



Jfokus 2011

Google Cloud for Java Developers: Platform and Monetization



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Agenda

- Google Apps Marketplace
- Google App Engine
- Google App Engine for Business
- Google Storage for Developers
- Prediction API
- BigQuery
- Google Fusion Tables
- Google Visualization API
- Google Refine

The benefits of Cloud Computing

Economics

Pay for only what you use

TCO

OPEX vs CAPEX

Operations

Day to day: no maintenance

Fighting fires: no Pagers

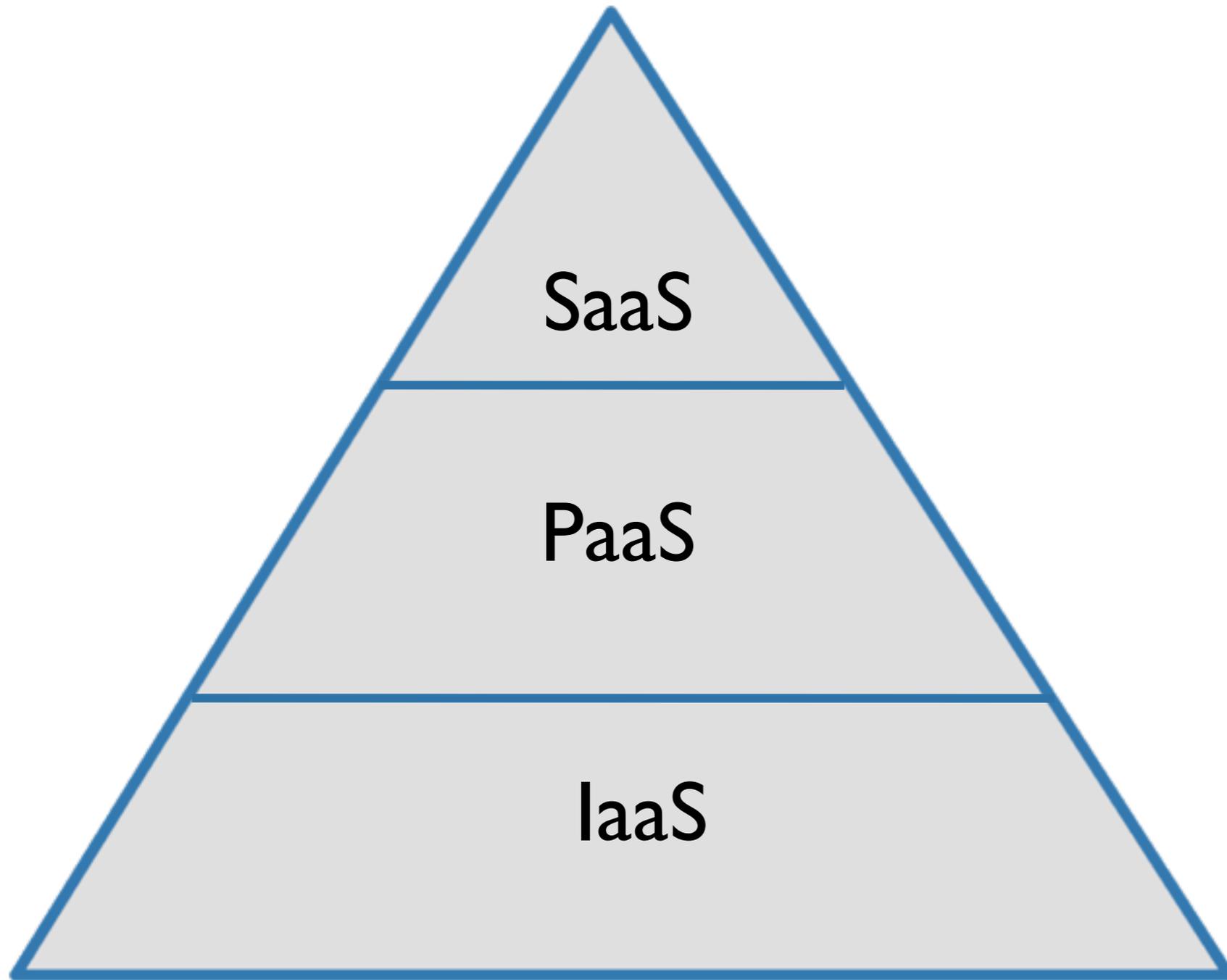
Elasticity

Focus on your Business

What is cloud computing?

