

Client, Connectivity, and the Cloud

Vic Gundotra
Engineering VP, Google Inc.

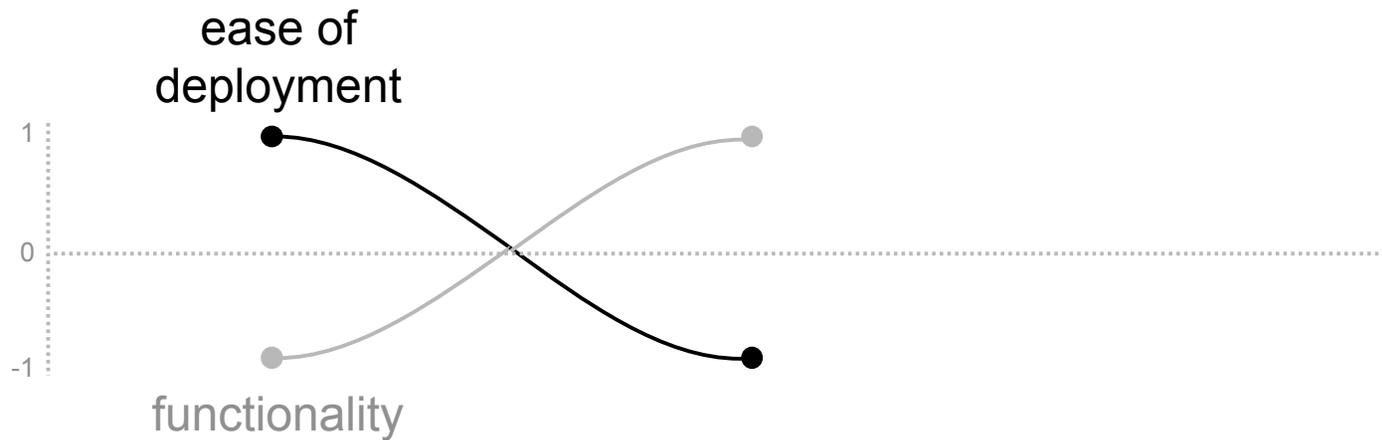
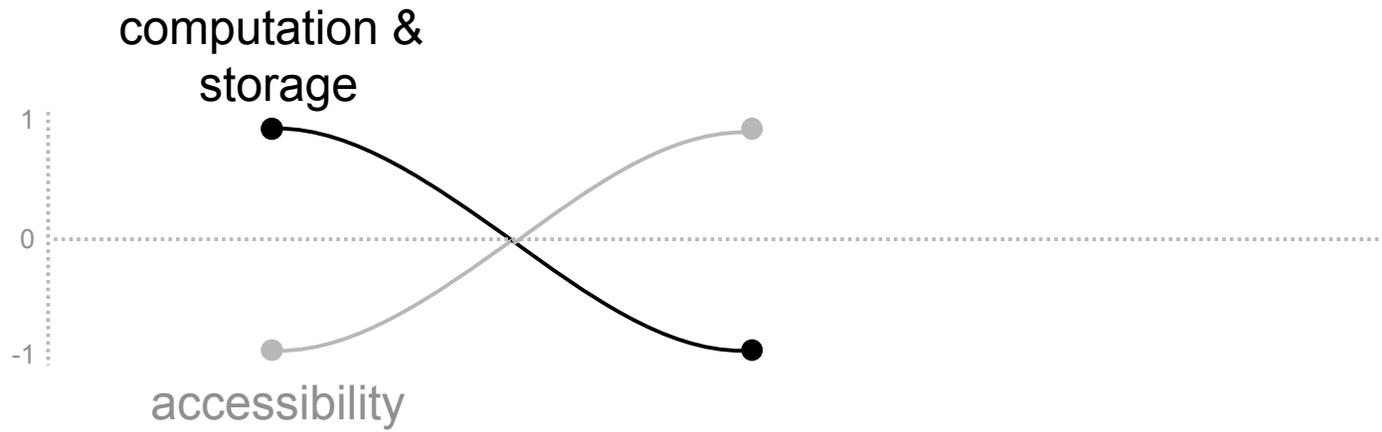
May 28, 2008

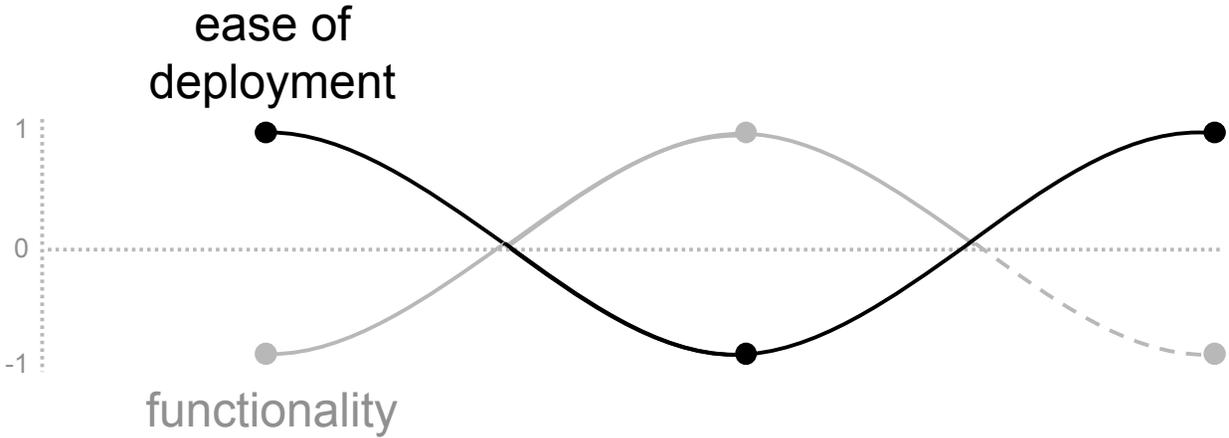
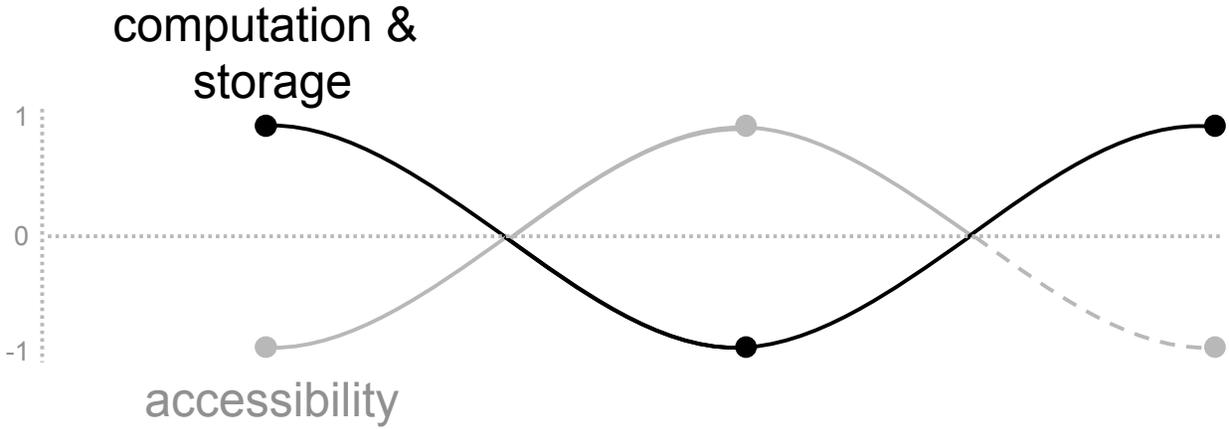


