

# On the Road from Simple Mapping to Spatial Analysis

Brief History – How to make disadvantages work for you

Building GIS Knowledge Internally

Tested GIS Initiatives

Current Initiatives

Next Steps

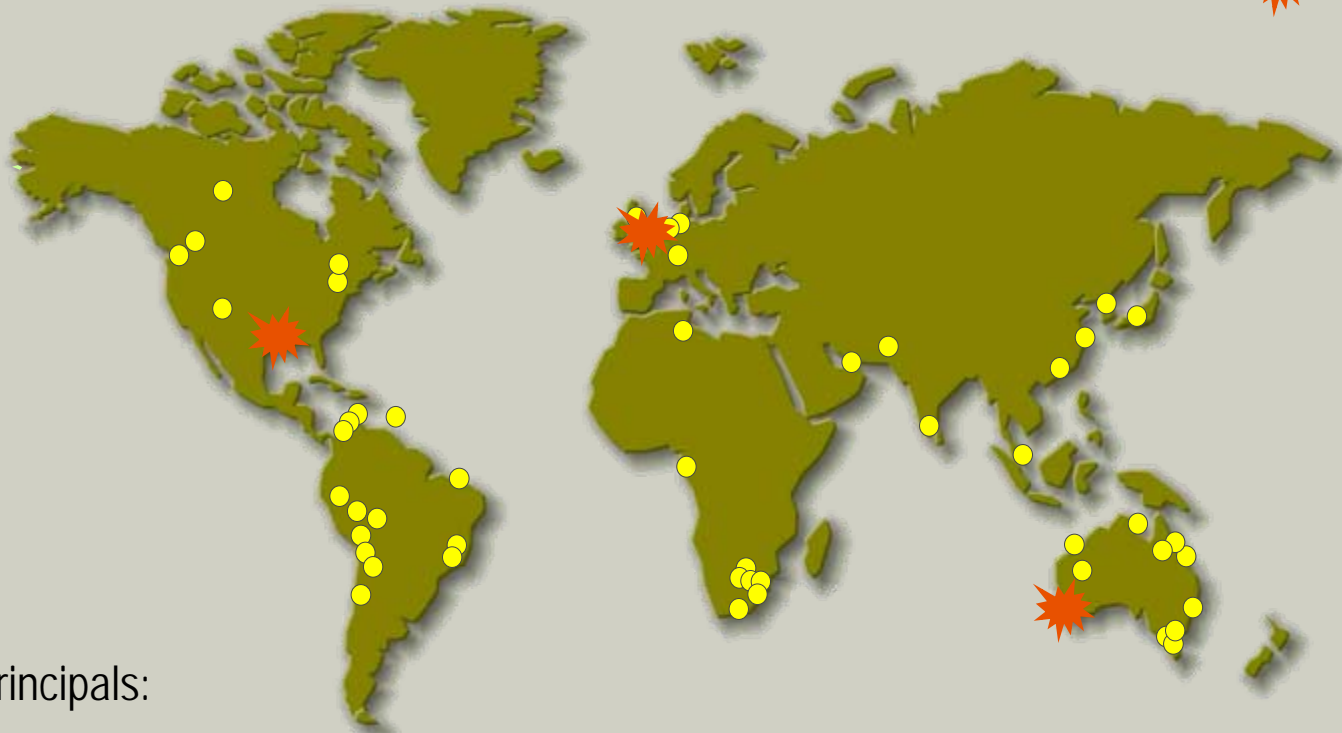
BHP Billiton Petroleum Inc.