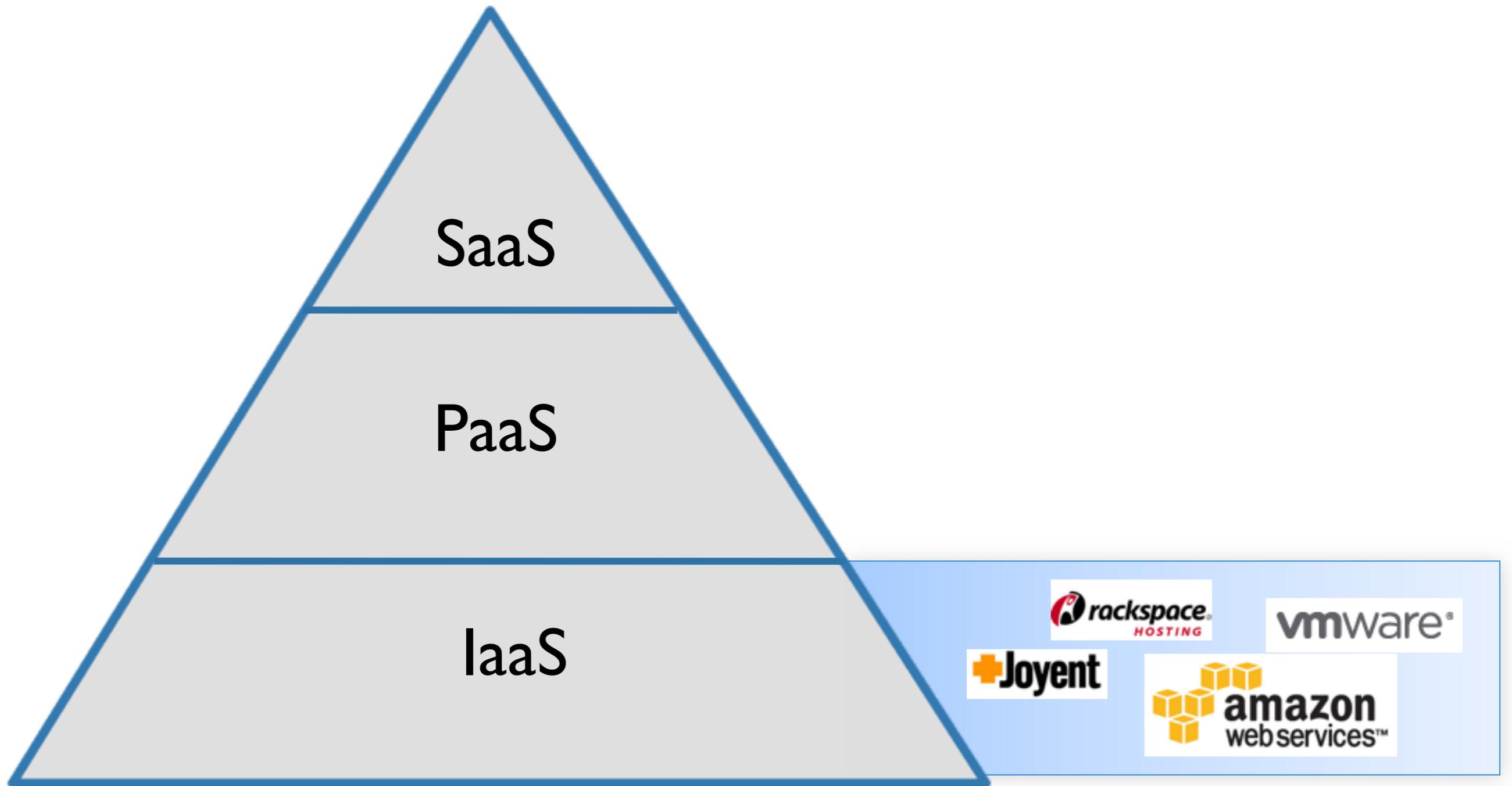


Cloud Computing Defined



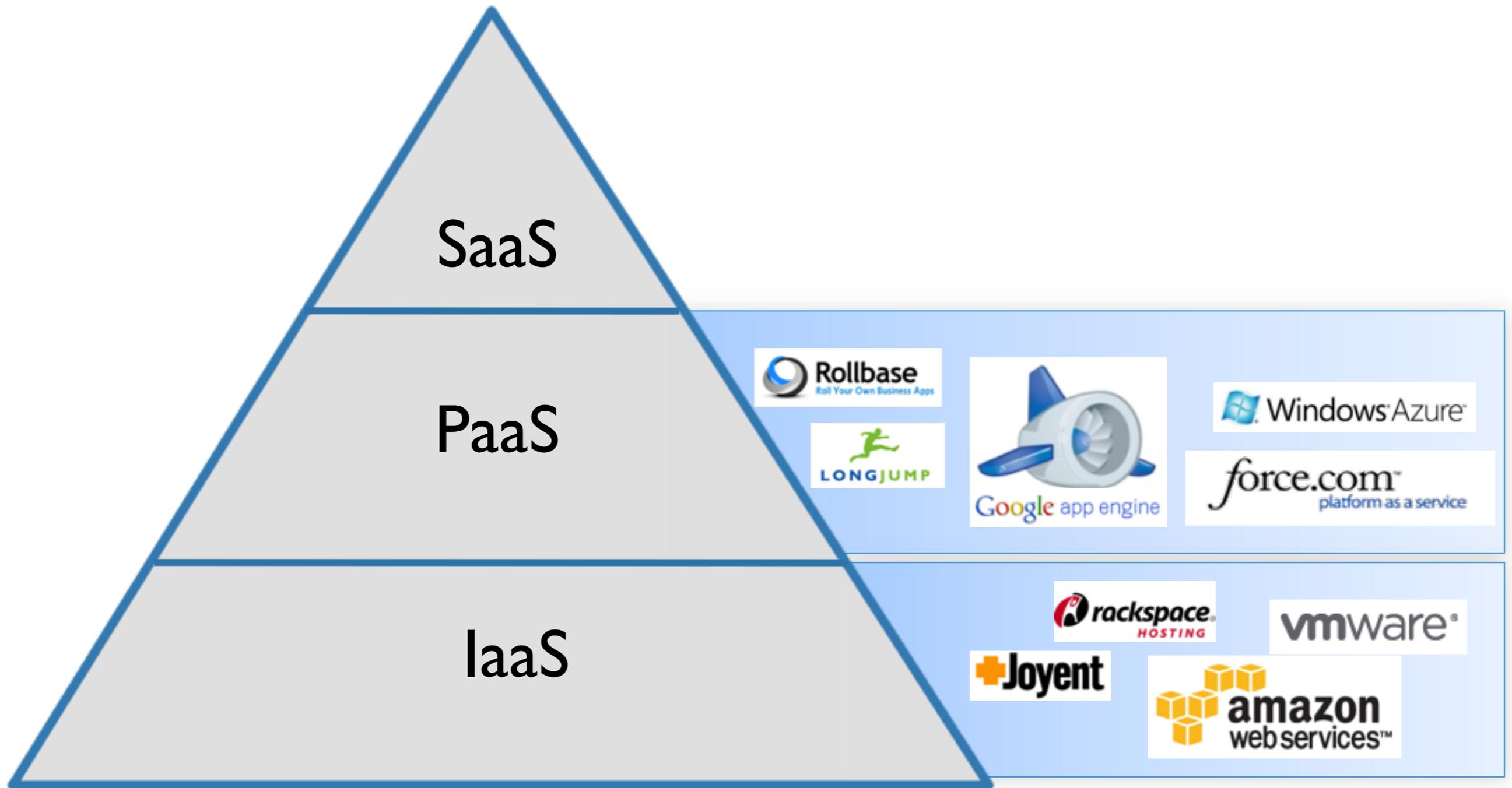
Source: Gartner AADI Summit Dec 2009

Cloud Computing Defined



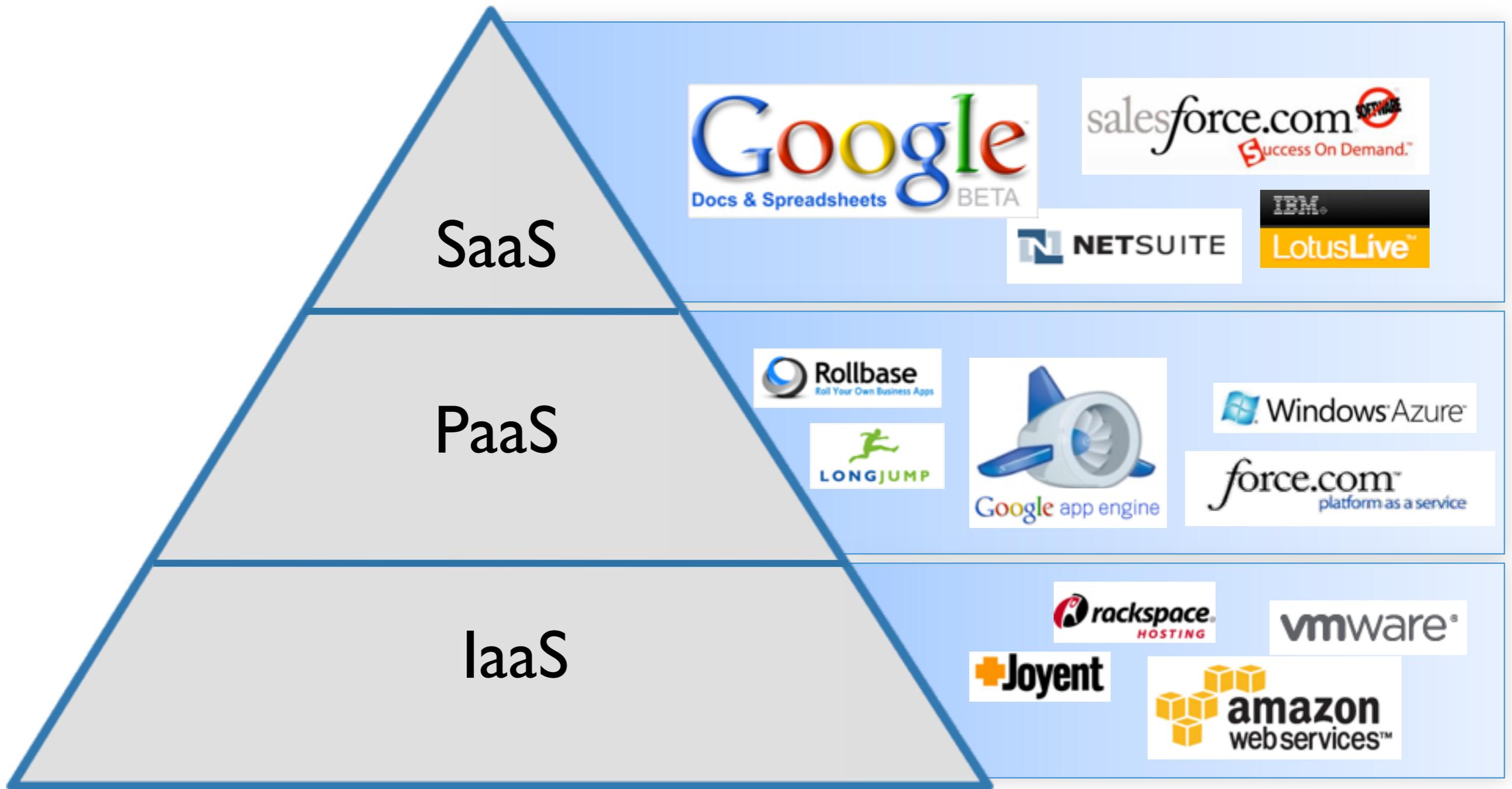
Source: Gartner AADI Summit Dec 2009

Cloud Computing Defined



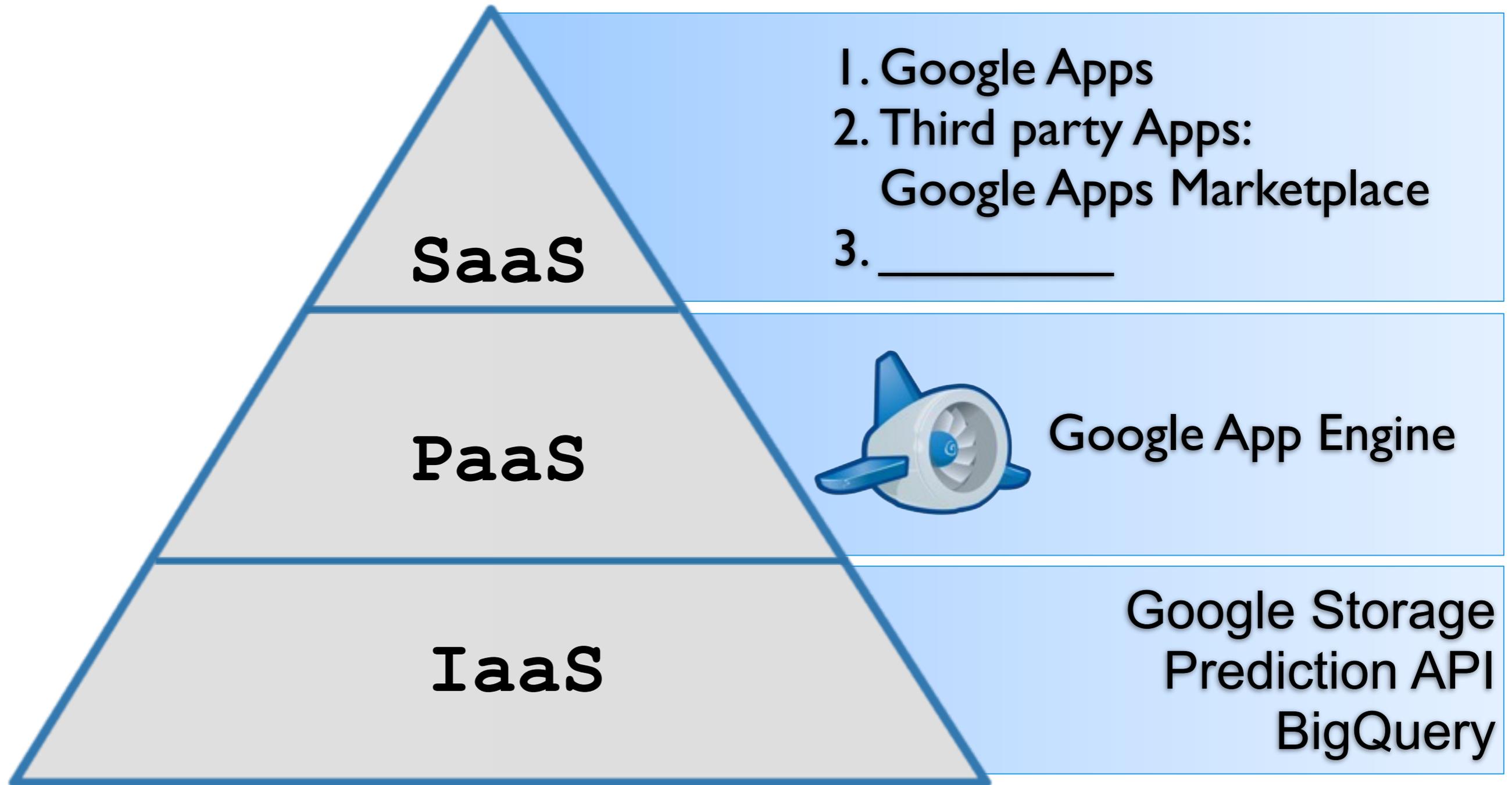
Source: Gartner AADI Summit Dec 2009

Cloud Computing Defined



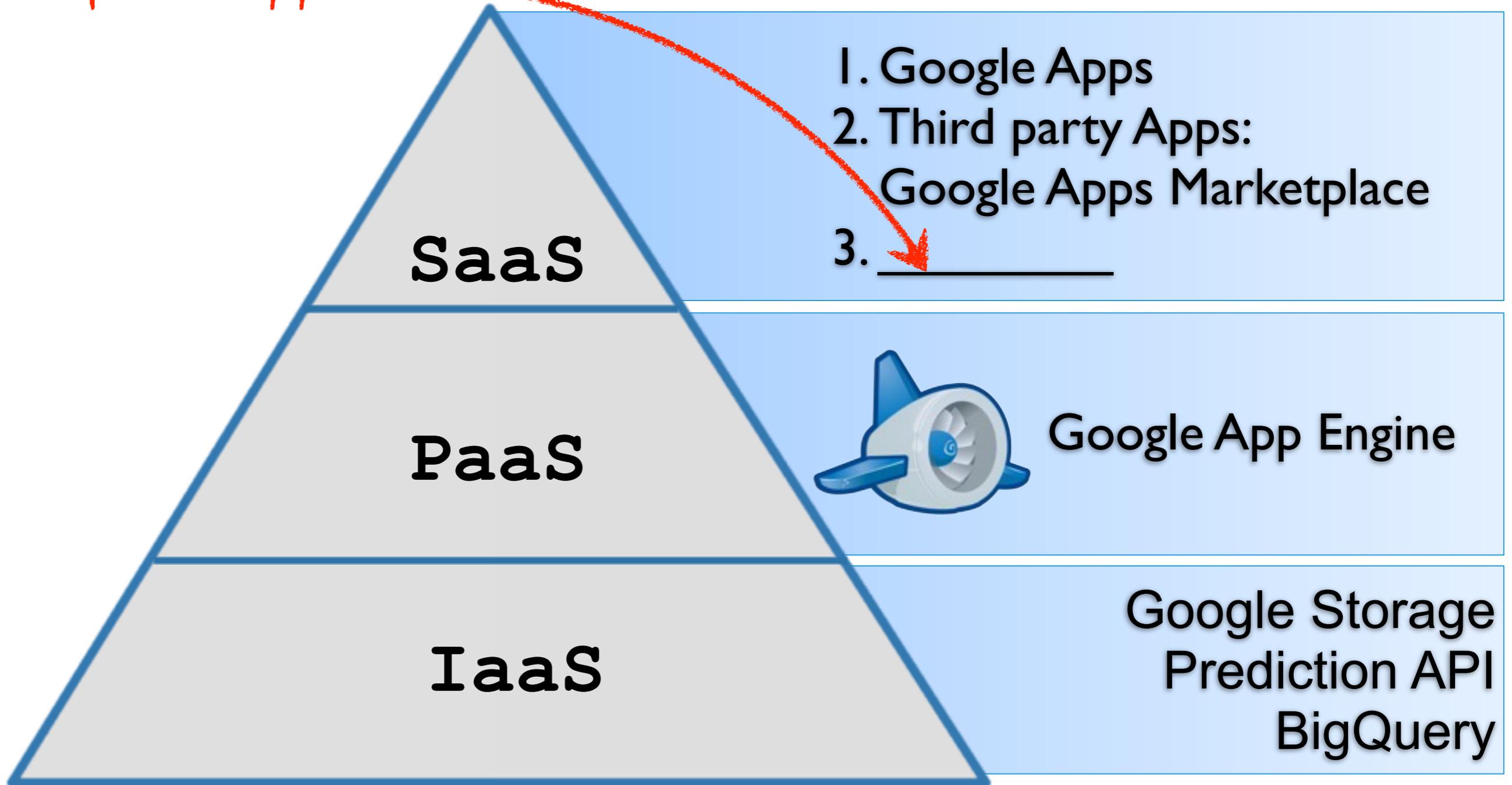
Source: Gartner AADI Summit Dec 2009

Google's Cloud Offerings

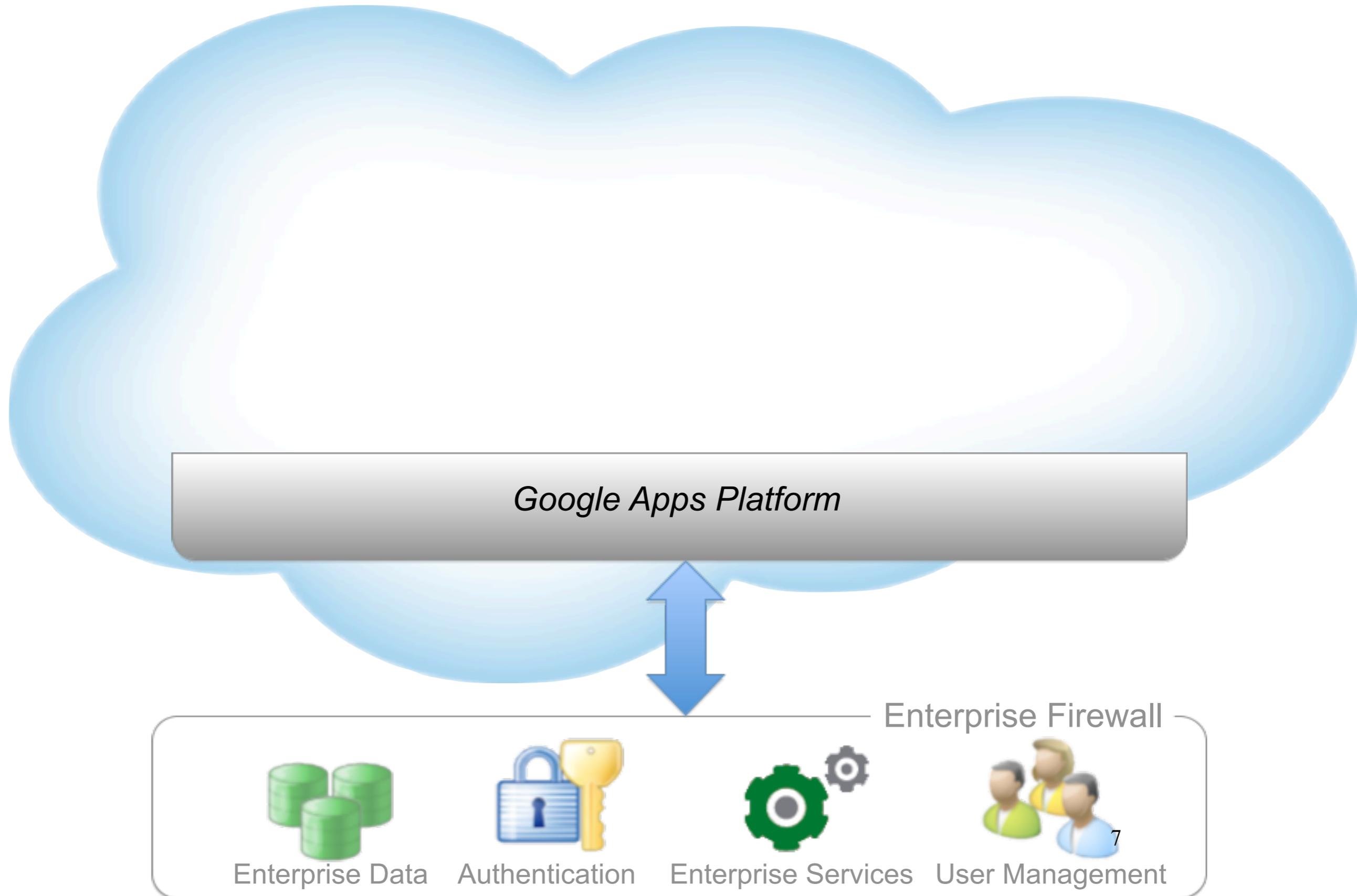


Google's Cloud Offerings

Your Apps



Build and Buy all your enterprise cloud apps...



Build and Buy all your enterprise cloud apps...

Buy from Google



Google Apps Platform



Enterprise Firewall



Enterprise Data



Authentication

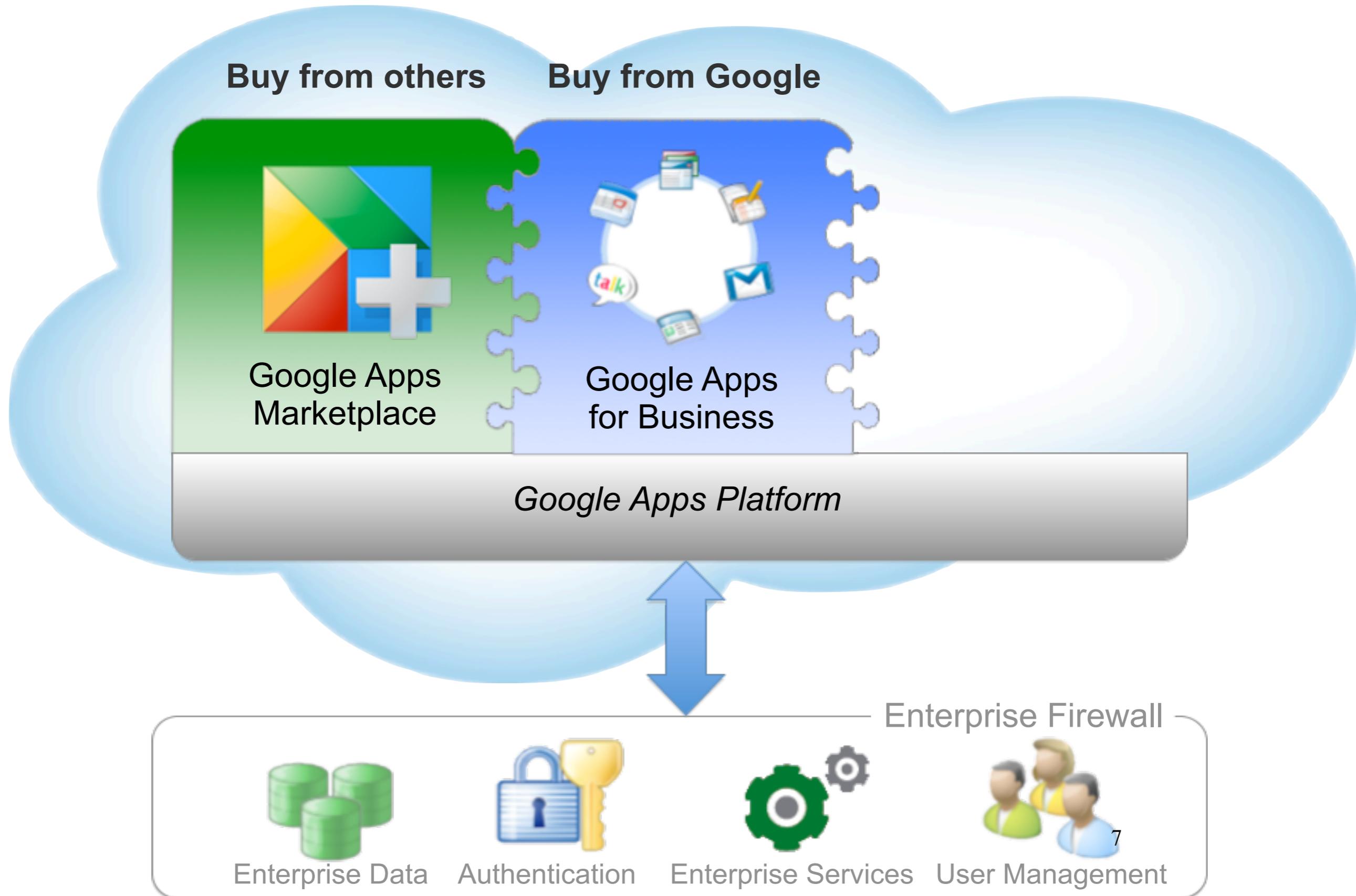


Enterprise Services

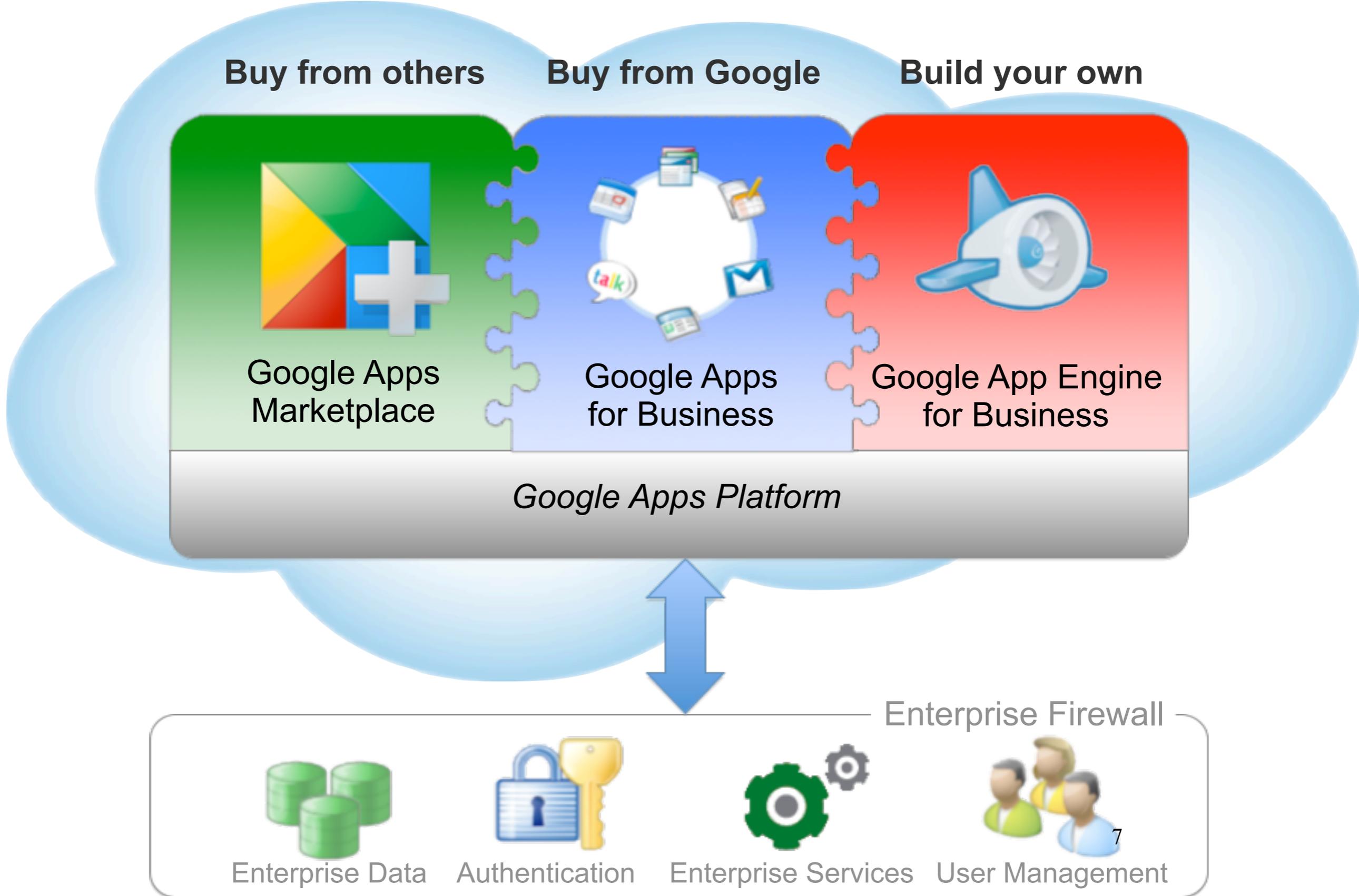


User Management

Build and Buy all your enterprise cloud apps...



