

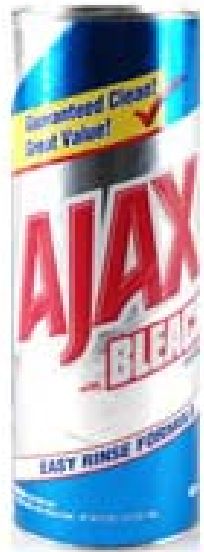


neoinsight

Customer Experience Specialists

# Ajax and usability CapCHI presentation

19<sup>th</sup> October 2006



or  
???





# Whistle-stop tour

- What is AJAX?
- Different areas of implications for usability
  - DIY widgets
    - Drag'n'drop
    - Sliders
  - Browser functionality
    - Restoring browser functionality
  - Back to the Future – application usability
    - Goals, tasks, standards, conventions – calendar example



## What is Ajax?

# Asynchronous JavaScript And XML

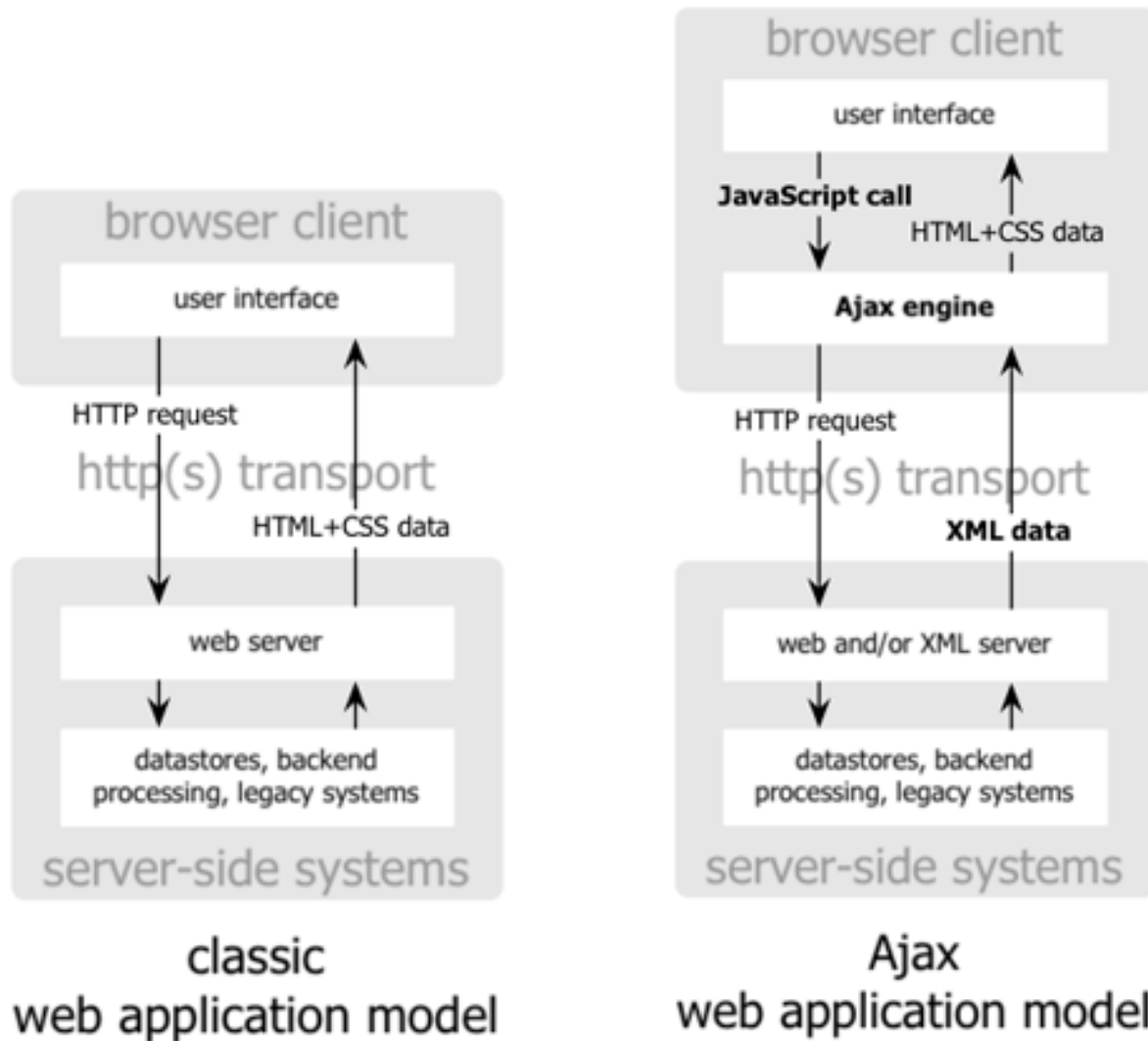
- Ajax isn't a technology. It's also not new.
- Ajax refers to the way developers bring together some existing technologies to create user interaction that differs from the traditional Web hypertext / link model
- Strict definition is using XMLHttpRequest (XHR) to retrieve XML within a web page

