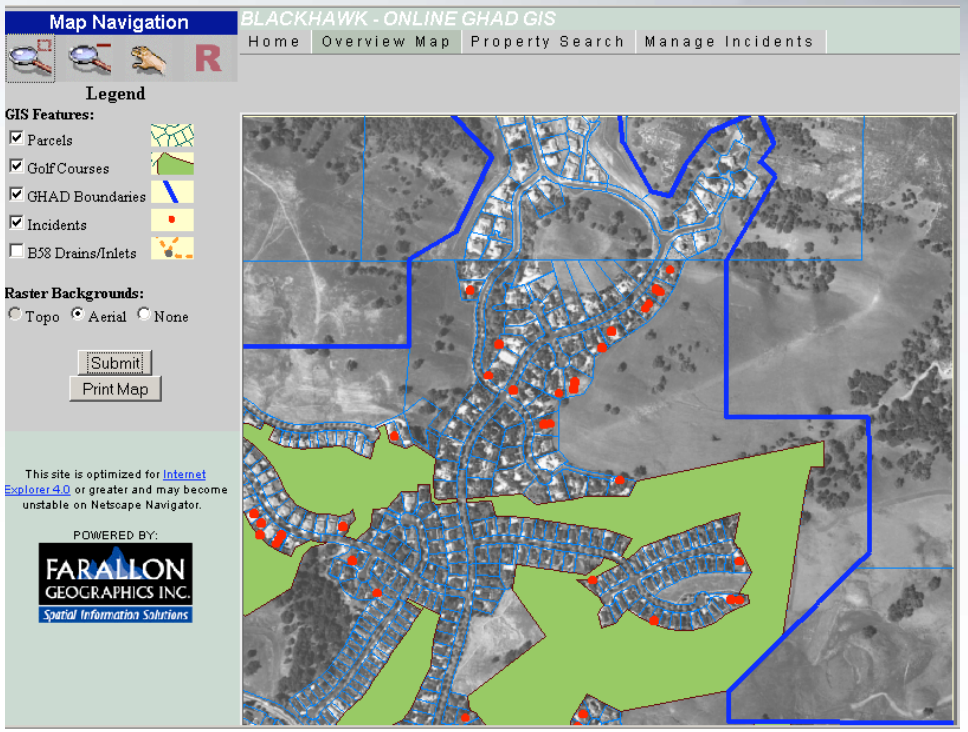
System Design and Implementation of a GIS Mashup

July 27, 2006

Alexei Peters
Farallon Geographics, Inc.

Original site

- Traditional web GIS implementation
- GHAD to track incidents (landslides, slope failure, etc..)
- Editing over the web



Old site learns new tricks

- View horizontal drain and piezometry point data
- Graph historical data from the last 20+ years
- Read only

H100A		1995-01	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A	3	1995-02	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-02	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-02	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-03	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-03	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-03	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-03	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-03	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-04	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1995-04	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A	0	1995-06	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A	0	1995-09	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1998-07	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A	0	1998-08	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1998-08	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1998-09	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A		1998-09	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A	0	1999-12	HORIZONTAL DRA	CRITICAL		-121.932941	37.826499
H100A			HORIZONTAL DRA	CRITICAL		-121.932941	37.826499

Use traditional GIS or free API?

- Traditional GIS
  - More functionality than needed
  - More programming
  - Costly
- Free mapping API's
  - Simple to use
  - Great for viewing point data
  - Latest technology (no more navigate and wait!)

Which API to use?

- Microsoft or Yahoo! or Google?
  - We chose Google
  - Why?
  - Matter of preference
    - Functionality
    - Cartography
    - API (Yahoo! Has flash, flexbuilder; MS and Google use AJAX)
    - BTW, what is AJAX?

What about data storage?

- Original data as MS Excel
  - Oracle express (why not!)
    - free, easy to use web based interface, power of oracle, 4 GB limit
    - perfect for small sized datasets
    - has locator capabilities within
    - scalability into full oracle implementation
    - procedural language for data transformation

So how do we get at the data?

- Web services !
  - WFS?
    - XML
    - Standards based
    - Good for widespread public consumption
    - Heavy… :-|

So how do we get at the data?

