

$$a + b = ?$$

# Open API Best Practices

Making web sites into web services



John Musser, ProgrammableWeb

# Today's Session on Open APIs

- 1) The Big Picture
- 2) Planning & business models
- 3) Design & technology
- 4) Risks & Issues

# Quick Introduction

## ProgrammableWeb

- Launched summer 2005
- API, Mashup & Tools directory
- News, community, reference
- 400 APIs
- 1700 mashups

The screenshot shows the ProgrammableWeb website dashboard. At the top, there is a navigation bar with links for Home, Blog, Mashups, APIs, Developers, Share, Learn, Discuss, and About. The main content area is divided into several sections:

- Mashup Stats:** Total Mashups Listed: 1623. Past 7 Days: 32. Past 30 Days: 112. Mashups/Day: 3.02. 7 Days Avg.: 4.57. 30 Days Avg.: 3.73.
- Mashup Dashboard:** Hundreds of mashups with new updates daily. **Mashup of the Day, March 6, 2007:** Wii Enterprise Remote. Demo of a setup using the Nintendo Wii remote to simulate a PC mouse, then integrate with an existing Ruby on Rails application connecting to an SAP BW resource planner. This might allow a manager to view and plan upcoming projects from the Wii. APIs: Tags: enterprise, hardware, input, sap, wii.
- Newest Mashups:** Wii Enterprise Remote, Domain Tools, Msg-Time.com, Bulletin, Summer of emokoo.
- Popular New Mashups:** Celebrity Sexy Video F..., Wheel of Food, PlotOrNot, Movers 2.0, Mainbase, SeriesOfTubes.
- Top Mashup Tags:** A pie chart showing the distribution of tags for the last 14 days. The legend includes: mapping (22%), photo (16%), video (9%), travel (9%), search (9%), shopping (7%), realstate (7%), rss (6%), visualization (6%), and social (5%).
- Random Mashup Trivia:** 204 mashups are now tagged with search.

On the right side, there are several sponsored ads and a search bar. The ads include openkapow, userplane, Clickatell, and BlueOrganizer. The search bar has a Google logo and a search button.

# APIs & Mashups: Why bother?

- **Make money**

- Over 45% of all products get listed via their APIs
- 3 billion API calls per month



- **Save money**

- Smugmug saves \$500K/year with Amazon S3 Storage



- **Build brand**

- Google Maps 300% growth vs 20% MapQuest



- **Build empires**

- Over 50% of all transactions via their API
- Platform for enterprise verticals. 500 apps so far.



- **Innovate**

- 100's of Flickr apps. Is Twitter next?



# Birth of the Web 2.0 Mashup

*HousingMaps.com, circa spring 2005*

s.f. bavarea craigslist > [apts/housing for rent](#) [ help ] [ post ]

s.f. bayarea | [san francisco](#) | [south bay](#) | [east bay](#) | [peninsula](#) | [north bay](#)

search for: arch st in: apts/housing for rent Search

rent: min max 0+ BR cats dogs

<< Prev Found: 5 Displaying: 1 - 5

- Mar-3 \$1095 Top Floor Studio Charm - Hardwood, Arch Details, Parking Available (mission district) pic
- Mar-3 \$1900 / 2br - FURNISHED TOWNHOUSE, Near UC/B Campus (berkeley north / hills)
- Mar-2 \$1919 / 2br - 2BR/1BA Main flr of House, View, Skylights, Hdwd flrs (ingleside / SFSU / CCSF) pic
- Feb-28 \$1100 / 1br - 1br In-law W/Views and Patio (ingleside / SFSU / CCSF) pic
- Feb-27 \$995 Large Studio in North side at 1434 Arch St. Vacant (berkeley)

+

Google Maps

Web Images Video News Maps more a

arch st, san francisco, ca

Search the map Find businesses Get directions

Maps Traffic Map

Address:  
Arch St  
San Francisco, CA 94132

Make this my default location  
Get directions: To here - From here  
Search nearby

=

For Rent For Sale Rooms Sublets

Powered by craigslist and Google Maps  
(this site is in no way affiliated with craigslist or Google)

