# Publishing Imagery using WMS: How do the Open Source Products Fare?

## FOSS4G2008

Bruce Tonkin, Michelle Douville
Province of British Columbia, Canada

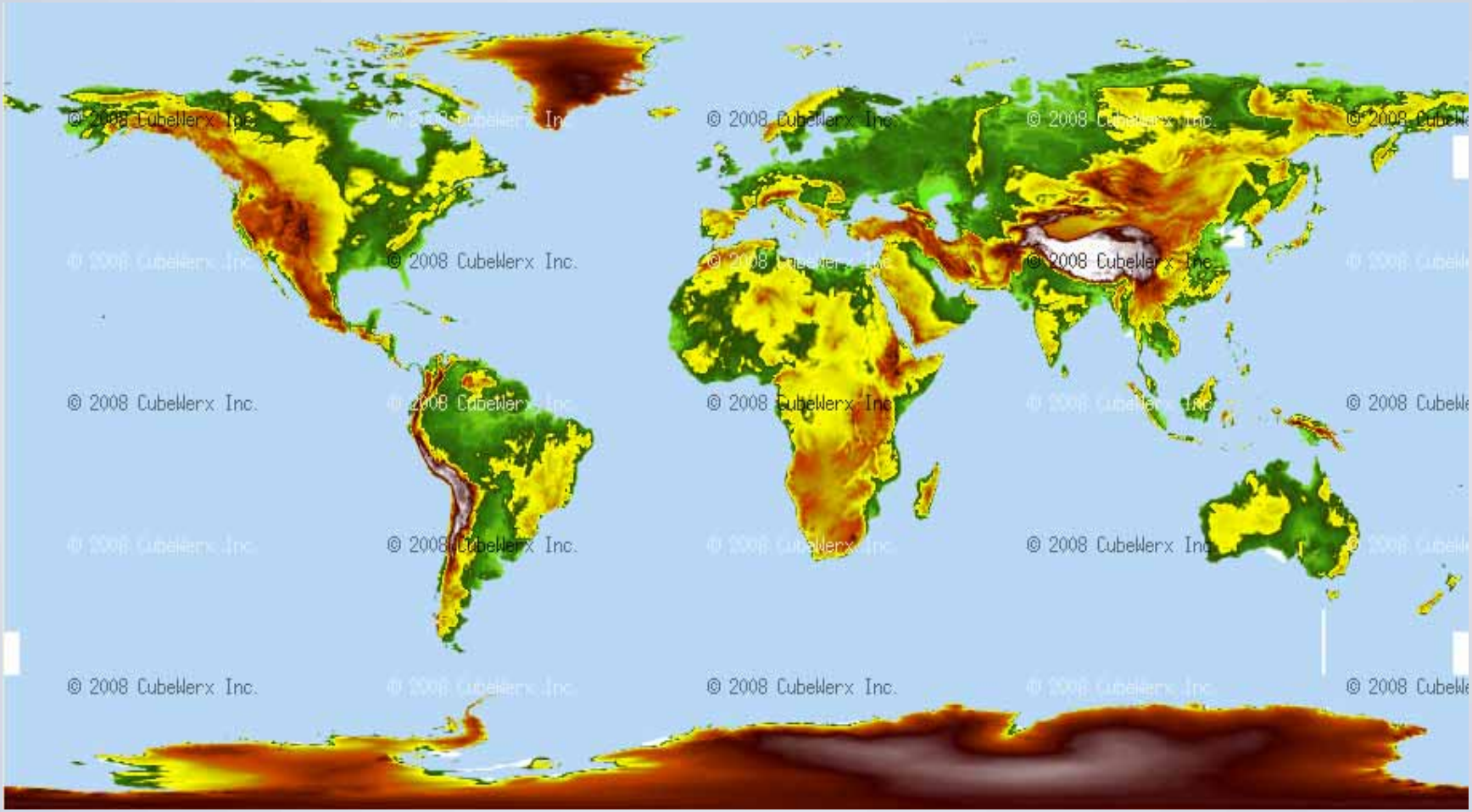
# Introduction

- Third largest province in Canada
- Larger than any state in the US except Alaska
- Province covers 950 000 km squared
- Four times larger than Great Britain
- Population of 3 900 000
- Capital of BC is Victoria (Host to FOSS4G2007)
- North is Yukon and NW Territories
- South is Washington, Idaho and Montana
- East is Alberta
- West is the Atlantic Ocean