- Web services !
  - So, JSON to the rescue
    - JavaScript Object Notation
    - Native JavaScript language
    - Great for web browser consumption
    - Lightweight
    - No parsing necessary, fast..!

WFS vs. JSON

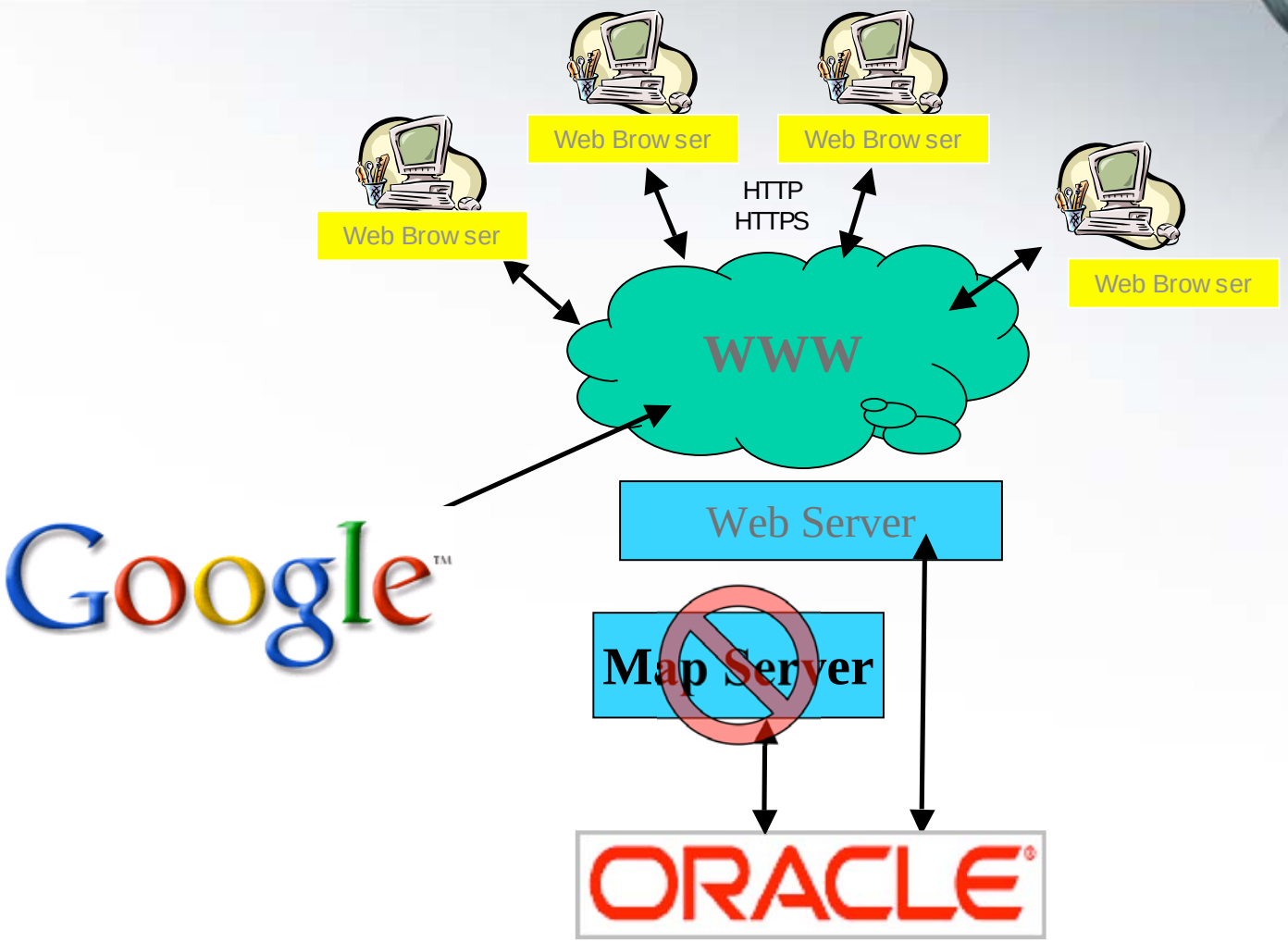
WFS


```
<?xml version="1.0" ?>
<ns0:FeatureCollection xmlns="http://localhost/myns"
   ns1:gml="http://www.opengis.net/gml"
   ns1:wfs="http://www.opengis.net/wfs"
   xmlns:wfs="http://www.opengis.net/wfs"
   xmlns:ns1="http://localhost/myns">
  <ns2:boundedBy
       xmlns:gml="http://www.opengis.net/gml">
   <ns2:Box srsName="EPSG:4326">
    <ns2:coordinates>-120,30 -100,50</ns2:coordinates>
   </ns2:Box>
  </ns2:boundedBy>
  <ns2:featureMember
       xmlns:gml="http://www.opengis.net/gml">
   <points>
    <ns2:boundedBy>
     <ns2:Box srsName="EPSG:4326">
      <ns2:coordinates>-110.5,44.3 -
      110.5,44.3</ns2:coordinates>
     </ns2:Box>
    </ns2:boundedBy>
    <ns2:pointProperty>
     <ns2:Point srsName="EPSG:4326">
      <ns2:coordinates>-110.5,44.3</ns2:coordinates>
     </ns2:Point>
     </ns2:pointProperty>
    <FID>1</FID>
    <FNAME>Point A</FNAME>
    <SCORE>0.2</SCORE>
   </points>
  </ns2:featureMember>
</ns0:FeatureCollection>
```


