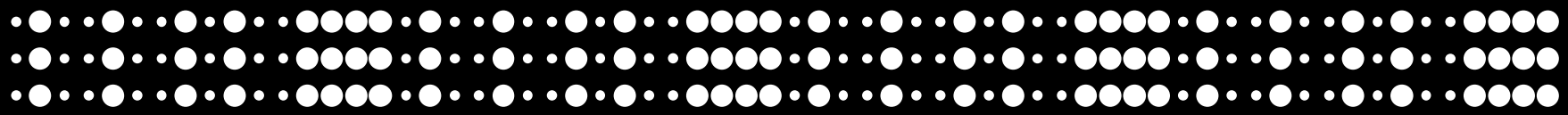
GOOGLE
I/O



Client, Connectivity, and the Cloud

Vic Gundotra
Engineering VP, Google Inc.

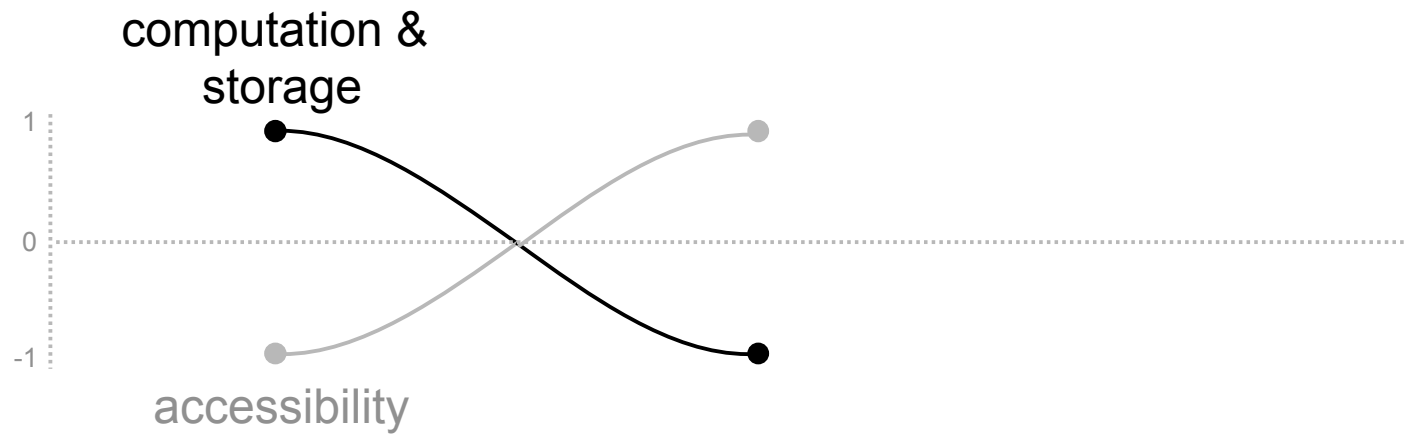
May 28, 2008

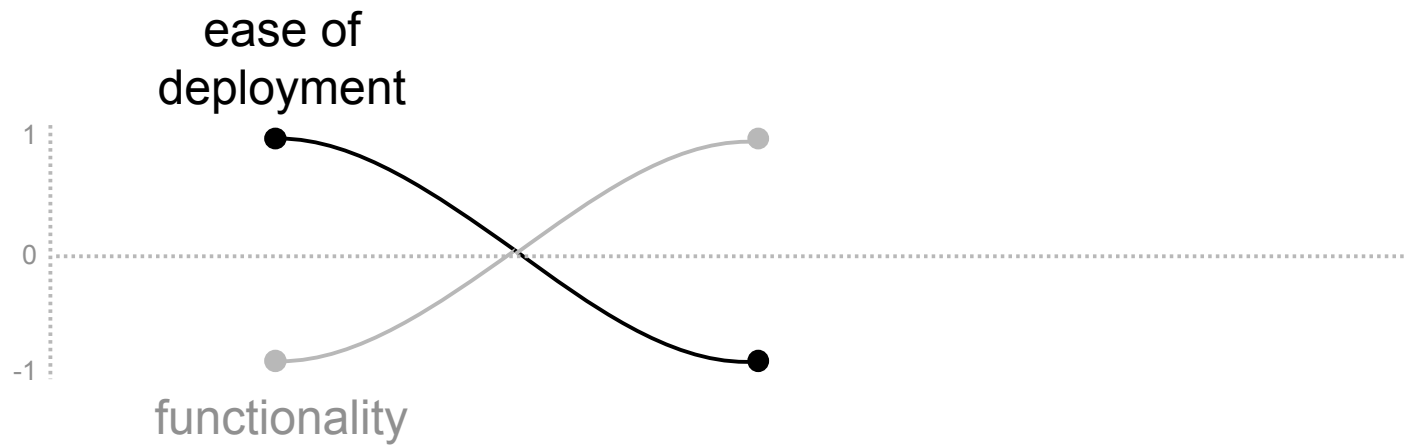
Mainframe

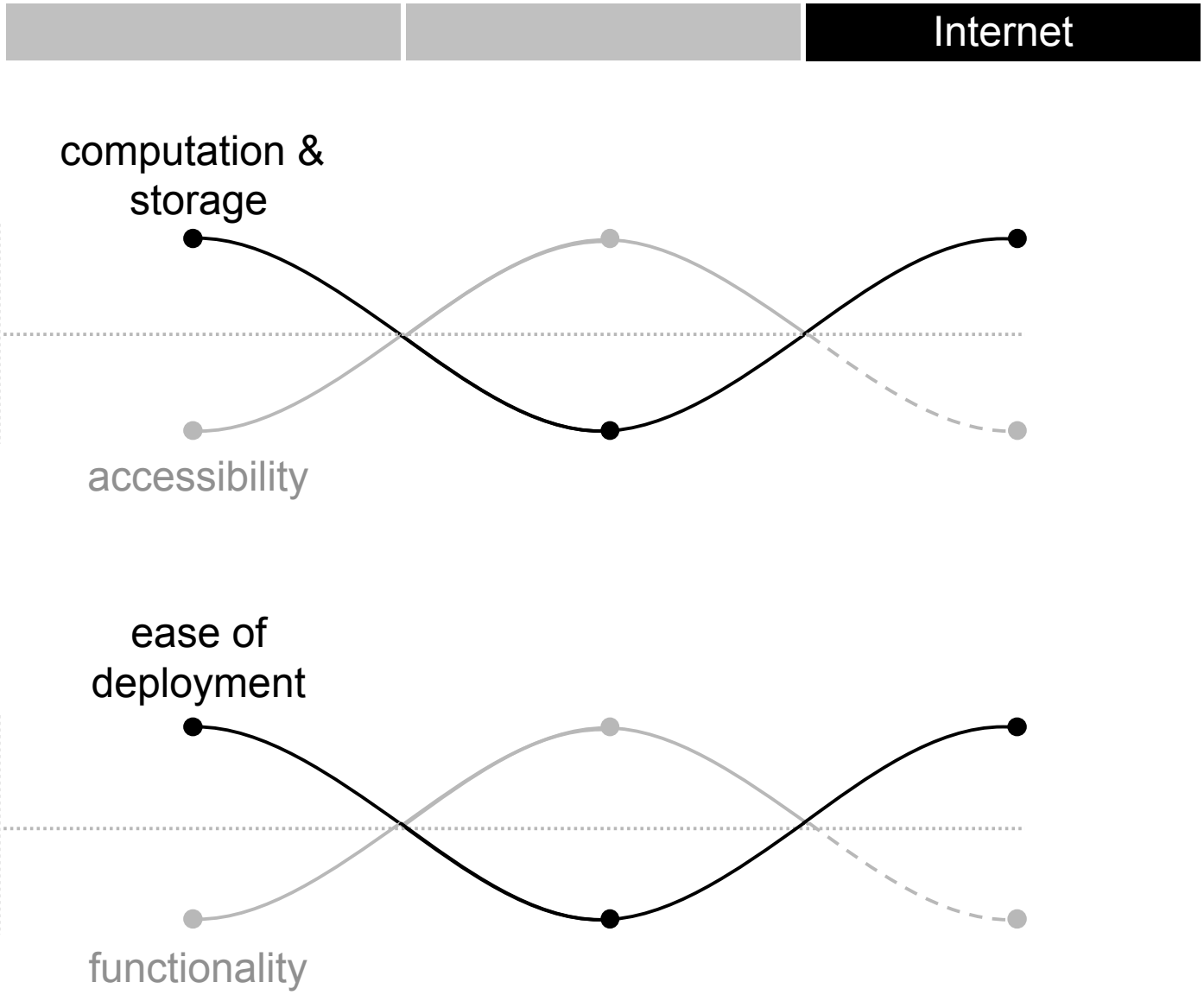
computation &
storage
1
0
-1
accessibility