# Google Finance

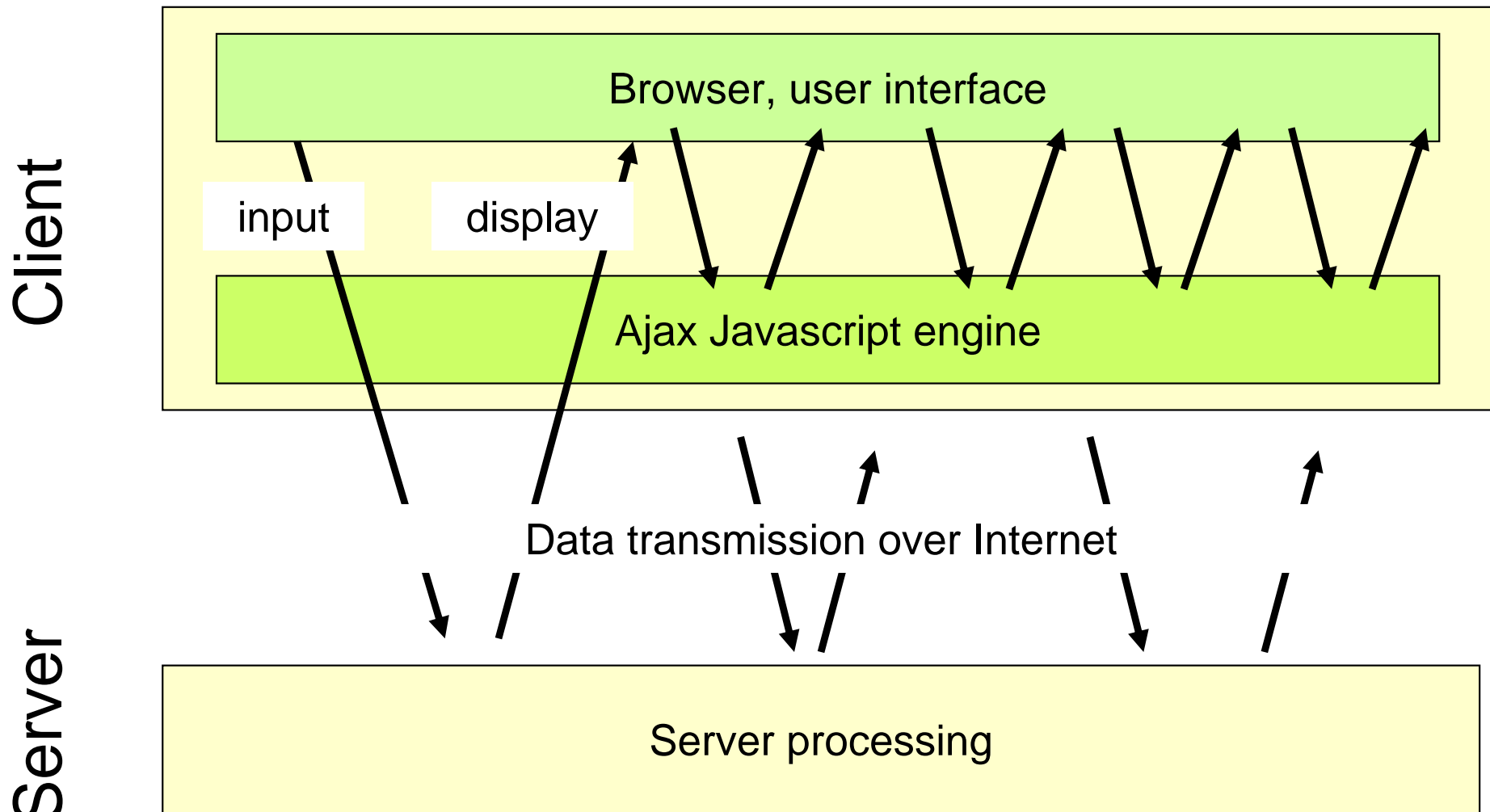


- Pan by dragging
- Select time-span with sliders
  - Main image doesn't update in real time
- Updates 'events' flags and list in real time, depending on time-span and scale
- Highlights 'spot' prices for finer detail
- Y axis scale varies with range of values

# Traditional Web and AJAX architectures



# Ajax asynchronous communication



[Jakob Nielsen's Alertbox](#) for December 2005:

## Why Ajax Sucks (Most of the Time)

Judging from the email I receive, the most controversial statement I have made in my Alertbox columns so far was to make "the use of Ajax" one of the mistakes in my list of [top ten mistakes in Web design](#).

For new or inexperienced Web designers, I stand by my original recommendation. **Ajax: Just Say No.**



With respect to the use of ajax by highly skilled Web designers, I have changed my opinion somewhat: people who *really* know what they are doing can sometimes use ajax to good effect, though even experienced designers are advised to use ajax as sparingly as possible.

### Fundamental Problems with ajax

Part of the genius of Tim Berners-Lee's original design of the Web was a total unification of several concepts in a single idea, **the page**:

- the user's view of the information on the screen
- the unit of navigation (what you get when you click a link or activate a navigation action like a bookmark)
- a textual address used to retrieve information over the net (the URL)
- the storage of the information on the server and the author's editing unit (except if using embedded objects like image files which do require the author to manage multiple files for a page)

The fundamental design of the Web is based on having the page as the atomic unit of information, and the notion of the page permeates all aspects of the Web. The simplicity of the original Web contributed to its ease of use and its rapid uptake.

Ajax breaks the unified model of the Web and introduce a new way of looking at data that has [not been well integrated](#) into the other aspects of the Web. With ajax, the user's view of information on the screen is now determined by a *sequence* of navigation actions rather than a *single* navigation action.

Navigation does not work with ajax since the unit of navigation is different from the unit of view. If users create a bookmark in their browser they may not get the same view back when they follow the bookmark at a later date since the bookmark doesn't include a representation of the state of the content on the page.

Even worse, URLs stop working: the addressing information shown at the top of the browser no longer constitutes a complete specification of the information shown in the window. If an author copies the URL in order to include it as a hypertext anchor in one of his or her own pages then that anchor will not lead readers to