**bhpbilliton**

# BHP Billiton Petroleum – part of Global Organization

 Main Petroleum offices

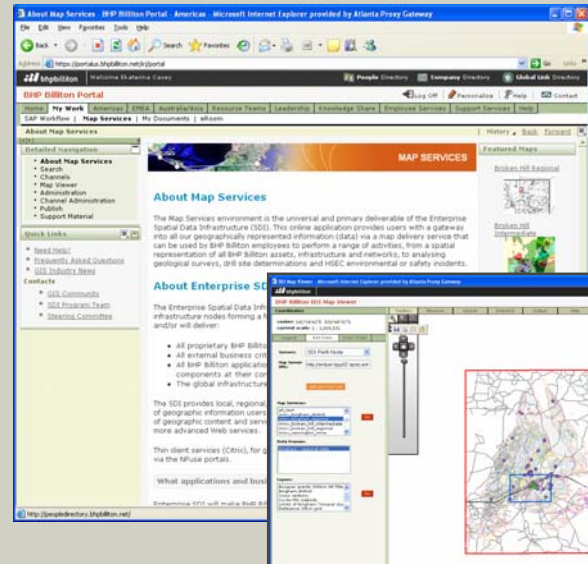
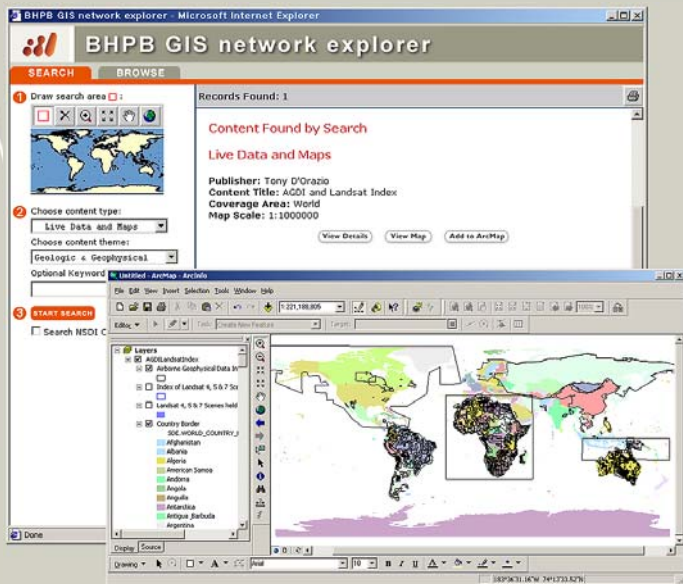


- Principals:

- Agree on common building blocks: Oracle, ArcSDE, ArcIMS, ArcServer (?)
- Desktop solutions/web GIS applications depend on business requirements
- Building Spatial Data Infrastructure (SDI) – foundation to share infrastructure, licenses and data
- The data has a value if there is a metadata on it – knowledge capture

# SDI - Incarnation of BHPB GIS Network

- ✓ SDI – multi site GIS data infrastructure and custom web application integrated into Enterprise Portal and providing on-line GIS environment for BHP Billiton.



- ✓ The BHPB GIS Network – single site GIS data management system and workflow application providing on-line GIS environment for Minerals Exploration and BHP Billiton as a whole.

# GIS in BHPB Petroleum

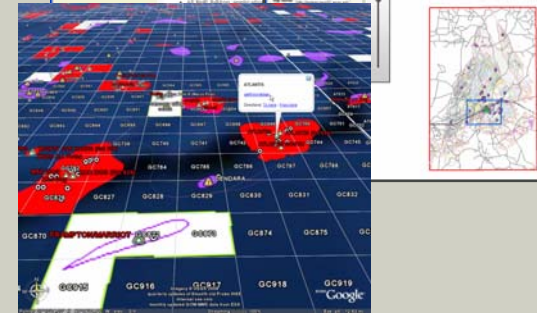
## •2004-2006

- ArcIMS and Portal
- Teaching GIS analysis
- ArcSDE in all offices
- ArcSDE –source of geographical information for Petroleum applications



## •2003-2004

- Conversion to ArcGIS 8.x
- Proper SDE implementation
- Raster Storage analysis
- Spatial Search Engine

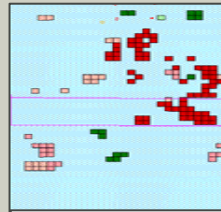
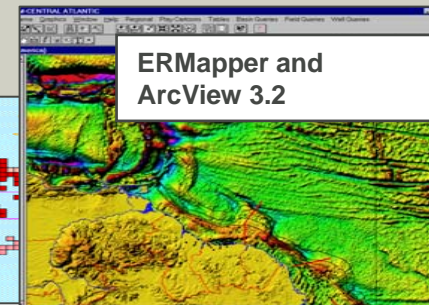
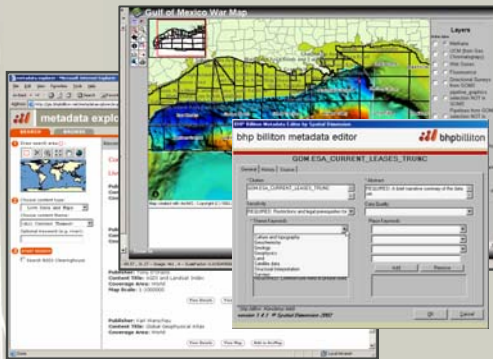


## •2002-2003

- Justifying needs for strategy on GIS data management
- Defining business rules
- Broadening GIS experience to other offices