# Integrated Land Management Bureau

## Ministry of Agriculture and Lands

BRITISH COLUMBIA
The Best Place on Earth



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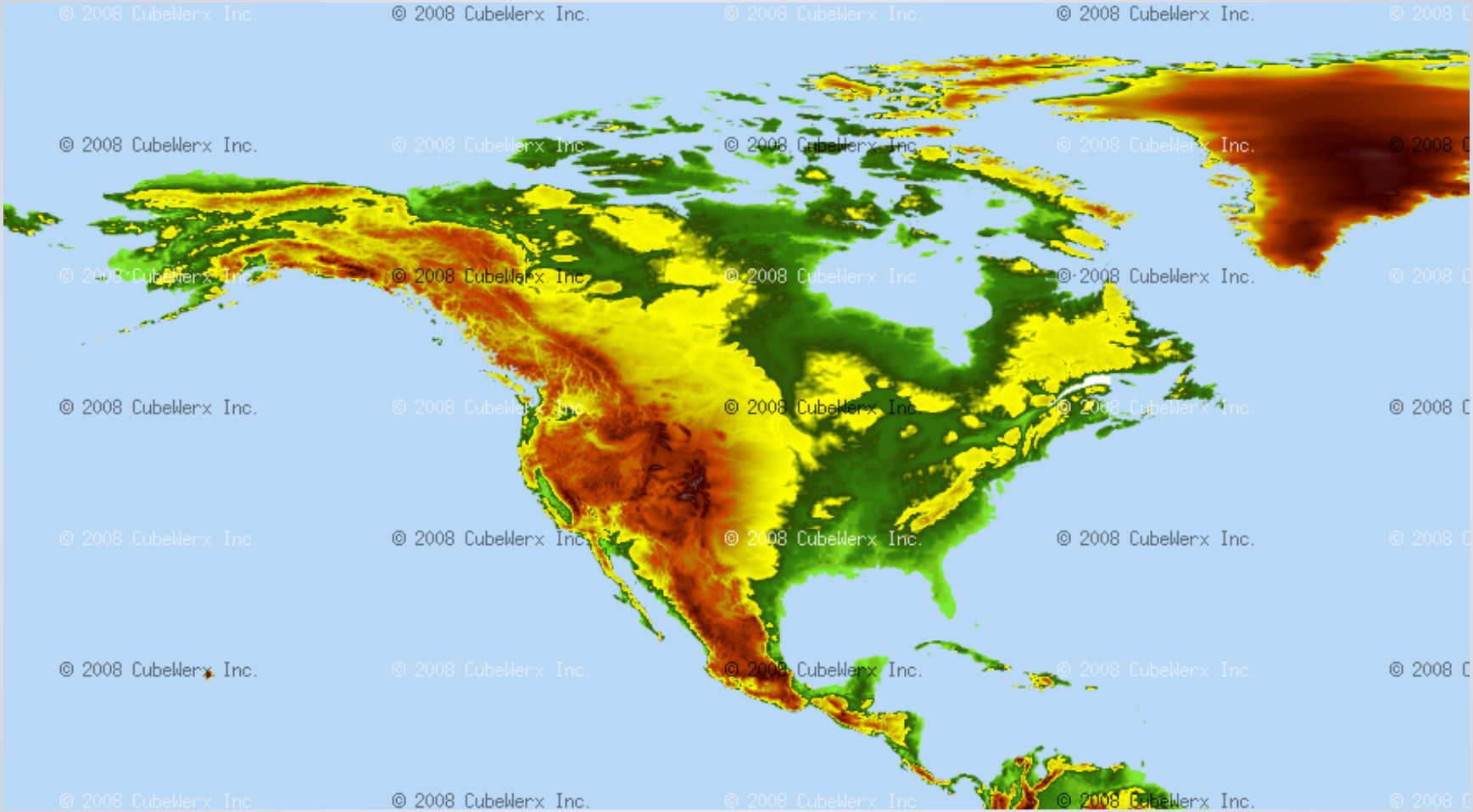

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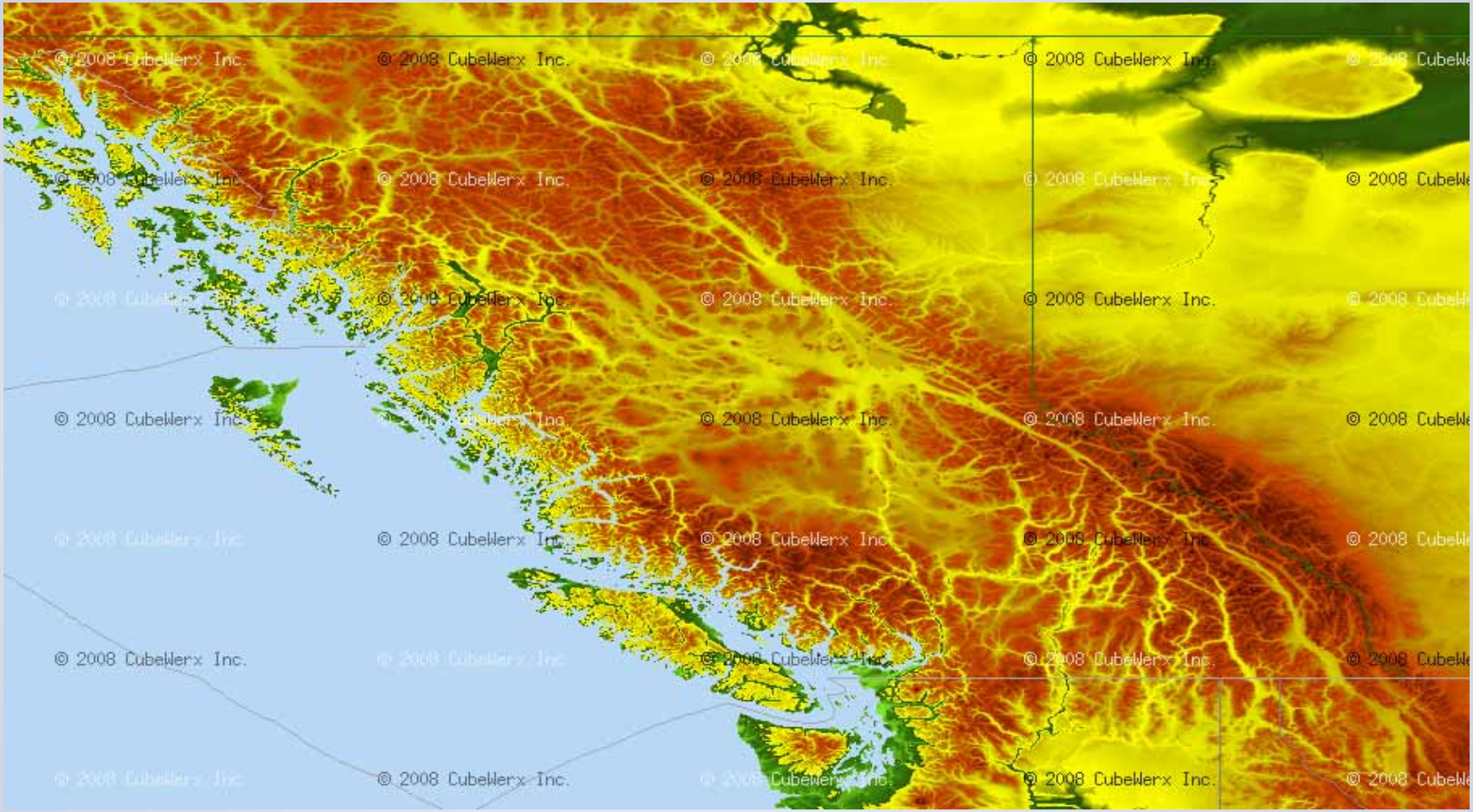

