

# The Future of Web Services Applications

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**Mac OS X**  
**Conference**

# Orientation: Shortcomings of the Browser

- A page has arbitrary structure, layout, design
  - User must learn navigation for each site
- Minimal User Interface Elements & Feedback
- Minimal integration with system applications
- Minimal state (just cookies)
- Redundant data entry
- We're only making slight improvements
  - Autofill, Keychain passwords



# Orientation: Why Use Web Services?

- Aggregation
- Local Feel
- Better user experience outside of the browser

Compare Prices for Mac OS X 10.2 Jaguar (Full)

PriceGrabber.com  
Comparison Shopping Beyond Compare®

Home Computers Photo Electronics Software Video Games Mov

Popular Software | Rebates | Merchant Reviews

Home > Software > Operating Systems > Mac OS

**Mac OS X 10.2 Jaguar (Full Product)**

**Manufacturer:** Apple  
**Part Number:** M8712LLA  
**Lowest Price:** \$ 108.88  
**Rebates:** (None)

**Price Comparisons** - Bottom Line Price calculated for zip code 94501

Seller	Price	+ Tax
PC Connection	\$119.95	No Tax
JBHr.com	\$119.88	No Tax
CDW	\$129.00	No Tax
now egg.com	\$122.00	\$10.07
Image Solutions	\$108.88	\$8.98
PROVANTAGE	\$114.49	No Tax

Comparison Shop for MP3 Players

THE MAC PRODUCT EXPERTS  
**Macworld** FULL COLOR PRINTING Online Ordering

FIND THE BEST PRICE USING OUR PRICING SEARCH ENGINE

MP3 Players  
Products 1 through 7 of 7 total matching your specifications

Filter Results

Manufacturer: Any  
System Compatibility: Mac  
System Connectivity: Any  
Storage Media Supported: Any

Min Price: 0 Max Price: 0

Search within results: apple ipod

Manufacturer	Product
Apple	iPod - 3rd Drive) (PC (Apple) - (M
Apple	iPod - 3rd Drive) (PC (Apple) - (M
Apple	iPod - 3rd Drive) (PC (Apple) - (M
Apple	iPod - 2nd Hard Drive) (Apple) - (M
Apple	iPod Orig) Hard Drive (Apple) - (M
Apple	iPod - 2nd Hard Drive (Apple) - (M

Watson: PriceGrabber

Search Electronics

Rank	Description	Rating	Lowest Price
8	Conair WJ7 Interplak Water Jet System	—	\$29.88
9	Braun Oral-B D15525 3D Pulsating Toothbrush	—	—
10	Conair 12160 Interplak Compact Brush Head	—	—
11	Conair 12207 Interplak Interpersonal Basic Toothbrush	—	—
12	Conair 91000 Interplak Replacement Brushes	—	—
13	Conair RTB2CS Interplak Toothbrush	—	—
14	Emjoi AP81 DentaPure Toothbrush Sanitizer	—	—
15	Sonicare CH2 Brush Head 2-Pack	—	—
16	Sonicare PL-4 Plus Electric Toothbrush	—	—

In association with PriceGrabber.com

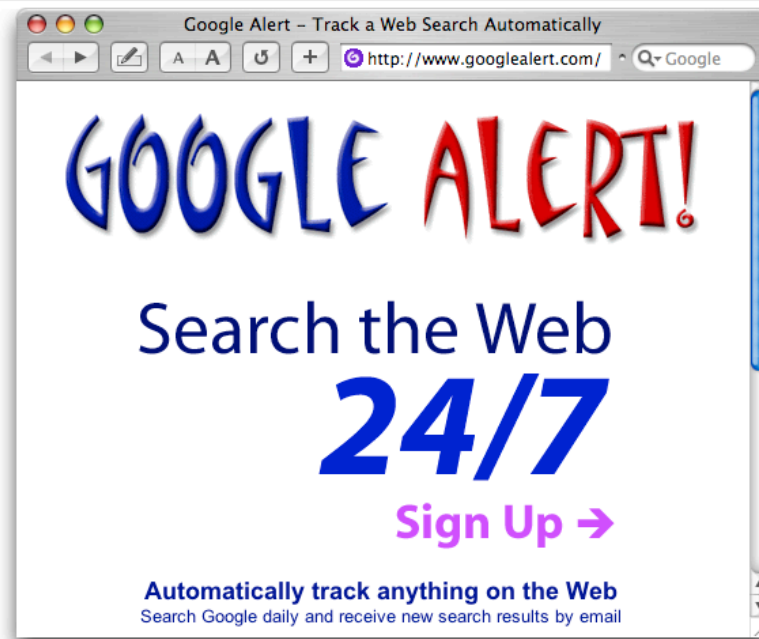
Compare & Purchase Selected Item

Top-Selling Items for Tooth Brushes 16 out of 200

Title: Braun Oral-B D15525 3D Pulsating Toothbrush

# Orientation: Why Use Web Services?

- Incorporate related data for your convenience
  - e.g. track package via online store, not UPS
- Innovative uses of data