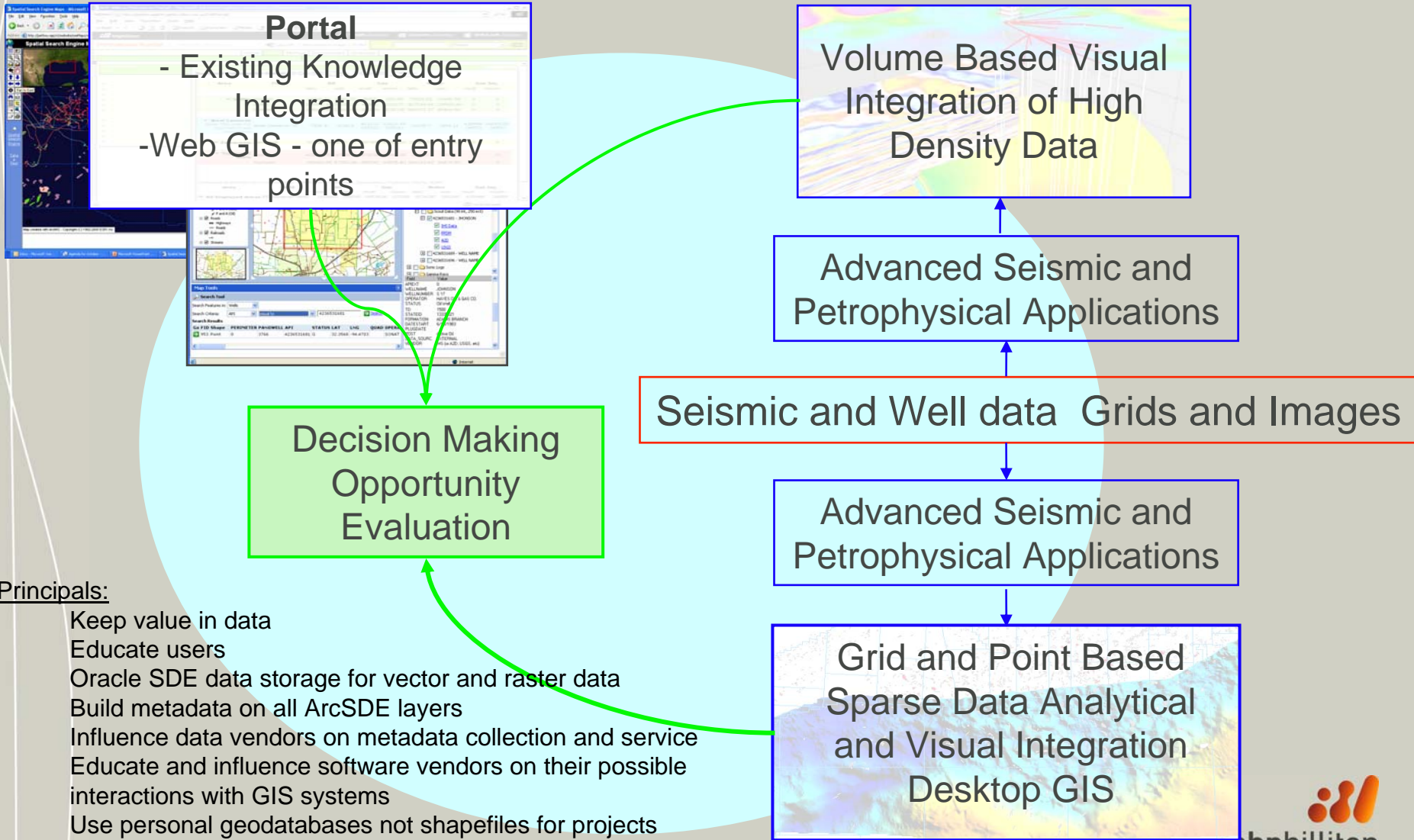
## •2000-2002

- Explaining role/benefits of GIS
- Identifying teams to gain most benefits from GIS with minimal investment
- Project data management



Leases of Merged Companies

# GIS is one of "Integration" Concepts to Make Better Decisions Faster



## Principals:

- Keep value in data
- Educate users
- Oracle SDE data storage for vector and raster data
- Build metadata on all ArcSDE layers
- Influence data vendors on metadata collection and service
- Educate and influence software vendors on their possible interactions with GIS systems
- Use personal geodatabases not shapefiles for projects
- Use UNC not drive letters

# Technically – How we did it

Build GIS to go from Simple Mapping to Spatial Analysis



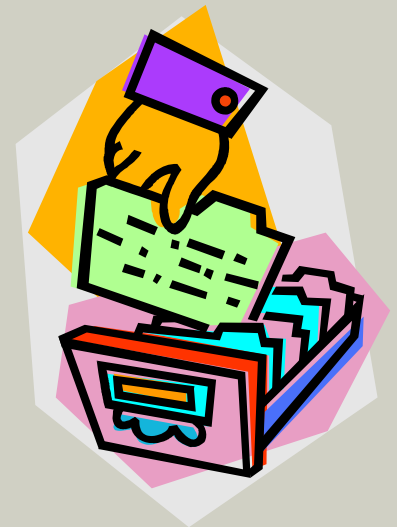
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# Data & Support

- Get the data ready for consumption
- Reduce need for intermediate people to find data
- Provide multiple avenues to access data
- Build smart defaults
- Build common layers
- Populate metadata for further descriptions
- Drive vendors to comply with data and metadata requirements
- Educate Users frequently & repeatedly

# Library card catalog - multiple ways to access the same data

- Not everyone thinks the same way
- Provide multiple links or references to the same data
- Organize by data type vs. use or both
- Metadata required for searching
- User's folder





# Metadata – Answer the questions

- Where is the data from?
- How was it created?
- When was it last updated?
- What are the uses & attributes?

