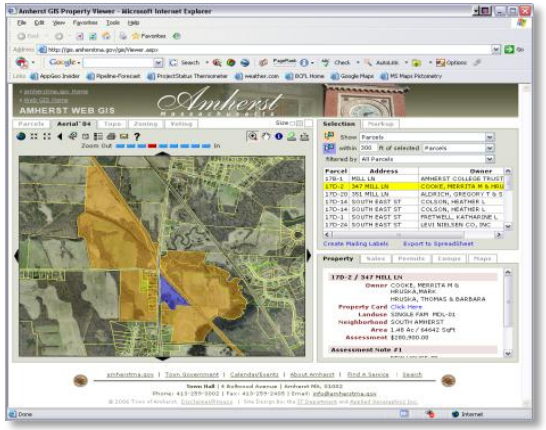
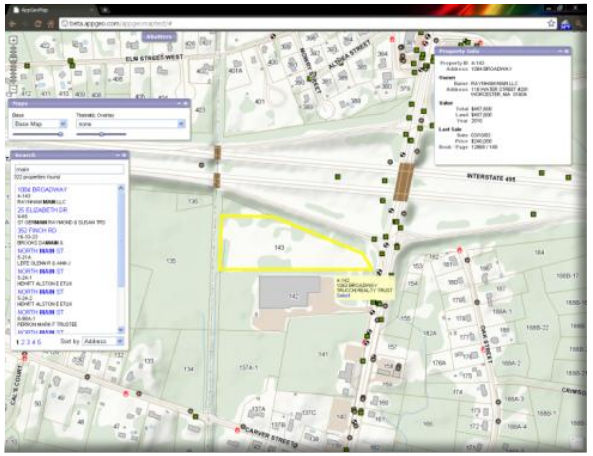


Trends & Issues in GIS Application Development?

Perspectives from the **past** and **present**, and a look into the **future**



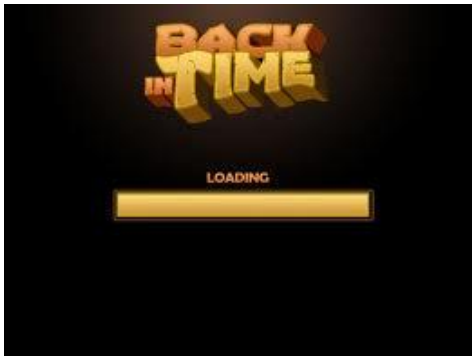
MSGIC Summer Meeting
July 16, 2012

Steve Anderson, GISP
Senior Vice President

AppGeo

Overview

- **The web is constantly changing… let's take a look back**
  - Highlights of the last 10+ years
  - What trends lead us to where we are?
  - How long has it been…
  - Recent changes and issues are affecting what we do
- **What does the future hold, some thing to pay attention to?**



Starting things off…

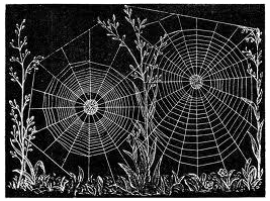
A few questions

- **What's your favorite or most used web site and why?**
  - **Fancy?**
  - **Answers questions?**
  - **Constantly changing?**
- **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 at some of them…**

A little history…

When was the web created and by who?

- English engineer and computer scientist Tim Berners-Lee wrote a proposal in March 1989 for what would eventually become the World Wide Web.
- Berners-Lee and Belgian computer scientist Robert Cailliau proposed 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“



Back then, what did we use to access the web?

- 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.
- 1st public access was on August 6, 1991
- First photo was uploaded onto the Web in 1992 by Lee…

…Just 20 years ago

Web History: 1995 - 2001

- Dot-com boom & bust (1995-2001)
- Amazon launched end of 1998
- Google BETA launched January 1999
- 2001 marked the end of the bubble
- Browsers

