The following was presented at DMT'09
(May 10-13, 2009).

The contents are provisional and will be
superseded by a paper in the
DMT'09 Proceedings.

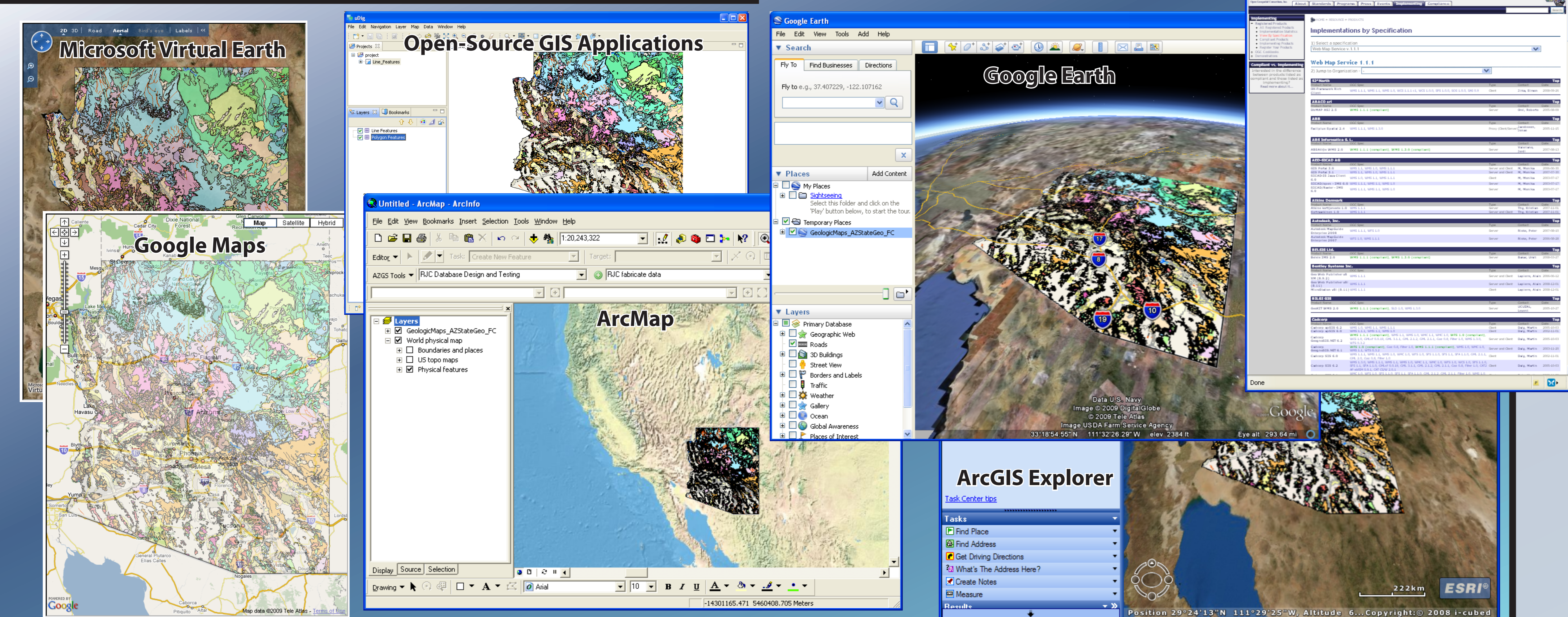See also earlier Proceedings (1997-2008)
http://ngmdb.usgs.gov/info/dmt/

