AuScope

AN ORGANISATION FOR A NATIONAL
EARTH SCIENCE INFRASTRUCTURE PROGRAM

Australian Earth Science Research Spatial Information Infrastructure

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AuScope Grid - Director

Outline

- Why build an Earth Science Spatial Information Infrastructure?
- What is AuScope?
- What is an Information Infrastructure?
- Building an Earth Science Information Infrastructure
- The AuScope Earth Science Information Infrastructure

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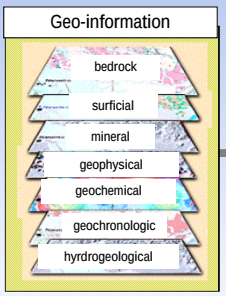
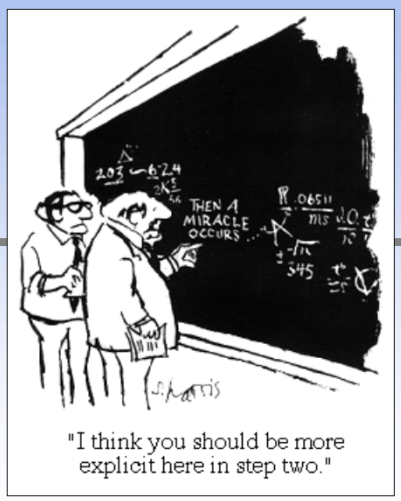
Decisions, decisions…?



knowledge base



?

Commonwealth

State

Local

Regional

Industry

Research

decision makers

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With acknowledgement to Boyan Brodaric, Natural Resources Canada

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Don't you hate it when……..

- You have to keep and maintain versions of someone else's data, and you don't know if it's correct or outdated?
- You know there's useful information out there, but you cannot find it?
- You waste valuable time downloading and converting datasets?
- You can see the data you want on a web map but you can't download the real data for analysis?

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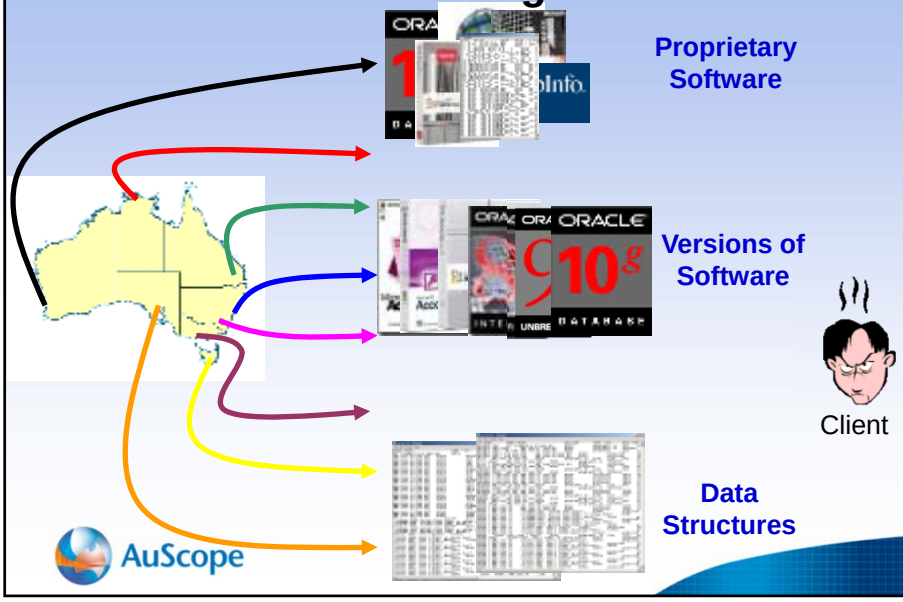
Part of our problem…data access is not standardised across organisations



Minerals Industry: Persistently driving

- Recommended actions
  - "Development and endorse a plan to upgrade … the Geoscience portal..
  - Endorse .. standards for company exploration data submitted to Mines Departments
  - Implement web-based services …
  - Develop and endorse a plan for implementation of an Australian Earth Science Grid"

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See http://www.industry.gov.au/assets/documents/itrinternet/Road_to_Discovery20040702155050.pdf?CFID=28

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The problem runs deeper…information is part of a workflow across organisations

- Water Resources
  - Bureau of Meteorology – legislative mandate on water data
  - ~300 data providers
  - Dozens of data products
- What format?
  - 95% say Comma Separated Values – what about relationships?
  - Is "T" Temperature, Time, Total, Turbidity?
  - What about Units of measurement? Temperature, Kelvin, Centigrade, Fahrenheit?