Use metadata to search and find data

- Show users the value of entering metadata
  - Search for data with keywords
  - Restrict searches to geographic region

# Teach users how to find the data so they can map without support

- Familiarize users with current structure
- Build default maps for users to pick and choose from
- Create publishing process for valuable interpretation back into SDE
- Avoid gatekeeper mentality
- Build trust in data



# Layers & Smart Defaults

- Build & organize common layers (i.e. countries, leases, wells)
- Symbolize with industry standards (i.e. wells by current status, and fields by classification)
- Default labeling – ready to be checked on
- Pre-built queries – either as layers and/or as expressions (.exp)
- Populated list of maps to start.
- Extensions & toolbars on
- Plotters added and selected with large selection of page sizes

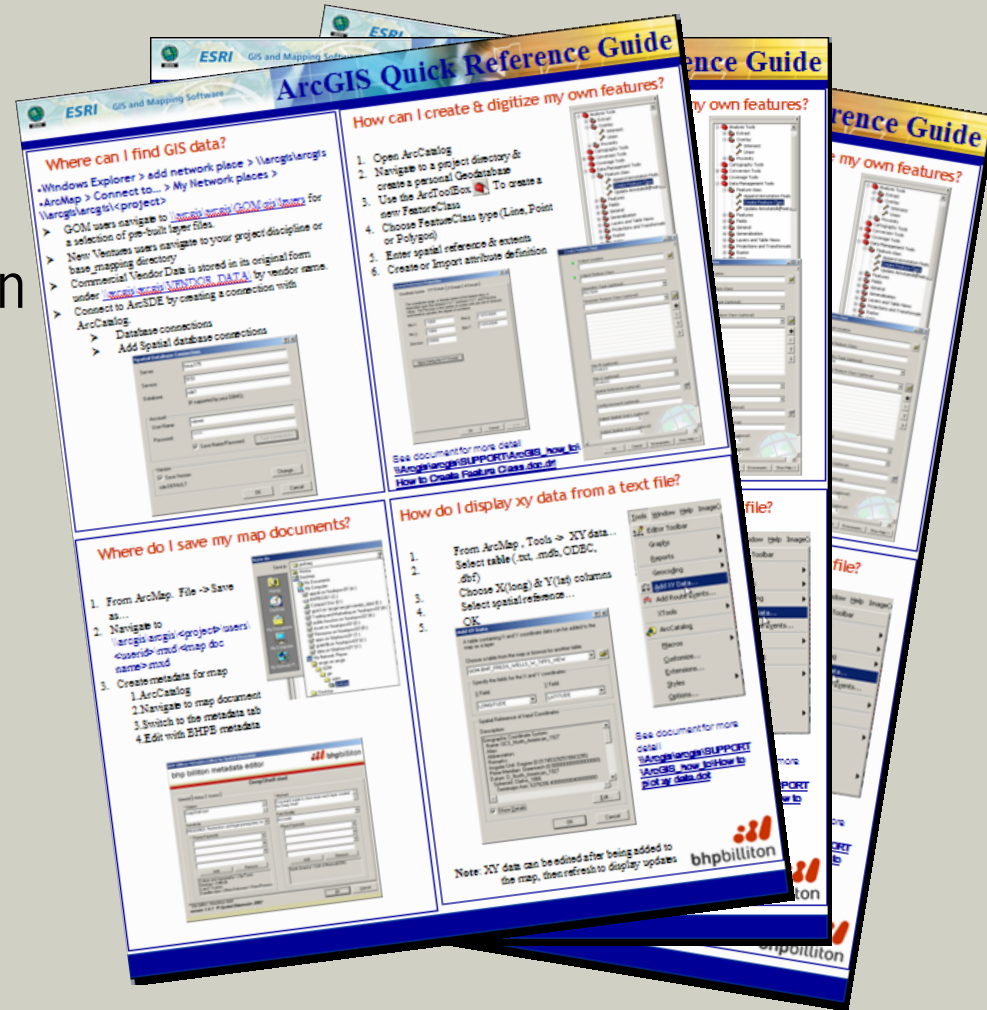
# Plug and Play Data

- Serve out from SDE & pGDB with layers
- Data must have spatial reference defined
- Attribute column names expanded and clear
- Data must have metadata
- Folder connected in ArcCatalog
- Use subtypes for default classification if adding directly from GDB