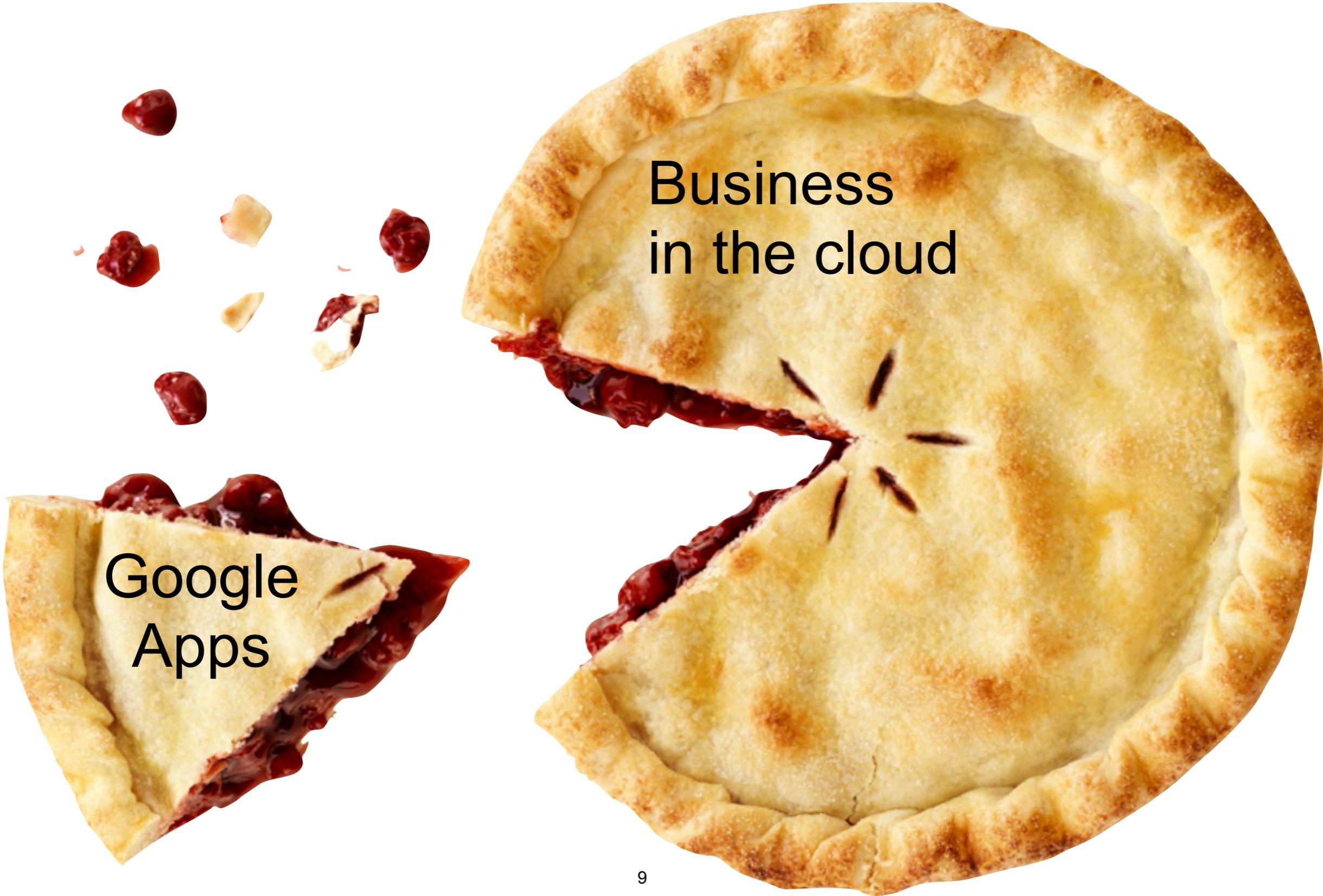
Build and Buy all your enterprise cloud apps...



Google Apps Marketplace



Customers want more Apps



Marketplace Overview



Google Apps is Focused on Messaging & Collaboration



Gives *every* employee powerful messaging and collaboration tools without the usual IT hassle and cost

These customers want more great cloud apps...



Accounting & Finance

Admin Tools

Calendaring / Meetings

Customer Management

Document Management

Productivity

Project Management

Sales & Marketing

Security & Compliance

Workflow

Google Apps Marketplace



Steps to sell your app to Google Apps customers

1. Build your app:

- with any tools and hosting provider you want

2. Integrate your app:

- add Single Sign On using OpenID (required)
- access over a dozen integration points from Calendar, Contacts, Docs, etc. using OAuth (optional)

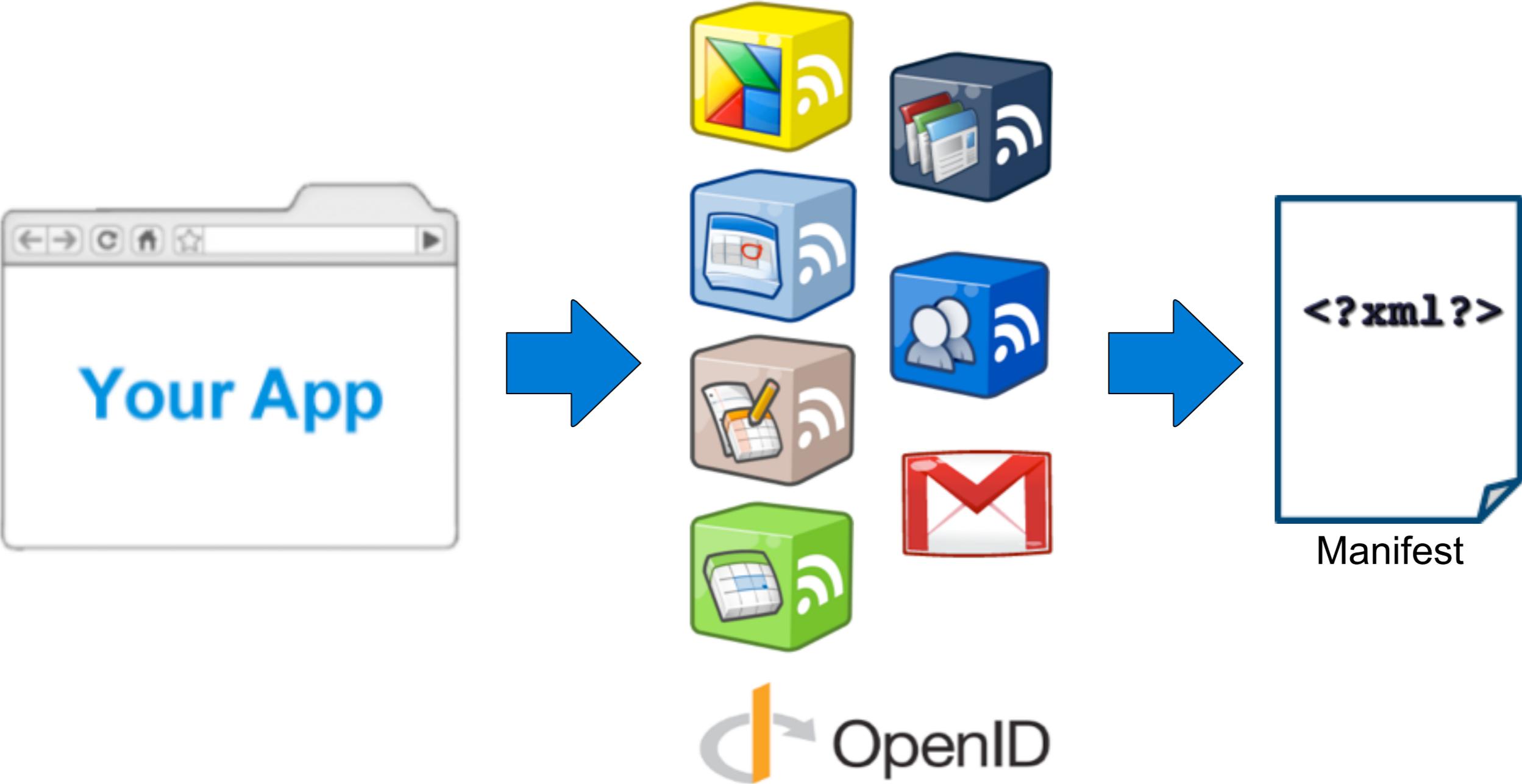
3. Sell your app:

- to 3M+ businesses & 30M+ users
- through Google Apps resellers
- to wherever Google Apps goes
- **One-time fee of \$100, 20% rev share starting 2H'10**

Everything in the Cloud



Integrating with Google Apps & the Marketplace



Demo Google Apps Marketplace



How it's done - Single Sign On



Single Sign On

OpenID with Google Apps



Sounds complicated, but not hard in practice!

Single Sign On OpenID Libraries

Language	Libraries
Java	OpenID4Java, Step2
.NET	DotNetOpenAuth
PHP	php-openid, php-openid-apps-discovery
Ruby	ruby-openid, ruby-openid-apps-discovery
Any	RPX, Ping Identity

Single Sign On - Code

Step 1 of 3 - Initialize library



```
function getOpenIDConsumer() {  
    // Initialize client, storing associations  
    // in memcache  
    $store = new Auth_OpenID_MemcachedStore($MEMCACHE);  
    $consumer = new Auth_OpenID_Consumer($store);  
  
    // Enable Google Apps support  
    GApps_OpenID_EnableDiscovery($consumer);  
    return $consumer;  
}
```





Single Sign On - Code

Step 2 of 3 - Make the request

```
// Create an auth request to the user's domain
$auth_request = getOpenIDConsumer()->begin($domain);

// Request email address & name during login
$ax = new Auth_OpenID_AX_FetchRequest;
$attr = Auth_OpenID_AX_AttrInfo::make(
    $AX_SCHEMA_EMAIL, 1, 1, 'email');
$attr = Auth_OpenID_AX_AttrInfo::make(
    $AX_SCHEMA_FIRSTNAME, 1, 1, 'first');
$attr = Auth_OpenID_AX_AttrInfo::make(
    $AX_SCHEMA_LASTNAME, 1, 1, 'last');
$auth_request->addExtension($ax);

// Render Javascript/form to post request
$form_html = $auth_request->htmlMarkup($REALM,
    $RETURN_TO, false,
    array('id' => 'openid_message'));
print $form_html;
```



Single Sign On - Code



Step 3 of 3 - Handle response

```
// Parse the response from identity provider
$response = getOpenIDConsumer()->complete($RETURN_TO);
if ($response->status == Auth_OpenID_SUCCESS) {
    // Extract data from response
    $openid = $response->getDisplayIdentifier();
    $ax = new Auth_OpenID_AX_FetchResponse();
    $ax_resp = $ax->fromSuccessResponse($response);
    $email = $ax_resp->data[$AX_SCHEMA_EMAIL][0];
    $firstName = $ax_resp->data[$AX_SCHEMA_FIRSTNAME][0];
    $lastName = $ax_resp->data[$AX_SCHEMA_LASTTTNAME][0];
    // Map to user in DB
    $user = fetch_user($openid, $email, $firstName,
        $lastName);
}
```



Single Sign On - Code

Manifest

<?xml?>

```
<ApplicationManifest>
  <Name>Sassy Voice</Name>
  <Description>Voice Mail & Messaging</Description>
  <Admin>
    <Link rel="setup">
      http://voice.saasyapp.com/setup.php?domain=${DOMAIN_NAME}
    </Link>
  </Admin>
  <Extension id="navlink" type="link">
    <Name>SaasyVoice</Name>
    <Url>
      http://voice.saasyapp.com/login.php?domain=${DOMAIN_NAME}
    </Url>
  </Extension>
  <Extension id="realm" type="openIdRealm">
    <Url>http://voice.saasyapp.com/</Url>
  </Extension>
</ApplicationManifest>
```



Single Sign On

What we learned about users



Claimed ID: <http://example.com/openid?id=12345>

Email: bob@example.com*

First Name: Bob

Last Name: Dobbs

* Be sure to confirm or white-list trusted providers

How it's done - Data Access



2-Legged OAuth

Delegating data access

```
<ApplicationManifest>
```

```
...
```

```
<Scope id="userFeed">
```

```
<Url>https://apps-apis.google...
```

```
<Reason>To get a list of user...
```

```
</Scope>
```

```
<Scope id="contactsFeed">
```

```
<Url>https://www.google.com...
```

```
<Reason>To display names of...
```

```
</Scope>
```

```
<Scope id="docsFeed">
```

```
<Url>https://docs.google.com...
```

```
<Reason>To export a call log...
```

```
</Scope>
```

```
</ApplicationManifest>
```

The screenshot shows a web interface with a navigation bar containing 'Dashboard', 'Users and groups', and 'Domain settings'. Below the navigation bar, a message states: 'You have requested that the ' SaaSy Vo'. The main content area is titled 'Grant data access' and features a progress indicator with three steps: '1 Agree to terms', '2 Grant data access' (which is currently active), and '3 Ext...'. Below the progress indicator, a warning message reads: 'In order to work properly, this app needs to access your do... include reading, writing, or deleting the data described bel...'. Three data access requests are listed, each with a yellow warning icon: 'User Provisioning (Read only)' with the reason 'To get a list of users to provision accounts', 'Docs (Read/Write)' with the reason 'To export a call log', and 'Contacts (Read/Write)' with the reason 'To display names of people who called'. At the bottom of the interface, there are two buttons: 'Grant data access' and 'Cancel'.



Data Access - Code

Step 1 of 2 - Initialize the client

```
function getOAuthClient() {  
    $options = array(  
        'consumerKey' => $CONSUMER_KEY,  
        'consumerSecret' => $CONSUMER_SECRET,  
        'signatureMethod' => 'HMAC-SHA1',  
        'requestScheme' => Zend_Oauth::REQUEST_SCHEME_HEADER,  
        'version' => '1.0');  
    $consumer = new Zend_Oauth_Consumer($options);  
    $token = new Zend_Oauth_Token_Access();  
    $httpClient = $token->getHttpClient($options);  
    return $httpClient;  
}
```





Data Access - Code

Step 2 of 2 - Fetching Users with Provisioning API

```
// Initialize client
$userClient = new Zend_Gdata_Gapps(getOauthClient());

// Query feed for current user's domain
$userQuery = new Zend_Gdata_Gapps_UserQuery(
    getCurrentUserDomain());
$usersFeed = $userClient->getUserFeed($userQuery);

// Extract data from user feed
$users = array();
foreach ($usersFeed as $userEntry) {
    $login = $userEntry->getLogin();
    $name = $userEntry->getName();
    $users[] = array(
        'username' => $login->getUsername(),
        'firstName' => $name->getGivenName(),
        'lastName' => $name->getFamilyName(),
        'admin' => $login->getAdmin());
}
```



Integration Recap

With not a lot of code we added:

- **Single Sign On** with OpenID
- **Quicker setup** with Attribute Exchange, Provisioning API
- **Integrated user data** with Contacts API
- **Uploading spreadsheets** with Docs API

Gadgets - your real estate in Google Apps



Gadgets

- Many types of gadgets
 - Gmail sidebar
 - Calendar sidebar
 - Sites
 - Spreadsheets
- Two new types of gadgets available this week!
 - Gmail contextual!
 - Wave!
- All use the OpenSocial gadgets specification

Gmail contextual gadgets

- Detect e-mail content via regular expressions
- Display and collect actionable business information directly in Gmail, below each message

Gmail contextual gadgets

The screenshot displays the Gmail interface with a focus on contextual gadgets. At the top, navigation links for Mail, Calendar, Documents, Sites, and more are visible. The user's email address, ryan@smart-lawfirm.com, is shown in the top right. The Gmail logo and search bars are present. The left sidebar contains navigation options like Compose Mail, Inbox, Starred, Sent Mail, Drafts, Follow up, Misc, Priority, 4 more, Contacts, and Tasks. A Chat section is also visible, showing a search bar and a contact named Ryan Boyd. A red arrow points from the Chat section to the 'Assign Task' button in the email's contextual gadgets. The main content area shows an email from Steve Bazyl to the user, with a subject line 'John Smith's company'. Below the email content, a blue bar offers the option to 'Create a task or project from this email', with buttons for 'Assign Task' and 'Create Project'. The email content includes a link to 'Incorporate in California - www.directincorporation.com' and a message from Steve Bazyl asking for next steps.

Mail [Calendar](#) [Documents](#) [Sites](#) [more](#) ryan@smart-lawfirm.com | [Manage](#)

Gmail
by Google

[Compose Mail](#)

Inbox

[Starred](#)

[Sent Mail](#)

[Drafts](#)

[Follow up](#)

[Misc](#)

[Priority](#)

[4 more](#)

[Contacts](#)

[Tasks](#)

- Chat

Search, add, or invite

Ryan Boyd
Set status here

[Options](#) [Add contact](#)

[Incorporate in California - www.directincorporation.com](#) - Need to Incorporate? Form an LLC, C or S-Corp. Free corp name check!