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It's all to hard

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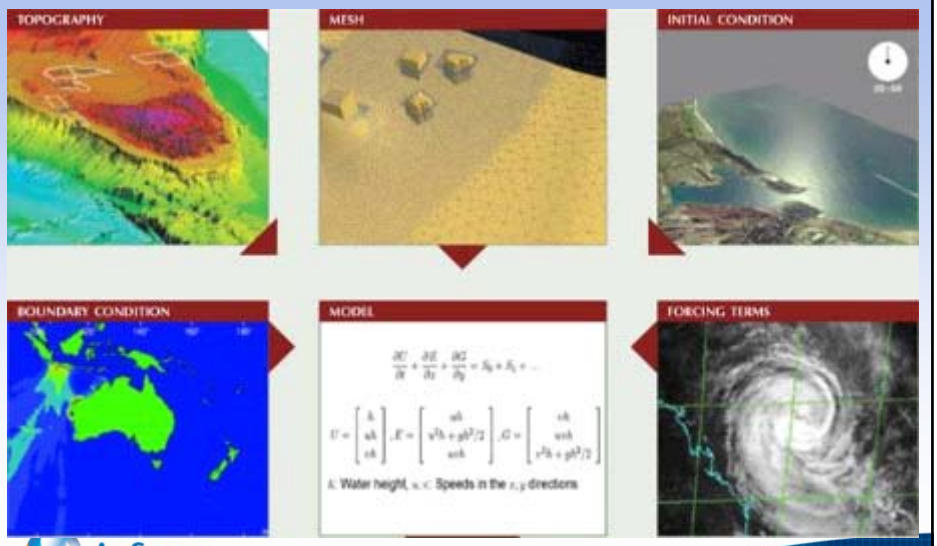
What is AuScope?

Earth Science *Research Community*

Integration of observations, models, simulation…



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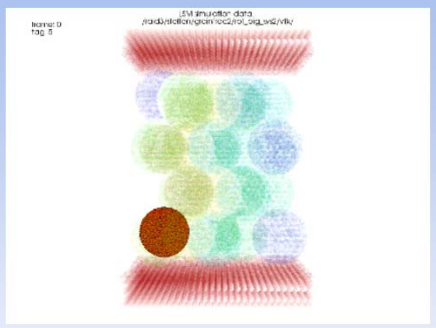
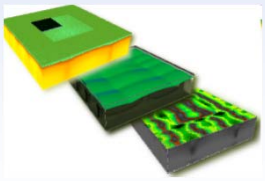
Analysis Workflows





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National Collaborative Research Infrastructure Strategy

- NCRIS – a new Australian Government Initiative
- Australian Government: ~$500M for FY06-FY11
- 11 Capability Areas + one Systemic ICT Infrastructure
- NCRIS Principles
  - "Major infrastructure …should serve the research and innovation system broadly, not just the host / funded institutions
  - "...seek to enable the fuller participation of Australian researchers in the international research system"
- Test Beds Prototypes

