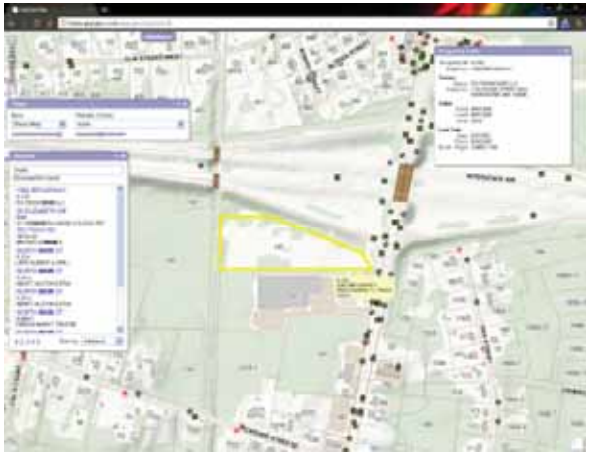


Best Practices and Options for Interactive Mapping on the Web:

Where we've been, where we're going

Steve Anderson

Senior Vice President

AppGeo

Overview

- **The web is constantly changing… let's take a look back**
  - Highlights of the last 20 years
  - What lead us to where we are?
  - Recent changes that are affecting what we do
- **Factors to consider today…**
  - Mobile Applications
  - Cloud Computing
  - Tiling vs dynamic

Starting things off…

A few questions for the audience to think about…

- What's your favorite web site and why?
- Is that the site you use the most…for work or play?
- Do you remember when it first came out?

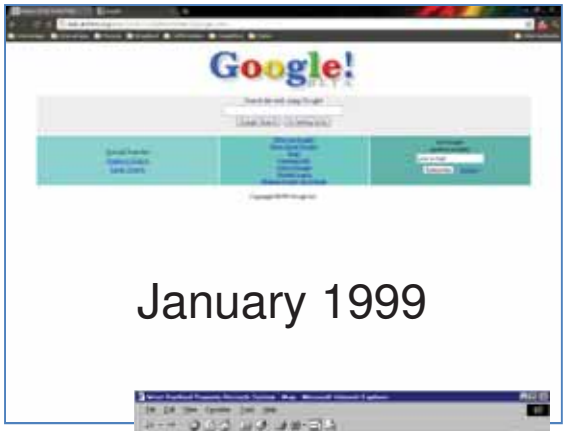
- Now let's take a look back…

When was the web created and by who?

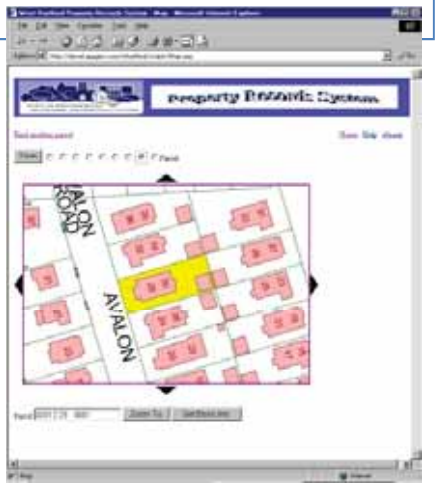
- Tim Berners-Lee
  - English engineer and computer scientist
  - Proposal in March 1989 for what would eventually become the WWW
- Berners-Lee and Robert Cailliau (Belgian computer scientist)
  - In 1990 to use "HyperText …to link and access information of various kinds as a web of nodes in which the user can browse at will“
- People often think Mosaic was the first web browser
  - But actually the most popular early browser was called ViolaWWW and predated Mosaic by 2 years.
  - Nexus was actually the first
- 1st public access was on August 6, 1991, just over 20 years ago
- First photo was uploaded onto the Web in 1992 by Lee

History: 1995 - 2001

- Web Highlights
  - Dot-com boom & bust (1995-2001)
  - Amazon launched end of 1998
  - Google BETA launched January 1999
  - 2001 marked the end of the “bubble”
  - Most Common Browsers
    - Internet Explorer 6.0 (91%)
    - Netscape 6.2 (5%)
    - Mozilla just enters the seen (1%)
- GIS Highlights
  - 1998 MO-IMS introduced by ESRI
    - Only worked on Windows platform
  - ArcView-IMS Retired
    - First “out-of-the box” web mapping software
  - June 2000 ArcIMS 3.0 Released
  - 2001 PostGIS was released
  - By end of this period web technologies are “maturing”
  - 2001 ArcGIS 8 released – personal GDB

