

# The World of Ajax

Designing and Building Ajax Applications

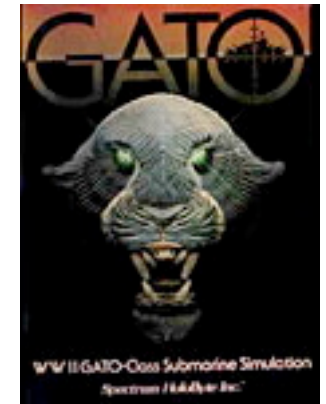
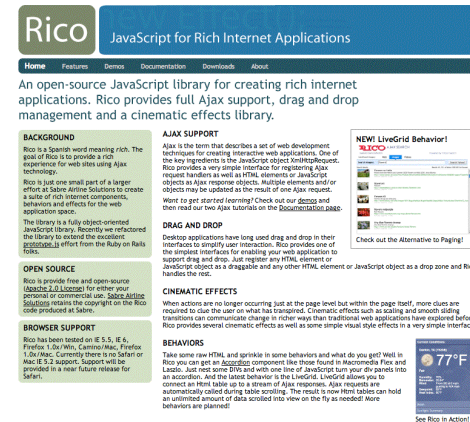
Bill W. Scott, Yahoo! Ajax Evangelist

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[b.scott@yahoo.com](mailto:b.scott@yahoo.com)

# Background

- Games, research, science, military, biz
- Apps, frameworks, widget sets
- Developer, designer
- Object-oriented background
- Software architect, user experience manager
- Yahoo! Ajax Evangelist, Yahoo! Patterns Curator
- <http://looksgoodworkswell.com>



# Ajax at Yahoo!

- Acquisition of Oddpost led to mission to evangelize *Ajax goodness throughout Yahoo*
- Summer 2005 - Ajax Evangelism Team Founded
  - Doug Crockford - JSON, Y! DHMTL Architect
  - Iain Lamb - Founder of Oddpost/Y!Mail Beta
  - Me

# Yahoo! Pattern Library Release

<http://developer.yahoo.net/ypatterns/>

The image displays three screenshots of the Yahoo! Developer Network Design Pattern Library website. The first screenshot shows the main library with a sidebar for navigation and a main content area with a welcome message and a list of patterns. The second screenshot shows the 'Ratings and Reviews' pattern page, which includes a problem summary, solution patterns, and a list of related patterns. The third screenshot shows the 'Rating An Object' example page, which includes a problem summary, an example of a restaurant rating, and a list of related patterns.

**Design Pattern Library**

Developer Network Home Help

Site Search Search

YAHOO! DEVELOPER NETWORK

Design Pattern Library

Yahoo! Developer Network > Design Pattern Library

**USER NEEDS TO**

**NAVIGATE**

- Breadcrumbs
- Faceted Navigation
- Fly-out Menus
- Horizontal Bar
- Hub and Spoke
- Left Navigation
- Tab
- Module Tabs
- Navigation Tabs

**EXPLORE DATA**

- Auto Complete
- Calendar Picker
- Pagination
- Item Pagination
- Search Pagination

**ORGANIZE DATA**

**GIVE FEEDBACK**

- Ratings & Reviews
- Architecture Review
- Rating an Object
- Writing a Review

**PERFORM ACTION**

**CUSTOMIZE**

- Drag and Drop
- Drag and Drop Modules
- Drag and Drop Objects
- In Page Editing
- Sliders

**APPLICATION NEEDS TO**

- CALL ATTENTION
- IMPROVE READABILITY
- Ratings & Reviews
- Review Architecture
- GROUP RELATED ITEMS
- ORGANIZE SCREEN/PAGE

**Welcome**

Welcome to the Yahoo! Design Pattern Library with the design and development patterns that we hope to be a monthly release. We have bundled the patterns with the [Code Library](#). We hope this helps you.

**What's a Pattern?**

A pattern describes an optimal solution to a common problem.

**Recent Patterns**

Send Save Draft

To: yu

Cc: Yusef Jones <yusef@...> Yusef Smith <yusef@...>

**Auto-Complete**

The user needs to enter an item into a text box which could be ambiguous or hard to remember and therefore has the potential to be mis-typed.

**Module Tabs**

The user needs to navigate through one or more stacked panes of content without refreshing the page.

**Results Page:**

1 2 3 4 Next

**Search Pagination**

The user needs to view a set of search results ranked by relevance that is too large to easily display within a single page.

**Rating an Object**

A user wants to quickly leave their opinion on an object, with minimal interruption to any other task flow they are involved in.

**Writing a Review**

User wants to share her opinion with others about an object (place, person, thing) in greater detail than a simple rating.

**Ratings and Reviews**

**Problem Summary**

User wants to leave an opinion or evaluate an object. Quick opinions can be captured using Reviews.

**Solution Patterns**

1. Target Elements (T1 - T5)

2. Review Elements (R1 - R5)

Apple iPhone Price: \$51 Read all (1)

Overall: ★★★★★

Quality: ★★★★★

Architecture of a Review

A product or website needs to present ratings and reviews with a variety of informational elements.

Rating an Object

A user wants to quickly leave their opinion on an object, with minimal interruption to any other task flow they are involved in.

**Rating An Object**

**Problem Summary**

A user wants to quickly leave their opinion on an object, with minimal interruption to any other task flow they are involved in.

**EXAMPLE:**

**Restaurant**

Alma St  
Menlo Park, CA 94025

Cross Street:  
Between Alma Ln and Ravenswood Ave

★ ★ ★ ★ ★  
Average Rating (7)  
[Read 7 reviews](#)

Average  
★ ★ ★ ★ ★  
[Write a Review](#)

[Play](#)

Rate a restaurant on [Yahoo! Local](#)

**Use When**

- A user wants to leave an opinion quickly.
- Use in combination with reviews for richer experience.
- Use to quickly tap into the existing "community" of a product.
- Ratings are collected together to present an average rating of an object from the collective user set.

**Solution**

- Show clickable items (most often used are stars) that light up on rollover to infer clickability.

**QUICK JUMP**

- [Solution](#)
- [Rationale](#)
- [Accessibility](#)

**RELATED PATTERNS**

- [Ratings and Reviews](#)
- [Architecture of a Review](#)
- [Writing a Review](#)

**AS USED ON YAHOO!**

- [Yahoo! Local](#)
- [Yahoo! Shopping](#)
- [Yahoo! Custom Autos](#)
- [Yahoo! Movies](#)


**BLOG**

- [Blog Article](#)