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# What are we trying to show?

- 200TB of Digital Imagery
- Raw Airphoto's, AT Scans, OrthoPhotoMosaic's, Satellite Imagery and scanned conventional maps
- 25TB is available on-line by direct access or WMS
- OrthoPhotoMosaic's cover about 75% of the province
- Most data was collected from 1995 onwards, but some exists for 1937 and 1987
- 30m Landsat Imagery covers the whole province from 1999
- 5m Spot Imagery covers about 50% of the province from 2004
- Add about 50TB of data per year of which 5 to 10TB will be made available
- Formats include ECW, MrSid, JP2000 and Tiff.

# Products

Evaluate the following applications ability to serve images using WMS:

- MapServer
- GeoServer
- ERDAS ER Mapper Image Web Server
- LizardTech Express Server
- ESRI’s ArcGIS Image Server

# Objective

To test each applications ability to support:

- Open standards
- Time required to prepare and publish the data
- Projection on the fly
- Image formats
- Stability
- Throughput and acceptable speed
- Integration with applications

# What do we know about?

- MapServer
- GeoServer
- ERDAS ER Mapper Image Web Server
- LizardTech's Express Server
- ESRI's ArcGIS Image Server

# MapServer

- Open Source Develop Environment using WMS and WFS
- Advanced cartographic output
- Support for scripting and development environments
- Cross-platform support
- Projection on the fly
- Supports multiple raster and vector formats
- Serves data using GDAL/OGR
- Easy to configure
- A layer can be a single image or image catalogue (grouping of multiple images)

# MapServer – Single Image

```
LAYER
  NAME "L5_4225_20030829_BCALB_30M_B543_ENH"
  DATA "l5_4225_20030829_bcalb_30m_b543_enh.jp2"
  STATUS ON
  TYPE RASTER
  PROCESSING "ANDS=1,2,3"
  PROCESSING "SCALE=AUTO"
  PROCESSING "DITHER=YES"
  UNITS Meters
  PROJECTION
    "init=epsg:3005"
  END #projection
  METADATA
    …
  END #metadata
END #layer
```