SHARING GEOLOGIC MAPS AS WEB MAP SERVICES

by Ryan Clark and Stephen Richard, Arizona Geological Survey

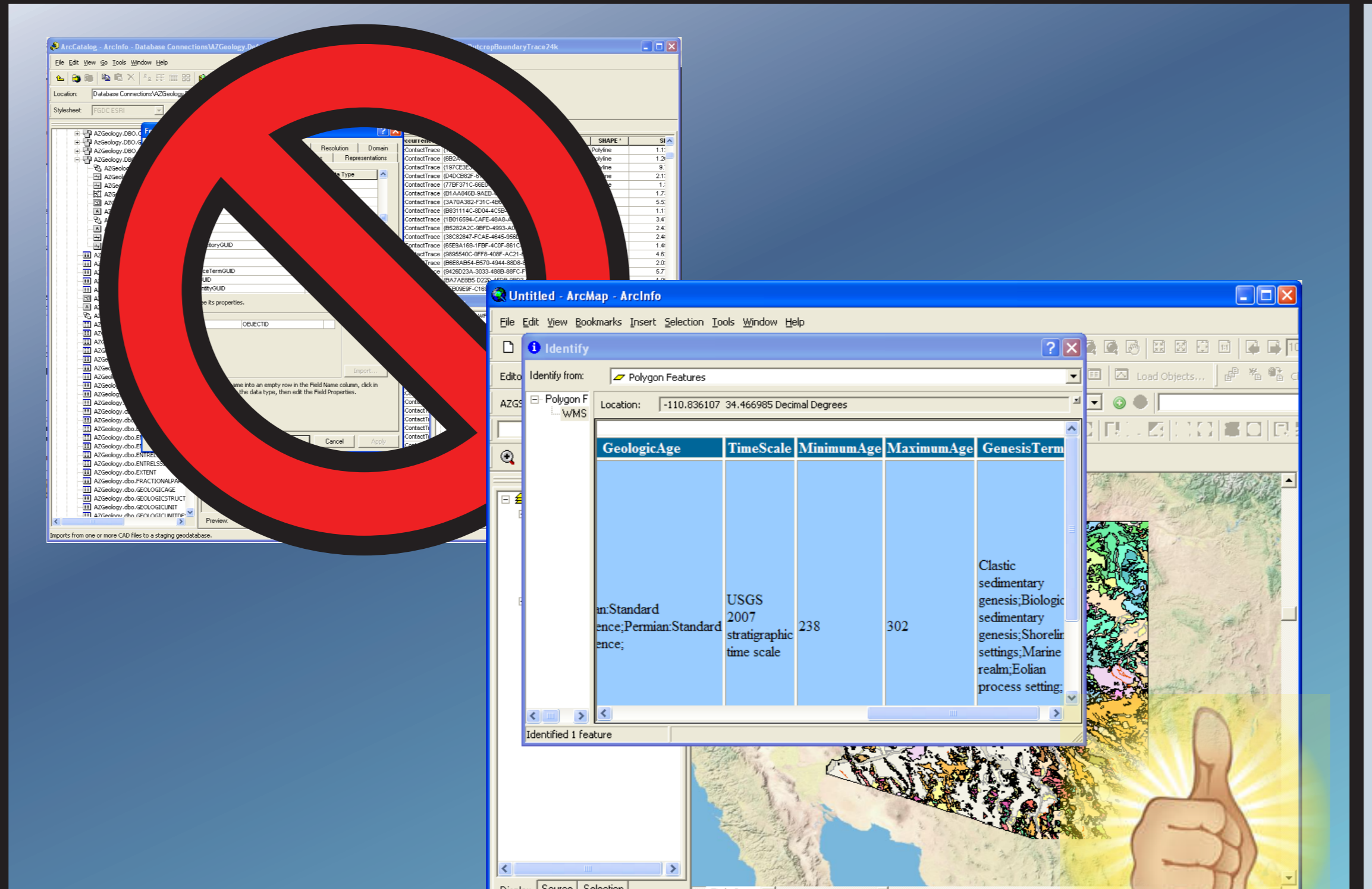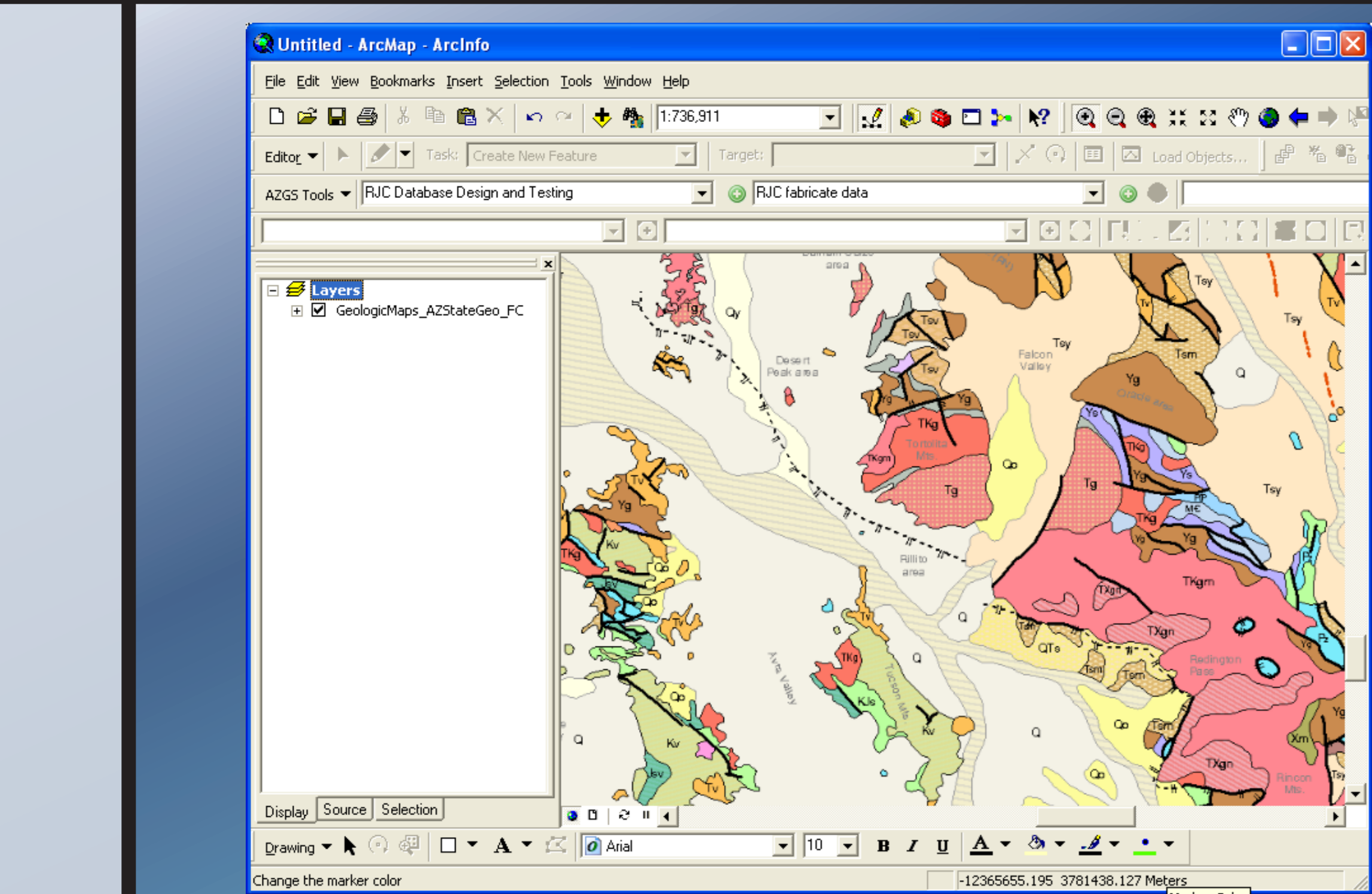## Why Provide Geologic Maps as Web Map Services?