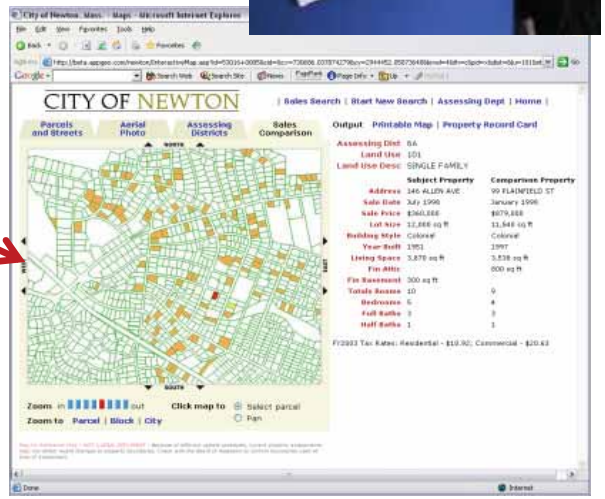


January 1999



History: 2002 - 2005

- Web Highlights
  - 2002 Web 2.0 first introduced ("Web as a platform", mashups, WebBlogs, RSS feeds)
  - 2002 Amazon Web Services Released
  - 2003 MySpace was launched
  - 2004 Facebook was launched
  - 2005 YouTube was launched
  - 2005 Zillow founded (first commercial apps with GIS?)
- GIS Highlights
  - ArcIMS 4.0 released April 2002
  - May 2004 ArcGIS 9.0 Released (includes ArcGIS Server)
  - Google Maps released February 2005
  - Keyhole becomes Google Earth June 2005
  - More customization of sites desired
    - Richer customization with .NET and SVG (Scalable Vector Graphics)
  - External hosting and data centers begin to gain popularity



History: 2006 - 2007

- Web Highlights
  - 2006 Twitter founded
  - January 2007 Apple introduces the iPhone
  - 92 million web sites exist
  - 2007: 1.1 billion people online
  - Spam now comprises 90% of emails sent
- GIS highlights
  - Wikimapia launched
  - Workflow orientation of web-sites
  - Configurable web sites
  - ArcGIS Server 9.2 released

History: 2008 - 2011

- Web Highlights
  - Flex 3.0 Released (Feb 2008)
  - Silverlight 2.0 Released
    - Advanced presentation of data on the web
    - Rich Internal Applications are born
  - Web Collaboration and business logic integration
- GIS Highlights
  - Flex, Java, Silverlight API support for ArcGIS Server
  - 2010 ArcGIS 10 released

Looking forward, bigger picture

What are some of the important issues to consider?

- Open Government – Gov 2.0
  - Reuse, unexpected use, or access control
- Standards versus standard practices
- Semantic web: machines to understand the meaning – or "semantics" – of information on the Web
  - Describe the data in the feed, don't standardize it
- Speed
  - How much longer will this be an issue?
  - Gigabyte connection, movie downloaded in 16 seconds
- Mobile
  - How many devices do you have?
  - iPod, iPad, Smartphone, laptop, tablet, etc

People want maps on their mobile devices

But how do you get them there?

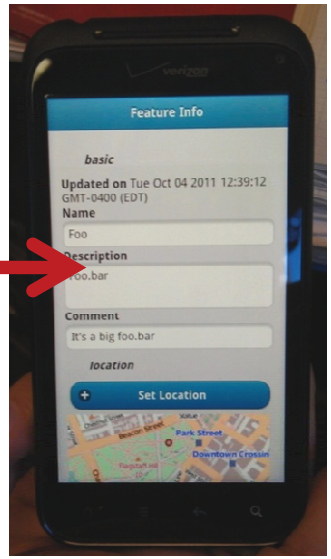
HTML5 vs. other immersive technologies

- Flash and Silverlight are waning
- Plug-ins are less desirable
  - Notably on mobile