# MapServer – Single Image Example

| JP2 Image |
| --- |
| Size 23Mb |

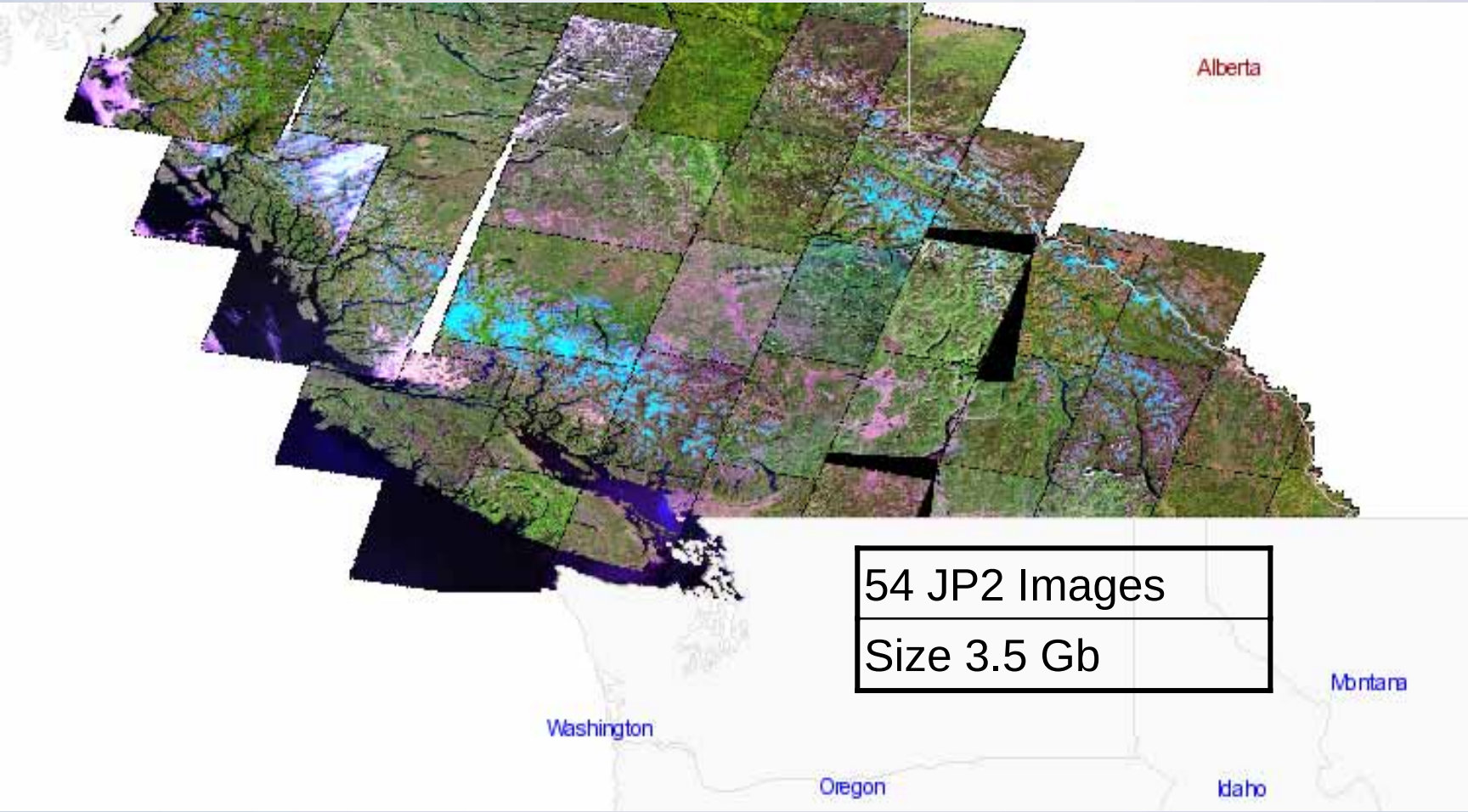
# MapServer – Image-Catalogue

```
LAYER
  NAME "Landsat2003"
  TILEINDEX "Landsat2003.shp"
  TILEITEM "Location"
  STATUS ON
  TYPE RASTER
  OFFSITE 0 0 0
END #layer
```

Landsat2003.shp

| location |
| --- |
| \\server\share$\file1.jp2 |
| \\server\share$\file2.jp2 |
