Designing for Ajax

Principles and Patterns for Designing Rich Internet Applications



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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



vell.com

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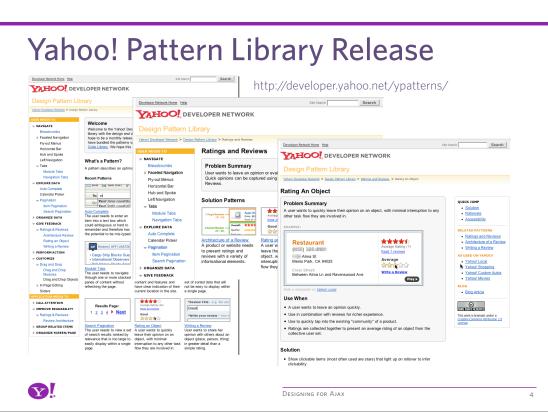


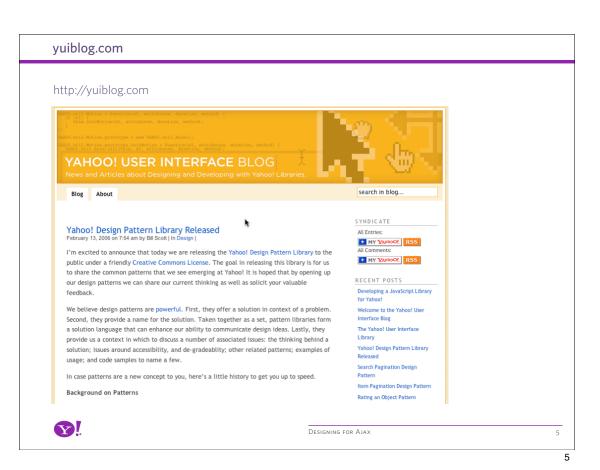
Ajax at Yahoo!

- 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



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Yahoo! Patterns Discussion Group http://groups.yahoo.com/group/ydn-patterns/ Yahoo! Yahoo! Plus Home Mail Search the Web Search Welcome, billwaynescott [Sign Out, My Account] IS IT EASY TO START AN ONLINE STORE? escott · bscott@yahoo-inc.com | Group Moderator - Edit Memb Start a Group | My Groups $\textbf{ydn-patterns} \cdot \text{Yahoo! Design Pattern Discussion Group}$ Messages Message # Go Search: Go Messages Help Home Messages View: Simple | Summary | Expanded As: Msg List | Thread 1 - 23 of 23 First | < Previous | Next > | Las Post Files Delete Links $\label{eq:welcome} \begin{aligned} \textbf{We are excited about the launch of our Yahoo! Disign Patterns} \\ \textbf{Library $$^$http://developer.yahoo.net/ypatterns/index.php>.} \end{aligned}$ While our internal patterns site is... Database Polls Members Re: Welcome!
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 Feb 13, 2006 7:49 pm Pending ⊕ ⊯ + Promote Re: Welcome!
Great work, I just scanned through the two libraries and have to say: You guys rock. :) Thanks.... Dominik Schwind

d_schwind

| Feb 14, 2006 |
| 12:41 am | Invite Y! DESIGNING FOR AJAX

Current Set of Patterns

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.



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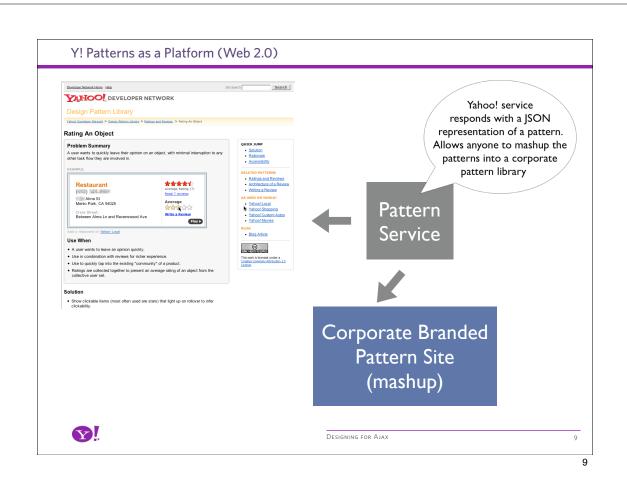
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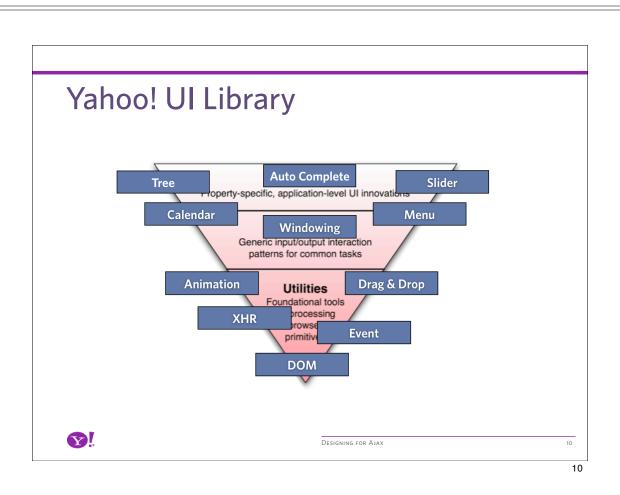
Rich Design Patterns

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.**



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Designing for Ajax

- Richness What is richness?
- Ajax Patterns DNA of an Ajax Pattern
- Principles Principles for Ajax Design



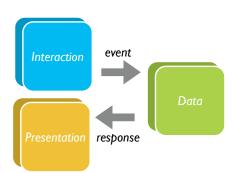
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Defining Richness: Web in 3D

- Interaction Dimension
- Data Dimension
- Presentation Dimension



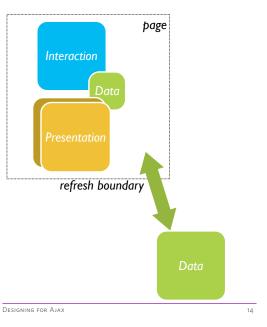


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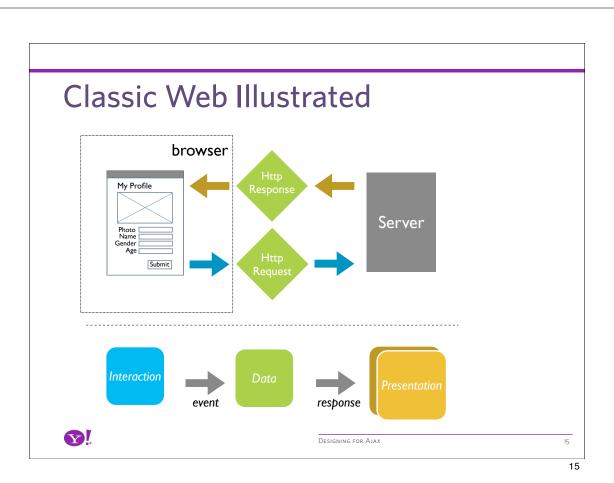
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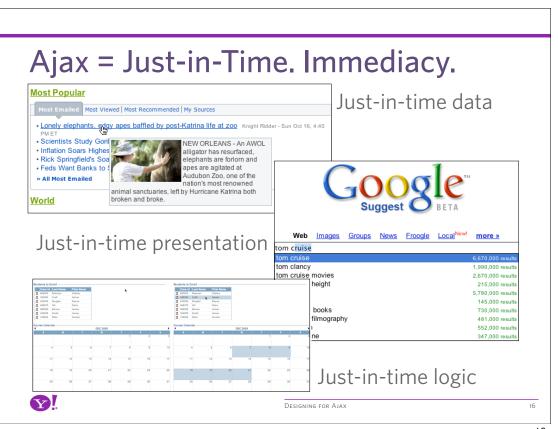
Classic Web

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



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Ajax Model - New & Improved!

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

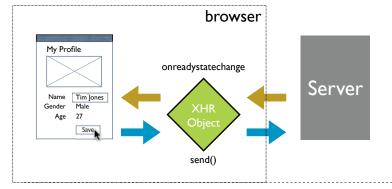


All dimensions are closer



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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



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Other Remote Scripting Techniques

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



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Rich Design 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.**



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But What Can XHR Do?