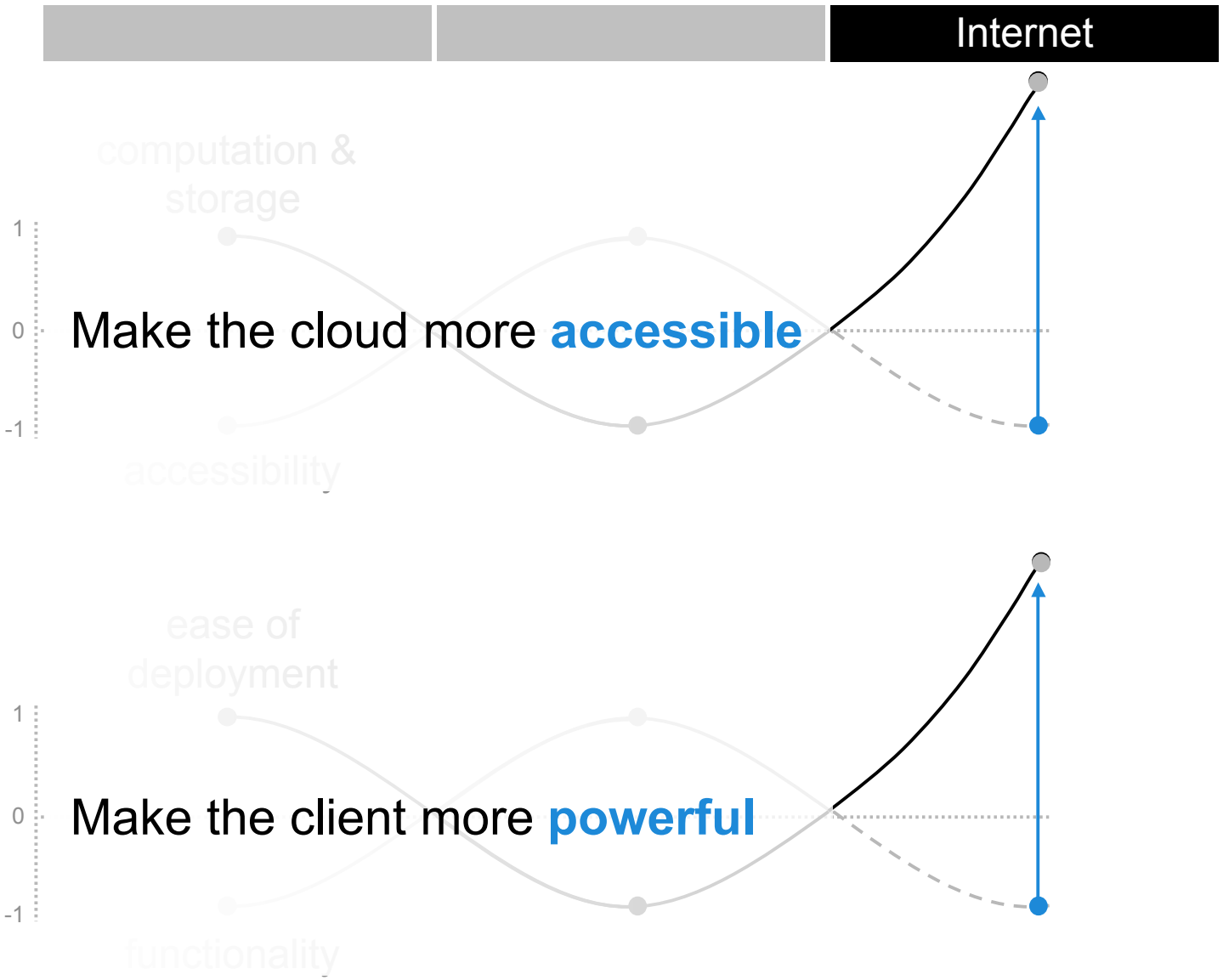
ease of
deployment
1
0
-1
functionality

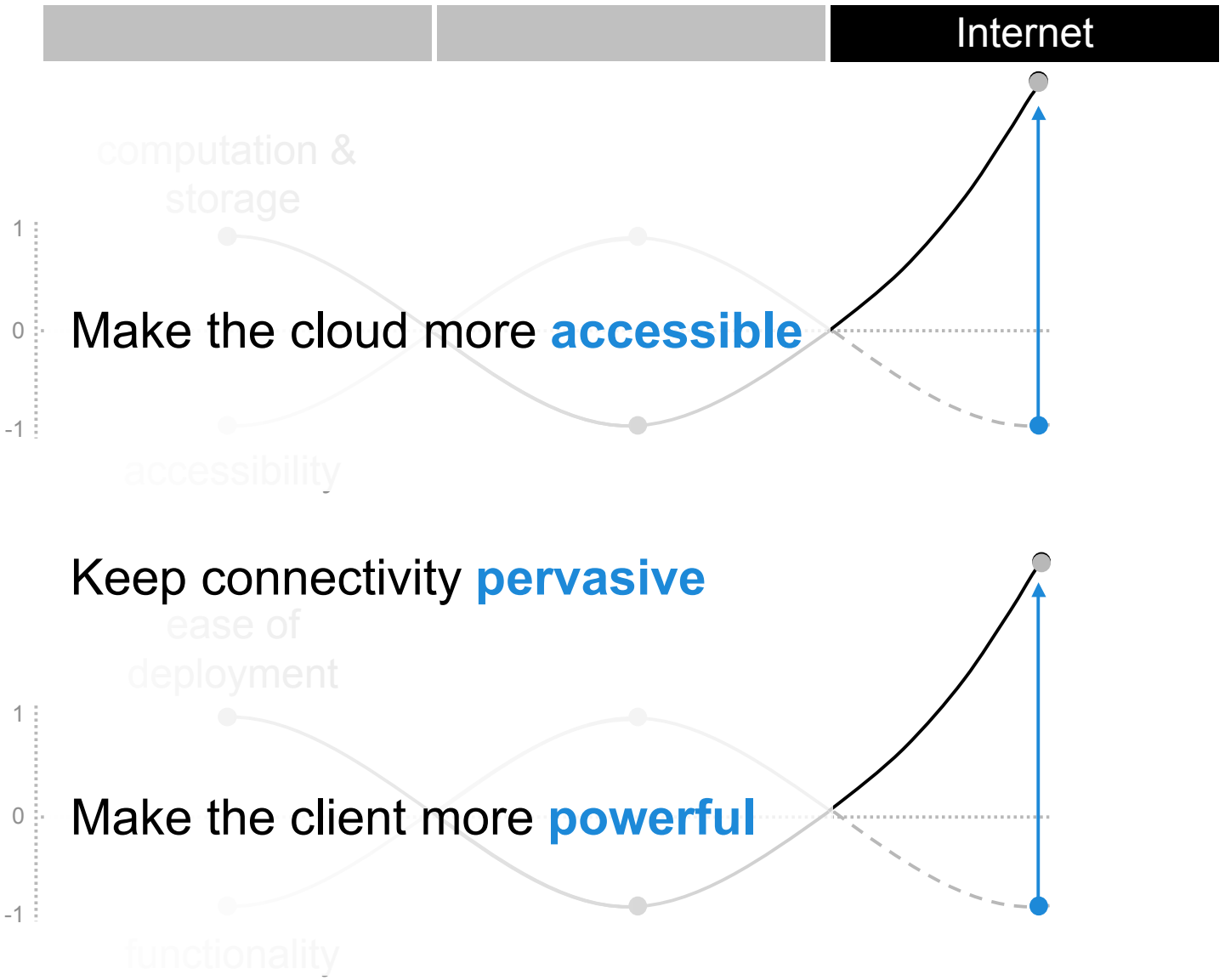
Personal Computer






Internet
computation &
storage
1
0
-1
accessibility
ease of
deployment
1
0
-1
functionality


Internet
computation &
storage
1
0
-1
accessibility
Make the cloud more accessible
ease of
deployment
1
0
-1
functionality
Make the client more powerful


Internet
computation &
storage
1
0
-1
Make the cloud more accessible
accessibility
Keep connectivity pervasive
ease of
deployment
1
0
-1
Make the client more powerful
functionality

What? Why? How?

1. Make the cloud more **accessible**
2. Keep connectivity **pervasive**
3. Make the client more **powerful**

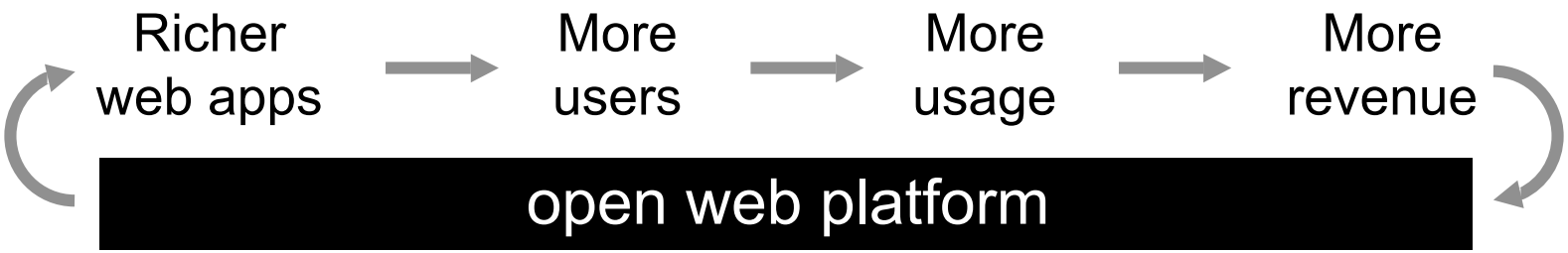
What? Why? How?

"The industry is going to develop as a partnering industry; not as a monopoly industry… likewise, [Google's] culture is one of consensus."

innovate in the open

Eric Schmidt, on the Internet and Google

What? Why? How?


Richer
web apps
More
users
More
usage
More
revenue
open web platform

What? Why? How?