| \\server\share$\file3.jp2 |
| Etc… |

# MapServer – Image-Catalogue Example



# MapServer – Observations

- Takes a while to configure
- Need to determine the correct OUTPUTFORMAT options

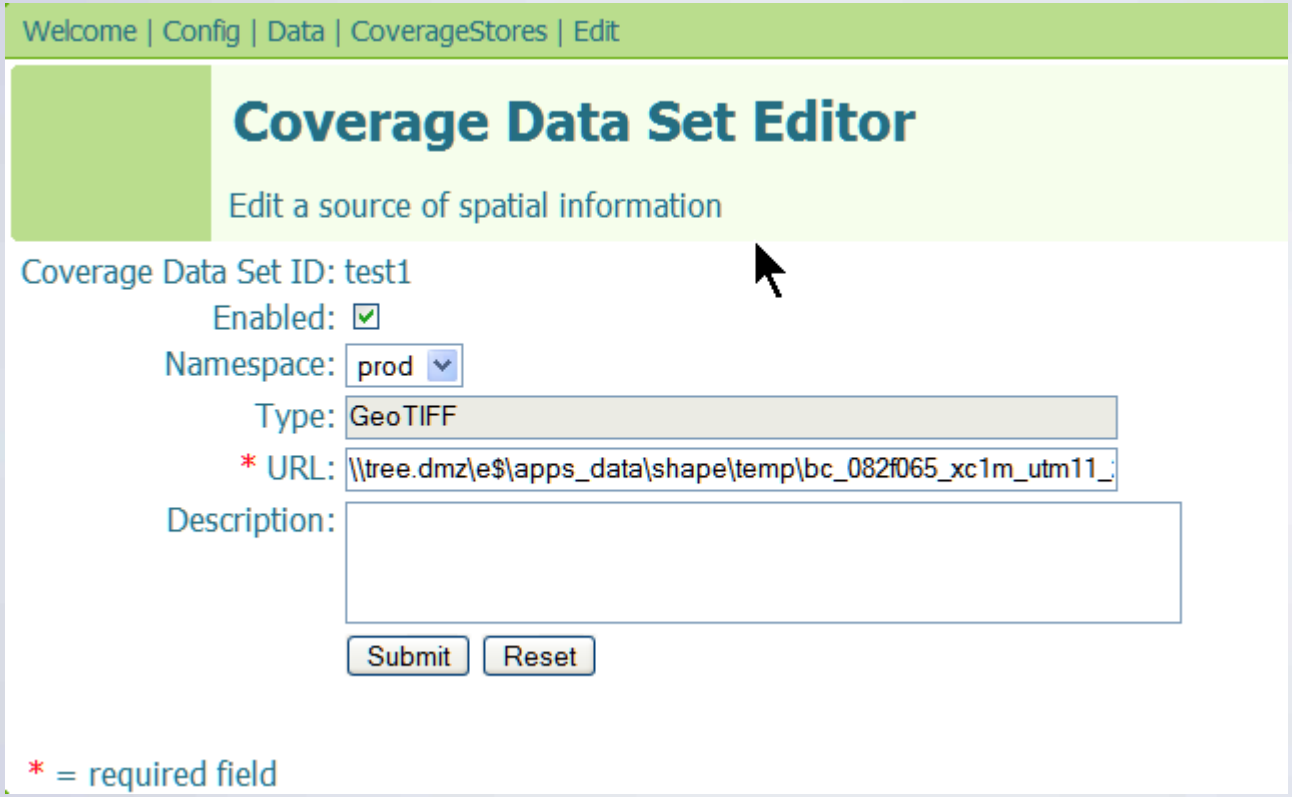
```
OUTPUTFORMAT
  NAME png
  DRIVER "GD/png24"
  MIMETYPE "image/png"
  IMAGEMODE RGBA
  EXTENSION "png"
END #OUTPUTFORMAT
```

