

# MISAC Meeting Northern California Chapter

## The Relevance of Emerging Geospatial Technologies for IT

Dennis Wuthrich, CEO  
Farallon Geographics  
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# Full Disclosure: about Farallon



- IT Systems Integrators focused on GIS
  - Ensure your GIS investment ROI
  - Geodatabase, Spatial web application services
  - Training, knowledge transfer
- Help our clients use GIS to achieve enterprise goals

# Some History



- GIS starts as a grass roots effort in a department, developed to address a very specific and narrow business need



- Success; soon other groups are asking for maps



- With greater demand, effort goes to GIS and no longer “doing the job”



- Other departments start to grow their own, select technologies that best meet their own business needs



- Silos form, redundant data creation/maintenance efforts, and heterogenous technologies



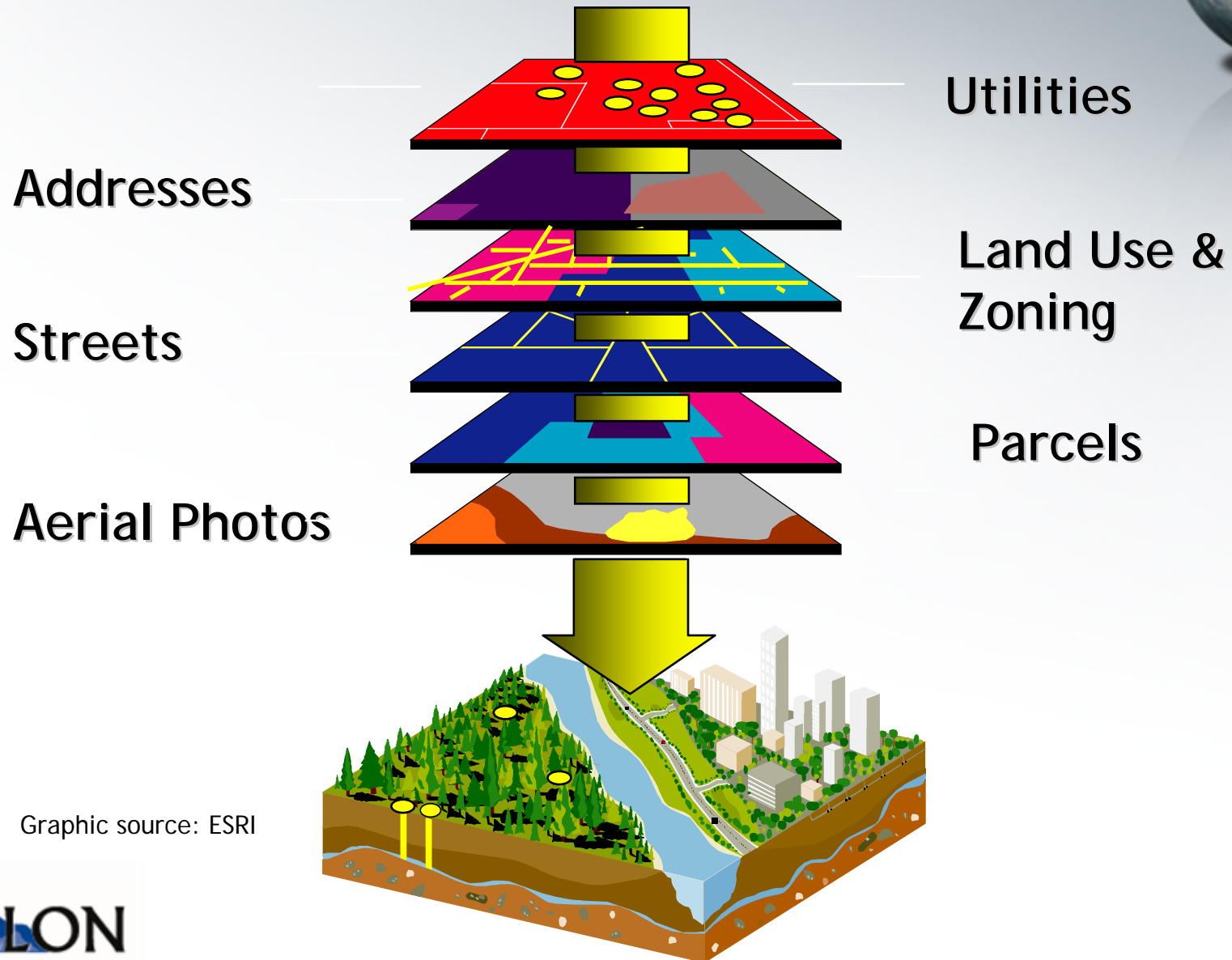
- And... administrative, budgetary, cultural clashes between departments make it difficult to develop a cohesive approach.