# Educate users – Smarter users reduce development & support needs.

- Simple guides to remind of specifics
- Dialog examples with common values
- Hyperlinks to other helpful documents



# From Mapping to Spatial Analysis

- Use SDE Views for complex SQL queries like;
  - Deepest well per county/block
  - Wells with log curves in Recall
- Overlay analysis like;
  - Find closest well to seismic line
  - Intersect fields with leases to find actual producing acreage
- Extraction like;
  - Masking grids for export
  - Clipping to field

# Evaluations at BHP

- Google Earth Enterprise
- ArcGIS Server portal integration
- OpenSpirit web services
- Meteorlogix
- Spatial Data Infrastructure (SDI), Federated GIS
- Gigabit to the desktop

# ArcGIS server portal integration

- ArcGIS server performing to our requirements
- SAP portal integration is possible and not difficult
- Continue development of specialty tools leveraging ArcObjects
- Test with DecisionPoint portlets and other BHPB Portal applications interactivity:
  - eWell
  - Data Search
  - Log viewer
  - getKnowledge
  - etc.

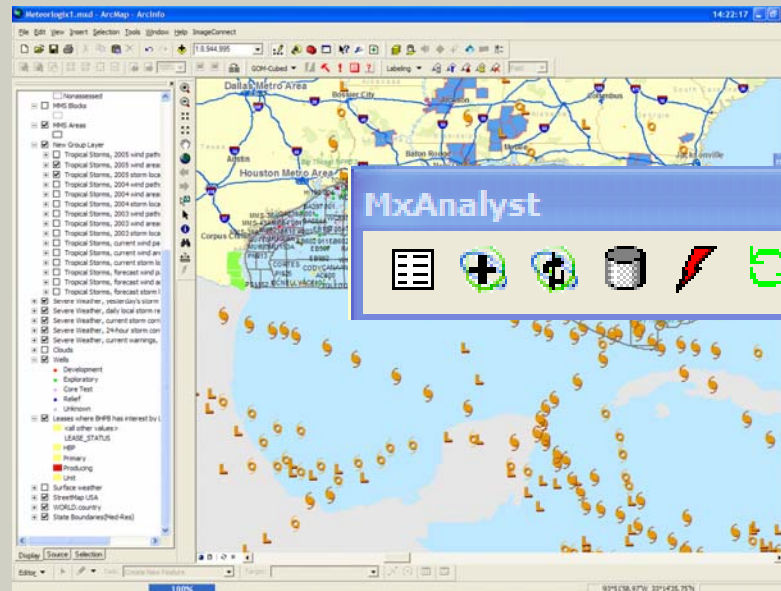


## OpenSpirit Web Services & SDE 'Culture' sever

- From a web site access the Landmark stores attributes
- Broadcasts SDE features to other OpenSpirit enabled software.
- Tested with Google Earth

# Meteorologix – Weather in GIS

- Value:
  - Near real time GIS layers of weather for HSE and operations
  - Expands GIS benefits within the company
- Considerations:
  - Firewall issues
  - Delivered as FTP services to the desktop GIS
  - User unawareness of geographical solution
- Opportunities for future improvements:
  - Gather data from the stations offshore and deliver detailed information via Arc Web Services
  - Make tools available from ArcGIS Server applications