Security Many devices Latency Authentication

Scalability Storage

Distribution

Internationalization Browser compatibility

Programming languages Deployment User administration

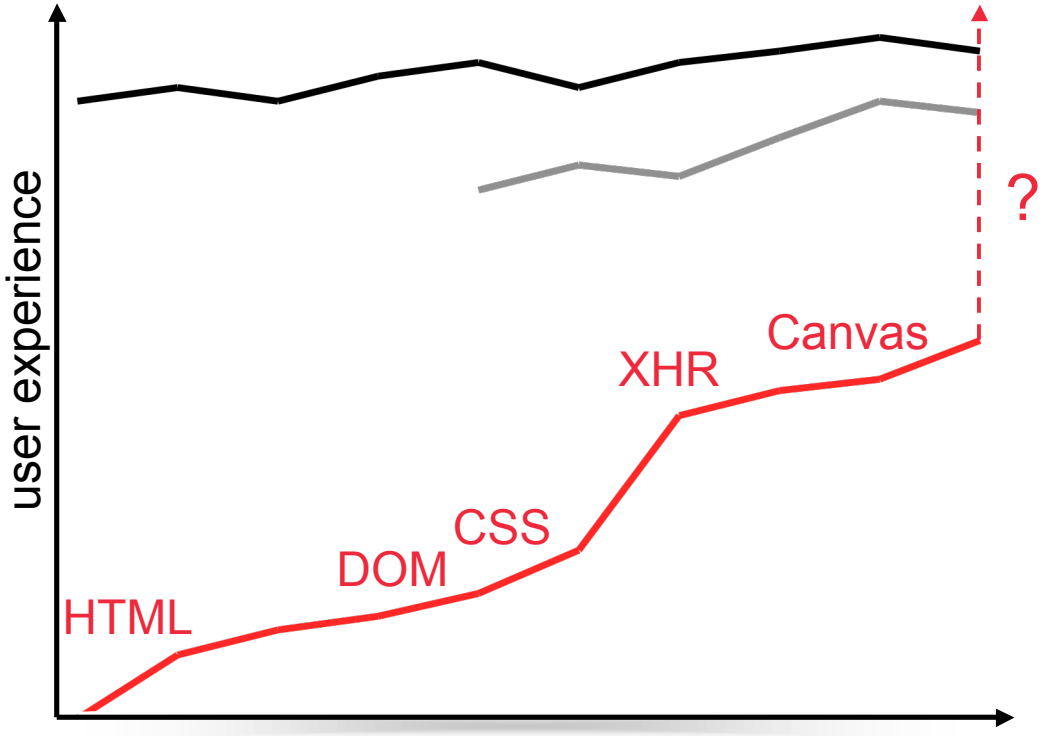
Monetization AJAX Debugging Analytics

Client Connectivity Cloud

make it more powerful

User Experience

Proprietary Platforms v. Open Web



native (windows, OS X)
flash, air, silverlight
open web

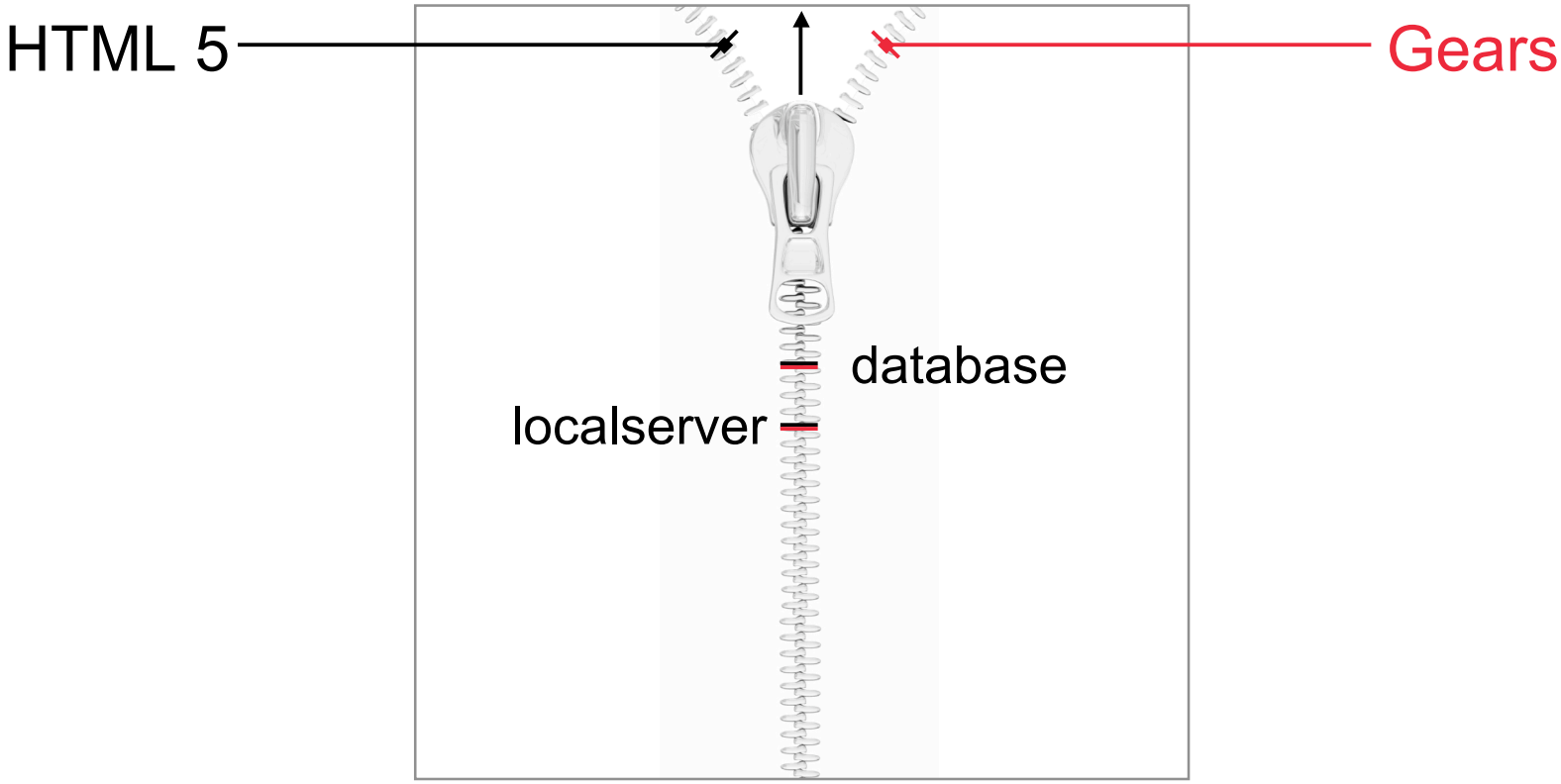
Gears

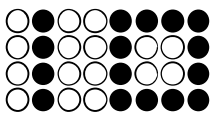
Extending the Browser – Enabling Rich Web Apps

- LocalServer: offline access
- Database: local, relational DB
- WorkerPool: asynchronous threads

Gears

Standards-Driven and Open Source





Allen Hurff, Engineering SVP

MySpace

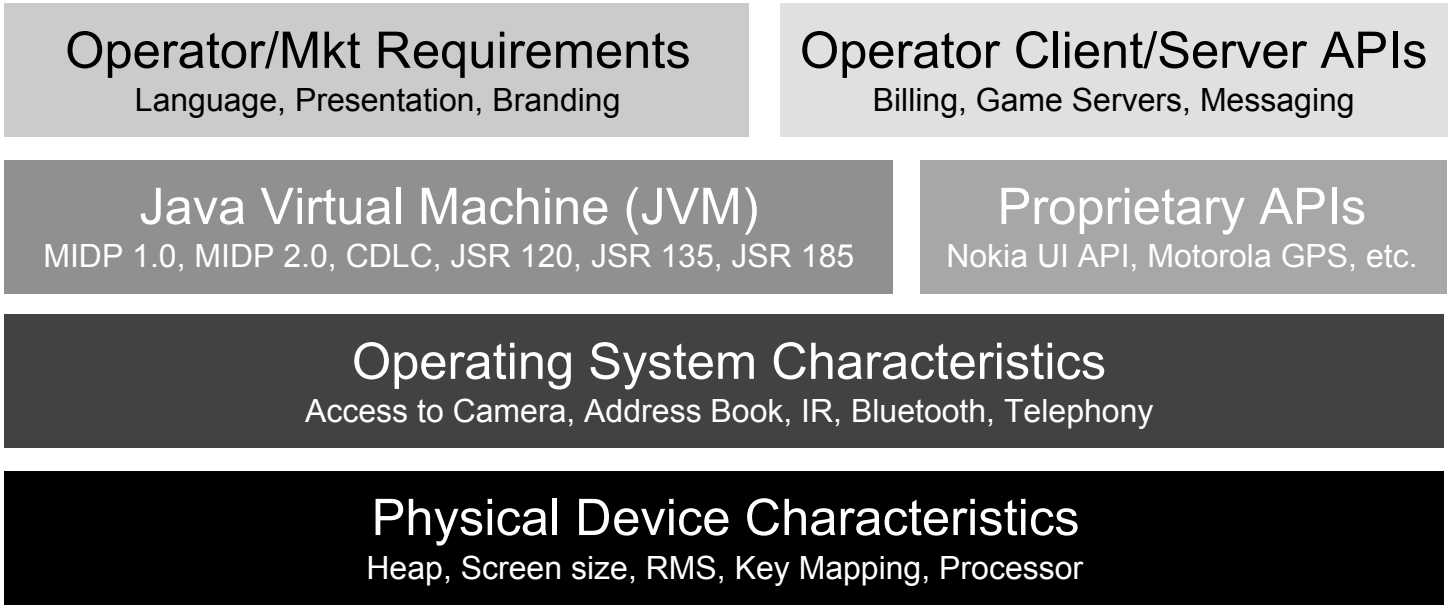
MySpace Mail

Powered by Gears

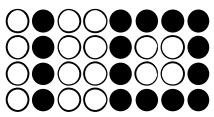
- Available to everyone today!
- Committed to open web standards
- Technical session with Owyn Richen, Wed 3-4pm

Client Connectivity Cloud

keep it pervasive



(JavaWorld.com, 2004)



Steve Horowitz, Engineering Director

Android

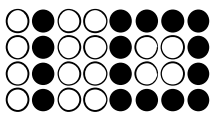
Android

Opening Up the Mobile Software Stack

- Open source mobile platform & key applications
- WebKit browser
- Raise the bar of baseline mobile functionality

Client Connectivity Cloud

make it more accessible



Kevin Gibbs, Tech Lead
Google App Engine

Google App Engine

Running Web Apps on Google's Infrastructure

- Fully-integrated application environment
- Python Runtime
- Free quota of 5M pageviews per month