# Inevitably...



- Departments investment in multiple technologies that all try and do the same thing
- Redundant data management efforts (which is complete? Most current? Valid? "Mine!")
- Lack of coordinated administrative oversight
- Ad-hoc budgeting
- Training?

# Citywide data



Graphic source: ESRI



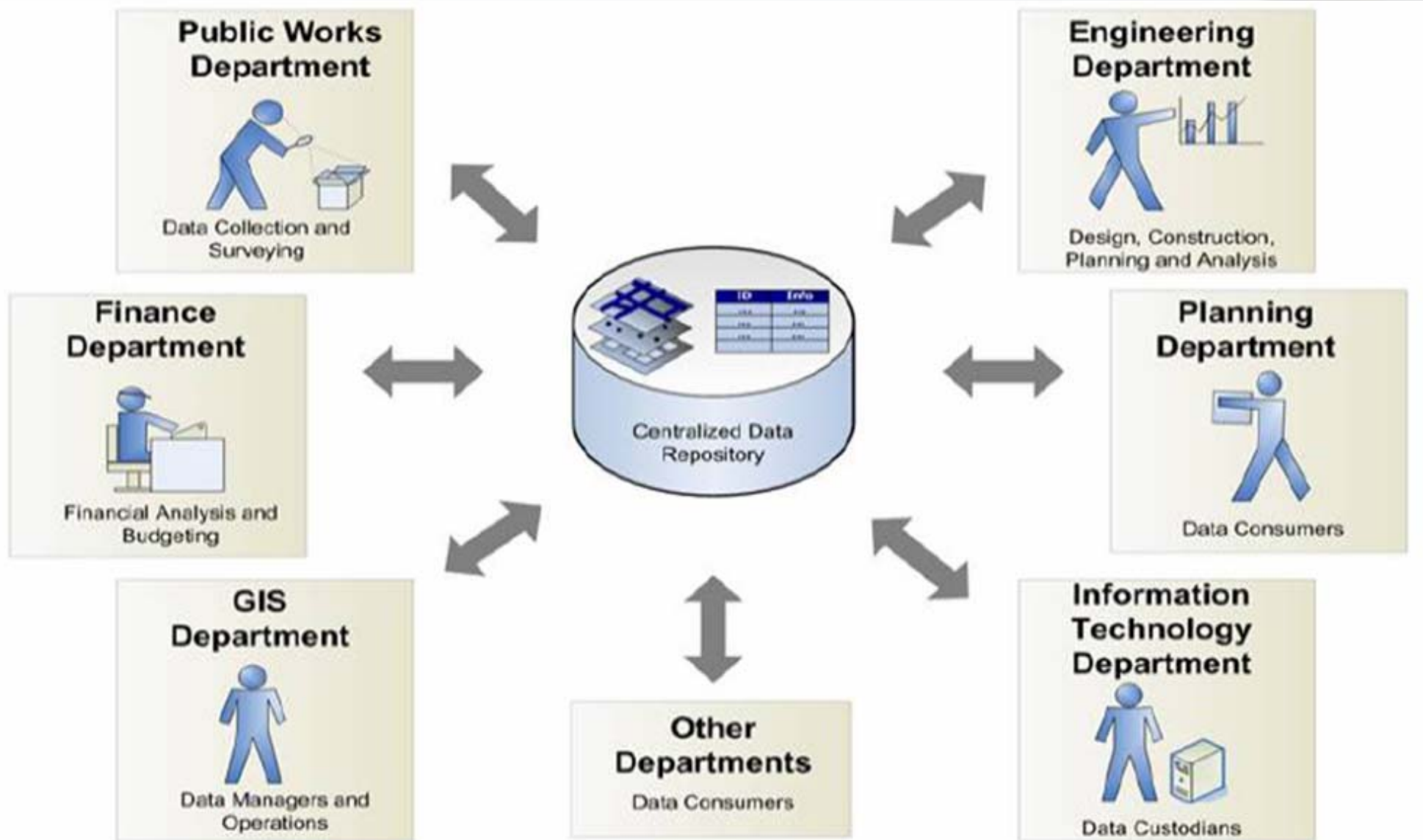
- Nonetheless, everybody is managing common “framework data” aka parcels, streets, addresses, aerials. Plus their own special data.