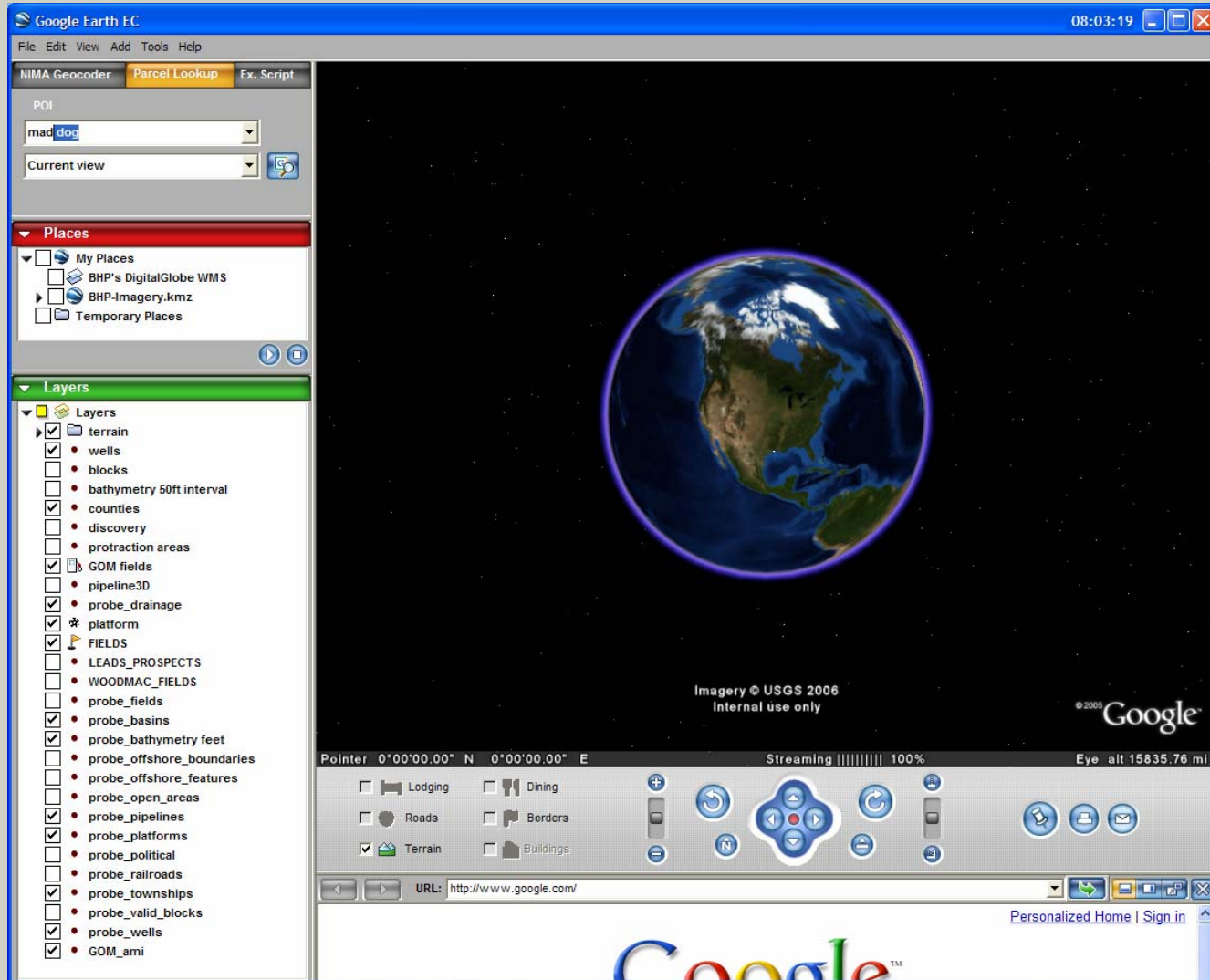


# SDI – Federated GIS

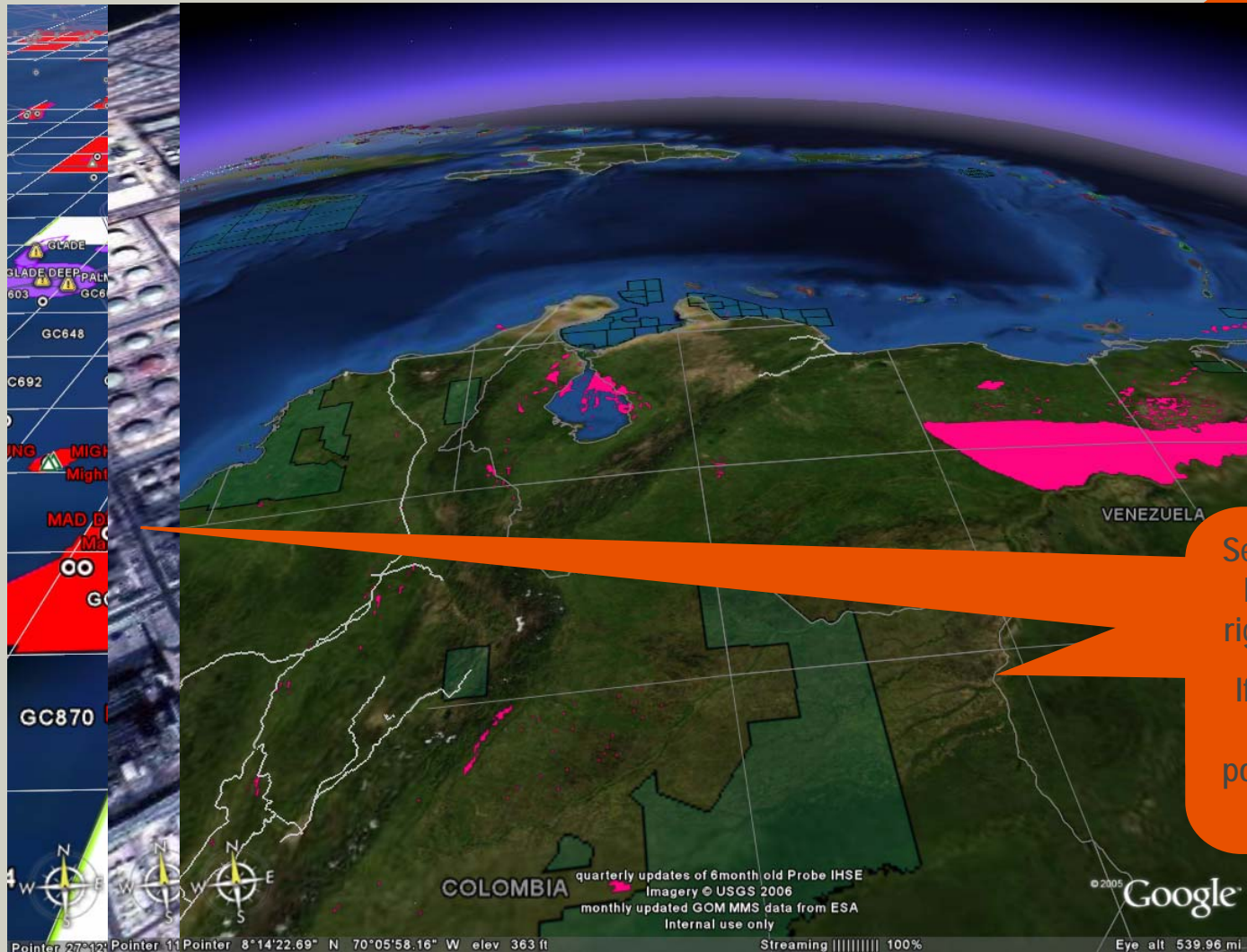
## We can see what they have

- Multi-node, synchronized, multi-instance, ArcIMS/ArcSDE
- Portal Integration
- Search & browse tools
- Publish & map viewing

# Simple and Intuitive Globe Viewers



# Google Earth Enterprise – Pilot to Integrate Digital Globe and Proprietary data – Fit