## Books: Current and Recent



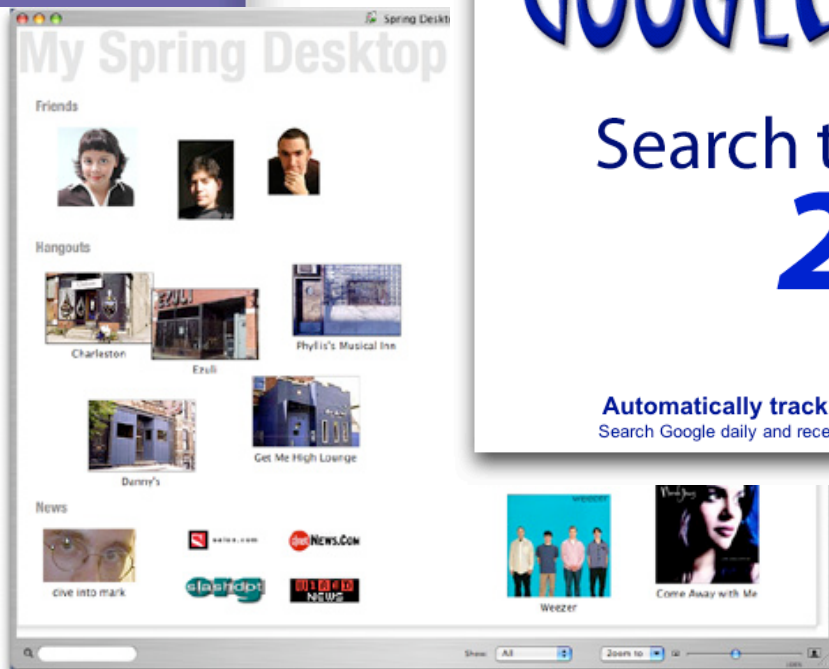
*Bones of the Moon*,  
Jonathan Carroll



*Fast Food Nation: The  
Dark Side of the  
All-American Meal*, Eric  
Schlosser



*Mac OS X Hacks*, Rael  
Dornfest, Kevin  
Hemenway



# Past ... Present ... Future



# The Past

- No computers!



# The Past ... Through the Present

- Private feeds
  - Ad-hoc protocol
  - Perhaps direct database access
- HTML Scraping
  - Publically available data intended for humans but used by computers



# Problems with Private Feeds

- Reinventing the wheel
- No standards
  - Very hard to add new clients and servers
  - Hard to aggregate
- Insecure to allow direct database access





# Problems with Scraping

- Reinventing the wheel
- Also no standards
- Very fragile
- Businesses don't want their data repackaged



# The Present

- Mac OS X Technologies
- Who is providing and using Web Services
- Capabilities
- Business Models



# Web Services Technologies on the Mac

- SOAP from Cocoa and AppleScript
- CURLHandle
- Rendezvous APIs for local services
- Lower-level APIs like CFNetwork, XML Parser
- Server-side: Java, WebObjects, Apache Axis, etc.



# A Few Companies Are Now Providing Web Services

- Some in full production
- Some experimental
  - Some piggyback off of scraping
- Noncommercial vs. Commercial



