategic move that will benefit both companies. Others have said that the acquisition is a risky move that could backfire for both companies.

Buacht and MyFace have been working closely together since the acquisition was announced. They have already released a new product that combines features from both sites.

Now, It's Models Who Are in Vogue

Fashion's pendulum swings back amid 'celebrity fatigue'

Marketplace

| THE WALL STREET JOURNAL |
| WEDNESDAY, JULY 28, 2024 |
| VOL. CXXLVIII NO. 21 |
| $19.90 |
MyFace bailout plan fuels debate

The Federal Reserve's unprecedented intervention on behalf of MyFace was intended to ease fallout from the credit crunch, but experts fear it augurs more government bailouts as the crisis worsens developing story.
BREAKING NEWS
ALL MYFACE DATA LOST AS DIRECT MAIL COMPANY FILES FOR BANKRUPTCY
What’s happening today ...

Police use Facebook to nab burglar

Wed Jan 14, 11:30 am ET

Apple blocks competitive products from iPhone App Store--surprised?

September 13, 2008 4:58 PM PDT

The Very Curious Microsoft–Facebook User Data Relationship

by Michael Arrington on November 14, 2008

100 Comments
Social Networking 2.0

Distributed social networking infrastructure
• Maintenance-free home servers, part of an ISP service
• Technically more scalable, but more complex

Design goals
• Data privacy
  – Separate data ownership from storage & app provider
• Competitive and practical
  – Convenient
    – Interoperates with existing services, enables easy migration
• Better usability
PrPl Personal Cloud Infrastructure
The PrPl Infrastructure

Person-Centric Social Networking

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

Distributed social networking
- Fine-grain access control
- Egalitarian: data privacy, scalability

High-level programming
- Location-agnostic semantic query
- Generic data navigation system
System Architecture

PrPl Applications
- Collective Memory
- Phone Book
- Movie Card
- Social Reviews
- Personal Feeds

Blobs
- SpARQL query

Personal-Cloud Butler
PrPl Semantic Index

Data Stewards
- Phone
- Laptop
- Home Server
- imap
- Google
- Yelp
- Facebook

Friend’s Personal Butler
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
  – Provides plausible deniability
Uber Phone Book

Combines information from: Gmail, iPhone, Facebook

100 lines of code
Collective Memory

Coherent, real-time view of photos from many users
550 lines of code
Filters Yelp information with personal friends list
580 lines of code
Personal Feeds

Real-time feeds from friends
No central server
480 lines of code
Movie Card

Suggests movie dates
  – Friends’ calendars
  – Movie schedule

620 lines of code
Resistance is Futile?

• To provide a choice
• To educate the public
• To provoke a response
Applications requiring privacy
  – Health care, finances
  – Blind date

Marketing based on whole personal digital history
  – Client-based targeted marketing
  – Market research: sampling of private data
Conclusion

Tian Di Ren 3-Tier Architecture
  – The Collective system

The Omniscient Monopoly

Distributed Social Networking Infrastructure
  – Person-centric versus application-centric
  – Separate applications, data storage, ownership
  – High-level programming abstraction

Monetization of Privacy