code.google.com/appengine

Google App Engine

Technical Challenges

Google App Engine

Financial Challenges

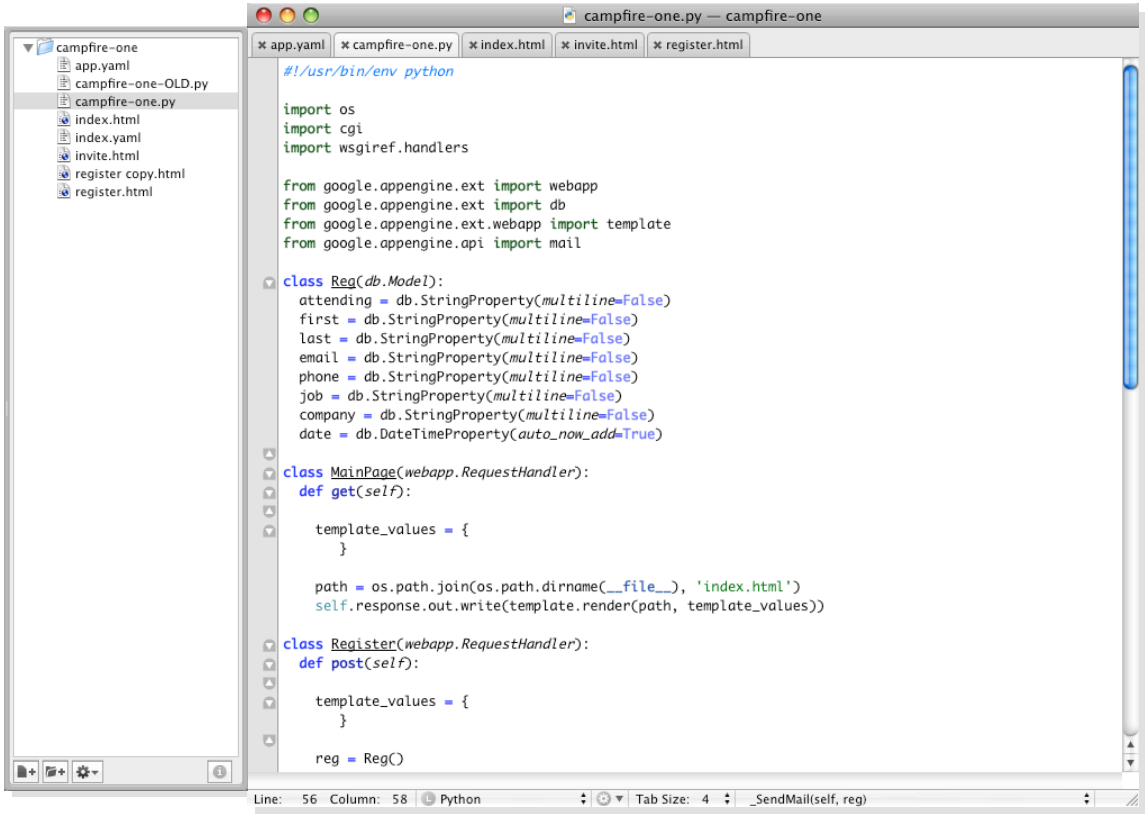
Google App Engine

Administrative Challenges

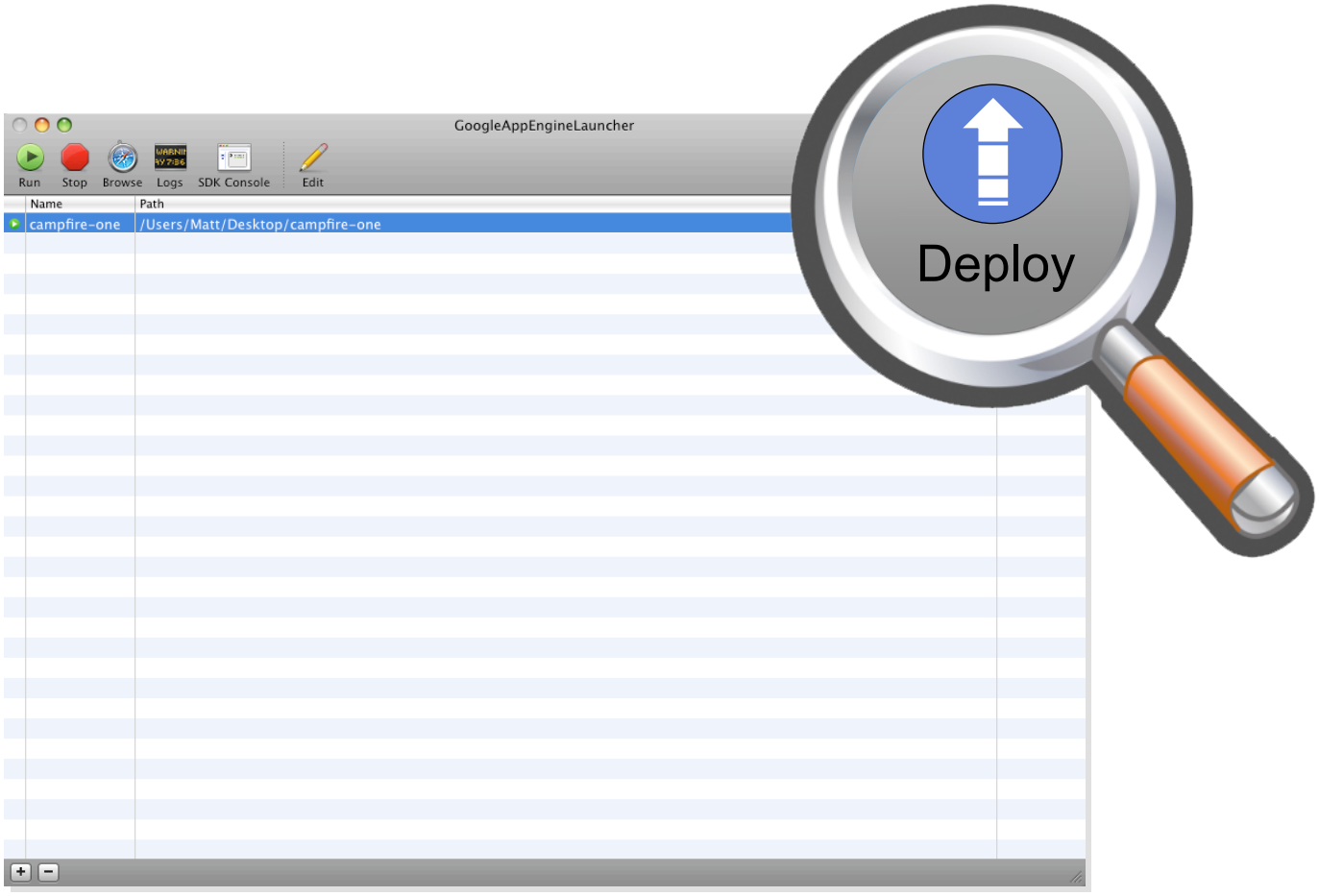
Google App Engine

Easy to Start, Easy to Scale

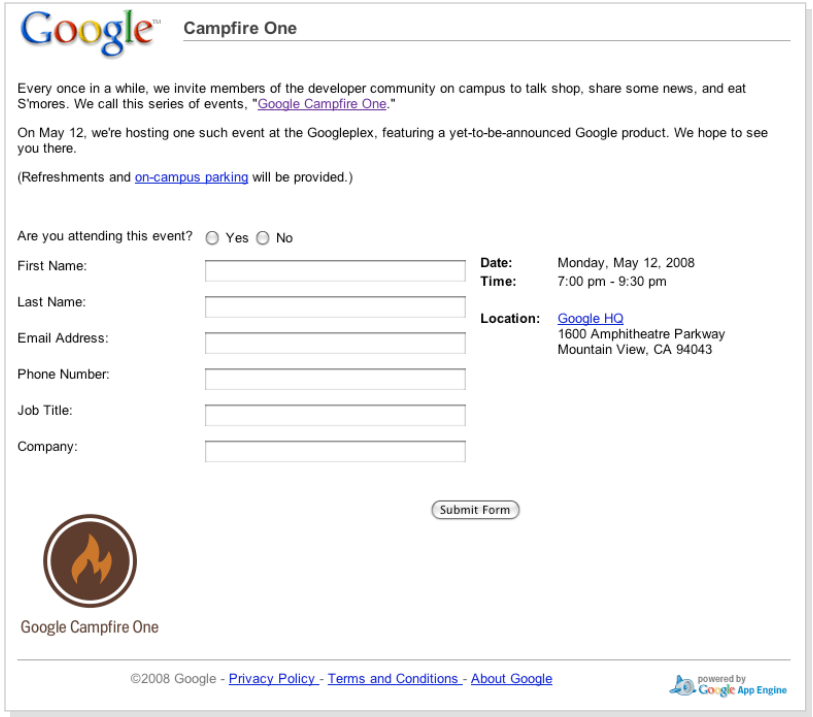
Develop locally. Deploy to Google. Launch.

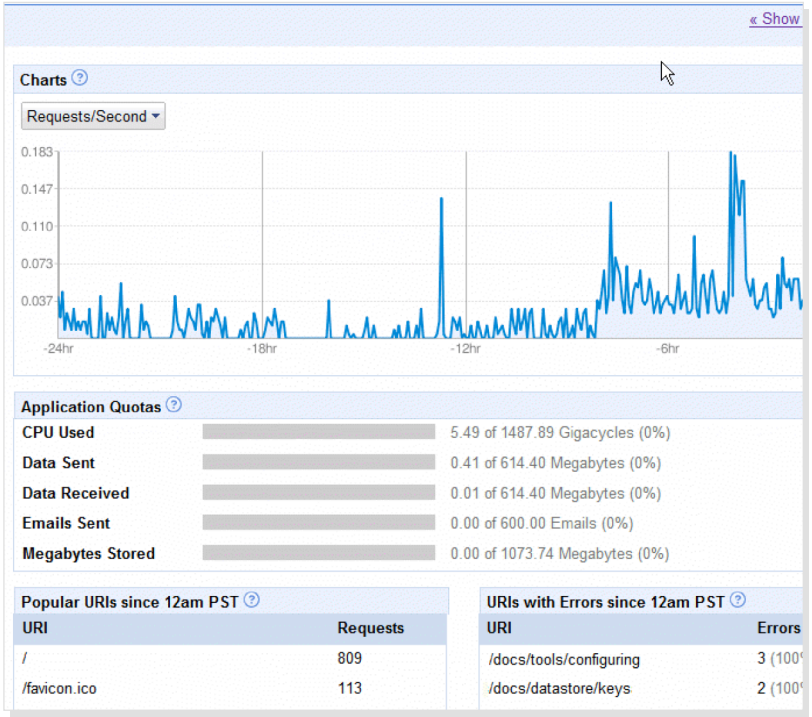


Develop locally. Deploy to Google. Launch.



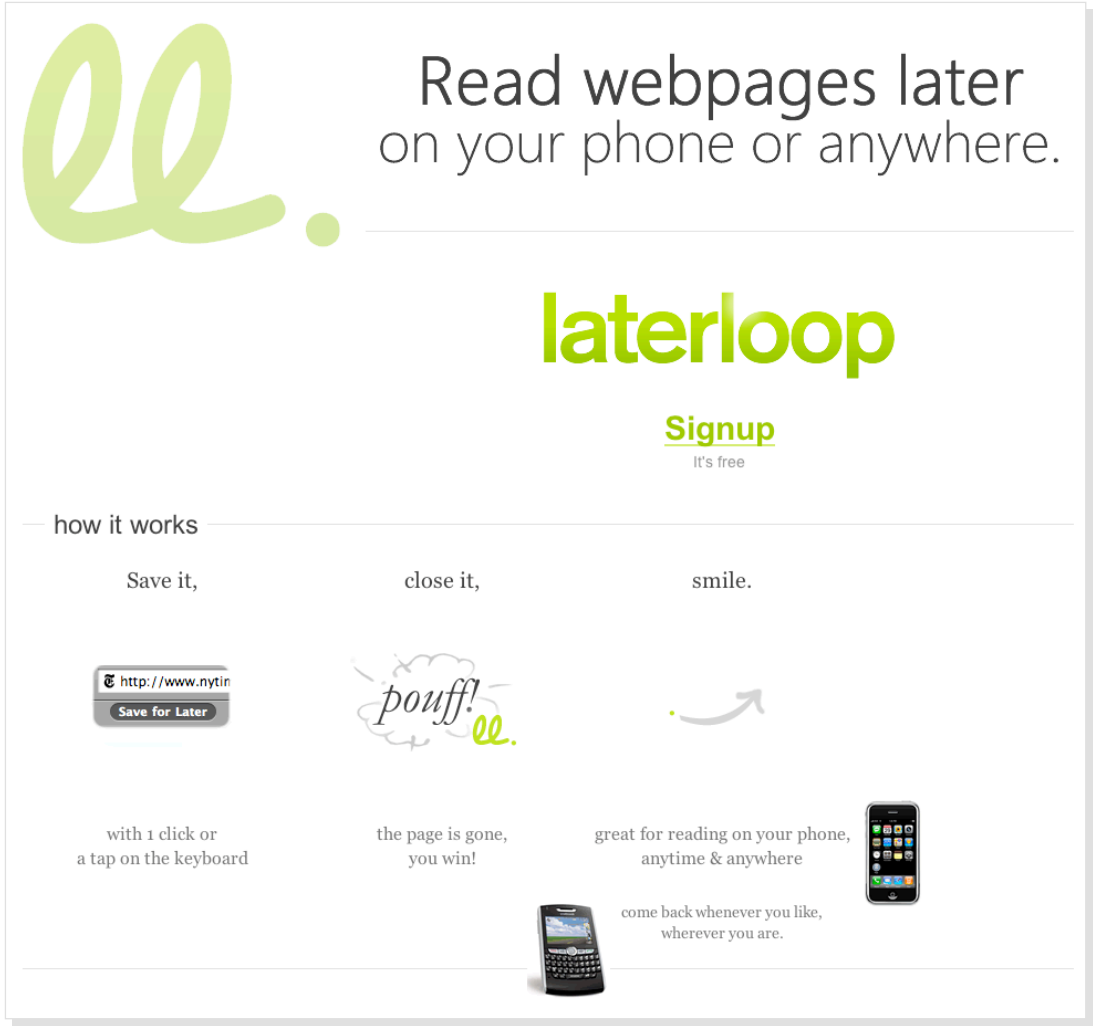
Develop locally. Deploy to Google. Launch.





TweetWheel

Find out which of your Twitter friends know each other!


Read webpages later
on your phone or anywhere.
laterloop
Signup
It's free
how it works
Save it,
close it,
smile.
http://www.nytin
Save for Later
pouff!
with 1 click or
a tap on the keyboard
the page is gone,
you win!
great for reading on your phone,
anytime & anywhere
come back whenever you like,
wherever you are.