City: San Francisco Price: \$1500 - \$2000 Show Filters Refresh Link

| Price  | br  | description   | date |
|--------|-----|---|------|
| \$1685 | 1bd | Pacific Heights - Junior 1Bd - Sunday Showings                            | 3/04 |
| \$1650 | 1bd | Very Clean Lower Flat   | 3/04 |
| \$1750 | 1bd | Single Family Home - 1BR, 1BA - Great Location                            | 3/03 |
| \$1895 | 1bd | Very Large One bedroom, One bath, Hw floors, Granite Kitchen              | 3/03 |
| \$1975 | 2bd | Elegant 2 bed 2 bath with Sweeping Ocean and city view                    | 3/03 |
| \$1725 | 2bd | Nice Bright Corner Flat   | 3/03 |
| \$1645 | 1bd | Brand new 1BR in Cole Valley, Strader between Rivoli & 17th               | 3/03 |
| \$1695 | 2bd | Large bright 2BR/2BA Apt. on Great Hwy at Kitcham                         | 3/03 |
| \$1500 | 1bd | Richmond dist Contemporary style 1 bedroom 1 bath                         | 3/03 |
| \$1800 | 2bd | Contemporary style 2br/1 bath   | 3/03 |
| \$1750 | 2bd | See Sat&Sun @4:30pm/Remodeled house/cottage Hwvd floors* Sunny/Garden     | 3/03 |
| \$1990 | 1bd | Sunny Lower Flat  | 3/03 |
| \$1800 | 2bd | Spacious Two Bedroom Apt.   | 3/03 |
| \$1985 | 2bd | Sunny Flat Nr. Usf  | 3/03 |
| \$1550 | 1bd | Corner one bedroom 15th & Geurreiro Open House Sunday 4th 3:00pm          | 3/03 |
| \$1645 | 1bd | Charming Upper Nob Hill Apartment   | 3/03 |
| \$1975 | 2bd | 2BR/1Bath Sunny top floor flat  | 3/03 |
| \$1750 | 2bd | Sh/Clement Sts, 2 br/1 top floor, crsta, dish/washer, nr shops/restaurant | 3/03 |
| \$1975 | 3bd | Awesome views from this baker beach apartment                             | 3/03 |
| \$1900 | 2bd | Uptown 2 Bedroom Apt w/ Large Living Room                                 | 3/03 |