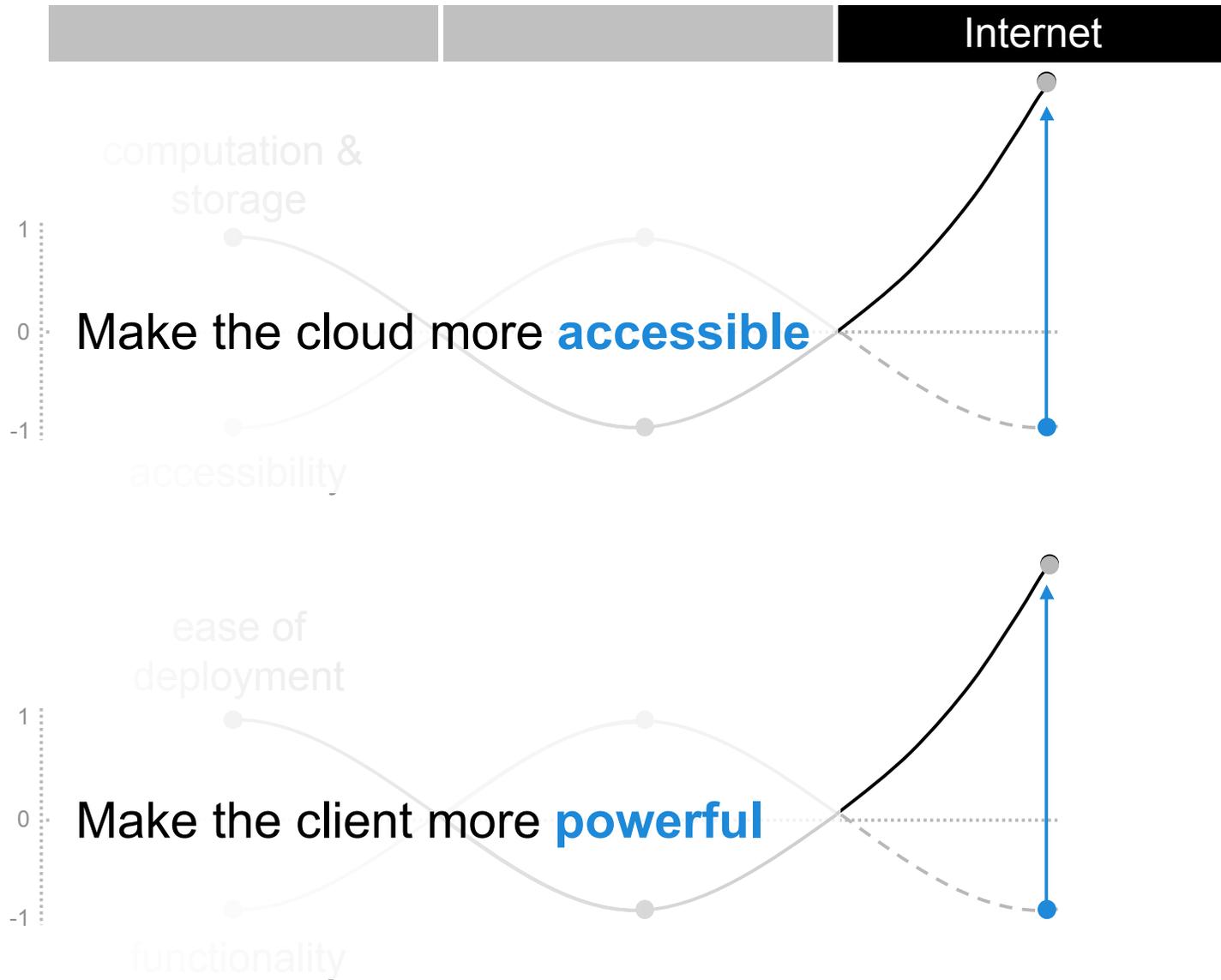
Mainframe

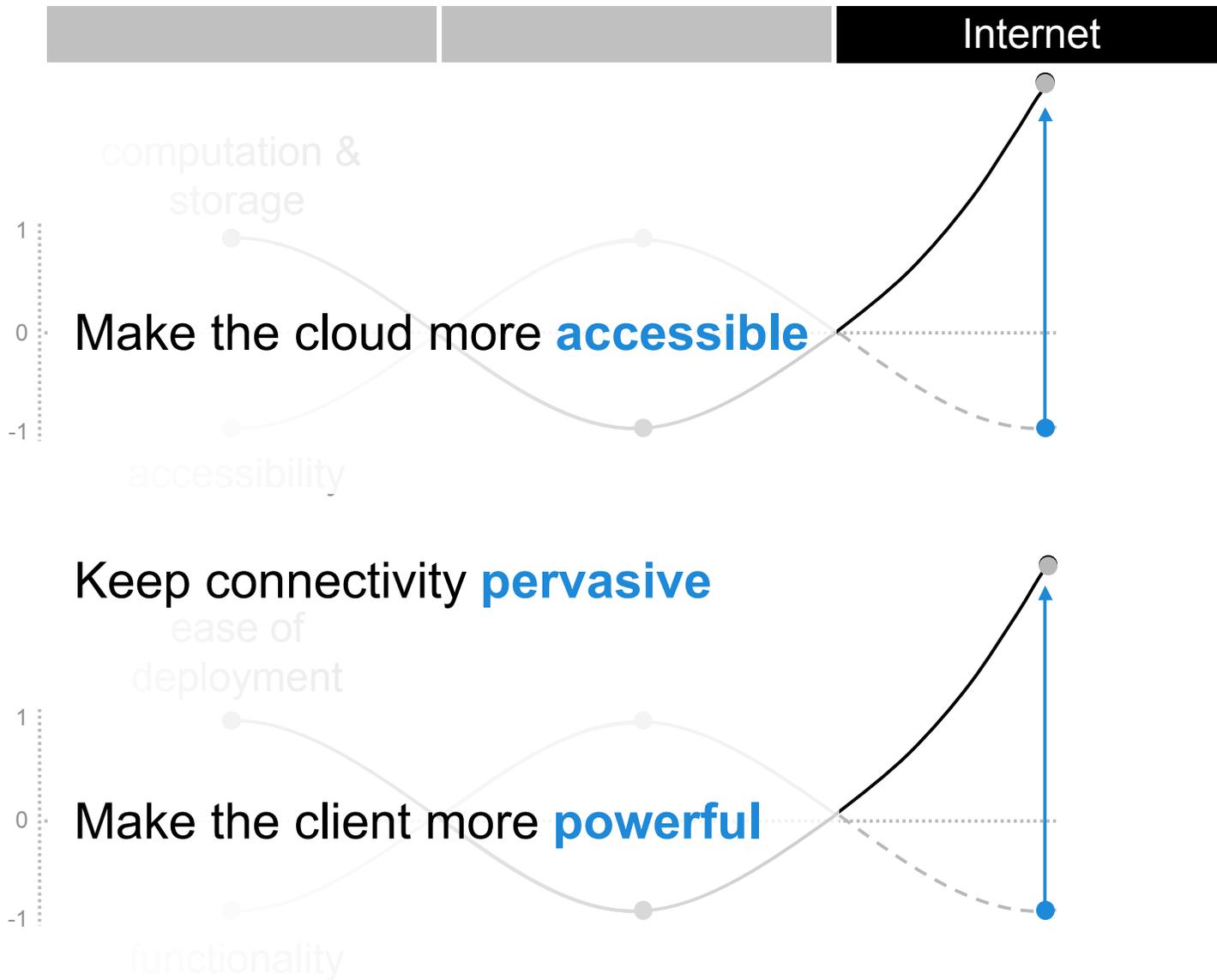


Personal Computer









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.”