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





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Anatomy of a Pattern

- Ajax design patterns contain three steps
- **Trigger** (event or timer)
- Operation (Ajax, remote scripting)
- **Update** (presentation)







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Trigger

- Every pattern 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



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Operation

Ajax patterns open the door to immediacy

- 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









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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.

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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.

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Update

Finally, patterns reflect a visual change

Indication. Busy Indication. Cursor Busy. In Context Busy. In Context Progress. Inline Status. 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. Slide-out. Popup Balloon.



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Pattern-O-Matic Trigger + Operation + Update = Ajax Pattern Pattern Page Ajax Pattern Designing for Alax 30





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Principles for Ajax Design

- 1. Keep it direct
- 2. Provide live feedback
- 3. Offer an invitation
- 4. Cross borders reluctantly
- 5. Leave a light footprint
- 6. Show transitions
- 7. Think in objects



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Shift. **Event granularity.**

 $\mathsf{submit}\, hyperlink$



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



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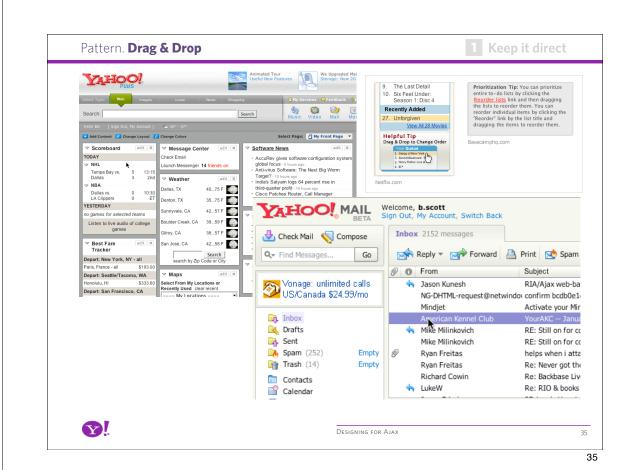
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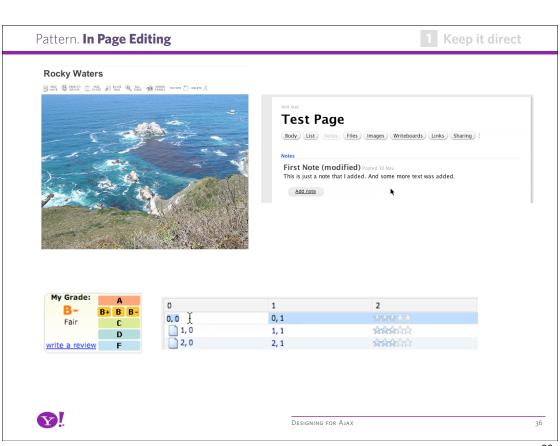
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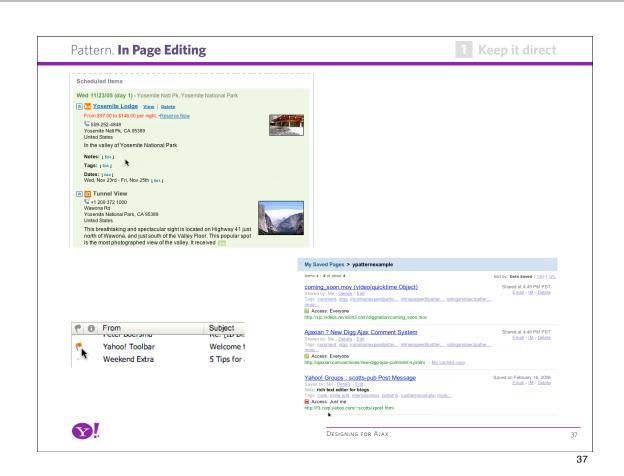
Keep it Direct

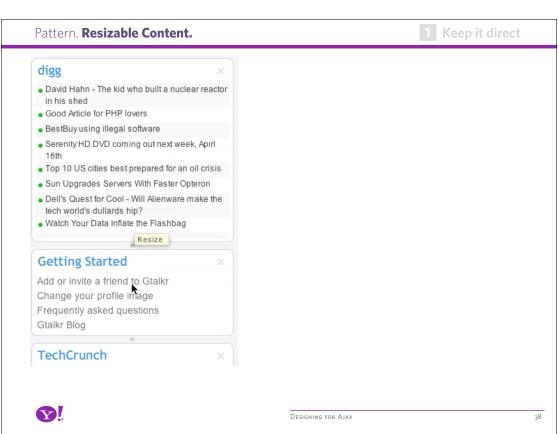


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The Patterns

1 Keep it direct

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. Inline** Reordering. Resizable Content.



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Keep it direct

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Prefer interaction within the page

What about discoverability?



State park near our home in San

Click to edit

5 photos | Add a comment?

Photos are from 22 Oct 05.



1 Keep it direct

Prefer interaction within the page

What about discoverability?

Use direct editing on page content

What about save/cancel? Avoid page jitter Reduce the feeling of modes



State park near our new home in San Jose (next to Milpitas)

SAVE OR CANCEL



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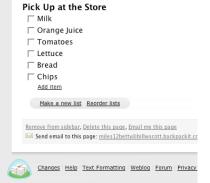
Prefer interaction within the page

What about discoverability?

Use direct editing on page content

What about save/cancel? Avoid page jitter Reduce the feeling of modes

Keep it direct



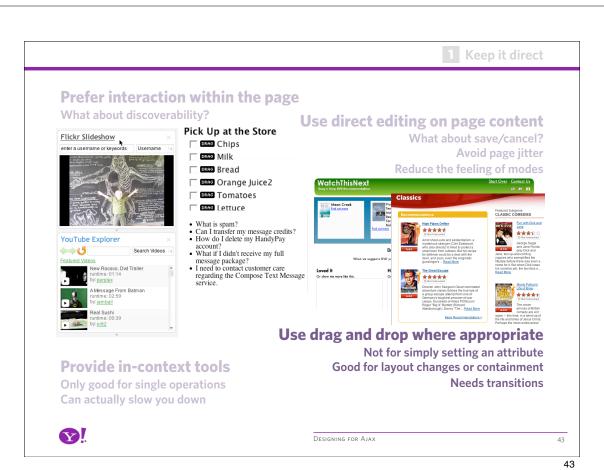
Create a home page for the VisDe to make findability easier

Provide in-context tools

Only good for single operations Can actually slow you down



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Shift. Immediacy.

Page
Interaction
Data
Presentation

Presentation

Data

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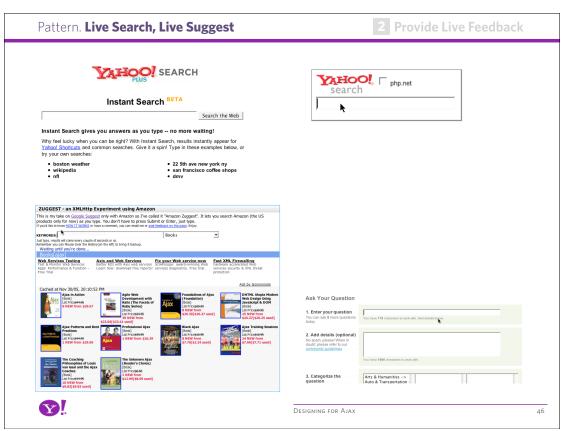