- Performance is pretty good
- Location of files are important

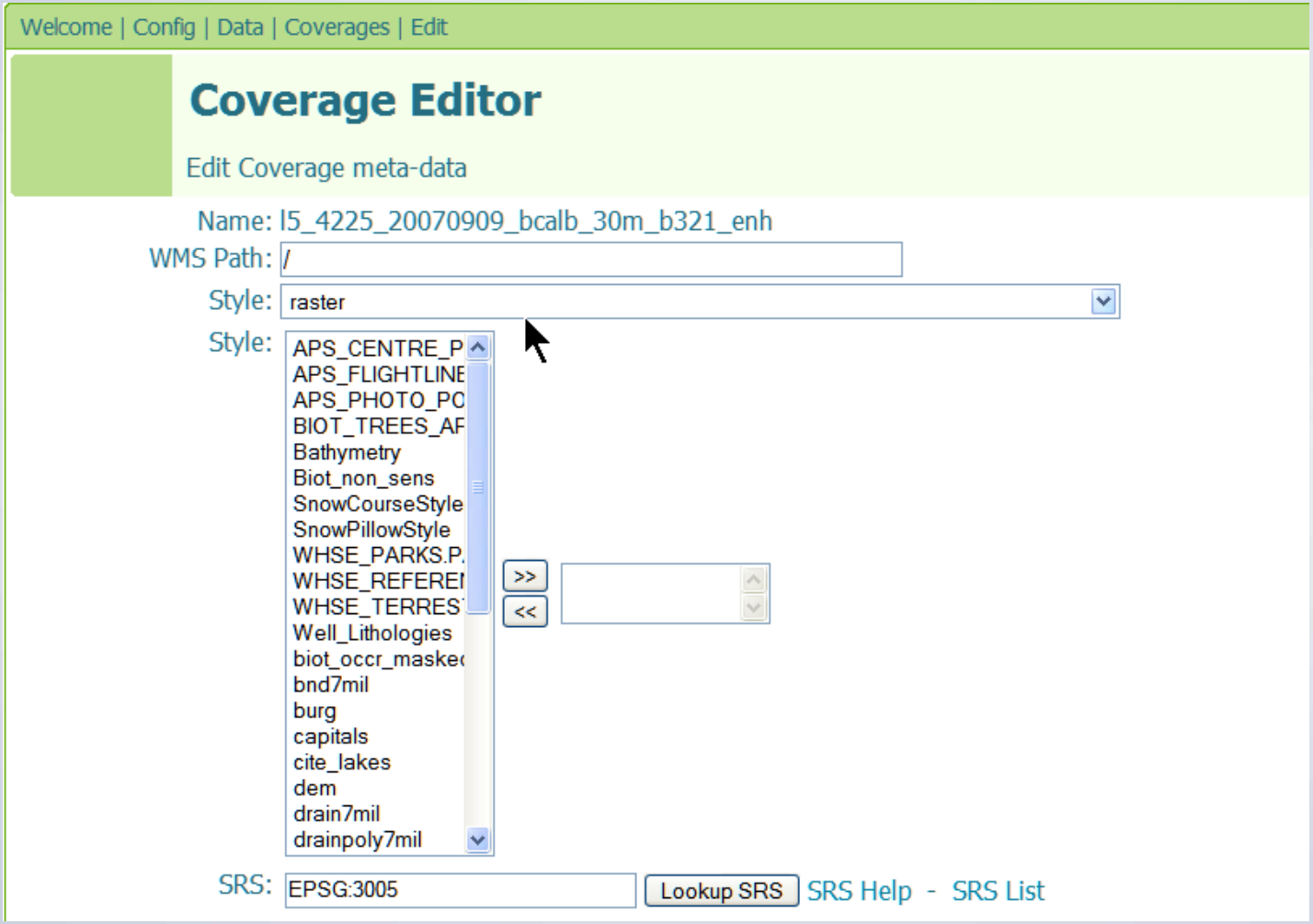
# GeoServer

- Open Source Develop Environment using WMS and WFS
- Built on GeoTools
- Supports multiple input formats
- Produces KML, GML, Shapefile, GeoRSS, PDF and many others
- Cross-platform support
- Supports a GUI for configuration