Google 寻找灾区的亲人 谷歌

Login

浏览名单 (信息按原样提供，仅供参考，Google未作任何核实)

搜索

名单表： 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

姓名	性别	年龄	联系电话	家庭住址	单位	受伤情况	其他补充信息	医院	科室	医院取
任雪欧	男	None	None	平武南坝小学（南坝街上）	None	None	520医院	None	None	None
任雨龙	男	80	None	北川内古	None	None	南河体育中心G11	None	None	None
任长会	女	56	None	绵竹武都4队	None	全身外伤	None	None	外科四楼骨科	None
任钢举	男	13	None	什邡龙居镇天宫村10组	None	None	None	成都医学院第一附属医院	None	028-83
任远飞	男	18	None	北川内古	None	None	南河体育中心G11	None	None	None
任远群	女	40	None	北川擂鼓	None	None	南河体育中心G15	None	None	None
任远真	男	13	None	北川内古	None	None	南河体育中心G11	None	None	None
任远效	女	None	None	None	None	腰伤	None	绵阳市中心医院	None	院办
任远华	女	38	None	None	None	None	南河体育中心西三区	None	None	None
任远军	男	50	None	北川内古	None	None	南河体育中心G11	None	None	None
任辉	女	None	None	None	None	None	None	广元第二人民医院	None	None
任足祥	男	None	None	擂鼓麻柳湾四组	None	None	绵阳市九洲体育馆	None	None	None
任超	男	35	None	北川开坪	None	None	南河体育中心F	None	None	None
任超	男	17	None	北川羌族自治县擂鼓镇麻柳湾村七组	None	None	绵阳九洲体育馆30区	None	None	None
任超	男	None	None	None	高1.6班	None	None	None	None	None
任贵湘	男	41	None	小坝	None	None	绵阳九洲体育馆31区	None	None	None
任财旺	男	12	None	北川新街村三组	None	None	绵阳九洲体育馆四区	None	None	None
任衣图	男	None	None	曲山镇新街回龙社区	None	None	绵阳九洲体育馆08区	None	None	None
任虹羽	男	None	None	北川县陈家坝羌族乡大竹村三组	None	None	绵阳市九洲体育馆	None	None	None
任薛霖	男	None	None	茅坝	None	None	绵阳市九洲体育馆	None	None	None

下一页>>

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“We got a prototype of our new ‘Pix Chat’ OpenSocial app running in App Engine and the Hi5 sandbox this morning. It took about 3 hours to get the app serving and our db code converted.”

Pixverse

Google App Engine

Areas of Work, Including…

- Offline Processing
- Rich Media Support (e.g., large file UL / DL)
- Add'l Infrastructure Services

Google App Engine

Areas of Work, Including… Two New APIs

- Offline Processing
- Rich Media Support (e.g., large file UL / DL)
- Add'l Infrastructure Services
- Memcache
- Image Manipulation

Google App Engine

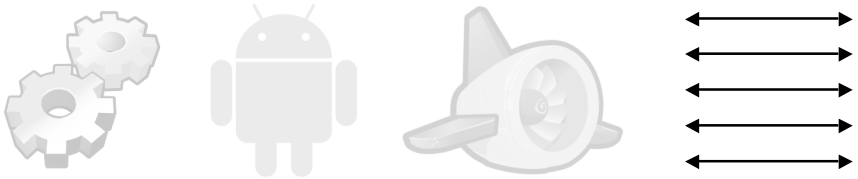
Free Quota and Expected Pricing

Resource	Free Quota	Additional
CPU	Equivalent to 5M pageviews / month for a typical app	10-12¢ / core-hour
Storage		15-18¢ / GB-month
Bandwidth, Outgoing		11-13¢ / GB transferred
Bandwidth, Incoming		9-11¢ / GB transferred