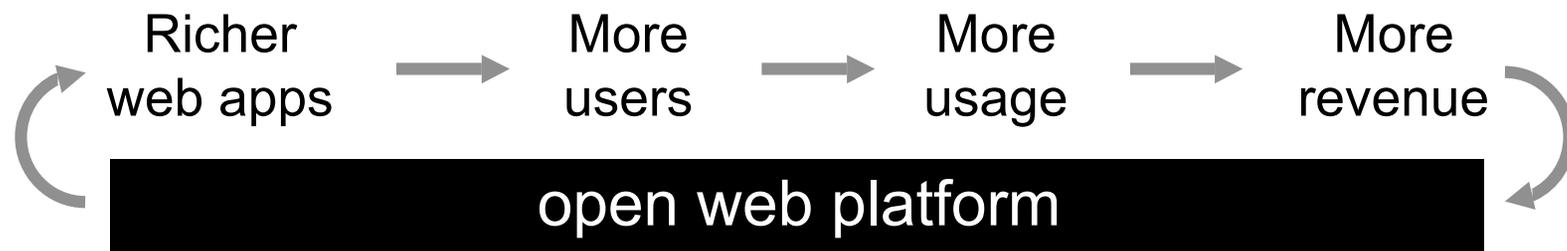


innovate in the open

Eric Schmidt, on the Internet and Google



What? Why? How?



What? Why? How?