Recent announcements on Flash/Silverlight

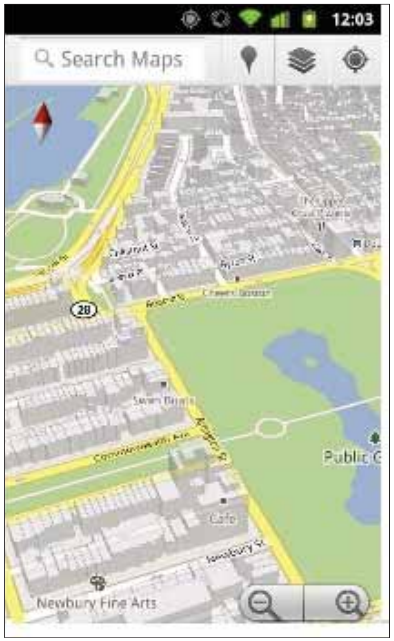
HTML5 allows for adaptive/responsive design

Can run in full browser mode on a PC, or on a phone



“Phone apps” vs “Phone web apps”

- **Pure phone**, e.g., “iPhone app”
  - Takes better advantage of phone hardware
    - Camera, GPS, accelerometer, etc.
  - But, requires standardization on a single phone
    - Or, building a different app for each phone

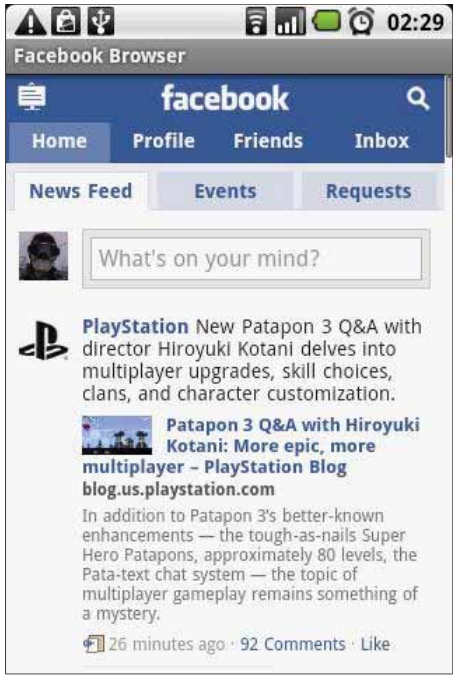


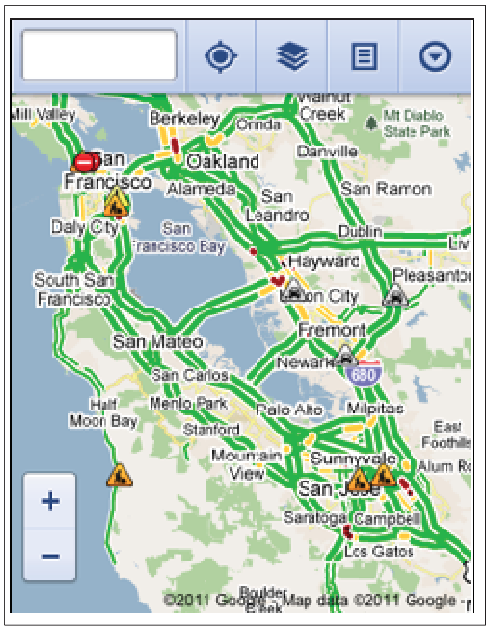
“Phone apps” vs “Phone *web* apps”

- **Phone-based web-app**
  - Relies on the phone’s browser app
  - Web pages, HTML5, JavaScript
    - Can be optimized for small screens
    - “Adaptive design”
  - Good access to GPS; camera not yet supported (but coming)
  - Examples of “minified web pages”

    http://Maps.google.com

    http://Touch.Facebook.com





How do you choose?

- Protect yourself with standards
- Try and choose the ubiquitous, long-lived ones
  - Others can come and go
  - Remember the Internet was founded using HTML
- Think carefully about the value of flashiness
  - Ex: **Flex, Silverlight**: robust and fancy but require plug-ins
  - Ex: **HTML5**: same rich content and functionality without plug-ins
- What is Google Maps built with?
  - HTML, JavaScript, Ajax

Impact of cloud-based hosting

- You don't need a data center to host web apps
  - Why buy, when you can rent?
  - Not just hardware, but also:
    - Bandwidth
    - Air conditioning
- Can scale applications by adding "virtual hardware" on demand
  - Of course, software licensing may not be so seamless