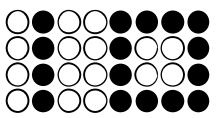
Google App Engine

Announcing Open Signups

Client Connectivity Cloud



make it more accessible

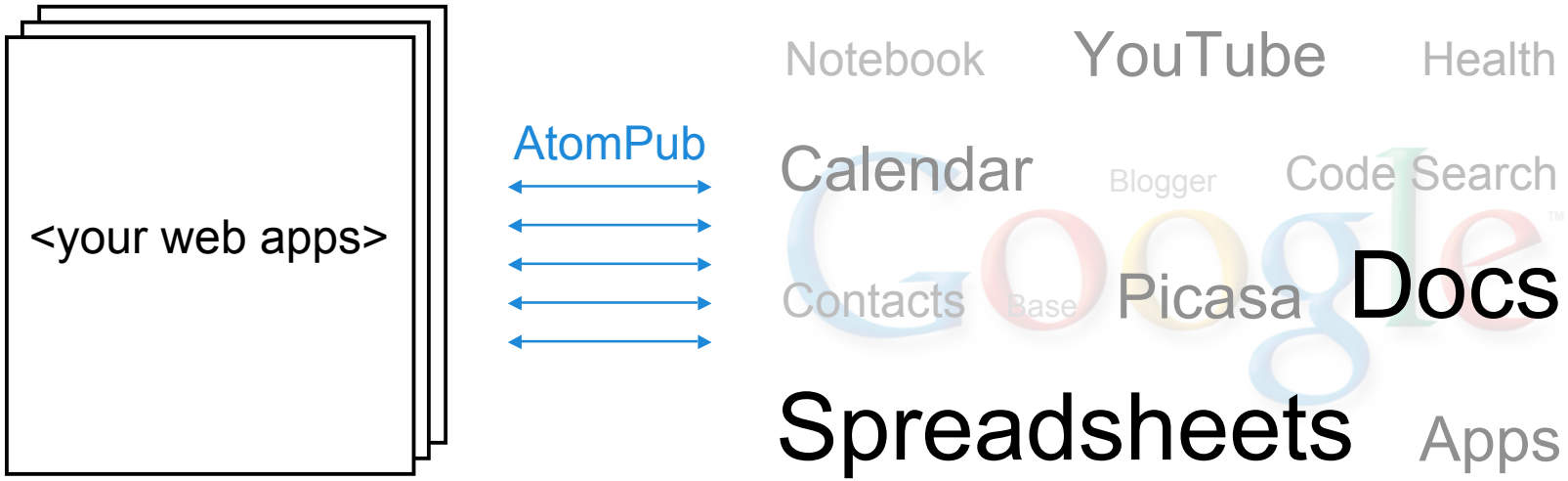


Mark Lucovsky, Technical Director

Google Data and AJAX APIs

Google Data APIs

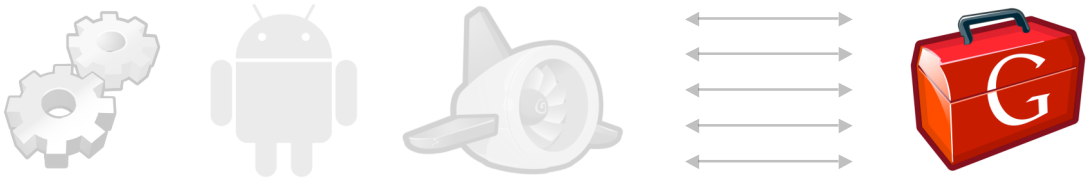
Read / Write Access To Google Services



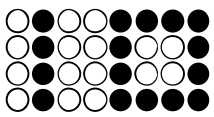
AJAX APIs and Controls

Sprinkle the Web Onto Your Applications

Client Connectivity Cloud



make development easier

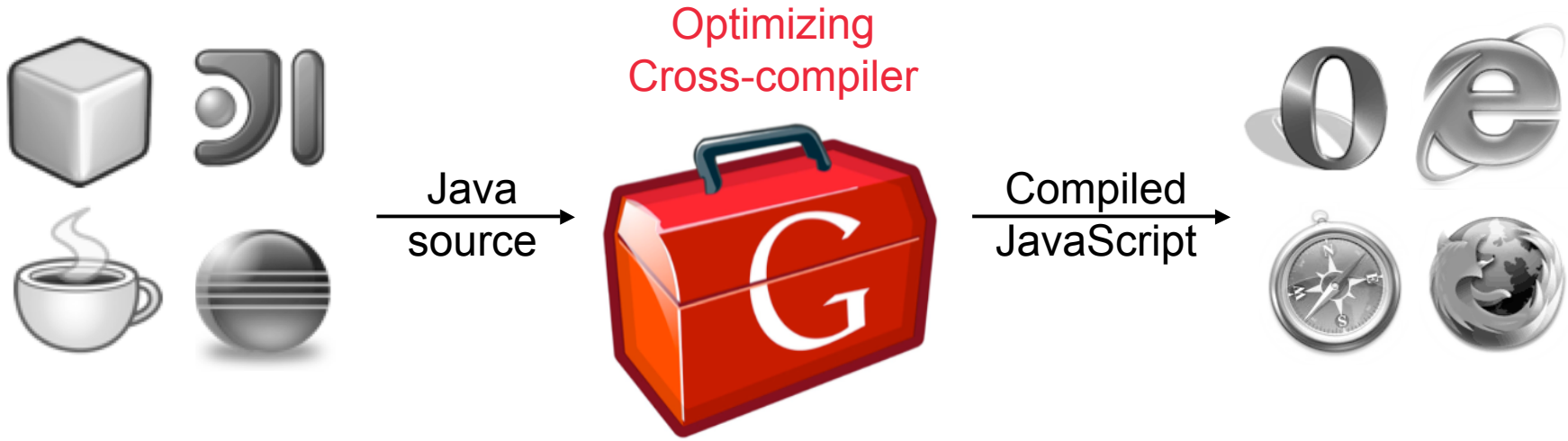


Bruce Johnson, Engineering Manager

Google Web Toolkit

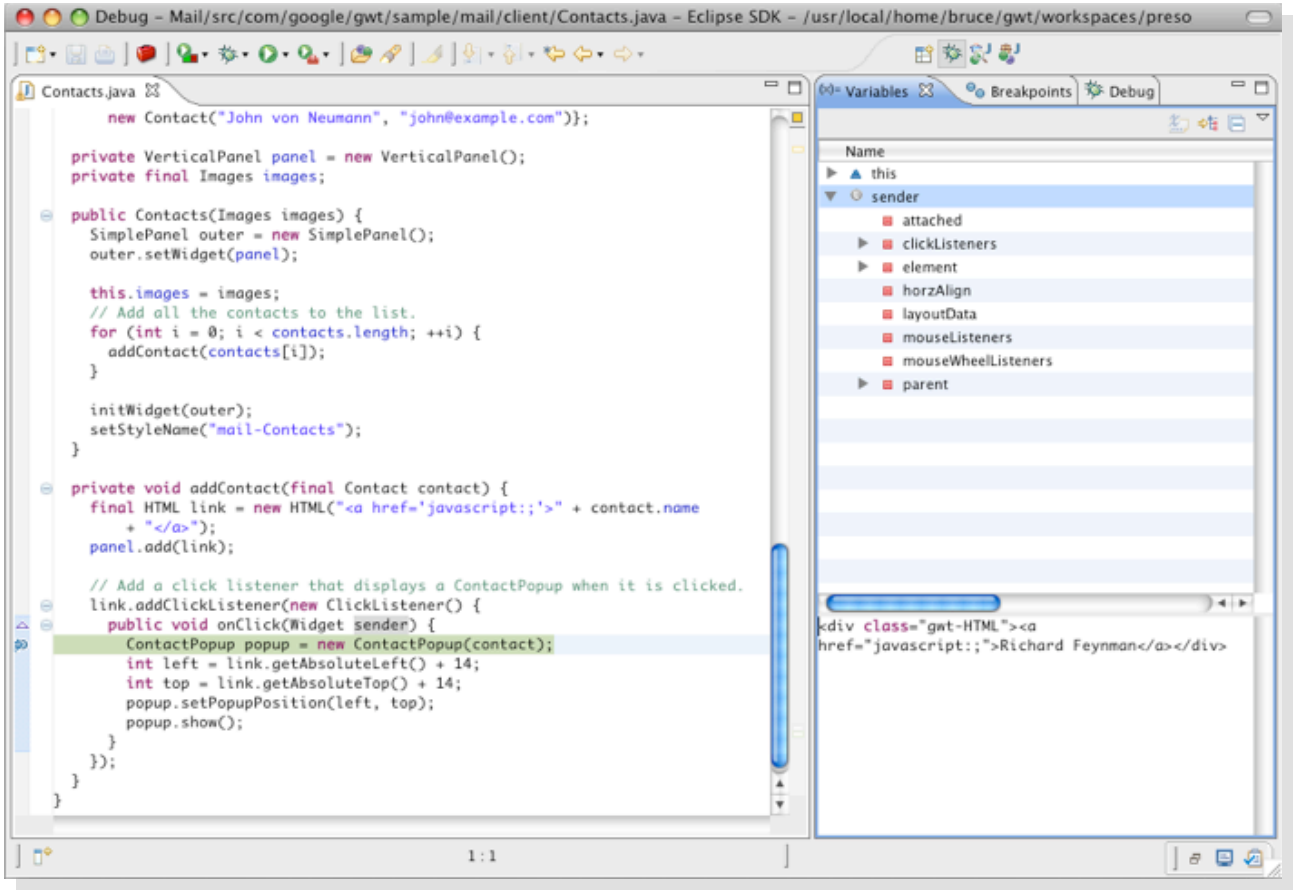
Google Web Toolkit

Java Development, JavaScript Deployment



Google Web Toolkit

Develop With <Your Favorite Java IDE>



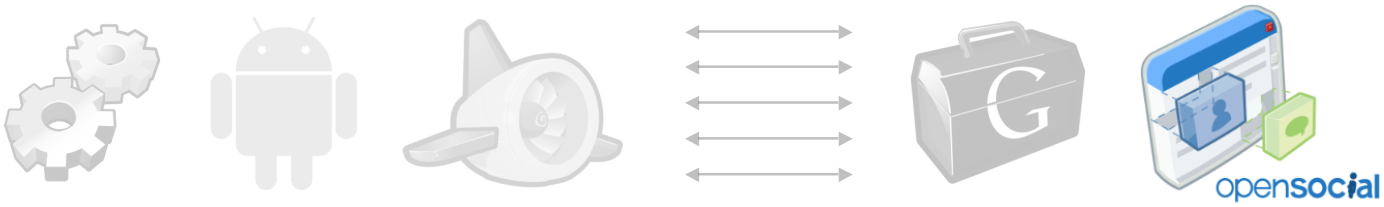
Google Web Toolkit

Announcing 1.5 Release Candidate

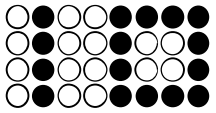
- Java 5 language features
- Performance, performance, performance

* Thank you, open source contributors!

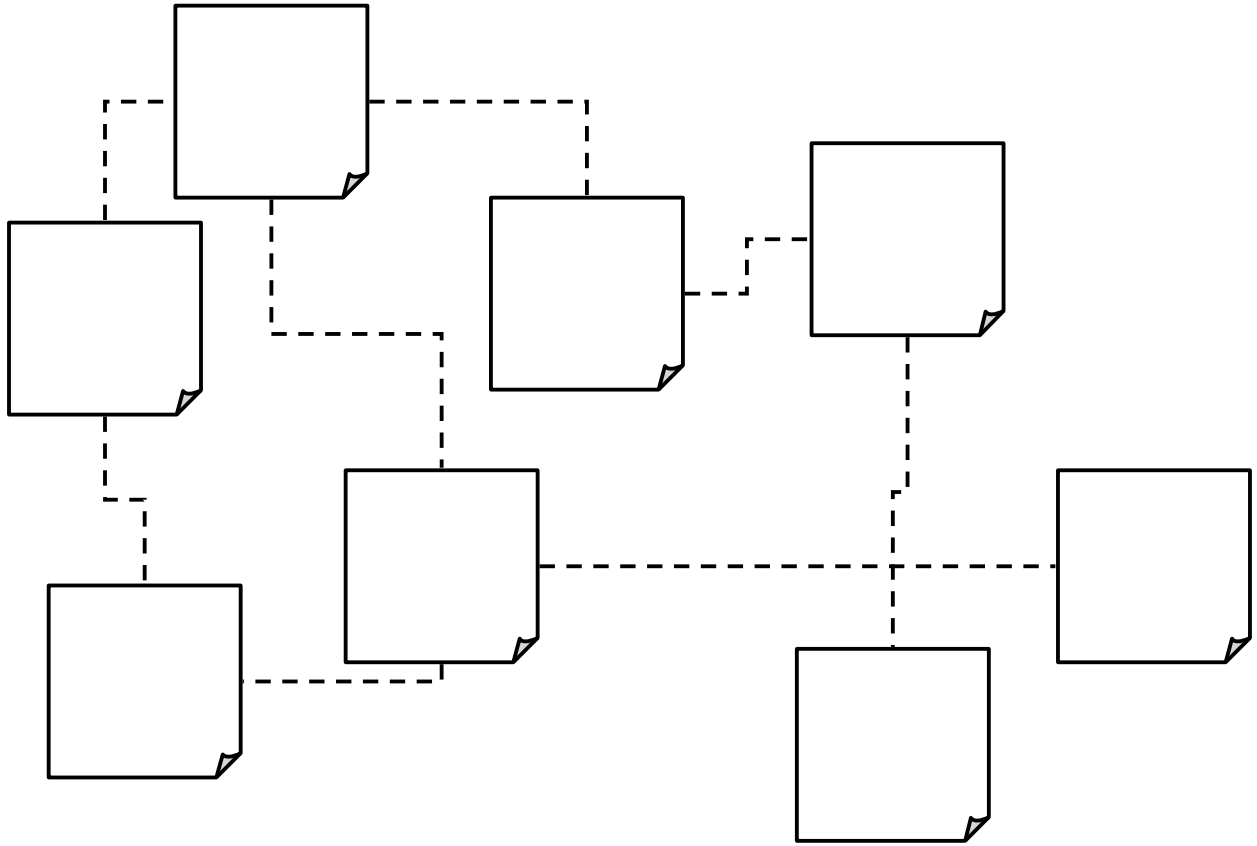
Client Connectivity Cloud

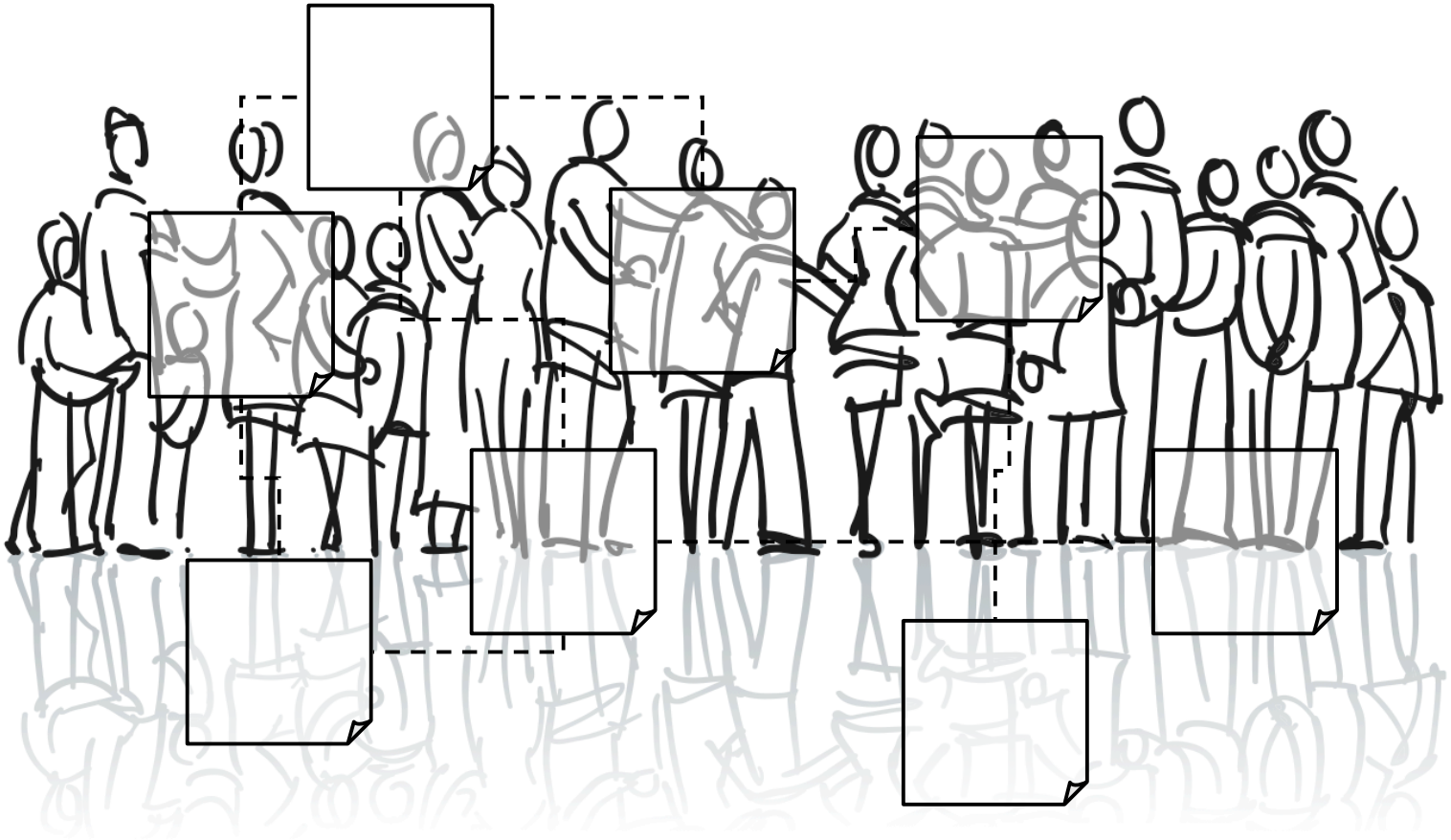


make the web more social



David Glazer, Engineering Director





“There are cries from the heart for my friendship, that relationship to another person, to transcend documents and sites.”