[« Back to Inbox](#) [Archive](#) [Report spam](#) [Delete](#) [Move to](#) [Labels](#) [More actions](#)

John Smith's company [Inbox](#) | [X](#)

Steve Bazyl to me [show details](#) 7:09 PM (8 minutes ago) [Reply](#)

John would like us to incorporate his company. Please let me know the next steps.

Thanks,
-Steve

Create a task or project from this email

[Assign Task](#) [Create Project](#)

[Reply](#) [Forward](#)

Gmail contextual gadgets

John Smith's company Inbox | X

★ **Steve Bazyl** to me [show details](#) 7:09 PM (11 minutes ago) Reply

John would like us to incorporate his company. Please let me know the next steps.

Thanks,
-Steve

Create a task or project from this email Help | Hide

Assign Task Create Project

Create Cancel

Project Name: Target Date:

Invite members: *Enter connection name(s) or email(s)*

[Show Options >>](#)

Create Cancel manymon

Calendar sidebar gadgets

- Can detect:
 - currently-displayed date range
 - currently-selected event
 - title
 - attendees
 - date/time

Calendar sidebar gadgets

The screenshot displays the Google Calendar interface for the week of May 16-22, 2010. The main calendar view is in 'Week' mode, showing events for Wednesday (I/O rehearsal) and Thursday (Google I/O). A red arrow points from the calendar grid to the 'TriplT' sidebar gadget. Other sidebar gadgets include 'My calendars' (Ryan Boyd), 'Other calendars' (US Holidays), and 'Next meeting'.

Calendar View Data:

Time	Sun 5/16	Mon 5/17	Tue 5/18	Wed 5/19	Thu 5/20	Fri 5/21	Sat 5/22
9am							
10am				10 - 6p Google I/O	10 - 6p Google I/O		
11am			11 - 12p I/O rehearsal				
12pm							
1pm			1:30p - 2:3 I/O Rehearsal				
2pm							
3pm							
4pm							
5pm							
6pm							

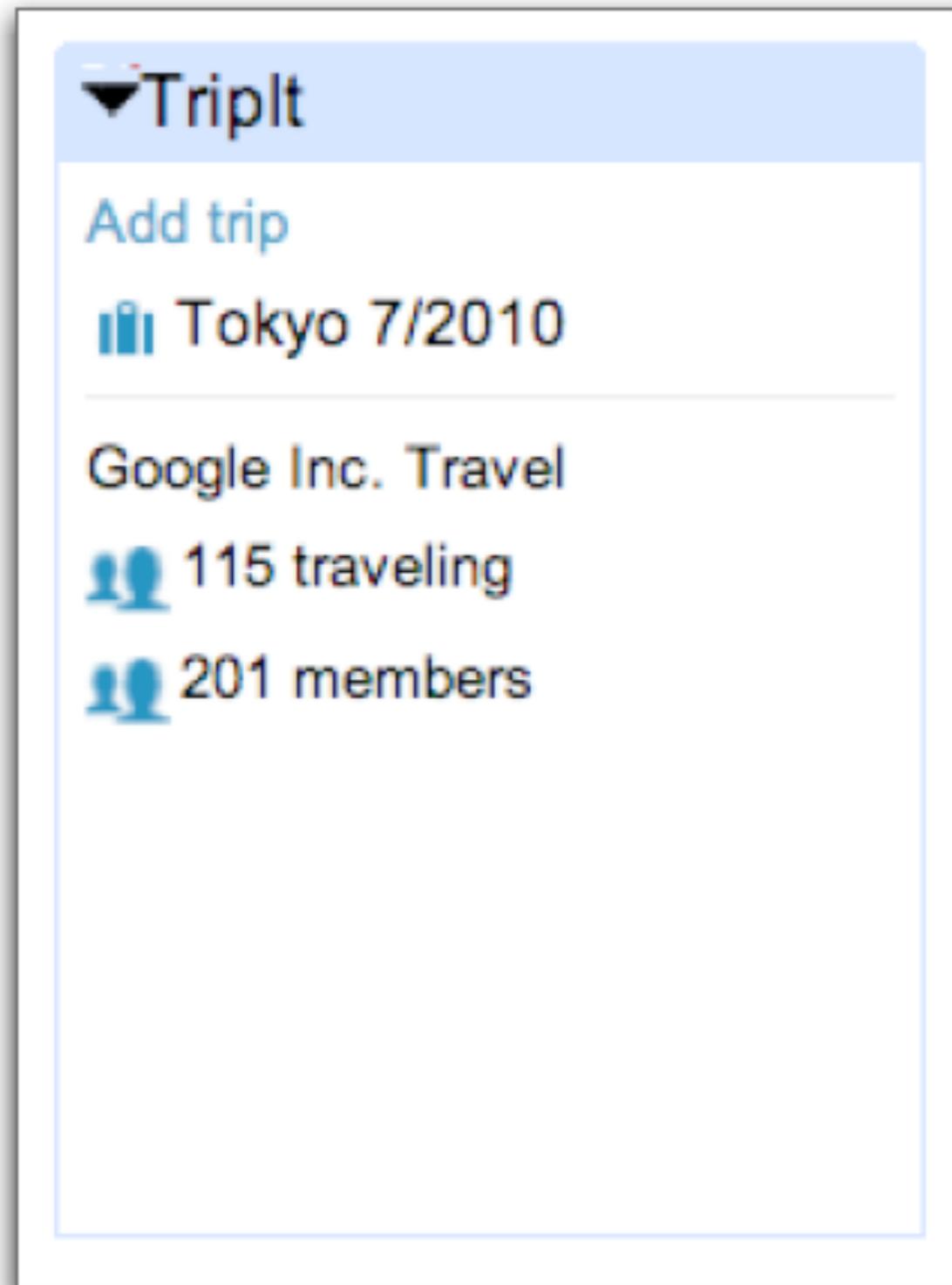
Calendar Sidebar Gadgets:

- Next meeting**
- TriplT**
 - Add trip
 - Tokyo 7/2010
 - Google Inc. Travel
 - 115 traveling
 - 201 members

Other Calendar Elements:

- My calendars:** Ryan Boyd (Settings, Create)
- Other calendars:** Add a coworker's calendar, US Holidays (Settings, Add)

Calendar sidebar gadgets



▼ Triplt

[Add trip](#)

 Tokyo 7/2010

Google Inc. Travel

 115 traveling

 201 members

Sell



Complete Manifest

```
<ApplicationManifest xmlns="http://schemas.google.com/
ApplicationManifest/2009">
  <Name>SaaSy Voice</Name>
  <Description>SaaSy Voice</Description>
  <Support>
    <Link rel="setup" href="https://.../setup.php?domain=${DOMAIN_NAME}" /
  >
    <Link rel="manage" href="https://.../config.php?domain=$
{DOMAIN_NAME}" />
    <Link rel="deletion-policy" href="http://.../deletion-policy.php" />
    <Link rel="support" href="http://.../support.php" />
  </Support>
```

Complete Manifest

(continued)

```
<!-- Link in universal navigation -->
<Extension id="oneBarLink" type="link">
  <Name>SaaSy Voice</Name>
  <Url>http://.../index.php?domain=${DOMAIN_NAME}</Url>
  <Scope ref="provisioningFeed"/>
  <Scope ref="contactsFeed"/>
  <Scope ref="docsFeed"/>
</Extension>
<!-- Declare our openid.realm -->
<Extension id="realm" type="openidRealm">
  <Url>http://voice.saasyapp.com/marketplace/</Url>
</Extension>
```

Complete Manifest

(continued)

```
<Scope id="provisioningFeed">
  <Url>https://apps-apis.google.com/a/feeds/user/#readonly</Url>
  <Reason>To get a list of users to provision accounts</Reason>
</Scope>
<Scope id="contactsFeed">
  <Url>https://www.google.com/m8/feeds/</Url>
  <Reason>To display names of people who called</Reason>
</Scope>
<Scope id="docsFeed">
  <Url>https://docs.google.com/feeds/</Url>
  <Reason>To export a call log</Reason>
</Scope>
</ApplicationManifest>
```

Listing in the Google Apps Marketplace

saasyvoice@marketplace-test.com | [My Vendor Profile](#) | [Help](#) | [Feedback](#) | [Sign out](#)

Google Apps Marketplace

Marketplaces ▾

Listing Information

All fields below are required.

My product may be directly installed into Google Apps domains
[How do I know if my product is installable?](#)

Category:

Name:
e.g. Productivity Builder or ACME Quickstart

Summary Overview:
131 character(s) remaining

Full Overview:
1320 character(s) remaining

Manifest:

Pricing summary:
115 character(s) remaining

Listing Notes and Collateral

[Add benefit points / external links](#)

Key benefits

-
-
-

Enter up to 3 feature/benefit statements of your solution

Try it! link:
URL to a demo or trial

Listing homepage:
URL to listing's existing web page

[Add a screenshot / logo](#)

Upload a screenshot No file chosen
Choose a gif, png, or jpeg image file

After uploading an image you might have to refresh the page for the new image to be displayed.

📷

Listing in the Google Apps Marketplace

Please review (and test) your listing.

Your listing will appear as shown below in the Marketplace. You may now test running your application on a domain by clicking "Add it now" button below. When you are ready, you may submit your listing for approval. (Google charges a one-time fee of **\$100** for submitting your first listing.)

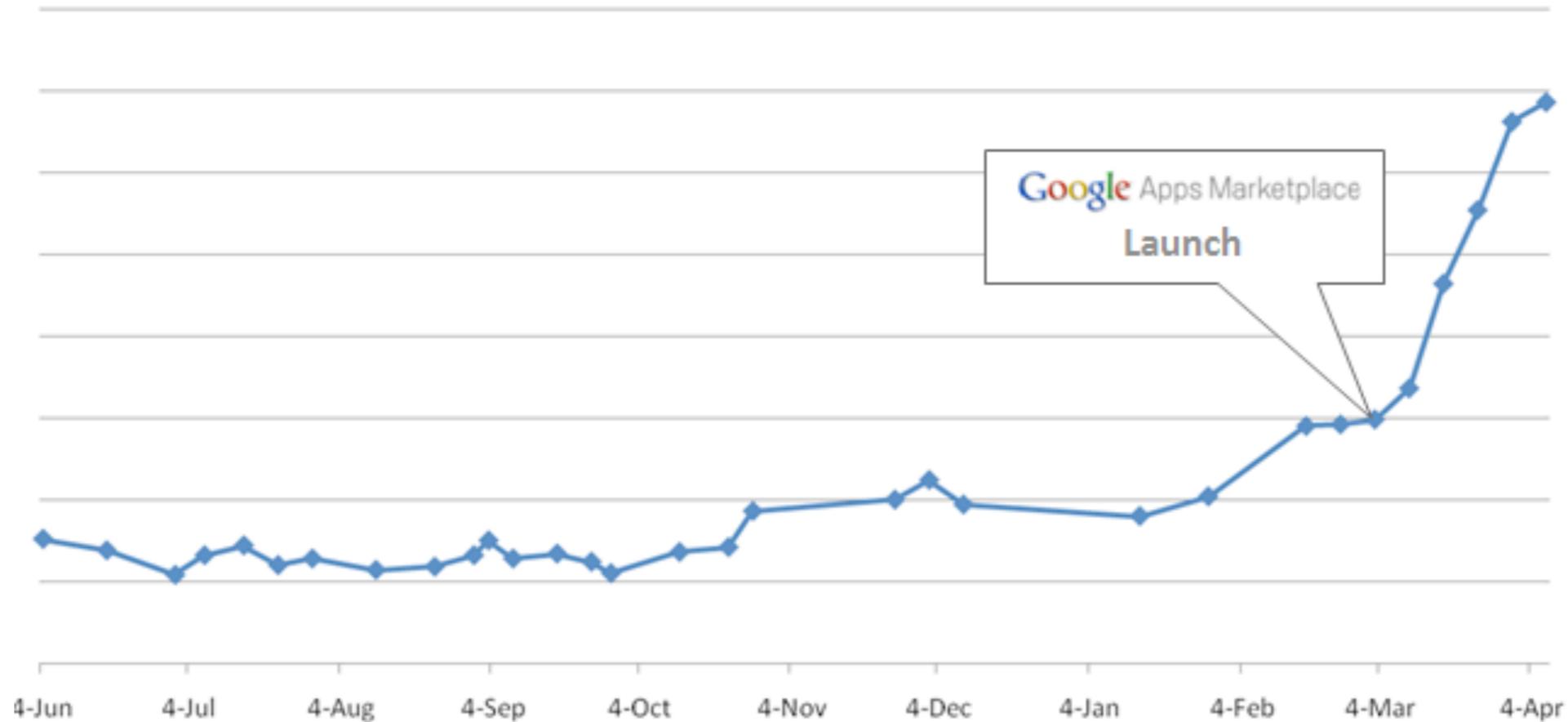
[Edit this listing](#)

[I am ready! Submit this listing for approval](#)



Reach 30 million Google Apps Users

Non PPC Strong Leads



"We've seen a very meaningful increase in high quality, non-paid lead flow directly attributable to Google Apps customers...Our customers cite Smartsheet's tight integration with Google's Data APIs as a key factor in their decision to purchase."

Brent Frei, Smartsheet

[Learn More](#)



Resources

- **Business and Marketing**
 - <http://developer.googleapps.com/marketplace>
- **Technical and Code**
 - <http://code.google.com/googleapps/marketplace>
- **Shopping!**
 - <http://www.google.com/appsmarketplace>
- **Don't have Google Apps?**
 - <http://www.google.com/a>

Google App Engine



Google App Engine

- Easy to **build**
- Easy to **maintain**
- Easy to **scale**

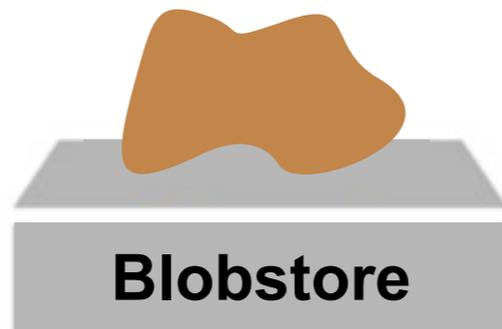
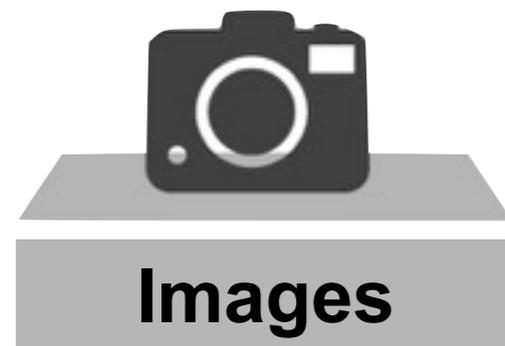
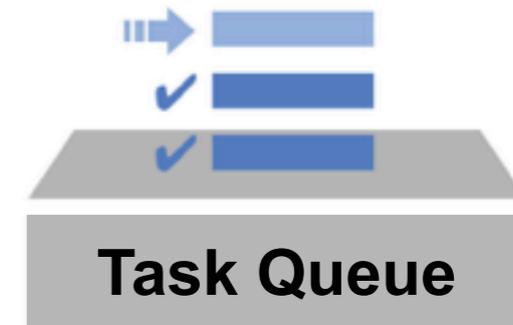
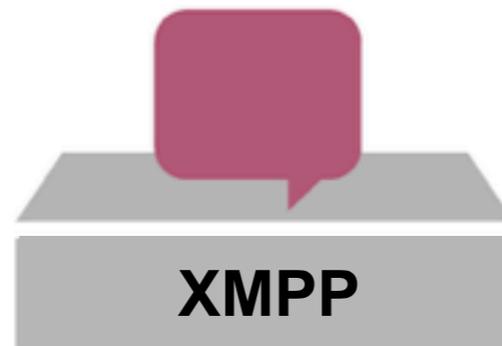
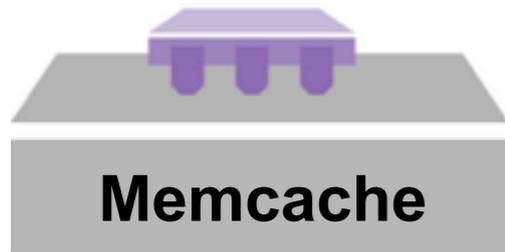


Cloud development in a box

- SDK & “The Cloud”
- Hardware
- Networking
- Operating system
- Application runtime
 - Java, Python
- Static file serving
- Services
- Fault tolerance
- Load balancing



App Engine Services



Always free to get started

~5M pageviews/month

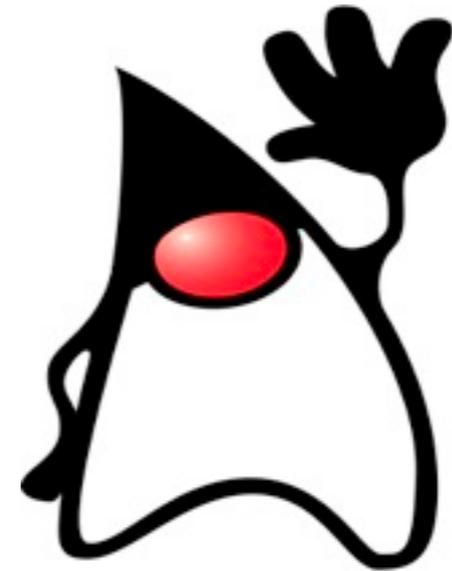
- 6.5 CPU hrs/day
- 1 GB storage
- 650K URL Fetch calls/day
- 2,000 recipients emailed
- 1 GB/day bandwidth
- 100,000 tasks enqueued
- 650K XMPP messages/day

Purchase additional resources *



* free monthly quota of ~5 million page views still in full effect

- Java
- Scala
- JRuby (Ruby)
- Groovy (Gaelyk Framework)
- Quercus (PHP)
- Rhino (JavaScript)
- Jython (Python)



Duke, the Java mascot
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Development Tools for Java App Engine



Google Plugin for Eclipse



Java - GuestBook/src/guestbook/GuestBookServlet.java - Eclipse Platform

Package Explorer

GuestBook

- src
 - guestbook
 - GuestBookServlet.java
 - META-INF
 - log4j.properties
 - App Engine SDK [appengine-java-sdk]
 - JRE System Library [JRE System Library]
 - war
 - WEB-INF
 - lib
 - appengine-...
 - logging.pro...
 - web.xml
 - index.html
 - ScottHelloWorld

Create a Web Application Project

Please configure a GWT SDK.