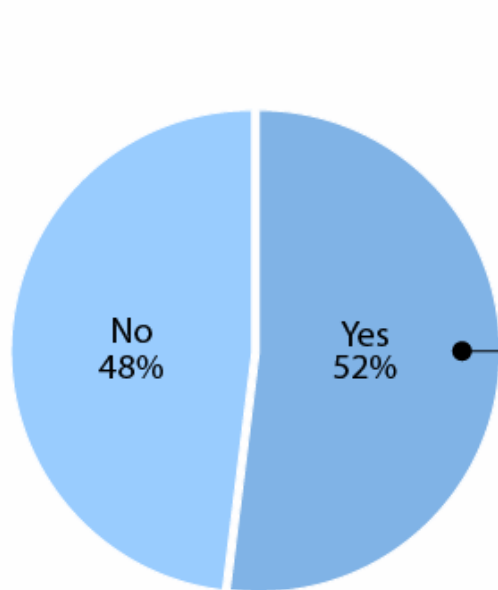
# HTML vs AJAX

can

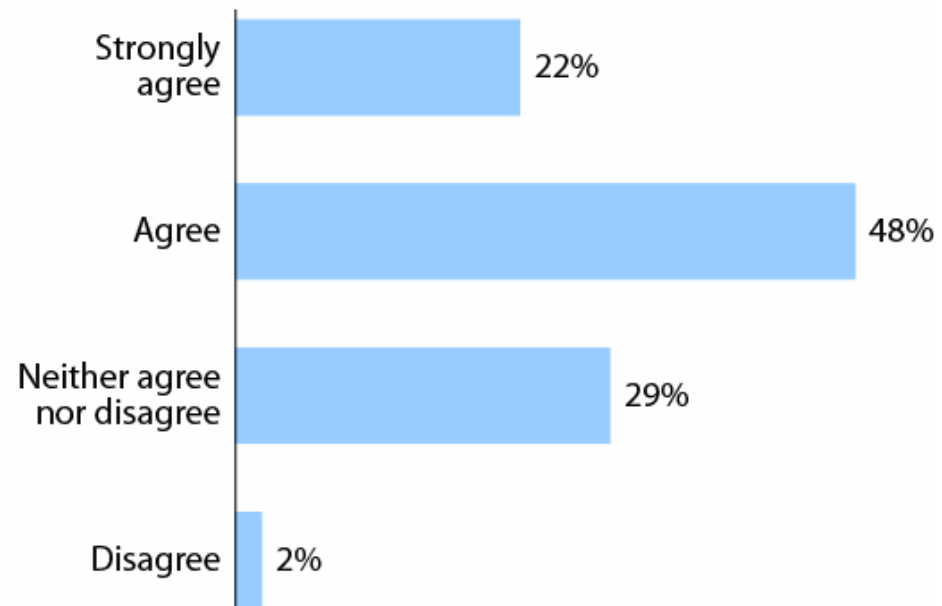
User experience principle	HTML experience	How RIAs improve user experience
Control	Users are limited to a linear process when they use site functionality like shopping carts.	Users move back and forth between steps in a process, quickly and easily.
Direct manipulation	Click and wait for a new page to download.	Users drag and drop data freely around the screen.
Forgiveness	To undo or modify actions — like changing data in multipage forms — users must back up, and may lose data when pages refresh.	Users can undo actions or change data input without long waits or the risk of lost data.
Feedback	Users have to wait for page refreshes to find out whether the site did what they wanted it to do.	System response to user inputs and changes is immediately visible.
Error handling	Field validation often requires a server call. Error message windows can appear disconnected from areas on a page that require attention.	Form fields are validated in real time as users fill them in — problem areas get highlighted before the form is submitted.
Efficient task flow	Processes are broken up into separate pages with server calls in between.	Whole processes contained on a single “page” flow smoothly from end to end.

# Awareness of Rich Internet Applications

**“Have you ever used highly interactive Web features like Google Maps or Zillow.com?”**



**“Highly interactive applications like Google Maps and Zillow.com greatly enhance my Web experience.”**



Base: Consumers who go online once a month or more  
(percentages may not total 100 because of rounding)

Source: Forrester's North American Consumer Technology Adoption Study Q2 2006  
Automotive, Customer Experience, And Government Online Survey

FORRESTER

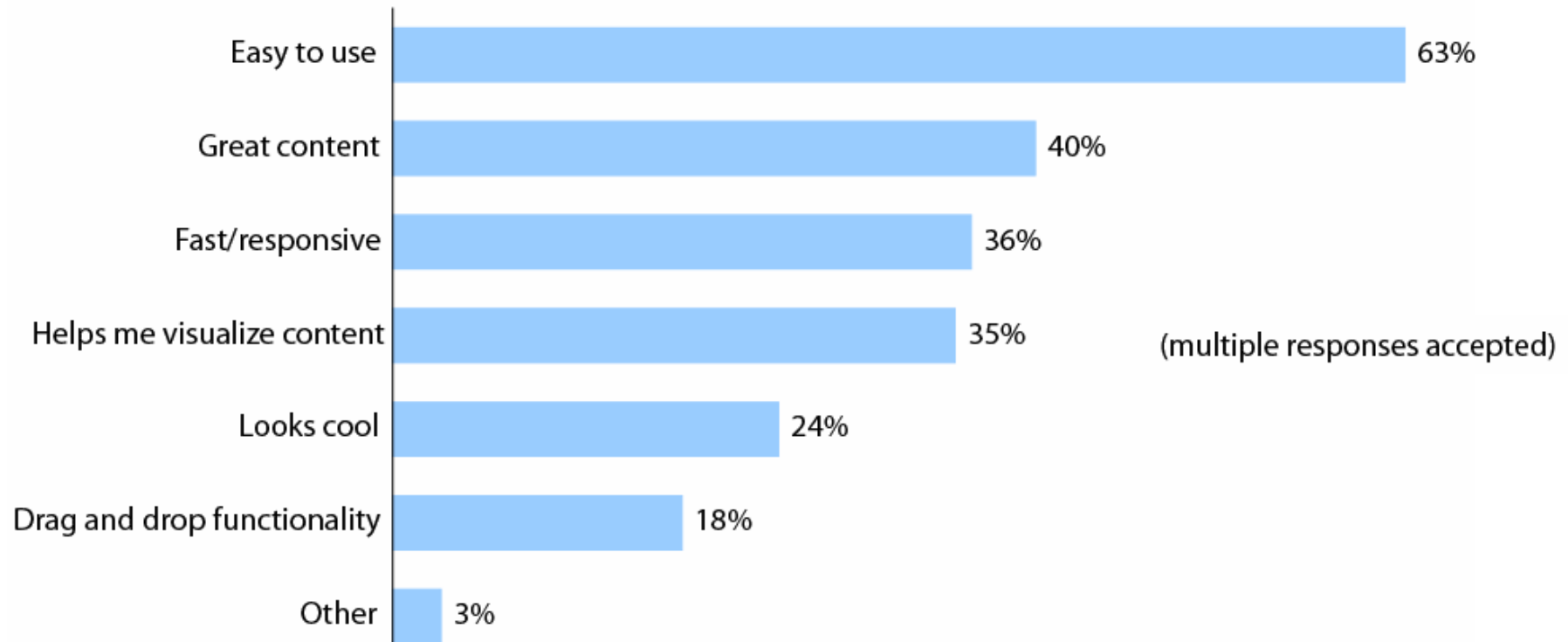
September 2006, Best Practices **“Rich Internet Applications: Why And How”**

neo insight

Customer Experience Specialists

# Highly interactive AND easy to use

“Please indicate from the following what you like most about highly interactive features like Google Maps and Zillow.com.”



Base: Consumers who go online once a month or more  
(percentages may not total 100 because of rounding)

Source: Forrester's North American Consumer Technology Adoption Study Q2 2006  
Automotive, Customer Experience, And Government Online Survey



“Ajax is about usability...”