Security Many devices Latency Authentication

Scalability Storage

Internationalization Browser compatibility **Distribution**

Programming languages Deployment User administration

Monetization AJAX Debugging Analytics



Client Connectivity Cloud

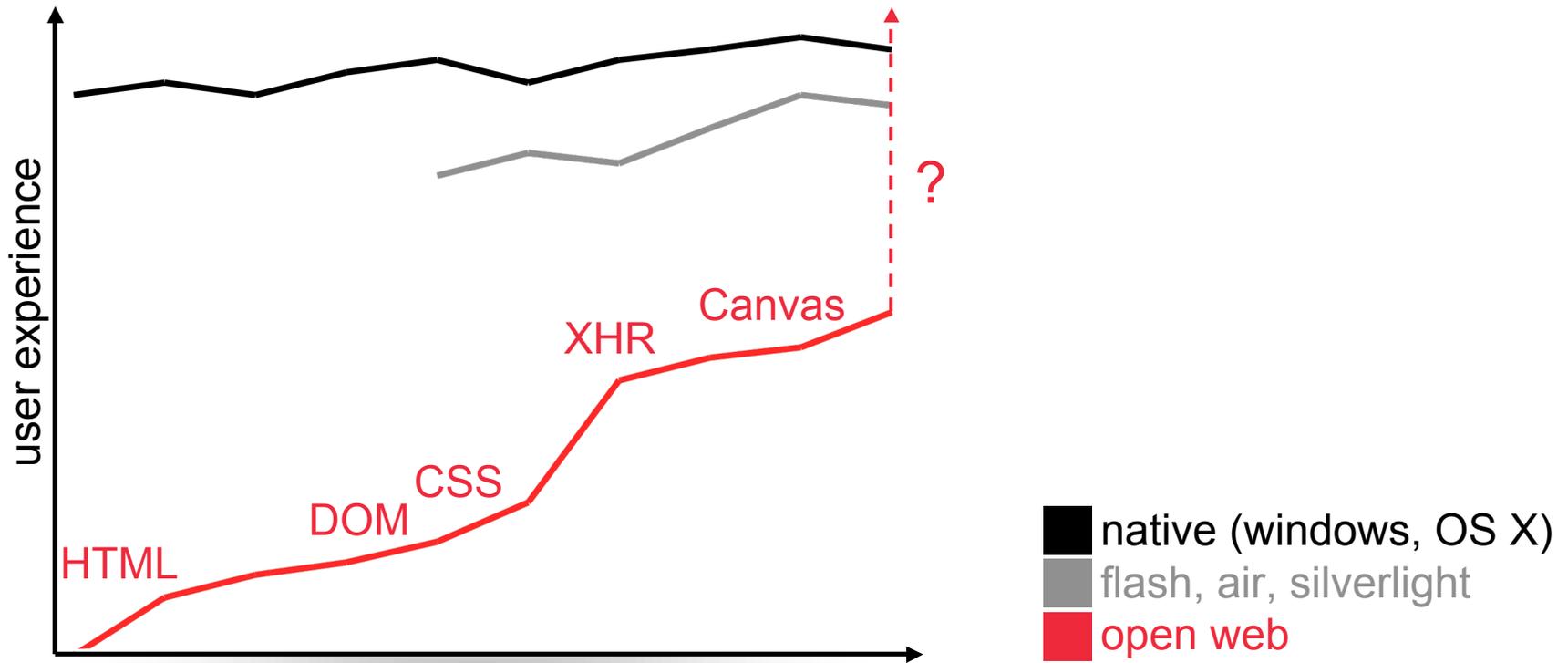


make it more powerful



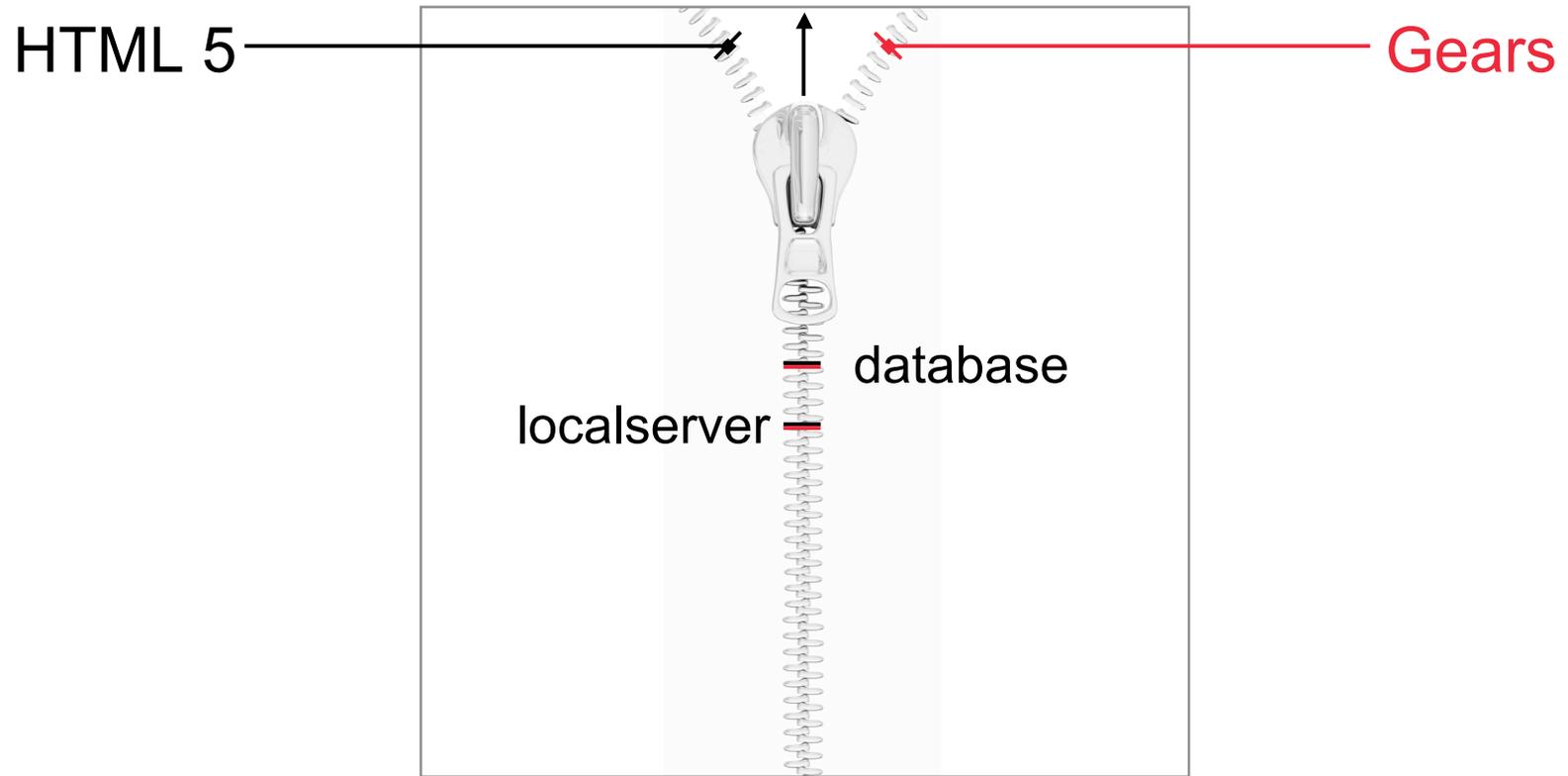
User Experience

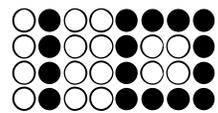
Proprietary Platforms v. Open Web



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

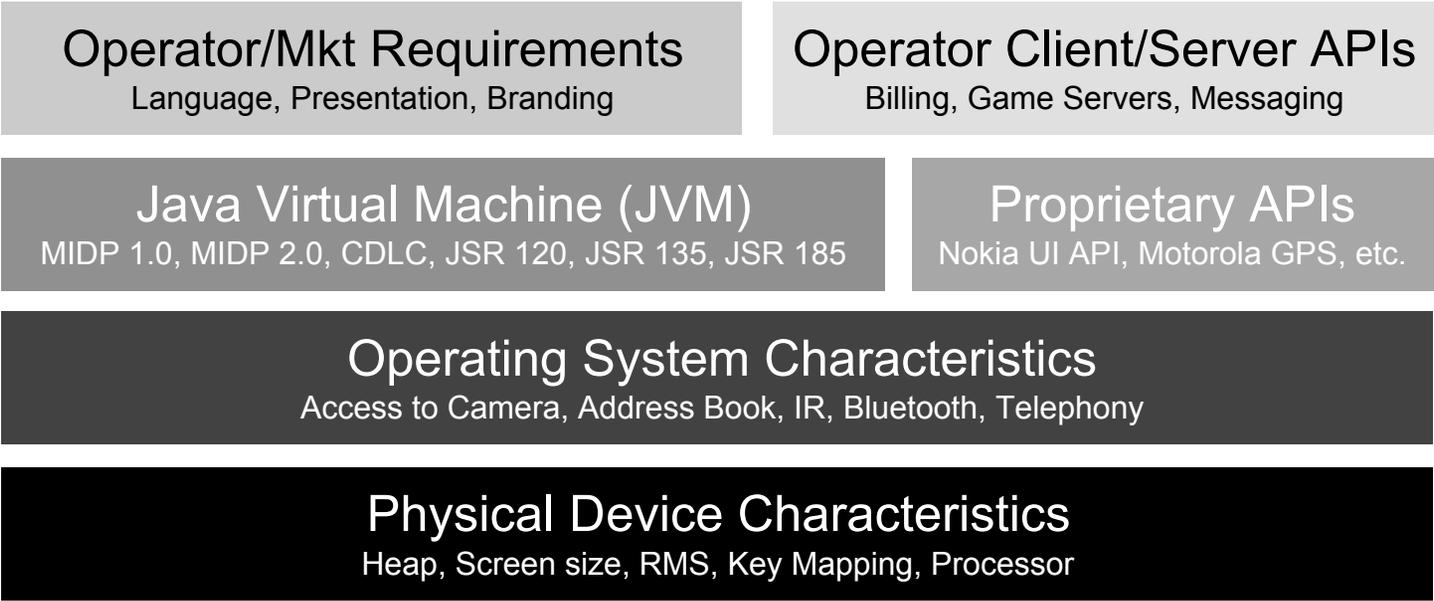


Client Connectivity Cloud



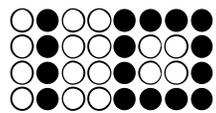
keep it pervasive





(JavaWorld.com, 2004)





Steve Horowitz, Engineering Director

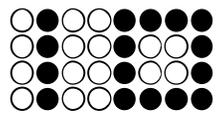
Android

Client Connectivity Cloud



make it more accessible





Kevin Gibbs, Tech Lead

Google App Engine

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.

```
#!/usr/bin/env python

import os
import cgi
import wsgiref.handlers

from google.appengine.ext import webapp
from google.appengine.ext import db
from google.appengine.ext.webapp import template
from google.appengine.api import mail

class Reg(db.Model):
    attending = db.StringProperty(multiline=False)
    first = db.StringProperty(multiline=False)
    last = db.StringProperty(multiline=False)
    email = db.StringProperty(multiline=False)
    phone = db.StringProperty(multiline=False)
    job = db.StringProperty(multiline=False)
    company = db.StringProperty(multiline=False)
    date = db.DateTimeProperty(auto_now_add=True)

class MainPage(webapp.RequestHandler):
    def get(self):
        template_values = {
        }

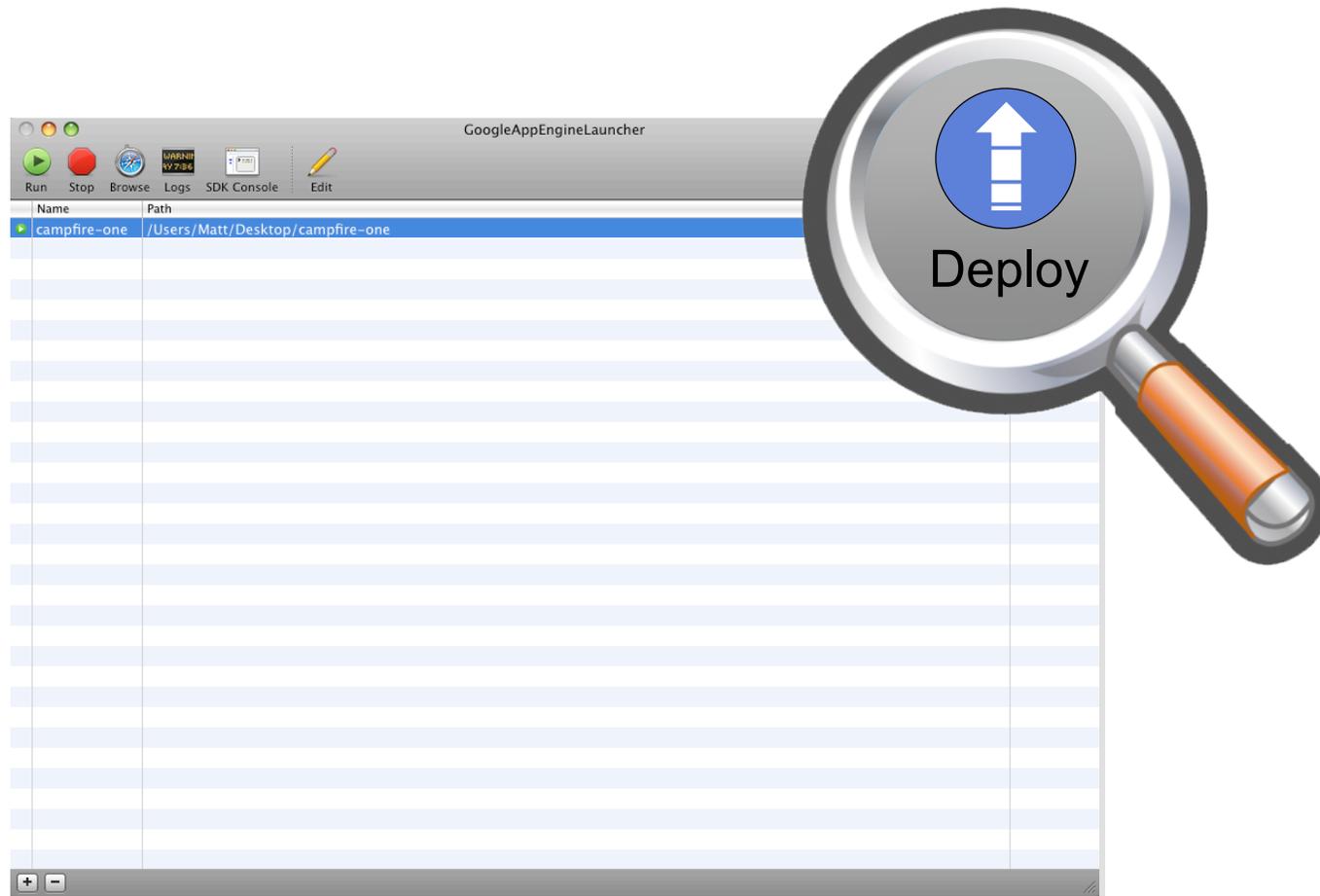
        path = os.path.join(os.path.dirname(__file__), 'index.html')
        self.response.out.write(template.render(path, template_values))

class Register(webapp.RequestHandler):
    def post(self):
        template_values = {
        }

        reg = Reg()
```



Develop locally. **Deploy to Google.** Launch.