# The problem...



- Your most fundamental data exists as hundreds (thousands?) of files in each department

# The Enterprise Approach





- It's not just a technology problem...

# Where the Enterprise GIS leaves you...



- Coordinated approach to managing geographic data
- A repository to support GIS analysts and cartographers
- Ready to build applications to support business needs

# However, for IT, GIS still a Black Box



- Spatial Reference Systems, Geodetic datums, Geometry, Rubbersheeting, Geocoding, Linear Referencing, Topologic editing, Conflation, spatial analysis, network analysis, Spatial joins...

# For GIS, IT is complicated



- SOA, SQL, XML, J2EE, .NET, PHP, Asynchronous JavaScript, BPM, Virtualization, VOIP, CRM, ERP, SAAS, SOAP, UDDI, Web Services, Load Balancing ...

# And for everyone else, GIS still hard to use



County of Kern Public Online Mapping - Windows Internet Explorer

http://206.169.45.184/imf/imf.jsp?site=kern\_pub

**Kern County**  
Online Mapping System

About Layers Legend Key Map Bookmarks Locate Print PDF Help Exit

Map Layers [Feedback](#)

- Property
  - Address Points
  - Parcels 2006
  - Assessor Map Books
  - Tract Boundaries
  - Parcel Maps
- Transportation
- Townships-Sections & Survey
- Cities & Counties
- Representation, Districts, Voter
- Census & Traffic Analysis Zones
- Zoning/General Plan/Flood
- Lakes/Rivers/Precipitation
- Public Safety
- Zip Codes
- Public Buildings
- Schools & Attendance Areas
- Waste - Landfills & Sewers
- Parks & Campgrounds
- AG Crops
- Special Land Uses
- Faults
- Hillshade & Contours
- Air Photos

Automatically Refresh Map

Notes:

Scale: 1:1,088,727 [go](#) Map Tool: **Zoom In** Active Layer: **\* NO ACTIVE LAYER \***

Map center: 1731181, 655181

Powered by [geocortex](#)

Done Internet 100%

start MISAC... Inbox... Adobe... 2 Int... 3:01 PM

# Best of all...



We've spent lots of time and money getting here.

# Meanwhile...



7051 Dublin Blvd., Dublin CA - Google Maps - Windows Internet Explorer

http://maps.google.com/

Google Maps

7051 Dublin Blvd., Dublin CA

Search Maps

Search the map Find businesses Get directions

Maps

Print Email Link to this page

Map Satellite Hybrid

**Address:**  
7051 Dublin Blvd  
Dublin, CA 94568

[Make this my default location](#)

Get directions: [To here](#) - [From here](#)

[Search nearby](#)

©2006 Google - Map data ©2006 NAVTEQ

Done Internet 100%

start

Inbox - Micros... 7051 Dublin Bl... 2 Microsoft O...