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```
YAHOO.util.Motion = function(el, attributes, duration, method) {  
    if (el) {  
        this.initMotion(el, attributes, duration, method);  
    }  
};  
YAHOO.util.Motion.prototype = new YAHOO.util.Anim();  
YAHOO.util.Motion.prototype.initMotion = function(el, attributes, duration, method) {  
    YAHOO.util.Anim.call(this, el, attributes, duration, method);  
};
```



## YAHOO! USER INTERFACE BLOG

News and Articles about Designing and Developing with Yahoo! Libraries.

[Blog](#) [About](#)

### Yahoo! Design Pattern Library Released

February 13, 2006 on 7:54 am by Bill Scott | In [Design](#) |

I'm excited to announce that today we are releasing the [Yahoo! Design Pattern Library](#) to the public under a friendly [Creative Commons License](#). The goal in releasing this library is for us to share the common patterns that we see emerging at Yahoo! It is hoped that by opening up our design patterns we can share our current thinking as well as solicit your valuable feedback.

We believe design patterns are [powerful](#). First, they offer a solution in context of a problem. Second, they provide a name for the solution. Taken together as a set, pattern libraries form a solution language that can enhance our ability to communicate design ideas. Lastly, they provide us a context in which to discuss a number of associated issues: the thinking behind a solution; issues around accessibility, and de-gradeability; other related patterns; examples of usage; and code samples to name a few.

In case patterns are a new concept to you, here's a little history to get you up to speed.

#### Background on Patterns

#### SYNDICATE

All Entries:

[+ MY YAHOO!](#) [RSS](#)

All Comments:

[+ MY YAHOO!](#) [RSS](#)

#### RECENT POSTS

- [Developing a JavaScript Library for Yahoo!](#)
- [Welcome to the Yahoo! User Interface Blog](#)
- [The Yahoo! User Interface Library](#)
- [Yahoo! Design Pattern Library Released](#)
- [Search Pagination Design Pattern](#)
- [Item Pagination Design Pattern](#)
- [Rating an Object Pattern](#)


<http://groups.yahoo.com/group/ydn-patterns/>

[Yahoo!](#) [Yahoo! Plus Home](#) [Mail](#)

Search the Web

**YAHOO! PLUS GROUPS** Welcome, **billwaynescott**  
[[Sign Out](#), [My Account](#)]

[Groups Home](#) | [Help](#)

IS IT EASY TO START AN ONLINE STORE ? 

billwaynescott · bscott@yahoo-inc.com | Group Moderator - [Edit Membership](#)

[Start a Group](#) | [My Groups](#)

**ydn-patterns** · Yahoo! Design Pattern Discussion Group










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    [Pending](#)  
[Links](#)  
[Database](#)  
[Polls](#)  
[Members](#)  
    [Pending](#)  
  
[Promote](#)  
[Invite](#)  
  
[Management](#)

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View: [Simple](#) | [Summary](#) | [Expanded](#)  
As: [Msg List](#) | [Thread](#)

1 - 23 of 23 First | < Previous | Next > | Last

	Subject	Author	Date 
<input type="checkbox"/>	1 <b>Welcome!</b> We are excited about the launch of our Yahoo! Design Patterns Library < <a href="http://developer.yahoo.net/ypatterns/index.php">http://developer.yahoo.net/ypatterns/index.php</a> > . While our internal patterns site is...	<a href="#">billwaynescott</a>  	Feb 13, 2006 2:31 pm
<input type="checkbox"/>	2 <b>Re: Welcome!</b> Great work! I hope to see more soon :) One navigation suggestion I have is some kind of linear navigation within the details so I can go to the next design...	Gilbert Lee <a href="#">gilbertlee</a>   	Feb 13, 2006 7:49 pm
<input type="checkbox"/>	3 <b>Re: Welcome!</b> Great work, I just scanned through the two libraries and have to say: You guys rock. :) Thanks....	Dominik Schwind <a href="#">d_schwind</a>   	Feb 14, 2006 12:41 am

**Breadcrumbs. Module Tabs. Navigation Tabs.  
Auto Complete. Pagination. Item Pagination.  
Search Pagination. Ratings and Reviews.  
Architecture of a Review. Rating an Object.  
Writing a Review. Drag and Drop. Drag and  
Drop Modules. Transition. Dim. Brighten.  
Cross Fade. Contract. Expand. Fade In. Fade  
Out. Move. Self-Healing. Slide. Highlight.  
Invitation. Cursor Invitation. Drop Invitation.  
Tool Tip Invitation. Hover Invitation. Links.  
Alphanumeric Links. Text Links.**

**Drag and Drop. Drag and Drop Modules. In Page Editing. In Page Custom Editing. Direct State Editing. Grid Cell Editing. Inline Custom Editing. Inline Tag Editing. Popup Custom Editing. Slide-out Custom Editing. Inline Text Editing. Persistent Portals. Inline Reordering. Indication. Busy Indication. Cursor Busy. In Context Busy. In Context Progress. Inline Status. Character Counter. Auto Complete. Balloon Error Tip. Deferred Content Loading. Dynamic Goal. Narrowing Choices. Refining Search. Live Search. Dynamic Filter. Invitation. Cursor Invitation. Drop Invitation. Tool Tip Invitation. Hover Invitation. Detail Zoom. Opacity Focus. Configurable Module - Faceplate. Configurable Module - Flip It. Configurable Module - Inline Configure. Configurable Module - Slide Out Drawer. Slide Out. Flip. Opacity Fade. Endless Scrolling. Expandable Paging Boundary. Fresh Content. Hover Detail. In Place Drill Down. Inline Assistant. Inline Validation. Validate Then Suggest. On Demand Refresh. Periodic Refresh. Resizable Modules. Scrolling Modules. Auto Save. In Context Tools. Remembered Collection. Remembered Preferences. Auto Form Fill. Rating an Object. Transition. Brighten Transition. Cross Fade Transition. Dim Transition. Expand Transition. Fade In Transition. Fade Out Transition. Flip Transition. Move Transition. Self-Healing Transition. Collapse Transition. Slide Transition. Rich Internet Object. Available. Selected. Identifiable Object.**



# Y! Patterns as a Platform (Web 2.0)

Developer Network Home Help Site Search Search

**YAHOO! DEVELOPER NETWORK**

Design Pattern Library

Yahoo! Developer Network > Design Pattern Library > Ratings and Reviews > Rating An Object

### Rating An Object

**Problem Summary**

A user wants to quickly leave their opinion on an object, with minimal interruption to any other task flow they are involved in.

**EXAMPLE:**

**Restaurant**

(100%) 100% Positive

Alma St  
Menlo Park, CA 94025

Cross Street:  
Between Alma Ln and Ravenswood Ave

★★★★★

Average Rating (7)  
[Read 7 reviews](#)

Average  
★★★★☆

[Write a Review](#)

Play ▶

Rate a restaurant on [Yahoo! Local](#)

**Use When**

- A user wants to leave an opinion quickly.
- Use in combination with reviews for richer experience.
- Use to quickly tap into the existing "community" of a product.
- Ratings are collected together to present an average rating of an object from the collective user set.

**Solution**

- Show clickable items (most often used are stars) that light up on rollover to infer clickability.

**QUICK JUMP**

- [Solution](#)
- [Rationale](#)
- [Accessibility](#)

**RELATED PATTERNS**


- [Ratings and Reviews](#)
- [Architecture of a Review](#)
- [Writing a Review](#)

**AS USED ON YAHOO!**

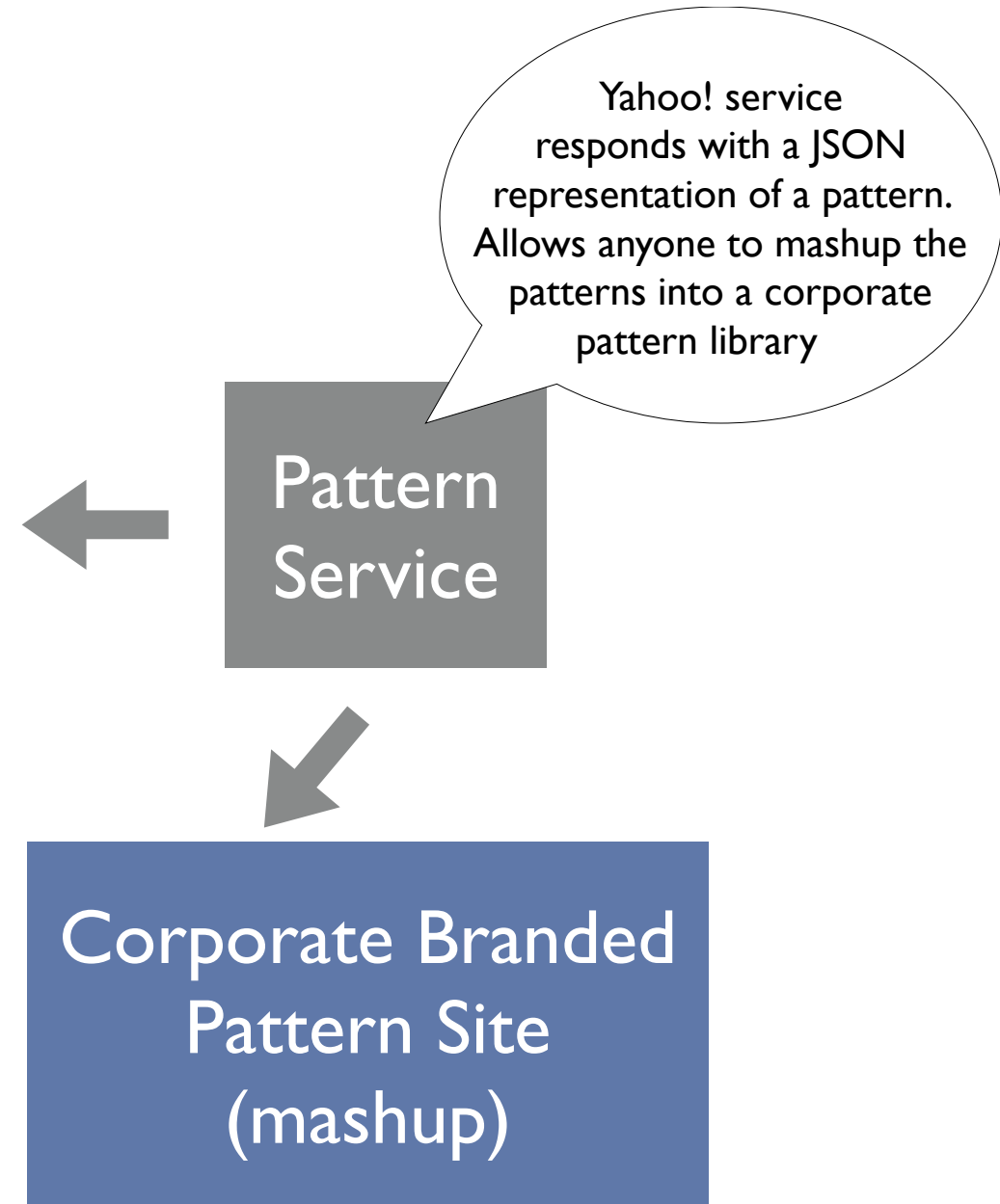
- [Yahoo! Local](#)
- [Yahoo! Shopping](#)
- [Yahoo! Custom Autos](#)
- [Yahoo! Movies](#)

**BLOG**

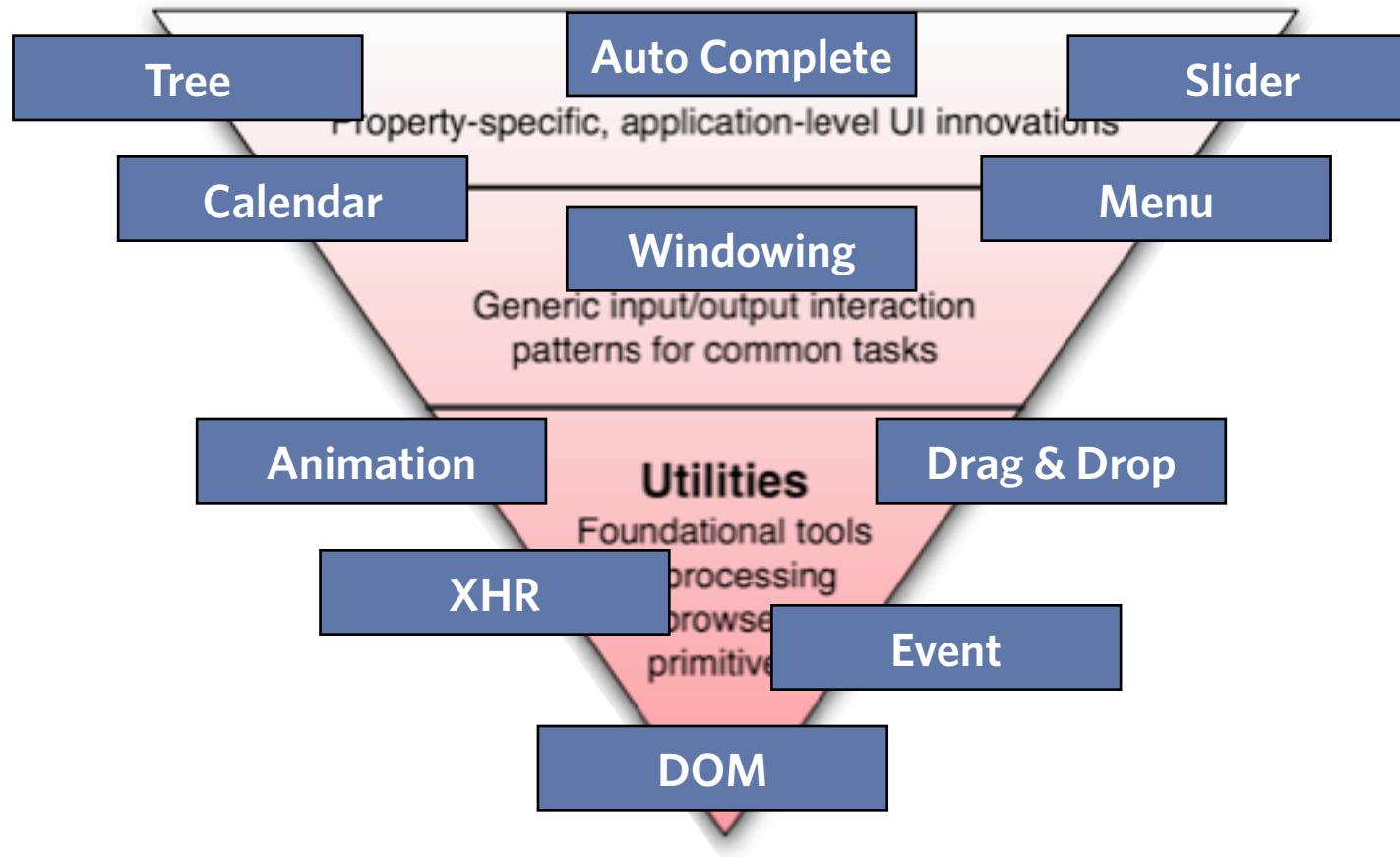
- [Blog Article](#)

  
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# Yahoo! UI Library

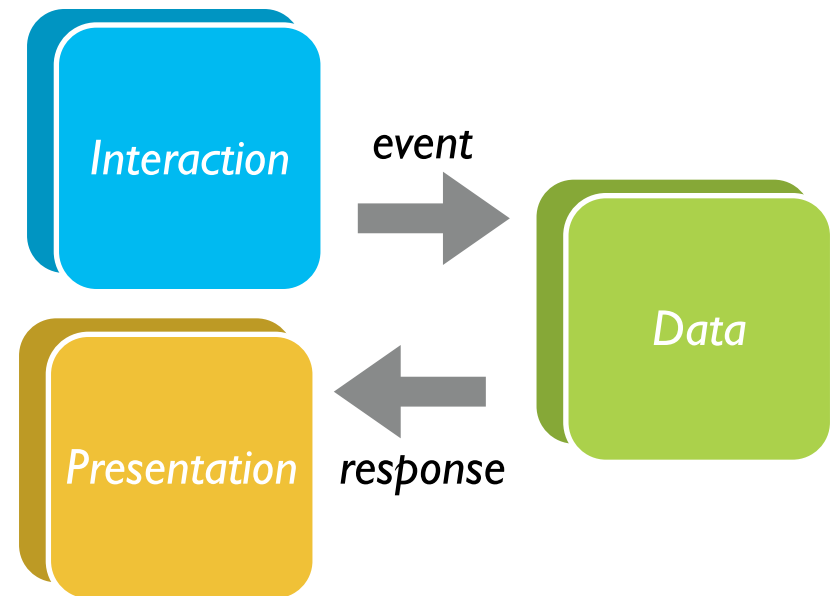




# Richness

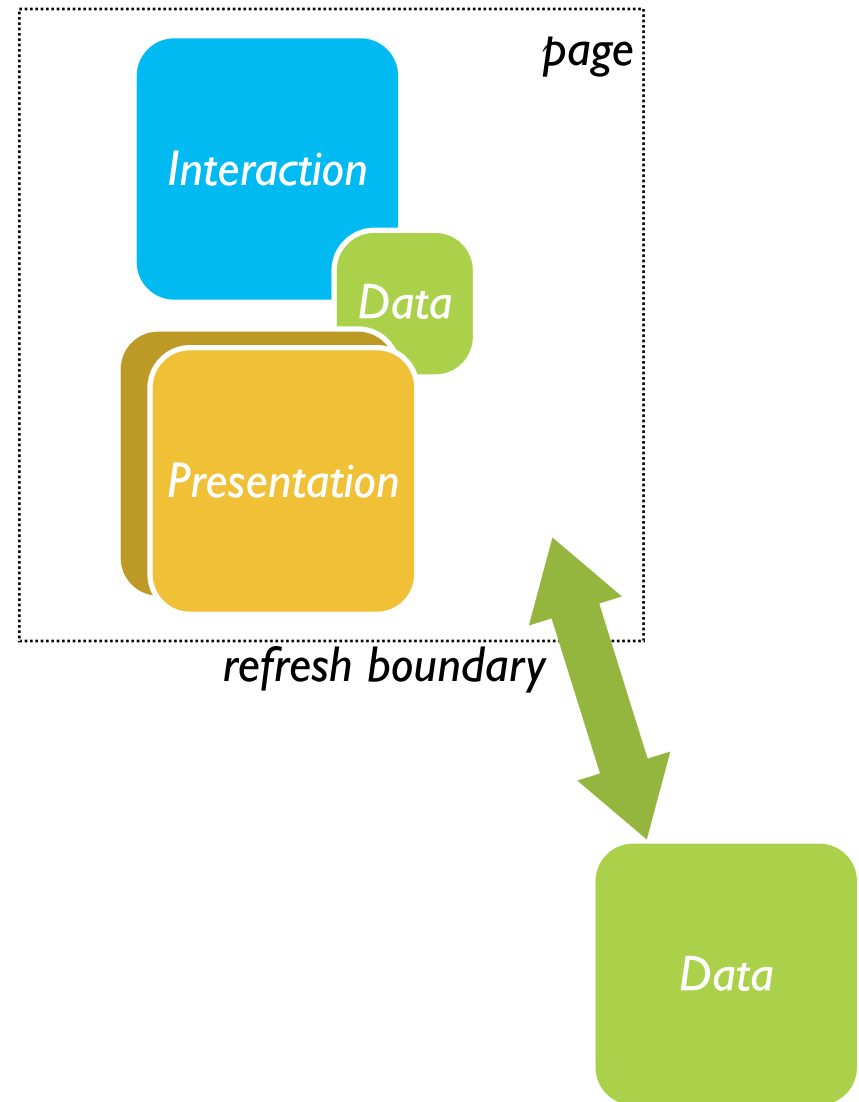
# Defining Richness: Web in 3D

- Interaction Dimension
- Data Dimension
- Presentation Dimension

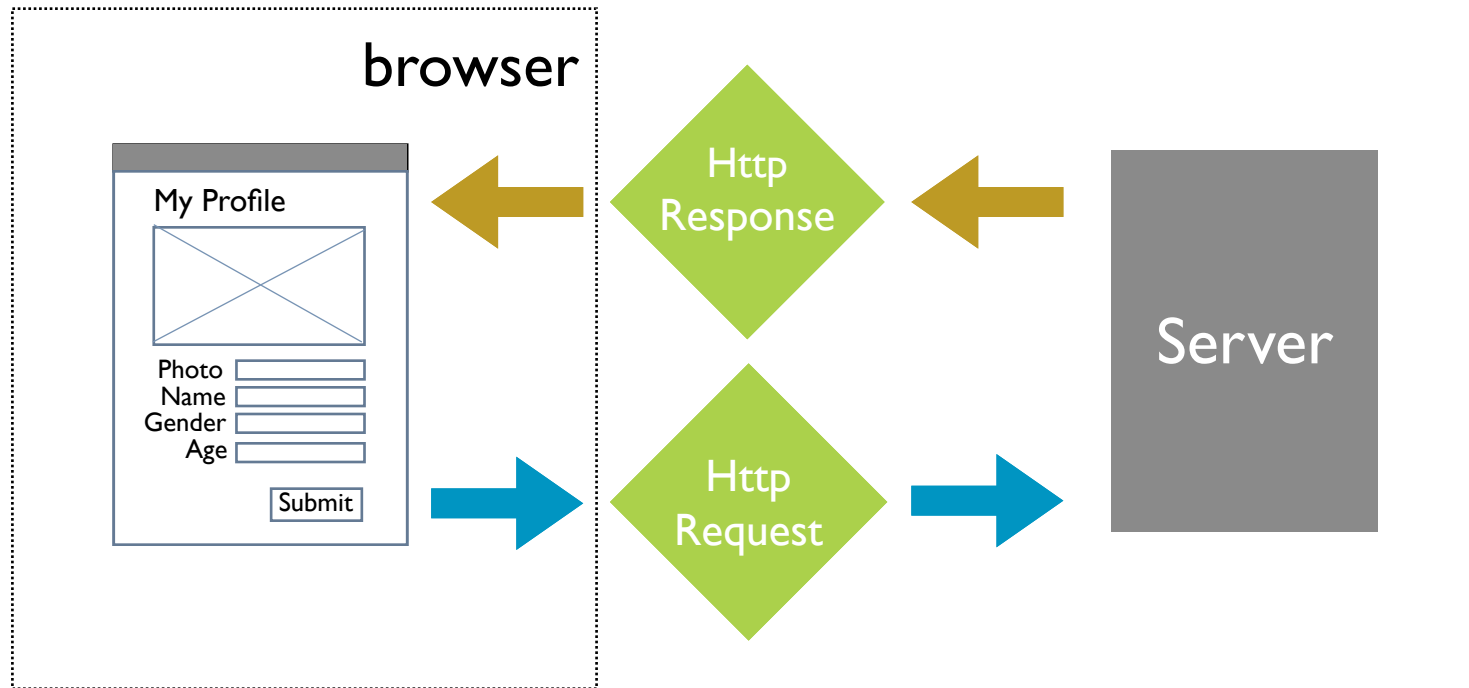


# Classic Web

- Interaction course-grained
- Data loaded with the page or obtained via refresh
- Presentation: page-based updates



# Classic Web Illustrated



# Ajax = Just-in-Time. Immediacy.

## Most Popular

Most Emailed | Most Viewed | Most Recommended | My Sources

- Lonely elephants, edgy apes baffled by post-Katrina life at zoo Knight Ridder - Sun Oct 16, 4:40 PM ET
  - Scientists Study Gorilla
  - Inflation Soars Higher
  - Rick Springfield's Soaring
  - Feds Want Banks to Stay
- » All Most Emailed



NEW ORLEANS - An AWOL alligator has resurfaced, elephants are forlorn and apes are agitated at Audubon Zoo, one of the nation's most renowned animal sanctuaries, left by Hurricane Katrina both broken and broke.

## World

Just-in-time data

Just-in-time presentation



Web | Images | Groups | News | Froogle | Local <sup>New!</sup> | more »

tom cruise	
tom cruise	6,670,000 results
tom clancy	1,990,000 results
tom cruise movies	2,670,000 results
height	215,000 results
	5,780,000 results
books	145,000 results
filmography	730,000 results
ne	481,000 results
	552,000 results
	347,000 results

Students to Enroll

Crew Id	Last Name	First Name
600922	Peterson	Shelley
349394	Craft	Adrian
432939	Douglas	Elayne
468370	Hill	Petra
999300	Barnes	James
344935	Smith	James
139204	Miller	Gordon

Students to Enroll

Crew Id	Last Name	First Name
600922	Peterson	Shelley
349394	Craft	Adrian
432939	Douglas	Elayne
468370	Hill	Petra
999300	Barnes	James
344935	Smith	James
139204	Miller	Gordon

Course Calendar

DEC 2005

S	M	T	W	T	F	S	1	2	3
4	5	6	7	8	9	10			
11	12	13	14	15	16	17			
18	19	20	21	22	23	24			
25	26	27	28	29	30	31			

Course Calendar

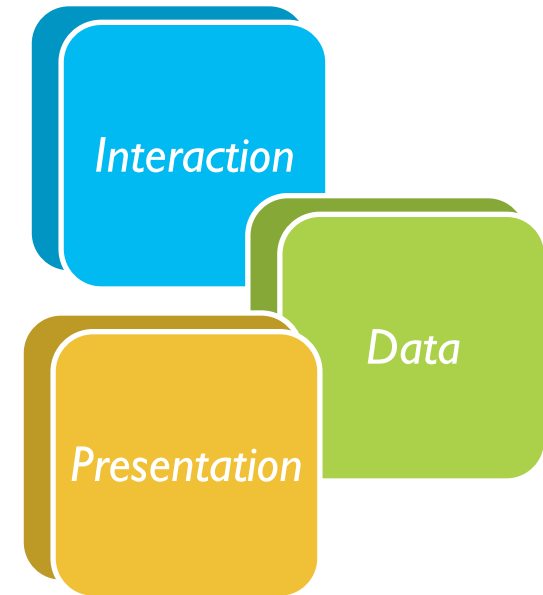
DEC 2005

S	M	T	W	T	F	S	1	2	3
4	5	6	7	8	9				
11	12	13	14	15	16				
18	19	20	21	22	23				
25	26	27	28	29	30				

Just-in-time logic

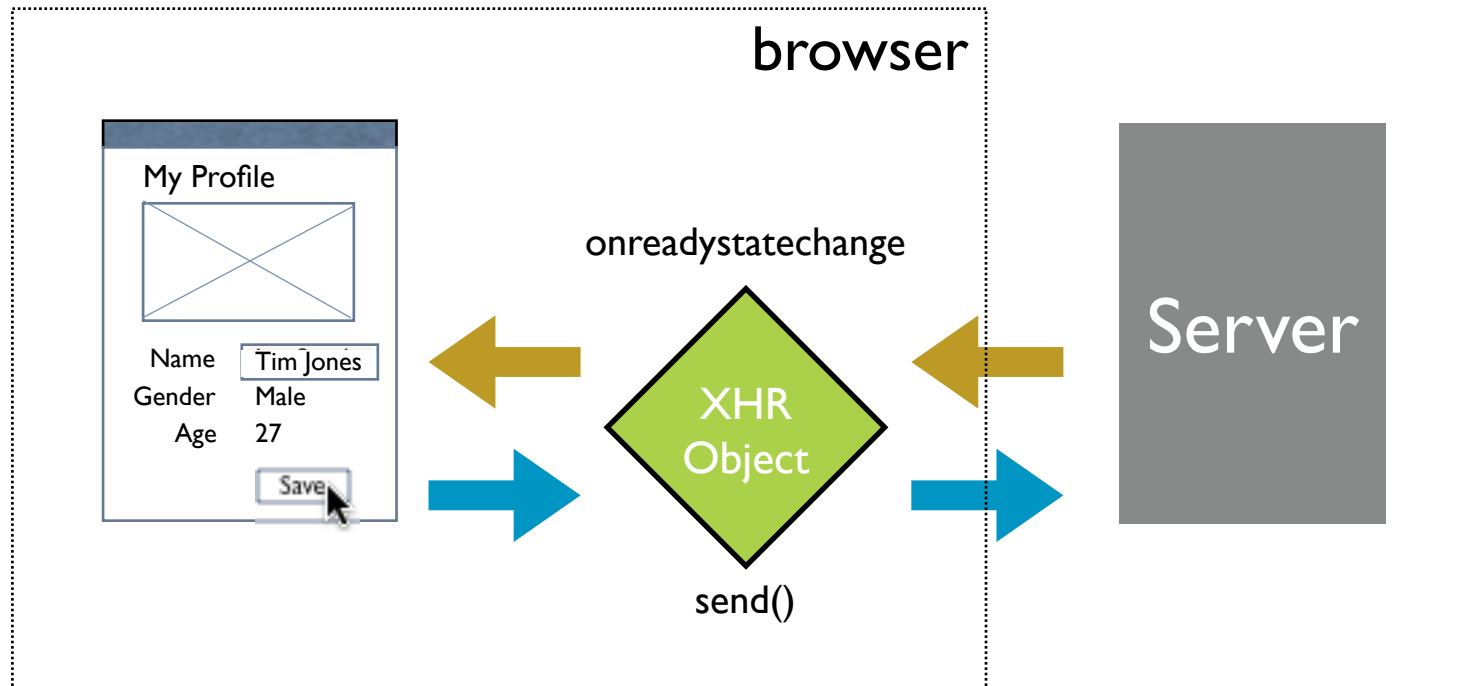
# Ajax Model - New & Improved!

- New! Deeper Interaction
- Now with Just-in-Time Data & Just-in-Time Logic!
  - ★ XMLHttpRequest (XHR) is the secret sauce!
- Now with Richer Interface!
- All dimensions are closer






# Ajax Illustrated



# AJAX vs Ajax

- AJAX = Asynchronous JavaScript and XML
  - Strict definition is using XMLHttpRequest (XHR) to retrieve XML within a web page
- Ajax = The set of technologies that allow web applications to provide rich interaction, just-in-time information and dynamic interfaces without required page refresh
- The Secret Sauce 
  - Ajax = XHR + DHTML (HTML, CSS, JavaScript) + Rich design

# Other Remote Scripting Techniques

- Hidden IFrame
- `<img> src`
- `<script> src` hack
- CSS href hack
- JS to faceless Java applets
- JS to faceless Flash
- NO CONTENT Response
- Cookies



# Patterns

**Drag and Drop. Drag and Drop Modules. In Page Editing. In Page Custom Editing. Direct State Editing. Grid Cell Editing. Inline Custom Editing. Inline Tag Editing. Popup Custom Editing. Slide-out Custom Editing. Inline Text Editing. Persistent Portals. Inline Reordering. Indication. Busy Indication. Cursor Busy. In Context Busy. In Context Progress. Inline Status. Character Counter. Auto Complete. Balloon Error Tip. Deferred Content Loading. Dynamic Goal. Narrowing Choices. Refining Search. Live Search. Dynamic Filter. Invitation. Cursor Invitation. Drop Invitation. Tool Tip Invitation. Hover Invitation. Detail Zoom. Opacity Focus. Configurable Module - Faceplate. Configurable Module - Flip It. Configurable Module - Inline Configure. Configurable Module - Slide Out Drawer. Slide Out. Flip. Opacity Fade. Endless Scrolling. Expandable Paging Boundary. Fresh Content. Hover Detail. In Place Drill Down. Inline Assistant. Inline Validation. Validate Then Suggest. On Demand Refresh. Periodic Refresh. Resizable Modules. Scrolling Modules. Auto Save. In Context Tools. Remembered Collection. Remembered Preferences. Auto Form Fill. Rating an Object. Transition. Brighten Transition. Cross Fade Transition. Dim Transition. Expand Transition. Fade In Transition. Fade Out Transition. Flip Transition. Move Transition. Self-Healing Transition. Collapse Transition. Slide Transition. Rich Internet Object. Available. Selected. Identifiable Object.**

## Ask Your Question

### 1. Enter your question

You can ask 5 more questions today.

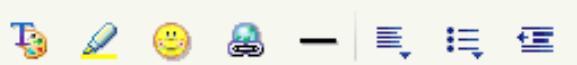
You have 110 characters to work with. Add details below.

### 2. Add details (optional)

No spam, please! When in doubt, please refer to our [community guidelines](#).

You have 1000 characters to work with.

pattern. Live Suggest.

To:	<input type="text"/>	Show BCC
Cc:	<input type="text"/>	
Subject:	<input type="text"/>	Plain Text