JSON

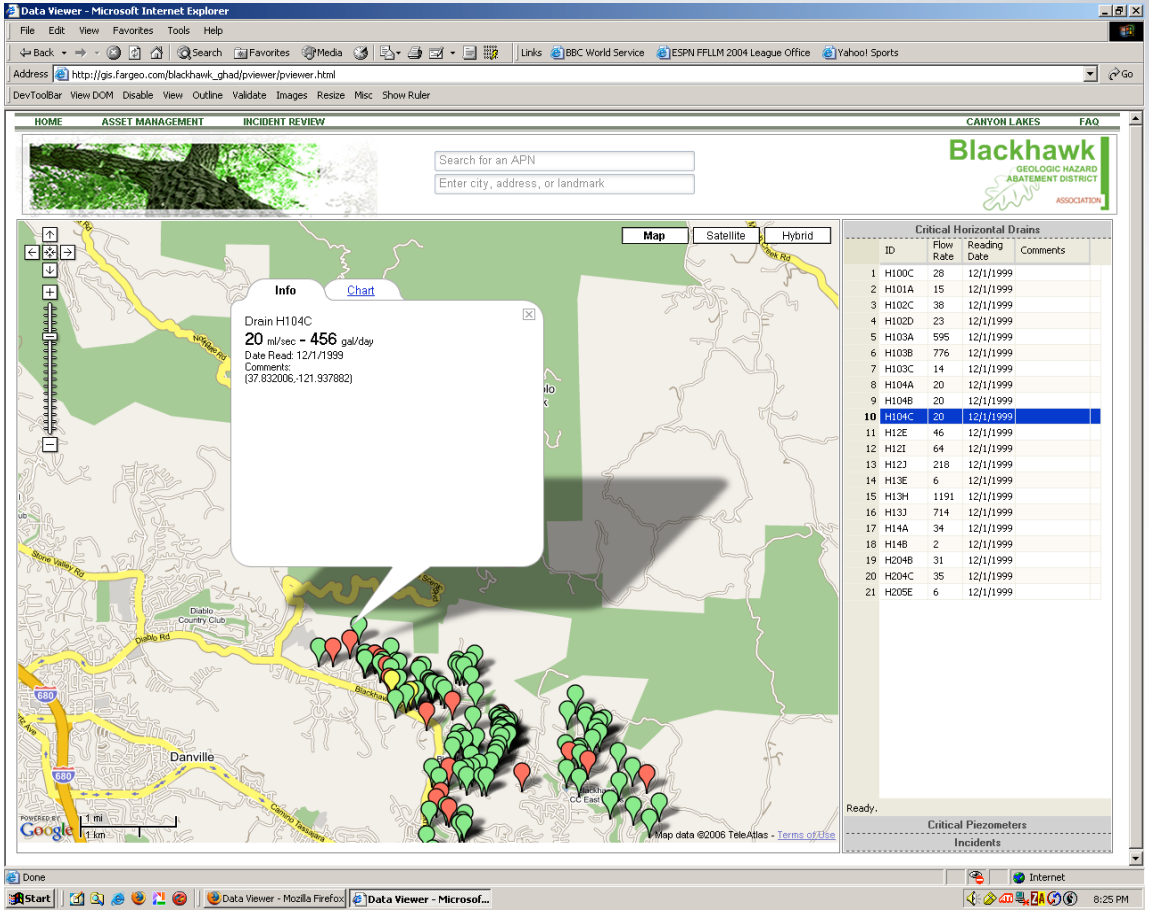
['H12F',221,'12/1/1999','',37.824163,-121.926254]