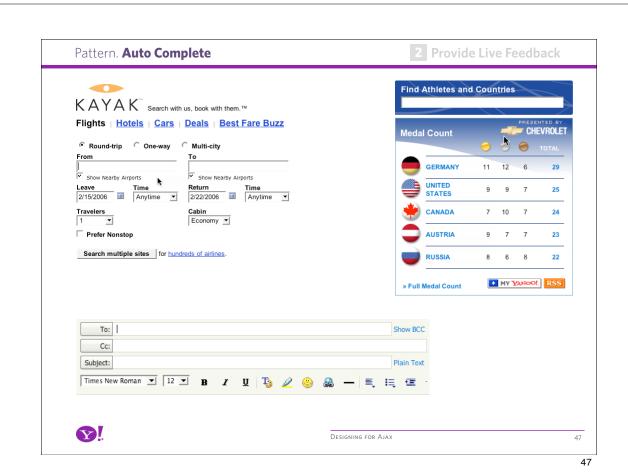
Provide live feedback

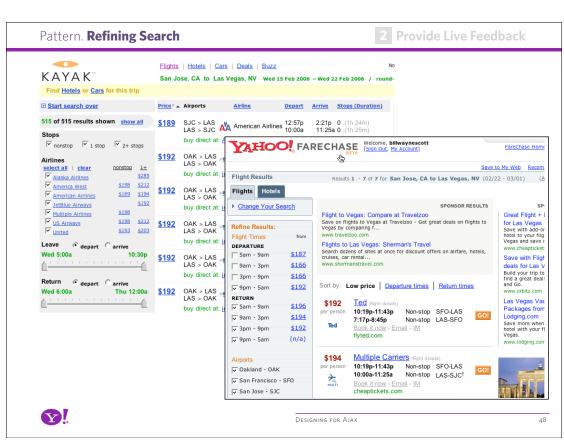


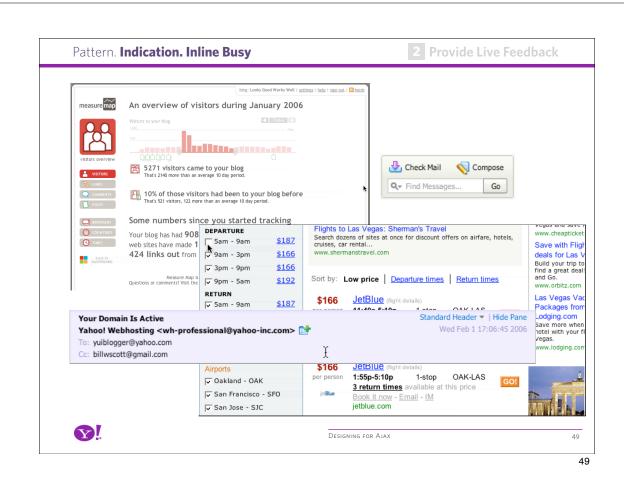
DESIGNING FOR AJAX

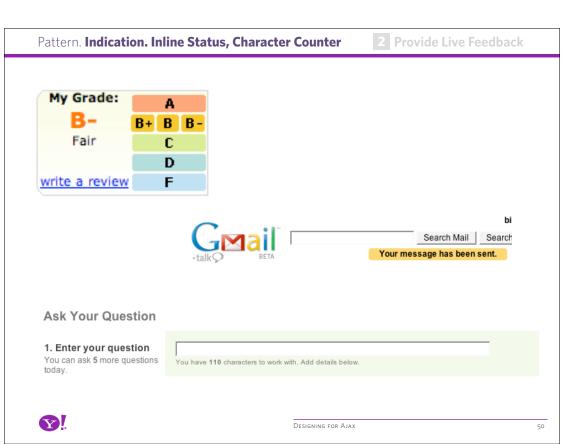
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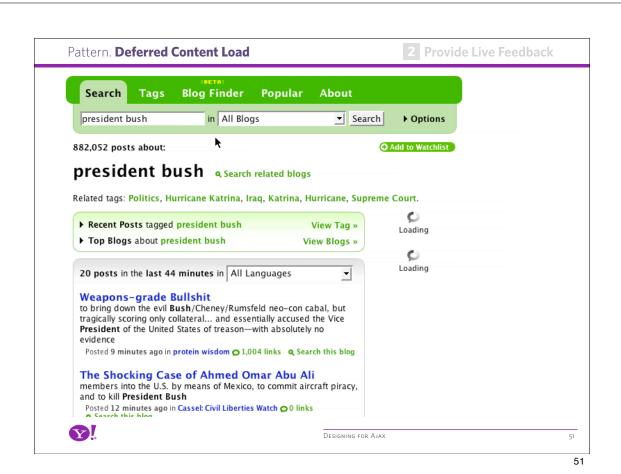


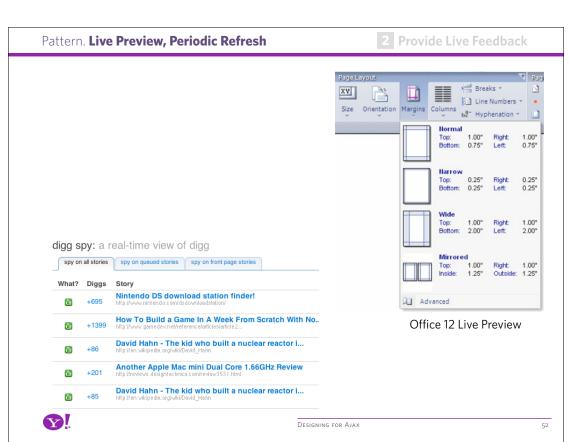


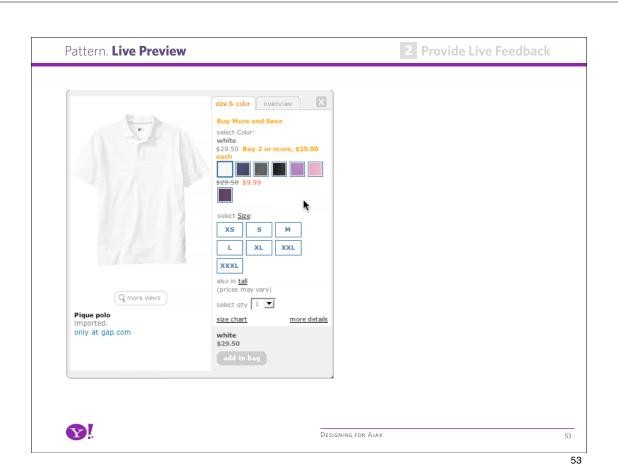


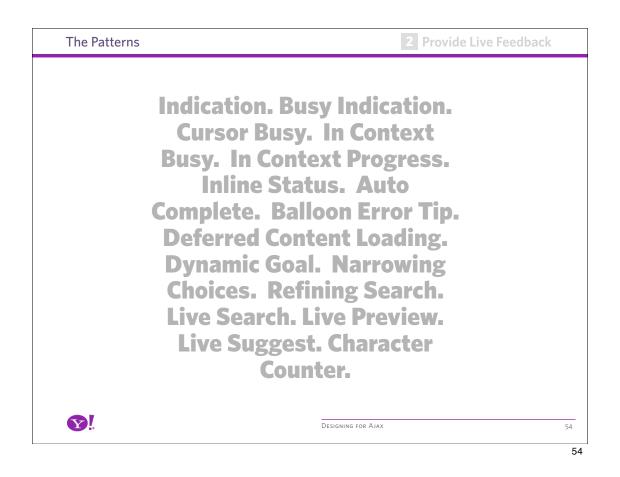


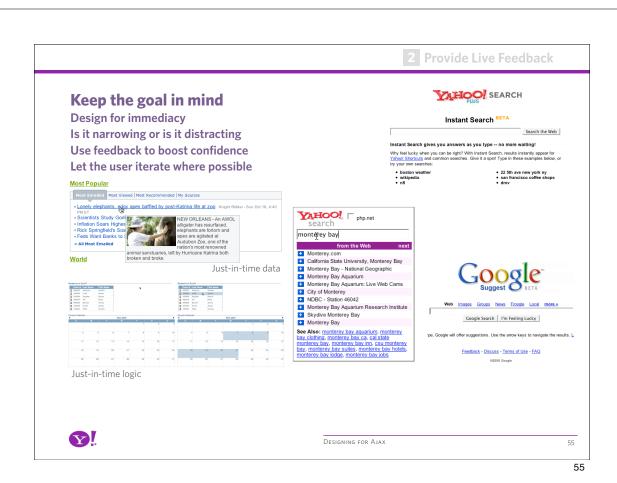












2 Provide Live Feedback

Keep the goal in mind

Design for immediacy Is it narrowing or is it distracting Use feedback to boost confidence Let the user iterate where possible