# Most Users of Web Services Are Other Servers

the simplest shop in the world




http://simplest-shop.com/ Google

**simplest-shop.com** ...online shopping made easy Welcome! Help

books cameras computers dvd electronics games music software toys video More

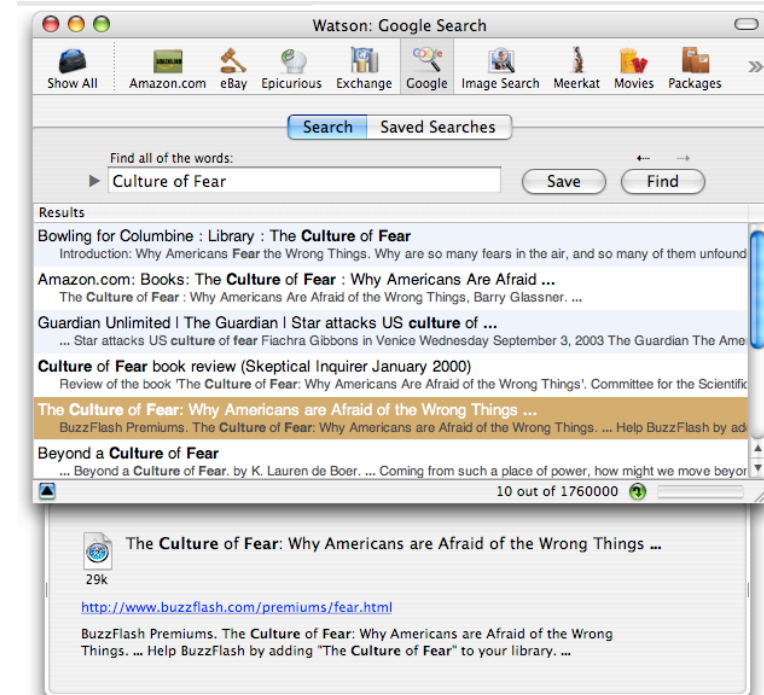
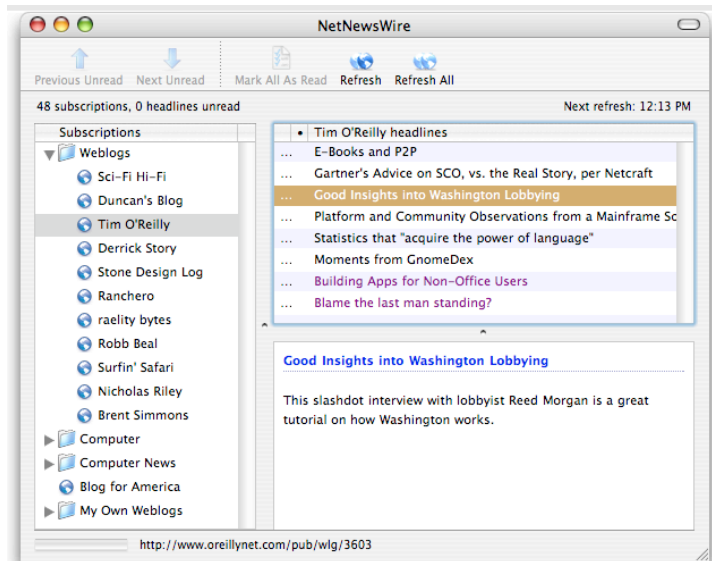
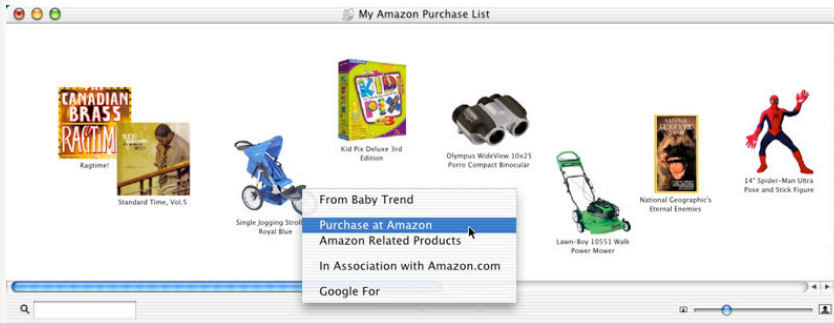
Search for  in all

or visit our featured top categories:

<b>classical</b>	<a href="#">Polkas</a> <a href="#">Polonaises</a> <a href="#">Tangos</a>	<a href="#">Waltzes</a> <a href="#">Chamber Music</a> <a href="#">General</a>	<a href="#">Octets</a> <a href="#">Quartets</a> <a href="#">Quintets</a>	<a href="#">Featured Composers, A-Z</a> (A) (B)	 <a href="#">Obrigado Brazil</a> by Yo-Yo Ma List Price: <del>\$18.00</del> Our Price: <b>\$13.49</b> , this means <b>27% off!</b> Manufacturer: Sony... <a href="#">Read more</a>
<b>baby</b>	<a href="#">Cosco (Eddie Bauer)</a> <a href="#">C.R. Gibson</a> <a href="#">Delta</a>	<a href="#">Especially for Baby</a> <a href="#">Evenflo</a> <a href="#">Backpacks &amp; Carriers</a>	<a href="#">Car Seats</a> <a href="#">Cribs &amp; Mattresses</a> <a href="#">Feeding</a>	<a href="#">Safety Strollers &amp; Travel Systems</a> <a href="#">Swings, Bouncers &amp; Saucers</a>	 <a href="#">Kick 'n Play Bouncer</a> List Price: <del>\$39.99</del> Our Price: <b>\$34.99</b> , this means <b>12% off!</b> Manufacturer: Fisher-Price... <a href="#">Read more</a>
<b>games</b>	<a href="#">Game Boy</a> <a href="#">Advance</a> <a href="#">Hardware &amp; Accessories</a> <a href="#">Kids' Video</a>	<a href="#">GameCube</a> <a href="#">Mac Games</a> <a href="#">Hardware &amp; Accessories</a>	<a href="#">More Systems</a> <a href="#">Linux</a> <a href="#">Sega Genesis</a>	<a href="#">Super Nintendo</a> <a href="#">Nintendo 64</a> <a href="#">Kids &amp; Family</a>	 <a href="#">Sony PlayStation2</a> Our Price: <b>\$179.99</b> Used Price: \$111.50 Manufacturer: Sony Computer Entertainment... <a href="#">Read</a>