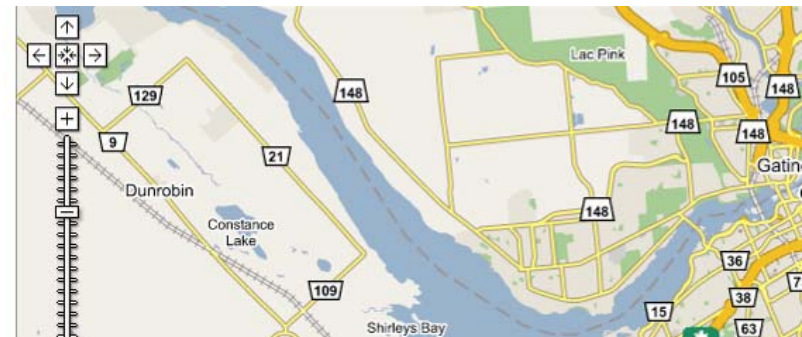
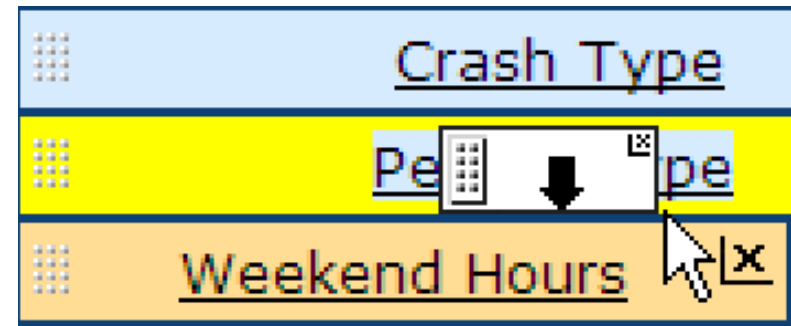
Andre Charland

“Ajax is also a dangerous technology for web developers. Its power introduces a huge amount of UI problems as well as server side state problems and server load problems.”

Alex Bosworth

# Usability impacts of AJAX components

1. User interface widgets
2. Browser functionality
3. Accessibility
4. Performance
5. Goals, tasks... culture

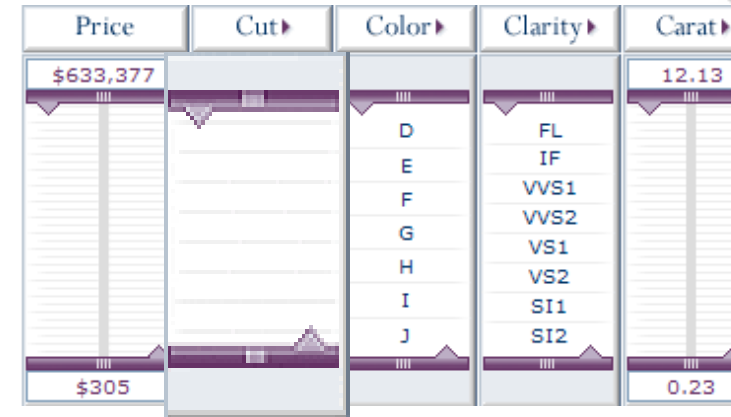


Tip: You can drag the chart.

Disclaimer

# With (AJAX) widgets, a user needs to...

- Anticipate...
  - ...what the widget will do
- Appreciate...
  - ... how to interact with it
- Monitor...
  - ...any changes during use (e.g. slider value updating)
- Evaluate...
  - ... what has changed after its use



The image shows a diamond selection interface with five interactive sliders. Each slider has a range of options and a current value. The Price slider ranges from \$305 to \$633,377. The Cut slider ranges from D to J. The Color slider ranges from FL to SI2. The Clarity slider ranges from VVS1 to SI2. The Carat slider ranges from 0.23 to 12.13. The sliders are currently set to the following values: Price: \$633,377, Cut: D, Color: FL, Clarity: VVS1, Carat: 12.13.

Price	Cut	Color	Clarity	Carat
\$633,377	D	FL	VVS1	12.13
\$305	E	IF	VVS2	
	F	VVS1	VS1	
	G	VS2	SI1	
	H	SI2		
	I			
	J			
				0.23



## Usability checklist for Ajax widgets

- Is it obvious which objects are "**live**" and which are not?
- Is the **purpose** of Ajax widgets self-evident before use?
- Is it self-evident **how to use** an Ajax widget before use?
- Is **feedback** provided during use (e.g. legal drag and drop areas)?
- Can Ajax widget actions be "**undone**"?
- Do any Ajax widgets employ relevant **conventions**?
- Do Ajax widgets show as **unavailable** (e.g. greyed out) when appropriate?
- Does drag and drop functionality include **auto-scroll**?

# Drag and drop with state information

## Type of Crash and Time for Young Drivers

Date: 2002

Measures: Number of Incidents

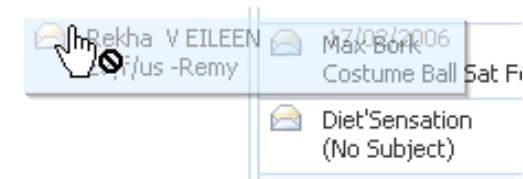
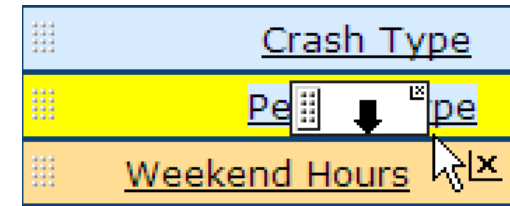
Rows 1-6 of 6 Columns 1-4 of 4

Indicators show whether the new location will appear above...