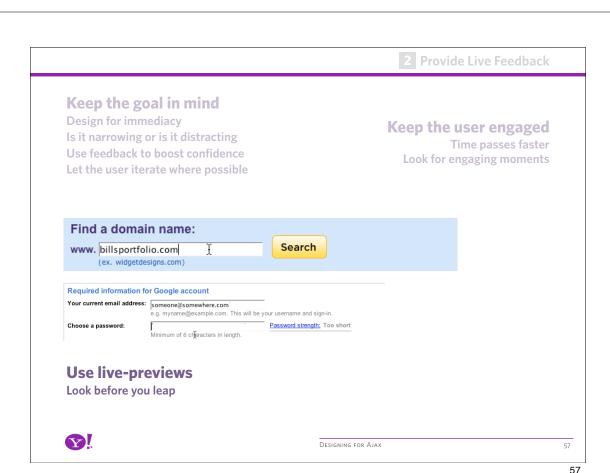
Keep the user engaged

Time passes faster Look for engaging moments



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Provide Live Feedback Keep the goal in mind Design for immediacy Keep the user engaged Is it narrowing or is it distracting Time passes faster Use feedback to boost confidence Look for engaging moments Let the user iterate where possible 282 Fixing the Mighty Mouse Exhibit the highty whouse

∫ submitted by usedment day it hour age (via http://mac

The Apple Mighty Mouse brings a slew of great feat
with most new Mac systems it is becoming a commone for close to a year now, I have found that the us

Scroll Ball far outweigh its quirks.

⊘ \$0.comments | blog this | email this | category: apple | Search Mail Search Your message has been sent. **AJAX Activity Indicators** Uheck Mail Compose Q+ from: darren (2) Stop Keep feedback focused Keep it in context **Use live-previews** Updating too many areas at once will be confusing Show dynamically what is relevant Look before you leap Avoid creating feedback noise/jitter Y! DESIGNING FOR AJAX 58 Shift. Deeper Interaction.



hover blur focus Click key shiftclick doubleclick drag dragdrop dragflipdrop shiftdoubleclick tripleclick shifttripleclick

hover blur focus Click key shiftclick doubleclick drag dragdrop dogs flodos

shiftdoubleclick tripleclick shifttripleclick



hover blur focus Click key shiftclick doubleclick dragdragdrop

hover blur focus click key shiftclick doubleclick drag dragdrop



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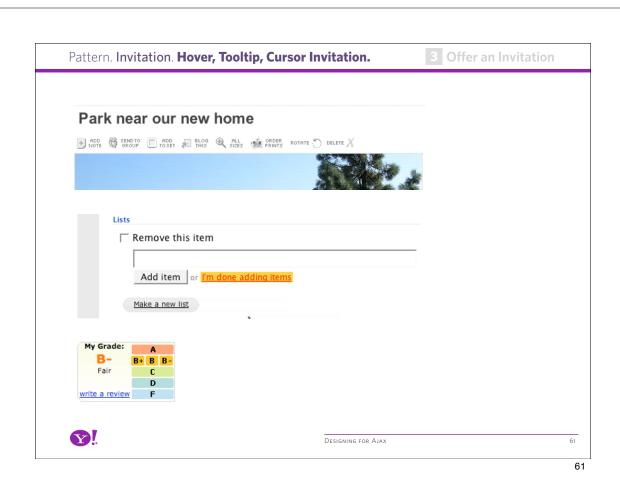
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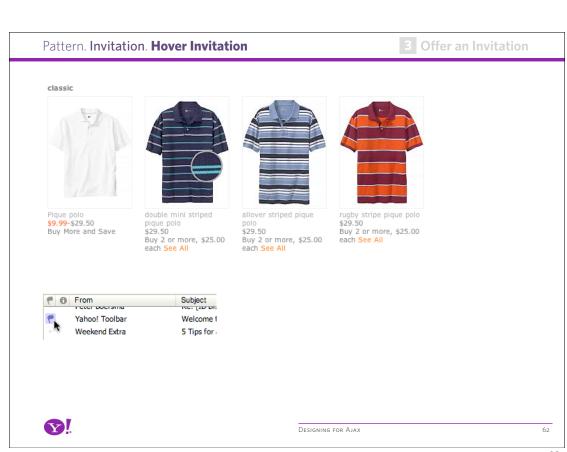
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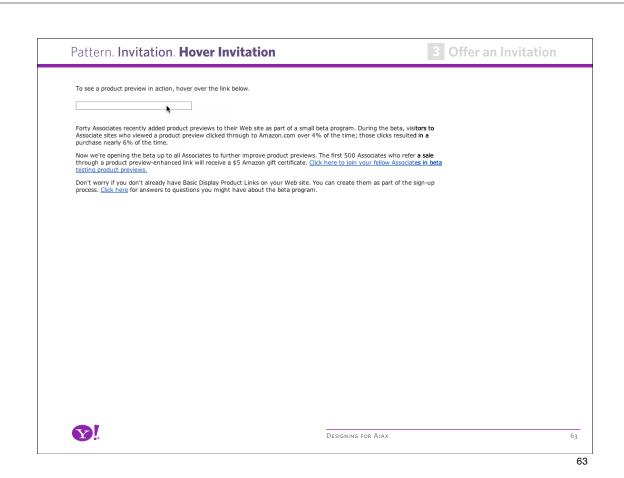
Offer an invitation

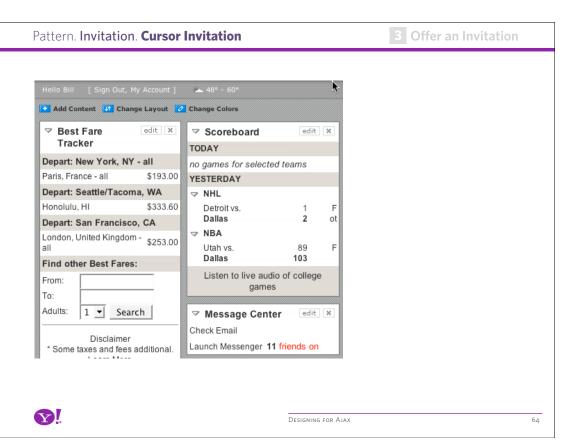


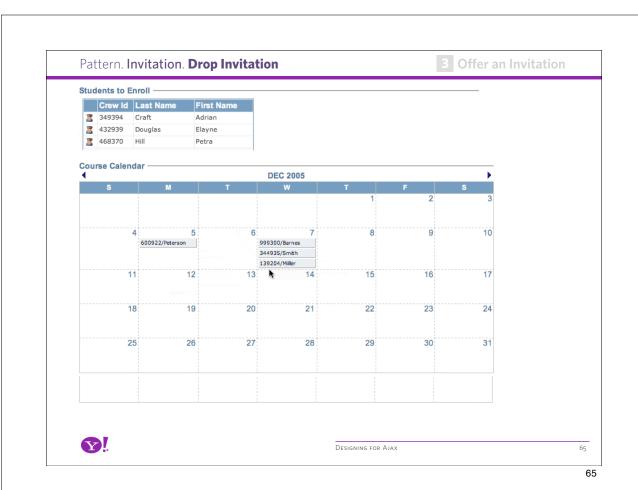
DESIGNING FOR AJAX



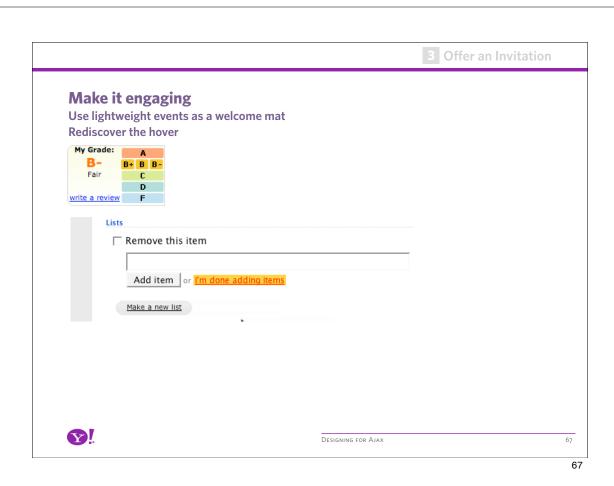








The Patterns Offer an Invitation **Invitation. Cursor Invitation. Drop Invitation. Tool Tip Invitation. Hover Invitation.** Y DESIGNING FOR AJAX 66 66



Make it engaging
Use lightweight events as a welcome mat
Rediscover the hover

Keep actions out of it
Don't make the user afraid to explore
Don't proselytize

For the make the user afraid to explore
Don't proselytize

To see a product preview in action, hover over the link below.