Times New Roman 12 <b>B</b> <i>I</i> <u>U</u> 		

pattern. Auto Complete.

### Find Athletes and Countries

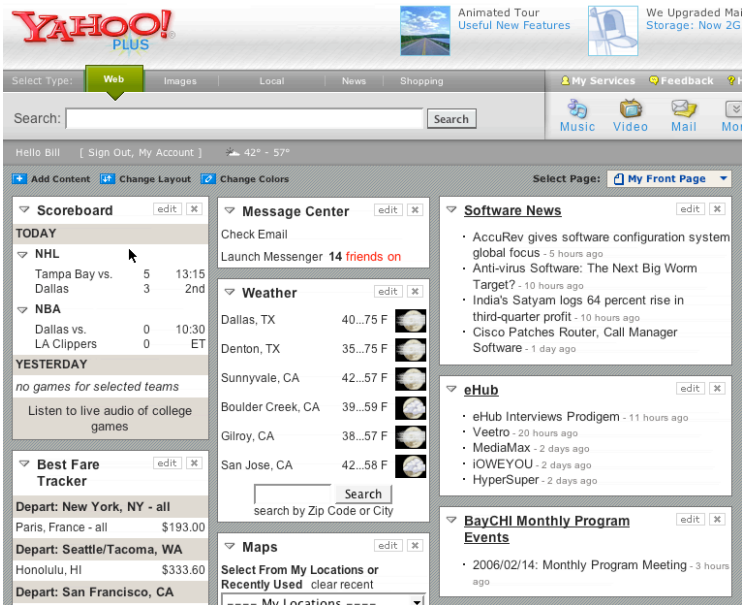
  
  

PRESENTED BY  CHEVROLET

### Medal Count

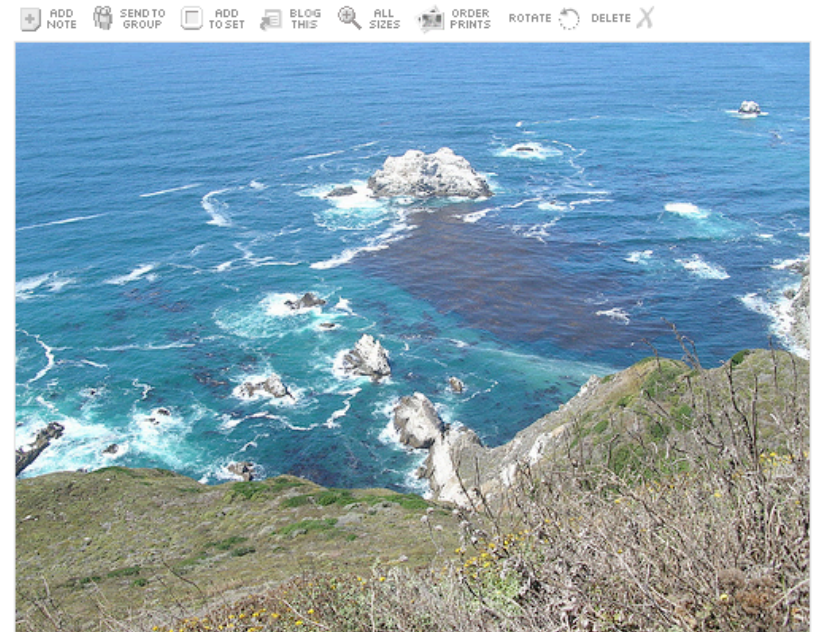
				TOTAL
 GERMANY	11	12	6	29
 UNITED STATES	9	9	7	25
 CANADA	7	10	7	24
 AUSTRIA	9	7	7	23
 RUSSIA	8	6	8	22

[» Full Medal Count](#) [+ MY YAHOO!](#) [RSS](#)

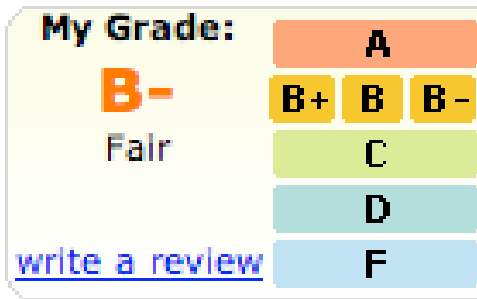


pattern. Drag and Drop.

## Rocky Waters



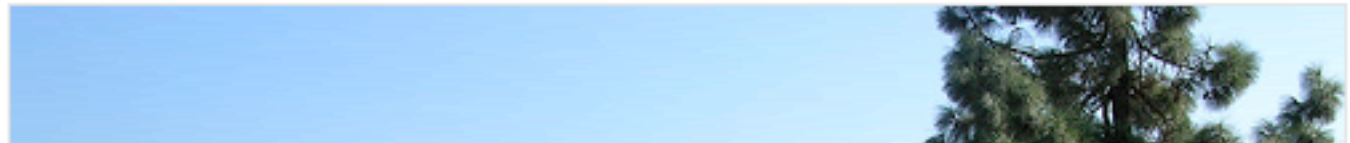
pattern. Inline Editing.



pattern. Hover Invitation.

### Park near our new home

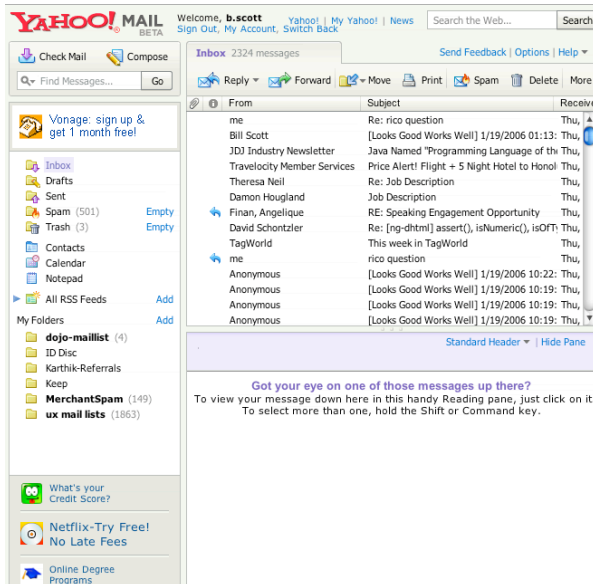
ADD NOTE SEND TO GROUP ADD TO SET BLOG THIS ALL SIZES ORDER PRINTS ROTATE DELETE X



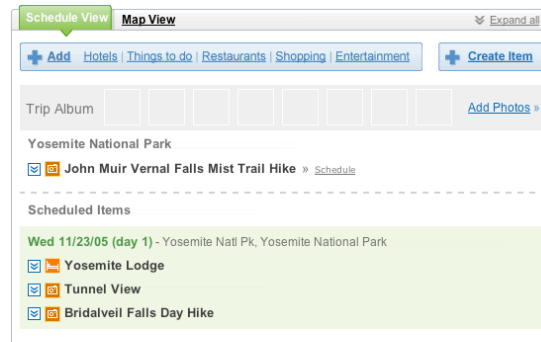
pattern. Tooltip Invitation + Hover Invitation.



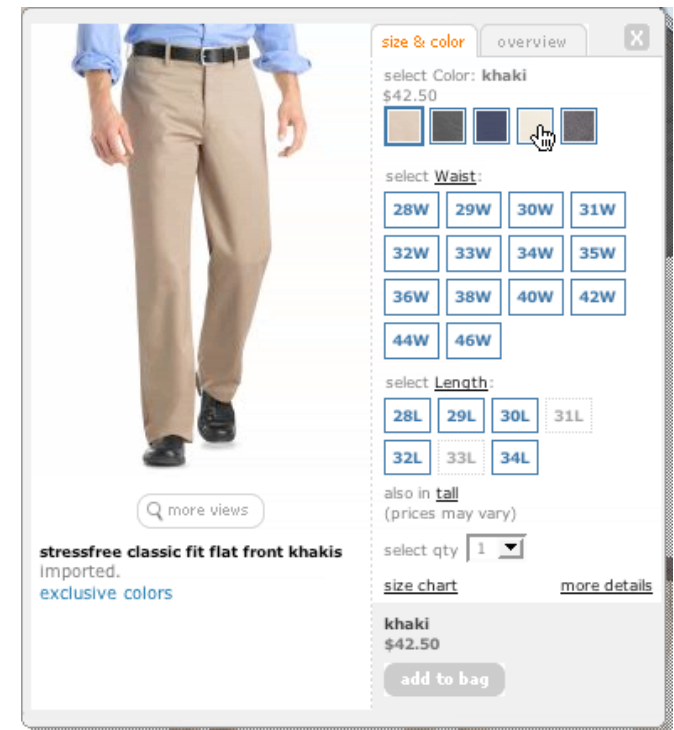
# Patterns. In Page Interaction.



pattern. Endless Scrolling.

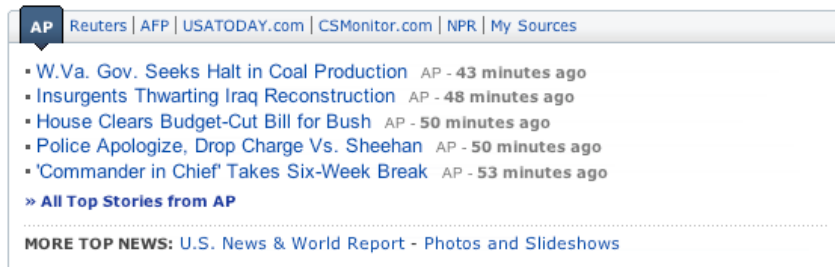


pattern. In Context Expand.



pattern. Inline Assistant.

## Top Stories



pattern. Hover Details.

# Patterns. Light Footprints.

0 items in [my bag](#) [checkout](#)

## Pique polo

only at gap.com

[overview](#) [you'll also like](#)

Soft cotton pique knit.  
Short-sleeved, button neckline.

- Need large quantities? [Click for Corporate Apparel](#)
- 100% Cotton. Machine wash. imported.

[regular](#) [tall](#)

**Buy More and Save** #346927  
prices may vary

select Color: **royal grape**  
\$29.50 **Buy 2 or more, \$25.00 each**

☐ ☒ ☐ ☐ ☐ ☐

~~\$29.50~~ **\$9.99**

select Size:  
☒ XS ☐ S ☐ M ☐ L ☐ XL ☐ XXL ☐ XXXL

[size chart](#)

Quantity:  **royal grape**  
~~\$29.50~~ **\$9.99** [add to bag](#)

**RECOMMEND THIS STORY**

Recommend It: ☆☆☆☆☆ Average (63 votes) ★★★★★

pattern. Rating an Object.

## Classics

**Recommendations**

**High Plains Drifter** ★★★★★ [Not Interested](#)  
[Add](#)  
Amid shoot-outs and existentialism, a mysterious stranger (Clint Eastwood, who also directs) is hired to protect a small town from outlaws. But his recipe for defense could be a deal with the devil, and soon, even the enigmatic gunslinger's ... [Read More](#)

**The Great Escape** ★★★★★ [Not Interested](#)  
[Add](#)  
Director John Sturges's Oscar-nominated adventure classic follows the true tale of a group-escape attempt from one of Germany's toughest prisoner-of-war camps. Hundreds of Allied POWs join Roger "Big X" Bartlett (Richard Attenborough), Danny "The ... [Read More](#)

[More Recommendations >](#)

**Featured Subgenre**  
**CLASSIC COMEDIES**

**Fun with Dick and Jane** ★★★★★ [Not Interested](#)  
[Add](#)  
George Segal and Jane Fonda play Dick and Jane, two up-and-coming yuppies who exemplified the lifestyle before there was even a name for it. But when Dick loses his lucrative job, the two face a ... [Read More](#)

**Monty Python's Life of Brian** ★★★★★ [Not Interested](#)  
[Add](#)  
The crown princes of British comedy are at it again -- this time, in a send-up of the life and times of Jesus Christ. Perhaps the most controversial

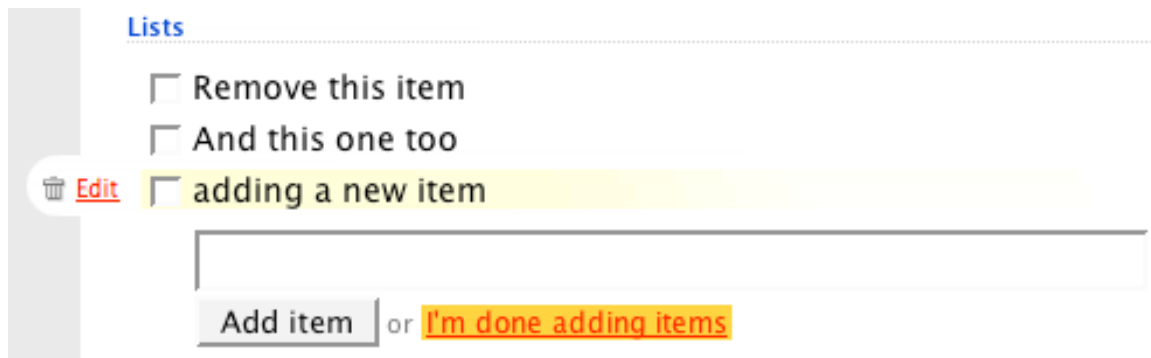
**282** diggs [dig it](#)

submitted by [usedmac](#) 1 day 1 hour ago (via [http://mac](#))

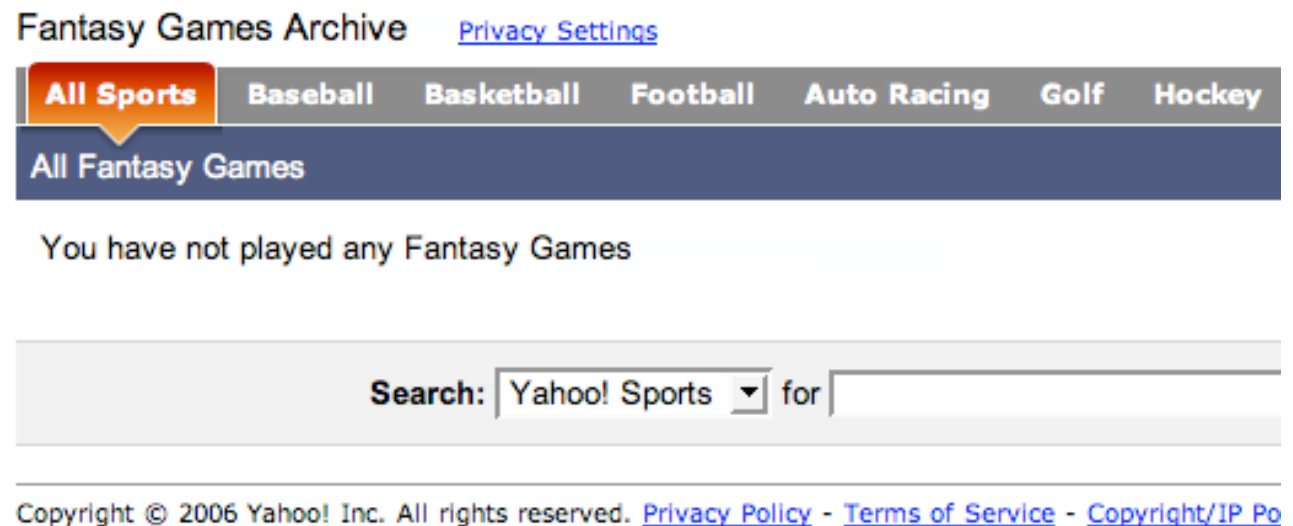
The Apple Mighty Mouse brings a slew of great feat with most new Mac systems it is becoming a comm one for close to a year now, I have found that the us Scroll Ball far outweigh its quirks.

[60 comments](#) | [blog this](#) | [email this](#) | category: [apple](#)

pattern. In Page Action.



pattern. Fade Transition + Self-Healing Transition.




pattern. Slide + Fade In + Fade Out.

# Patterns. Rich Objects.

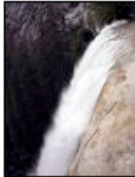
**Schedule View** **Map View** [Expand all](#)

[+ Add](#) [Hotels](#) | [Things to do](#) | [Restaurants](#) | [Shopping](#) | [Entertainment](#) [+ Create Item](#)

**Yosemite National Park**

  [John Muir Vernal Falls Mist Trail Hike](#) » [Schedule](#) | [View](#) | [Delete](#)

 +1 209 372 0200  
Happy Isle Shuttle Stop #16  
Yosemite National Park, CA 95389  
United States



This hike is also known as the Mist Trail because it passes right beside Vernal Falls, which in the spring blows a heavy mist everywhere. This 1.4 mile roundtrip hike is considered a moderate ...

**Notes:** [\[ Edit \]](#)


**Tags:** [\[ Edit \]](#)



**Dates:** [\[ Add \]](#)

---

**Scheduled Items**

**Wed 11/23/05 (day 1)** - Yosemite Natl Pk, Yosemite National Park


  **Yosemite Lodge**


  **Tunnel View**


  **Bridalveil Falls Day Hike**


pattern. Shareable Object.


**Other trips you might like ...** [Browse All Public Trips »](#)

  
**The Ultimate A...**  
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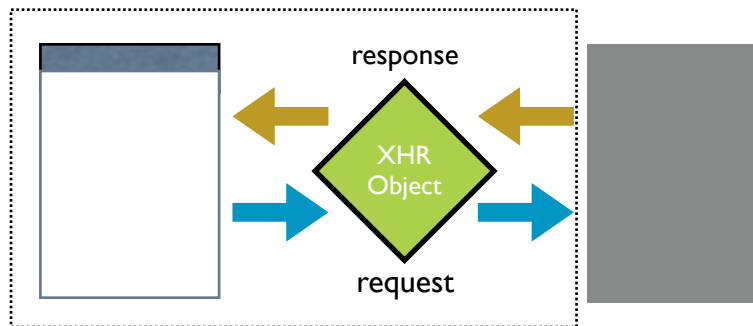
  
**6 Parks in 8 d...**  
by [jacorebb](#)  
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**Yosemite**  
by [whiskeywom...](#)  
[Copy this trip](#)

  
**Cali Baby!**  
by [ibily78](#)  
[Copy this trip](#)

# So What Can XHR Do?

- Make a request
- Return a response
- And do it asynchronously



# Ajax Pattern DNA

- Every Ajax design pattern consists of a
  - **Trigger** (event or timer)
  - **Operation** (ajax)
  - **Update** (dom)



# Trigger

- Every pattern of interaction starts with
  - a user event
  - a timer event

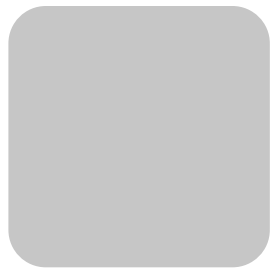
mouseout hover keypress keydown mousedown  
drop filter choices mouseup drag click mousedown select  
focus blur resize move timeout



# Operation

Five basic operations define what you can do

- **Lookup** I can get information when I need it
- **Persist** I can save in real-time
- **Validate** I can prevent errors early
- **Invoke** I can make things happen now
- **Message** I can communicate instantly





# Operation. Lookup

I can get information when I need it

**Auto Complete. Deferred Content Loading. Dynamic Goal. Narrowing Choices. Refining Search. Live Search. Dynamic Filter. Detail Zoom. Endless Scrolling. Expandable Paging Boundary. Fresh Content. Hover Detail. In Place Drill Down. On Demand Refresh. Periodic Refresh. Resizable Modules. Scrolling Modules. Auto Form Fill.**





type, Google will offer suggestions. Use the arrow keys to navigate the results. [L](#)

[Feedback](#) - [Discuss](#) - [Terms of Use](#) - [FAQ](#)

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**Instant Search** BETA



**Instant Search gives you answers as you type -- no more waiting!**

Why feel lucky when you can be right? With Instant Search, results instantly appear for [Yahoo! Shortcuts](#) and common searches. Give it a spin! Type in these examples below, or try your own searches:

- boston weather
- wikipedia
- nfl
- 22 5th ave new york ny
- san francisco coffee shops
- dmv



## Rico LiveGrid

**RICO** AJAX SEARCH

LiveGrid Demonstration

Powered by Yahoo! Search

Select Search Category: **Web** Images Videos

Search the Web:

Search Results Results 1 - 5 of about 10600000 for monterey bay

1. [Monterey.com](http://www.monterey.com/)  
guide to attractions, lodging, dining, and more. A service of the Monterey Peninsula Visitors and Conventions Bureau.  
<http://www.monterey.com/> - text/html
2. [California State University, Monterey Bay](http://csumb.edu/)  
comprehensive state university which values service through high quality education.  
<http://csumb.edu/> - text/html
3. [Monterey Bay - National Geographic](http://www.nationalgeographic.com/monterey/ax/primary_fs.html)  
Monterey Bay @ nationalgeographic.com ...  
[http://www.nationalgeographic.com/monterey/ax/primary\\_fs.html](http://www.nationalgeographic.com/monterey/ax/primary_fs.html) - text/html
4. [Monterey Bay Aquarium](http://www.mbayaq.org/)  
mission is to inspire conservation of the seas.  
<http://www.mbayaq.org/> - text/html
5. [Monterey Bay Aquarium: Live Web Cams](http://www.mbayaq.org/efc/cam_menu.asp)  
Eight live web cameras of the Monterey Bay Aquarium's marine life exhibits and Monterey Bay, Monterey, CA. ... Monterey Bay Aquarium, 886 Cannery Row, Monterey, CA 93940 Tel: (831) 648-4800. Â© 1999-20  
[http://www.mbayaq.org/efc/cam\\_menu.asp](http://www.mbayaq.org/efc/cam_menu.asp) - text/html

**YAHOO! MAIL BETA** Welcome, **b.scott** [Yahoo!](#) | [My Yahoo!](#) | [News](#)

**Inbox** 2324 messages [Send Feedback](#) | [Options](#) | [Help](#)

	From	Subject	Receive
	me	Re: rico question	Thu, 1/19/2006 01:13: Thu,
	Bill Scott	[Looks Good Works Well] 1/19/2006 01:13: Thu,	
	JDJ Industry Newsletter	Java Named "Programming Language of the Year"	Thu,
	Travelocity Member Services	Price Alert! Flight + 5 Night Hotel to Honolulu	Thu,
	Theresa Neil	Re: Job Description	Thu,
	Damon Hougland	Job Description	Thu,
	Finan, Angelique	RE: Speaking Engagement Opportunity	Thu,
	David Schontzler	Re: [ng-dhtml] assert(), isNaN(), isObject()	Thu,
	TagWorld	This week in TagWorld	Thu,
	me	rico question	Thu,
	Anonymous	[Looks Good Works Well] 1/19/2006 10:22: Thu,	
	Anonymous	[Looks Good Works Well] 1/19/2006 10:19: Thu,	
	Anonymous	[Looks Good Works Well] 1/19/2006 10:19: Thu,	
	Anonymous	[Looks Good Works Well] 1/19/2006 10:19: Thu,	

[Standard Header](#) | [Hide Pane](#)

**Got your eye on one of those messages up there?**  
To view your message down here in this handy Reading pane, just click on it.  
To select more than one, hold the Shift or Command key.

**What's your Credit Score?**

**Netflix-Try Free! No Late Fees**

**Online Degree Programs**

## Yahoo! Mail Beta (Oddpost)



# Operation. Persist

I can save in real-time

**Drag and Drop Modules. In Page Editing. In Page Custom Editing. Direct State Editing. Grid Cell Editing. Inline Custom Editing. Inline Tag Editing. Popup Custom Editing. Slide-out Custom Editing. Inline Text Editing. Inline Reordering. Auto Save. Remembered Collection. Remembered Preferences. Rating an Object.**



## Rocky Waters

ADD NOTE SEND TO GROUP ADD TO SET BLOG THIS ALL SIZES ORDER PRINTS ROTATE DELETE X



Add tags

## Test Page

Body List Notes Files Images Writeboards Links Sharing ?

### Notes

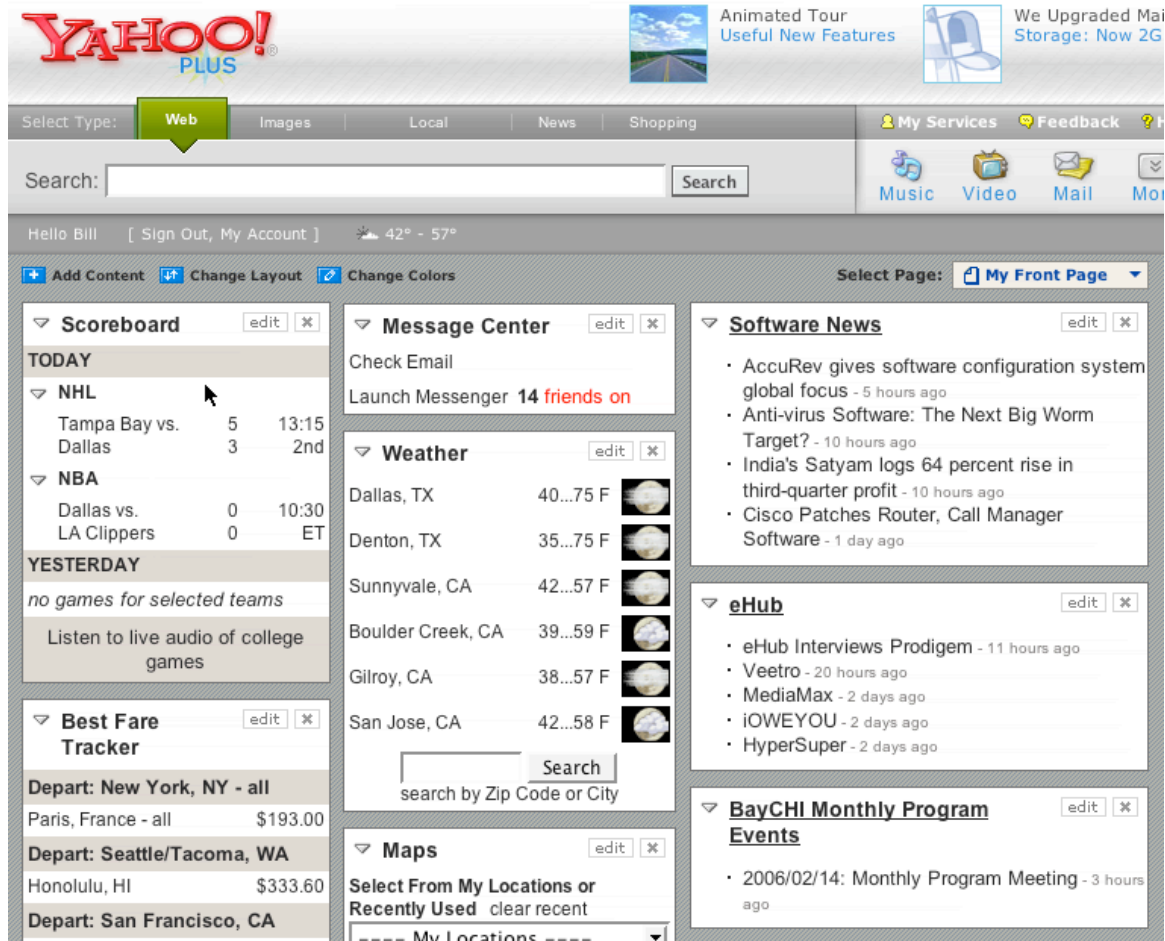
**First Note (modified)** Posted 30 Nov

This is just a note that I added. And some more text was added.

[Add note](#)



# Persist persistent portals



# Operation. Validate

I can prevent errors early

per field validate keystroke validate  
inline form validate invalid but suggest



# Operation. Invoke

I can make things happen now

fire and forget lightweight action

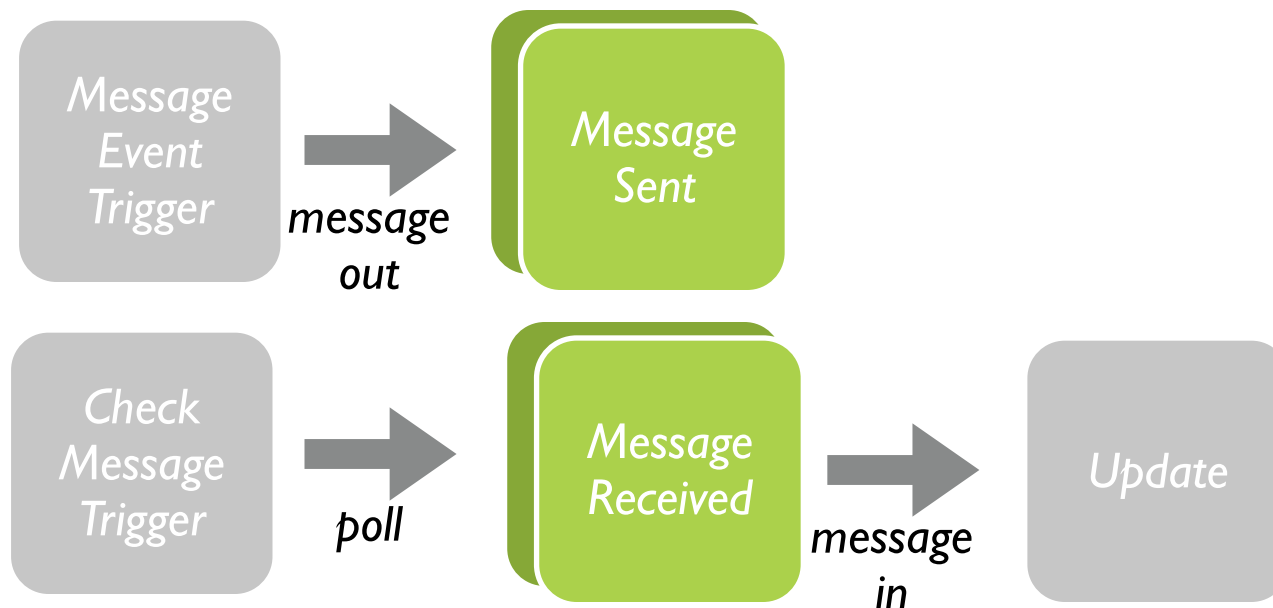




# Operation. Message

I can communicate instantly

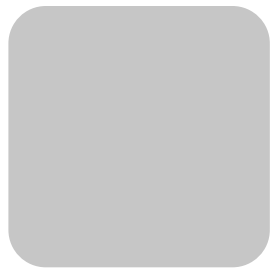
two-way chat real-time auction  
collaborative white board



# Update

- User interface changes to reflect what is happening

slideout slideover dropdown popup balloon  
busyicon mousecursor fade dim brighten selfhealing additems  
finishedindicator remove show hide resize



# Five Operations Define Ajax

- **Lookup.** I can get information when I need it
- **Persist.** I can save in real-time
- **Validate.** I can prevent errors early
- **Invoke.** I can make things happen now
- **Message.** I can communicate instantly

# Steps to Understanding Ajax

- Use the **patterns**
- Understand XHR - **operations**
- Understand event management - **triggers**
- Know the tricks of the DOM - **update**
- Understand the **issues** that surround Ajax
  - *We will discuss these issues this afternoon*

# Pattern-O-Matic



# Ajax 101

A Look Under the Hood

Bill W. Scott, Yahoo! Ajax Evangelist

---

[b.scott@yahoo.com](mailto:b.scott@yahoo.com)



# Operation. Using XHR

# Operation. Using XHR

- The five operations are not built into XHR
- The simple send/response mechanism can be used to implement lookup, persist, validate, invoke and message
- To create these operations, one must understand how to use XHR
- A simple HelloWorld example will illustrate using XHR



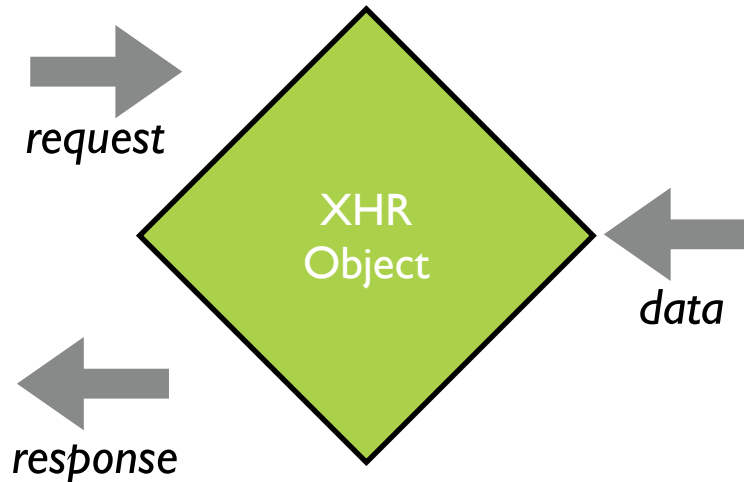
# Simple Ajax 'Hello World'

## Ajax Hello World

Clicking the link below will use XHR to fetch the data and then show the result in the box below.

[Make an ajax request for data](#)

This data was brought to you by Ajax!