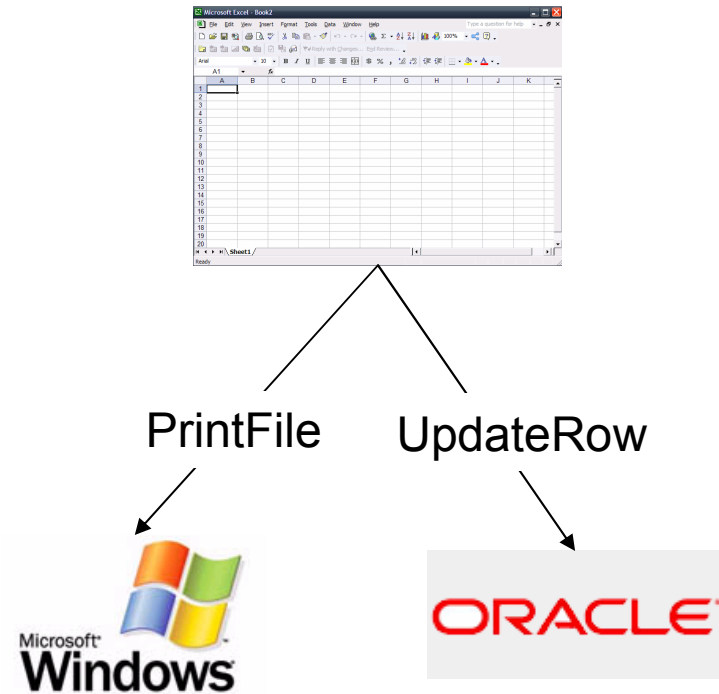
Company 1

Company 2

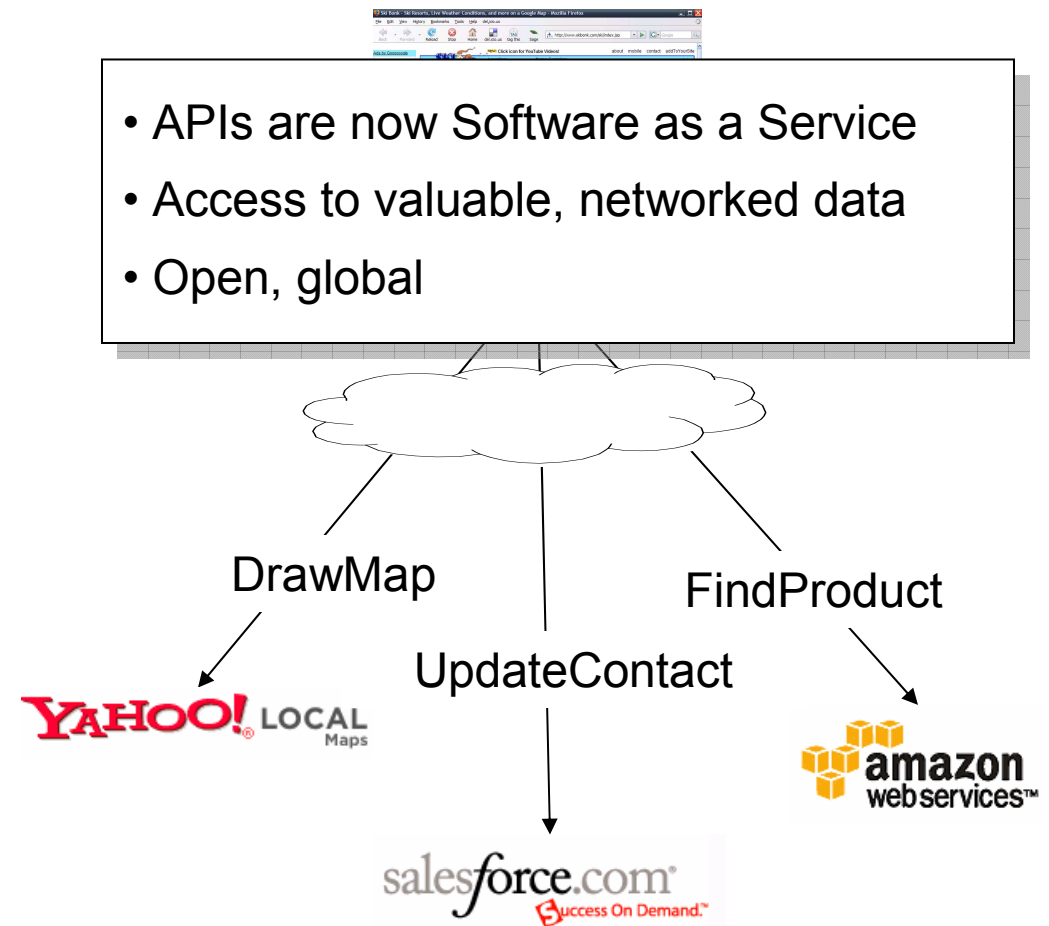
Company 3 Person

# Application Programming Interface

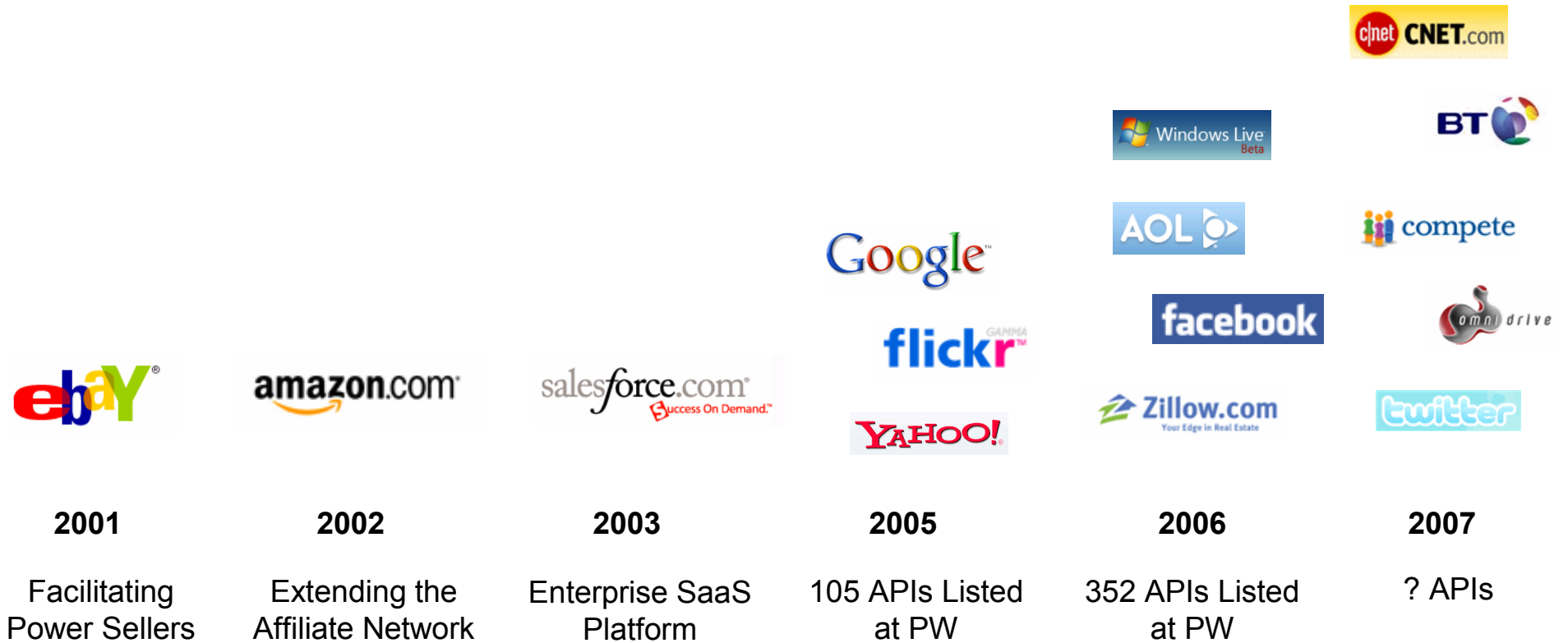