Forty Associates recently added orduct previews to their Web site as part of a small beta program. During the beta, visitors to
purchase nearly 6% of the time.

Now we're possing the beta up to all associates for further improve product previews. The first 550 Associates who refer a see
through a product preview changed for which the province of the street.

Don't make the user afraid to explore
Don't proselytize

Containing
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Make it engaging

Use lightweight events as a welcome mat Rediscover the hover

Keep actions out of it

Don't make the user afraid to explore Don't proselytize

Park near our new home



Get the actors involved

Hover Invitation Cursor Invitation Tooltip Invitation

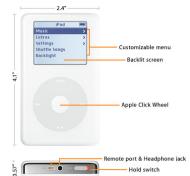


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Make it engaging

Use lightweight events as a welcome mat Rediscover the hover



Keep actions out of it

Offer an Invitation

Don't make the user afraid to explore Don't proselytize

Pick Up at the Store Ldit Chips Ldit Crange Juice2 Ldit Milk Ldit Bread Ldit Tomatoes Ldit Lettuce Add Item Reorder

Get the actors involved

Hover Invitation Cursor Invitation Tooltip Invitation

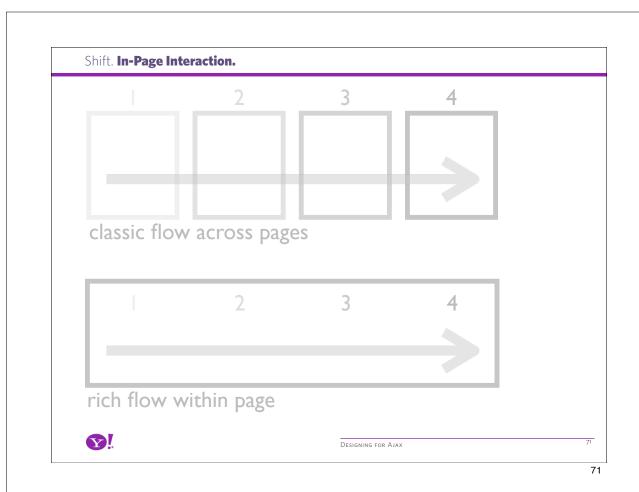
Use invitations to aid discoverability

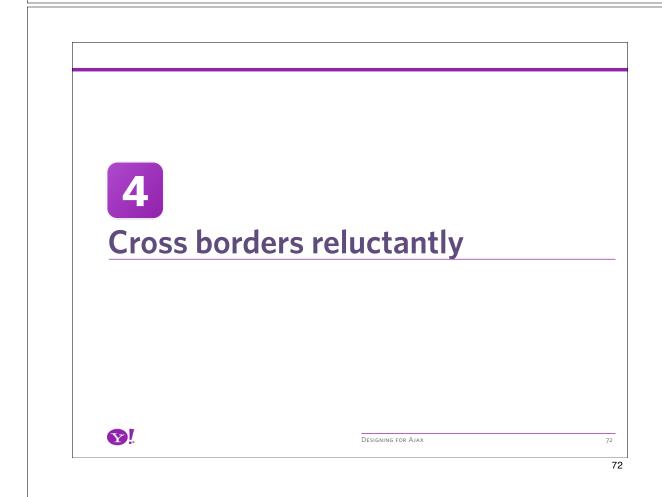
Two challenges: idiom & feature Adding signposts, always-on clues doesn't scale Add tours, help pedals, tips, spotlights

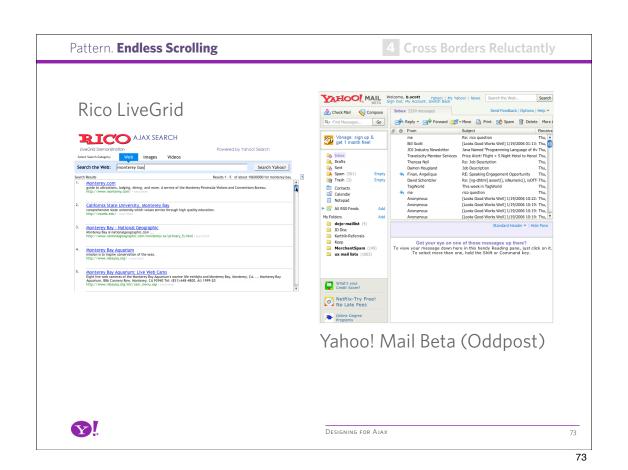


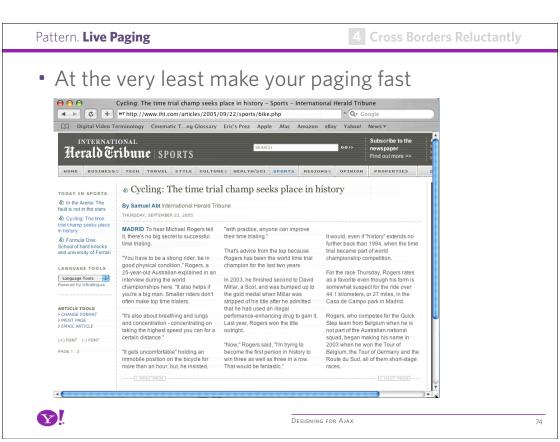
DESIGNING FOR AJAX

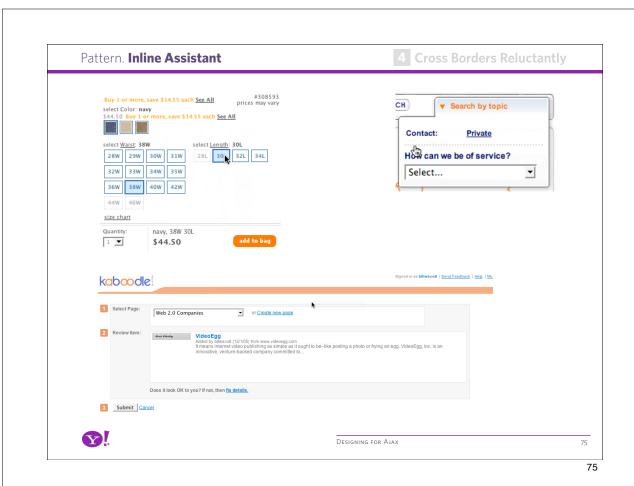
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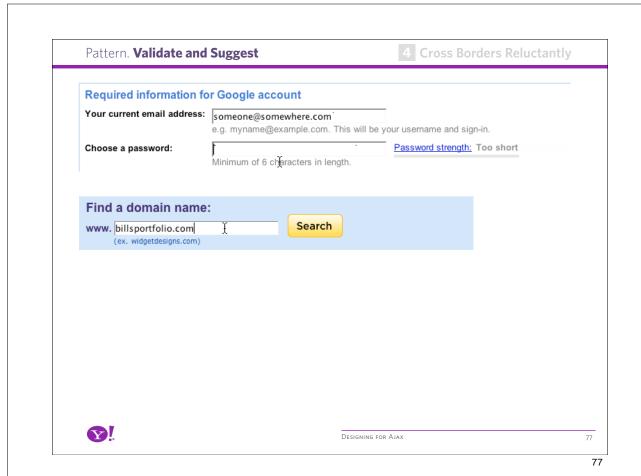