```
<?xml version="1.0" ?>
<root>
This data was brought
to you by Ajax!
</root>
```

*/response.xml*

```
<h2>Ajax Hello World</h2>
<p>Clicking the link below will use XHR to fetch the data and then show the
result in the box below.</p>

<span class="ajaxlink" onclick="makeRequest('test.xml')">
Make an ajax request for data
</span>

<div id="helloArea"></div>
```

*/index.html*

- Clicking the link makes an XHR request
- Response is inserted into the area outlined in blue

# Ajax How To

1. Create a request object
2. Write a callback
3. Make the request
4. Parse the response

if browser is mozilla or safari or opera then  
create a `new XMLHttpRequest`

otherwise it is IE then  
create a `new ActiveXObject`

otherwise  
error - browser does not support XMLHttpRequest

- IE5, 5.5, 6 implements XHR as an ActiveX object (Msxm12.XMLHTTP/Microsoft.XMLHTTP)
- Mozilla 1.0+, Safari 1.2+, Opera 8+, IE7 provide XMLHttpRequest object natively
- All XHR objects have same methods & properties

# XHR Methods

Method	Description
<code>open("method", "url", [, asyncFlag [, "username" [, "password"]]])</code>	Sets up the request object for sending a request
<code>send(content)</code>	Sends the request to the server. Can be null.
<code>abort()</code>	Stops the request.
<code>getAllResponseHeaders()</code>	Returns all response headers for the HTTP request as key/value pairs.
<code>getResponseHeader("header")</code>	Returns the string value of the specified header.
<code>setRequestHeader("header", "value")</code>	Sets the specified header to the supplied value.

Source: *Foundations of Ajax* - APress

# XHR Properties

Property	Description
<code>onreadystatechange</code>	The event handler that fires at every state change.
<code>readyState</code>	The state of the request: 0=uninitialized, 1=loading, 2=loaded, 3=interactive, 4=complete
<code>responseText</code>	The response from the server as a text string
<code>responseXML</code>	The response from the server as an XML document
<code>status</code>	The HTTP status code from the server for the request object: 200: Ok; 201: Created; 400: bad request, 403: Forbidden; 500: internal sever error
<code>statusText</code>	The text version of the HTTP status code

```
function handleAjaxResponse  
begin  
    do something with the data that is returned from XHR  
end
```

- JavaScript callback function is invoked when the readystate changes on the XHR object

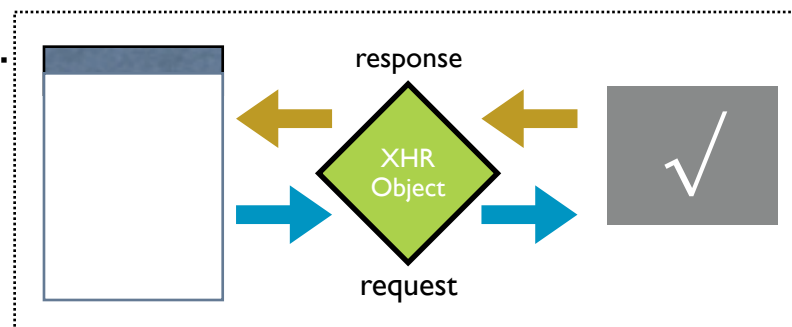
set onreadystatechange to callback function - `handleAjaxResponse`

open a request on the xhr object

send the request through the xhr object

- The JavaScript function *handleAjaxResponse* will be invoked when the readystate property changes on the XHR object
- Same site rule
- 'GET' or 'POST'
- Asynchronous flag

server must be accessible via relative url



- Use **GET** for
  - For retrieve
  - REST services
  - When passing parameters
  - Idempotent URLs
  - Small amount of data
- Use **POST** for
  - Modification
  - Large amounts of data passed to server
  - Non-idempotent URLs



- Its just a normal `HttpRequest`
  - Normal mechanism for getting request parameters
- Raw POST (`xhr.send(someData)`)
  - Java/JSP: `request.getInputStream()` - read as raw post
  - Rails: `@request.raw_post`
  - PHP: `$data = file_get_contents('php://input')`

```
function handleAjaxResponse
begin
    if response is valid then
        get responseXML
        get rootNode
        get helloArea on the page
        stuff the rootNode value into the helloArea DIV
    endif
end
```

- **readystate** values

- 0 - Uninitialized
- 1 - Loading
- 2 - Loaded
- 3 - Interactive
- 4 - Completed

- XML version must be first line  
`<?xml version="1.0" encoding="ISO-8859-1"?>`
- Set up response header's Content-type  
“Content-Type”, “text/xml”
- Use well-formed XML

- Use XHR property **responseXML** to get the response as an XML DOM (XmlDocument)
- Use standard JavaScript DOM methods
  - Mozilla, Safari, Opera & IE support a common set of methods and properties
  - Watch out for IE only stuff (e.g., **children** property)
  - Watch out for whitespace issues
- Other options
  - Use XML library for JS (e.g., XML for <script>)

Property/Method	Description
documentElement	Returns the root element of the document
firstChild	Is the first element within another element (the first child of the current node)
lastChild	Is the last element within another element (the last child of the current node)
nextSibling	Is the next element in the same nested level as the current one
previousSibling	Is the previous element in the same nested level as the current one
nodeValue	The value of a document element
getElementsByTagName	Used to place all elements into an object ????????

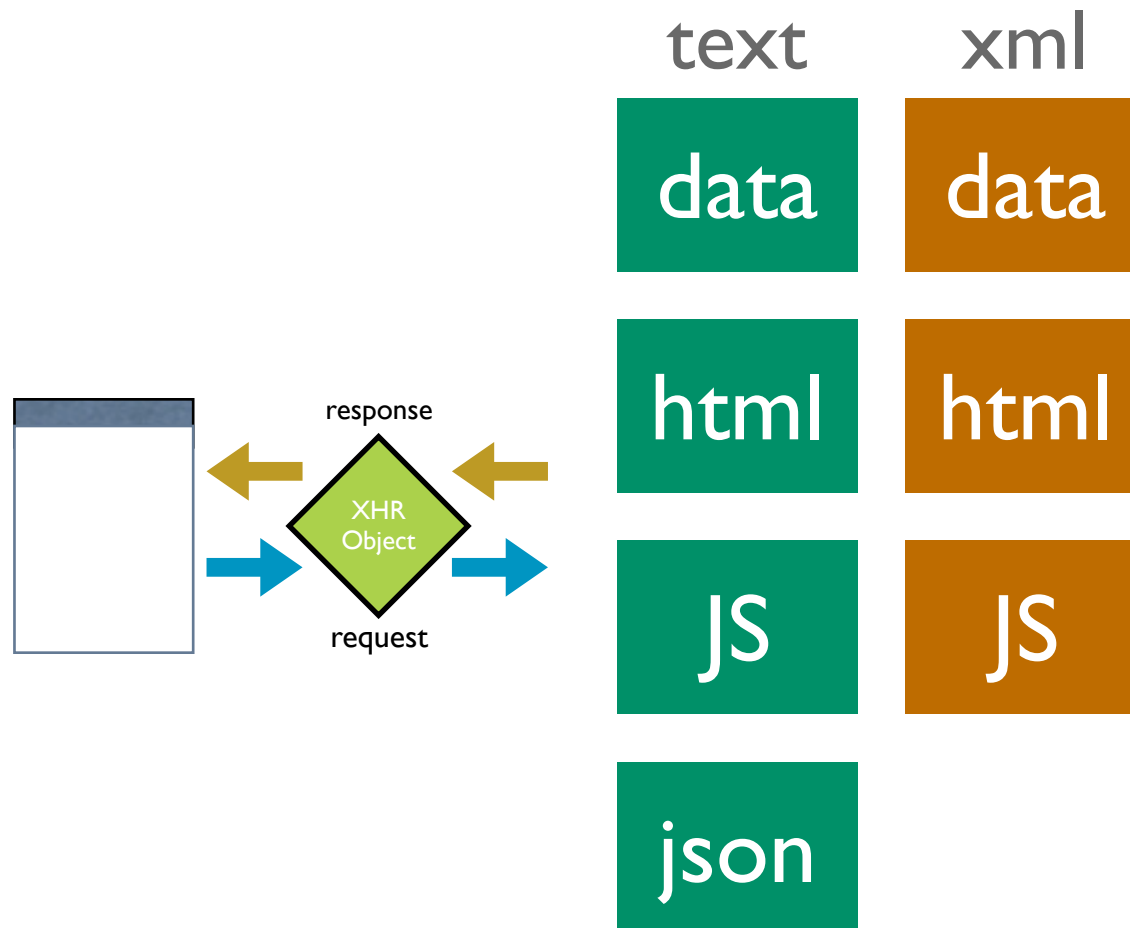
## 4. Parse the Response: A little more parsing.