Tim Berners-Lee, on the “Giant Global Graph”

Identity OpenID

Authorization OAuth

Apps OpenSocial

OpenSocial

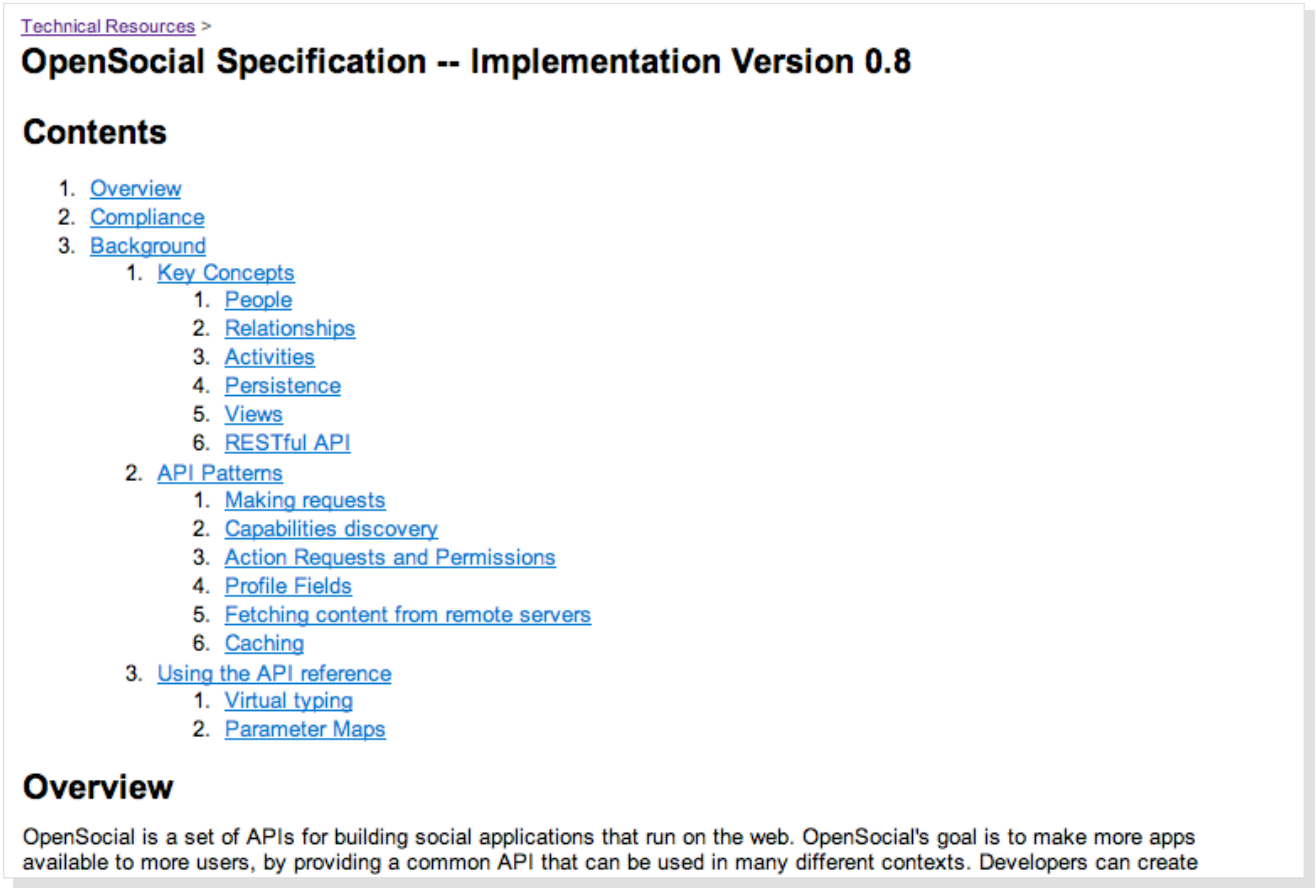
Making the Web More Social

opensocial

- A family of APIs
- A reference implementation
- A community of developers, containers and apps

OpenSocial

A Family of APIs



Technical Resources >

OpenSocial Specification -- Implementation Version 0.8

Contents

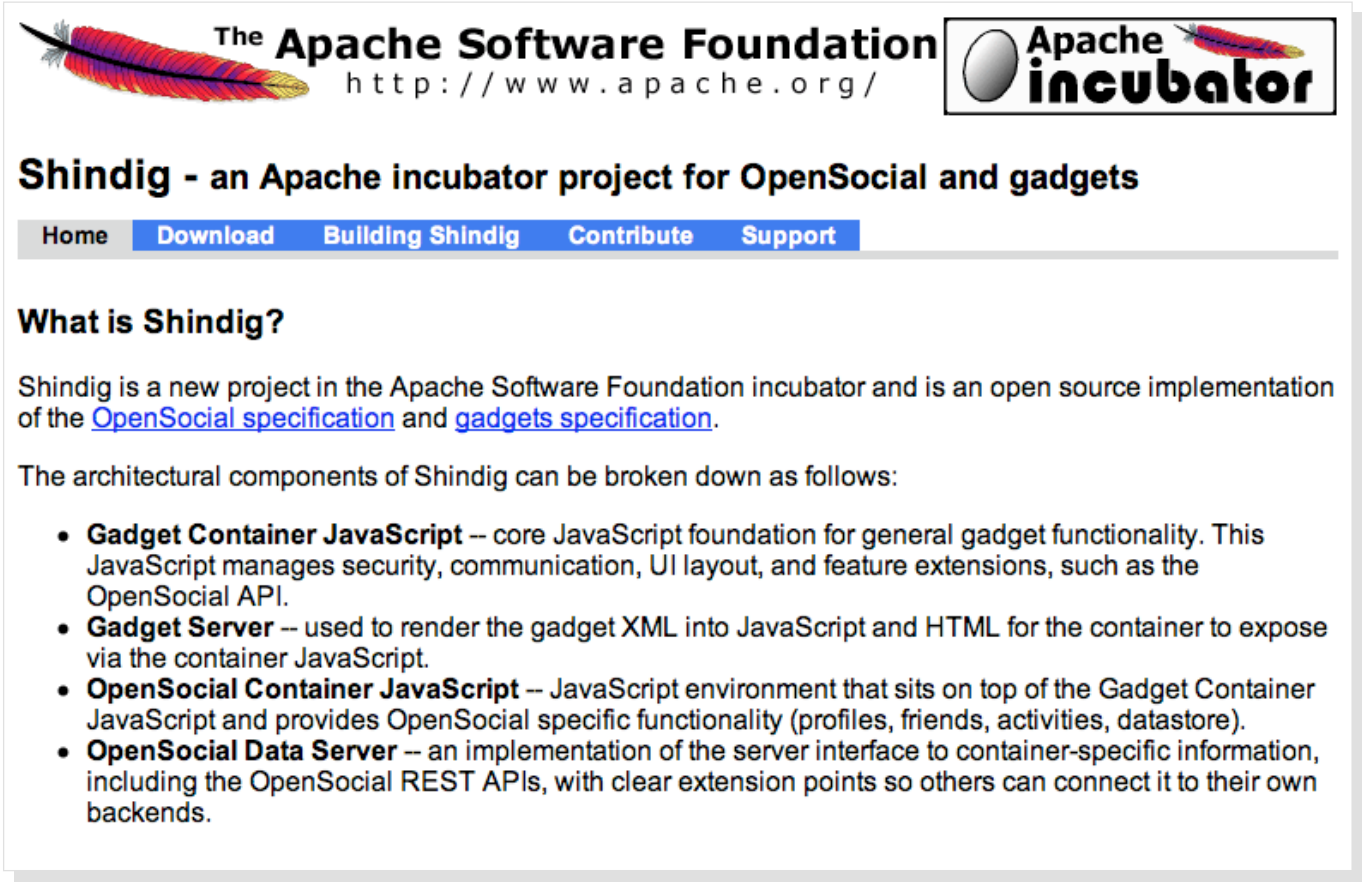
1. Overview
2. Compliance
3. Background
    1. Key Concepts
        1. People
        2. Relationships
        3. Activities
        4. Persistence
        5. Views
        6. RESTful API
    2. API Patterns
        1. Making requests
        2. Capabilities discovery
        3. Action Requests and Permissions
        4. Profile Fields
        5. Fetching content from remote servers
        6. Caching
    3. Using the API reference
        1. Virtual typing
        2. Parameter Maps

Overview

OpenSocial is a set of APIs for building social applications that run on the web. OpenSocial's goal is to make more apps available to more users, by providing a common API that can be used in many different contexts. Developers can create