## Old Model



## New Model



# Web 2.0 API Timeline



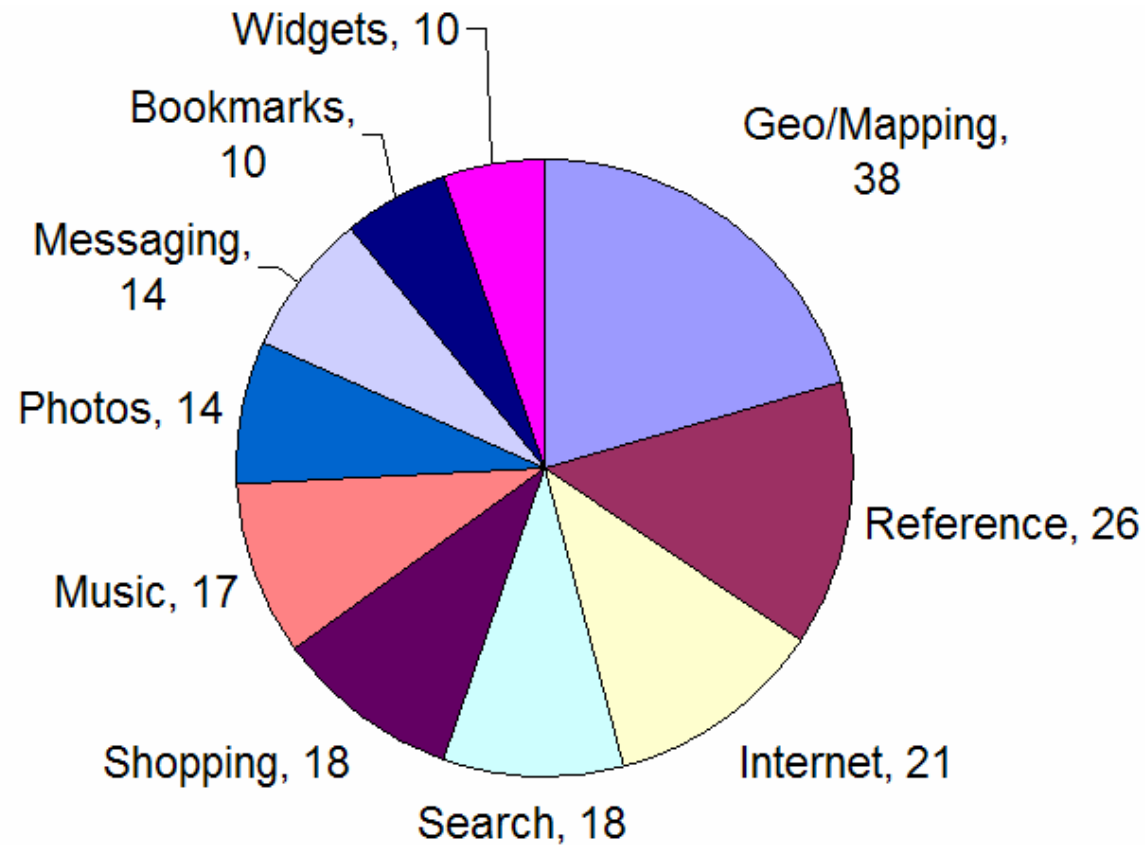
# Today's Session on Open APIs

- 1) The Big Picture
- 2) Planning & business models**
- 3) Design & technology
- 4) Risks & issues