11:11 AM

# And the Mash-up was invented



HousingMaps - Windows Internet Explorer

http://www.housingmaps.com/ google maps mash up

Google oogle maps mash up Go Bookmarks 7 blocked Check AutoLink AutoFill Send to google Settings

Authors - Directions Magazine HousingMaps

For Rent For Sale Rooms Sublets

Powered by [craigslist](#) and [Google Maps](#)  
(this site is in no way affiliated with craigslist or Google)

City: **San Francisco** Price: **\$1500 - \$2000** [Show Filters](#) [Refresh](#) [Link](#) [About / Feedback](#)

pics	price	bd	description	date
	\$1875	2bd	<a href="#">Spacious 2 Bedroom With Splendid Views</a>	11/16
	\$1895	1bd	<a href="#">Telegraph Hill Flat Near Coit Tower/Fibert Steps</a>	11/16
	\$1625	2bd	<a href="#">2 BR/1 Bath Sunset Flat Available December 1</a>	11/16
	\$1500		<a href="#">Large Marina Studio near Chestnut Street</a>	11/15
	\$1650	1bd	<a href="#">Charming, Sunny, Totally Remodeled One Bedroom</a>	11/15
	\$1500		<a href="#">Great Studio With Amazing View!</a>	11/15
	\$1650	2bd	<a href="#">10years old apts/ Large 2 Beds/1Baths, newly renovated.</a>	11/15
	\$1895	2bd	<a href="#">Full five rm flat with large back yard in Great location</a>	11/15
	\$1900	3bd	<a href="#">House for rent</a>	11/15
	\$2000		<a href="#">Apartment 2 Bedroom</a>	11/15
	\$2000	2bd	<a href="#">Beautiful 2 Bed Edwardian in Upper Haight</a>	11/15
	\$1995	2bd	<a href="#">Nr PresidioSteps, Laurel Village, True 2BR (photos) 415-297-9777</a>	11/15
	\$1525	1bd	<a href="#">View of the Ocean from your 1BR apartment!</a>	11/15
	\$1595	1bd	<a href="#">Completely Remodeled Great Location</a>	11/15
	\$1950	2bd	<a href="#">Spacious Flat in Cole Valley</a>	11/15
	\$1850	2bd	<a href="#">Judah &amp; 20th - Lovely Apartment Available Dec.1</a>	11/15
	\$1995		<a href="#">Spacious, sunny Studio with amazing Bay views!</a>	11/15
	\$1600	1bd	<a href="#">1 BR Nice, Available January 1, Valencia Corridor, Dog ok!</a>	11/15
	\$1750	2bd	<a href="#">Newly Remodeled 2 Bedroom Apartment</a>	11/15

Done Internet 100%

start Inb... Ho... 3 M... Mic... C:\... 11:57 AM

# A New Approach to Developing Applications with GIS data



- Fast
- Simple
- Free
- APIs use a modern IT approach (Asynchronous JavaScript with XML)

*The mash-up was NOT invented by GIS people...*

# Geospatial Application Development Alternatives



- Continue to use specialized GIS technology to develop business applications
- Free public APIs, Internet Mapping Servers, and spatial databases

# Traditional GIS Approach



- Great software
- Proven approach
- But expensive to buy, pricey to maintain

# Enterprise Ready, Innovative Options



- Google Maps, Microsoft Virtual Earth, Yahoo! Free APIs
- Free versions of commercial software (Oracle XE, SQL Server Express)
- Free, Open Source Software (MapGuide Enterprise, MySQL, PostGres/PostGIS, etc.)

# A note about Open Source GIS



- Not for everyone, but definitely ready for "Prime Time"
- Creative, innovative, committed developer community
- Professional support (Autodesk)
- Excellent software

# (I m)ponderables



- “The application of GIS is limited only by the imagination of those who use it”
  - Jack Dangermond, President, ESRI
- “The barriers to adoption of open source technology in the geospatial industry are mental”
  - Gary Lang, VP Autodesk

# Opportunity #1: Build Applications on Free Google, Microsoft APIs



- Asynchronous JavaScript with XML
  - Fast
  - Built-in map navigation
  - Support many development environments
- Continuous basemap dataset
  - High quality cartography
  - Avoid significant data/system maintenance costs
- Can be licensed to avoid advertisements

# Google Maps, Microsoft VE Geographic APIs:



```
<?xml version='1.0' ?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-
  syntax-ns#"
<item>
  <title>1322 Madrone Ave.</title>
  <description>
    <3400 sq ft, available: 9/15/06>
  </description>
  <geo:lat>37.89</geo:lat>
  <geo:long>-122.1023</geo:long>
</item>
</rdf:RDF>
```

# Building XML



- Coordinates from your GIS geodatabase
- Can use a script or simple web service to build XML dynamically
- Extremely flexible (easy to transform from one encoding to another)