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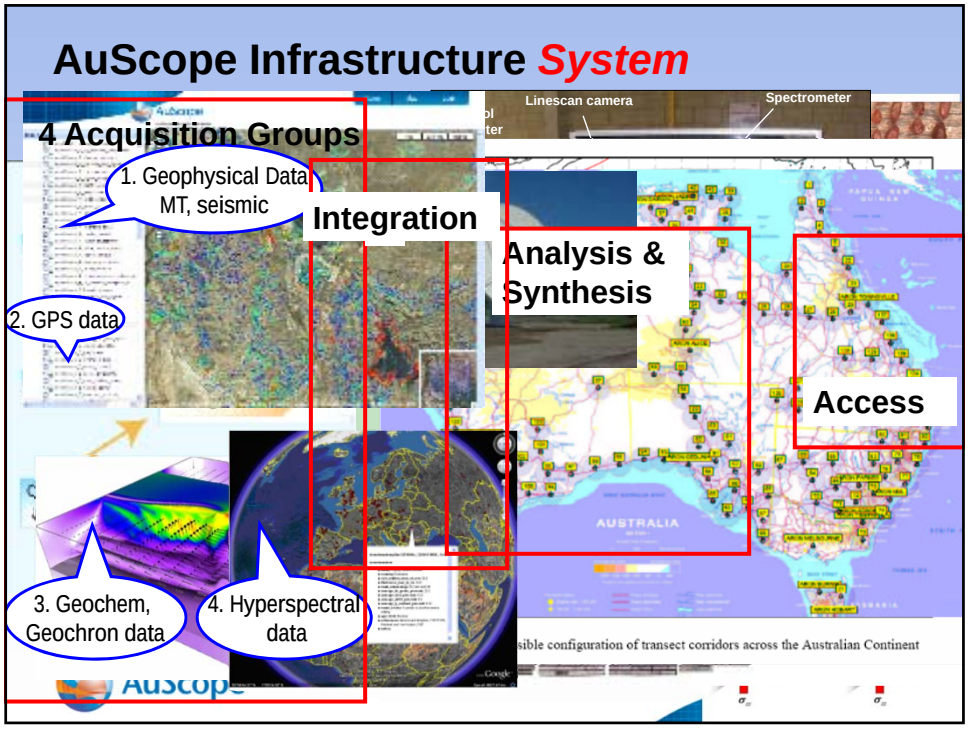
AuScope Infrastructure System
4 Acquisition Groups
1. Geophysical Data MT, seismic
2. GPS data
3. Geochem, Geochron data
4. Hyperspectral data
Integration
Analysis & Synthesis
Access
Linescan camera
Spectrometer
AUSTRALIA
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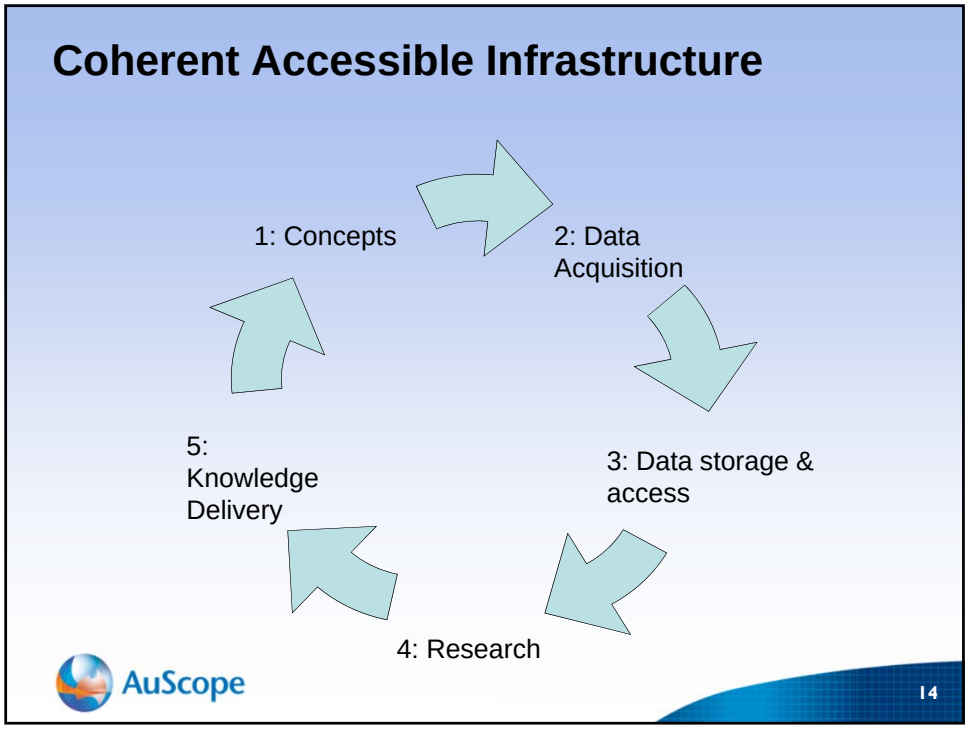
Coherent Accessible Infrastructure
1: Concepts
2: Data Acquisition
3: Data storage & access
4: Research
5: Knowledge Delivery
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What is an Information Infrastructure?

Data sharing, applications, discovery and access

What hat do you wear? Consumer, Provider or both!