# Some Web Services clients are Desktop Applications



# Many Services Still Limited

- Google: Search and spellcheck only
  - No news, images, groups
- Amazon: Search only
  - No browse, music/book preview, purchase



## Limited actions

- Input: Search parameters
- Output: Result list
- Complex protocols like SOAP often not needed
- Structure not conducive to Interactivity





# Business Models

- Totally Open Program
- Private Program
- Registration Required



# A Totally Open Program

- Provider isn't even aware of what the clients are
- Many experimental, unofficial feeds
- Encourages Innovation
- May not be commercially viable
- Success Story: RSS



# A Private Program

- Many in existence
- Watson's VersionTracker, PriceGrabber tools
- Easier to set up (technically and legally)



# Private Program: Disadvantages

- Stifles innovation
- Often ad-hoc
- Expensive for client to use
  - Web Services doesn't mean a client application is trivial!
  - Why should I write a tool to connect to JoesComputerStore.com?



# The Middle Ground: A Registration Program

- Clients register themselves with service provider
- Commercial (free/commissioned): Amazon
- Commercial (pay): eBay
- Non-commercial (free): Google



# How a Typical Registration Program Works

- Client signs a contract with service provider
- Provider gives client a “token”
- Client passes token with each transaction
- Provider can restrict client’s use



## Registration: Advantages

- Client has a formal specification to work with
- Provider can track users and usage



# Registration: Disadvantages

- Token must be kept private
  - Not easy when client is a desktop
  - SSL would help
- The program may cost money!
- Desktop clients can't bottleneck traffic





# eBay developer Program

- Where does the desktop client fit in?
- They might do better by *giving away* the services



Member Sign In

## Services / Fees

Below is a handy chart to help you compare the service offerings and prices of our various tiers. Keep in mind that you may always upgrade your tier at a later date.

• = Included

	Individual	Basic	Professional	Enterprise
<b>API</b>				
<b>License Type</b> ◉	Individual	Commercial	Commercial	Commercial
<b>API Calls Included</b>	50 per day	30,000 Per month	None	None
<b>Fees</b> ◉				
<b>Annual Membership Fee</b>	Free	\$500	\$1,000	\$5,000
<b>Monthly API Usage Fee</b>	None	\$2.90 per 1,000 over 30,000 limit	\$1.60 per 1,000	\$1.25 per 1,000
<b>Certification Fee (per application)</b>	\$100	\$200	\$200	Included (1 per year)
<b>Developer Technical Support Fee</b>	N/A	\$195 per case	\$195 per case	\$195 per case



# Problems with The Present

- Not Enough Providers!
- Ad-hoc feeds are expensive in the long run
- Closed programs stifle innovation
- Desktop clients are at a disadvantage
- Business Models aren't developed



# The Future

- A Lofty Goal: To enable the user to completely avoid the web browser for many daily tasks.