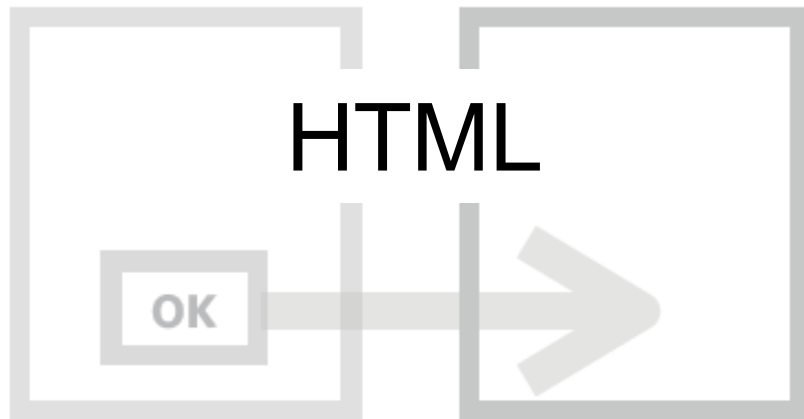
		Person type		Female	
		Driver	Driver	Fatal	Injury
Weekend Hours	Age	↑ ↓	↑ ↓	↑ ↓	↑ ↓
Weekend: 6pm Fri - 6am Mon	<18	1	38	1	44
	18-19		30		28
	20-24		51		31
Weekday	<18	2	85	1	88
	18-19	2	78	1	53
	20-24	6	98	1	65

# Drag and drop usability checklist

- How do you know you can drag and drop something?
- How do you know *what* can be dragged and dropped?
- Do you know – in advance – where something can be dragged and dropped?
- Can you tell as you drag an object whether you can drop an object here?
- Is it easy to understand the *meaning* of dragging and dropping objects to a location?
- Does dragging an object cause unexpected and problematic changes?
- Does dropping an object cause unexpected and problematic changes?
- Are there accessible ways of carrying out the same task?



# Designing details: “Interesting moments”

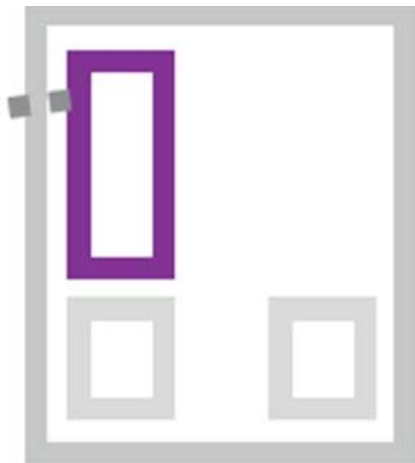


page level events



microstates, interesting moments

AJAX



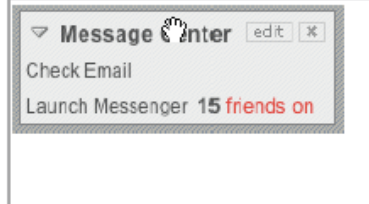
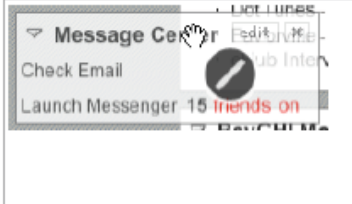
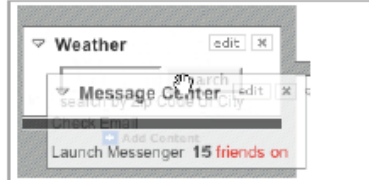
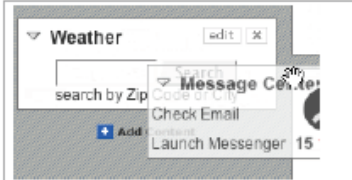




# Interesting moments for drag and drop

- Page load
- Mouse hover over drag-able object
- Mouse down on drag-able object
- Drag initiated (mouse down, mouse moves  $\geq 3$  pixels)
- Drag over valid target area(s)
- Drag over invalid target area
- Drag over original location
- Drop accepted
- Drop rejected
- Drop on original location

# Specifying “drag and drop” details

Drag Over Valid Target	Drag Over Invalid Target
 <p>CSS Move cursor</p>	 <p>CSS Move cursor</p>
 <p>Message Center</p> <p>Check Email</p> <p>Launch Messenger 15 friends on</p>	 <p>Message Center</p> <p>Check Email</p> <p>Launch Messenger 15 friends on</p>
Reduced Opacity	Reduced Opacity & Invalid Badge
 <p>Weather</p> <p>Message Center</p> <p>Check Email</p> <p>Launch Messenger 15 friends on</p>	 <p>Weather</p> <p>Message Center</p> <p>Check Email</p> <p>Launch Messenger 15</p>
Insertion bar showing where it will drop	No insertion bar, just a gap

Name of each state

Applicable CSS

Changes to state of active object

Changes to state of other objects



# Browser functionality checklist

- Do the “Back” and “Forward” buttons work as expected, allowing end users to navigate through the history of steps?
- Can users create bookmarks?
- Can users send “deep links” to friends and colleagues by e-mail?
- Does the “Refresh” button work – does it refresh the current state rather than re-initialize the application?
- Can users search text using “find”?

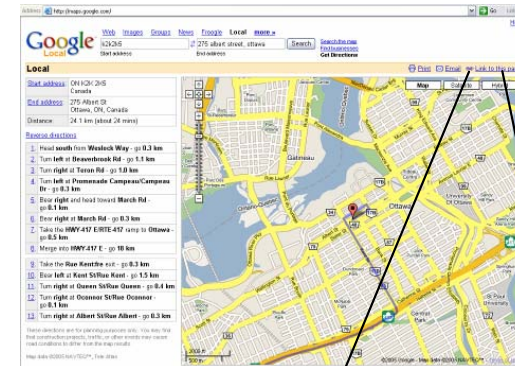
# Restoring some browser functionality


## ➤ Create history

- Save meaningful state
- Generate a corresponding URI
- Push the URI onto the browser stack

## ➤ Restore history

- Detect URI change
- Recreate the state from a URI



Address  <http://maps.google.com/maps?f=d&hl=en&saddr=k2k2k5&daddr=275+albert+street,+ottawa&ll=45.419178,-75.701294&spn=0.036208,0.061197>

<http://www.ajaxify.com/run/sum/uniqueURL/pollURL/>



**The Amazon.com Collection**  
[Why Buy Jewelry & Watches at Amazon?](#)

**Learning Center**  
[Learn About Precious Metals](#)  
[Learn About Diamonds](#)  
[Learn About Certification and Grading Reports](#)

**More to Explore**  
[Preset Engagement Rings](#)  
[Wedding Bands](#)  
[Anniversary Bands](#)

**Amazon.com Diamond Search**

Select one or more diamond shapes. You can adjust the left and right sliders to narrow your search by price range, carat weight, cut, color, and clarity. Click the **See results** button at any time to see the diamonds that match your search criteria.

