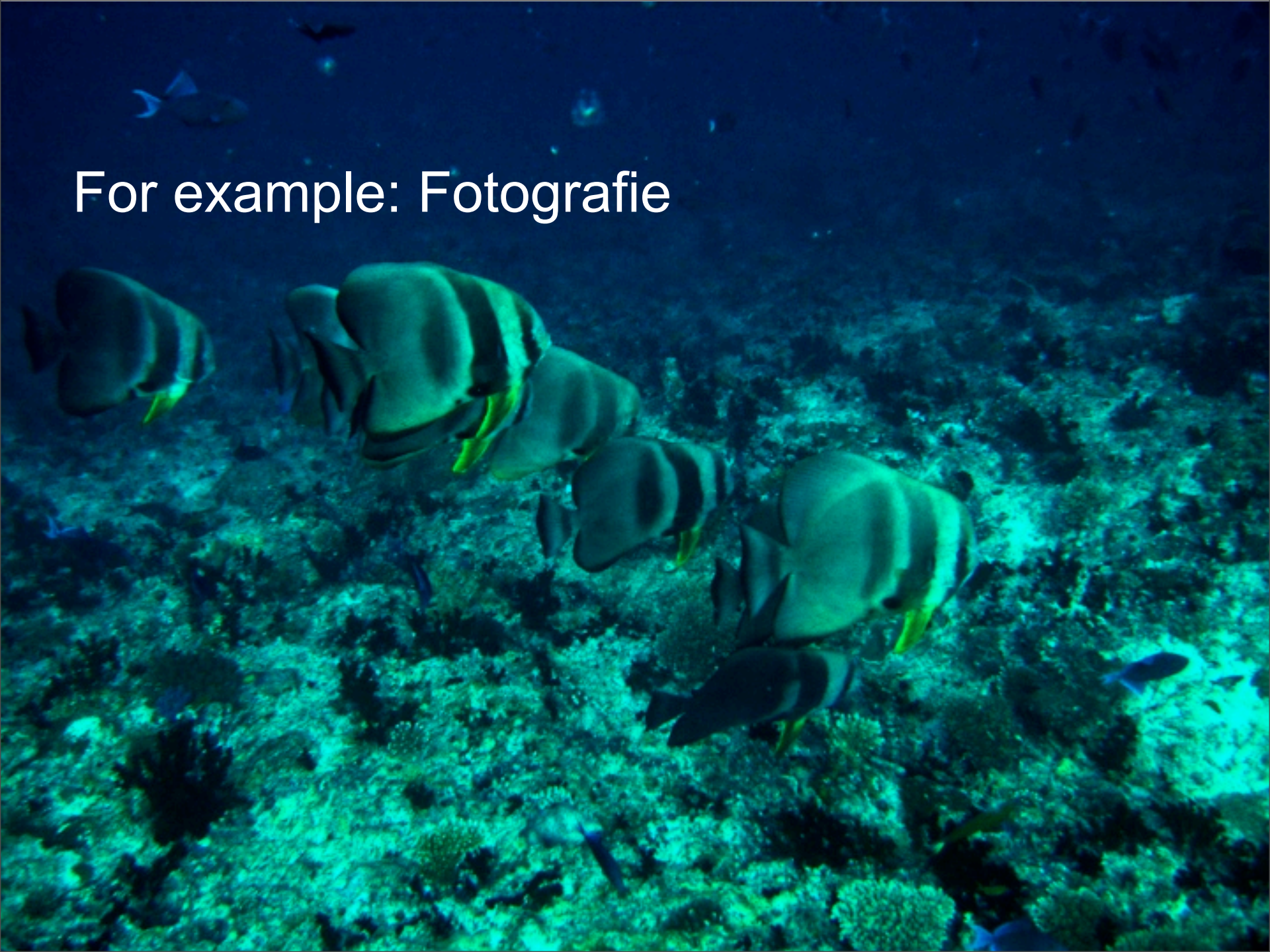Diving and digital data

For example: Fotografie

Name all the Fish....