# What Makes an API Successful?

- Rule #1, the underlying service
  - *Or, a good API on a bad service is lipstick on a pig*
- A plan and a business model
- Simple, open, easily adopted
- Providing choices
- Good developer support

# Planning: Know the Players



Number of API providers in each of the top 10 categories

*Based on sample of 400 APIs listed at ProgrammableWeb, March 2007*

# Know the Expected Sources



# And the Unexpected Sources

**HOT or NOT.**

**TheHolyBible**



**CRMTeeTimeAPI**



**TheyWorkForYou**

# And the Unexpected Sources



# API Business Models

| <i>Who</i>     | <i>What</i>    | <i>How</i>        |
|----------------|----------------|-------------------|
| Amazon.com ECS | Retail         | Affiliate Model   |
| Amazon.com     | Infrastructure | Pay-as-you-go     |
| eBay           | Auctions       | APIs for listings |
| Salesforce.com | CRM            | Seats             |
| Exact Target   | Bulk Email     | Tiered pricing    |
| Cypress Golf   | ASP Tee Times  | Integration       |
| Rhapsody       | Music          | Partnerships      |

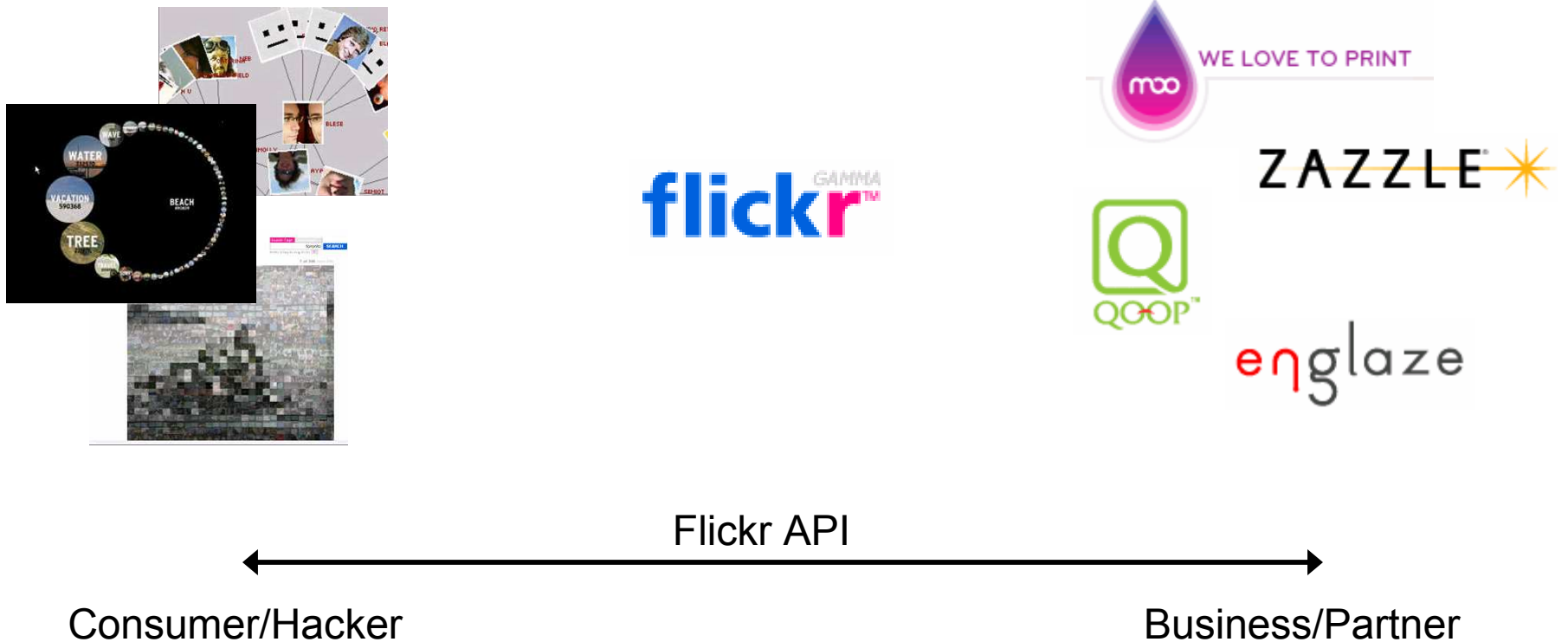
Best practice: Build your business model into your API