[Hide instructions](#)

If you encounter problems with this page, try our [basic diamond search](#)

**Shape**  
 Round  Princess  Marquise  Emerald  Radiant  Pear  Oval  Heart  
[Learn](#)

**Price**  
 \$400 - \$14,000  
[Learn](#)

**Carat**  
 1.5 ct. - 4.5 ct.  
[Learn](#)

**Cut**  
 Ideal - Very Good - Good - Fair  
[Learn](#)

**Color**  
 D - E - F - G - H - I - J  
 Colorless - Near Colorless  
[Close](#)

**410**  
diamonds match your criteria

[See results](#)

Diamonds with an absence of body color most purely reflect the full color spectrum and are therefore the most valuable. Most diamonds come in a wide range of colors and are graded on a letter scale from D ( colorless ), the highest grade, through Z ( usually a light yellow, brown, or gray ). It is difficult for the untrained eye to see variations in color grades D through J unless stones are being



## AJAX “plus” Web 2.0

- AJAX integrated with other “Web 2.0” ideas and technologies...
- Patterns - One-page application
- Merge of browse and search
- Browsing becomes query-behind-the-scenes
- Look-ahead – making the search space tractable
- Overview, zoom-and-filter, show me the details (Schneidermantra)

# Search-and-browse

The screenshot displays the Future Shop website's search results page. At the top, there is a red navigation bar with the Future Shop logo and several promotional icons: Weekly Flyer, Store Locator, Ask an Expert, Clearance Outlet, and Mail-in Rebate. Below the navigation bar, there are links for Login, My Orders, Account, Create New Account, and Français. The main content area is titled 'Search Results' and shows that a search for 'printer' in the 'Computers' department yielded 27 results. The results are organized into two columns: 'Results by category' on the left and 'Products Found' on the right. The 'Results by category' column lists 'Computers (27)' with sub-categories: Printers & Fax Machines (27), Colour Inkjet Printers (3), Laser Printers (8), Photo Printers (6), and Multifunctions (10). The 'Products Found' column lists four printer models: Brother RHL2070N Laser Printer (Refurbished, \$129.95), HP LaserJet Printer (1018, \$89.95), Canon Laser All-In-1 Multifunction Printer (MF5750, \$299.99), and Konica Minolta PagePro Laser Printer and Corel WordPerfect Office X3 package (\$259.98). Each product listing includes a small image, a brief description, the price, and a 'More Info' link. The search filters on the left include 'Select a department' (Computers), 'Category' (COMPUTERS), 'Keyword(s)' (printer), 'Manufacturer', 'Minimum Price', 'Maximum Price', and 'WebID'. A 'SUBMIT' button is at the bottom of the filters.

**FUTURE SHOP**

WEEKLY FLYER STORE LOCATOR ASK AN EXPERT CLEARANCE OUTLET MAIL-IN REBATE

» LOGIN » MY ORDERS » ACCOUNT » CREATE NEW ACCOUNT » FRANÇAIS

Shop by department Brand Showcase VIEW CART ITEMS: 0 SUBTOTAL: \$0.00

### Search Results

Your search for **printer** in **Computers** generated a **total of 27 results**. You can find more info and narrow down your search results below using the **Results by Category** tool.

If the search results do not contain the information you need, try [Advanced Search](#) or consult our search [help section](#).

#### Results by category

**Computers (27)**

- Printers & Fax Machines (27)
  - Colour Inkjet Printers (3)
  - Laser Printers (8)
  - Photo Printers (6)
  - Multifunctions (10)

#### Advanced Search

Select a department:  
Computers

Category :  
COMPUTERS

Keyword(s) :  
printer

Manufacturer :

Minimum Price :

Maximum Price :

WebID :

SUBMIT »

#### Products Found

**1**

**Brother RHL2070N Laser Printer - Refurbished - Web Only**

The RHL-2070N Refurb is a fast, compact and affordable network ready monochrome laser printer.... [More Info](#)

**Price:** \$129.95

[View similar products](#) [View similar products with same brand](#)

**HP LaserJet Printer (1018)**

Smoothly print documents containing text, images, and graphics with the 234MHz processor and 2MB... [More Info](#)

**Price:** \$89.95

You save: \$60.00 after instant savings

[View similar products](#) [View similar products with same brand](#)

**Canon Laser All-In-1 Multifunction Printer (MF5750)**

Print, copy, fax and scan with the Canon ImageClass MF5750 laser multifunction printer. Benefit... [More Info](#)

**Price:** \$299.99

[View similar products](#) [View similar products with same brand](#)

**Konica Minolta PagePro Laser Printer and Corel WordPerfect Office X3 package**

This package includes the Konica Minolta PagePro Laser Printer (1400W) and the Corel WordPerfect... [More Info](#)

**Price:** \$259.98

You save: \$40.00 after mail-in rebate

[View similar products](#) [View similar products with same brand](#)

# AJAX calendar example

Welcome matyeo, logout | my settings | my profile | import | export | feedback | help OFF | sidebars ON

Quick Create 3/12 12p to 1p Lunch SHOWHELP

kiko

NEW APPOINTMENT

Labels ADD LABEL

Show All Appointments

Unlabelled

Work

Work

RENAME DELETE CANCEL

Home

Home

RENAME DELETE CANCEL

Feeds MANAGE FEEDS

NEW CONTACT

Contacts ADD GROUP

Chez

Chez

RENAME DELETE CANCEL

© 2006 Kiko Software  
[FAQ](#) | [Blog](#) | [Privacy Policy](#)

Calendar | Sharing

Month | Week | Day | Upcoming

October 2006

Wk	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	Oct 1	2	3	4	5	6	7
40							
8		9	10	11	12	13	14
41							
15		16	17	18	19	20	21
42			9a shopping	shopping	shopping 9a shopping	shopping	shopping
22		23	24	25	26	27	28
43							
29		30	31	1	Nov 2	3	4
44							
5		6	7	8	9	10	11
45							