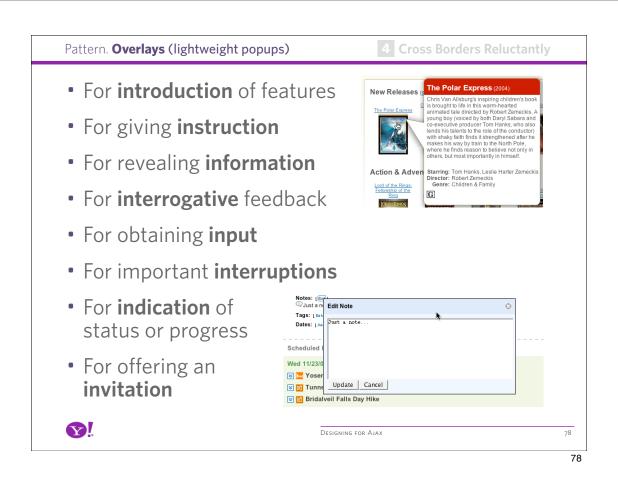


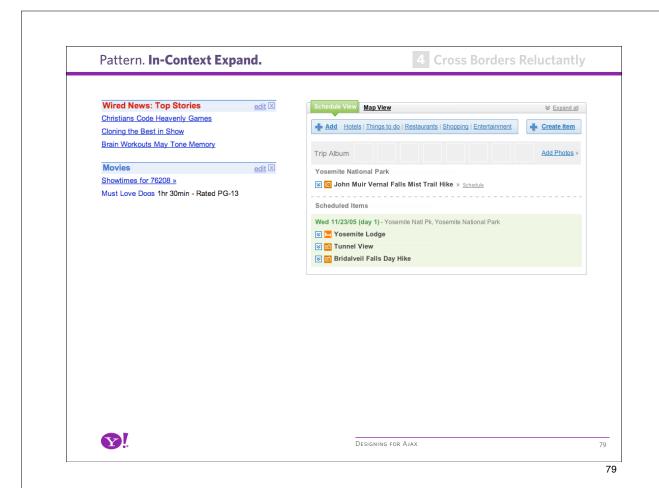


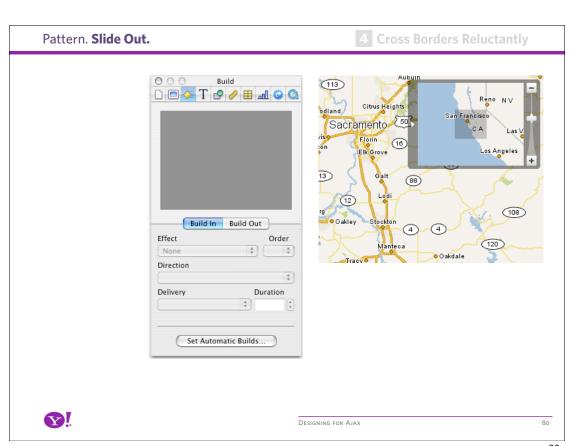


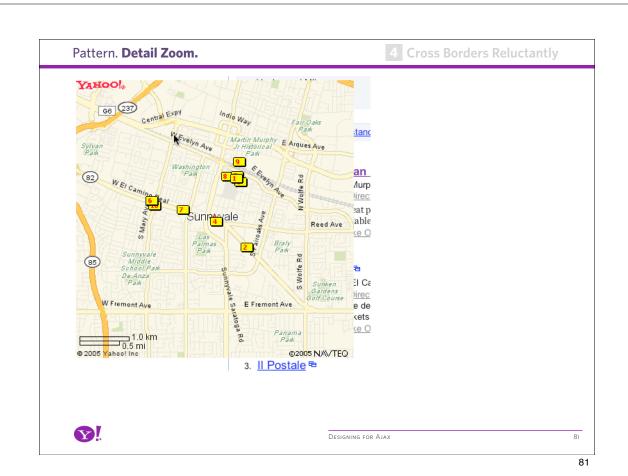












The Patterns 4 Cross Borders Reluctantly

Endless Scrolling. Expandable Paging
Boundary. Fresh Content. Hover Detail.
In Place Drill Down. Inline Assistant.
Inline Validation. Validate Then Suggest.
On Demand Refresh. Resizable Modules.
Scrolling Modules. 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.

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Rethink process flows

Its the user's model, not the page model Every page jump is a mental speed bump

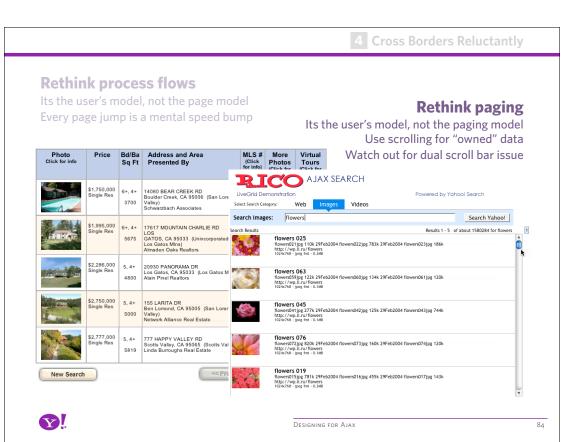






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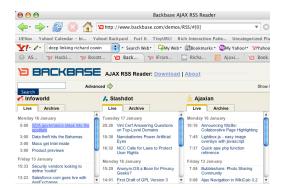
83





Rethink process flows

Its the user's model, not the page model Every page jump is a mental speed bump



Rethink paging

Its the user's model, not the paging model
Use scrolling for "owned" data
Watch out for dual scroll bar issue

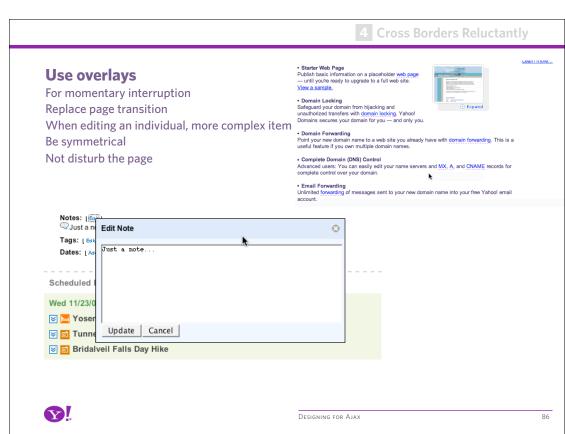
Plan for linking, crawling and back button

Not everything is a single page application What will the user think the back button does?



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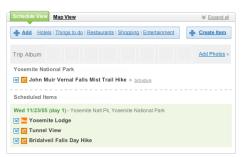
Use overlays

For momentary interruption Replace page transition When editing an individual, more complex item Be symmetrical Not disturb the page

> Wired News: Top Stories Christians Code Heavenly Games Cloning the Best in Show Brain Workouts May Tone Memory Movies Showtimes for 76208 » Must Love Dogs 1hr 30min - Rated PG-13

Use in-context expands

For editing part of a collection Need to see surrounding context For managing content modules





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Use overlays

For momentary interruption Replace page transition When editing an individual, more complex item Be symmetrical Not disturb the page



Slide, zoom, flip, lens, fade Think of your backstage

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Cross Borders Reluctantly

Use in-context expands

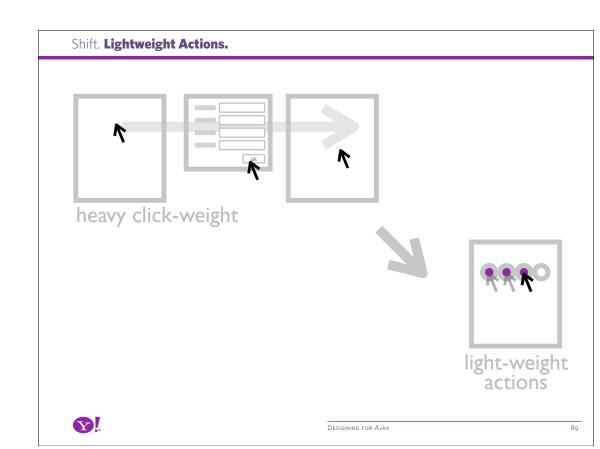
Need to see surrounding context

For managing content modules

For editing part of a collection

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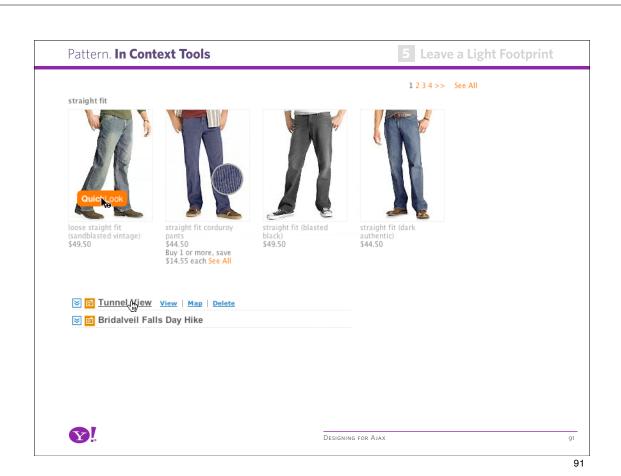