# How to bring more Service Providers On-Board?

- Find business models that work
- Expose sufficient functionality
- Design for the desktop as well as the server
- Conform to standards
- Build more standards



# Business Models

- Free is easy if it brings the provider business
- Advertising: not just web banners
- Pay (flat or per-use) for premium services
- Different plans could expose different capabilities



# Business Models

- Client could agree to display an advertisement with each transaction
- Token should be used to identify client only
- If restricted access desired, end user should establish account with service



# Expose entire Web site's functionality as service

- Searching
- Browsing/Navigation
- What's New (News)
- Purchasing
- Account Management
- Client-stored data *vs.* Server-stored data



# Expose entire Web site's functionality as service

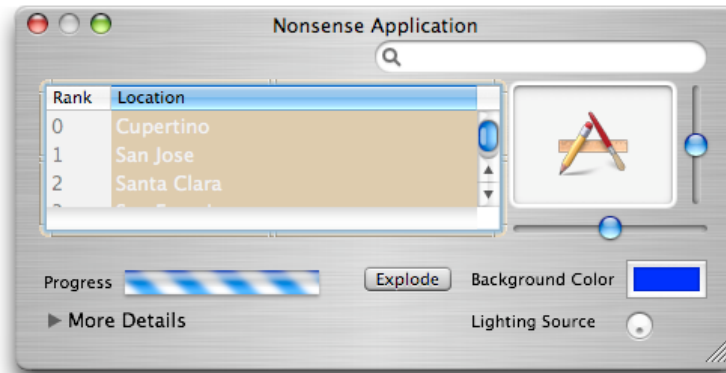
- Provider's Web site can be its own client!  
(Model-View-Controller partitioning)





# Design for the Desktop

- Desktop application has much richer feature set



- Structured, quick transactions
- Clients are distributed over the world!



## Conform to standards

- Use SOAP rather than ad-hoc XML (or worse)
- Use secure SOAP
- Standards make it easier for clients!



## Build more standards

- More standards will make the client's job easier
- Imagine common APIs for common functions
  - shopping carts
  - searching
  - browsing



# Scenarios



# The Present: Shopping on the Web

- Browser only, or assisted by Watson
- Ultimately, browser needed to make the purchase
- Experience is different on each web site



# The Future: A Shopping Application

- Without browser, shop Amazon.com
- Run another App to shop at J&R Music World
- Yet another App to shop at the Apple Store



# The Future: A Shopping Application

- Is a variety of desktop programs any better?
- Inconsistent user interface
- Can you trust each with your credit card number?



# The Future: *A Better Shopping Application*

- What if a “shopping mall” protocol develops?
- A standard for browsing and buying
- One application, many stores





# The Future: *A Better Shopping Application*

- User could compare prices among the vendors
- Purchase integrated with Address Book, Keychain



# The Present: Searching the Web

- **Google** is still sometimes “shotgun”
- Many sites offer their own searches
- Searching syntax inconsistent
- Search results inconsistent



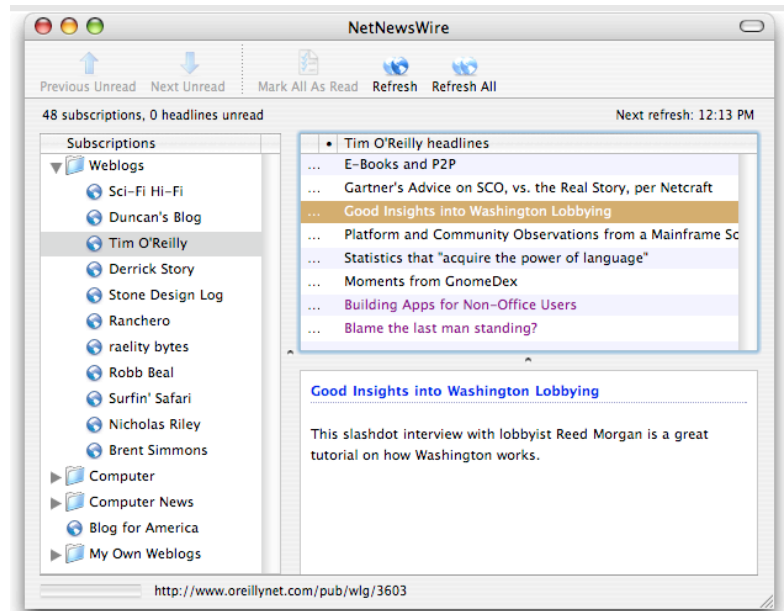
# The Future: Searching the Web

- Standard searching protocol/syntax
- Search on a site, or over the whole web, consistently
- Search the sites you subscribe to
  - (Think Watson’s “Google” tool + NetNewsWire)



# The Present: Reading the News

- Some sites offer full RSS feeds
- Others provide limited feeds or none
- Advertisement & subscriptions = Money



# The Future: Reading the News

- Incorporate user accounts into news feeds
- Free users could view feeds with advertising
- Paid users could view feeds ad-free
- More sources would come on-line
- Browser could detect newsfeed for Web page



# Will we ever abandon the browser?

- Still the easiest way to present information and simple functionality
- User doesn't need any specialized software
- Java Web Start may be the bridge



FIN



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