Amazon.com 1998

January 1999

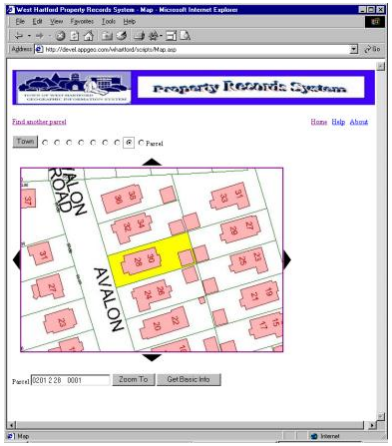
91% Market Share

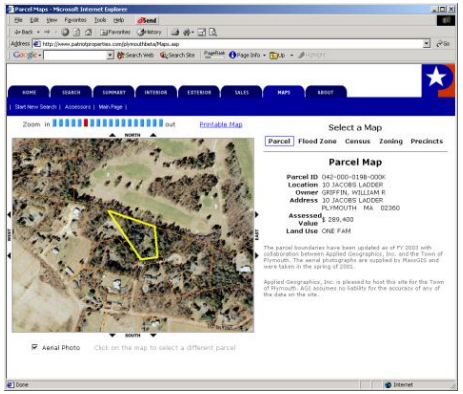
5% Market Share

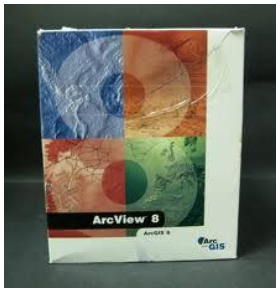
1% Market Share

GIS History: 1995 - 2001

- 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







Web History: 2002 - 2005

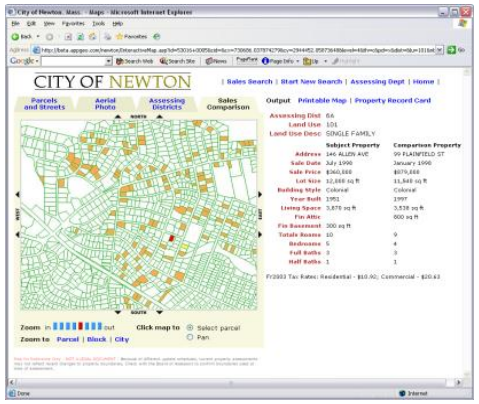
- 2002 Web 2.0 first introduced ("Web as a platform", mashups, WebBlogs, RSS feeds)
- 2002 Amazon Web Services Released
- 2003 MySpace was launched
- 2004 Facebook was launched
- 2005 YouTube was launched
- 2005 Zillo founded (first commercial apps with GIS?)
- Browsers

87%(91%) Market Share (10/2001)

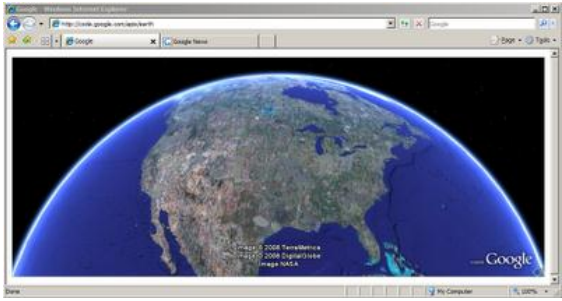
8% (5%) Market Share 5/2005)

2% Market Share (11/2004)

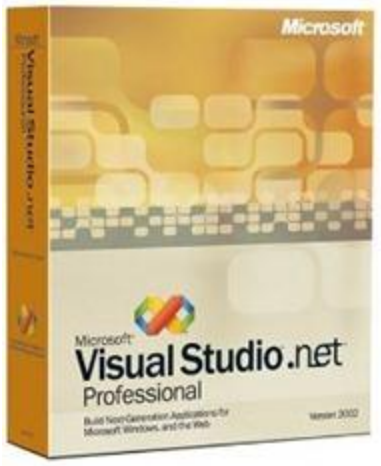
GIS History: 2002 - 2005



- 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



Your local hosting company since 2002



Web History: 2006 - 2007

- 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
- Browsers

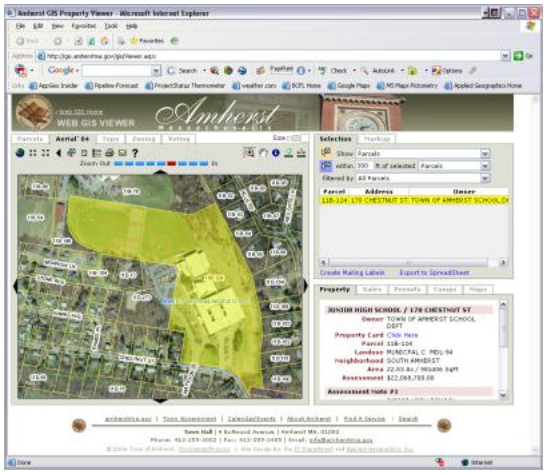
83%(87%) Market Share (10/2006)