Develop locally. Deploy to Google. Launch.

Google **Campfire One**

Every once in a while, we invite members of the developer community on campus to talk shop, share some news, and eat S'mores. We call this series of events, "[Google Campfire One](#)."

On May 12, we're hosting one such event at the Googleplex, featuring a yet-to-be-announced Google product. We hope to see you there.

(Refreshments and [on-campus parking](#) will be provided.)

Are you attending this event? Yes No

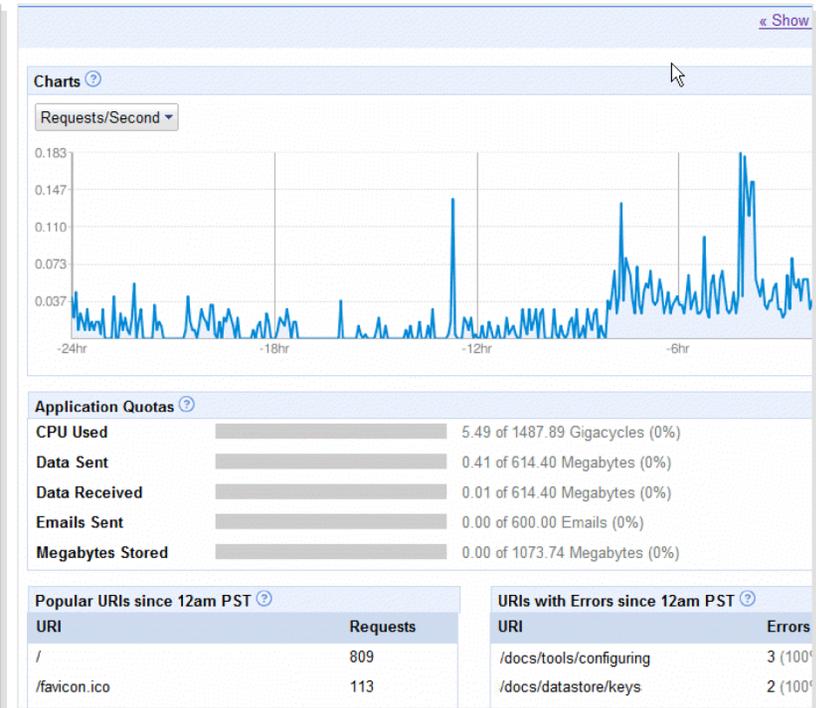
First Name: **Date:** Monday, May 12, 2008
Last Name: **Time:** 7:00 pm - 9:30 pm
Email Address: **Location:** [Google HQ](#)
Phone Number: 1600 Amphitheatre Parkway
Job Title: Mountain View, CA 94043
Company:



Google Campfire One

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powered by  Google App Engine



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,



with 1 click or
a tap on the keyboard

close it,



the page is gone,
you win!

smile.



great for reading on your phone,
anytime & anywhere



come back whenever you like,
wherever you are.





[Login](#)

浏览名单 (信息按原样提供, 仅供参考, Google未作任何核实)

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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	医院联系
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

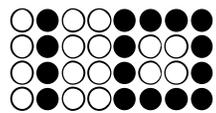


Client Connectivity Cloud



make it more accessible





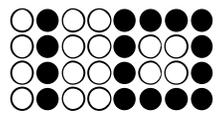
Mark Lucovsky, Technical Director
Google Data and AJAX APIs