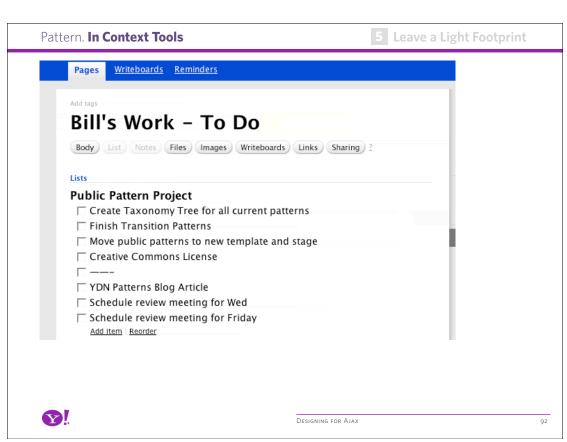
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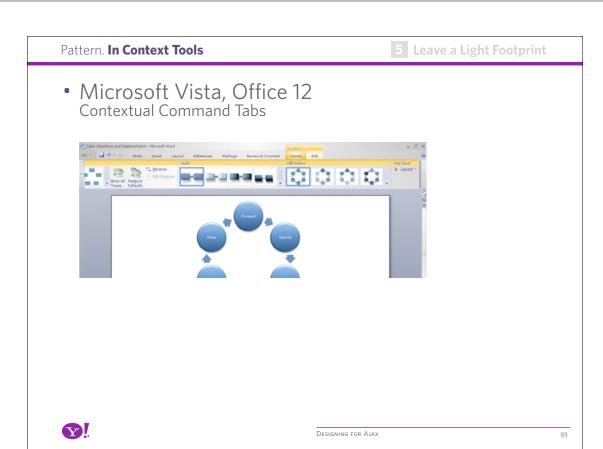
5 Leave a light footprint

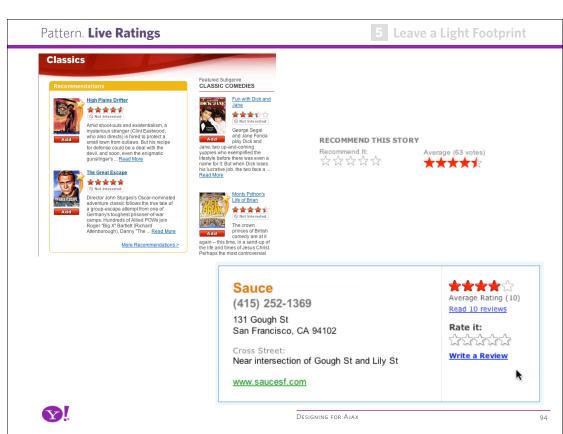
Y.

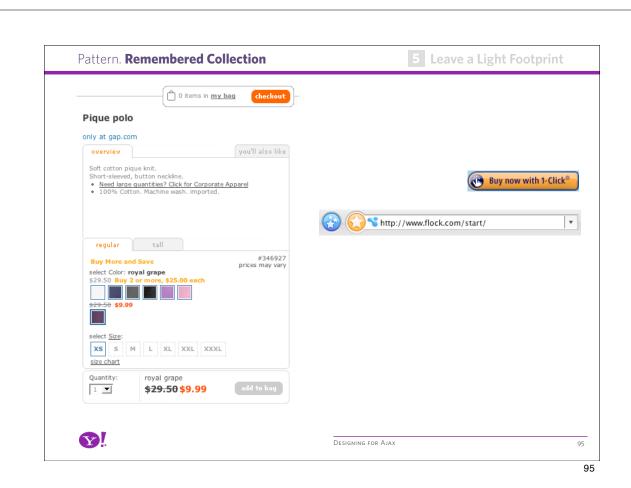
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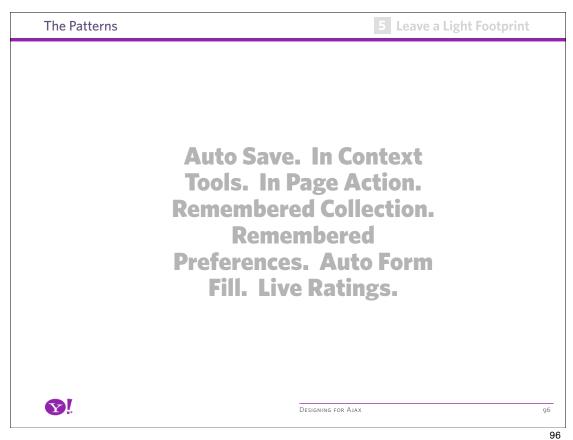














Watch your click weight

Keep actions immediate and light Count "clicks"



diggs Fixing

Fixing the Mighty Mouse

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.

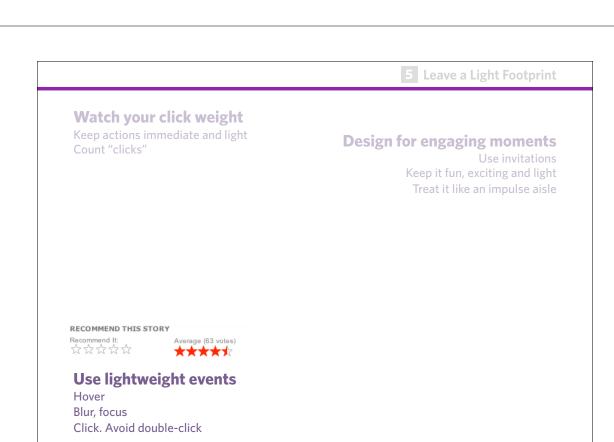
(apple | 60 comments | blog this | email this | category: apple |

Y.

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Y

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Shift. Multiple Happenings.