Project name: OurNewWebApp

Package: com.ourcompany.ournewwebapp

Location

- Create new project in workspace
- Create new project in:

Directory: /Users/scottmc/Documents/workspace/OurNewWebApp Browse...

Google

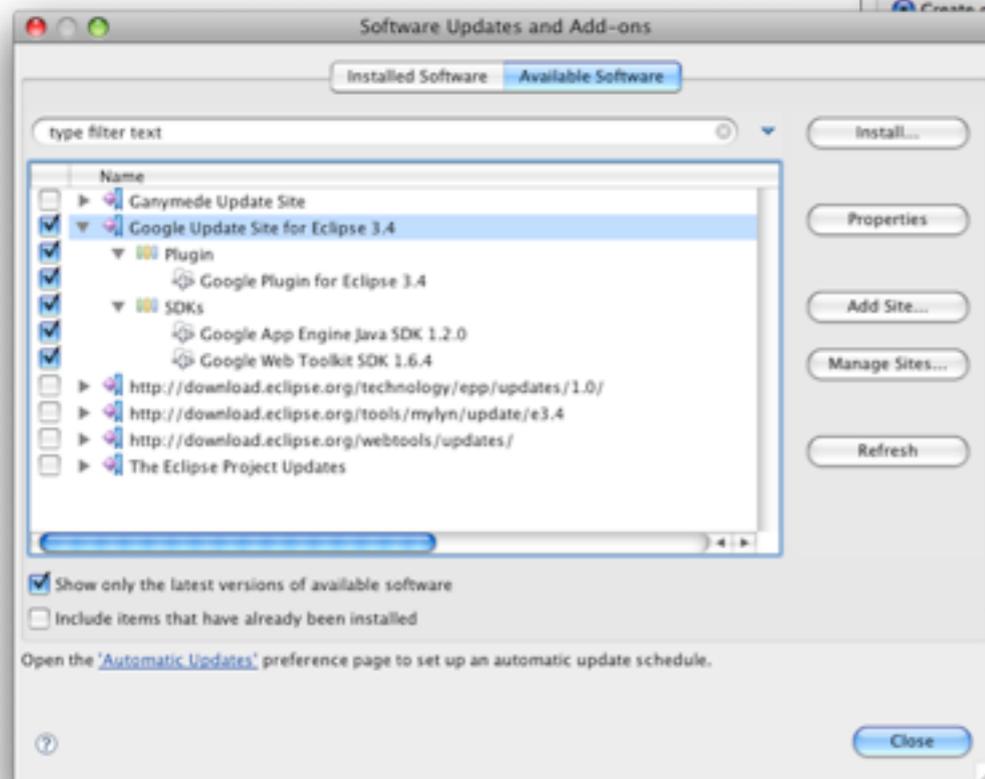
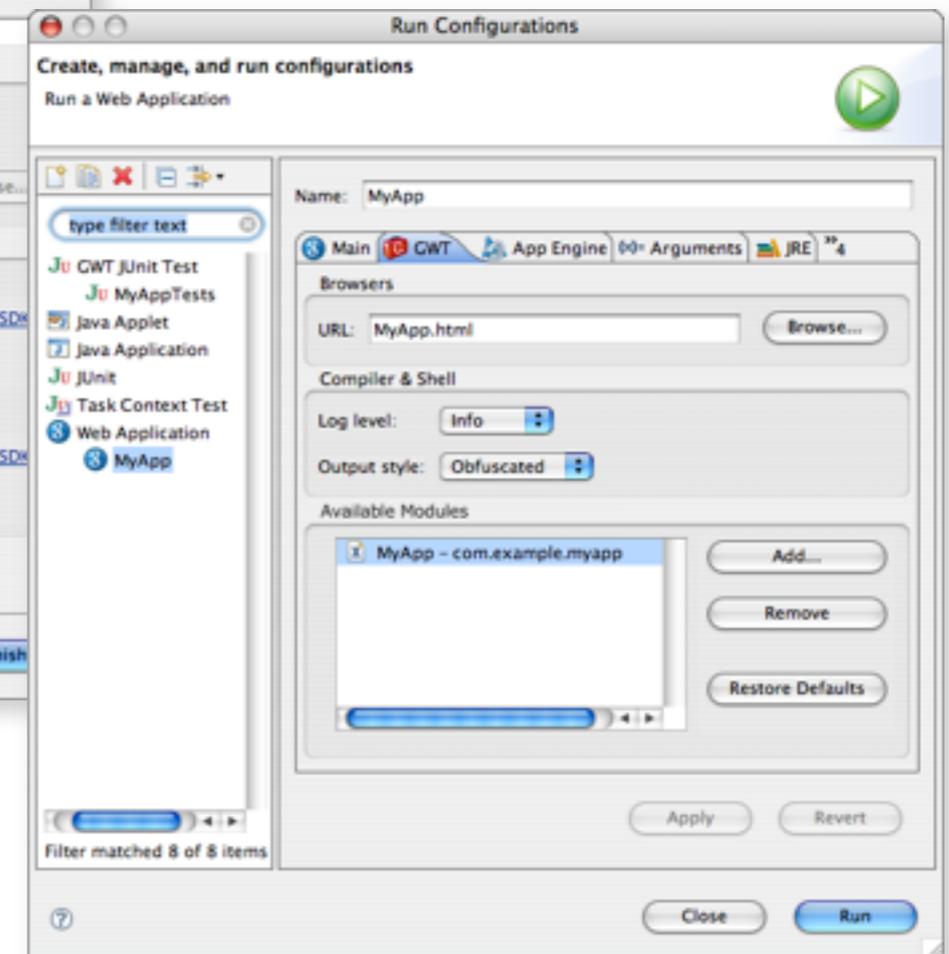
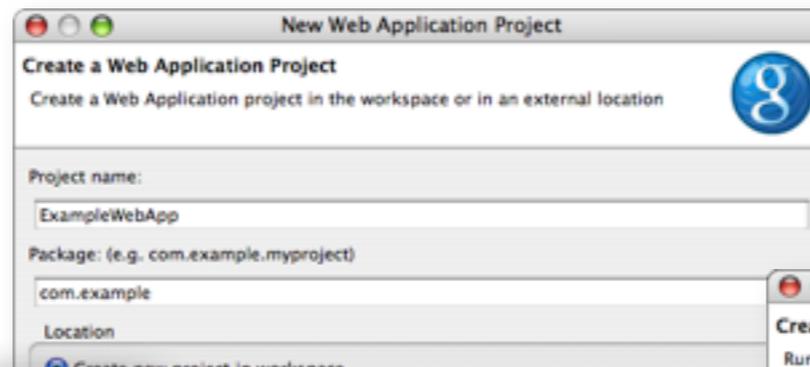
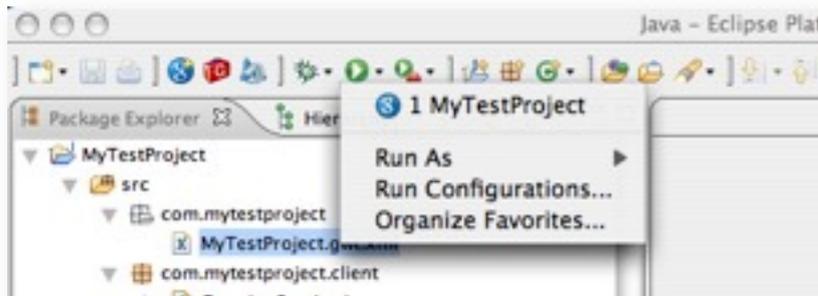
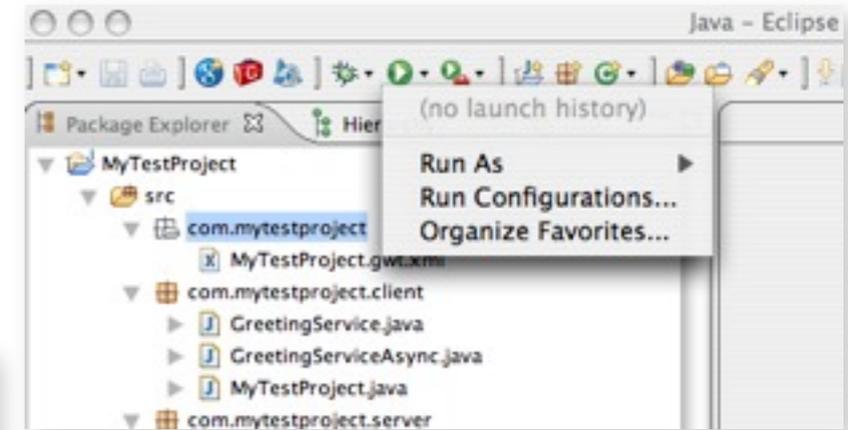
- Use Google Web Toolkit
 - Use default SDK (none) [Configure SDKs...](#)
 - Use specific SDK: [dropdown]
- Use Google App Engine
 - Use default SDK (appengine-java-sdk) [Configure SDKs...](#)
 - Use specific SDK: appengine-java-sdk [dropdown]

```
public class HttpServlet {
    request req, HttpServletResponse res) {
        res.setContentType("text/html");
        res.getWriter().println("Hello, world");
    }
}
```

Google Plugin for Eclipse

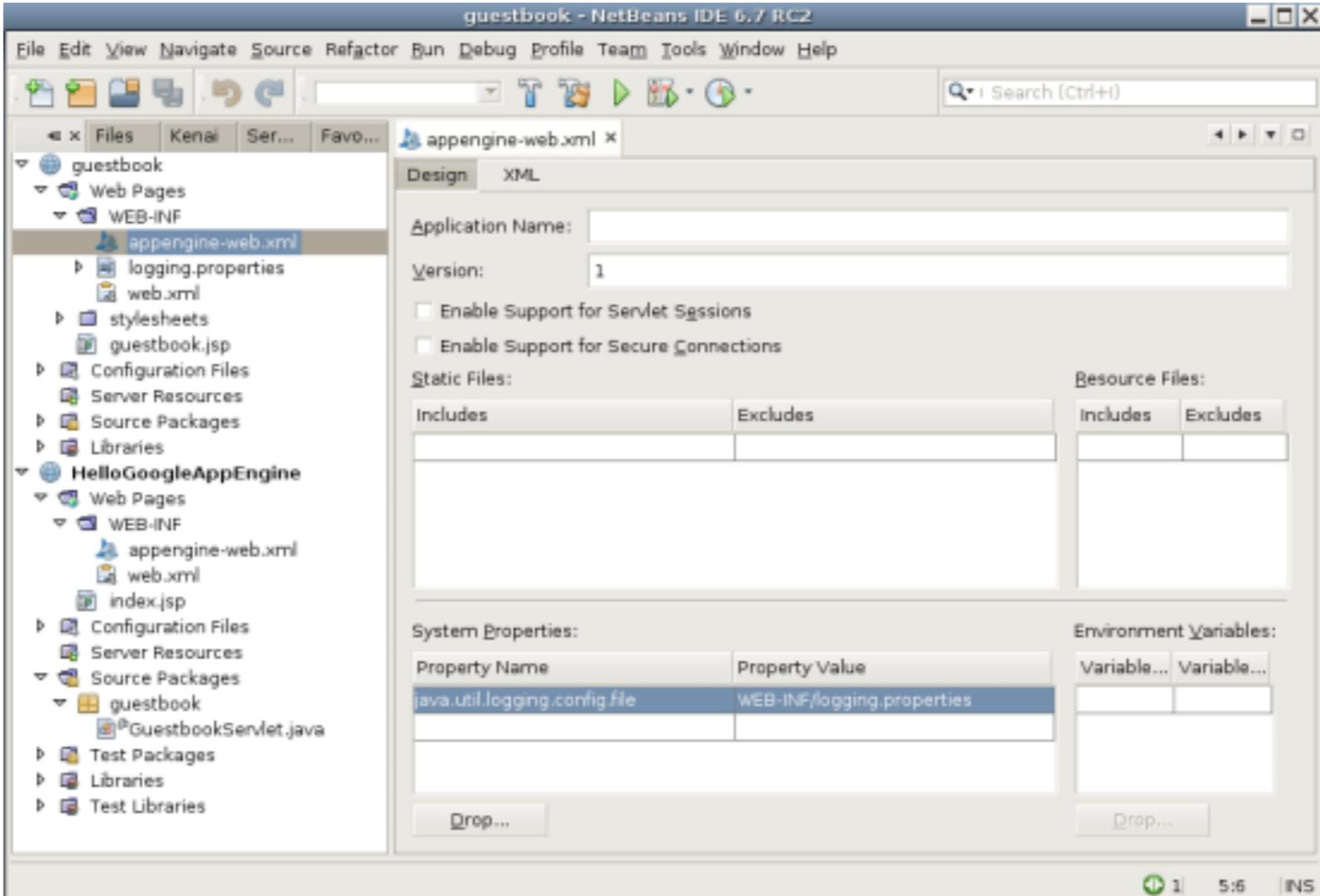


```
private static native void jsniMethod(boolean sayHi)/*- {  
    // Display a pop-up  
    if (sayHi) {  
        var name = this.@com.example.myapp.client.MyApp::name;  
        window.alert('Hello, ' + name);  
    }  
}/*-*/;
```



NeatBeans Plugin for Java App Engine

<http://kenai.com/projects/nbappengine/>







Gaelyk





Gaelyk

<http://gaelyk.appspot.com>





Gaelyk

<http://gaelyk.appspot.com>

Gaelyk - a lightweight Groovy toolkit for Google App Engine Java

Google

http://gaelyk.appspot.com/tutorial/

jeu3= mer19= jeu9= dim28= Gmail Reader DZone Twitter GAE reddit VMW Stock EUR/USD



Home Tutorial Download Community

Tutorial

The goal of this tutorial is to quickly get you started with using **Gaelyk** to let you write and deploy your Groovy applications on Google App Engine. We'll assume you have already downloaded and installed the Google App Engine SDK of your machine. If you haven't, please do so by reading the [instructions](#) from Google.

The easiest way to get setup rapidly is to download the template project from the [download section](#). It provides a ready-to-go project with the right configuration files pre-filled and an appropriate directory layout:

- `web.xml` preconfigured with the **Gaelyk** servlets
- `appengine-web.xml` with the right settings predefined (static file directive)
- a sample Groovlet and template
- the needed JARs (Groovy, Gaelyk and Google App Engine SDK)

You can [browse the JavaDoc](#) of the classes composing **Gaelyk**.

Setting up your project

Directory layout

We'll follow the directory layout proposed by the **Gaelyk** template project:

Google App Engine For Business



Google App Engine for Business

Same scalable cloud hosting platform. Designed for the enterprise.

- **Enterprise application management**
 - Centralized domain console
- **Enterprise reliability and support**
 - 99.9% Service Level Agreement
 - Premium Developer Support
- **Hosted SQL**
 - Managed relational SQL database in the cloud
- **SSL on your domain**
 - Including "naked" domain support
- **Secure by default**
 - Integrated Single Sign On (SSO)
- **Pricing that makes sense**
 - Pay only for what you use



* Hosted SQL and SSL on your domain available later this year

Domain Console

Domain

[Applications](#)

[Settings](#)

[Billing](#)

Domain Settings for chanezon.com

Mapping:

User Settings:

- Domain users must opt-in before using domain features
- Domain users can view the list of all domain applications
- Domain users can create domain applications

Domain:

chanezon.com

Application Identifier Prefix:

chanezon.com:

The application identifier, or app_id, for every domain application will be prefixed with chanezon.com:

Domain Administrators

Add Domain Administrator:

Complete email address, for example user@chanezon.com. **Note:** Google Apps administrators for the domain always have administrator access.