# The Result...



http://dev.fargeo.com/CCCED/ - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: http://dev.fargeo.com/CCCED/

Google

## Contra Costa County California

Economic Development

WELCOME COLLECTIONS DRIVING DIRECTIONS TRAFFIC LOCATE

QUICK SEARCH

METRO / CITY: Concord

PRICE FROM: \$150,000

PRICE TO: \$200,000

SQFT MIN: No Min

SQFT MAX: No Max

SEARCH

221 Barkley Ave

22500 sq ft  
zone: mixed use  
avail: 10/14/06

Add to my collection  
zoom to street level  
[View Building in Google Earth](#)

Fly To Local Search Directions

e.g. Hotels near JFK

Places

- My Places
  - PARCEL\_UPDATE\_ATTRIBUTES.shp
  - FEMA\_fld\_polys.shp
  - SAMPLE Hazzard Materials Business
  - [HGA Hurricane Relief Imagery](#)  
Access the latest imagery from hurricaneimagery.org provided by NGA.
  - GE Data Feeds
  - DRW
  - Sightseeing
  - default  
Google Earth default view
- Temporary Places
  - bldgs\_apn.shp
    - bldgs\_apn
  - zoning\_historic.shp

Layers

- National Geographic Magazine
- Google Earth Community
- Community Showcase
- Google Earth Community (Unrank)
- Dining
- Lodging
- Banks/ATMs
- Bars/Clubs
- Coffee Shops
- Shopping Malls
- Major Retail
- Movie/DVD Rentals
- Grocery Stores
- Pharmacy
- Gas Stations
- Golf
- Sports Venues
- Parks/Recreation Areas
- Fire/Hospitals
- Schools
- Elementary School Districts



- Lodging
- Roads
- Terrain
- Dining
- Borders
- Buildings



# Opportunity #2: Build Application on Spatially Enabled databases



- Oracle XE
- MySQL
- PostGres/PostGIS

# Spatially Enabled Database:



```
C:\WINDOWS\system32\cmd.exe
1 select
2 a.APN, b.election_prec_id
3 from active_parcels_ogc_test a, election_precincts b
4 where b.election_prec_id = 5605
5* and SDO_RELATE(b.geometry, a.geometry, 'MASK=ANYINTERACT' )='TRUE'
SQL> /
```

APN	ELECTION
004351010	5605
004391150	5605
004262390	5605
004281080	5605
004382390	5605
004372070	5605
004281180	5605
004281270	5605
004382210	5605
004340570	5605
004262110	5605

# Oracle XE, Free Spatial Database



- Small footprint version of Oracle Database 10g Release 2
- Free to develop, deploy, distribute
- Easy, web-based management console
- Native spatial data, analysis support
- 100% compatible with enterprise version of Oracle

# Why XE?



- Supports GIS features natively (points, line, polygons, etc.)
- Works with ESRI, Intergraph, Autodesk, MapInfo, Manifold GIS
- Open and standards-compliant
- Native spatial indexing, operators; coordinate system support
- Security, replication

# XE Limitations



- Can be installed on any size host machine, but is limited to:
  - 4GB of user data
  - 1GB of RAM memory
  - 1 CPU used

# XE's Significance: Direct Feed to Google/Microsoft APIs



Data Viewer - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print DevTools Links BBC World Service ESPN FFLM 2004 League Office Yahoo! Sports

Address [http://gs.fargeo.com/blackhawk\\_ghad/pviewer/pviewer.html](http://gs.fargeo.com/blackhawk_ghad/pviewer/pviewer.html) Go

DevToolBar View DOM Disable View Outline Validate Images Resize Msc Show Ruler

HOME ASSET MANAGEMENT INCIDENT REVIEW CANYON LAKES FAQ

Search for an APN  
Enter city, address, or landmark

**Blackhawk**  
GEOLOGIC HAZARD  
ABATEMENT DISTRICT  
ASSOCIATION

Map Satellite Hybrid

Info Chart

**H104C - (flow rate gal/day)**  
Demo Version - Visit us at <http://www.scarlettech.com>.

Flow Rate	Reading Date
0	1995-01
0	1995-02
0	1995-03
0	1995-04
0	1995-05
0	1995-06
0	1995-07
0	1995-08
0	1995-09
0	1995-10
57	1995-11
46	1995-12
0	1996-01
0	1996-02
0	1996-03
0	1996-04
0	1996-05
0	1996-06
0	1996-07
0	1996-08
0	1996-09
0	1996-10
33	1996-11
20	1996-12
0	1997-01