Final Architecture

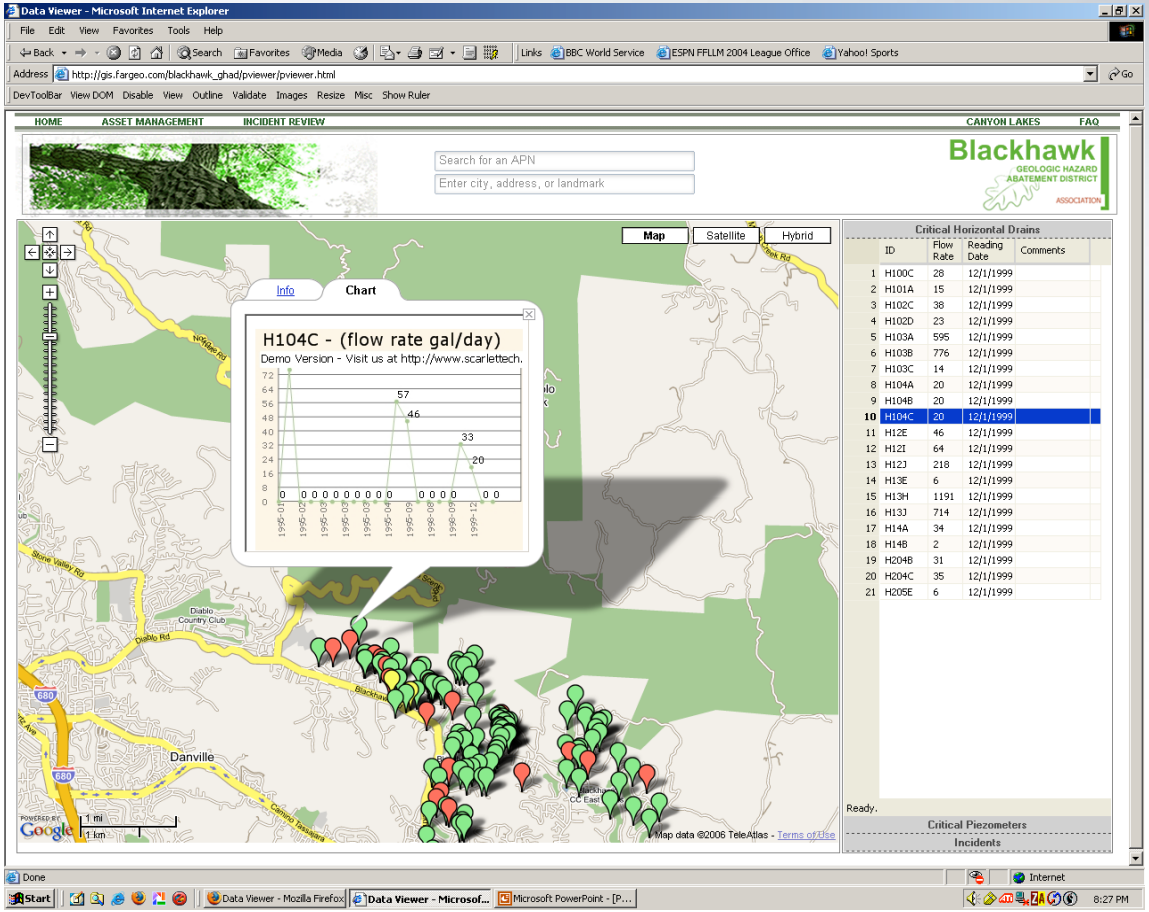


Costs $$$

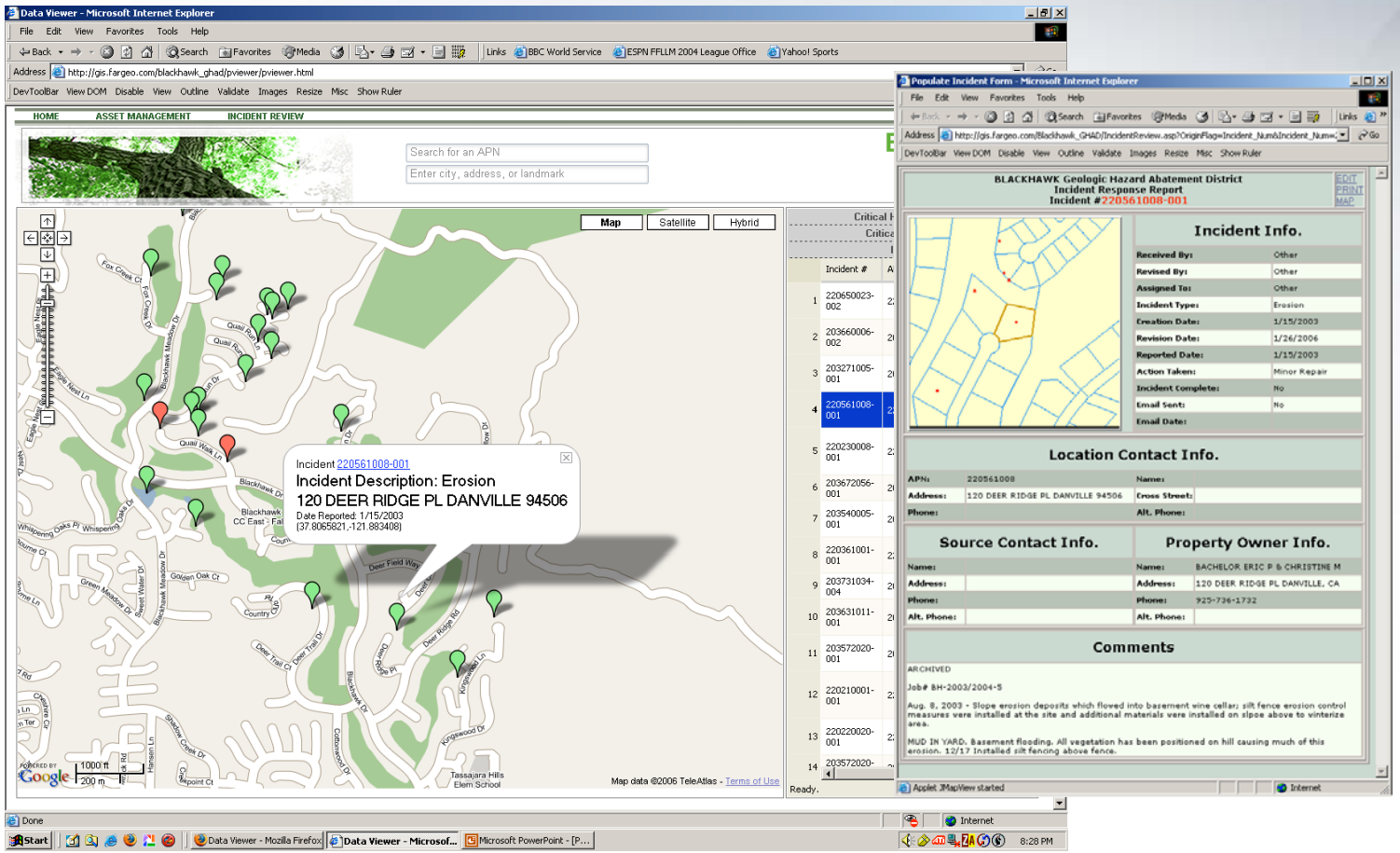
- So how much did we spend in software?
  - Nothing….!
- What about programming effort?
  - Less time….!
- What did we gain?
  - Widely know map interface
  - Responsive map
- What did we sacrifice?
  - Not much….



www.fargeo.com



www.fargeo.com



www.fargeo.com

Questions?

Thank You

Alexei Peters
apeters@fargeo.com

Farallon Geographics, Inc.
415 227 1140
www.fargeo.com