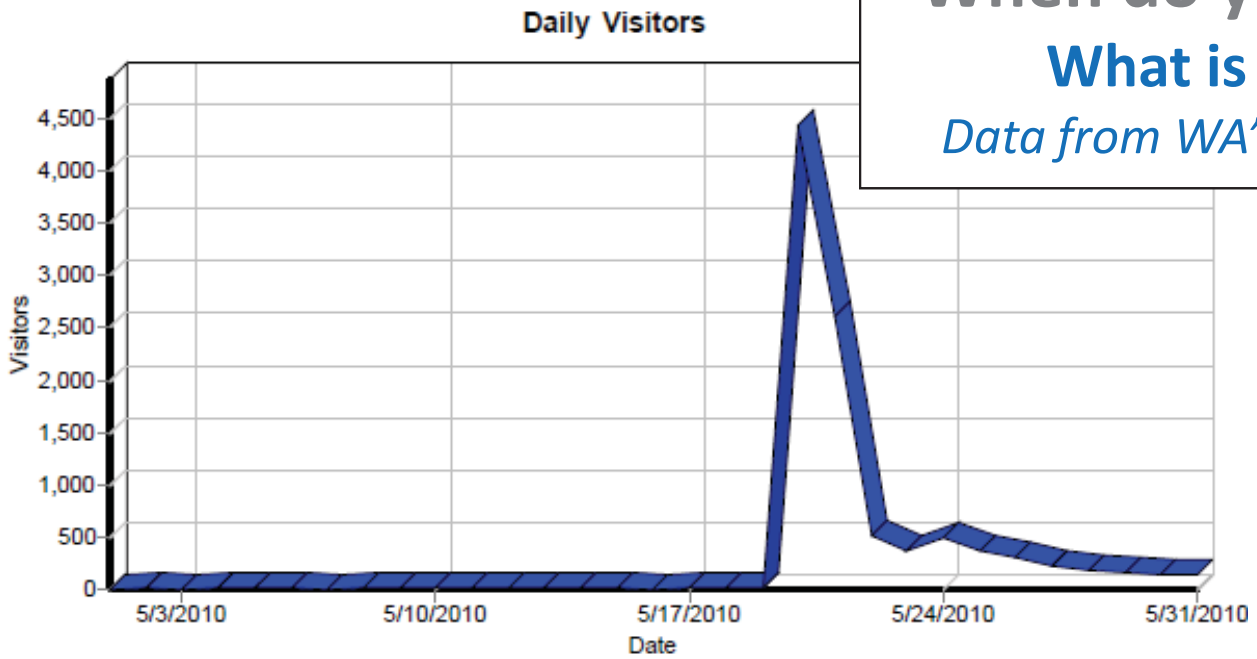
Tools where scaling is just a matter of spinning up instances.

Image from Paul Ramsay, used with permission.

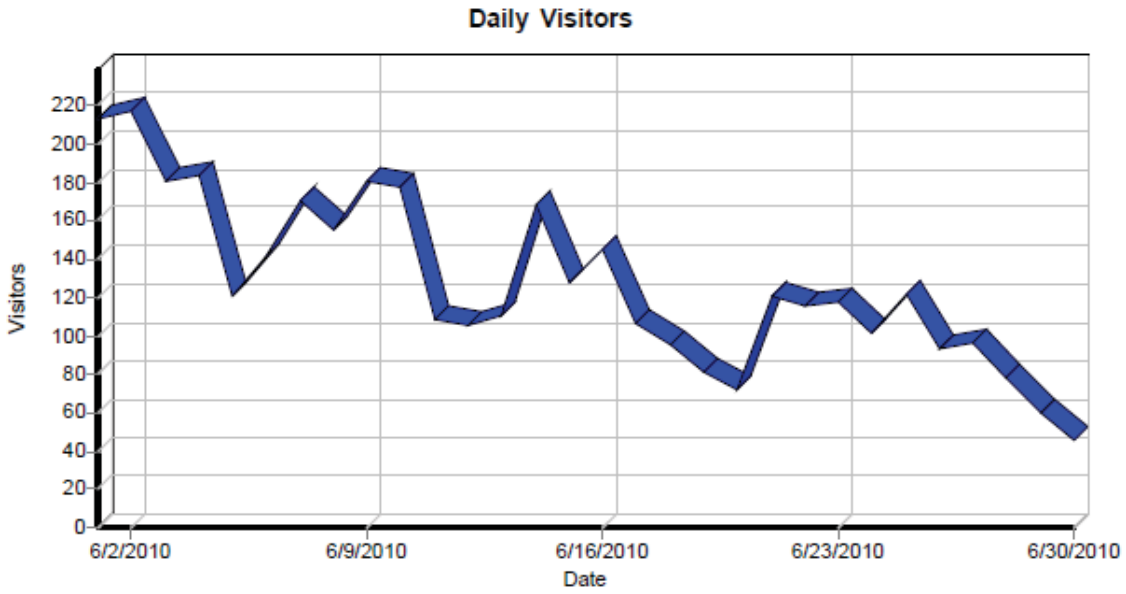
When do you need to scale?