```
<?xml version="1.0" ?>
<root>
  <contents>
    This data was brought to you by Ajax!
  </contents>
  <style>
    height:40px;width:250px;margin-top:20px;padding:20px;border:8px solid red;
  </style>
</root>
```

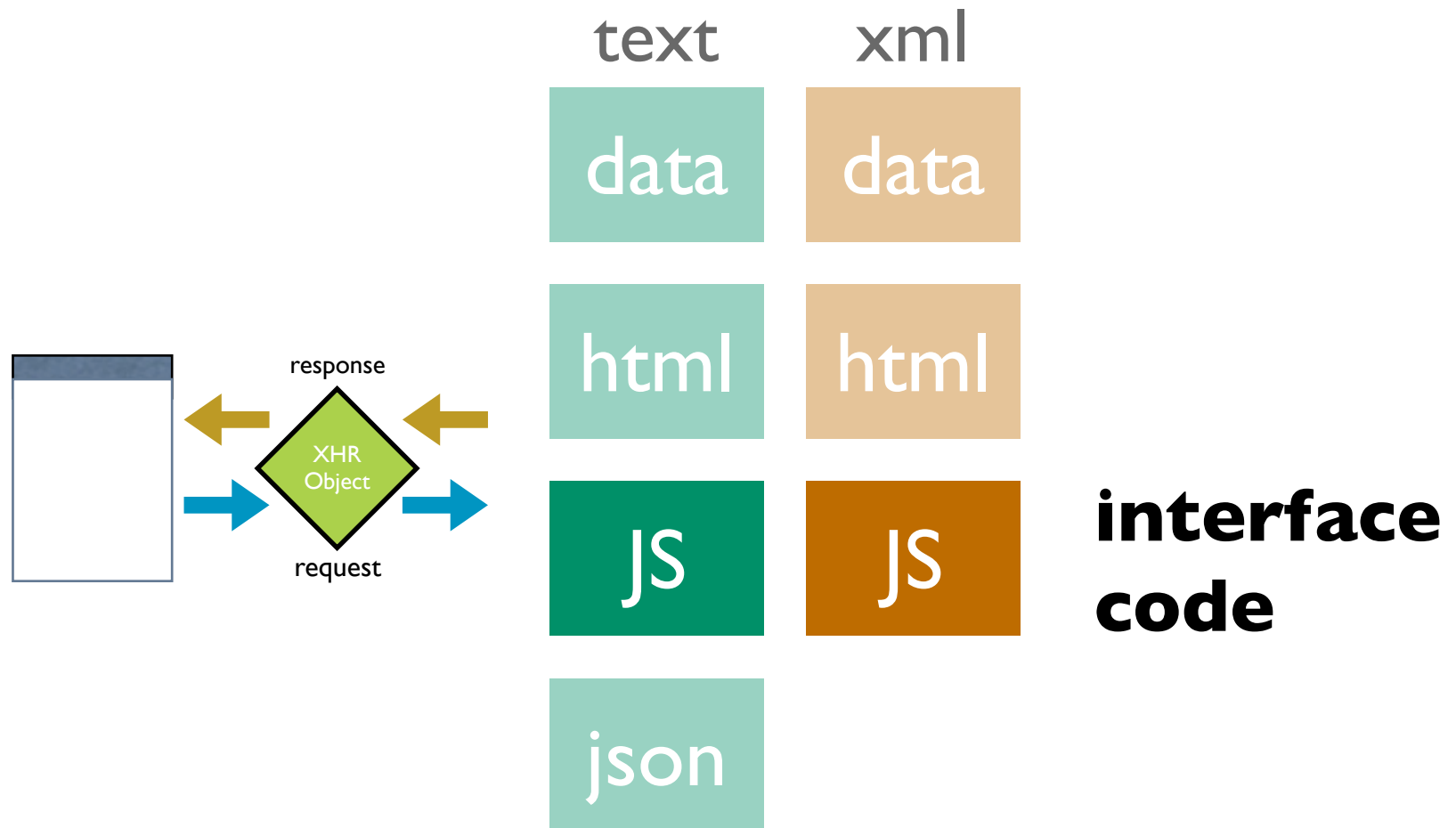
```
function alertContents() {
    if (xhr.readyState == 4) {
        if (xhr.status == 200) {
            var response = xhr.responseXML.documentElement;
            var content =
                response.getElementsByTagName('contents')[0].firstChild.data;
            var style =
                response.getElementsByTagName('style')[0].firstChild.data;
            var helloArea = document.getElementById("helloArea");
            helloArea.innerHTML=content;
            helloArea.style.cssText=style;
        } else {
            alert('There was a problem with the request.');
```

This data was brought to you by Ajax!

- Two types: text, xml
- Many formats

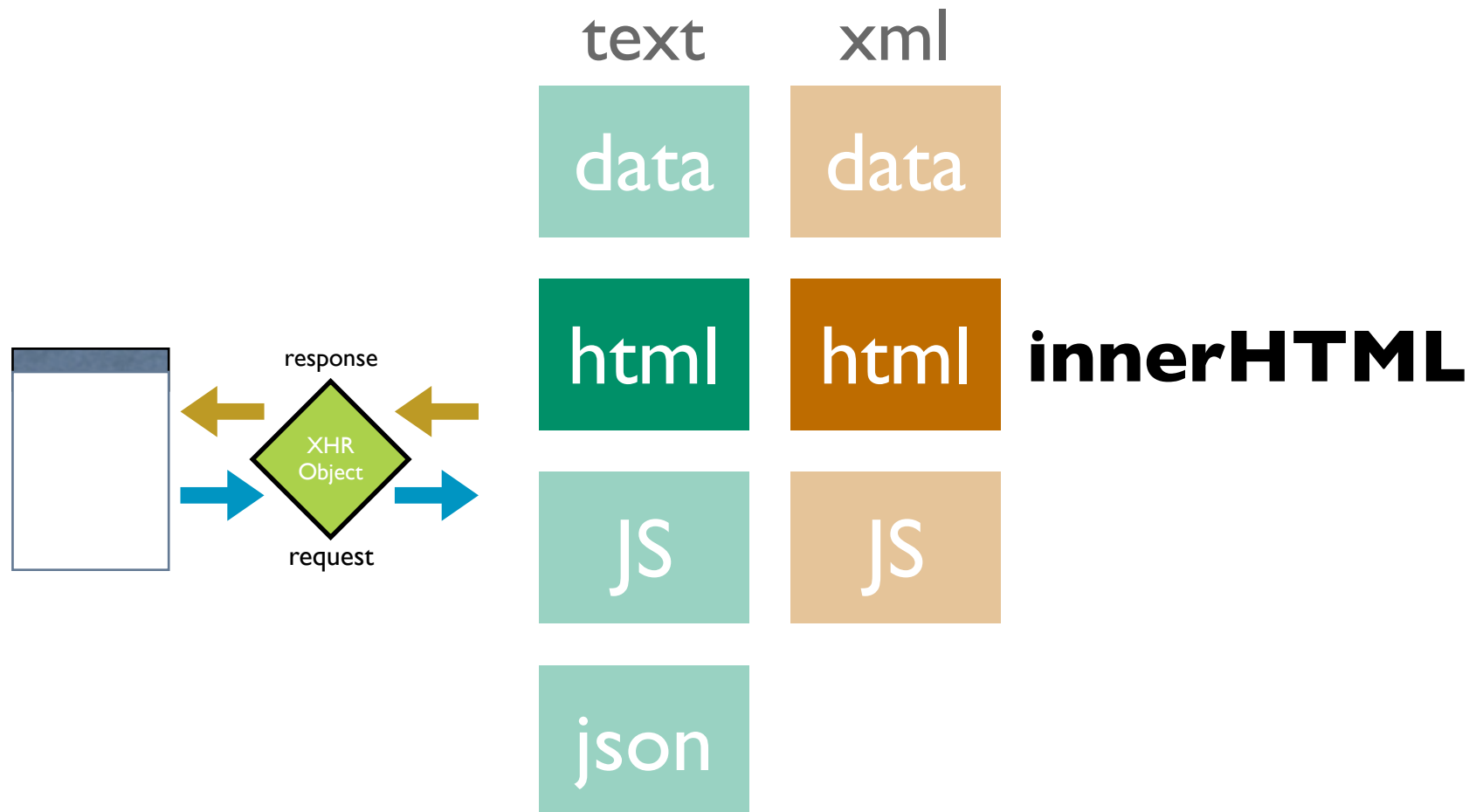


- JavaScript generated on server-side
- JavaScript is eval'ed on client side to generate GUI
- Dangerous!

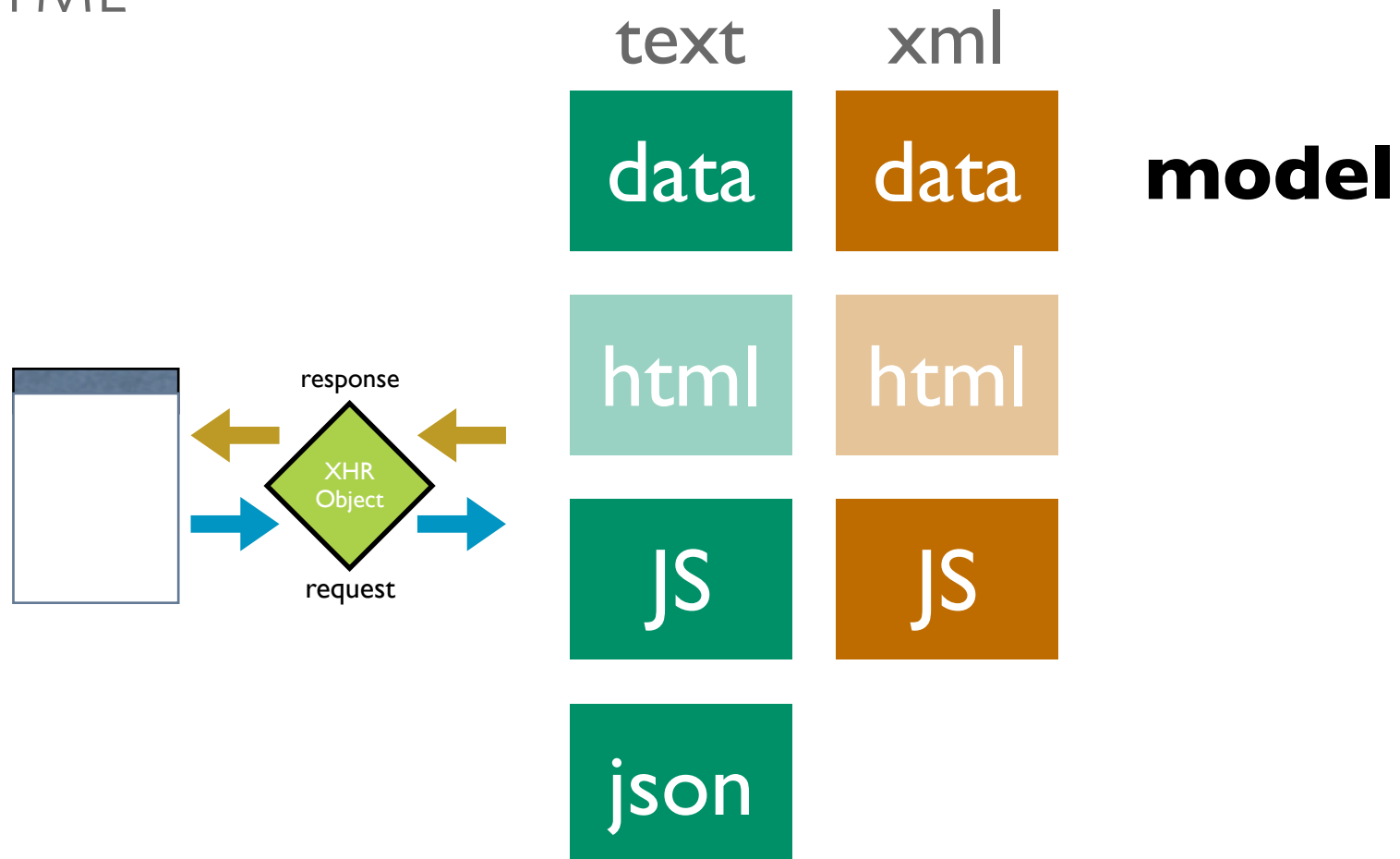




- HTML generated on server side
- Stuffed into innerHTML of DOM element



- Model data generated on server side
  - w3c DOM elements created from model data
  - Substitute model data into HTML strings and insert via innerHTML



# JSON

- JavaScript supports several string based notations
  - Allows the basic types to be represented as string literals
  - Strings are easy to pass over the wire
- JSON (JavaScript Object Notation - [json.org](http://json.org))

```
{"name": "Jack B. Nimble", "at large": true, "grade":  
"A", "level": 3}
```

<b>name</b>	Jack B. Nimble
<b>at large</b>	true
<b>grade</b>	A
<b>level</b>	3

```
["Sunday", "Monday", "Tuesday", "Wednesday",  
"Thursday", "Friday", "Saturday"]
```

*array of 7 named days*

```
[  
[0, -1, 0],  
[1, 0, 0],  
[0, 0, 1]  
]
```

*3x3 array*

- JSON's simple values are the same as used in JavaScript
- No restructuring is requested: JSON's structures are JavaScript!
- JSON's object is the JavaScript object
- JSON's array is the JavaScript array
- Parsing is simple, native

- Obtain responseText
- Parse the responseText

```
responseData = eval('(' + responseText + ')');
```

OR

```
responseData = JSON.parse(responseText);
```

- <http://api.search.yahoo.com/WebSearchService/V1/webSearch?appid=YahooDemo&query=finances&start=1&results=1&output=json>

```
{
  "ResultSet":
  {
    "totalResultsAvailable": "69200000",
    "totalResultsReturned": "1",
    "firstResultPosition": "1",
    "Result":
    {
      "Title": "Yahoo! Finance",
      "Summary": "manage the market and your money with Yahoo! Finance. Includes stock market quotes, business news, mutual funds, online bill pay, banking tools, loans, insurance, retirement planning, and tax tips and advice.",
      "Url": "http://finance.yahoo.com/",
      "ClickUrl": "http://finance.yahoo.com/",
      "ModificationDate": "1137225600",
      "MimeType": "text/html"
    }
  }
}
```





# Trigger. JavaScript Events

# Trigger. JavaScript Events

- Ajax interactions are kicked off by event & timer triggers
- There are issues with event management within the browsers
- You **do** need to understand these implications to write good Ajax applications

# First, the Events

onAbort	onBlur
onChange	onClick
onDbClick	onDragDrop
onError	onFocus
onKeyDown	onKeyPress
onKeyUp	onLoad
onMouseDown	onMouseMove
onMouseOut	onMouseOver
onMouseUp	onMove
onReset	onResize
onSelect	onSubmit
onUnload	

# Problem in a Nutshell

- Different event models
- Timing Issues
- Confusing madness around the **this** pointer
- Browser incompatibilities
- Memory leak issues

- Element Attributes
  - `<element onclick="func()" >`
- Element Properties (function reference)
  - `element.onclick=func;`
- Event Binding
  - w3c: `addEventListener`, `removeEventListener`
  - IE: `attachEvent`, `detachEvent`

- Element Attributes

```
<a href="#" onclick="clickHandler(this)">
function clickHandler(anchorDOMElem) {
    // this == window --> window owns the function
    // anchorDOMElem was set to anchor DOM element
    this = anchorDOMElem; // fix this pointer
}
```

- Element Properties

```
myAnchor.onclick=clickHandler;
function clickHandler() {
    //this == anchorDOMElem --> anchorDOMElem owns the function
}
```

- Event Binding

```
function AnchorLink(anchorDOMElem) {
    this.anchorDOMElem = anchorDOMElem;
    this.anchorDOMElem.onclick = this.clickHandler;
    this.anchorDOMElem.anchorLinkObj = this;
}
AnchorLink.prototype.clickHandler = function() {
    // this == anchorDOMElem, not AnchorLink object
    // confusing since this normally refers to AnchorLink
    // grab our normal this
    anchorLinkObj = this.anchorLinkObj;
}
```

- Supports arbitrary number of event handlers
- Provides a way to remove events
- The model defines capture & bubble flow
- But, no way to get list of handlers
- And remember the browsers play differently:

Internet Explorer	Mozilla (FF), Safari, Opera [W3C]
<code>attachEvent()</code> <code>detachEvent()</code>	<code>addEventListener()</code> <code>removeEventListener()</code>
<code>this == window object</code>	<code>this == DOM event object</code>

- Attempting to attach events before the page is loaded will cause problems
- Do it on the onload



- IE's garbage collection does simple reference counting
- Attaching events and not removing them when finished will cause memory leaks
- Can use an Observer style pattern to cache event handlers and at the end clean them up

- Standardizes event binding

- Attach an event

```
var oElement = document.getElementById("elementid");  
function fnCallback(e) { alert("click"); }  
YAHOO.util.Event.addListener(oElement, "click", fnCallback);
```

- Attach multiple events

```
var ids = ["el1", "el2", "el3"]; // array can contain object references, element ids, or both  
function fnCallback(e) { alert(this.id); }  
YAHOO.util.Event.addListener(ids, "click", fnCallback);
```

- Handles automatic scope correction

- By default “this” refers to the DOM element that the event was attached to
  - Can be overridden
- First parameter is the event object
- Pass arbitrary objects to event handler

- Automatic Listener Cleanup
- Custom Events
  - For custom objects or overriding events on widgets
- onAvailable event
  - Define a function that will execute as soon as an element is detected in the DOM (during load)

```
<script type="text/javascript">
```

```
function TestObj(id) { YAHOO.util.Event.onAvailable(id, this.handleOnAvailable, this); }
```

```
TestObj.prototype.handleOnAvailable = function(me) { alert(this.id + " is available"); }
```

```
var obj = new TestObj("myelementid"); </script>
```

```
<div id="myelementid">my element</div>
```



# Update. The DOM

# Update. The DOM

- Browsers represent the user interface as a set of objects (or elements)
- Since a page has a hierarchy of containment, each of these elements are related as parent-child or siblings
- This takes the shape of a tree
- The tree of elements is called the *document object model* or DOM. Specifically the Browser DOM.
- Any change to the DOM structure or a DOM element is reflected immediately on the web page

# DOM Example

- Represented as a tree of nodes

Document - DOM Nodes			
nodeName	id	class	
#document			
HTML			
HEAD			
BODY			
#text			
SCRIPT			
#text			
H2			
#text			
P			
#text			
SPAN		ajaxlink	
#text			
DIV	helloArea		
#text			

## Ajax Hello World

Clicking the link below will use XHR to fetch the data and then show the result in the box below.

[Make an ajax request for data](#)

# Using the DOM

- JavaScript is the DOM manipulator
- Use it to
  - Find DOM elements
  - Add new elements
  - Remove elements
  - Modify element attributes
    - Position elements
    - Style elements

# Finding DOM Elements

- `document.getElementById`
  - Prototype library shortcut: `$("#idName")` or `$(id)`
  - Yahoo! library shortcuts:
    - `YAHOO.util.Dom.get("idName")`
    - `getElementByClassName`
- `parentNode`
- `childNodes`
  - Yahoo! library has ways to find ancestors



# DOM Manipulation

- Creating new interface elements
  - `innerHTML`, `createElement()`, `createTextNode()`, `appendChild()`
- Changing element styles
  - Visual attributes
  - Geometry
- Y!UI positioning, region detection
- Y!UI classname & style normalization

```
<h2>Ajax Hello World</h2>
```

```
<p>Clicking the link below will use XHR to fetch the data and  
then show the result in the box below.</p>
```

```
<span class="ajaxlink" onclick="makeRequest('response.jsp')">  
Make an ajax request for data  
</span>
```

```
<div id="helloArea"></div>
```

### Ajax Hello World

Clicking the link below will use XHR to  
fetch the data and then show the  
result in the box below.

[Make an ajax request for data](#)

This data was brought to you by  
Ajax!

```
var helloArea = document.getElementById("helloArea");  
helloArea.innerHTML=rootNode.firstChild.data;
```

# Keeping it Clean

- Separate presentation style from content with CSS
  - Supports degradability
  - Supports accessibility
  - Simplifies maintenance
- <http://www.mezzoblue.com/css/cribsheet/>
-

- Avoid these elements:
  - b, big, hr, i, small, sub, sup, tt
  - basefont, center, dir, font, isindex, menu, s, strike, u, tfoot
  - br is ok for content breaks; not layout
- Make your HTML meaningful
  - List structures as ul, li
  - Tree structures as nested ul, li
  - Containers as div
- Use css selectors (contextual)
  - Reduces the number of classes
  - Avoid inline styles

```
<div id="weather">
  <div id="current">
    <div id="currentHeader" class="accordionTabTitleBar">
      Current Conditions
    </div>
    <div class="weatherTabContentBox">
      <div class="weatherPanel" id="ccInfo">
      </div>
    </div>
  </div>

  <div id="moon">
    <div id="moonHeader" class="accordionTabTitleBar">
      Moon
    </div>
    <div class="weatherTabContentBox">
      <div class="weatherPanel" id="moonInfo">
      </div>
    </div>
  </div>

  <div id="sun">
    <div id="sunHeader" class="accordionTabTitleBar">
      Sunlight Summary
    </div>
    <div class="weatherTabContentBox">
      <div class="weatherPanel" id="sunInfo">
      </div>
    </div>
  </div>
</div>
```



```
new Rico.Accordion( 'weather', {panelHeight:220, expandedBg:'#39497b'}
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">
<html>
<head><title>Make this page more semantic</title></head>
<body>
<div class="page-title">Make this page more semantic</div>
<div>
<div class="module-title">Module Title</div>

<span class="time"><i>12:40pm Wed Mar 29</span></i>
<div class="para">Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod
tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci </
div>
</div>
<p><div><i>iWeb users ultimately want to get at data quickly and easily. They don't care as much about
attractive sites and pretty design.i</i></div> says <b>Tim Berner's Lee</b>, inventor of the World Wide Web,
although I'm sure many visual designers would beg to differ. <u>"The web isn't print!"</u> - Chanel.</p>

<table>
  <tr>
    <td class="heading">column 1</td>
    <td class="heading">column 2</td>
    <td class="heading">column 3</td>
  </tr>
  <tr>
    <td class="data">data cell 1</td>
    <td class="data">data cell 2</td>
    <td class="data">data cell 3</td>
  </tr>
</table>
</body>
</html>
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">
<html>
<head><title>Make this page more semantic</title></head>
<body>
<h1>Make this page more semantic</h1>

<h2>Module Title</h2>

<em class="time" title="time stamp">12:40pm Wed Mar 29</em>
<blockquote>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt
ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci </blockquote>
<blockquote cite="Tim Berner's Lee">

<p>&#39;Web users ultimately want to get at data quickly and easily. They don't care as much about attractive
sites and pretty design.&#39;</p></blockquote> says <cite>Tim Berners Lee</cite>, inventor of the World Wide
Web, although I'm sure many visual designers would beg to differ. <q>The web isn't print!</q> -
<cite>Chanel</cite>.