Consumer

Standardise Information models
Standardise the Query interface

Provider

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Do *not* change my internal operations dramatically *(including databases)*
Should *not* second guess the *consumers* workflow

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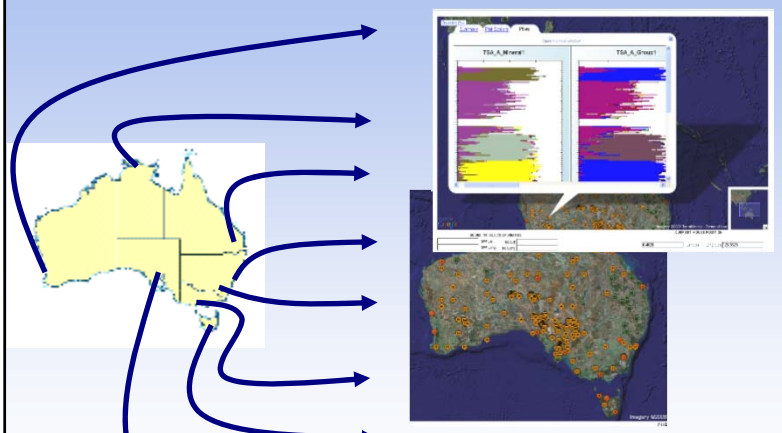
A solution: Open standards based earth science information infrastructure



Client

AuScope Community Agreements

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Applications: It's not about you…it's about them.

Rendered into a map layer AND queried by a user or….

… formatted into a report or ….

… read and used by any enabled application

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Slides courtesy Stuart Girvan – Geoscience Australia

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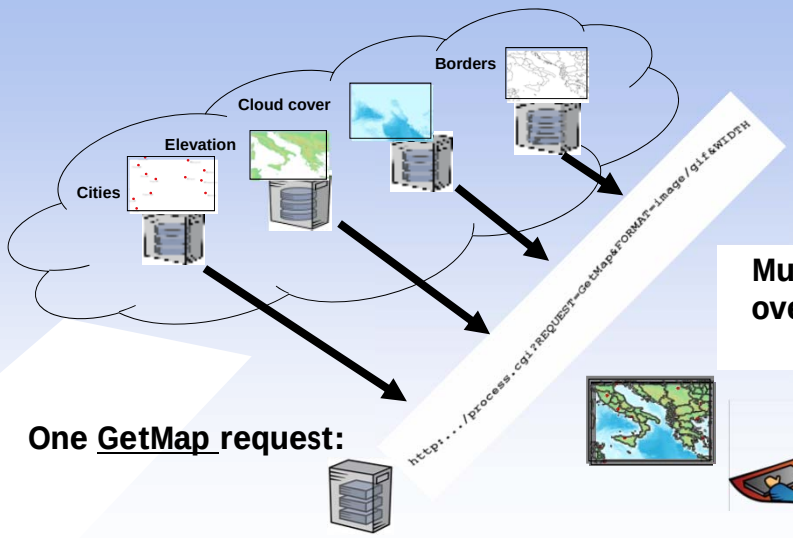
Web Map Service (WMS) can access multiple maps



Multiple overlaid maps

One GetMap request:

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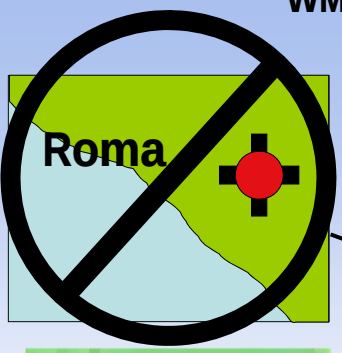
WMS can't "give data away."



WMS GetMap returns a server's "dumb" JPEG, GIF or PNG representation of the data on the server. It does NOT return the actual data, only a bitmap of the data.