for Purpose Viewing and Geographical Locator



Customisable  
'balloons' can send  
users to knowledge

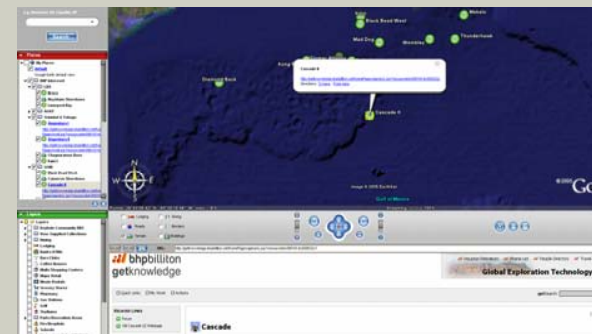
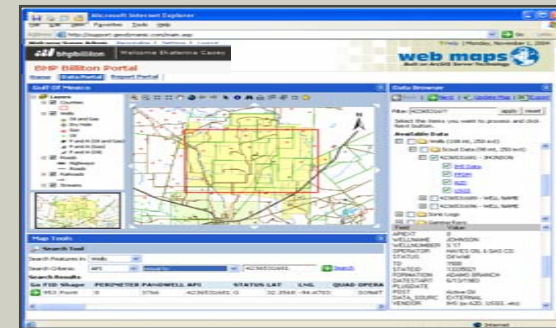
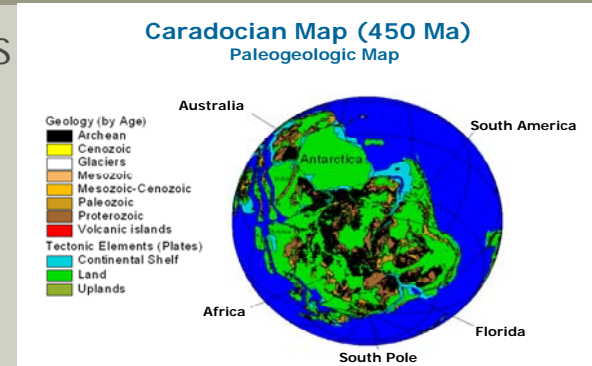
where we own high  
resolution digital  
globe imagery, this  
is displayed on the  
'globe'

See all wells, blocks,  
basins, pipelines,  
rigs, opportunities...