App Engine for Business Pricing

Intranet apps:

Each app costs \$8 / active user / month

Capped at \$1,000 / month (i.e. users above 125 are free)

Apps are auth-restricted to domain users

Development is free

Overage charges on Background Analysis/Storage

Non intranet apps (external/public/ISV apps):

Pricing TBD

Postpaid (i.e. billed at the end of month)

App Engine for Business Support

Paid Support

Email based

1000\$/month

1h response time on operational issues

8h on development issues

SLA

99.9% uptime

Service credits from 10% to 100% refund of monthly bill

Google Developer Qualification

Get Qualified.
<http://code.google.com/qualify>



Chrome Extensions



Gadgets



Search



App Engine



JS Maps API



KML



3D

App Engine for Data Crunchers

- High Performance Image Serving
- OpenId/Oauth integration
- Increased quotas
 - > 1k entities per query
 - 10” task queues
- Async UrlFetch
- Mapper API (Reduce coming soon)
- Channel API
- Matcher API

Mapper API

- First component of App Engine's MapReduce toolkit
- Large scale data manipulation
- Examples include:
 - Report generation
 - Computing statistics and metrics ...
- Python Example:
 - <http://blog.notdot.net/2010/05/Exploring-the-new-mapper-API>
- Java Example:
 - <http://ikaisays.com/2010/07/09/using-the-java-mapper-framework-for-app-engine/>

Channel API

- Allows for Server Push (Comet) to browser
 - Blog post announcement:
 - <http://googleappengine.blogspot.com/2010/05/app-engine-at-google-io-2010.html>
 - External coverage:
 - Sneak Peak from an early trusted tester
 - <http://bitshaq.com/2010/09/01/sneak-peak-gae-channel-api/>
- Demo code for Dance Dance Robot available here:
 - <http://code.google.com/p/dance-dance-robot/>
 - Also see: https://groups.google.com/group/google-appengine-java/browse_thread/thread/6fa09953ffae2cd3/c1db7de5fdb82b65?pli=1#

Matcher API

- Allows an app to register a set of queries to match against a stream of documents
 - Trustes Testers, Python only
 - Group post announcement:
 - <http://groups.google.com/group/google-appengine/msg/40021537e2e58962>
 - Docs:
 - <http://code.google.com/p/google-app-engine-samples/wiki/AppEngineMatcherService>
- Demo code:
 - <http://code.google.com/p/google-app-engine-samples/source/browse/#svn/trunk/matcher-sample>

Google Storage for Developers

Store your data in Google's cloud



What Is Google Storage?

- Store your data in Google's cloud
 - any format, any amount, any time
- You control access to your data
 - private, shared, or public
- Access via Google APIs or 3rd party tools/libraries

Google Storage Technical Details

RESTful API

- Verbs: GET, PUT, POST, HEAD, DELETE
- Resources: identified by URI, like:
`http://commondatastorage.googleapis.com/bucket/object`
- Compatible with S3

Buckets

- Flat containers (no bucket hierarchy)

Performance and Scalability

Object types and size

- Objects of any type and 100GB+ / Object
- Unlimited numbers of objects, 1000s of buckets
- Range-get support for data retrieval

Replication

- All data replicated to multiple US data centers
- Leveraging Google's worldwide network for data delivery

Consistency

- “Read-your-writes” data consistency

Security and Privacy Features

Authenticated downloads from a web browser

- Sharing with individuals
- Group sharing via Google Groups
- Sharing with Google Apps domains

Permissions set on Buckets or Objects

- READ (an object, or list a bucket's contents)
- WRITE (applicable to buckets, allows upload/delete/etc)
- FULL_CONTROL (read/write ACLs on objects or buckets)

Tools

Google Storage Manager

Send Feedback | mattg@google.com | Help | Sign out

Google code labs Google Storage for Developers

Places Home mrgtest123 Refresh New Folder Upload Delete

Drag and drop frequently used buckets and folders here for quicker access

Name	Size	Last Updated	Share Publicly
Test 1			
Test2			
script1.png	368 KB	12:15 pm	✓
script2.png	473 KB	12:16 pm	✓
script3.png	585 KB	12:16 pm	✓

gsutil

```
dhcp-172-19-3-109:~ wferrell$ gsutil

SYNOPSIS
gsutil [-d] [-h header]... command args

-d option shows HTTP protocol detail.

-h option allows you to specify additional HTTP headers, for example:
gsutil -h "Cache-Control:public,max-age=3600" -h "Content-Type:gzip" cp * g
s://bucket

Commands:
Concatenate object content to stdout:
cat [-h] uri...
-h Prints short header for each object.
Copy objects:
cp [-a canned_acl] [-t] [-z ext1,ext2,...] src_uri dst_uri
- or -
cp [-a canned_acl] [-t] [-z extensions] uri... dst_uri
-a Sets named canned_acl when uploaded objects created (list below).
-t Sets MIME type based on file extension.
-z 'txt,html' Compresses file uploads with the given extensions.
Get ACL XML for a bucket or object (save and edit for "setacl" command):
```

Google Storage Benefits



High Performance and Scalability
Backed by Google infrastructure

Strong Security and Privacy
Control access to your data



Easy to Use
Get started fast with Google & 3rd party tools

Some Early Google Storage Adopters

vmware®

 syncplicity

 LITECH

 APPIRIO™

 SnapABug



VIVU

 Cloud Sherpas

mēmeo

widgetbox

theguardian

socialwok 

XYLABS

Google Storage usage within Google

Google
BigQuery

Google
Prediction API

Panoramio
from Google

picnik

google.org
Haiti Relief Imagery

Google patents
USPTO data



double
click

Partner Reporting



Partner Reporting

Google Storage - Availability

Limited preview in US* currently

- 100GB free storage and network per account
- Sign up for wait list at
 - <http://code.google.com/apis/storage/>

* Non-US preview available on case-by-case basis

Google Prediction API

Google's prediction engine in the cloud

Introducing the Google Prediction API

- Google's sophisticated machine learning technology
- Available as an on-demand RESTful HTTP web service

“Tous pour un,
un pour tous,
c'est notre
devise.”



A virtually endless number of applications...



Customer
Sentiment



Transaction
Risk



Species
Identification



Message
Routing



Diagnostics



Churn
Prediction



Legal Docket
Classification



Suspicious
Activity



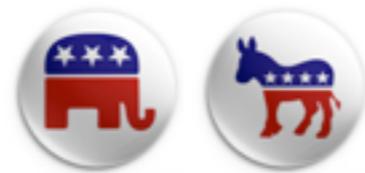
Work Roster
Assignment



Inappropriate
Content



Recommend
Products



Political
Bias



Uplift
Marketing



Email
Filtering



Career
Counseling

... and many more ...

How does it work?

1. TRAIN

The Prediction API finds relevant *features* in the sample data during training.

"english"	The quick brown fox jumped over the lazy dog.
"english"	To err is human, but to really foul things up you need a computer.
"spanish"	No hay mal que por bien no venga.
"spanish"	La tercera es la vencida.

2. PREDICT

The Prediction API later searches for those *features* during prediction.

?	To be or not to be, that is the question.
?	La fe mueve montañas.

Marketplaces

Google Apps

Products

- Accounting & Finance
- Admin Tools
- Calendar & Scheduling
- Customer Management
- Document Management
- EDU
- Productivity
- Project Management
- Sales & Marketing
- Security & Compliance
- Workflow

Professional Services

- Archiving & Discovery Implementation
- Custom Application Development
- EDU Specialists
- Google Analytics
- Medium-Large Business Implementation
- Small Business Implementation
- Support & Managed Services
- Training & Change Management

Enterprise Search

Products

- Content Connectors
- OneBox Modules
- Search Extensions

Professional Services

- GSA Deployment
- Google Mini Deployment
- Custom Development
- Training
- GeoSpatial Solutions

The Google Apps Marketplace offers products and services designed for Google users, including installable apps that integrate directly with Google Apps. Installable apps are easy to use because they include single sign-on, Google's universal navigation, and some even include features that integrate with your domain's data.

Featured Apps

Concur Breeze – Free Mobile and Web Expense Reporting

Concur Breeze is designed specifically to help small and mid-sized businesses take the hassle out of expense reporting, allowing your employees to spend more time making your business successful.

Concur
Breeze



• Try popular & notable apps

SAP StreamWork



SAP StreamWork

SAP StreamWork is a collaborative decision-making solution that brings together the people, information, and proven business approaches to drive fast, meaningful results.



ERPLY

ERPLY offers web-based software for managing your points of sale, inventory, relationships and billing.



Gantter Project

Gantter.com is a powerful, web-based Project Management Tool that requires no software to be installed and it completely integrates with Google Docs.

"Tops" in Google Apps

Top Installed this week

1. [Insightly: Free simple CRM and Project Management](#)
★★★★★ 321 reviews
2. [Manymoon: Free Social Productivity, Project Management & Task Management](#)
★★★★★ 194 reviews
3. [Zoho CRM \(3 users free\)](#)
★★★★★ 41 reviews
4. [MailChimp](#)
★★★★★ 23 reviews
5. [myERP.com \(Free 2 users\) Accounting CRM Sales Inventory](#)
★★★★★ 72 reviews

Top installed

1. [Manymoon: Free Social Productivity, Project Management & Task Management](#)
★★★★★ 194 reviews
2. [Insightly: Free simple CRM and Project Management](#)
★★★★★ 321 reviews
3. [Aviary Design Suite \(Free\)](#)
★★★★★ 14 reviews
4. [OffiSync - \[FREE\] Integrate Microsoft Office with Google Apps](#)
★★★★★ 572 reviews
5. [Zoho CRM \(3 users free\)](#)
★★★★★ 41 reviews

Recently added

- [Zoho Books - Accounting and bookkeeping software](#)

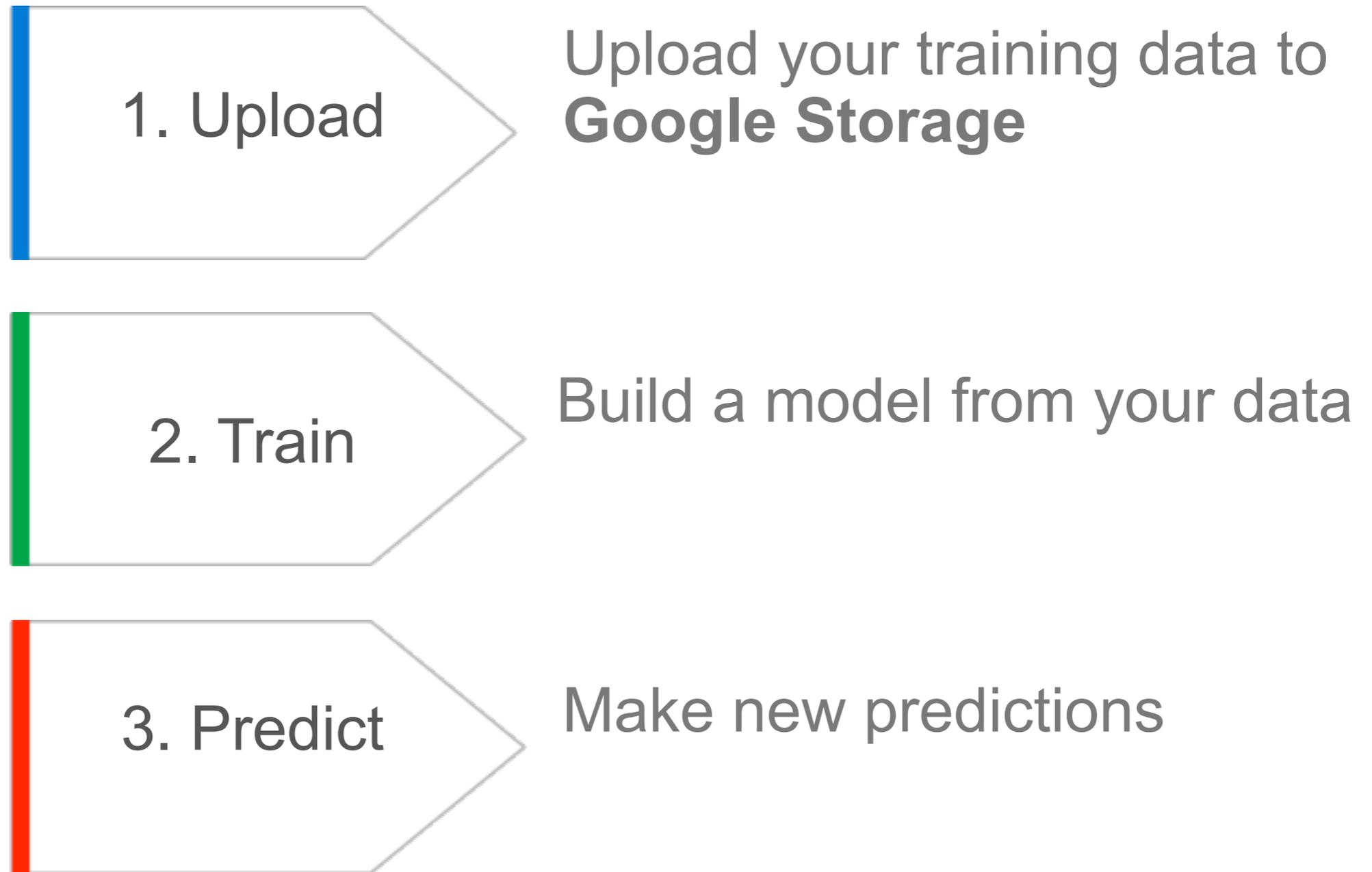
A Prediction API Example

Automatically determine application recommendations

- **Goal:** Increase relevancy on the Apps Marketplace via recommendations
- **Customers:** Businesses of various sizes and industries using Google Apps around the world
- **Data:** Sampling of previous installs of applications
- **Outcome:** Predict applications which would be appropriate for a new customer visiting the site

Using the Prediction API

A simple three step process...



Step 1: Upload

Upload your training data to Google Storage

- Training data: **outputs** and **input features**
- Data format: comma separated value format (CSV), result in first column

```
"SlideRocket", "EDUCATION", "us", "en", "10", "5"  
"MailChimp", "BUSINESS", "us", "en", "7", "0"  
"MailChimp", "STANDARD", "se", "sv", "1", "0"  
"Smartsheet", "BUSINESS", "us", "en", "13", "4"
```

Upload to Google Storage

```
gsutil cp installs gs://appdata/
```

Step 2: Train

Create a new model by training on data

To train a model:

```
POST prediction/v1.1/training?data=appdata%2Finstalls
```

Training runs asynchronously. To see if it has finished:

```
GET prediction/v1.1/training/appdata%2Finstalls
```

```
{ "data": {  
  "data": "appdata/installs",  
  "modelinfo": "estimated accuracy: 0.xx" } }
```

Step 3: Predict

Apply the trained model to make predictions on new data

```
POST prediction/v1.1/query/appdata%2Finstalls/predict
```

```
{ "data": {  
  "input": { "mixture" : [  
    "EDUCATION", "us", "en", "10", "0" ] } } }
```

```
{ data : {  
  "kind" : "prediction#output",  
  "outputLabel": "Manymoon",  
  "outputMulti" : [  
    {"label": "OffiSync", "score": x.xx}  
    {"label": "Zoho CRM", "score": x.xx}  
    {"label": "MailChimp", "score": x.xx}] } }
```

Demo!

Demo Screenshots

The screenshot shows a Google Docs document titled "Predict Apps" with a "Prediction API" menu. A spreadsheet is open with columns A through H and rows 1 through 17. The spreadsheet contains the following data:

	A	B	C	D	E	F	G	H
1			Valid					
2			STANDARD, PREMIER, EDUCATION					
3	Edition		2-letter country code					
4	Country Code							
5	Language							
6	Company Type							
7			5 for 1,001-5,000 6 for 5,001+					
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								

A "Perform a Prediction" dialog box is overlaid on the spreadsheet. It contains the following fields and options:

- Google Apps Edition: EDUCATION
- Country: United States
- Language: English
- Company Type: Education
- Company Size: 501-1,000

A "Run Prediction" button is located at the bottom of the dialog box.

Predicting apps for a 501-1,000 seat educational institution

Demo Screenshots

The screenshot shows a Google Docs spreadsheet titled 'Predict Apps' with a 'Prediction API' menu item. A dialog box titled 'Prediction Complete!' is overlaid on the spreadsheet. The dialog box contains a list of app names and their predicted scores. The spreadsheet data is as follows:

App Name	Score
EasyBib Bibliography	-28.9072
User Renamer for Google Apps	-29.5511
SherpaTools for Google Apps (FREE!)	-29.5936
PlanbookEdu Lesson Planner	-29.8956
Grockit Learning Platform	-30.1503
Free Gradebook and Lesson Plan Software	-33.9449
Promevo gPanel for Google Apps Administration	-34.2701
Power Panel for Google Apps	-34.2733
Aviary Design Suite (Free)	
Dito Directory - Shared Contacts Manager	
SurveyMonkey	
Google Apps File Audit Tool	
OffiSync - [FREE] Integrate Microsoft Office with Google Apps	
eStreamDesk Helpdesk	
Mojo Helpdesk	
MeetingMix: Run Productive Meetings	

Predicting apps for a 501-1,000 seat educational institution

Demo Screenshots

The screenshot shows the Google Docs Predict Apps interface. The spreadsheet contains the following data:

	A	B	C	D	E	F	G	H
1	SherpaTools for Google Apps (FREE!)	-24.8841						
2	User Renamer for Google Apps	-25.429						
3	Power Panel for Google Apps	-26.694						
4	Dito Directory - Shared Contacts Manager	-26.796						
5	Promevo gPanel for Google Apps Administration	-26.928						
6	Aviary Design Suite (Free)	-27.188						
7	EasyBib Bibliography	-27.5						
8	OffiSync - [FREE] Integrate Microsoft Office with Google Apps	-27.755						
9	SurveyMonkey	-27.951						
10	Mojo Helpdesk	-28.482						
11	eStreamDesk Helpdesk	-28.5436						
12	PlanbookEdu Lesson Planner	-28.7191						
13	Jobvite Recruiting Software	-28.7334						
14	Creately - Online Diagramming and Design	-28.7879						
15	Grockit Learning Platform	-28.8383						
16	Backupify ? Backup and Restore for Google							

The 'Perform a Prediction' dialog box is open, showing the following settings:

- Google Apps Edition: BUSINESS
- Country: United States
- Language: English
- Company Type: Professional Services
- Company Size: 50 or less

A 'Run Prediction' button is visible at the bottom of the dialog box.