Client Connectivity Cloud



make development easier



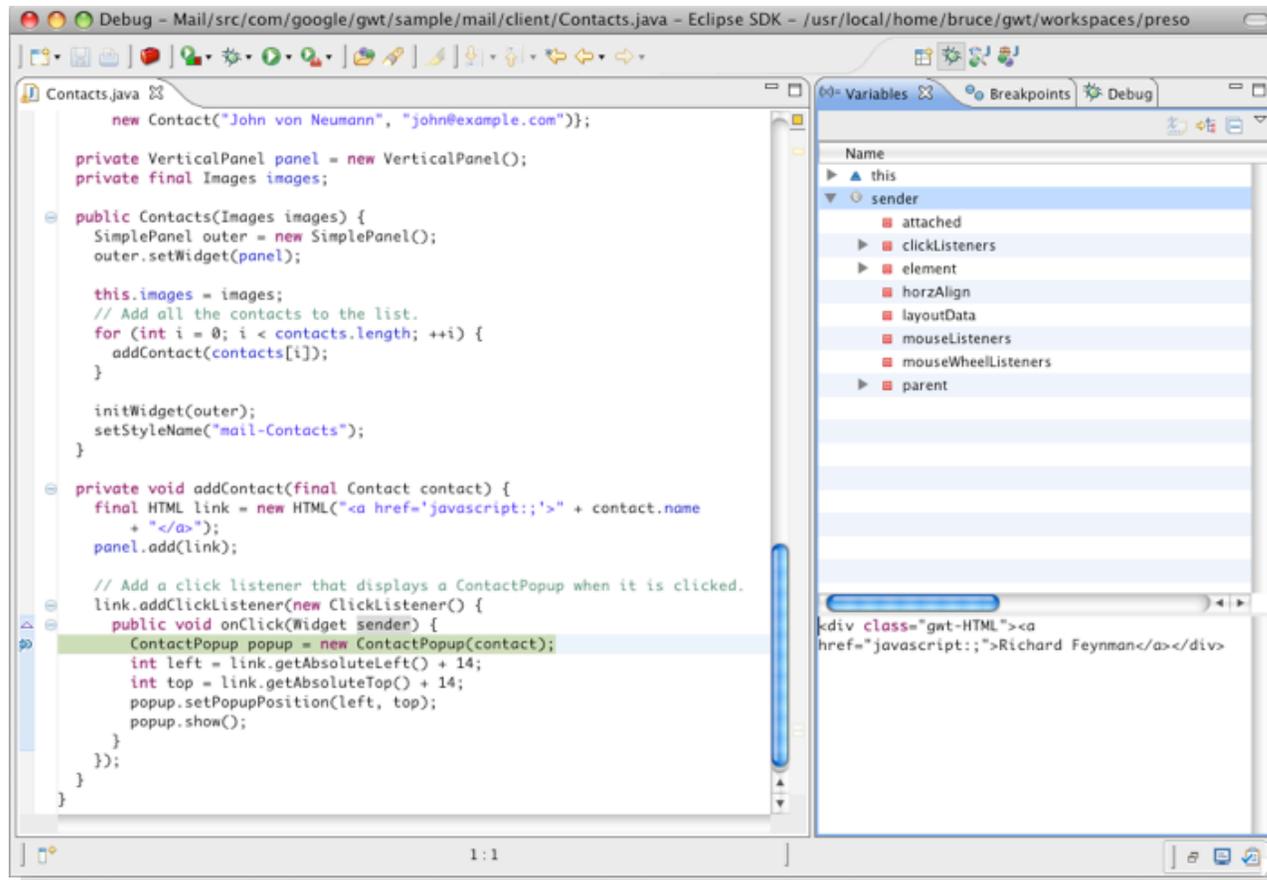


Bruce Johnson, Engineering Manager

Google Web Toolkit

Google Web Toolkit

Develop With <Your Favorite Java IDE>



Google Web Toolkit

Announcing 1.5 Release Candidate

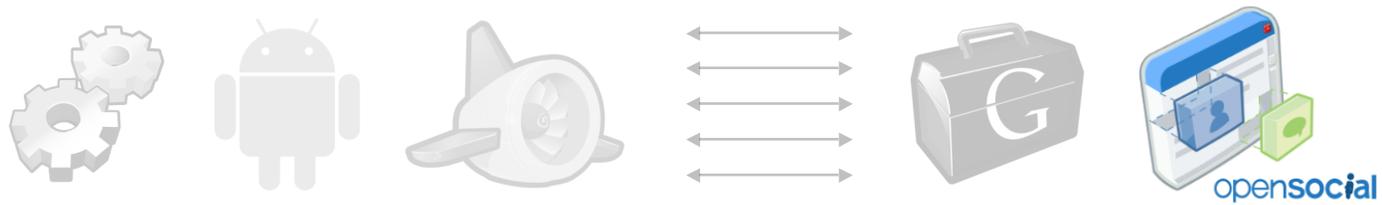


- Java 5 language features
- Performance, performance, performance

* Thank you, open source contributors!