<table summary="this month's numbers">
  <caption>Q1 Financials</caption>
  <thead> <tr>
    <th scope="col">column 1</th>
    <th scope="col">column 2</th>
    <th scope="col">column 3</th>
  </tr> </thead>
  <tbody>
    <td class="data">data cell 1</td>
    <td class="data">data cell 2</td>
    <td class="data">data cell 3</td>
  </tr>
</tbody>
</table>
</body>
</html>
```

```
...
<script type="text/javascript">
YAHOO.example.DDApp = function() {
    var dd;
    return {
        init: function() {
            var dd = new YAHOO.util.DD("dragDiv");
        }
    }
} ();
YAHOO.util.Event.addListener(window, "load", YAHOO.example.DDApp.init);
</script>

<style type="text/css">
#dragDiv {
    background:url(images/macosexlogo.gif) 0 0 no-repeat;
    height:100px;
    width:70px;
}
</style>
</head>

<body>
<h2>Drag and Drop</h2>
<p>The Mac logo is draggable</p>

<div id="dragDiv"></div>

</body>
...
```

## Drag and Drop

The Mac logo is draggable



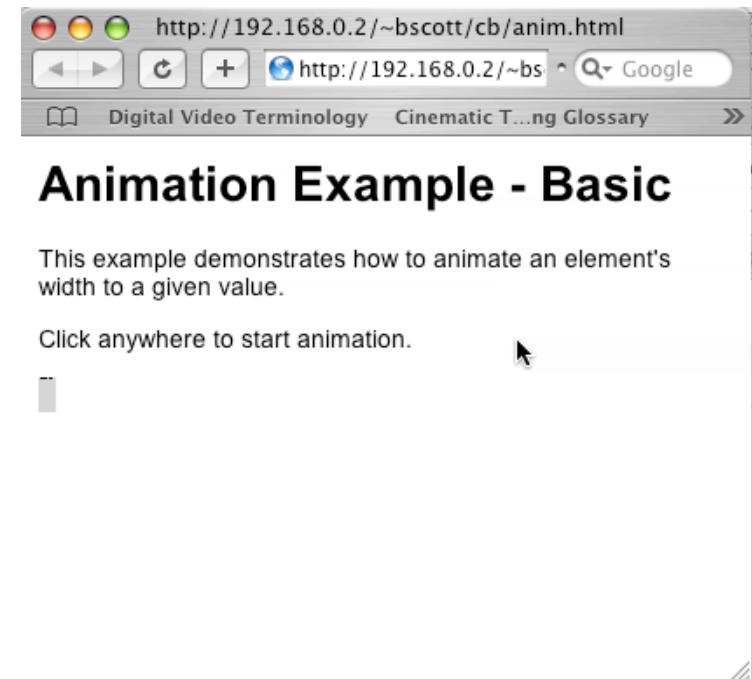


```
<html>
<head>
<style>
#anim { background:#ccc;width:10px;height:20px;font-size:10%;}
</style>
<script type="text/javascript">
YAHOO.namespace('example.anim');
YAHOO.example.anim.init = function() {
    var myAnim = new YAHOO.util.Anim('anim', {
        width: {to: 200},
        height: {to: 150},
        fontSize: {from: 20, to: 120, unit: '%'},
        opacity: {from: 0.25, to: 1.0 }},
        1,
        YAHOO.util.Easing.easeOut);

    var animate = function(e) {
        myAnim.animate();
        return false;
    }
    YAHOO.util.Event.addListener(document, 'click', animate);
}
YAHOO.util.Event.addListener(window, 'load', YAHOO.example.anim.init);
</script>
</head>
<body>
<h1>Animation Example - Basic</h1>
<p>This example demonstrates how to animate an element's width to a given value.</p>
<p>Click anywhere to start animation.</p>

<div id="anim">Lorem ipsum dolor</div>

</body>
</html>
```



# Learning Ajax

- Learning Ajax, means understanding
  - **Triggers** (event or timer)
  - **Operations** (ajax xhr)
  - **Updating** (dom)

*Triggering  
Events &  
Timers*

*Using XHR  
for Ajax  
Operations*

*Updating  
the DOM*



# Summary

# Ajax Architecture

- The Ajax DNA (events, data, presentation) is just a restatement of Model-View-Controller software pattern
- It is an architectural approach that separates these three concerns
  - **Model:** keep it pure, avoid presentation artifacts
  - **View:** keep HTML clear of style. Keep style in CSS.
  - **Controller:** don't mix events in HTML markup, use observer style of event management

# Pulling It All Together

- Two Projects that
  - Shows XHR in action
  - Explores XML vs JSON

# Ajax & Web Services

XML and JSON Examples

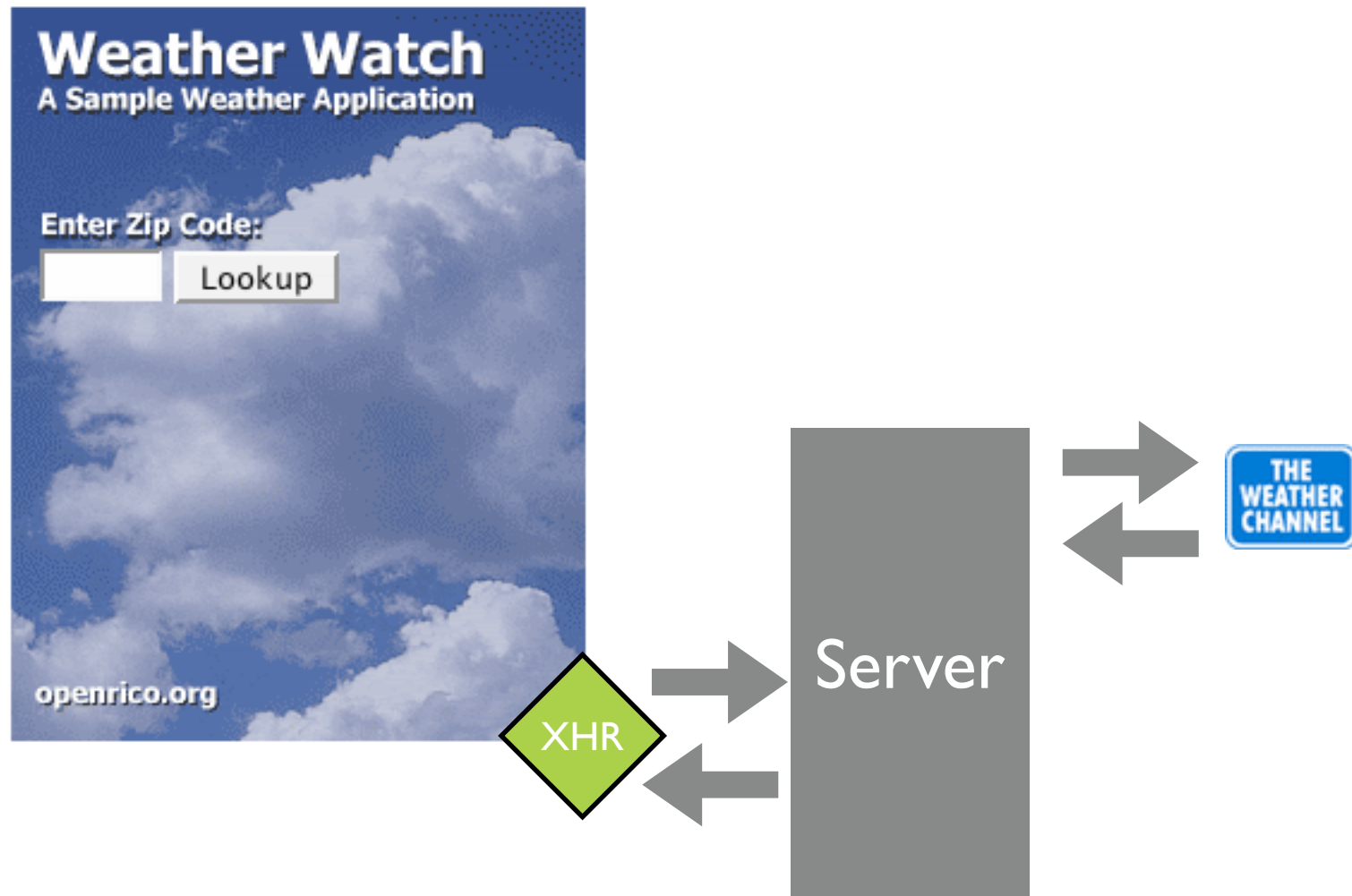
Bill W. Scott, Yahoo! Ajax Evangelist

---

[b.scott@yahoo.com](mailto:b.scott@yahoo.com)

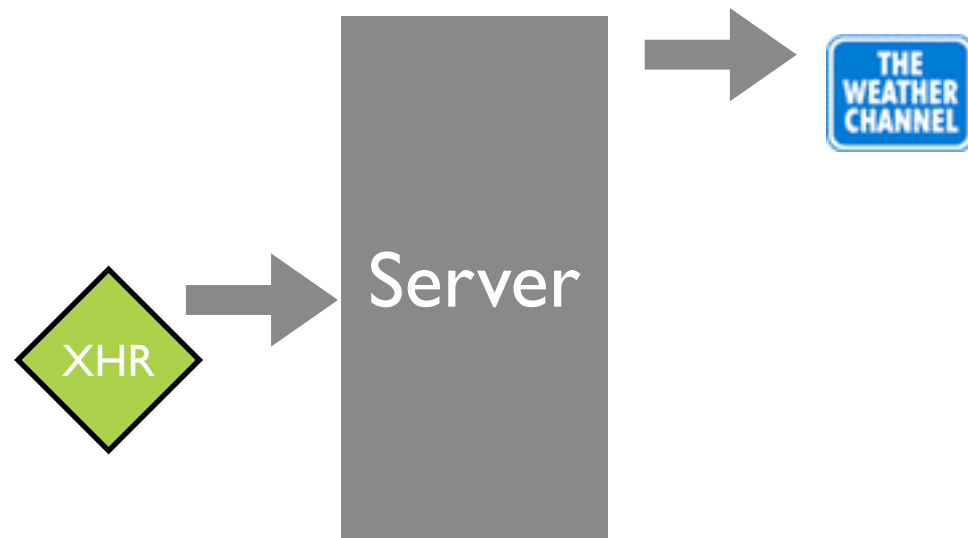
# Building an Ajax Weather Widget

Using an XML Service



weather.com exposes its weather service via an URL that includes a partner key and license key

`http://xoap.weather.com/weather/local/95132?cc=*&link=xoap&prod=xoap&par=PARTNER_KEY&key=LICENSE_KEY`





Server

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<weather ver="2.0">
  <head>
    <locale>en_US</locale>
    <form>MEDIUM</form>
    <ut>F</ut>
    <ud>mi</ud>
    <us>mph</us>
    <up>in</up>
    <ur>in</ur>
  </head>
  <loc id="95132">
    <dnam>San Jose, CA (95132)</dnam>
    <tm>8:37 PM</tm>
    <lat>37.4</lat>
    <lon>-121.86</lon>
    <sunr>7:18 AM</sunr>
    <suns>5:20 PM</suns>
    <zone>-8</zone>
  </loc>
```



```
<cc>
  <lsup>1/21/06 7:53 PM PST</lsup>
  <obst>San Jose, CA</obst>
  <tmp>49</tmp>
  <flik>46</flik>
  <t>Mostly Cloudy</t>
  <icon>27</icon>
  <bar>
    <r>30.27</r>
    <d>rising</d>
  </bar>
  <wind>
    <s>7</s>
    <gust>N/A</gust>
    <d>350</d>
    <t>N</t>
  </wind>
  <hmid>80</hmid>
  <vis>10.0</vis>
  <uv>
    <i>0</i>
    <t>Low</t>
  </uv>
  <dewp>43</dewp>
  <moon>
    <icon>21</icon>
    <t>Waning Gibbous</t>
  </moon>
</cc>
</weather>
```

weather.com responds with an XML response that describes the weather's current conditions

# Rico/Prototype Response

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<ajax-response>
  <response type="element" id="ccInfo">
    <div class="weatherTitle">San Jose, CA (95132)</div>
    <div>
      <span><image id="ccImg" src="/images/weather/27.png"></image></span>
      <span class="weatherTemp">49&#176;F</span>
    </div>
    <div class="weatherDescr">Mostly Cloudy</div>
    <div>
      <table cellpadding="0" cellspacing="0" border="0">
        <tr class="weatherDetail">
          <td class="weatherDetailTitle">Humidity:</td>
          <td>80&#37;</td></tr>
        <tr class="weatherDetail">
          <td class="weatherDetailTitle">Barometer:</td>
          <td>30.27&quot;</td></tr>
        <tr class="weatherDetail">
          <td class="weatherDetailTitle">Wind:</td>
          <td>From N at 7 mph</td></tr>
        <tr class="weatherDetail">
          <td class="weatherDetailTitle"></td>
          <td>gusting to N/A mph</td></tr>
        <tr class="weatherDetail">
          <td class="weatherDetailTitle">Dewpoint:</td>
          <td>43&#176;F</td></tr>
        <tr class="weatherDetail">
          <td class="weatherDetailTitle">Heat Index:</td>
          <td>46&#176;F</td></tr>
      </table>
    </div>
  </response>
</ajax-response>
```

My server code translates the weather.com XML into a Rico/Prototype ajax-response. Notice the response is an **HTML code snippet**. The response is of type element, and mapped to id="ccInfo"



Server

# Simple DIV Structure Defines the Accordion

```
<div id="weather">
  <div id="current">
    <div id="currentHeader" class="accordionTabTitleBar">
      Current Conditions
    </div>
    <div class="weatherTabContentBox">
      <div class="weatherPanel" id="ccInfo">
    </div>
  </div>
</div>
```

```
<div id="moon">
  <div id="moonHeader" class="accordionTabTitleBar">
    Moon
  </div>
  <div class="weatherTabContentBox">
    <div class="weatherPanel" id="moonInfo">
  </div>
</div>
```

```
<div id="sun">
  <div id="sunHeader" class="accordionTabTitleBar">
    Sunlight Summary
  </div>
  <div class="weatherTabContentBox">
    <div class="weatherPanel" id="sunInfo">
  </div>
</div>
</div>
```



```
<script>
onloads.push( accord );
function accord() {
  new Rico.Accordion( 'weather',
    {panelHeight:220, expandedBg:'#39497b'} );
}
</script>
```

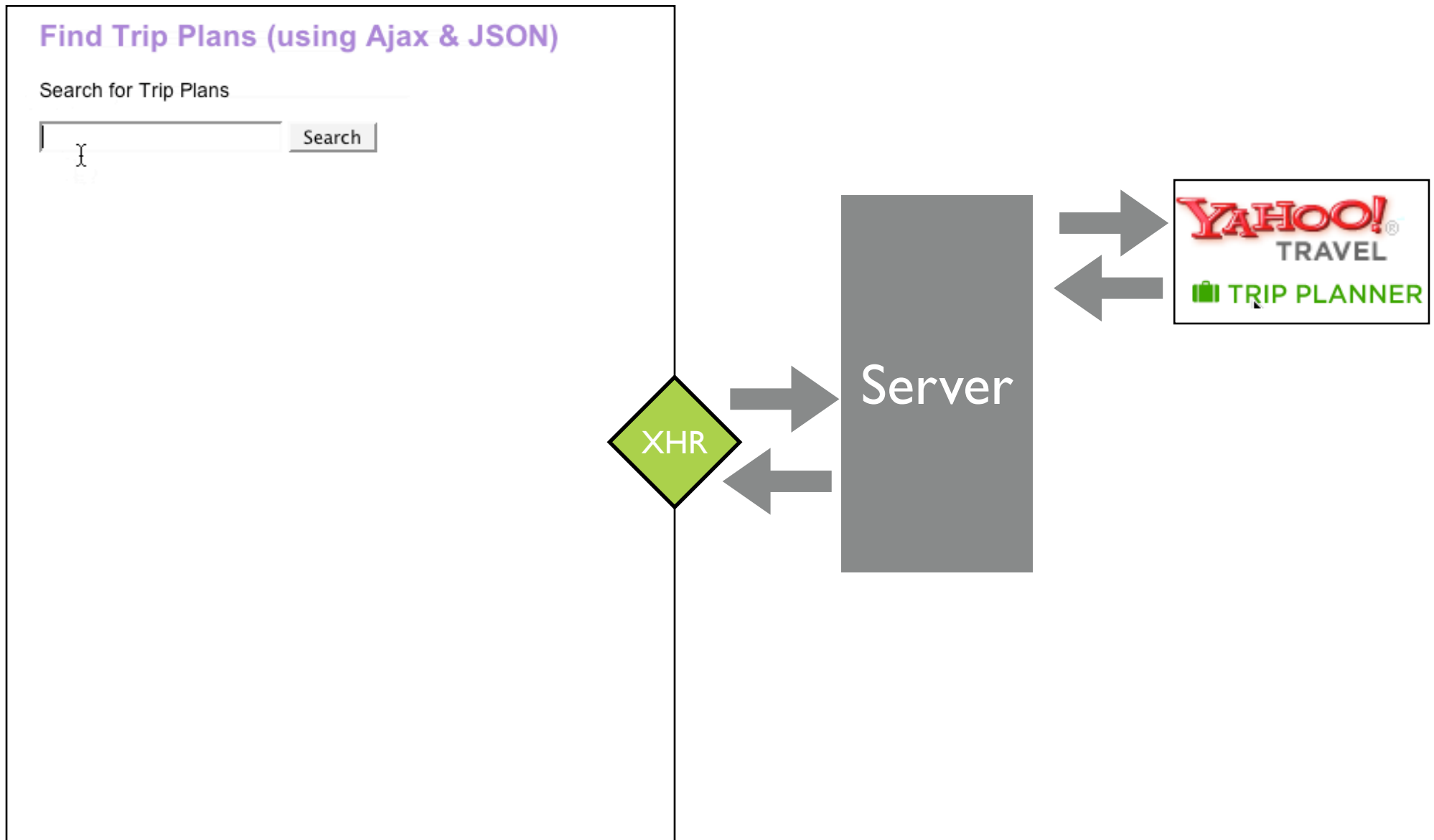
```
function registerAjaxStuff() {
    ajaxEngine.registerRequest( 'getWeatherInfo', 'ajax_weather_info' );
    ajaxEngine.registerAjaxElement( 'ccInfo' );
    ajaxEngine.registerAjaxElement( 'moonInfo' );
    ajaxEngine.registerAjaxElement( 'sunInfo' );
    ajaxEngine.registerAjaxElement( 'sponsoredLinks' );
    $('zip').onkeydown = handleEnterKey.bindAsEventListener($('zip'));
}
function getWeatherInfo() {
    $('checkanother').style.visibility='visible';
    new Rico.Effect.Position( $('zipinput'), 200, null, 100, 10);

    new Rico.Effect.FadeTo( 'frontdoor', 0, 100, 10,
        {complete:function() {$('frontdoor').style.display = 'none';}}
    );

    ajaxEngine.sendRequest( 'getWeatherInfo', "zip=" + $('zip').value);
}
function resetWeather() {
    $('zipinput').style.left = '12px';
    $('checkanother').style.visibility='hidden';