Make your data available to a wide variety of applications: The standard data format makes it easy for developers to create custom applications, or mash-up your data with any other data sources.

There are TONS of pre-existing WMS Clients

Preserve your Cartographic Work: You spend a lot of time making your maps look good. Providing your data in WMS format allows that cartography to be seen by your users.

No more schema-mapping: Simplifies your clients' lives - no more cryptic field names and coded values. Instead of having to figure out which fields contain the right data, you control the attributes they see.

Maintain Control of your Data: Instead of distributing databases and shapefiles, you distribute URLs. Clients see the data on your server, so you retain complete control.

Simplify updates and data maintenance: Because clients are looking directly at your datasets, data can be updated and maintained in real-time. Clients no longer need to download the latest version of your data - they always get whatever you make available.

Your data is available online immediately: Your clients don't need to wait for any large files to download. They need nothing more than the URL for your WMS and an application in which to view it. You can control access through standard internet protocols.

You are already using web services: Map-based web applications you use on a daily basis such as Google Earth, MapQuest, or Microsoft Live Search: Maps already use web services to easily and conveniently convey spatial data to a wide audience. Web Map Services are an obvious online delivery method for our geologic data.

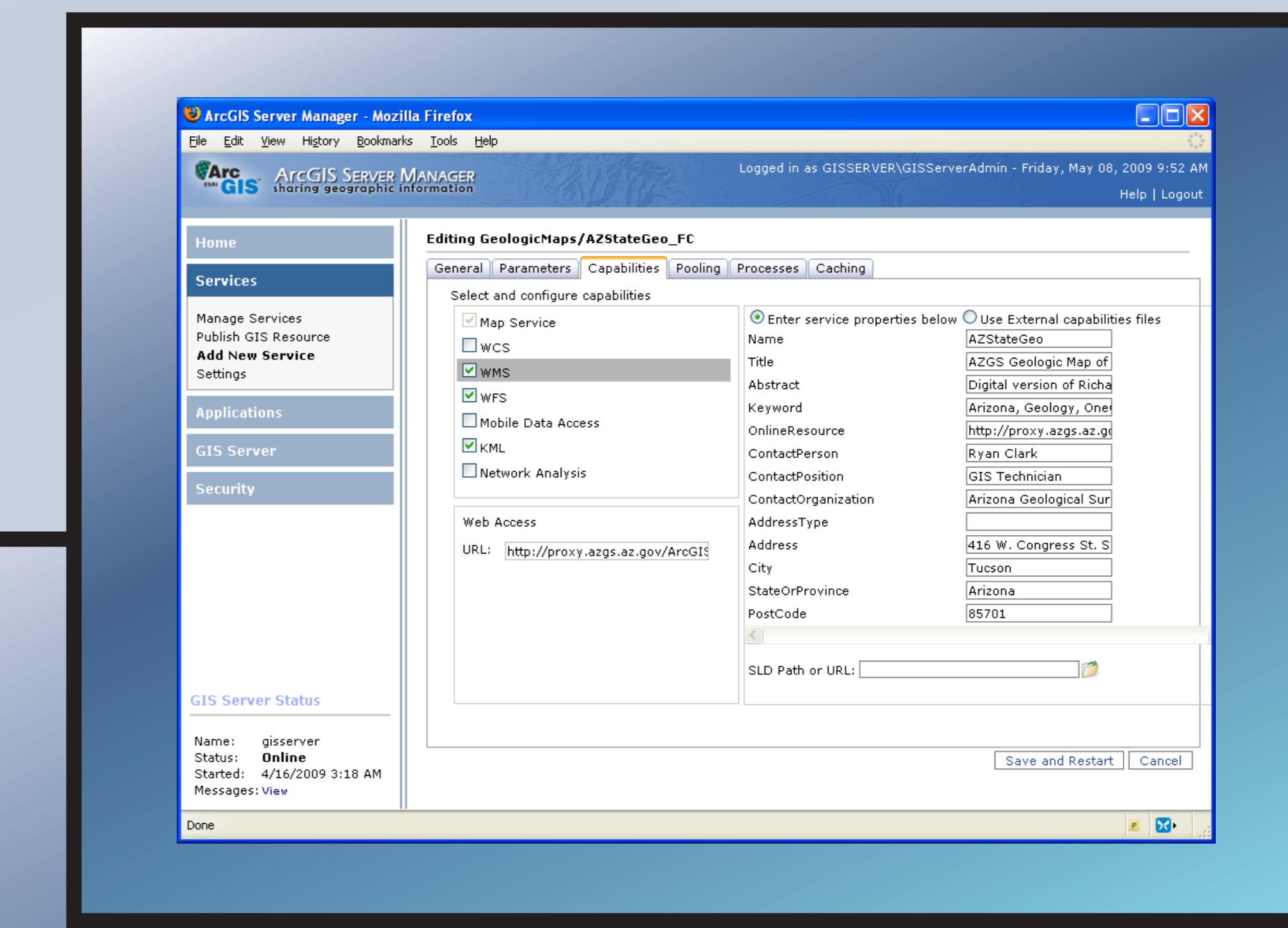## How Can You Provide Geologic Maps as Web Map Services?