14% (2%) Market Share (10/2006)

0.1% (8%) Market Share (10/2007)

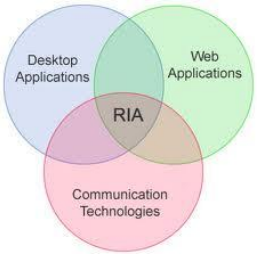
GIS History: 2006 - 2007

- Wikimapia launched (editable map)
- Workflow orientation of web-sites
- Configurable web sites
- ArcGIS Server 9.2 released



Web History: 2008 - 2010

- 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
- Browsers



I.E 8
56%(83%) Market Share (3/2009)

Firefox 3
32% (14%) Market Share (10/2006)

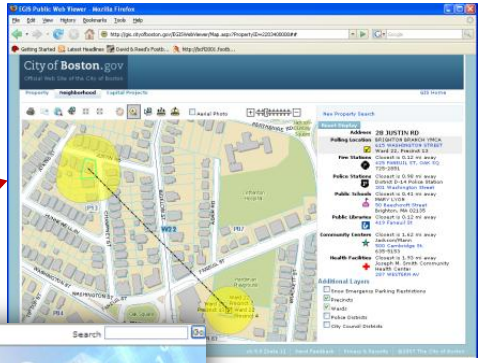
Chrome 1
5.5% (0.1%) Market Share (9/2008)

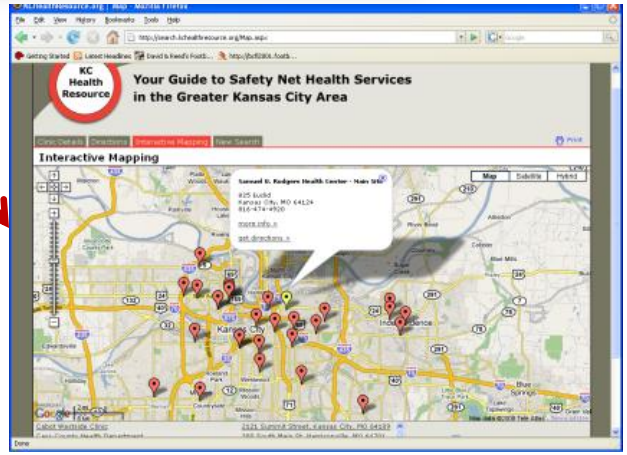
Safari 5
3.5% (2%) Market Share (6/2010)

Mobile
1.3 % Market Share

GIS History: 2008 - 2010

- Flex API in ArcGIS Server
- Silverlight API in ArcGIS Server
- Java API in ArcGIS Server
- 2010 ArcGIS 10 released





Recent Web History

- ARRA Broadband Improvement Act
  - National Broadband Plan to "ensure every American has access to broadband capability."
  - Program to support affordable access to 4 MB downloads to every US household
- Web 3.0 – convergence of the virtual and physical world
  - Sites like Foursquare

I.E 8
39%(56%) Market Share (3/2009)

Firefox 3
26% (32%) Market Share (10/2006)

Chrome 1
20% (5.5%) Market Share (9/2008)

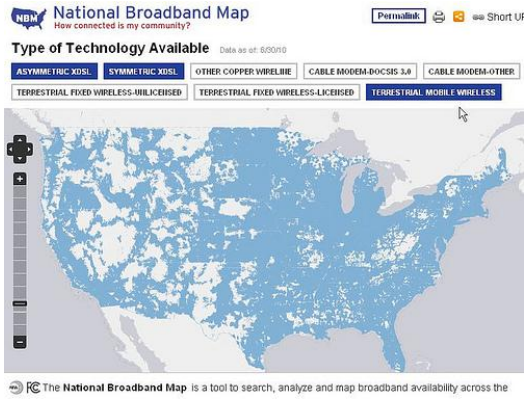
Safari 5
8% (3.5%) Market Share (6/2010)

7% (1.3%) Market Share

Recent Web History

- Tablets becoming phones – phones becoming tablets
- Web Services are free (or virtually free)
  - Amazon EC2 Micro Instance
    - 750 Hours of Linux usage (32 or 64 bit)
    - 10 GB of Elastic Block Storage
- 4G Mobile Broadband Services