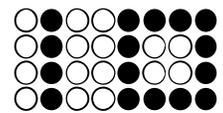


Client Connectivity Cloud



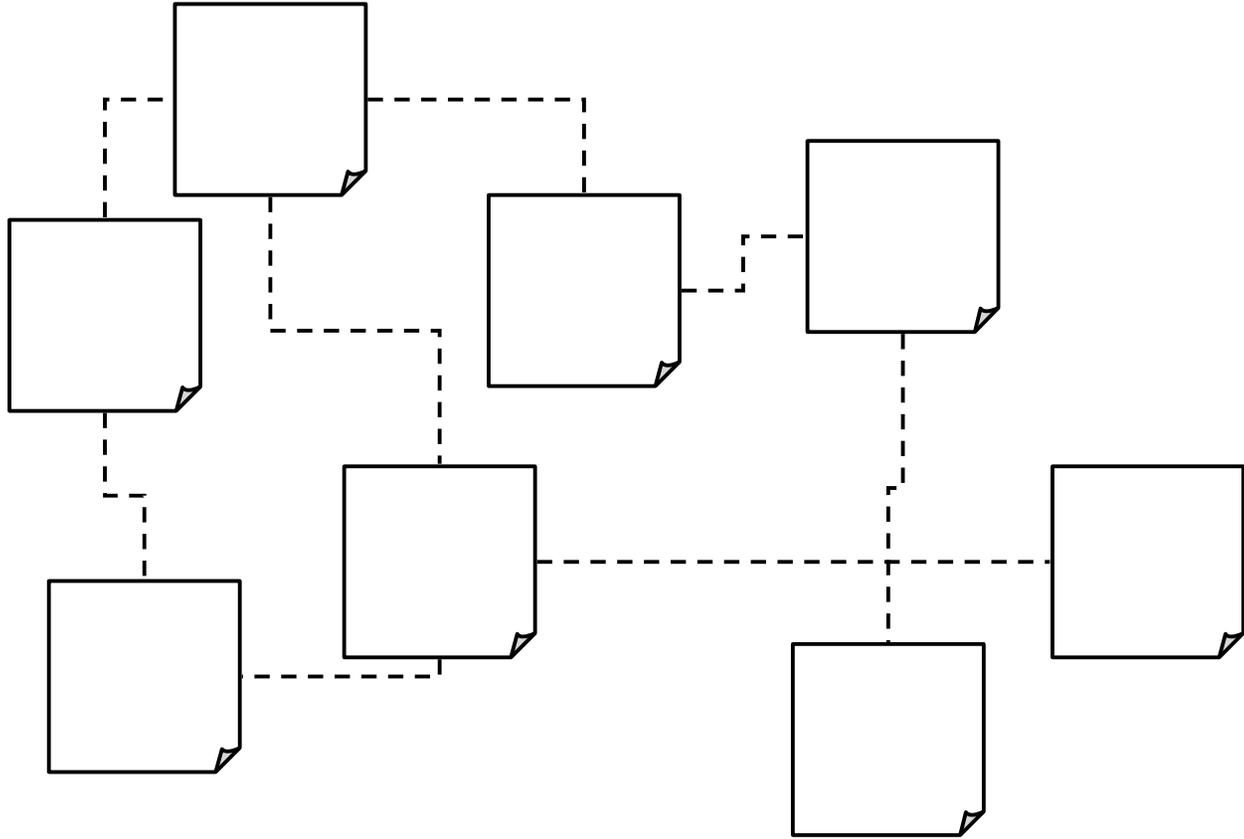
make the web more social

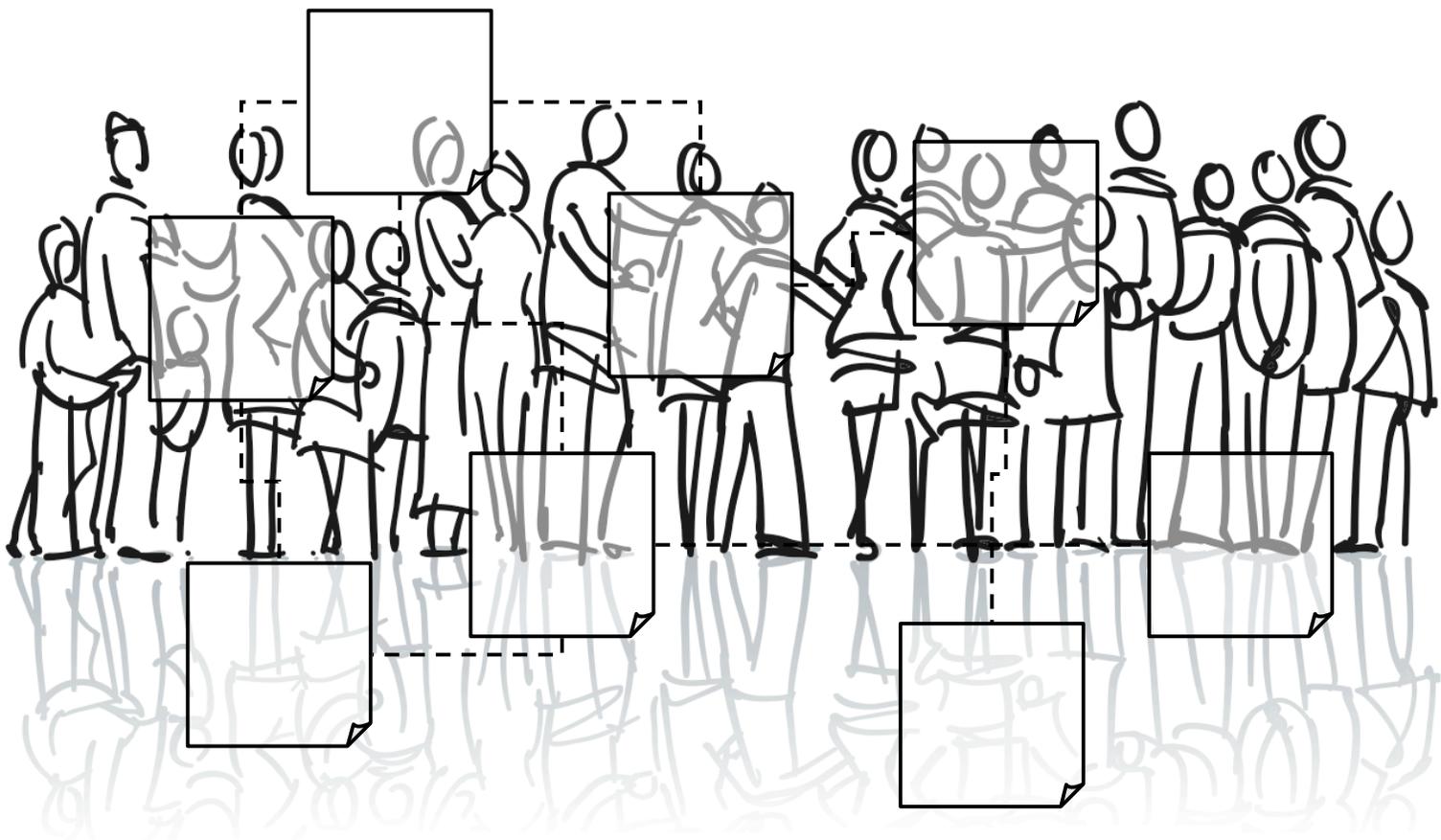




David Glazer, Engineering Director







“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.org •••••

OpenSocial

A Family of APIs

[Technical Resources](#) >

OpenSocial Specification -- Implementation Version 0.8

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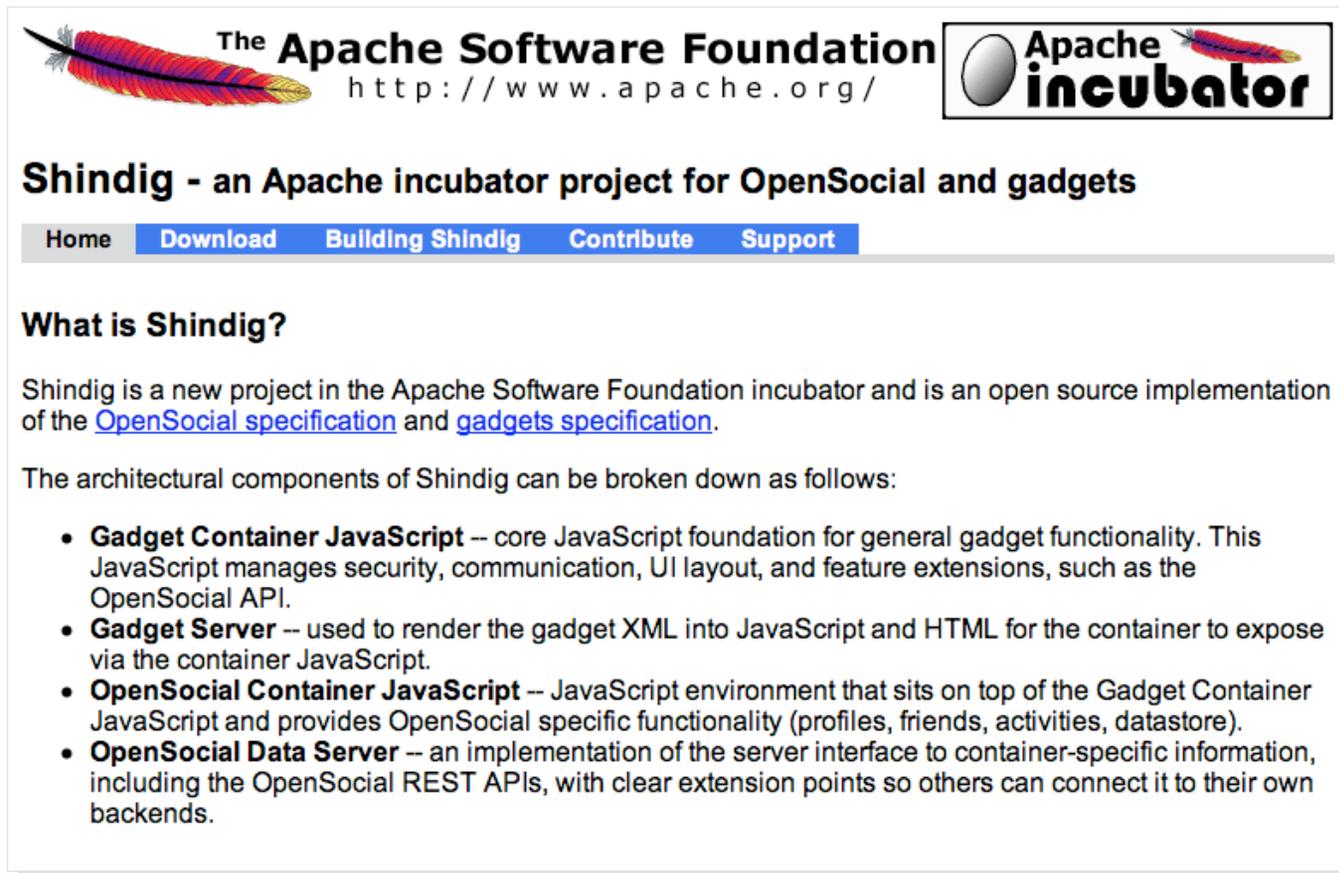
Overview

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



The Apache Software Foundation <http://www.apache.org/> Apache incubator

Shindig - an Apache incubator project for OpenSocial and gadgets

Home Download Building Shindig Contribute Support

What is Shindig?

Shindig is a new project in the Apache Software Foundation incubator and is an open source implementation of the [OpenSocial specification](#) and [gadgets specification](#).

The architectural components of Shindig can be broken down as follows:

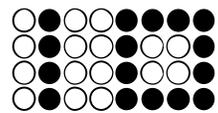
- **Gadget Container JavaScript** -- core JavaScript foundation for general gadget functionality. This JavaScript manages security, communication, UI layout, and feature extensions, such as the OpenSocial API.
- **Gadget Server** -- used to render the gadget XML into JavaScript and HTML for the container to expose via the container JavaScript.
- **OpenSocial Container JavaScript** -- JavaScript environment that sits on top of the Gadget Container JavaScript and provides OpenSocial specific functionality (profiles, friends, activities, datastore).
- **OpenSocial Data Server** -- an implementation of the server interface to container-specific information, including the OpenSocial REST APIs, with clear extension points so others can connect it to their own backends.



OpenSocial

A Community





Nat Brown, CTO

iLike

iLike on hi5

hi5 Home **My Profile** Friends Messages Groups Welcome, David [Log Out] 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

The screenshot shows the MySpace.com website with a blue header. At the top right, there are links for Privacy, Help, and SignOut. A large banner for 'ENGAGE' features the text 'A NEW WAY TO NOT BE ALONE' and a silhouette of a couple. Below the banner is a search bar with a dropdown menu set to 'People' and a 'Search' button. A navigation bar contains links for Home, Browse, Search, Invite, Apps, Mail, Blogs, Favorites, Forum, Groups, Events, MySpaceTV, Music, Comedy, and Classifieds.

The main content area is titled 'Music iLike (View Profile)' and includes 'MySpace Apps | View My Apps'. Below this is a navigation menu: 'My Music | Songs iLike | Artists iLike | Dedications | Music Challenge Find Music:'. A search box is present, followed by the 'iLike.' logo and a list of genres: 'Multi-Genre | R&B and Hip Hop | Rock Music | Country Music'.

The current challenge is 'Name this artist'. The instruction is 'Listen to the sample and select the artist who plays it.' The question is 'Which artist plays this song?'. The options are: Avril Lavigne, Pink, Gwen Stefani, and Madonna. A large ':26' timer is displayed with 'Points: 9' below it.