page-based transitions

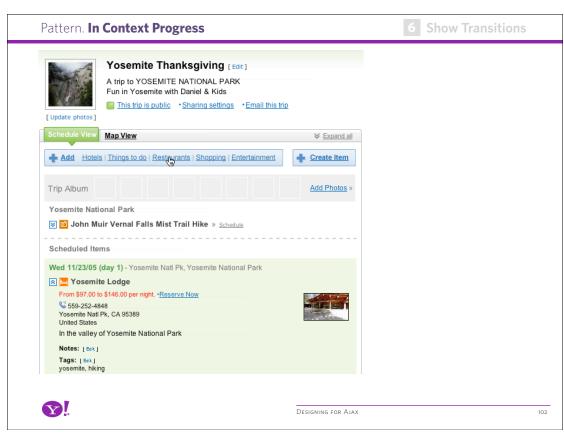


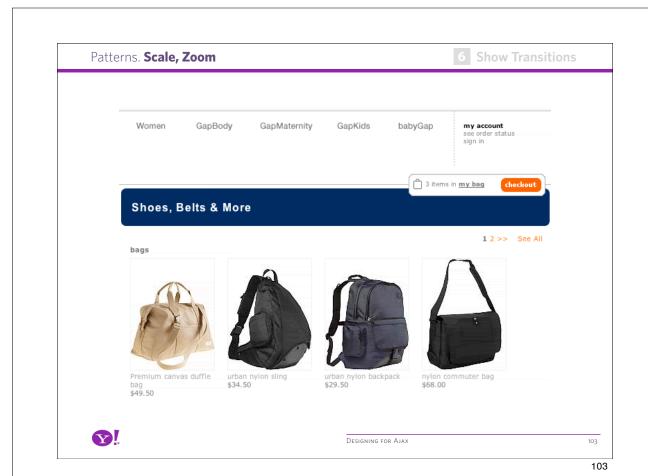
100

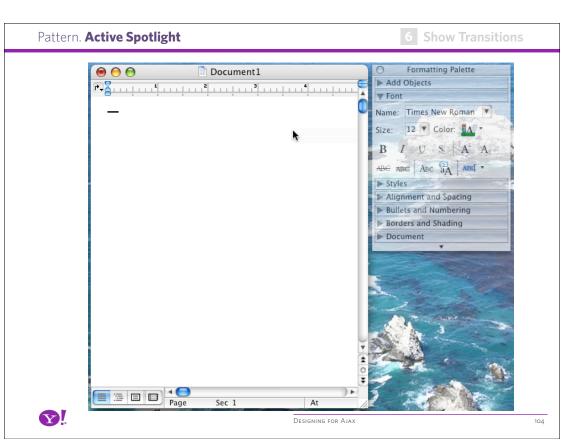
Show transitions

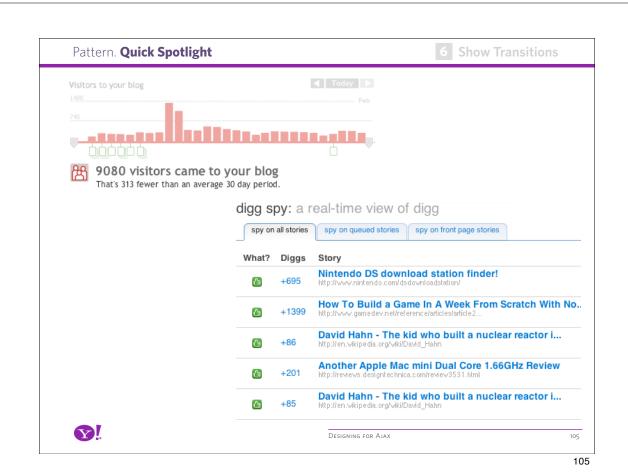


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Pattern. Fade, Self-Heal, Slide, Collapse, Expand **Show Transitions** Fantasy Games Archive Privacy Settings All Sports Baseball Basketball Football Auto Ra Remove this item And this one too All Fantasy Games tadding a new item You have not played any Fantasy Games Add item or I'm done adding items Search: Yahoo! Sports 🔻 for Copyright © 2006 Yahoo! Inc. All rights reserved. Privacy Policy - Terms of Service - Copyright/IP Po Starter Web Page
Publish basic information on a placeholder web page
— until you're ready to upgrade to a full web site.

View a sample. Domain Locking
 Safeguard your domain from hijacking and
 unauthorized transfers with domain locking. Yahoo!
 Domains secures your domain for you — and only you. Domain Forwarding
Point your new domain name to a web site you already have with domain forwarding. This is a useful feature if you own multiple domain names. Complete Domain (DNS) Control Advanced users: You can easily edit your name servers and MX, A, and CNAME records for complete control over your domain. Email Forwarding
Unlimited forwarding of messages sent to your new domain name into your free Yahoo! email account. Y DESIGNING FOR AJAX 106

Transitions

- **6** Show Transitions
- Brighten. Raise importance
- Cross Fade. One leaves, another enters
- Dim. Lower importance
- Expand. Open in context of others
- Fade In. Good for adds
- Fade Out. Good for deletes
- Flip. Edit configuration
- Animate. Change relationship, tweening
- Self-Healing. After delete or "yank"
- Collapse. Close in context of others
- Slide. Similar to expand but child window



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The Patterns

6

Show Transitions

Transition. Brighten Transition.
Cross Fade Transition. Dim
Transition. Expand Transition.
Fade In Transition. Fade Out
Transition. Flip Transition.
Animate Transition. SelfHealing Transition. Collapse
Transition. Slide Transition.



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6 Show Transitions

Speak to the BRAIN

Understanding attention processing Sending the wrong message

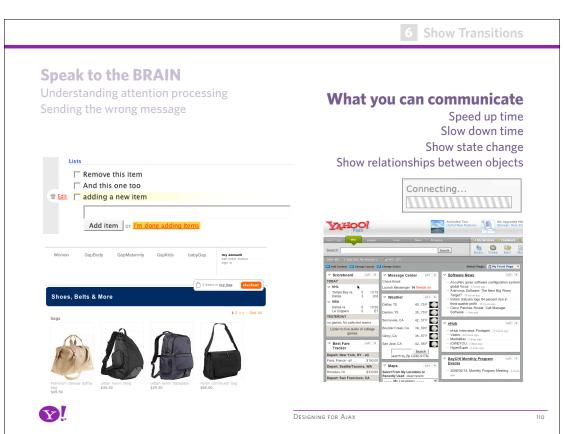




Y!

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Speak to the BRAIN

Understanding attention processing Sending the wrong message

What you can communicate

Speed up time Slow down time Show state change Show relationships between objects





Keep it sane

"Cut in half" rule of thumb Use a "contrast knob" approach Don't overuse



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Simple observations

Show Transitions

- The more rapid the change the more important the event.
- Rapid movement is seen as more important than rapid color change.
- Movement toward the user is seen as more important than movement away from the user.
- Very slow change can be processed without disrupting the user's attention.
- Animation can be used to communicate where an object was and now is



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Think in objects

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The shift to objects



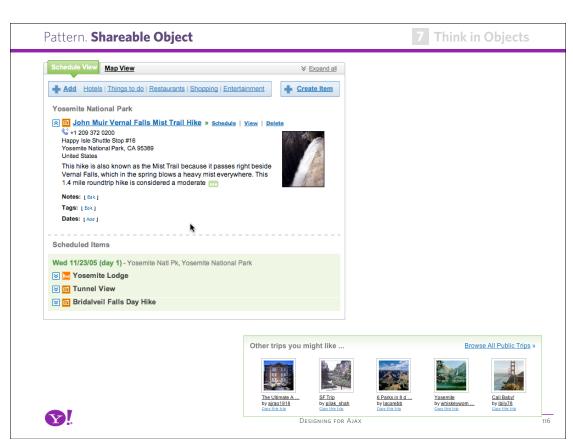
7 Think in Objects

| | Page-Based Web | Rich Internet App |
|-----------------------|----------------|------------------------------------|
| Richer Model | Document | Rich Internet Object |
| Longer Lifecycle | Transient | Permanent |
| Community/ Sharing | Bookmark | Content, properties, and behaviors |



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The Patterns

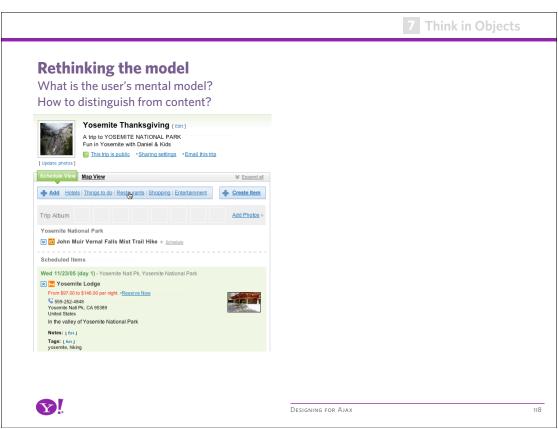
Think in Objects

Rich Internet Object. Available. Selected. Identifiable Object.



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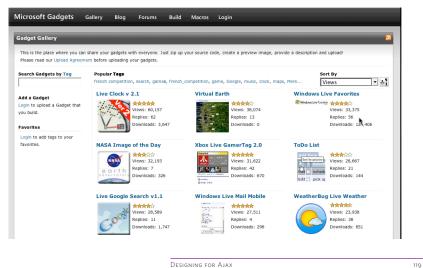


Rethinking the model

What is the user's mental model? How to distinguish from content?

The power of sharing

Bloggable, shareable, findable How to dial-in community Collections





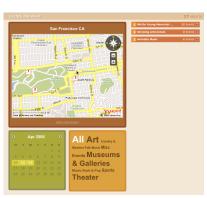
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Rethinking the model

What is the user's mental model? How to distinguish from content?



Web 2.0 as a platform

Rich objects fit the SOA model Creates a good separation of concerns Mashups



The power of sharing

Bloggable, shareable, findable How to dial-in community



See your friends on a mobile map. Anywhere. Outside or inside

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Y! DESIGNING FOR AJAX 122





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Have You Seen a Cool Example?

- Tag It!
 - Use 'ypatternexample' tag in either delicious or Yahoo! My Web2
 - Use additional tags to identify the pattern name you think it belongs to
 - Write a comment about what is interesting about the example or how to see the interaction



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