October 2006

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	1	2	3	4
5	6	7	8	9	10	11

Today is Oct 16, 2006

**Value Any Home**

Address OR Street OR Neighborhood

City, State OR ZIP

optional

required

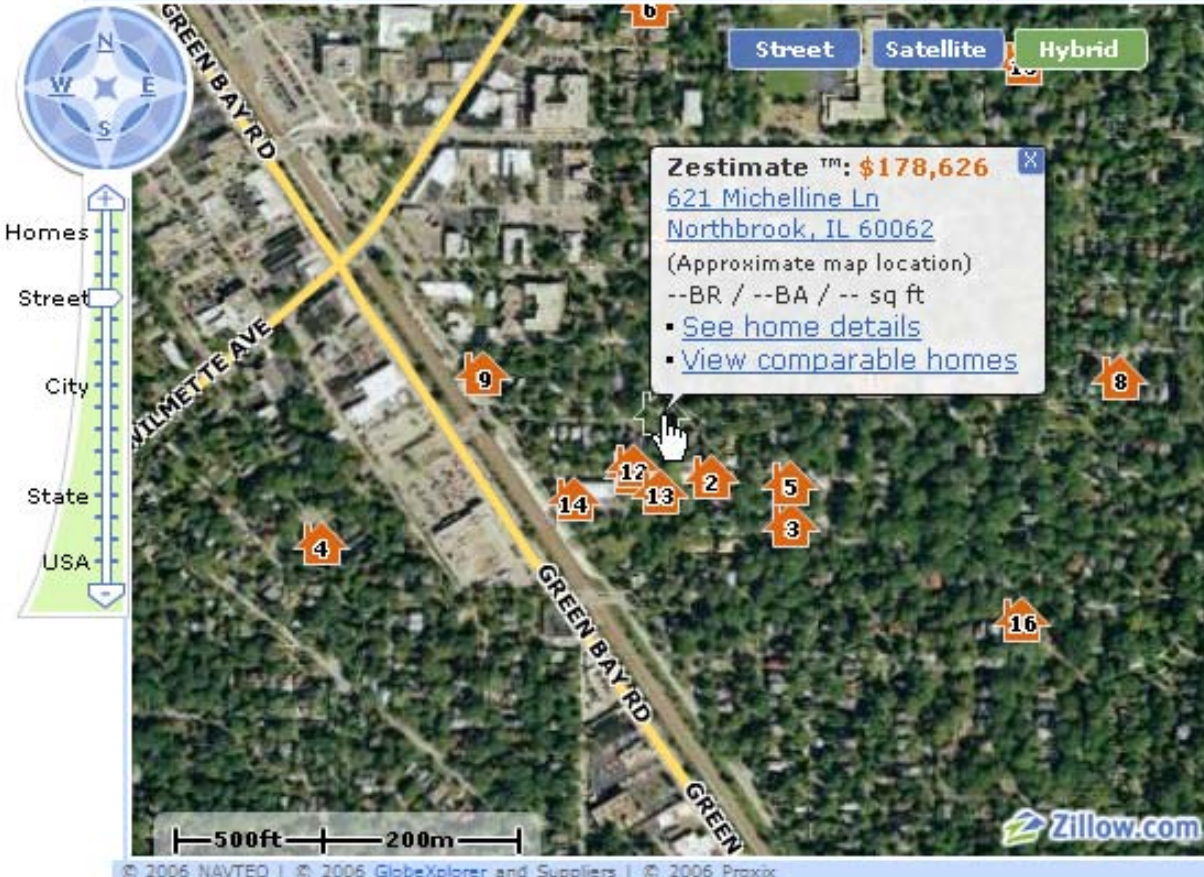
Neighborhood

City, State OR ZIP

Showing 19 matching homes in [mapped area]

Show all homes Show  Sort results Show heat map

Zestimate/sq ft: \$0 \$100 \$200 \$300 \$400 \$500 \$600 \$700



**NEED A LOAN?**

[See Zillow's new Financing section](#)

Ads by Google

**Canadian Mortgages**

Mortgage brokers, low rates. Apply Online  
[www.ProfessionalReferrals.ca](http://www.ProfessionalReferrals.ca)

**Refinance Second Mortgage**

The Money Management Directory. Find Refinance Second Mortgages Now  
[WealthyGeek.com](http://WealthyGeek.com)

**Top 10 Home Loans**

Finance or refinance a home today before interest rates rise again.  
[www-homeloan.net](http://www-homeloan.net)

**Get Your Info**

Mortgage Broker Home Loan Refinance from 14 Search Engines in 1.  
[www.info.com](http://www.info.com)

**Home Equity Loans**

Guide to Lenders' Offers Find Exactly What You Want Today  
[www.HomeEquity.in](http://www.HomeEquity.in)

Single family

Condo

Multi-family

Manufactured

Bedrooms: 4 Bathrooms: 4+

Current Zestimate™ (in \$)

From

Home size (in sq ft)

From

Lot size  sq ft  acre

From

Year built

From

Sold within: No date

**GO** Hide Advanced

More results on pan/zoom

#	Address	Home Type	BR	BA	Zestimate™	Home (sq ft)	Lot (sq ft)	Year Built	Date Sold
1	<a href="#">915 Linden Ave</a>	Single	--	4	\$1,298,584	2,580	19,000	1891	--
2	<a href="#">435 10th St</a>	Single	--	4.5	\$894,054	4,360	18,100	2002	08/05/2002
3	<a href="#">418 10th St</a>	Single	--	4.5	\$1,244,974	3,460	10,500	1999	--