Critical Horizontal Drains			
ID	Flow Rate	Reading Date	Comments
1	H100C	28	12/1/1999
2	H101A	15	12/1/1999
3	H102C	38	12/1/1999
4	H102D	23	12/1/1999
5	H103A	595	12/1/1999
6	H103B	776	12/1/1999
7	H103C	14	12/1/1999
8	H104A	20	12/1/1999
9	H104B	20	12/1/1999
10	H104C	20	12/1/1999
11	H12E	46	12/1/1999
12	H12I	64	12/1/1999
13	H12J	218	12/1/1999
14	H13E	6	12/1/1999
15	H13H	1191	12/1/1999
16	H13J	714	12/1/1999
17	H14A	34	12/1/1999
18	H14B	2	12/1/1999
19	H204B	31	12/1/1999
20	H204C	35	12/1/1999
21	H205E	6	12/1/1999

Ready.

Critical Piezometers  
Incidents

Map data ©2006 TeleAtlas - Terms of Use

Done

Start Data Viewer - Mozilla Firefox Data Viewer - Microsof... Microsoft PowerPoint - [P...

Internet 8:27 PM

# XE can create maps directly



Oracle Maps Demo Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://localhost:8888/mapviewer/fsmc/omaps.jsp?datasrc=sfmuni&basemap=sfmuni&centerX=5000000&centerY=2000000&srId=40977&zoomLevel=4&width=800&height=600&submit=Proceed...> Go Links

ORACLE APPLICATION SERVER

MapViewer Oracle Maps Demo

mouse location:6007502.318142363, 2113558.25694444

X:6007502.318142363 / Y:2113558.25694444

Local intranet

# Free APIs, internet mapping servers, and databases offer:



- Easy way to handle GIS features
- No special GIS software required
- Can often avoid “basemap” data development and maintenance
- Faster, more scaleable than most GIS Internet Mapping Applications
- Much less IT maintenance and oversight required
- Much better at meeting user’s expectations for how a map should work

# The Benefits?



**Avoiding a single new set of GIS licenses means saving:**

Application	Typical GIS	Free API , Spatial Db	Savings
Desktop GIS	\$2k to \$7k	n/a	0
Internet Mapping Server	\$12k	0	\$12k
Database Middleware	\$13k	0	\$13k
Database instance	\$5k	0	\$5k
Cost Savings			\$30k

Courtesy of Rod Schatz, GIS Manager, UMA Engineering Ltd

# Your current GIS Investment is Critical



- GIS tools are essential for data management
- Many analyses will continue to require GIS applications
- Paper map production and cartography will require GIS

# Integrating Your Existing GIS with Innovative technology means



- Lowest cost approach to developing business applications
- Flexibility
- Use of familiar, proven technologies
- Take advantage of innovation in the marketplace

# Your colleagues are doing it...



- Myth: No real savings
  - Still need to train staff, support multiple technologies
  - But mainstream technology (eg, XML) is everywhere
- Myth: No support for free, open source
  - Oracle, Autodesk
  - Farallon Geographics
  - Community
- Myth: Not ready for mission critical apps
  - Internet runs on open source (Apache, etc.)
  - Google runs its business on free/open source software

# To Do: Evaluate Emerging Technologies



- Free APIs
  - Google Maps, Google Earth, Virtual Earth, Yahoo!
- Free Geospatial Software
  - Oracle XE
- Open Source
  - Databases (PostGIS, MySQL)
  - Web Mapping Servers (MapGuide, many others)



# Thank You!

Farallon Geographics, Inc.  
415 227 1140  
[www.fargeo.com](http://www.fargeo.com)

[dwuthrich@fargeo.com](mailto:dwuthrich@fargeo.com)