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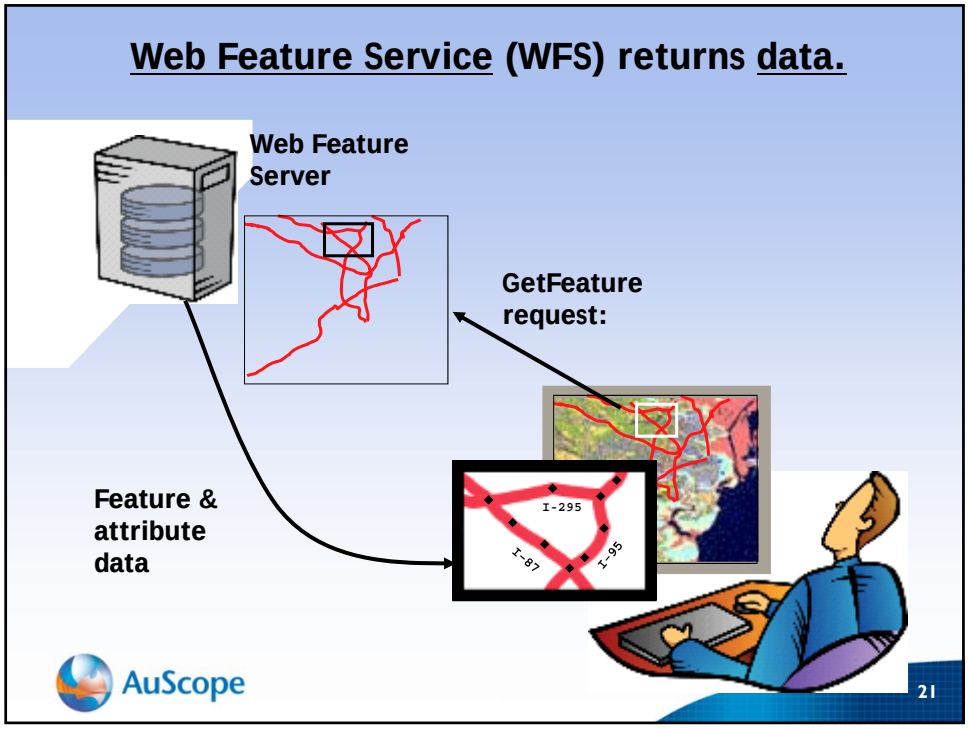
Web Feature Service (WFS) returns data.
Web Feature Server
GetFeature request:
Feature & attribute data
I-295
I-87
I-95
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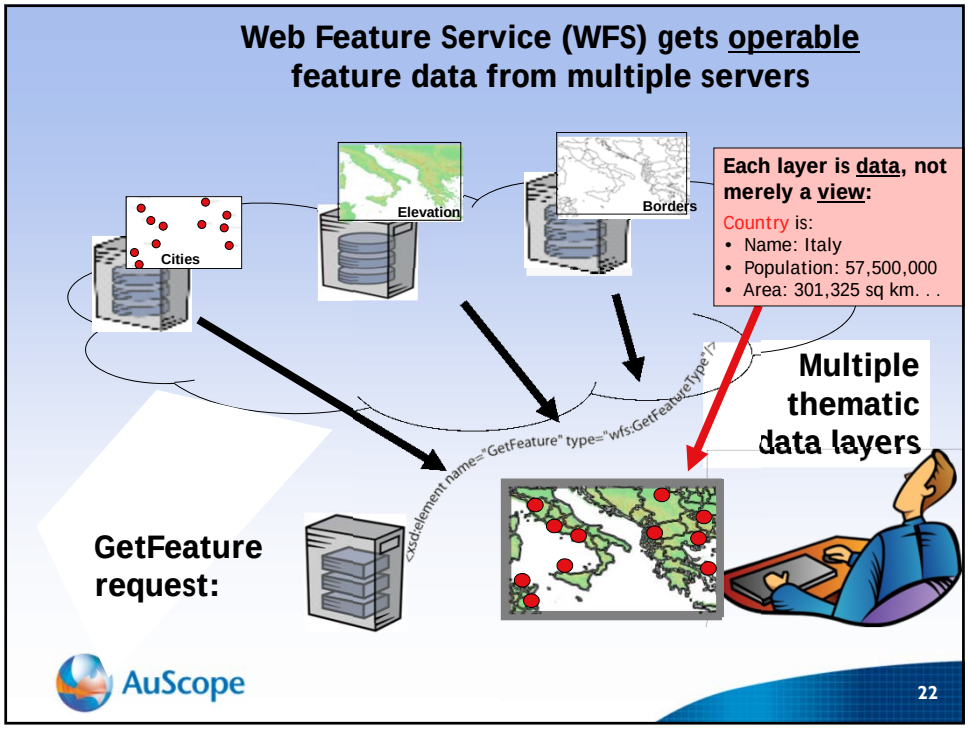
Web Feature Service (WFS) gets operable feature data from multiple servers
Cities
Elevation
Borders
Each layer is data, not merely a view:
Country is:
• Name: Italy
• Population: 57,500,000
• Area: 301,325 sq km. . .
Multiple thematic data layers
GetFeature request:
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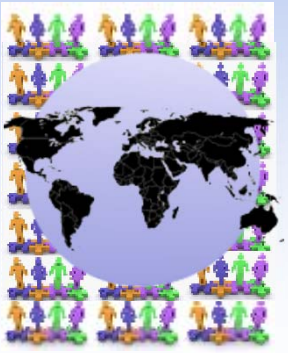
Portrayal vs Analysis
Simple vs Community Schemas