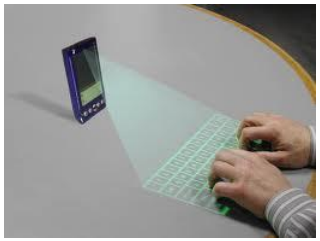
Recent GIS History



- FCC launches National Broadband Map
  - Open Source Platform used for high profile site
  - First time a national dataset was successfully created in less than one year
  - Federal & State cooperation to build Spatial Data Infrastructure
- ArcGIS.com /AGOL – Sharing of maps and data like Flicker and YouTube
- OpenStreetMap – Crowdsourced data to improve data quality
- Volunteered Geospatial Information (VGI) (spam?)
- SeeClickFix – Integration of GIS into workflow
- OpenSource Technology – becoming a viable option to Commercial products

Looking forward, bigger picture

What are some of the important issues/concepts to consider?



- Open Government – Gov 2.0
- Standards versus standard practices
- Semantic web: machines to understand the meaning – or "semantics" – of information on the Web
- Mobile
- Technology Platform Choices

Looking forward, bigger picture

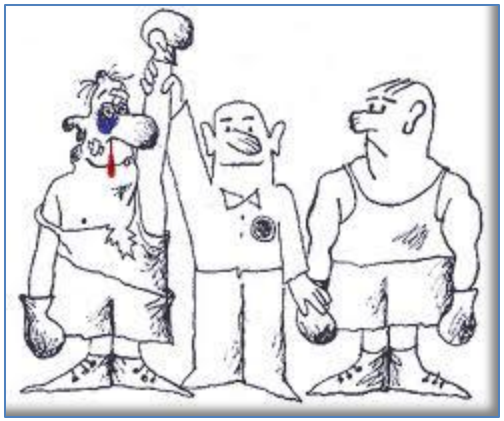
Open Government

- Reuse
- Unexpected use
- Or access control

gov2.0

Looking forward, bigger picture

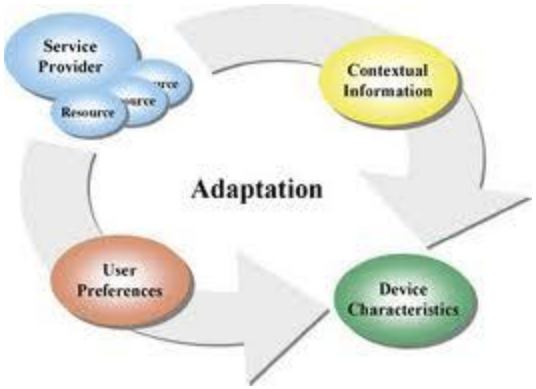
Standards vs standard practices



Looking forward, bigger picture

Semantic Web

- Machines understand the meaning – or "semantics" – of information on the Web
- Describe the data in the feed, don't standardize it



Looking forward, bigger picture

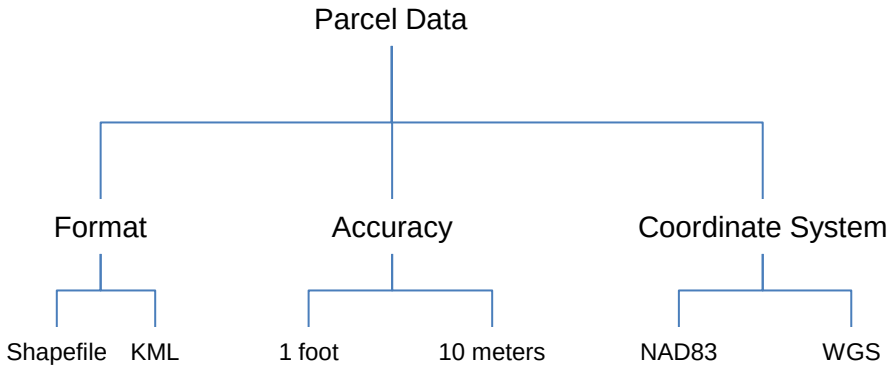
Semantic Web – How it works? Commercial application…

The Social Network DVD

- Condition
  - New
  - Used
- Price
  - Lowest
  - Highest
- Shipping
  - Fast
  - Lowest Cost
- Specifications
  - DVD
  - Blu-ray Disc

Looking forward, bigger picture

Semantic Web – How could it work for a GIS application?