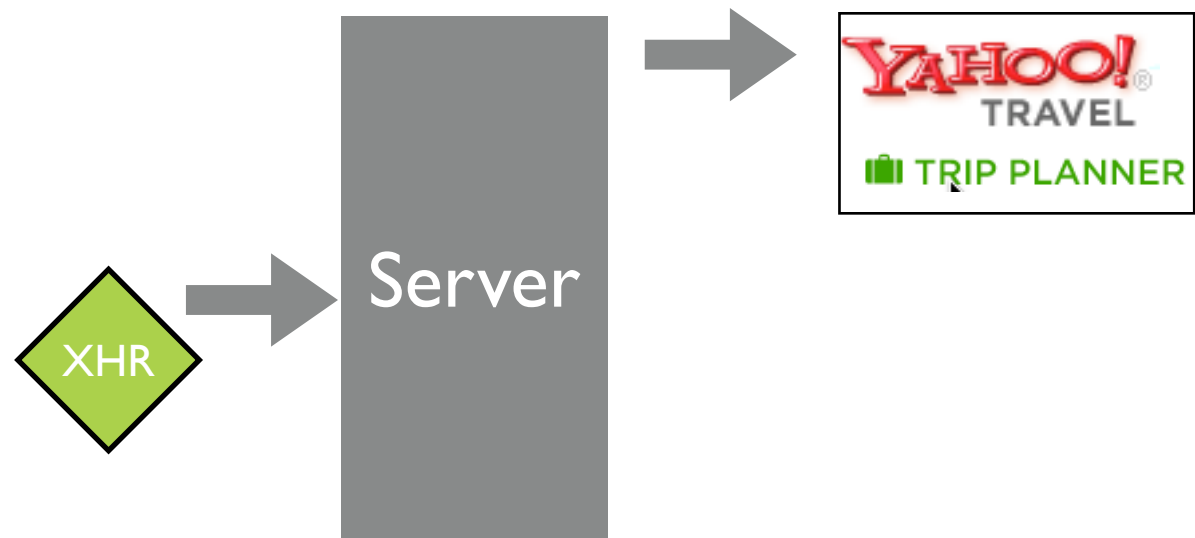
    $('frontdoor').style.display = ''
    $('zip').focus();
    new Rico.Effect.FadeTo( 'frontdoor', .99999, 100, 10, {complete:emptyContents});
}
```

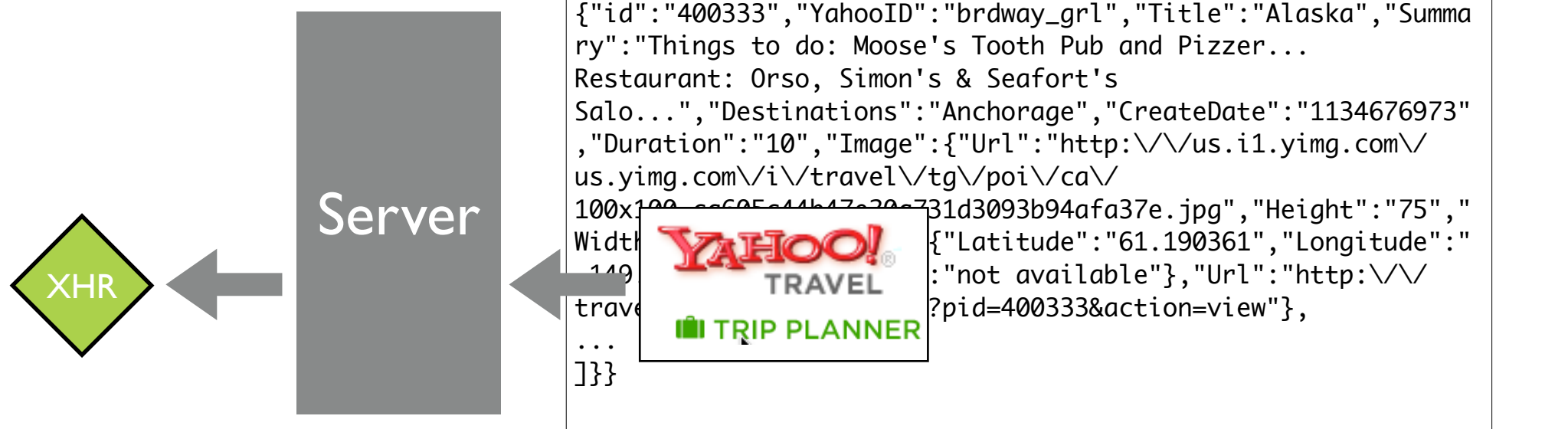
# JSON Trip Finder



Yahoo! Trip Planner exposes its service via an URL that requires a free partner key. Notice output=json.

`http://api.travel.yahoo.com/TripService/V1/tripSearch?appid=PARTNER_KEY&query=alaska&output=json`





# The Ajax/JSON Code

```
<script>
function showResponse() {
    if (xhr.readyState == 4) {
        if (xhr.status == 200) {
            var jsonText = xhr.responseText;
            var helloArea = document.getElementById("helloArea");
            var theTrip = eval( '(' + jsonText + ')' );
            var tripPlanHTML = "";
            for(var i=0; i<theTrip.ResultSet.totalResultsReturned; i++) {
                var result = theTrip.ResultSet.Result[i];
                tripPlanHTML = tripPlanHTML + '<div style="padding:4px;
border:1px solid gray;width: '+result.Image.Width+';"></img></div>'+
'<div ><a href="'+result.Url+' "><span style="font-weight:bold;font-size:
18px;">'+result.Title+'</span></a></div><div>'+result.Summary+'</div><br/>';
            }
            helloArea.innerHTML=tripPlanHTML;
        } else {
            alert('There was a problem with the request.');
```

```
        }
    }
}
</script>
<h2>Find Trip Plans (using Ajax & JSON)</h2>
<p>Search for Trip Plans</p>
<input id="searchCriteria" type="text"> <input value="Search" type="button"
onclick="makeRequest('response_trip_planner_mult_json.jsp',
    document.getElementById('searchCriteria').value)">
<div style="height:300px;width:420px;margin-top:8px;padding:8px;"
id="helloArea"></div>
```



# Ajax Toolkits

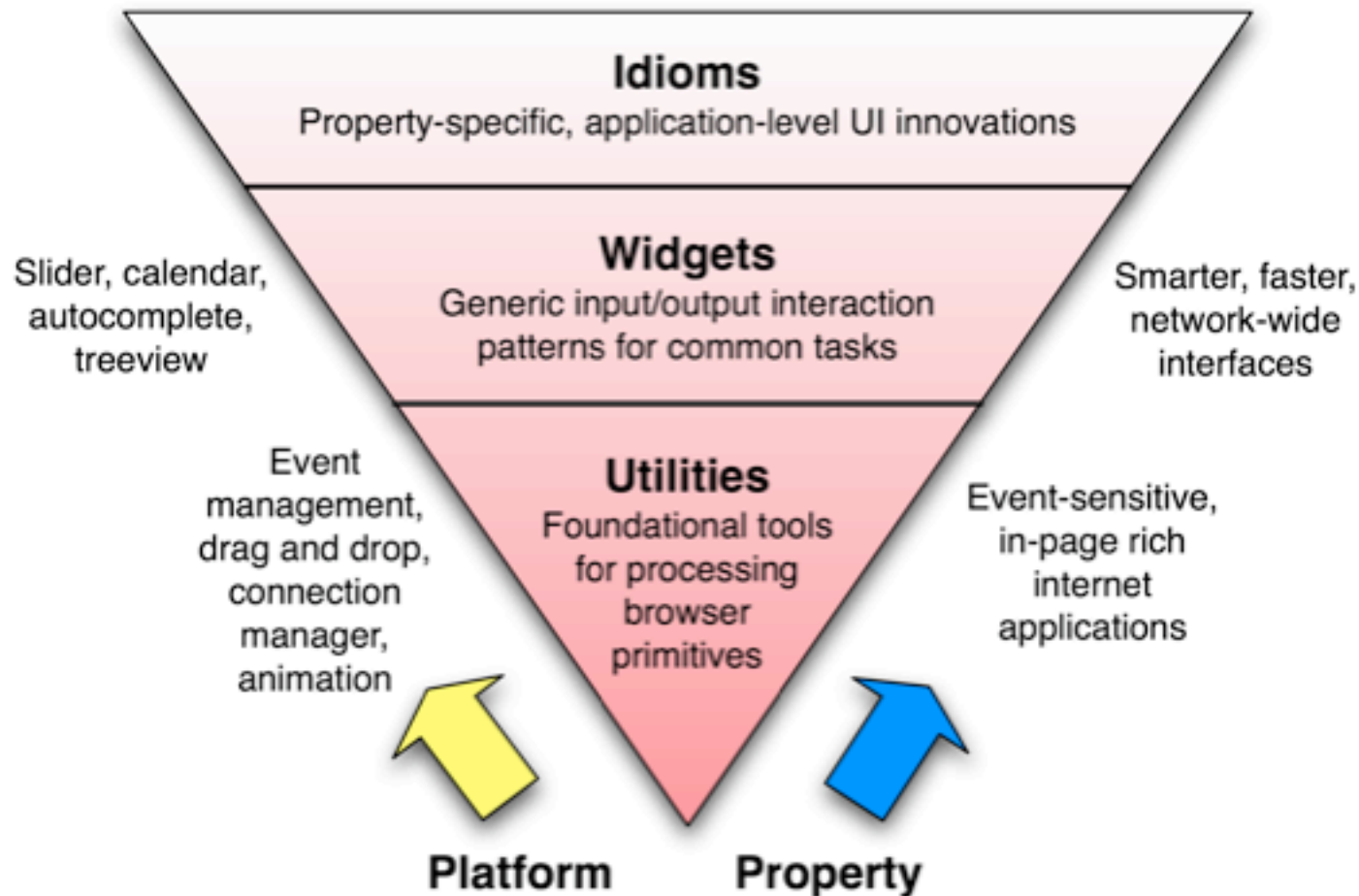
Designing and Building Ajax Applications with Ajax Toolkits

Bill W. Scott, Yahoo! Ajax Evangelist

---

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# What a Toolkit Provides



# Evaluating Toolkits

- What language is it targeted for?
- Are you looking for XHR abstraction or high level?
- Will you use XML or JSON?
- Is it \$\$ or open source?
- Does it simplify general JS development?
- Community of support?
- Likelihood it will be around next year?

Prototype	Inspired by Ruby, simplifies DOM manipulation, events, Ajax connectivity. Several frameworks based on it. Notable for the <code>\$()</code> function among many other shortcuts. OO extends.
Scriptaculous	Built on Prototype, nice effects, animations, drag and drop, widgets. Nicely documented
Rico	Built on Prototype, nice effects, animations, behaviours (widgets), drag and drop, nice Ajax engine abstraction, style effects. Lots of demos.
Behaviour	Built on Prototype, separates event management from HTML using CSS selectors
Dojo	Widget library, drag and drop, effects, widget framework, event management, animation, bookmarkability, manipulating location history, extensive deployment support
Zimbra	Extensive set of widgets (data list, wizard, button, rich text editor, tree, menus, etc.). MVC, debugging facilities
Microsoft Atlas	In developer release. Support for drag and drop, animation, full XML specification for wiring widgets together, behavior abstraction, will be integrated in full suite of MS dev tools.
MochiKit	Widgets, painless DOM manipulation, task management, JSON-like notation, logging. Active community
Yahoo! UI	Official Yahoo! DHTML/Ajax library. Contains event mgmt, DOM manipulation, animation, drag and drop, CSS grid, CSS fonts, CSS resets, calendar, tree, autocomplete, windowing, menus, etc.

TIBCO GI	Very extensive framework with full IDE. Dozens of widgets, vector based charting package, support for SOAP. IDE has WYSIWYG GUI layout, step through debugging as well as code completion
Bindows	Been around since 2001, lots of great widgets and library routines. Not always browser independent
JackBe	Focused at corporate environments. Able to emulate a desktop application. Very fast performance even on a dial-up line. Uses a proprietary “screen” format that gets interpreted by a JavaScript runtime engine.
Active Widgets	Rich set of JavaScript widgets. Rich grid widget is a high spot.

AjaxAC	Separates events from HTML, subrequest support, event management, easily remotes to PHP methods, start of a widget framework
Cajax	Low level. Simplifies server side programming, limits client side JS required, suggest widget, plug-in for form submission.
CakePHP	OO, modeled after Ruby on Rails, integrated CRUD, fast, flexible templating, nice docs
CPAINT	OO library for Ajax connectivity. Local & remote functions, single or multiple XHR, supports both POST & GET
JPSpan	PHP remoting via JavaScript
XAjax	Low level. PHP remoting via JavaScript. Simplified DOM updates on XHR response.
XOAD	Uses JSON and native PHP serialized objects, security emphasis, server side events, HTML manipulation. Tutorials and documentation.

Ajax JavaServer Faces Framework	Converts JSF applications to Ajax
Ajax JSP Tag Library	Set of tags for Ajax. Autocomplete, callout, select, toggle, update fields
DWR	For remoting Java methods from JavaScript code. Contains a number of widgets.
Echo2	Auto generate HTML & JavaScript from server side. Write in pure Java.
Guise (\$\$)	Application framework that uses the desktop UI approach to components and events (hides HTML generation and DOM manipulation.) Controls, dialogs, flyovers,
JSP Controls Tag Library	For portlet style JSP components. Supports Ajax and non-Ajax modes
SWATO	JS library based on Prototype. Uses JSON for marshalling. Direct remoting for POJOs. Widgets include auto suggest, template, logger.
AjaxAnywhere	Turns existing JSP/JSF/Struts/Spring components into Ajax Aware components
WebOrb for Java	Ties together Ajax, Flash and Java objects with XML services

# Prototype

```
function makeRequest(url) {  
    var xhr = new Ajax.Request(url, {method: 'get', onComplete: showResponse});
```

- ```
$()
```

```
}
```

```
function showResponse(xhr) {  
    $('helloArea').innerHTML = xhr.responseText;
```
- ```
$F()
```

```
}
```
- ```
Try.these()
```
- ```
Ajax.request()
```
- ```
Ajax.Updater()
```
- ```
Element.show/hide/toggle/remove
```
- Object-oriented extensions



- Makes Ajax request/response simple

```
function makeRequest(url) {  
    var xhr = new Ajax.Request(url,  
        { method: 'get', onComplete: showResponse });  
}
```

```
function showResponse(xhr) {  
    $('helloArea').innerHTML = xhr.responseText;  
}
```

- Rico allows multiple targets in the response

# Dojo



- Events: multiple listeners, browser abstraction, memory leak protection
- Aspect-oriented
- I/O: common interface for multiple transports, single/multi response
- Built-in packaging system
- Widget building w/HTML & CSS fragments, automatic reuse

# Microsoft Atlas Features

- Extensible core adds lifetime mgmt, inheritance, multicast event handler, and interfaces
- Base class library: strings, timers, tasks
- UI framework for attaching behaviors to HTML
- Simple connectivity
- Set of rich UI controls (auto complete, popup panels, animation, and drag and drop)
- Browser compatibility layer

# Microsoft Atlas: Interesting Concepts

- Update panels: mark region for auto update
- Behaviors: encapsulate actions to associate with DHTML events [floating, hover, popup, autocomplete]
- Validators [required, type, range, regex, etc.]
- Data binding: connect controls & manage flow between them [data entered, reflected elsewhere]
- Bindings transformers: support transform event as part of a binding [ToString, invert, etc.]

# Microsoft Atlas

- Two models: XML scripting & JS API
- Will be fully supported by Microsoft tools

# Advanced Topics

Problems and Challenges with Building Ajax Applications

Bill W. Scott, Yahoo! Ajax Evangelist

---

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# How Ajax Changes Things

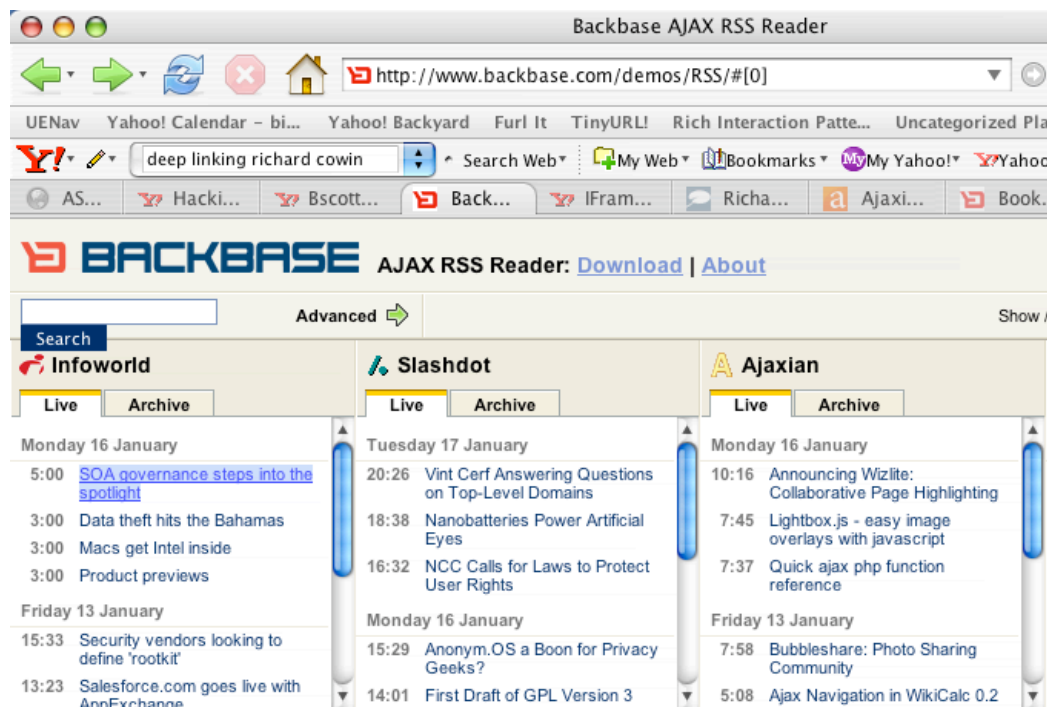
<b>Classic Web</b>	<b>Ajax/Web 2.0</b>	<b>Problems/Challenges</b>
Page to page navigation	Micro content	Back button, SEO, bookmarking, accessibility, security
URL/Link = User's location	Application state	Back button, SEO, bookmarking, accessibility
Browser history	Application history	Back button, bookmarking, accessibility
Back button = Undo	Is unpredictable	Back button, bookmarking, accessibility
Little JavaScript	More JavaScript	Accessibility, degradability, security, memory, performance, debug, obfuscation, error handling
Document model	Application model	Back button, SEO, bookmarking, accessibility
Static content	Dynamic content	SEO, bookmarking, accessibility
Course-grained events	Micro states	Back button
Synchronous	Asynchronous	Error handling
Browser chrome	Application controls	Back button, bookmarking, accessibility
Page Services	Web Services	Security, XML vs. JSON

# Back Button

- Problem: Ajax application state changes, URL does not. No browser history of state changes/navigation
- What does the user expect?
  - Often confused with Undo
  - True context view changes should be part of history
    - Navigation tabs; but not content tabs?
    - Steps in a process
    - Tree selection when views change
- Impact of tabbed browsers?



- URL hash, fragment identifier (**http://a.com#loc** does not trigger a page reload
- Fragment identifier (string after '#') can be used to record state changes in the URL



- Yahoo! Maps Beta also uses this technique
- Bottom line: tricky to implement
  - Dojo, Backbase provide direct support
  - One approach:  
<http://www.contentwithstyle.co.uk/Articles/38/fixing-the-back-button-and-enabling-bookmarking-for-ajax-apps>
    - All links have fragment
    - Clicking link changes URL, not page
    - Timer monitors `window.location.href` & updates

- Technique: use iframes to control browser history for recording state changes
- Tricky issues abound
  - Fragile across browsers
  - onload issues
  - audible transition (on IE if sound enabled)
- Bottom line: problematic

# Search Engine Optimization (Deep Linking)

- All the content may not be statically available for search engine crawlers
  - Won't find content to index your pages correctly
- Possible solutions
  - **Lightweight Indexing**: leverage existing tags such as meta, title and h1
  - **Extra Links**: extra links are placed on the site.
  - **Secondary Site**: a secondary site is fully accessible to the search engine. (See degraded experience)

source: [backbase.com](http://backbase.com)

# Bookmarking

- Since we have broken the history and URL paradigm, bookmarking become problematic
- What does the user expect?
  - Do they expect to bookmark application state? content viewed?
  - Desktop apps often support bookmarking. It is always content based.

- Allow the user to save a bookmark at an interesting moment in an Ajax application
- Perhaps dynamically generate a link for bookmarking
- The URL generated for the bookmark is sufficient to restore the state

- Google Maps
  - Link is generated on each new map address
  - Link contains URL parameters to return to the page

 [Print](#)  [Email](#)  [Link to this page](#)

- OpenRico LiveGrid

[http://richardcowin.typepad.com/blog/2005/07/there\\_has\\_been\\_.html](http://richardcowin.typepad.com/blog/2005/07/there_has_been_.html)

Listing movies

#	Title	Year
1	Mr and Mrs Smith	0
2	Shichinin no samurai	1954
3	The Lord of the Rings: T	2003
4	Buono, y il brutto, il cattivo, Il	1966
5	The Lord of the Rings: The Fellowship of the Ring	2001
6	Star Wars	1977
7	The Lord of the Rings: The Two Towers	2002
8	Star Wars: Episode V - The Empire Strikes Back	1980
9	Raiders of the Lost Ark	1981
10	Apocalypse Now	1979

Name: Listing movies 61 - 70 of 894

Create in: Bookmarks

Cancel Add

<http://openrico.org/rico/livegrid.page?>

[data\\_grid\\_index=60&data\\_grid\\_sort\\_col=rating&data\\_grid\\_sort\\_dir=ASC](http://openrico.org/rico/livegrid.page?data_grid_index=60&data_grid_sort_col=rating&data_grid_sort_dir=ASC)



# Accessibility

<b>DHTML Provides</b>	<b>Accessibility Expects</b>	<b>Problem</b>
JavaScript enabled markup, new user interface controls	Simple markup	Markup has more meaning than expected. How does the assistive technology understand this is a tree control? How does it understand the state of a control?
Dynamic pages & content	Fairly static pages	How do I announce dynamic content?
Weak support for keyboard navigation	Keyboard navigation	Sight-impaired users will not be using rich interactions; they will use the keyboard (or another device that simulates the keyboard) But how to tab key, arrow key, select items with the keyboard?

- IBM/Mozilla Accessible DHTML API/Spec
  - Direct support for keyboard traversal
    - Supports tab key to a container, arrow keys to navigate inside the container and enter key to select item
    - Setting tabindex=-1 allows focus to be set on a object without it being in the tab order
  - A way to add metadata to HTML markup for assistive technologies to understand:
    - Widget roles, properties, values and events
  - Working with assistive technology vendors to make them aware of this API (funded development)
- Microsoft's plans

<b>tabindex value</b>	<b>Purpose</b>	<b>Tab key navigable?</b>
Not set	Accept default behavior	Default behavior Form elements
tabindex = “-1”	For child elements (nodes in a tree)	No. You must set the focus with JavaScript
tabindex = “0”	To tab in HTML code order	Tabbing moves you field to field in the order they are added to the page
tabindex > “0”	To specify an exact order for each field	Value describes the tab order

- Roles