Talk about accomadations….
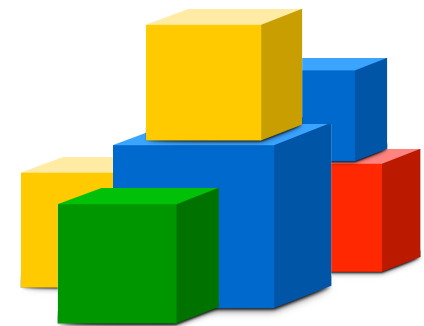
and the dangers for you and your data…

Clouds ➡️

Google Data APIs

Frank Mantek

"The benefit [of GData] is that you'd have a single API that could be used to query, update, and index structured data on the web--anywhere on the web. It's a pretty powerful vision and something I didn't expect to see for a couple more years."

Jeremy Zawodny, Yahoo

Contrast this with the API efforts on Yahoo! Developer Network or Windows Live Dev which are an inconsistent glop of incompatible RESTful protocols, SOAP APIs and XML-RPC methods all under the same roof. In the Google case, an app that can read and write data to Blogger can also do so to Google Calendar or Picasa Web Albums with minimal changes. This is not the case when using APIs provided by two Yahoo! services (e.g . Flickr and del.icio.us) or two Windows Live services (e.g. Live Search and Windows Live Spaces) which use completely different protocols, object models and authentication mechanisms even though provided by the same vendor."

Dare Obasanjo, Architect, Microsoft

Google's APIs

- Google Offers Many APIs
  - AJAX APIs – Presentation Oriented APIs
    - Maps, Search, Feeds
  - *Google Data APIs – Full Fidelity Data APIs*
    - *Calendar, Blogger, Base, ...*
  - AdWords API – SOAP based RPC API
  - Gadgets API – Portable JavaScript "Applets"
  - Checkout API – ReST based API
  - Desktop API – Extended Search
  - ... and many more ...

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Building Web Services the REST way

Building Web Services the REST way

- SOAP:

  – Arbitrary actions (verbs)

  – Arbitrarily data payloads

  – Complex service description and behavior (WSDL)

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  - Arbitrarily data payloads
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- REST:
  - Common actions (HTTP Get, Post, Put, Delete)
  - Operate on whole resources (XML documents)
  - Uniform resource names and links (URIs)

Building Web Services the REST way

- SOAP:
  - Arbitrary actions (verbs)
  - Arbitrarily data payloads
  - Complex service description and behavior (WSDL)
- REST:
  - Common actions (HTTP Get, Post, Put, Delete)
  - Operate on whole resources (XML documents)
  - Uniform resource names and links (URIs)
- Why REST over SOAP?
  - It's how the web works! (stateless, cachable, scalable)
  - It's easy on the programmer

Elements of the Data API

Atom Publishing Protocol

- Simple Format
  - Atom Syndication Format
- Simple Protocol
  - HTTP

- Google Extensions
  - Data Model
  - Query
  - Concurrency
  - Authentication

Google Data APIs

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Data Model: Standard Atom

```
<entry xmlns:gd="http://schemas.google.com/g/2005">
    <category scheme="http://schemas.google.com/g/2005#kind"
            term="http://schemas.google.com/g/2005#event"/>
    <id>http://mycal.example.com/feeds/jo/home/full/e1a2af0</id>
    <published>2005-01-18T21:00:00Z</published>
    <updated>2006-01-01T00:00:00Z</updated>
    <title>Discuss BazMat API</title>
    <content>We will discuss integrating GData with BazMat.</content>
    <author>
        <name>Jo March</name>
    </author>
    <gd:when startTime='2005-01-18T21:00:00Z' endTime='2005-01-18T22:00:00Z'>
        <gd:reminder minutes='15'/>
    </gd:when>
    <gd:where valueString='Building 41, Room X'/>
    <gd:eventStatus value="http://schemas.google.com/g/2005#event.confirmed"/>
    <gd:visibility value="http://schemas.google.com/g/2005#event.public"/>
</entry>
```

Data Model: Google Kinds and Extensions

```xml
<entry xmlns:gd="http://schemas.google.com/g/2005">
    <category scheme="http://schemas.google.com/g/2005#kind"
            term="http://schemas.google.com/g/2005#event"/>
    <id>http://mycal.example.com/feeds/jo/home/full/e1a2af0</id>
    <published>2005-01-18T21:00:00Z</published>
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    <gd:visibility value="http://schemas.google.com/g/2005#event.public"/>
</entry>
```

Querying a Feed

- Full Text Search
  - http://www.example.com/feeds/friends?q=John
- Categories (Tags)
  - http://www.example.com/feeds/friends/-/work|play
- Update Time
  - http://www.example.com/feeds/friends?updated-min=2005-08-09T10:57:00-08:00
- Custom ...
  - eg. spreadsheets supports min-row, max-row, ...
- Output Format
  - http://www.example.com/feeds/friends?alt=json