Predicting apps for a small business

Demo Screenshots

Google docs Predict Apps Private to me + 2 more Saved 2 minutes ago Saved Share

File Edit View Insert Format Form Tools Help Prediction API

Formula: Insightly: Free simple CRM and Project Management Show all formulas

	A	H
1	Insightly: Free simple CRM and Project Management	
2	Zoho CRM (3 users free)	
3	OffiSync - [FREE] Integrate Microsoft Office with Google Apps	
4	MailChimp	
5	Triplt - Free Travel Organizer	
6	Aviary Design Suite (Free)	
7	FreshBooks online billing and bookkeeping	
8	Gist Gadget - Rich Business Profiles	
9	SherpaTools for Google Apps (FREE!)	
10	Smartsheet Project Management for Google Apps	
11	myERP.com (Free 2 users) Accounting CRM Sales Inventory	
12	Expensify - Free expense reports	-16.3192
13	Solve360 :: CRM Meets Project Management for Serious Business	-16.3512
14	GQueues	-16.4362

Prediction Complete!

	Insightly: Free simple CRM and Project Management	-15.3239
	Zoho CRM (3 users free)	-15.3715
	OffiSync - [FREE] Integrate Microsoft Office with Google Apps	-15.465
	MailChimp	-15.6044
	Triplt - Free Travel Organizer	-15.6145

Predicting apps for a small business

Prediction API Capabilities

Data

- Input Features: numeric or unstructured text
- Output: up to hundreds of discrete categories, or continuous values

Training

- Many machine learning techniques
- Automatically selected
- Performed asynchronously

Access from many platforms:

- Web app from Google App Engine
- Apps Script (e.g. from Google Spreadsheet)
- Desktop app

Prediction API - Pricing

Free Quota in trial/development

- 100 predictions/day, 5MB trained/day
- Available for 6 months

Paid Usage

- \$10/month per project includes 10,000 predictions
- Additional predictions are \$0.50 per 1,000
- Absolute limit of 60,000 predictions per day
- \$0.002 per MB trained (max size per dataset is 100MB)

Google Storage - Availability

Limited preview in US* currently

- Sign up for wait list at
 - <http://code.google.com/apis/predict/>

* Non-US preview available on case-by-case basis

Google BigQuery

Interactive analysis of large datasets in Google's cloud

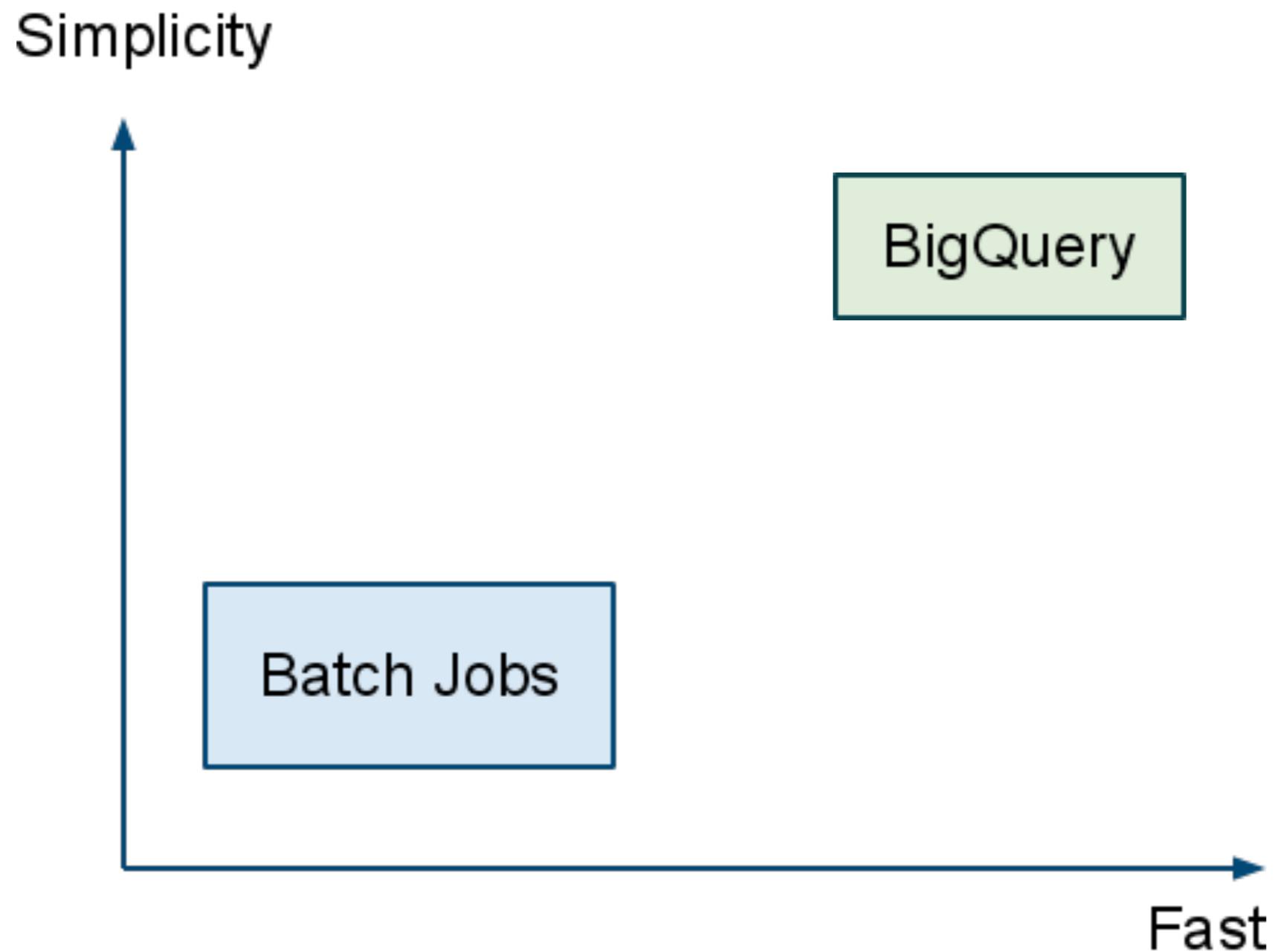
Introducing Google BigQuery

- Google's large data adhoc analysis technology
 - Analyze massive amounts of data in seconds
- Simple SQL-like query language
- Flexible access
 - REST APIs, JSON-RPC, Google Apps Script



Why BigQuery?

Working with large data is a challenge



Many Use Cases ...



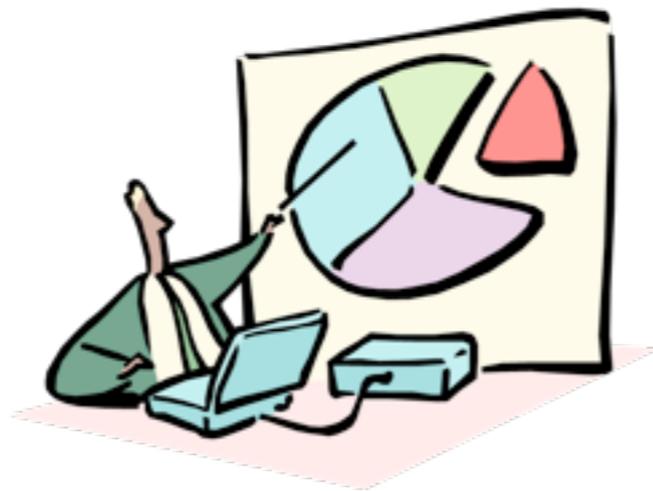
Interactive
Tools



Spam



Trends
Detection



Web
Dashboards



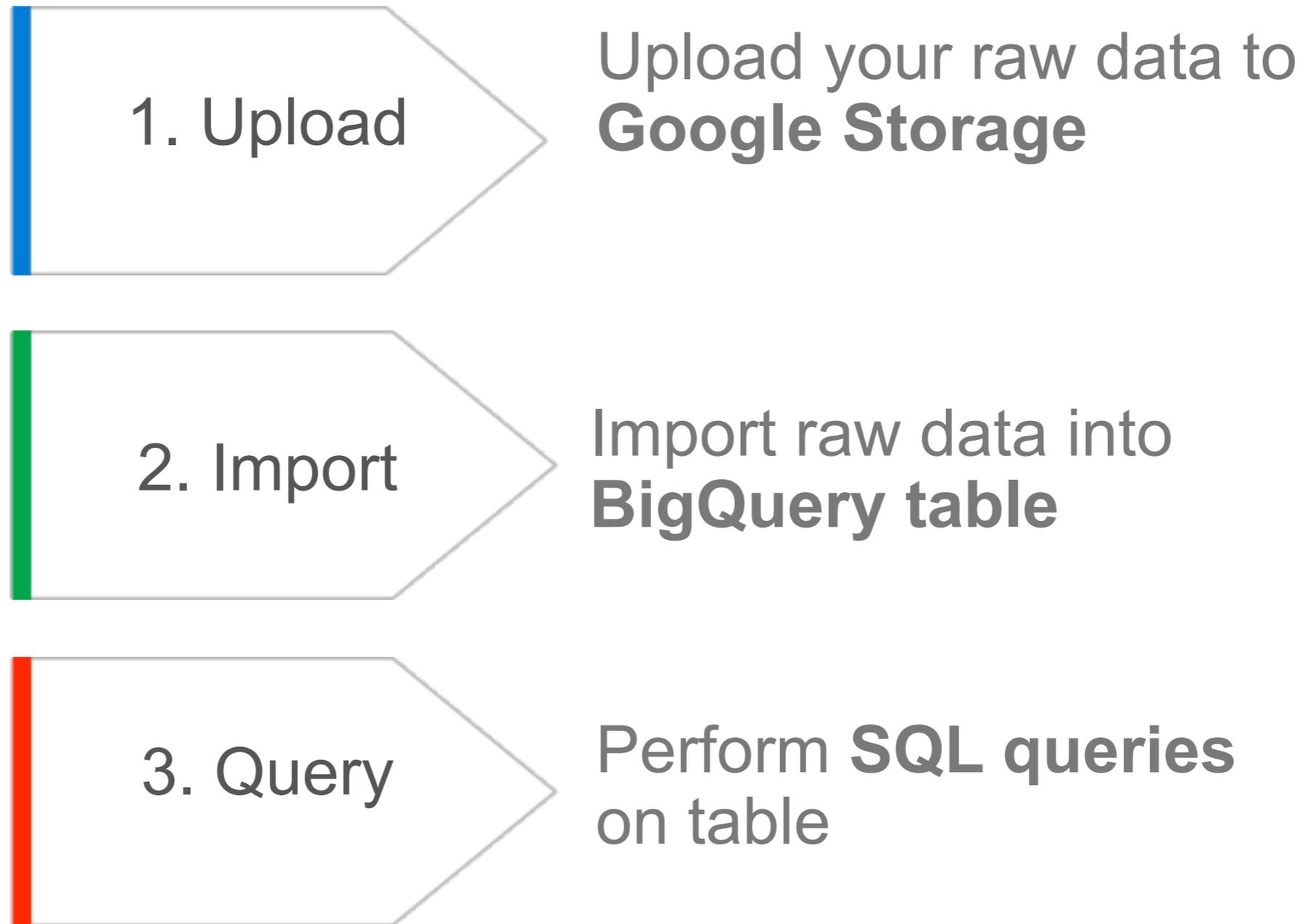
Network
Optimization

Key Capabilities of BigQuery

- **Scalable:** Billions of rows
- **Fast:** Response in seconds
- **Simple:** Queries in SQL
- Web Service
 - REST
 - JSON-RPC
 - Google App Scripts

Using BigQuery

Another simple three step process...



Writing Queries

Compact subset of SQL

- **SELECT ... FROM ...
WHERE ...
GROUP BY ... ORDER BY ...
LIMIT ...;**

Common functions

- **Math, String, Time, ...**

Additional statistical approximations

- **TOP**
- **COUNT DISTINCT**



BigQuery via REST

```
GET /bigquery/v1/tables/{table name}
```

```
GET /bigquery/v1/query?q={query}
```

Sample JSON Reply:

```
{
  "results": {
    "fields": { [
      {"id": "COUNT(*)", "type": "uint64"}, ... ]
    },
    "rows": [
      {"f": [{"v": "2949"}, ...]},
      {"f": [{"v": "5387"}, ...]}, ... ]
    }
  }
}
```

Also supports JSON-RPC

Security and Privacy

Standard Google Authentication

- Client Login
- OAuth
- AuthSub

HTTPS support

- protects your credentials
- protects your data

Relies on Google Storage to manage access



Large Data Analysis Example

Wikimedia Revision History

BigQuery

[Help](#) [Report a problem](#) [Send feedback](#) [Sign out](#)

Enter SQL query

```
SELECT TOP(title, 5), COUNT(*)  
FROM [wikipedia]  
WHERE wp_namespace = 0;
```

Run

Wikimedia Revision history data from:

<http://download.wikimedia.org/enwiki/latest/enwiki-latest-pages-meta-history.xml.7z>

Large Data Analysis Example

Wikimedia Revision History

BigQuery

[Help](#) [Report a problem](#) [Send feedback](#) [Sign out](#)

Enter SQL query

```
SELECT TOP(title, 5), COUNT(*)  
FROM [wikipedia]  
WHERE wp_namespace = 0;
```

Run

TOP(title, 5)	COUNT(*)
George W. Bush	43652
List of World Wrestling Entertainment emplo	30571
Wikipedia	29722
United States	27432
TOP(title, 5)	COUNT(*)

Wikimedia Revision history data from:

<http://download.wikimedia.org/enwiki/latest/enwiki-latest-pages-meta-history.xml.7z>

Using BigQuery Shell

Python DB API 2.0 + B. Clapper's `sqlcmd`

<http://www.clapper.org/software/python/sqlcmd/>

```
Editor
title          STRING NULL
id             INT64 NULL
is_bot         BOOL NULL
comment        STRING NULL
num_characters INT32 NULL
is_minor       BOOL NULL

? SELECT TOP(title, 5), COUNT(*) FROM [bigquery.test.001/tables/wikipedia]
> WHERE wp_namespace = 0;
Execution time: 10.953 seconds
5 rows

TOP(title, 5)          COUNT(*)
-----
George W. Bush        43652
List of World Wrestling Entertainment employees  30572
Wikipedia             29726
United States         27433
Michael Jackson       23245

? |
```

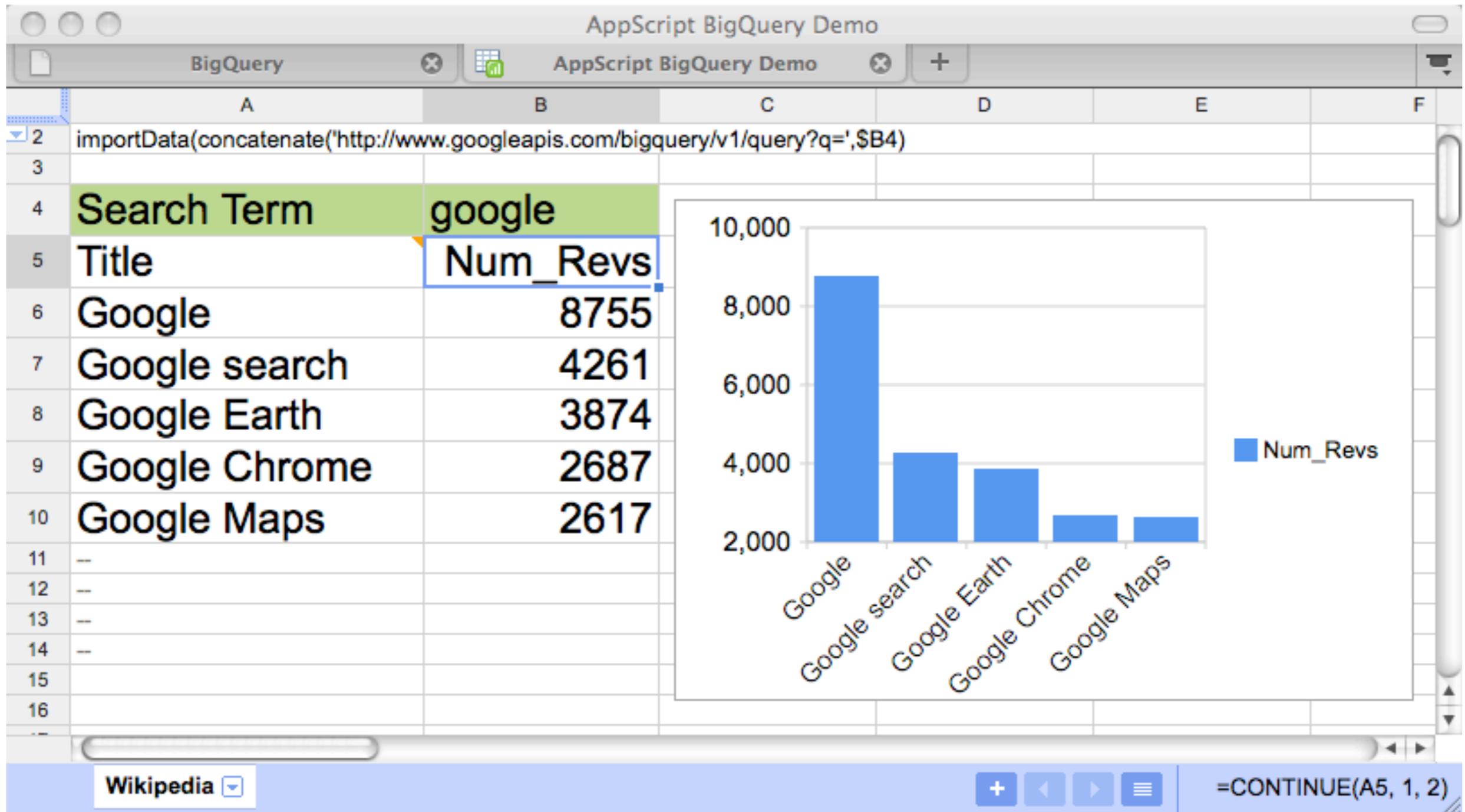


BigQuery from a Spreadsheet

The screenshot shows a Google Spreadsheet titled "AppScript BigQuery Demo" with two tabs: "BigQuery" and "AppScript BigQuery Demo". The spreadsheet has columns A through F and rows 2 through 16. Row 2 contains the formula: `importData(concatenate('http://www.googleapis.com/bigquery/v1/query?q=', $B4))`. Row 4 has "Search Term" in column A and "*novalue*" in column B. Row 5 has "Title" in column A and "Num_Revs" in column B. Rows 6 through 10 have dashes in both columns. A large white box with the text "No data" is overlaid on the right side of the spreadsheet. The bottom status bar shows "Wikipedia" in a dropdown menu, navigation buttons, and the formula `=CONTINUE(A5, 1, 2)`.