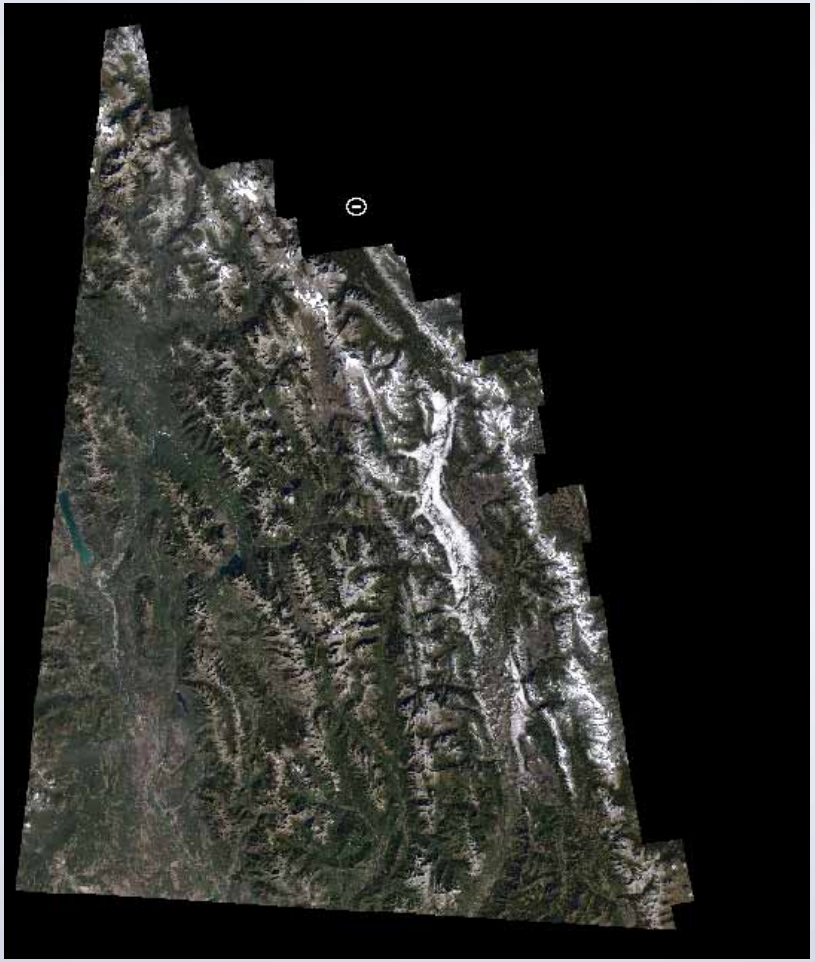
# GeoServer – Image Store Setup



# GeoServer – Image Coverage Setup



# GeoServer – Image Example



| TIF Image |
| --- |
| Size 100 Mb |

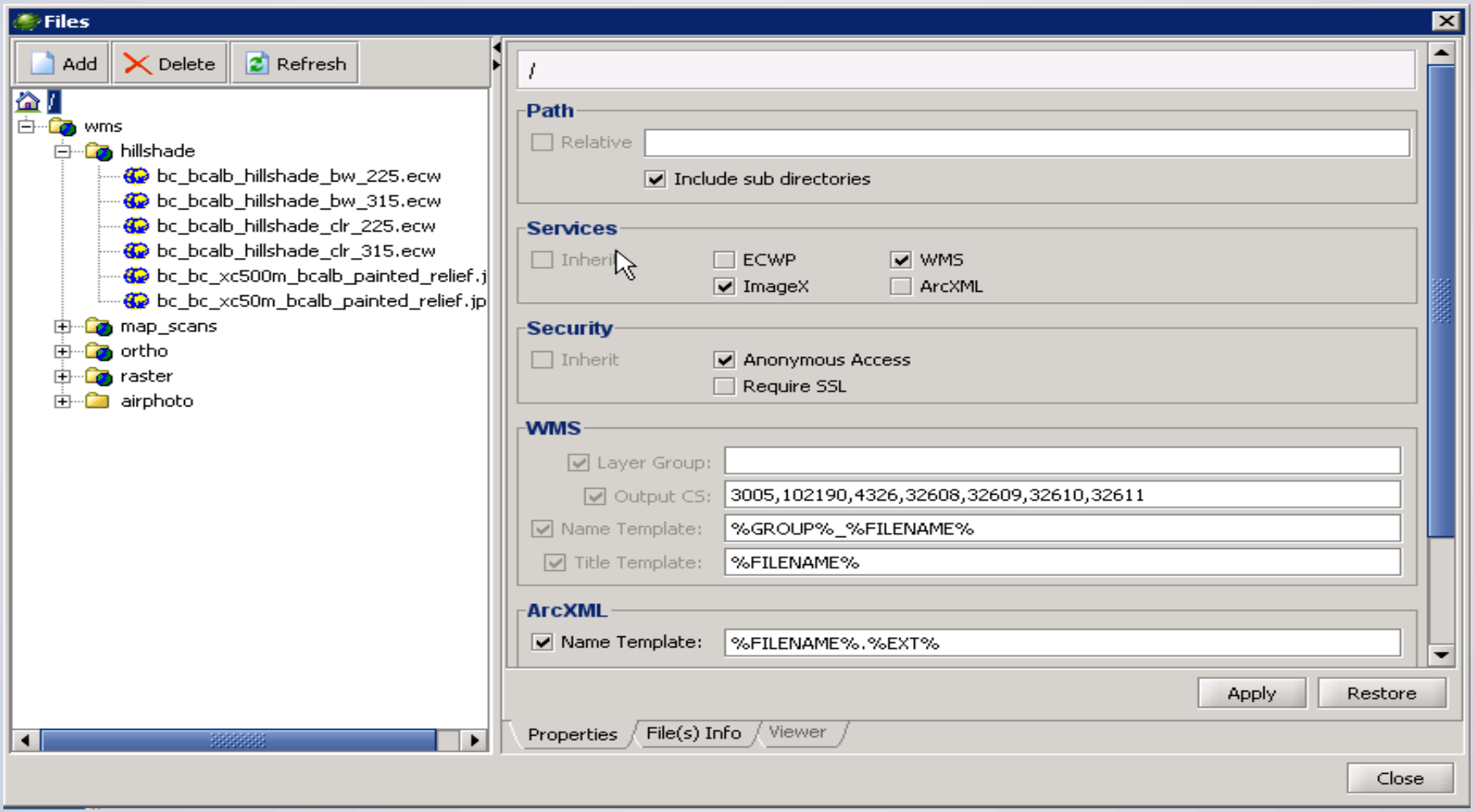
# GeoServer – Observations

- Relatively easy to configure but does require two steps
- Need to define projection and bounding box
- Large images take a long time to draw and in some cases may fail
- Need to assign more memory to JVM for large files