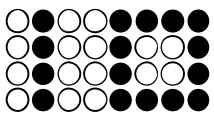
OpenSocial

A Reference Implementation



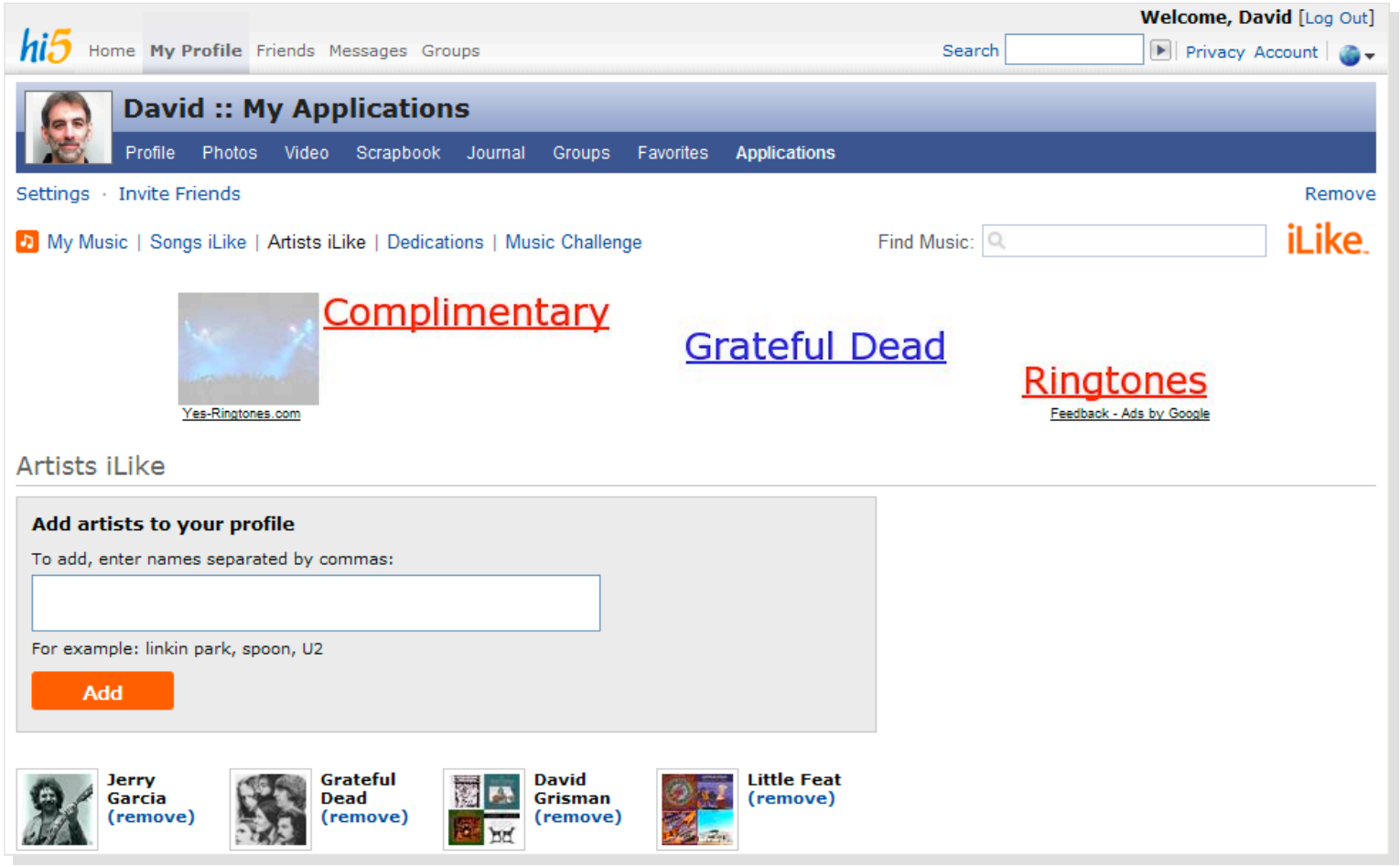
OpenSocial

A Community



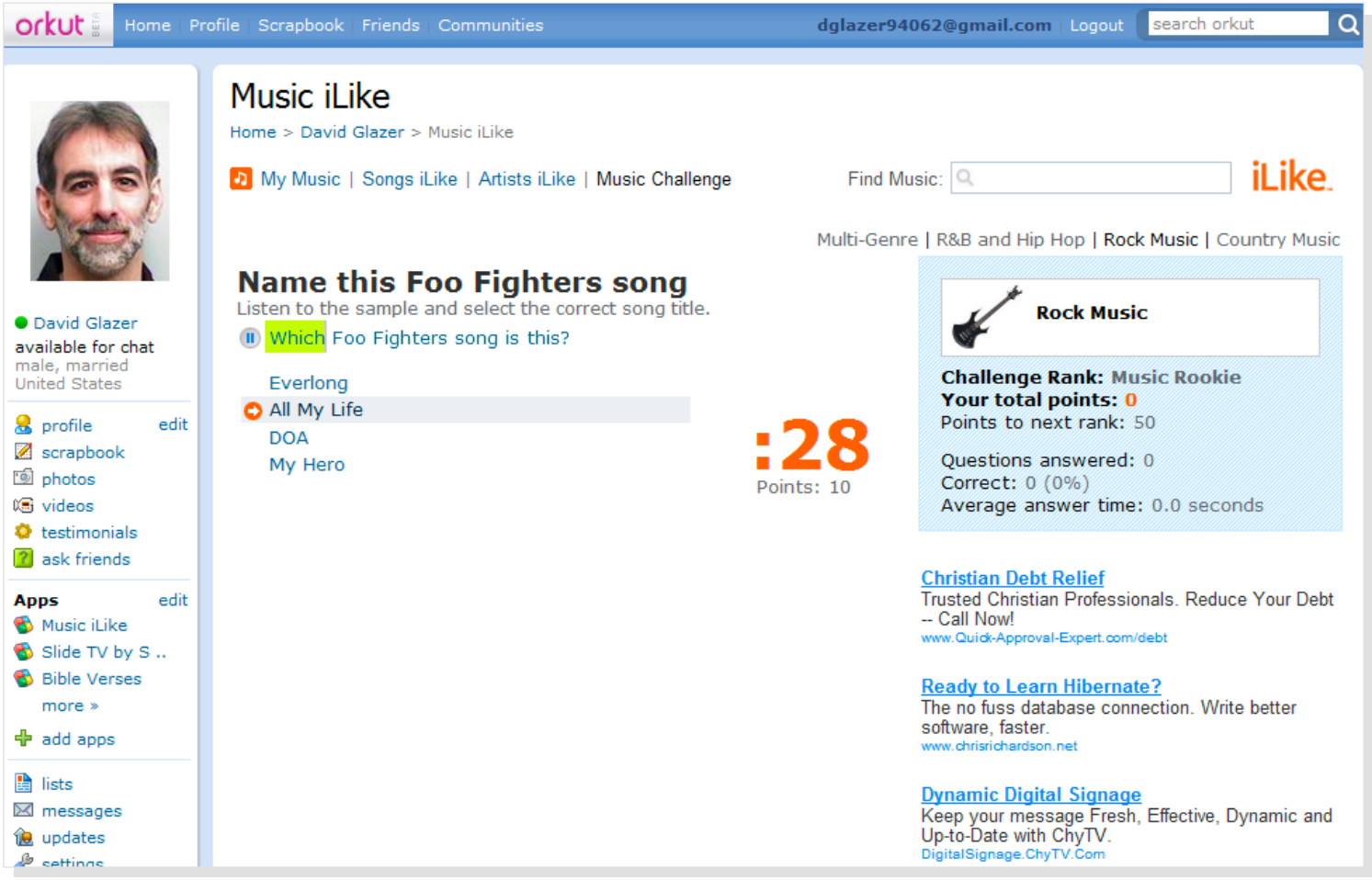
Nat Brown, CTO
iLike

iLike on hi5


Welcome, David [Log Out]
hi5 Home My Profile Friends Messages Groups
Search Privacy Account
David :: My Applications
Profile Photos Video Scrapbook Journal Groups Favorites Applications
Settings · Invite Friends
Remove
My Music | Songs iLike | Artists iLike | Dedications | Music Challenge
Find Music:
iLike.
Complimentary
Grateful Dead
Ringtones
Yes-Ringtones.com
Feedback - Ads by Google
Artists iLike
Add artists to your profile
To add, enter names separated by commas:
For example: linkin park, spoon, U2
Add
Jerry Garcia (remove)
Grateful Dead (remove)
David Grisman (remove)
Little Feat (remove)

iLike on MySpace

iLike on orkut



iLike on ingridmichaelson.com

OpenSocial

By The Numbers – November 2007

0M
total reach

0K
developers

0M
app installs

OpenSocial

By The Numbers – May 2008

275M
total reach

20K
developers

50M
app installs

OpenSocial

Container Status

OpenSocial

Container Status

OpenSocial

Container Status

OpenSocial

What's Next

- RESTful (v0.8)
- Template language

```
# Description: People API

personFeed =  element atom:feed {
( element atom:author { personConstruct
}+
  & personEntry*
  & generator
  & id
  & itemsPerPage?
  & peopleLink*
  & startIndex?
  & element atom:title { textConstruct }
  & totalResults?
  & updated    )  }
```

OpenSocial

What's Next

- RESTful (v0.8)
- Template language

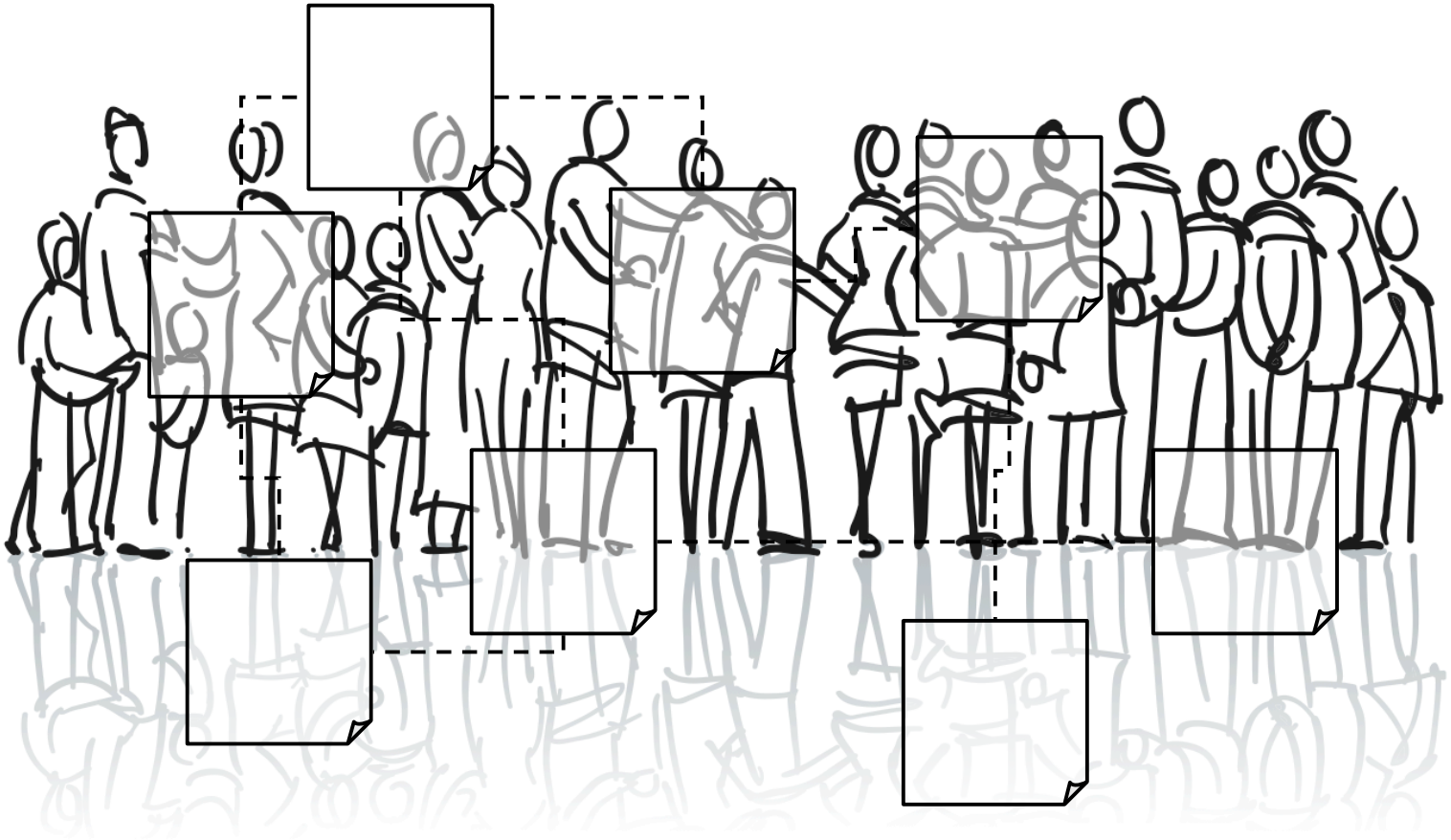
```
<Template name="my:Game">
  <os:Page>
    <os:Title>The Game</os:Title>
    <os:Body>
      <my:FriendScores />
      <my:LinkToClick />
      <my:InviteFriends />
    </os:Body>
  </osPage>
</Template>
<Template name="my:FriendScores">
  <os:Headers>
   <os:Header>Friend</os:Header>
   <os:Header>Score</os:Header>
```

Google Friend Connect

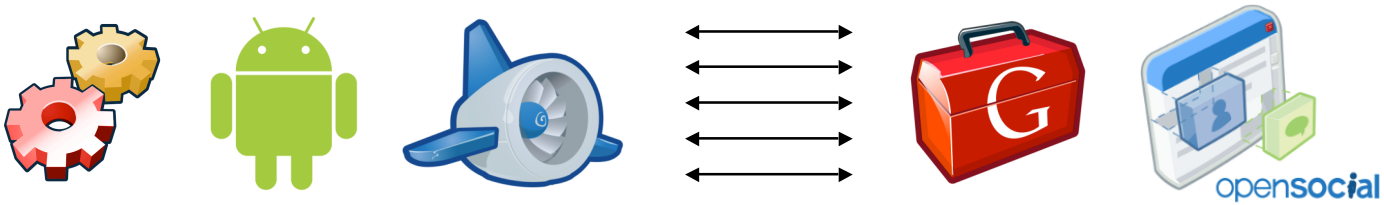
Bringing Friends to Every Website

- Built on open standards
- Copy & paste functionality
- Additional reach for OpenSocial containers and developers

google.com/friendconnect



Client Connectivity Cloud



open web platform

Thank You

vicg@google.com

GOOGLE
I/O