Search Term	*novalue*
Title	Num_Revs
--	--
--	--
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--	--
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--	--
--	--

BigQuery from a Spreadsheet



Google Fusion Tables



Google Fusion Tables

- Manage large collections of tabular data in the cloud
 - 100 Mb tables
 - Filters, Aggregation, Merge
 - ACL, Collaboration, Discuss Data
 - Visualizations
- REST API
 - Geo queries
- Maps Integration
 - FusionTablesLayer



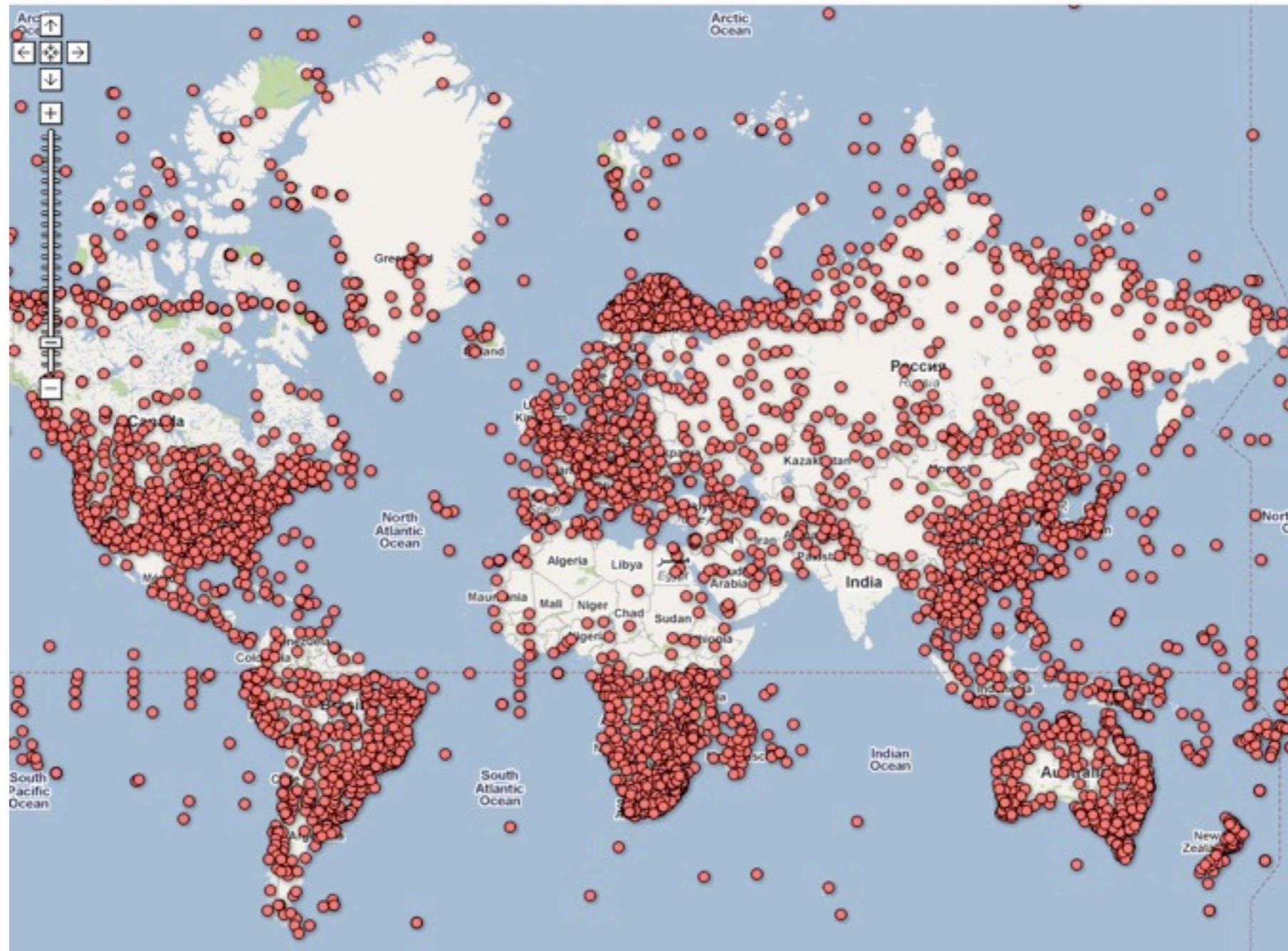
Google Fusion Tables

Google fusion tables weather-stations.csv US National Climatic Data Center

File View Edit Visualize Merge

Current view: All - [Show options](#)

Location Display as heat map [Configure info window](#) [Configure styles](#) [Export to KML](#) [Get KML network link](#) [Get embeddable link](#)



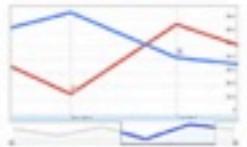
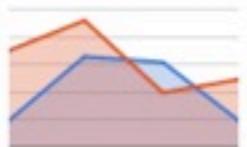
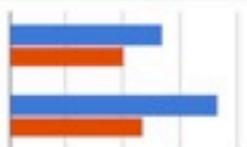
Google Visualization API



Google Visualization API

- Collection of JavaScript Visualization components
 - Some from Google (Chart Tools)
 - Some from other developers
 - Share the same wire protocol for Data Sources

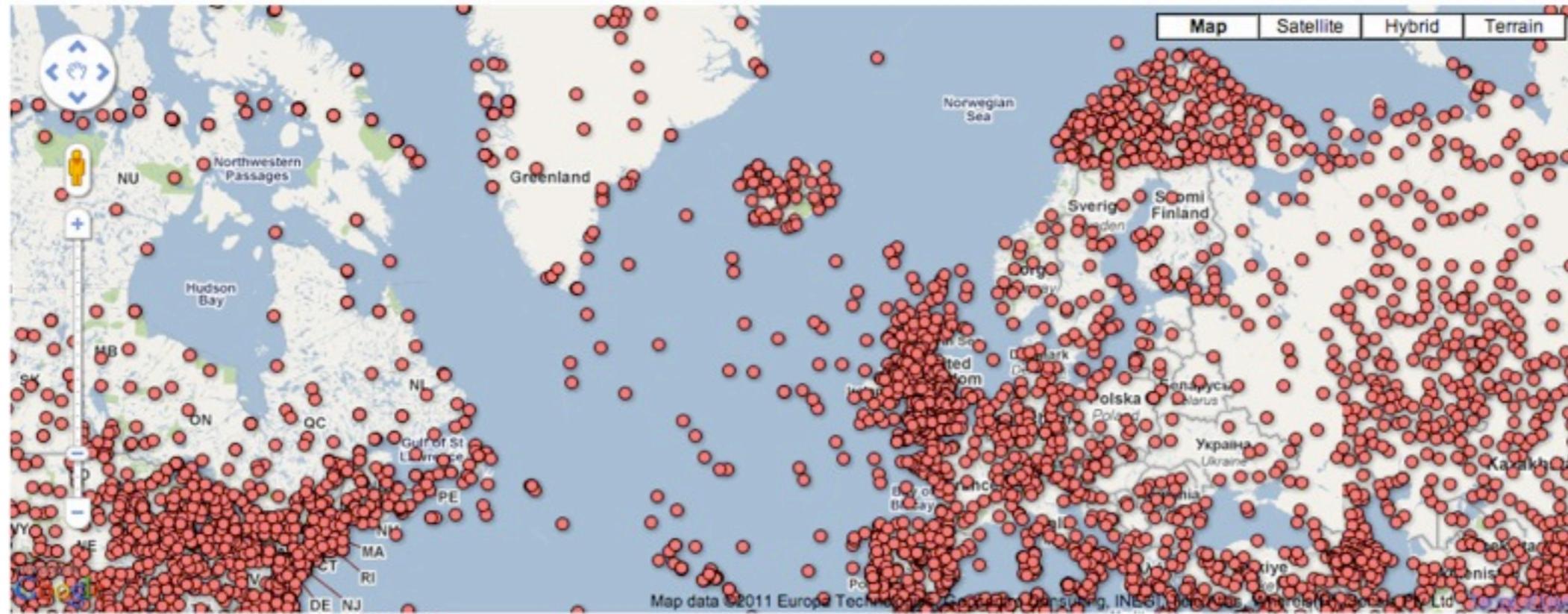
Filter charts by type:

	Annotated Time Line An animated time series chart. By: Google	GWT Integrated
	Area Chart (Image) Area chart using Google Chart API . By: Google	GWT Integrated
	Area Chart Interactive area chart. By: Google	GWT Integrated
	Bar Chart (Image) Bar chart using Google Chart API . By: Google	GWT Integrated
	Bar Chart Interactive bar chart. By: Google	GWT Integrated

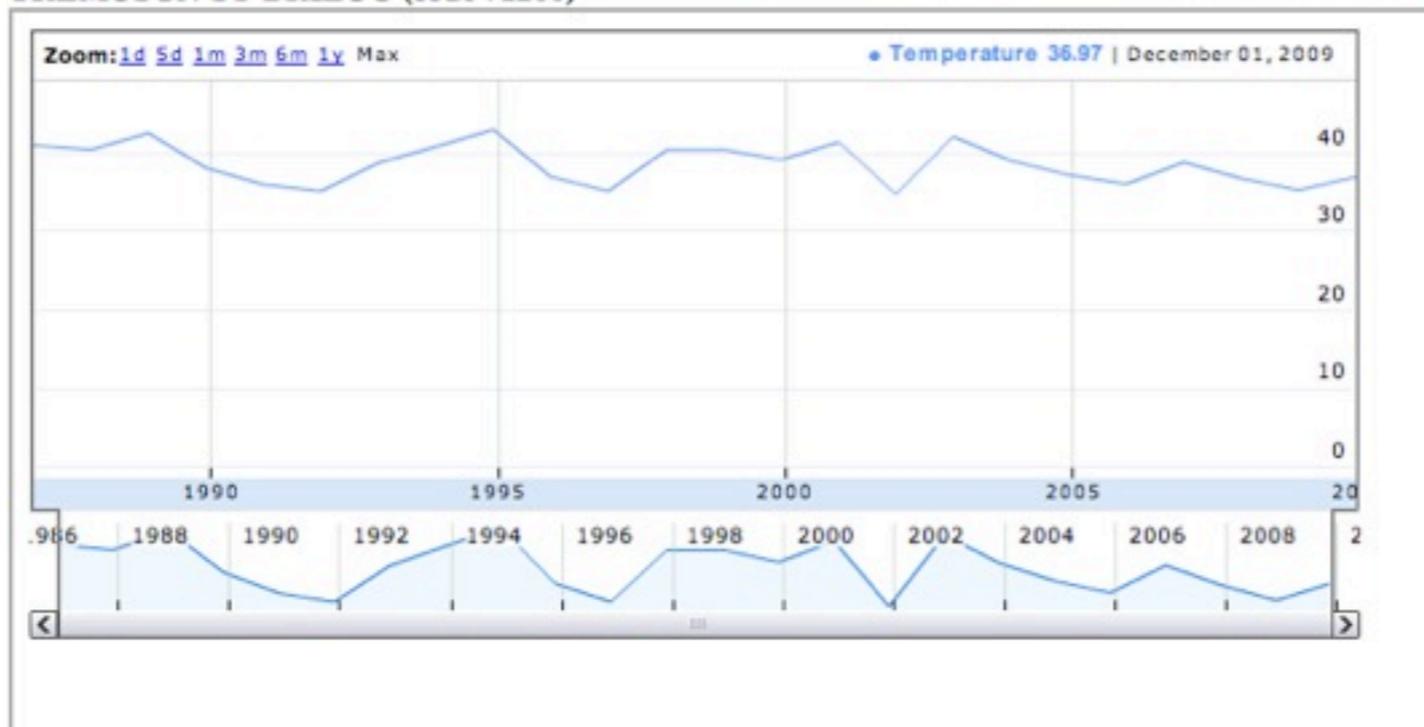
Example: Weather data

- US National Climatic Data Center
 - weather data at stations around the globe since 1929
 - Stored in Google Storage
 - Created a Table for Bigquery
 - Upload Weather Station coordinates in Fusion Tables
 - App Engine App
 - Maps API to display weather station Maps
 - Bigquery to query average temperature in January
 - A bit of Python to create a JSON Data Source
 - Visualization API
- Just an example: rinse, repeat, enhance!

Example: Weather data



TREMUSON-ST-BRIEUC (code 71200)



Google Refine



Google Refine



- Power tool for working with messy data
 - Cleanup
 - Transform
 - Augment
 - (Link with FreeBase)
- Desktop software for now
- <http://code.google.com/p/google-refine/>

Google Refine



Show: 5 10 25 50 rows « first < p

Contractor Name	Type of Contract	Date of Award	Start Date	End Date	Total value of Con
ASAP SOFTWARE EXPRESS INC DELL MARKETING L.P.	Facet ▶	Text facet		06/30/2011	
	Text filter	Numeric facet			
BMC SOFTWARE DISTRIBUTION INCORPORATED	Edit cells ▶	Timeline facet		03/31/2010	
GOVCONNECTION INCORPORATED	Edit column ▶	Scatterplot facet		04/30/2011	
	Transpose ▶	Custom text facet...			
ITS CORPORATION	Sort..	Custom numeric facet..		12/30/2011	
	View ▶	Customized facets ▶			
SENET INTERNATIONAL CORPORATIO	Reconcile ▶	05/04/2009	05/05/2009	07/03/2009	0.04
	firm fixed price	01/26/2009	01/26/2010	09/30/2010	
IT FEDERAL SALES LIMITED LIABILITY COMPANY	firm fixed price	10/01/2009	10/01/2009	09/25/2010	
	firm fixed price	09/30/2009	10/01/2009	09/30/2010	
	firm fixed price	11/05/2009	11/05/2009	09/30/2010	
REDHAWK IT SOLUTIONS LLC	firm fixed price	01/22/2009	01/01/2010	12/31/2010	

Recap

- **Google App Engine**
 - Easy to build, deploy and manage web apps
- **Google Storage**
 - High speed data storage on Google Cloud
- **Prediction API**
 - Google's machine learning technology
- **BigQuery**
 - Interactive analysis of very large data sets
- **Google Fusion Tables**
 - Manage collections of tabular data in the cloud
- **Google Refine**
 - Power tool for working with messy data
- **Google Visualization**
 - Collection of JavaScript Visualization

More information

<http://code.google.com/apis/>

<http://code.google.com/more/table/>

Google APIs & Developer Products - January 2011

Mobile Search Gadgets Data APIs Social Misc Ads Geo Tools Chrome

Android																			Chromium	
Google Custom Search API	Gadgets API																			
Image Search API	iGoogle Developer Home																			
News Search API	iGoogle Themes API	Google Data Protocol	Google Analytics	Blogger Data API	Gmail APIs and Tools	Google Calendar APIs and	Google Buzz API	Google Friend Connect APIs	Google Feed API	Feedburner APIs	Google Language API	Google Translator Toolkit Data	Google Prediction API	BigQuery	Google AdSense API	AdSense for Search Ads Only	Google Static Maps API	Google Geocoding API	Google Web Toolkit	Installable Web Apps
Blog Search API	Google Desktop APIs	Google Contacts APIs	Google Apps	Google Webmaster Tools Data	Google Sidewiki API	Content API for Shopping	PubSubHubbu	Orkut Developer Home	Google Checkout	Google Commerce Search	Chart Tools	Google SketchUp Ruby API	Google Storage for Developers	Google Fusion Tables API	AdSense for Ajax	AdSense for Mobile Applications	AdMob	Google Directions API	Google Plugin for Eclipse	Chrome Web Store
Video Search API	Google Apps Marketplace	Google Documents List Data API	Google Spreadsheets Data API	Google Finance Data API	Google Health API	Google Sites Data API	Social Graph API	OpenSocial	Google PowerMeter API	Google Moderator API	Google Safe Browsing APIs	Mobile Homepage	Google Cloud Print	Google TV Optimization Guides	Google Interactive Media Ads	Google's DoubleClick for	Google's DoubleClick for	Google Analytics for Mobile	Google Java Developer Tools	V8
Patent Search API	Google Web Elements	Picasa Web Albums Data API	Google Book Search APIs	YouTube APIs	Google Code Search Data API	Google Secure Data Connector	Google Wave API	Google Talk for Developers	Google Account Authentication	reCAPTCHA	Google Libraries API	Google Project Hosting	Google Apps Script	Google APIs Console						

Jfokus 2011

Google Cloud for Java Developers: Platform and Monetization

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