Looking forward, bigger picture

Mobile Technology

- How many devices do you have?

Why Mobile?

- Great new and powerful devices
  - Smart Phones
  - Tablets

- Increasingly ubiquitous wireless broadband
  - 3G/4G networks

  - Hot spots and air cards for laptops

- Productivity gains for mobile workforces
  - Organizations, such as DOTs or municipalities, have large mobile workforces

Decisions, decisions, decisions

- What kind(s) of applications?
  - Mapping & business systems
  - What are your business needs for mobile?
- What kind(s) of devices and how many?
- “Phone apps” vs “Phone web apps”
- Existing Infrastructure
- Disconnected vs connected editing
  - Data check-in/check-out?

What kind(s) of applications?

On a phone, GIS/mapping may on the periphery

- **Business systems?**
  - Email
  - Timesheets
  - Work orders
- **Mapping?**
  - Direction finding
  - Field inspections
  - Access to asset information
  - Feature locating
  - Finding reported issues

What kind(s) of devices?

- **Phones**
  - Are you prepared/able to standardize?
  - iPhone, Android, RIM, WinPhone

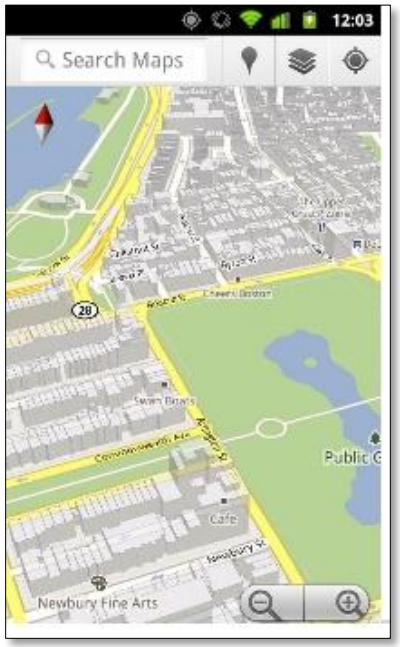



- **Tablets**
  - iPad
  - Android


- **Laptops & GPS Devices**

“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

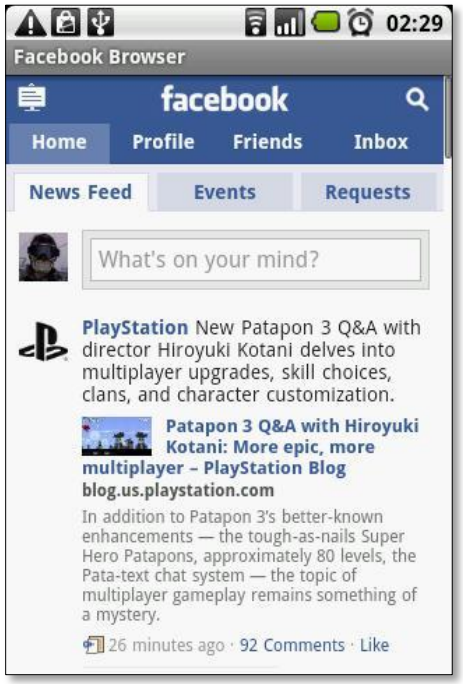


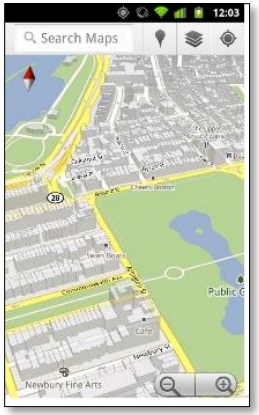
“Phone apps” vs “Phone *web* apps”

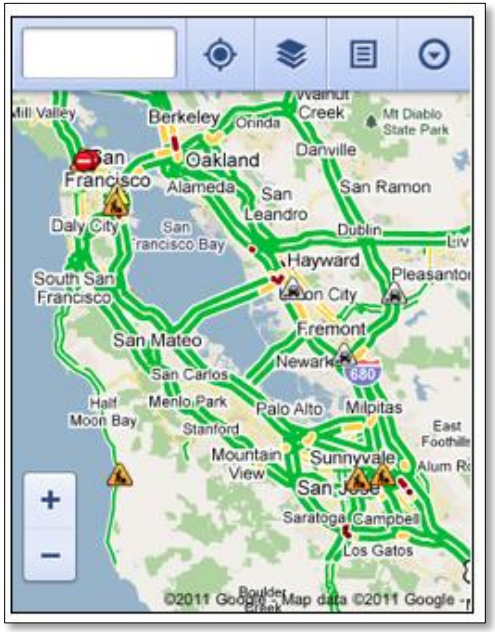
- **Phone-based web-app**
  - Relies on the phone’s browser app
  - Web pages, HTML5, JavaScript
    - Can be optimized for small screens
    - “Adaptive design”
  - Good access to GPS; camera not yet directly supported (but coming)
  - Examples of “minified web pages”