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Optimistic Concurrency

GET /feeds/entry1

200 OK
<link rel="edit" href="http://www.example.com/feeds/entry1/**version1**/"/>

PUT /feeds/entry1/**version1**/

200 OK
<link rel="edit" href="http://www.example.com/feeds/entry1/**version2**/"/>

DELETE /feeds/entry1/**version1**/

409 CONFLICT

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Security and Authentication

- Authentication for Desktop Apps
  - Users authenticates to Google Authentication Service
  - Google returns Auth Token to Application
- Authentication for Web Apps
  - Web Application redirects to Google Auth Service (1)
  - Login to Google, redirect back to app with Auth Token (2)
  - Web Application uses Token to proxy GData (3)
  - Password remains secure

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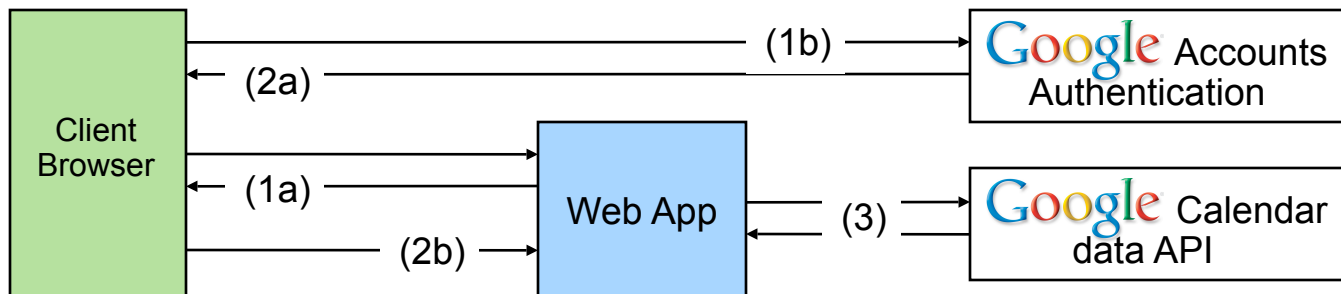
Atom Publishing Everywhere?

- Google Apps data API
- Google Base data API
- Blogger data API
- Google Calendar data API
- Google Code Search data API
- Google Notebook data API
- Picasa Web Albums data API
- Google Spreadsheets data API
- Google Doclist data API
- YouTube data API
- ... and the list is growing ...

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Developer Support

- Open Source Client Libraries
  - Java
  - PHP
  - Objective C
  - .NET
  - Python
  - JSON (JavaScript)
- Contributed Client Libraries
  - Ruby
  - Perl
  - Lisp
- Documentation
  - Developer Guides
  - Knowledge Base
- Active Developer Community (Google Groups)
  - Google Data API Group, ...
  - Google Groups Wiki ...

Google Apps data API

- Functionality
  - Programmatically enable access to these Google Apps applications
  - Create, retrieve, update and delete user accounts, nicknames and email lists.
- Supported Client Libraries
  - Basic HTTP
  - Java
  - .NET

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Google Base data API

- Functionality
  - Query Google Base data to create applications and mashups.
  - Input and manage Google Base items programmatically.
- Supported Client Libraries
  - Basic HTTP
  - Java
  - .NET
  - PHP
  - Python

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Blogger

- Functionality
  - Create new blog posts, edit or delete existing posts, and query for posts that match particular criteria.

- Supported Client Libraries
  - Basic HTTP
  - Java
  - .NET
  - PHP
  - Python
  - Objective C

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Google Calendar

- Functionality
  - Create new events, edit or delete existing events, and query for events that match particular criteria.

- Supported Client Libraries
  - Basic HTTP
  - Java
  - .NET
  - PHP
  - Python
  - Objective C

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Google Code Search

- Functionality
  - Read Only - Query for public code snippets that match particular criteria.