There are many applications that you can use to turn your maps into web map services. At the Arizona Geological Survey, we've focused on two different servers: ArcGIS Server and Deegree. Other common choices include GeoServer and MapServer. Each application has its own benefits and disadvantages

ArcGIS Server Implementation
http://resources.esri.com/arcgisserver/

PROS:
- Very good support for all the cartographic niceties provided by ArcGIS Desktop.
- Provides simple implementation, a nice user-interface for setting up services, and good documentation.
- For those using ArcMap to produce your geologic maps: Your .mxds can be published as services in seconds.
- Easily provide your data in a variety of formats: WMS, WFS, KML, etc.
- Utilities to create and update tiles for your services.
- For developers: Simple and effective APIs help you to build web-applications which consume your services.
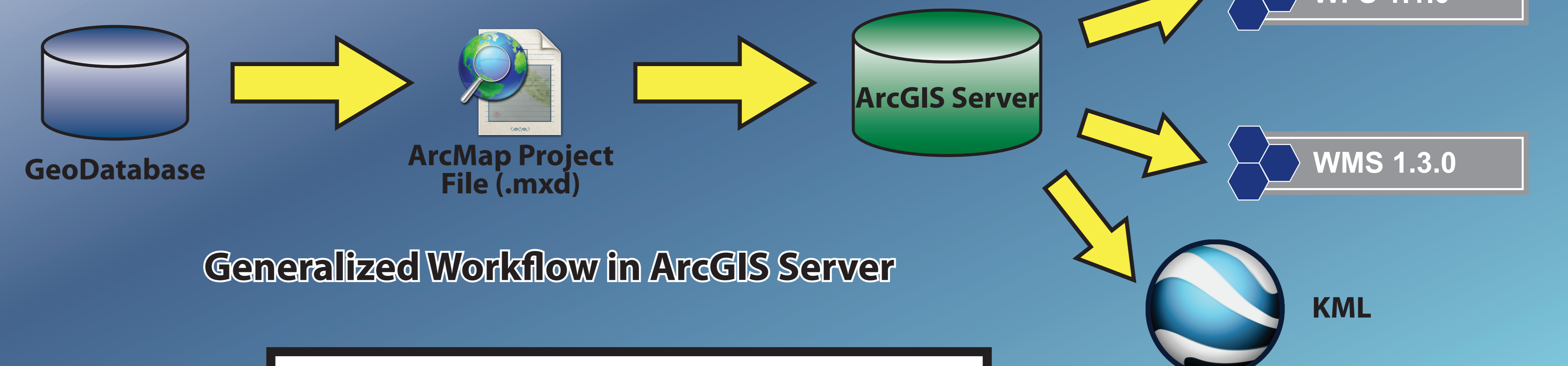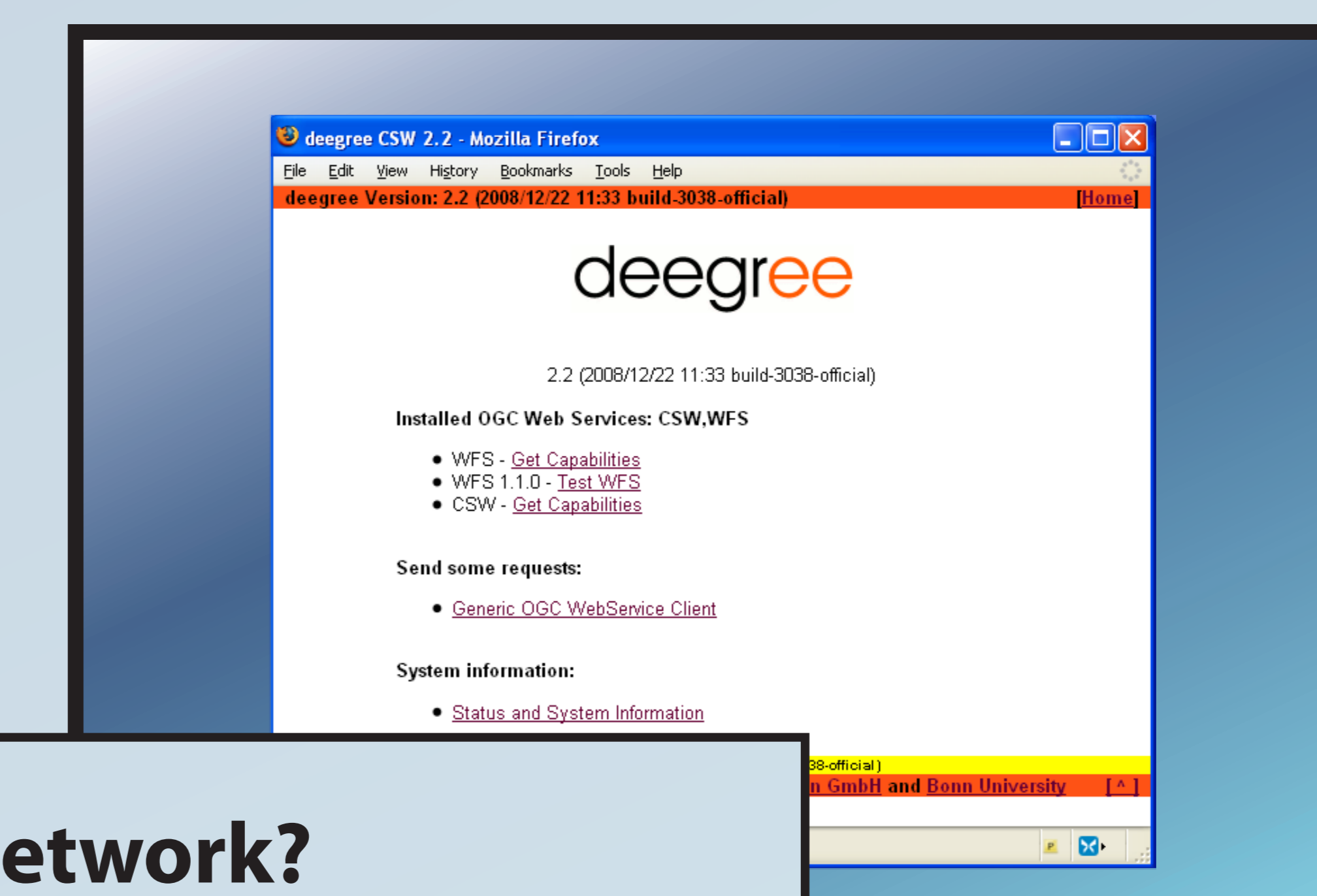
CONS:
- Ability to customize your services is somewhat limited.
- Cannot implement a complex WFS: this is required to provide GeoSciML Web Feature Services.
- **Definitely not free**