    http://Maps.google.com

    http://Touch.Facebook.com







Disconnected vs connected editing

- **Connected** = direct edits to the server
- **Disconnected** = “synching” with server
- Will you always be connected to the internet?
  - If so, then web-based forms are possible
  - If not, need a mechanism to work while disconnected, and then synch with server “later”
  - Support for connection disruption (i.e., “mostly connected”)
- Support for fully disconnected editing
  - Data check-out/check-in
  - Synchronization upon return to the office
  - Non-trivial and Esri provides some good tools

Mobile apps require a solid server and data management foundation

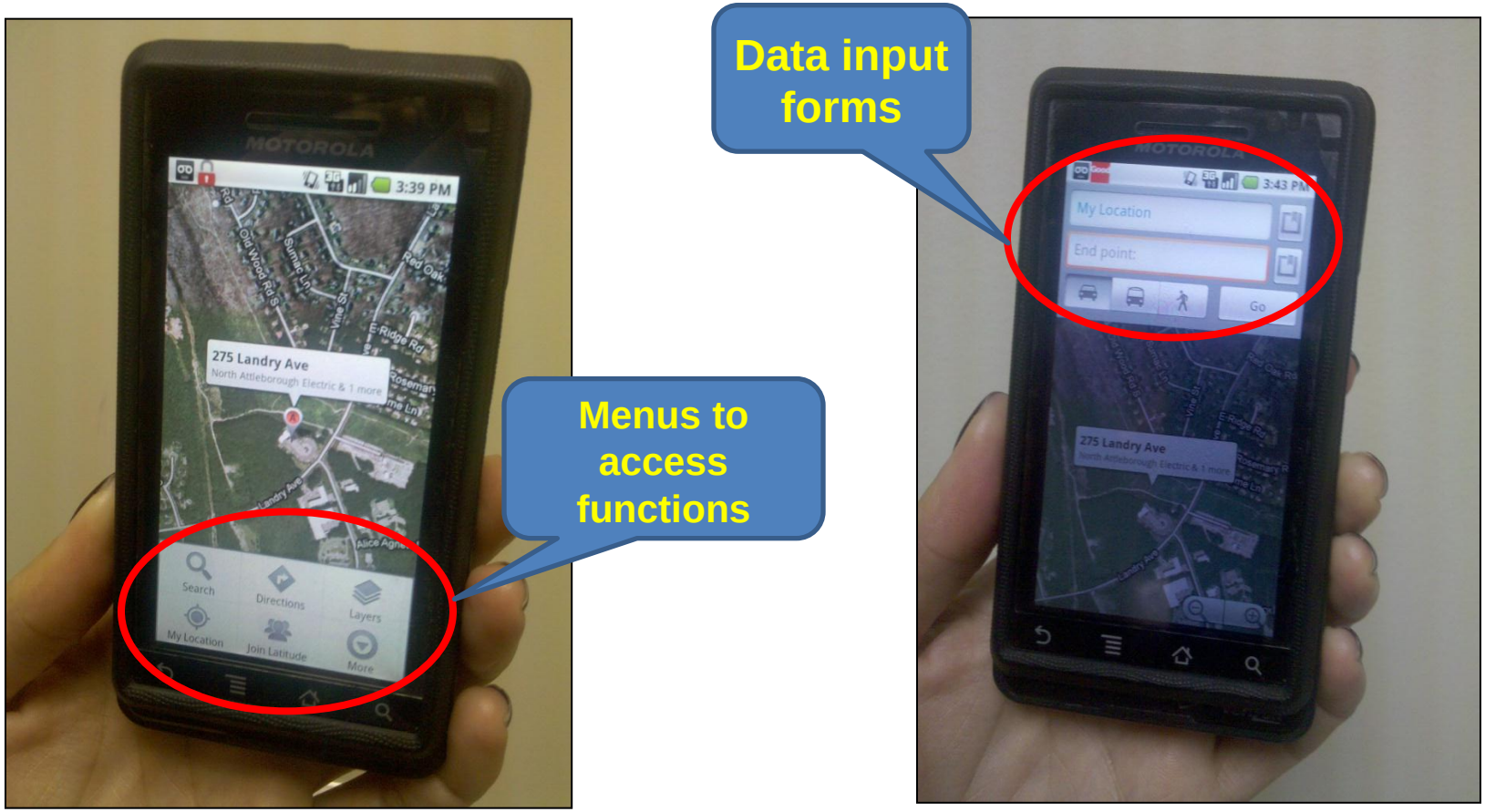
- In short, to effectively take your data into the field you need to have your back-end in order
- Mobile applications should interface with your "enterprise infrastructure"
  - Enterprise GIS
    - **Base maps**
    - **Business layers** and their attributes (e.g., parcels, utilities)
    - Web services (both cached and dynamic)
  - Business systems
    - For example, work orders, asset management, CAMA, etc.