What is a launch spike?

Data from WA's broadband site launch



- Governor makes an announcement
- Press release is issued
- Newspaper runs a story



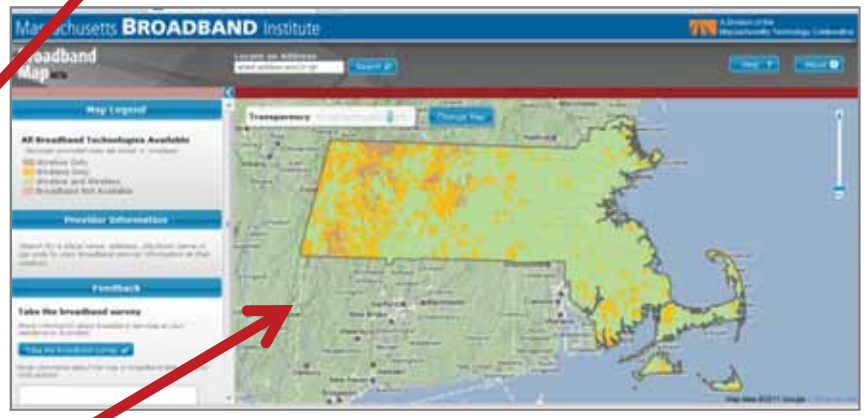
Cloud based hosting

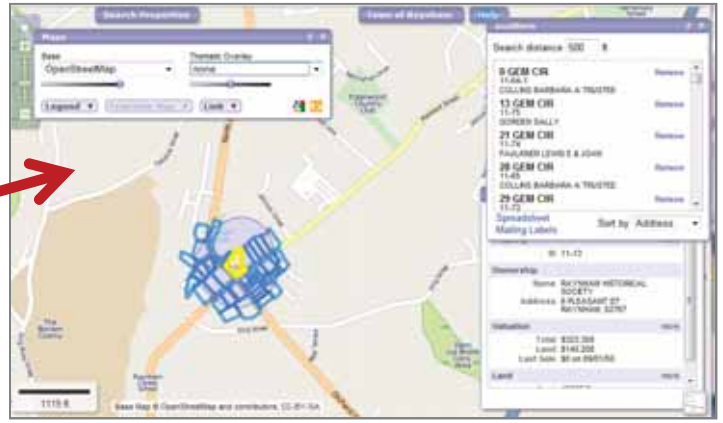
Things to know

- Need to understand virtual machines and offerings
  - IaaS vs. PaaS vs. SaaS
- Need to understand the cost model
  - Fixed costs of virtual hardware ($'s/hour)
  - Data storage cost
    - $.14 /GB/Mo = $1,860 /TB/Yr
  - Usage fees for data access
    - $.01 /10,000 file accesses means 1,750,000 files = $1.75
- Pushing data onto the cloud can be a bottleneck
  - How thick is your pipe?
  - Import/Export Option - Can send physical drives

Capitalizing on cloud-based map/tile services

- Use of other people's map services
  - Often national or global in scope
  - Often for free
- Esri (ArcGIS Online)
- Bing, MapQuest, Google
- OpenStreetMap (OSM)





So what should you look for or watch out for?

- **Characteristics**
  - Enable users to **easily use GIS technology, not learn GIS technology**
  - Try to use the **latest** web-mapping **technologies**
  - **Improve information sharing** for your end users
  - **Provide access** to the data you have
  - **Solve problems** and **answer questions**
- **Things to watch out for**
  - Cartography changes are **not simple**
  - Lots of storage needed, but storage is very inexpensive