```
<span tabindex="0" xhtml2:role="wairole:checkbox"
    property:checked="true"
    onkeydown="return checkBoxEvent(event);"
    onclick="return checkBoxEvent(event);">
    Any checkbox label
</span>
```

- Provides clues to assistive technologies

# Progressive Enhancement



- Degradability - Managing the user experience as you move down in device/browser capability
- At Yahoo! we grade the browser by experience we will provide (A, B, X grade)
  - A-grade experience (majority of our users; greatest visual fidelity and richest interactions)
  - B-grade experience (almost A-grade, but either they are on bleeding edge, low adoption or low economic value). Not considered in development or testing
  - X-grade experience (baseline of support; content but little style or interaction). Crawlers and old browsers get this experience.

# Graded Browser Support @ Yahoo!

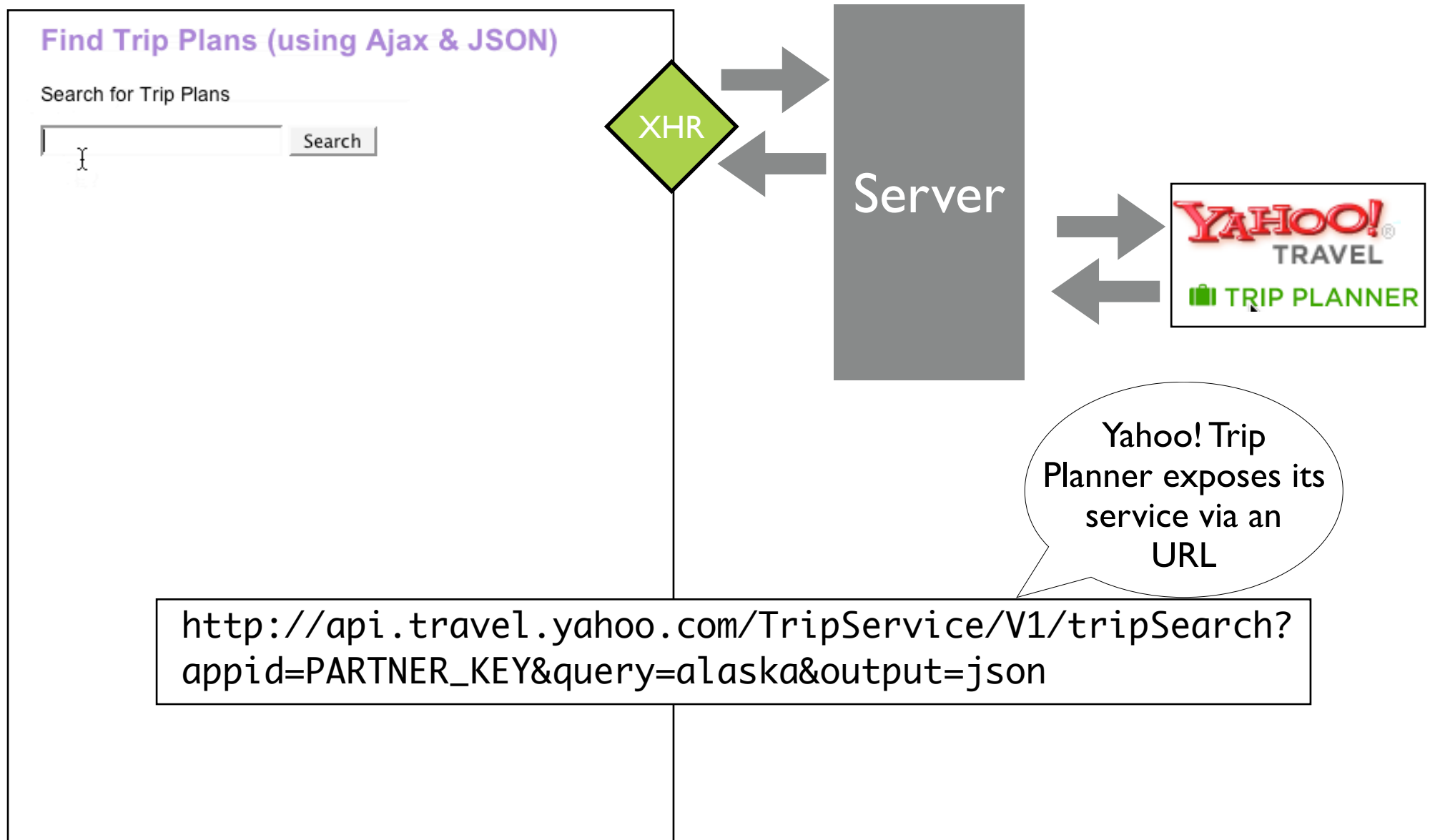
	Win 98	Win 2000	Win XP	Mac 10.0	Mac 10.2	Mac 10.3	Mac 10.3.x	Mac 10.4
<b>IE 7.0</b>	n/a	n/a	A-grade	n/a	n/a	n/a	n/a	n/a
<b>IE 6.0</b>	A-grade	A-grade	A-grade	n/a	n/a	n/a	n/a	n/a
<b>IE 5.5</b>	A-grade	A-grade	n/a	n/a	n/a	n/a	n/a	n/a
<b>IE 5.0</b>	C-grade	C-grade	n/a	C-grade	C-grade	C-grade	C-grade	C-grade
<b>Netscape 8.0</b>	X-grade	X-grade	A-grade	n/a	n/a	n/a	n/a	n/a
<b>Firefox 1.5</b>	A-grade	A-grade	A-grade	A-grade	A-grade	A-grade	A-grade	A-grade
<b>Firefox 1.0.7</b>	A-grade	A-grade	A-grade	A-grade	A-grade	A-grade	A-grade	A-grade
<b>Mozilla 1.7.12</b>	X-grade	X-grade	A-grade	X-grade	X-grade	X-grade	X-grade	X-grade
<b>Opera 8.5</b>	X-grade	X-grade	A-grade	C-grade	C-grade	C-grade	X-grade	X-grade
<b>Safari 1.0</b>	n/a	n/a	n/a	X-grade	n/a	n/a	n/a	n/a
<b>Safari 1.1</b>	n/a	n/a	n/a	X-grade	X-grade	n/a	n/a	n/a
<b>Safari 1.2</b>	n/a	n/a	n/a	X-grade	X-grade	X-grade	n/a	n/a
<b>Safari 1.3</b>	n/a	n/a	n/a	n/a	n/a	X-grade	A-grade	n/a
<b>Safari 2.0</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	A-grade

- Pre-emptive nag bar
- Semantic Markup
  - What's good for accessibility is good for degradability
- Design Issues
  - What is the experience for C-grade browsers?
  - What is the experience for non-browsers?

# Web Services

- Web 2.0 - Web as a Platform. Lots of web services!
-  **YAHOO! DEVELOPER NETWORK**
  - del.icio.us, Finance, flickr, HotJobs, Maps, Merchant Solutions, Music, Design Patterns, RSS Feeds, Search, Search Marketing, Shopping, Travel, Traffic, upcoming.org, UI library, weather, webjay, widgets, JS Developer Center, PHP Developer Center
-  **Google Web APIs (beta)**
  - maps, search, desktop, sitemaps, adwords, finance, calendar





- JSON means
  - Trivial parsing
  - Faster than XML
  - Friendlier for developer
  - Runs everywhere
  - It's JavaScript, simpler programming model
  - Very stable... never will change!
  - Strong community, wide acceptance
- Yahoo! behind it

# Security: Same Site Rule

- The domain of the URL request destination must be same as one that serves up page containing script
- Why? XHR requests to a different site would carry cookies. Cookies would spoof authentication.
- Solutions
  - Proxies
  - `<script>` hack
  - Other remote scripting tricks
  - XMLHttpRequest (coming)

- I want to access multiple services (from different domains) without setting up a separate server (scalable, simpler to implement)
- Solution: Protocol that POSTs JSON text, gets response, parses the response into JavaScript value
  - No cookies sent
  - No other file formats accepted. Must be valid JS
  - JSON is safe JavaScript (data not functions)
  - Little or no error information provided to a miscreant
  - Accumulates random delays before trying again to frustrate denial of service attacks
  - Can support duplex!

# Memory Management

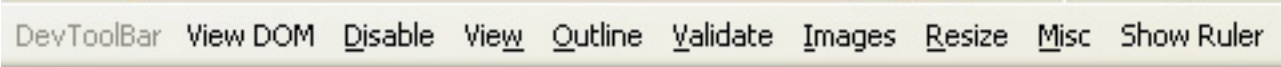
- Hey, Internet Explorer is leaky!
  - Its memory garbage collector is the culprit
    - Uses reference counting; JS uses Mark & Sweep
    - Often closures are blamed
- Common problem that causes memory leaks
  - DOM <--> Application object reference each other
  - Event handlers left hanging around
- Tool for IE: Drip

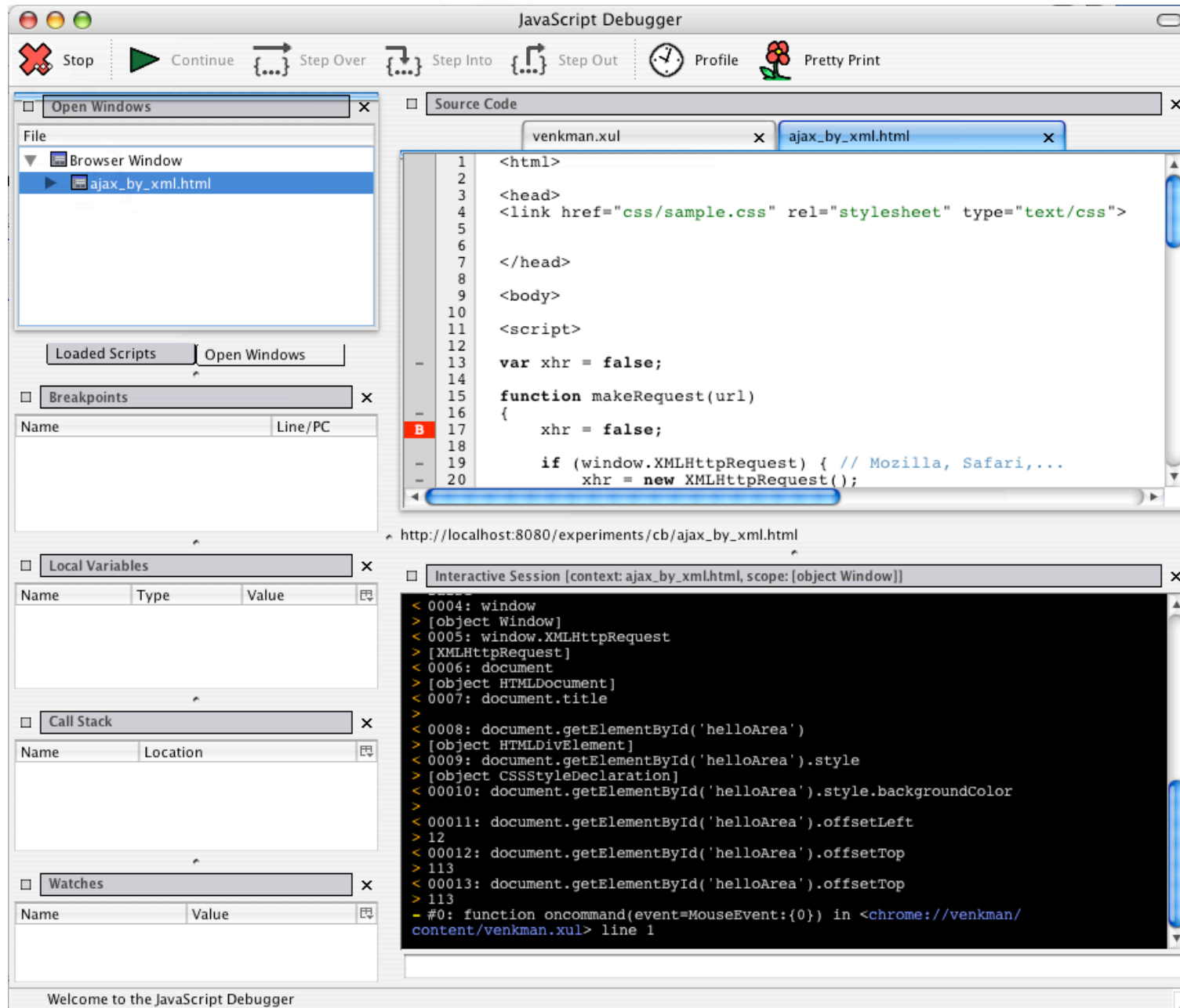
# JavaScript Performance

- JavaScript requires common sense
  - Cache repeatedly accessed objects
  - Always use var for local variables
  - Use numbers for number and strings for strings
  - Avoid using eval() for accessing properties  
eval("obj."+propName) --> obj[propName]
  - Look to your loops
- And a few surprises
  - Build DOM trees downward
  - Use array.join for lengthy string concatenations

source: Adam Platti

# Debugging Tools

- Microsoft Script Editor
- Instant Source (IE Plugin)
- IE Dev Toolbar 
- Venkman (Mozilla)
- Firebug (Mozilla)
- DOM Inspector (Mozilla)
- Web Developer Tools (Mozilla)
- Safari JavaScript Console
- JSLint



- Breakpoints
- Local variables
- Watches
- Call Stack
- Profiling
- Source view
- Debug toolbar



[Developer Network Home](#) [Help](#)

Site Search

**YAHOO!** DEVELOPER NETWORK

Design Pattern Library

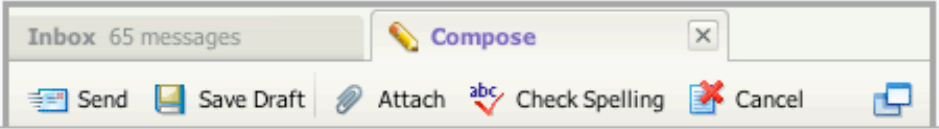
[Yahoo! Developer Network](#) > [Design Pattern Library](#) > Auto Complete

## Auto Complete

### Problem Summary

The user needs to enter an item into a text box which could be ambiguous or hard to remember and therefore has the potential to be mis-typed.

EXAMPLE:



### QUICK JUMP

- [Solution](#)
- [Rationale](#)
- [Accessibility](#)

### RELATED PATTERNS

- Button Sequence
- Chooser
- Input Guidance

Clear Inspect Options ▾

Console Inspector

▼ <html>

▶ <head>

▼ <body onload="MM\_preloadImages('images/pattern\_autocomplete\_ani.gif')">

▶ <div id="ygunav">

▶ <div id="ygma">

▶ <div id="ypattern-wrap">

</body>

</html>

← → /html/body

Source Style Layout Events DOM

- Lint are syntax checkers and validators
- JavaScript needs lint
- <http://www.crockford.com/jslint/lint.html>
- Scans source file & looks for common syntax problems
  - Nice way to catch silly mistakes
  - Try it at: <http://jslint.com>

# Obsfucation or Minification

- JavaScript is easy to see with a Save or a <ctrl>-U
- JavaScript can increase page size & page load
  - Obsfucators mangle the code into unreadable form
  - Minifiers strip white space & comments
- Obsfucators go too far
  - Makes development way too hard
- Minification & compression do just enough
  - JSMIn (<http://www.crockford.com/javascript/jsmin.html>)

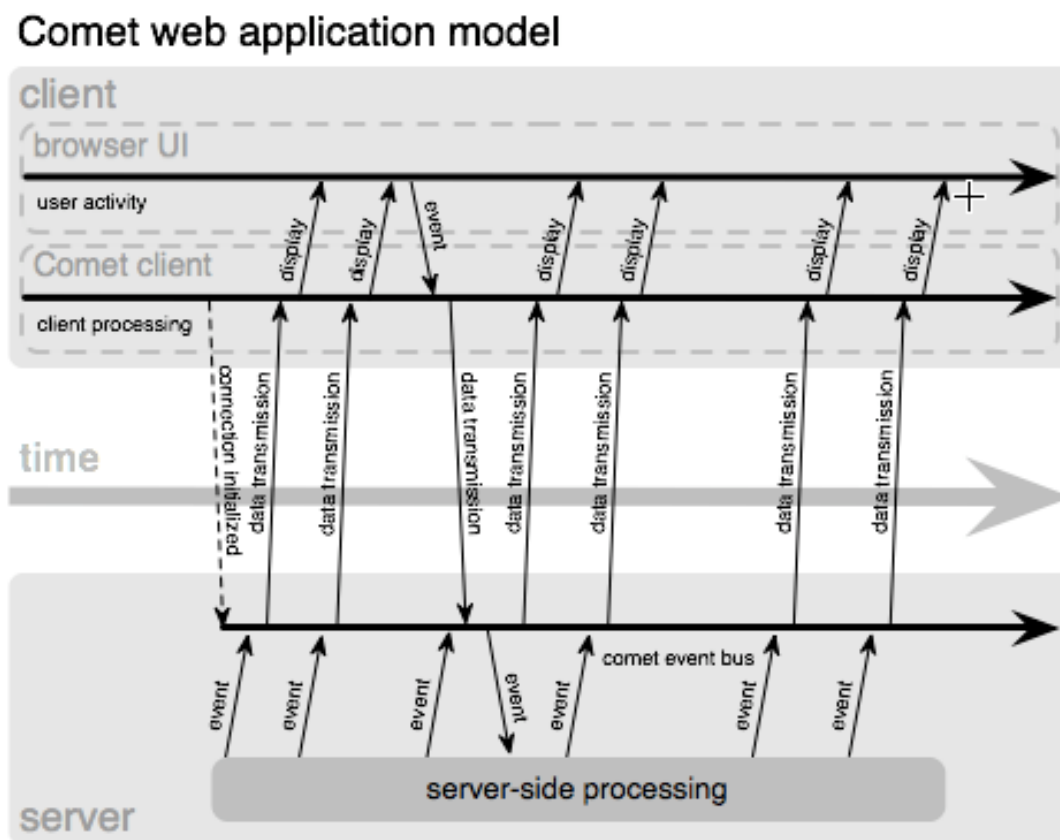
# Error Handling

- Asynchronous error handling
  - Keep design simple (do you need multiple requests going at once?)
  - Will increase implementation issues
- Normal error handling
  - Check for error codes ( $\neq 200$ )
  - Roll your own HTTP status error codes
- Minimize server-side errors with intentional validation (error prevention)

- Difficult to correct XML, JSON or even HTML over the wire. XML & JSON are slightly harder. Server issue, but how to handle
- Use error handlers provided by Ajax frameworks
  - Prototype try.these
  - JavaScript try/catch
  - DWR has global error handler
  - Dojo error handlers

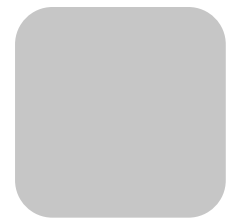
# Comet

- Can deliver data to client any time
- Delivered over single, previously opened connection
- Example applications
  - gmail's GTalk integration
  - Jot Live
  - Renkoo
  - Meebo



# What about Flash?

- Adobe Flash/JS Bridge ([finance.google.com](http://finance.google.com))
- Adobe Flex/Ajax Bridge (8.5)
- Flash sites ([maps.yahoo.com/beta](http://maps.yahoo.com/beta))
- Flex: 2.0 is serious environment (Flash 8.5; free)
- Laszlo: Generates either Flash or DHTML/Ajax
- Communication Bridge
- Storage Mechanism
- Event Extender
- Rich Media Extender (sound, video, streaming)



# Questions?