Some observations from a recent project for MnDOT

- Mobile application development ***is*** different than enterprise application development
  - Need for **flexibility and agility**
  - Need to **deploy rapidly**
    - You may have a field crew (or interns) waiting for the tool
  - Need to be able to **readily make adjustments** to the app
    - You learn how the app needs to change once you're in the field

Mobile technology is a major driver for simplicity

There's literally no room for complexity



Looking forward

Technology Platform Choices

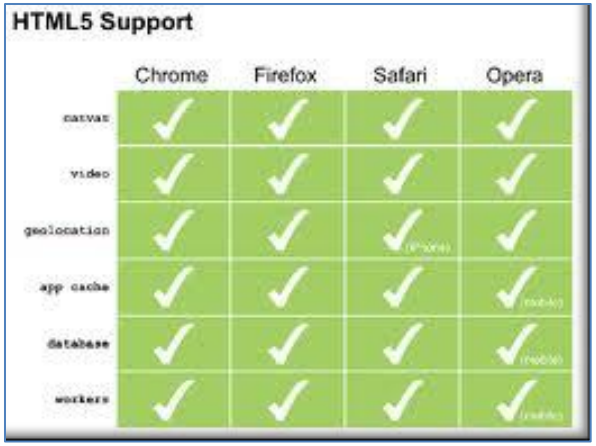
Windows vs. Linux

ESRI vs. Open Source

Flex/Silverlight vs. HTML5

How do you choose?

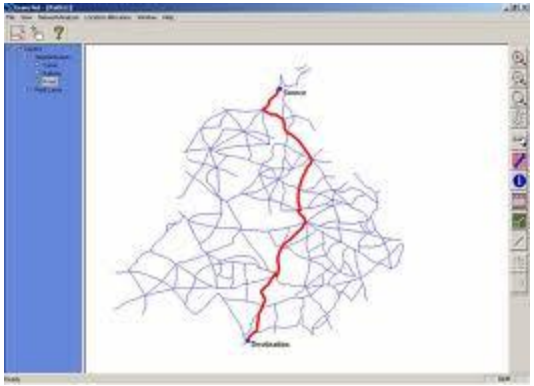
- Protect yourself with standards
- Try and choose the ubiquitous, long-lived ones
  - Others can come and go
  - Remember the Internet was founded using HTML
- Think carefully about the value of flashiness
  - Ex: **Flex, Silverlight**: robust and fancy but require plug-ins
  - Ex: **HTML5**: same rich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



Some final thoughts…

Good design is essential to maintaining simplicity

- Design begins by identifying the questions that the application must answer
  - Where are the three closest fire hydrants?
  - Who lives next door?
  - What is the shortest path?
  - Which is the least expensive?



Good design is essential to maintaining simplicity

- People are less interested in open ended browsing, less GIS on the web
  - If a function is not used, it's just cluttering the interface
  - If the application isn't quick and efficient, it won't get used

So what should you look for or watch out for?

- Enable users to **easily use GIS technology, not learn GIS technology**
- Use the **latest** web-mapping **technologies**
- **Improve information sharing** for your end users
- **Provide access** to your best data, not all your data
- **Publish data as services** so others can use it
- Automate common **workflows** & business processes

Thank You

If you have any questions:

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