# API Pricing & Licensing Models

|  |  |
|--|--|
| Revenue Sharing                          | Via affiliates; advertising (see new AdSense API)            |
| Subscription                             | Per time period; classic SaaS                                |
| Tiered                                   | Pricing in volume buckets                                    |
| Per-call metering                        | Fee per API call (see StrikeIron)                            |
| Utility                                  | API is free, but fee for resources (CPU, storage, bandwidth) |
| Pay per conversion or sign-up            | Commissions and referrals (Yahoo! Mail)                      |
| Ad-supported is free, ad-free is premium | See ad and branding-free premium mapping                     |
| Units                                    | Different calls priced at different levels (Google AdWords)  |

# APIs as BizDev Enabler

- Decentralized business development *-Toni Schneider*
  - An API can lower barriers to working with you



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# Design



## Apple 30 GB iPod with Video Playback Black

Other products by [Apple](#)

★★★★☆ (592 customer reviews)

[More about this product](#)

Color Name:

Black: \$279.99

List Price: ~~\$299.99~~

Price: **\$279.99** & this item ships for **FREE with Super Saver Shipping**. [Details](#)

You Save: \$20.00 (7%)

**Availability:** In Stock. Ships from and sold by Amazon.com.

**Want it delivered Tuesday, August 1?** Order it in the next 70 hours and 51 minutes, and choose **One-Day Shipping** at checkout. [See details](#)

**19 used & new** available from \$239.95

[See larger image](#)



[See 40 customer images](#)

[Share your own customer images](#)



```
- <Items>
- <Request>
  <IsValid>True</IsValid>
- <ItemSearchRequest>
  <Keywords>B000A3WS84</Keywords>
  <SearchIndex>Electronics</SearchIndex>
</ItemSearchRequest>
</Request>
<TotalResults>1</TotalResults>
<TotalPages>1</TotalPages>
- <Item>
  <ASIN>B000A3WS84</ASIN>
- <DetailPageURL>
  http://www.amazon.com/exec/obidos/redirect?tag=ws%26link_c
</DetailPageURL>
- <ItemAttributes>
  <Manufacturer>Apple Computer</Manufacturer>
  <ProductGroup>CE</ProductGroup>
  <Title>Apple 30 GB iPod with Video Playback Black</Title>
</ItemAttributes>
</Item>
</Items>
```

---

Best practice: Design for people & computers

# Technology: The Big Debates

- Protocols
  - REST vs. SOAP vs. ...
- Data Formats
  - XML vs. JSON vs. ...
- Tools
  - Data vs. Presentation vs. Hosted vs. ...

# API Protocols & Styles

- REST: Representational State Transfer 68%
- SOAP: Simple Object Access Protocol 40%
- JavaScript 7%
  - *OK, not a 'protocol', but key API model*
- XML-RPC 6%
  - *See blog tools*
- APP: Atom Publishing Protocol
  - *Is RESTful; see Google GData*
- Specialized / proprietary: XMPP, OSCAR

*20% support > 1  
protocol*

Percentages based on sample of 265 APIs at  
ProgrammableWeb, March 2007

# REST vs. SOAP with Flickr

## REST Call

`http://api.flickr.com/services/rest/?method=flickr.photos.search&api_key=abc&tags=cars`

## SOAP Call

```
<s:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" >  
  <s:Body>  
    <x:FlickrRequest xmlns:x="urn:flickr">  
      <method>flickr.photos.search</method>  
      <api_key>abc</api_key>  
    </x:FlickrRequest>  
  </s:Body>  
</s:Envelope>
```

|      | Pros                                   | Cons                                       |
|------|--|--|
| SOAP | Established standard; tool support     | Complexity; interoperability issues        |
| REST | Simplicity; built on how the web works | Lack of standards; tool support challenges |

Note: Protocol and data formats alone do not answer the “simple vs. complex” question!