Data can be easily exchanged within communities where meaning is understood and humans are involved

Property = temperature, *(only) Value* = '15-20'



For use in wider communities more precise definitions are required that reflect the complexity of the real world

Property = temperature,
Value = 15 *Unit* = C *Instrument* = thermometer
Value = 17 *Unit* = C *Instrument* = thermometer
Value = 20 *Unit* = C *Instrument* = thermometer

OR

Property = temperature,
MinValue = 15 *Unit* = C
MaxValue = 20 *Unit* = C

Agreement at an international level enables data to be reused, *repurposed* and used by other domains globally

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Building an Earth Science Information Infrastructure

…locally for access nationally and globally
…to provide access to authoritative, high quality, data and information
…to enable reuse and repurposing of data and information
…to integrate with other national and state network initiatives

1st Step: Standardise the Information Models

- Not a storage problem…
  - Exchange
- Semantics and structure
  - GeoSciML, OGC
- Tool support
  - Creation and validation

OGC® Open Geospatial Consortium, Inc.

Geography Markup Language

IUGS CGI <GeoSciML/>

FullMoon XML Processor

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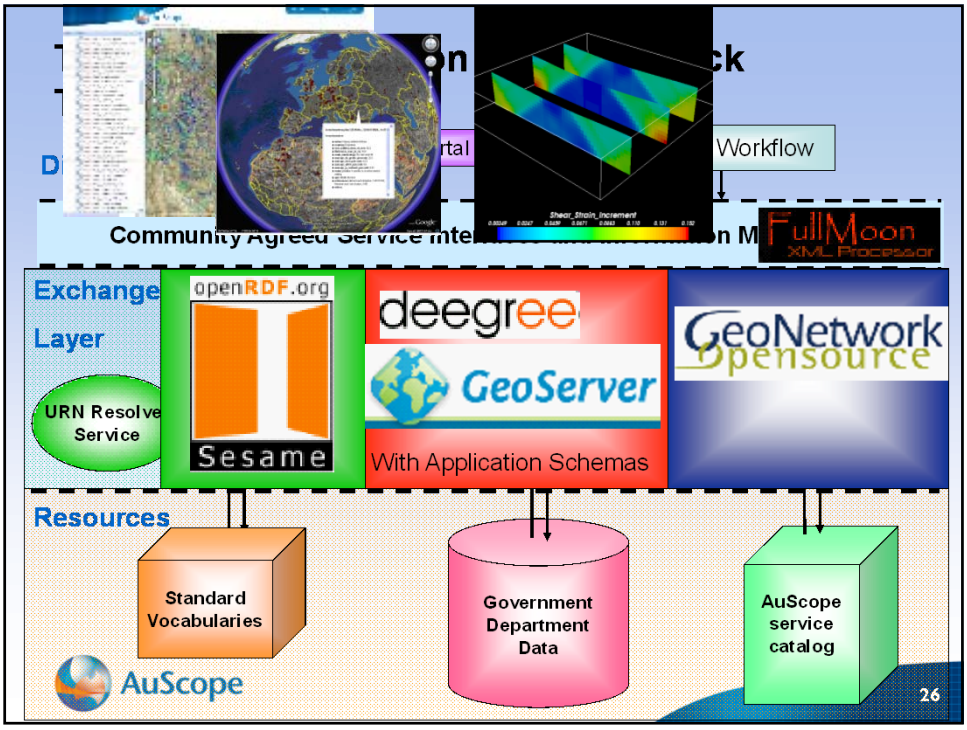
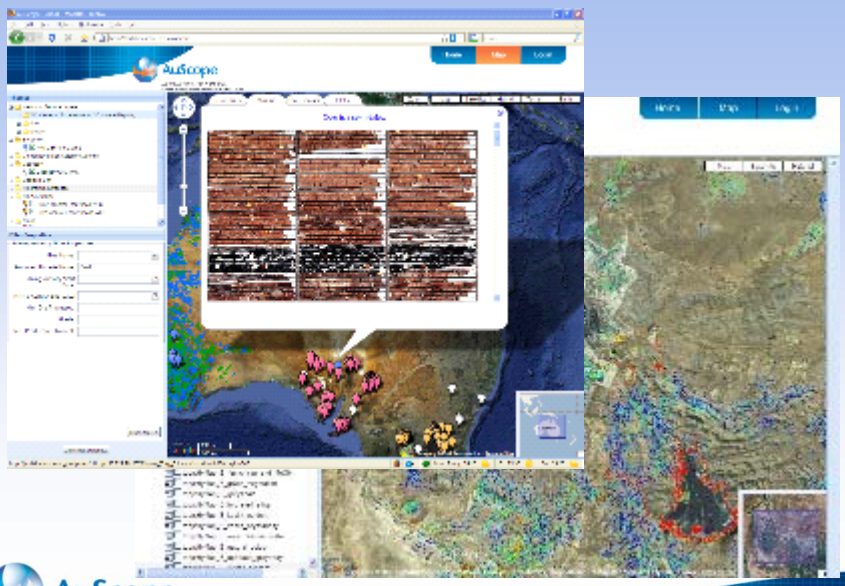