Generalized Workflow in ArcGIS Server

GeoDatabase → ArcMap Project File (.mxd) → ArcGIS Server → ESRI Map Service (for use with APIs) / WFS 1.1.0 / WMS 1.3.0 / KML

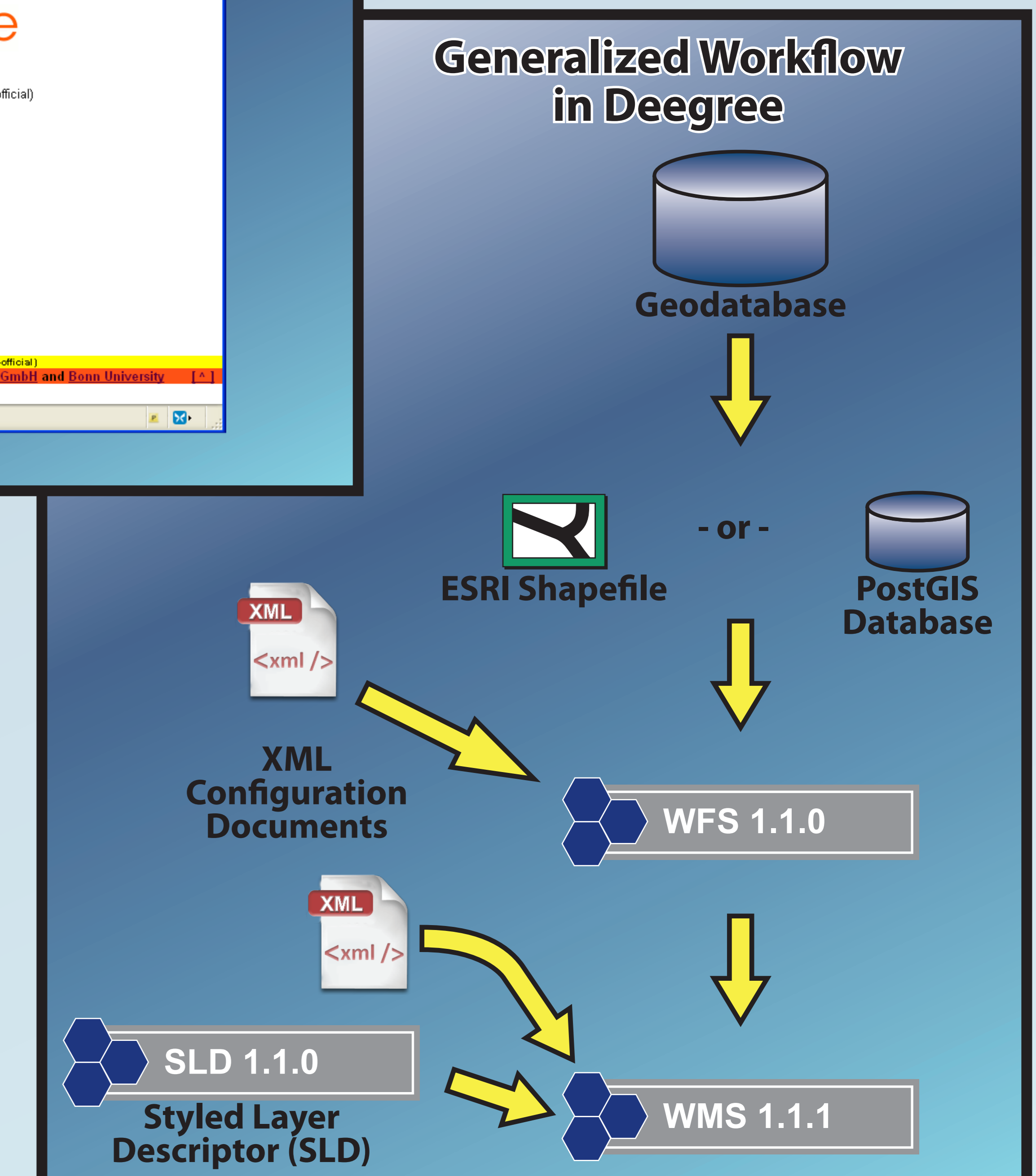### Deegree Implementation
http://www.deegree.org

PROS:
- All Java implementation - Tomcat servlet: Runs on a variety of different platforms
- **FREE**
- Configurations can be developed on one platform and deployed on another. We've tested it with both Windows and Debian.
- A GeoSciML Web Feature Service can be implemented in the same environment.
- Completely customizable through XML configuration documents

CONS:
- Complicated XML configuration
- Limited cartographic capability

Generalized Workflow in Deegree

Geodatabase → ESRI Shapefile - or - PostGIS Database → XML Configuration Documents → WFS 1.1.0 / SLD 1.1.0 Styled Layer Descriptor (SLD) → WMS 1.1.1

How Do Web Map Services Fit into the Geoscience Information Network?

Web Map Services are one form of data shared within GIN: All online data sources linked in GIN conform to already established OGC (Open Geospatial Consortium) standards. Other data sources might be Web Feature Services (WFS) or even simple scanned, georeferenced imagery.

All data sources are discovered through standard CSW (Catalog Service for the Web) services: These catalogs provide a standard mechanism for searching metadata records. Metadata for WMS or other online services provide the client with the URLs neccessary to connect to the service. Because the client has to search through the actual metadata before linking to your data, they are never left with a dataset and no metadata for it.

You maintain complete control over your data: There is no centralized repository or database where you have to send your data to have it included in GIN. OGC services allow the data to reside on your server, and allow your clients to access it directly.

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