On the right, a 'Multi-Genre' challenge box shows a CD icon and the following statistics: 'Challenge Rank: Music Rookie', 'Your total points: 9', 'Points to next rank: 41', 'Best streak: 9 points', and 'Current streak: 0'. It also shows 'Questions answered: 2', 'Correct: 1 (50.0%)', and 'Average answer time: 17.5 seconds'. An orange button at the bottom says 'Challenge your friends »'.



iLike on orkut

The screenshot shows the Orkut website interface. At the top, the navigation bar includes 'Home', 'Profile', 'Scrapbook', 'Friends', and 'Communities'. The user's email 'dglazer94062@gmail.com' and a 'Logout' link are visible. A search bar contains the text 'search orkut'. The main content area is titled 'Music iLike' and shows a challenge: 'Name this Foo Fighters song'. The challenge instructions are 'Listen to the sample and select the correct song title.' and the question is 'Which Foo Fighters song is this?'. The options are 'Everlong', 'All My Life' (which is selected), 'DOA', and 'My Hero'. A large timer shows ':28' and 'Points: 10'. To the right, there is a 'Rock Music' challenge box with a guitar icon, stating 'Challenge Rank: Music Rookie', 'Your total points: 0', 'Points to next rank: 50', 'Questions answered: 0', 'Correct: 0 (0%)', and 'Average answer time: 0.0 seconds'. Below this, there are three advertisements: 'Christian Debt Relief', 'Ready to Learn Hibernate?', and 'Dynamic Digital Signage'. On the left side, there is a user profile for David Glazer, including a photo and a list of links for profile, scrapbook, photos, videos, testimonials, and ask friends. There is also a section for 'Apps' with links to Music iLike, Slide TV by S.., Bible Verses, and an 'add apps' button. At the bottom left, there is a row of black dots of varying sizes, and at the bottom right, there is a 'GOOGLE IO' logo and the number '63'.

iLike on ingridmichaelson.com

Sign In

ingrid michaelson
Summer Headlining Tour
june 1 - july 2

ILIKE NEWS STORE SHOWS CONTACT PRESS LYRICS PHOTOS MYSFACE LINKS

FOR FANS CONCERTS BULLETINS

Sign in to add your post

May 28, 07:30 AM
This is interesting.

May 28, 05:13 AM
weee :)

May 28, 03:09 AM
i'm here

▶ The Way I Am	Full song	<input type="checkbox"/>
▶ Giving Up	Full song	<input type="checkbox"/>
▶ Breakable	Full song	<input type="checkbox"/>
▶ Keep Breathing	Full song	<input type="checkbox"/>
▶ The Chain	Full song	<input type="checkbox"/>
▶ Overboard	Full song	<input type="checkbox"/>
▶ Corner Of Your Heart	Full song	<input type="checkbox"/>
▶ Die Alone	Full song	<input type="checkbox"/>
▶ The Hat	Full song	<input type="checkbox"/>
▶ Far Away	Full song	<input type="checkbox"/>
▶ Men of Snow (Live at WXPN)	Full song	<input type="checkbox"/>
▶ The Way I Am	Full song	<input type="checkbox"/>



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      ) }
```



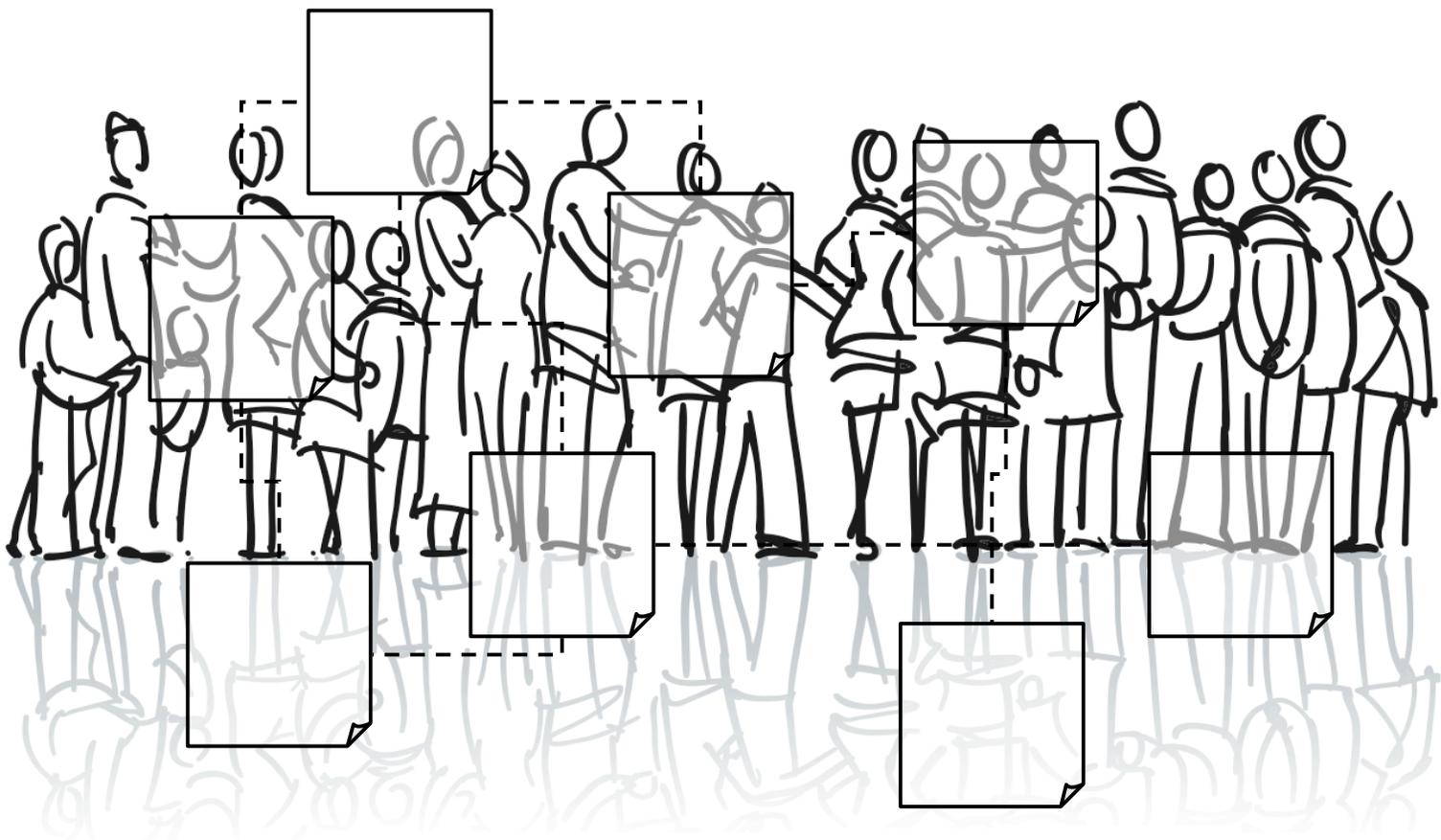
OpenSocial

What's Next

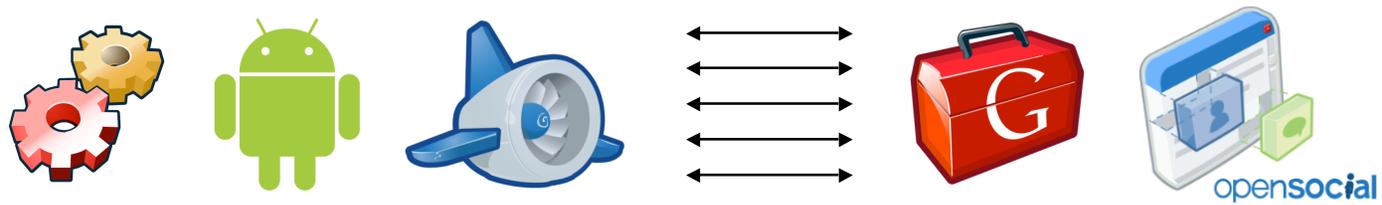
- RESTful (v0.8)
- **Template language**

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





Client Connectivity Cloud



open web platform



Thank You

vicg@google.com