- Supported Client Libraries
  - Basic HTTP
  - Java
  - .NET
  - PHP
  - Python
  - Objective C

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Picasa Web Albums

- Functionality

  - Request a list of a user's albums, photos, comments, or tags, edit or delete content in an existing entry, and query the content in an existing entry

- Supported Client Libraries

  - Basic HTTP

  - Java

  - .NET support soon

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Google Spreadsheets

- Functionality
  - Request a list of a user's spreadsheets, edit or delete content in an existing Spreadsheets worksheet, and query the content in an existing Spreadsheets worksheet

- Supported Client Libraries
  - Basic HTTP
  - Java
  - .NET
  - Python

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What Some Developers are Doing

Ambient Clock
(Calendar)

Phixr Online
Photo Editor
(PicasaWeb)

Timesheets with
Google Office Tools
(Spreadsheets,
Calendar)

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Spanning Sync (www.spanningsync.com)

- two way synchronization between iCal and Google Calendar

- Client/Server architecture, all GData operations happen on the server

- Straight HTTP calls using PHP

- around 6M GData API calls per day

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Gumiyo (www.gumiyo.com)

- Buyer/Seller platform using Google Base data api

- Allows creation of ads completely on your mobile device (take picture, send MMS to your account)

- Searching/buying on the phone

- Rule based alert system that sends real time notifications to your phone

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Bloghud (www.bloghud.com)

- This is a Second Life "Heads Up" device (900 Linden for the Pro Version)

- It allows you to post to your blog from inside the virtual world, using Google Authentication for Web Apps

- /9 "your message" posts or drag text based notecards on the Hud

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Choosing REST over SOAP

- Technologies of REST are well understood
  - HTTP, URIs, XML, Atom

- Four actions are sufficient
  - most of the time (90% solution)

- Developers like it
  - Every API behaves the same

- REST was a good choice

Is REST as flexible as SOAP?

- Some Operations are not obvious
  - eg. transactions
  - eg. send notification with reply

- Be creative
  - notifications as side effects of update
  - drop box feeds (insert only)
  - virtually infinite feeds (get & update only)

- REST is sufficient, but you may have to be creative

Using the Atom Publishing Protocol ...

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Using the Atom Publishing Protocol ...

- Good REST based design

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Using the Atom Publishing Protocol ...

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- Missing Query:
  - Solution: query parameters
  - Not always sufficient ... an open issue

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- Missing Authentication:
  - Solution: Google Auth
  - More secure than Basic Auth, slowed integration

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Using the Atom Publishing Protocol ...

- Good REST based design
- Missing Query:
  - Solution: query parameters
  - Not always sufficient ... an open issue
- Missing Authentication:
  - Solution: Google Auth
  - More secure than Basic Auth, slowed integration
- Concurrent Operations
  - Solution: Optimistic Concurrency via Edit URIs
  - We should have used strong eTags

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Extending the Atom Publishing Protocol ...

- **Engineers care about efficiency**

- Forced Read-Modify-Write
  - Solution: URIs based on the data (ACL)

- Batch Processing
  - Solution: GData batch extension

- Incremental Changes / Updates
  - an open issue ...

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Using Atom Data Format ...

Using Atom Data Format ...

- Originally designed for **blogs** not **data**

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  - standardized (IETF)
  - extensible
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Using Atom Data Format ...

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- Drawbacks
  - syntax constraints (atom:content, atom:updated)

- Benefits
  - standardized (IETF)
  - extensible
  - useful fields (atom:id, atom:updated)
  - can use a feed reader (cool!)

- Overall, a very good choice

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Modeling Data in Atom ...

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Modeling Data in Atom ...

- How to indicate extensions / semantics?
  - Solution: atom:category URI to indicate "kind"
  - Should have been human readable string

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Modeling Data in Atom ...

- How to indicate extensions / semantics?
  - Solution: atom:category URI to indicate "kind"
  - Should have been human readable string

- How to indicate related feeds and entries?
  - Solutions: ...
    - link@rel, gd:feedLink, gd:entryLink, content@href
  - No clear standard, try to be consistent

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Designing New Data Formats ...

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Designing New Data Formats ...

- The Idea: GD-namespace
  - Create reusable extensions and kinds
  - Manage extensions in one namespace

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- Our Experience:
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  - Used only by Google APIs (so far)

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  - Create reusable extensions and kinds
  - Manage extensions in one namespace

- Our Experience:
  - Almost every Google API has extended it
  - Used only by Google APIs (so far)

- Alternatives:
  - Reuse existing XML schemas (GeoRSS, MediaRSS)
  - Create an ecology of 'kinds' (GData ACL)

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Care for your Developers

- Protocol Centric & Language Agnostic

- Open your Code

- Give Fair Warnings of Changes

- Meet your Developers

Do you feel lucky?

- Questions, comments?

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