You can design bad or complex REST and some SOAP is simpler than others

# Comparing Protocol Choices

|           | <i>REST</i> | <i>SOAP</i> | <i>XML-RPC</i> | <i>JavaScript</i> | <i>Other</i> | <i>Total</i> | <i>Multiple</i> |
|-----------|-------------|-------------|----------------|-------------------|--------------|--------------|-----------------|
| Google    | 11          | 3           | 1              | 4                 | 3            | 21           | 1               |
| Amazon    | 8           | 10          |                |                   |              | 10           | 8               |
| Microsoft | 1           | 6           | 1              | 3                 | 1            | 10           | 1               |
| eBay      | 2           | 2           |                |                   | 1            | 4            | 2               |
| Yahoo!    | 19          | 1           |                | 3                 | 2            | 23           | 2               |
| AOL       | 3           | 1           | 2              | 2                 | 4            | 9            | 1               |
| Total     | 44          | 23          | 4              | 12                | 11           | 77           | 15              |

Favor simple designs

Use > 1 to broaden your base

Be as consistent as possible

# Data Formats: Many Choices

XML, JSON, RSS, Atom, YAML, iCalendar,  
CSV, Serialized PHP, HTML, PNG, GeoRSS,  
vCard, Text, PDF, CRM, VM, TV, Applications,  
hC

25% of new APIs listed at PW in 2007 support JSON  
8% of APIs listed before 2007 support JSON

---

Favor simplicity and standards

Use > 1 to broaden your base

Provide domain-appropriate alternatives

# JSON: Fat-free XML?

```
<CNETResponse version="1.0">
- <TechProduct id="31303113"
  xlink:href="http://api.cnet.com/restApi/v1.0/tech
    <Name>Canon Digital Rebel XT (body only -
    <ImageURL width="60">http://i.i.com.com/c
    <ImageURL width="120">http://i.i.com.com/
  - <PriceURL>
    http://shopper.cnet.com/4014-6501_9-3130
  </PriceURL>
  <ReviewURL>http://reviews.cnet.com/4505-
- <Manufacturer id="275062">
  <Name>Canon USA, Inc.</Name>
  </Manufacturer>
  <SKU>0206B001</SKU>
  <EditorsChoice>>false</EditorsChoice>
```

## XML

Well established, general purpose;  
greater parsing overhead; well suited  
for documents; wide tool support

```
{ "CNETResponse" : { "@version":"1.0",
  "TechProduct" : { "@id":"31303113",
    "@xlink:href" : "http://api.cn
    "Name" : { "$" : "Canon Digital Reb
    "ImageURL" : [ { "@width":"60", "$":
      { "@width":"120", "$":"http://i
    "PriceURL" : {
      "$" : "http://shopper.cnet
    "ReviewURL" : {
      "$" : "http://reviews.cnet
    "Manufacturer" : { "@id":"275062",
      "Name" : { "$":"Canon USA, I
    "SKU": { "$" : "0206B001"},
    "EditorsChoice" : { "$":"false"},
    "EditorsRating" : { "@outOf":"10", "$"
    "PreferredNode" : { "@id":"6501"},
    "Category" : { "@id":"6501", "@xlink:
      "Title" : { "$":"Digital cameras"
      "Breadcrumb" : { "$":"Digital Pho
      "Node" : [ { "@id":"6451", "@xlink:
```

## JSON

Objects and simple types; fast  
parsing; good fit for client side  
scripting; bindings for 20+ languages

---

Best practice: Support both

# A Flexible API



REST  
SOAP  
XML-RPC

RSS (5 revs)  
Atom  
PHP  
Serialized PHP  
CSV  
JSON  
SQL  
YAML  
CDF

# Know the Tools Ecosystem

- Data Mashup Tools



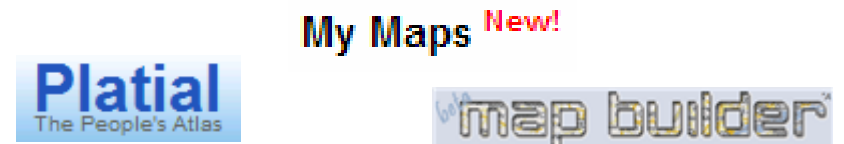
- Scraping Tools



- Visual Development Tools



- DIY Consumer Tools



# #1 API Provider Issue: Adoption

- How many steps from zero-to-code?
  - Easy sign-up & self-service is key
  - Offer a free level of API use
- How well do you treat your developers?
  - Developer network and evangelism
- How's your pre-code support?
  - Docs, gallery, forums, mailing lists, and lots of code
  - Media: videos, screencasts, podcasts
- Any post-code support?
  - Certification, marketing, events
  - System status, usage reporting