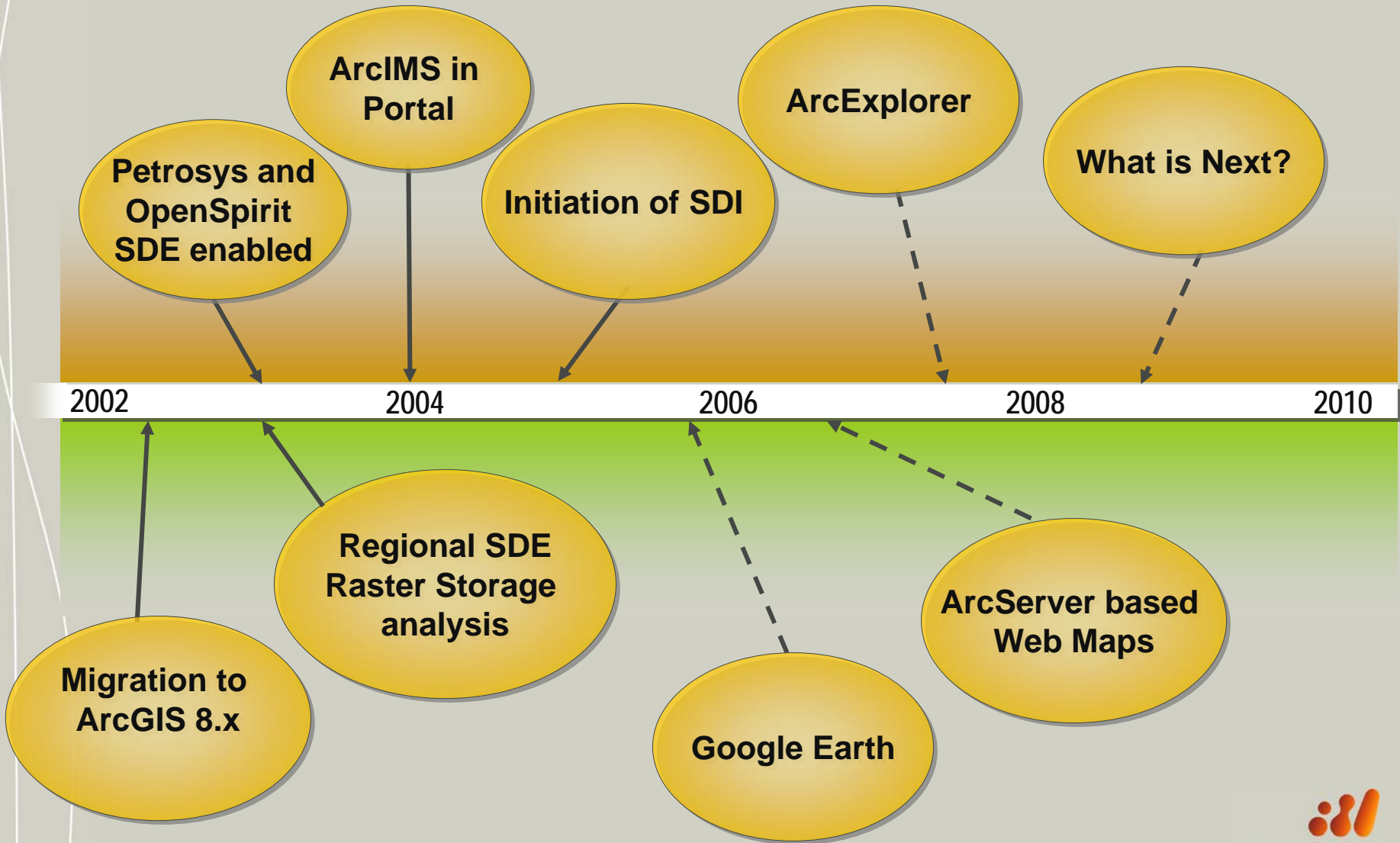
If data has a spatial  
element, it is  
possible to display it

# GIS needs in Petroleum

- Advanced Analysis (Desktop ArcGIS) – Frequent (trained) users
  - Structural mapping
  - Advanced geographic data manipulation (raster and vector)
  - Powerful geospatial analysis and geo processing
  - Temporal and spatial data modeling (Paleo geography reconstructions)
- WebMaps – 'Casual' users
  - Quick review of published maps
  - Simple geographical analysis tasks
  - Cartographic print of the map
  - Small specialty GIS applications
  - Search for documents from the map
- Geography for everybody
  - GoogleEarth:
    - current way of viewing and purchasing of high resolution imagery
    - simple reconnaissance tool
    - Promotion of geography and imagery
  - ArcExplorer
    - In development: competitor for Google Earth designed by ESRI
  - Free NOAA and NASA Earth viewers



# Geographical Applications Road Map at BHP Billiton



# What is Next

- Continue to move from .shp to pGDB
- Web Services
- Broaden GIS to other teams: engineers, marketing, HR, HSE, etc.
  - Simplified GIS for web maps
- SOM- self ordering maps: BHPB Minerals Exploration technology in Petroleum?
- Participation in SDI



# BHP Billiton Petroleum Strategic Alignment

- Focus on searching and locating quality data
- Reuse of data
- Integrating complementing technologies to have job done
- GIS- community integrator and requires team players to realize full value of it
  
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