**MAIL** | **CONTACTS**

Search

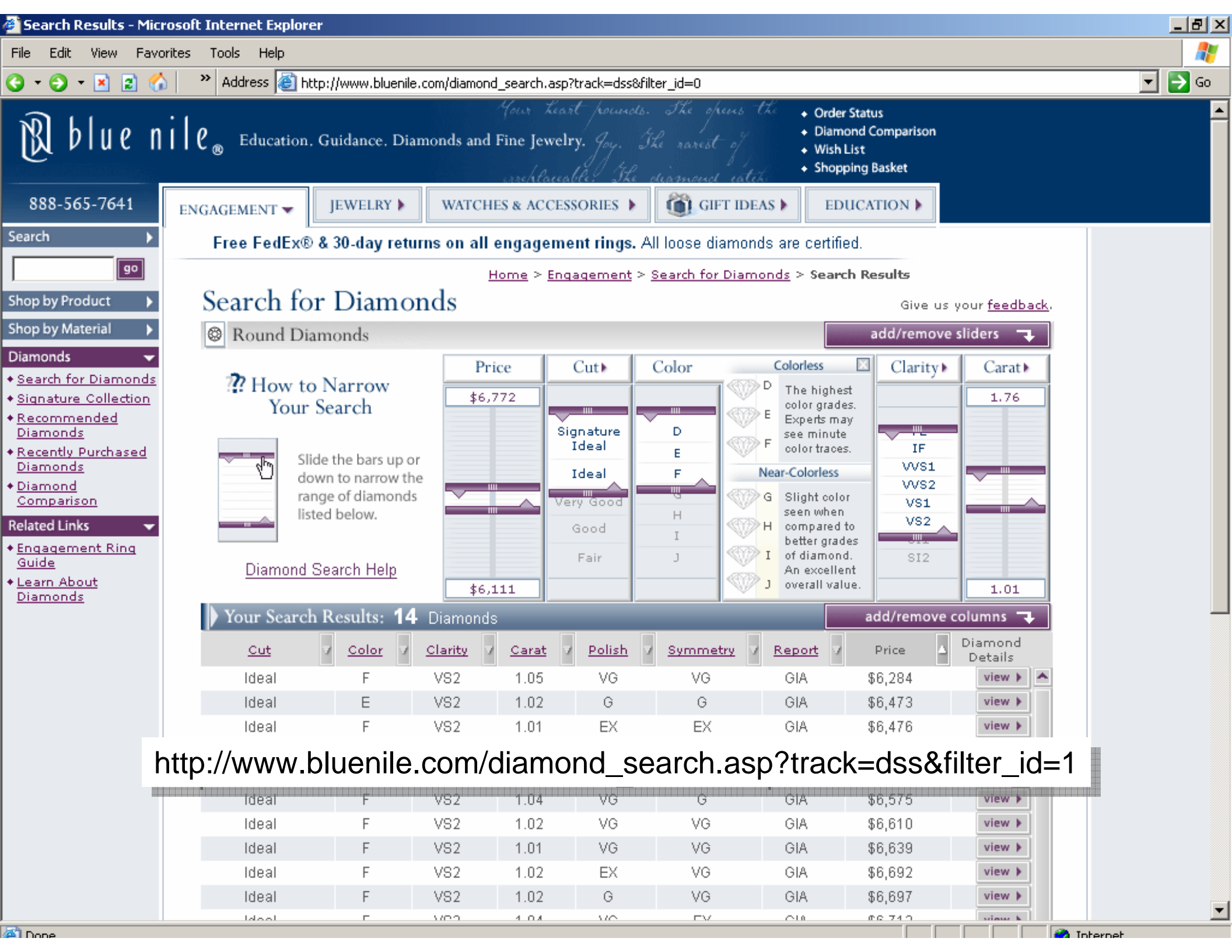
- INBOX (8)**
- Drafts
- Sent
- Junk (1)**
- Trash
- test fold

New Folder | Delete Folder

**INBOX** 8 unread of 10 messages

[Check Mail](#)
[New](#)
[Reply](#)
[Reply All](#)
[Forward](#)
[Print](#)
[Junk](#)
[Delete](#)

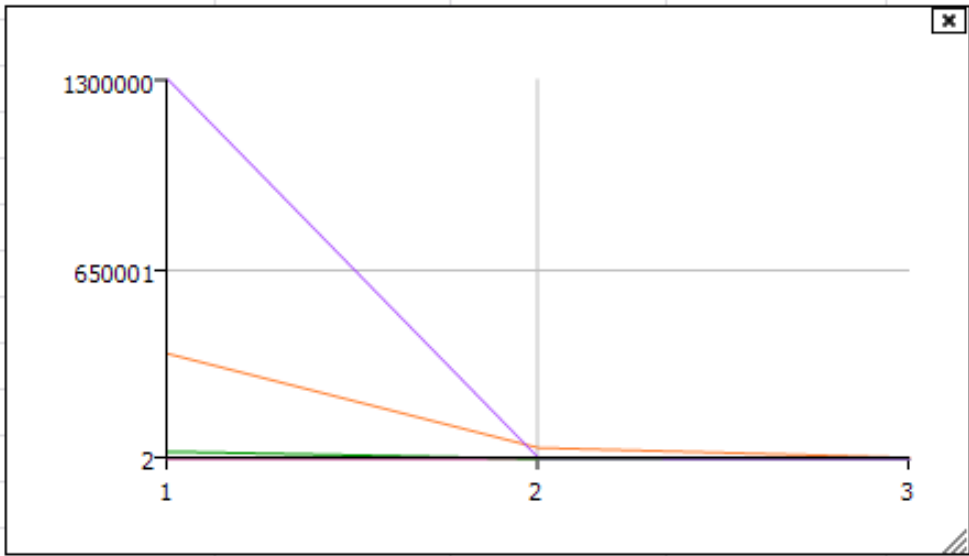
	From	Subject	Date	Size
	Rogowski, Ronald	FW: Heads-up I thought you'd appreciate	11:07 PM	0.8MB
	Rogowski, Ronald	FW: Ticketless Travel Passenger Itinerary	11:07 PM	10.3KB
	Rogowski, Ronald	FW: Web Site Globalization Conference	11:07 PM	26.1KB
	Rogowski, Ronald	FW: have you seen this?	11:06 PM	17KB
	Laszlo Team	Tell us what you think!	11:03 PM	0.7KB
	Antony Campitelli	Change your settings	11:03 PM	0.8KB
	Antony Campitelli	Integrated address book	11:03 PM	0.8KB
	Antony Campitelli	Responsive as desktop software	11:03 PM	1.1KB
	David Temkin	What is Digital Life Experience?	11:03 PM	1.5KB
	Kent Libbey	Web mail that Shines	11:03 PM	1.6KB




http://www.bluenile.com/diamond\_search.asp?track=dss&filter\_id=1

	<u>1995</u>	<u>2005</u>	<u>2015</u>
Bandwidth:	\$1100	\$128	\$12.80 megabit/month
Cage Space:	\$175	\$25	\$2.50 sqft/month
1-CPU Server:	\$25,000	\$1,000	\$100.00
4-CPU Server:	\$360,000	\$38,000	\$3,800.00
Disk Storage:	\$1,300,000	\$3,300	\$330.00 TB

(conservative 1/10 extrapolation)



Copy Spreadsheet

**Name:** [Mr Moore in the Datacenter](#) by  [steveven](#)

**Description:** datacenter prices: 1995, 2005, 2015

**Tags:** [comparison](#) [mooreslaw](#) [datacenter](#) [cpu](#) [storage](#) [cage-space](#) [Mix](#)

Average Rating

# Ajax open source and developer communities

**Feedback and dialogue**

- Learning is quick
- Issues raised and prioritized

**Reuse**

- Raises awareness and reuse of solutions

**Standards**

- By agreement and practice, rather than committee

**Caveat – the wiki problems, systemic issues, cultural issues**