Discovery Portal - Surfing the Earth Model



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The AuScope Earth Science Information Infrastructure

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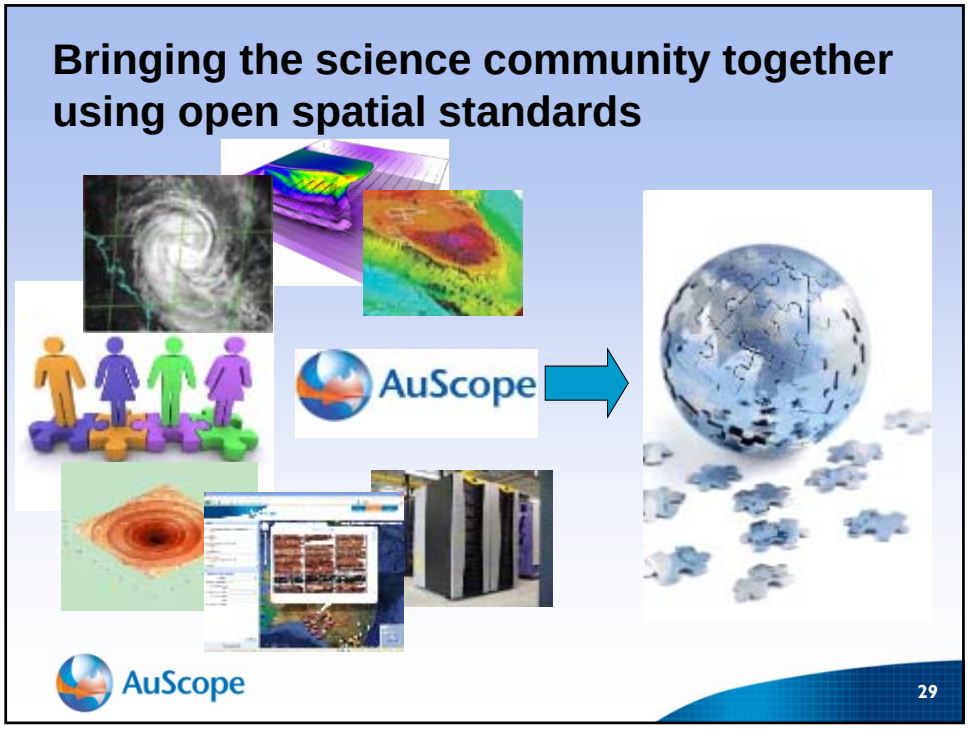
Bringing the science community together using open spatial standards
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