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# Mashup and API Issues

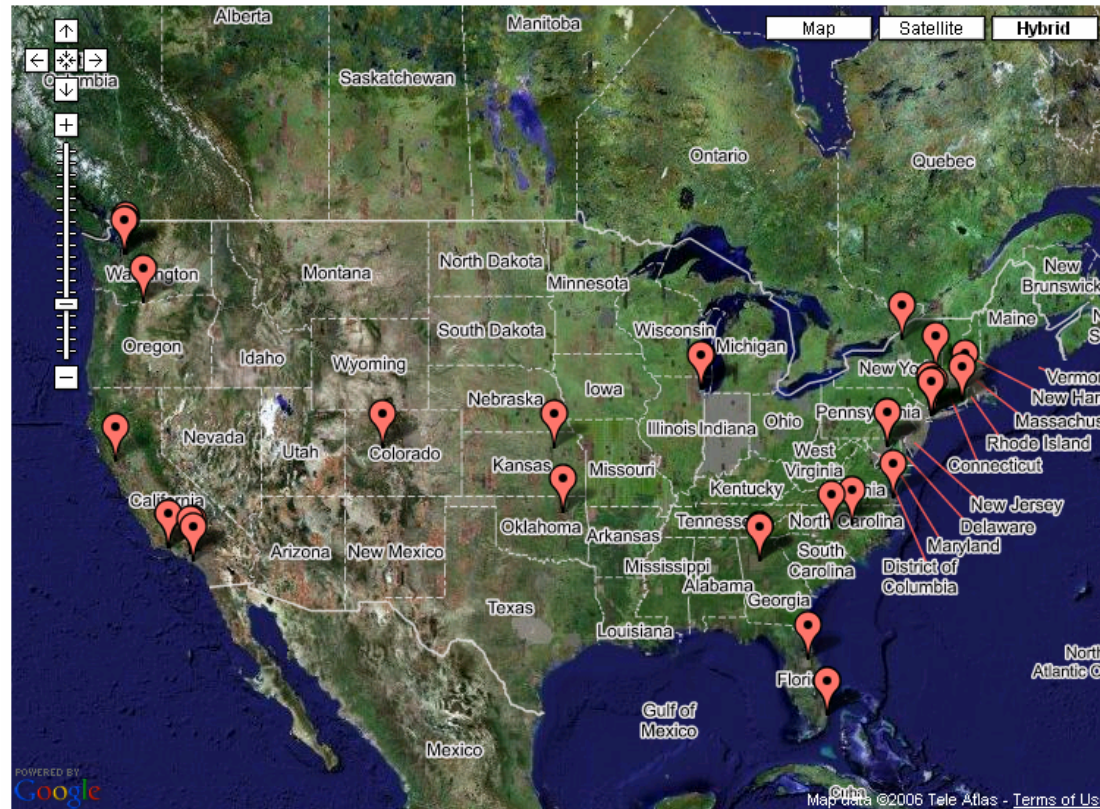
- **Dependencies: business and technical**
  - Strategize accordingly – go in eyes-open
  - Mashups: know switching costs (consider tools like MapStraction)
- **Lack of service level agreements**
  - Consider commercial license models (ex Google Maps Enterprise)
  - Mashups: should also disclaim warranty (“trickle-down terms”)
- **Commercial vs. non-commercial use**
  - Most API terms of service differentiate these, but vaguely
  - If you place ads on your mashup, is that “commercial use”?
- **Copyright law issues**
  - What data can be re-used and how?
  - See: Flickr API integrates Creative Commons license

# The Big Issue: Identity

- Where are the ‘personal mashups’?
  - High-value data locked behind IDs and passwords
- Limited standardization & consensus
  - Even in new competing “authorization APIs”
  - Yahoo! BBAuth, Microsoft LiveID, Google Web Auth
- Solutions
  - OpenID? Meta-identity networks? TBD...
- In the meantime
  - Phishing Mashups coming soon
  - Mapping mashups are so safe, right?

# Privacy Issues. Beware.

*Data Mining 101: Finding Subversives with Amazon Wishlists*



*Readers of “1984”*

# Trends

- Battle of the Platform Players
- Having an API as a checklist item
  - Got an API? Check.
- Lightweight services & data
  - REST protocol & JSON data format
- New Tools
  - For developers and non-devs
- Enterprise mashups
- New business models

# Recommendations...

- Have an API strategy and a plan
- Keep it simple
  - Protocols, formats, tools, adoption
- Provide choices
  - In order to reach the widest base
- Treat developers well
  - And they will treat you well in return

**thank you**

Questions, ideas, comments?

Email me: [john@programmableweb.com](mailto:john@programmableweb.com)