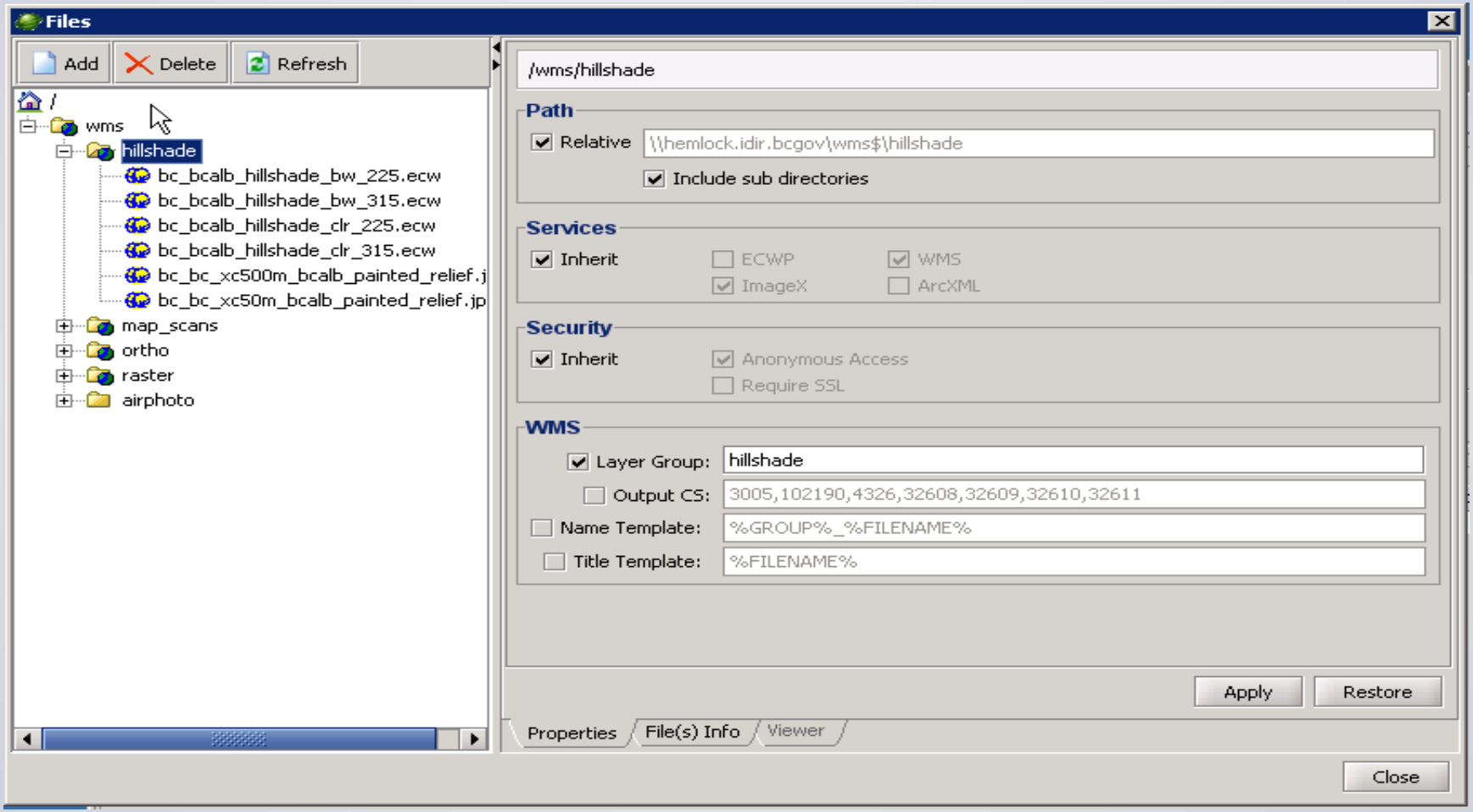
# ERDAS ER Mapper Image Web Server

- Designed to distribute large volumes of image data
- Reads images in ECW and JPEG 2000
- Projects data on the fly using the EPSG codes
- Reads directly from the file system
- Simple configuration
- Add data without restarting any services
- Configure multiple image services
- Name and group images independantly

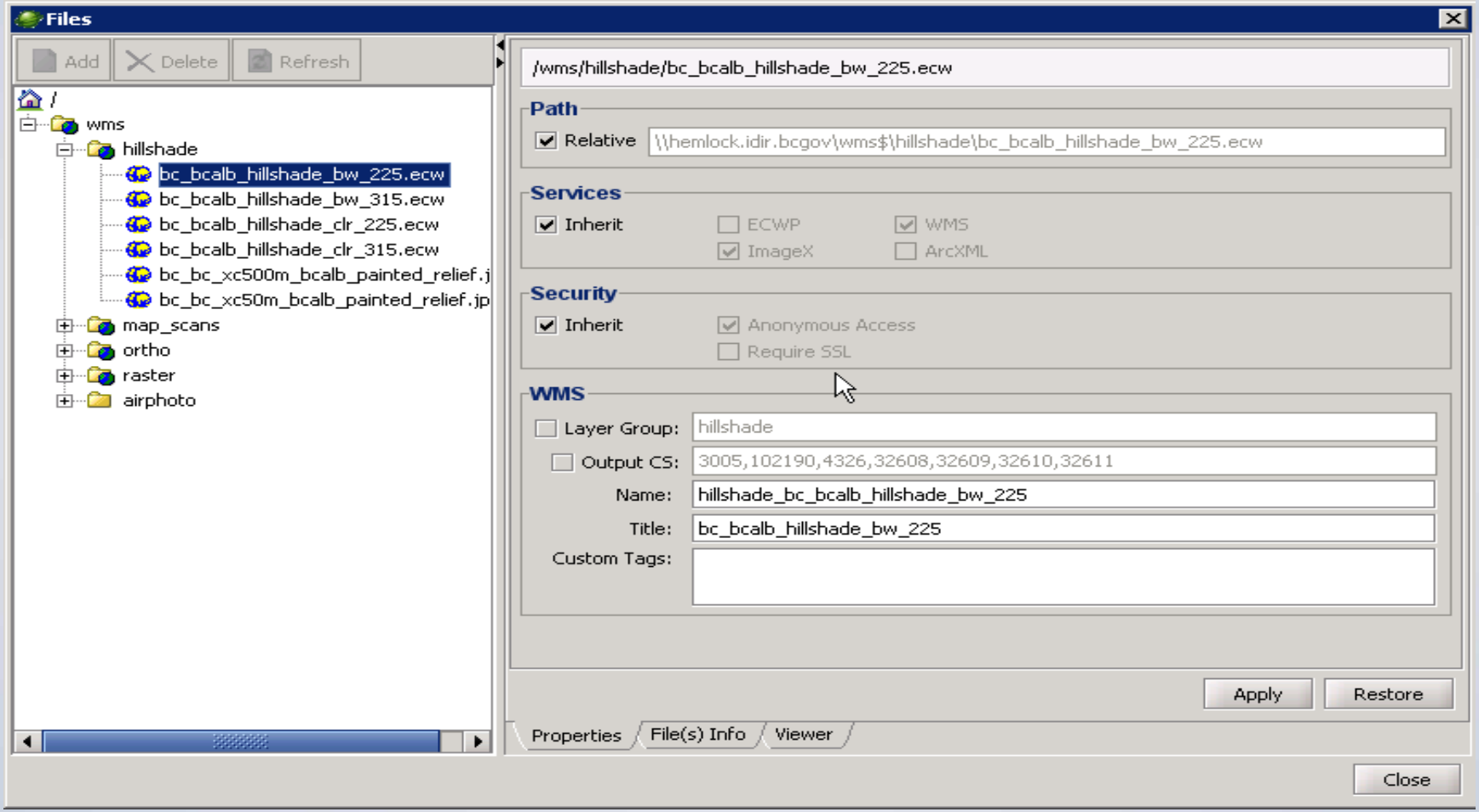
# ER Mapper Image Web Server - Setup



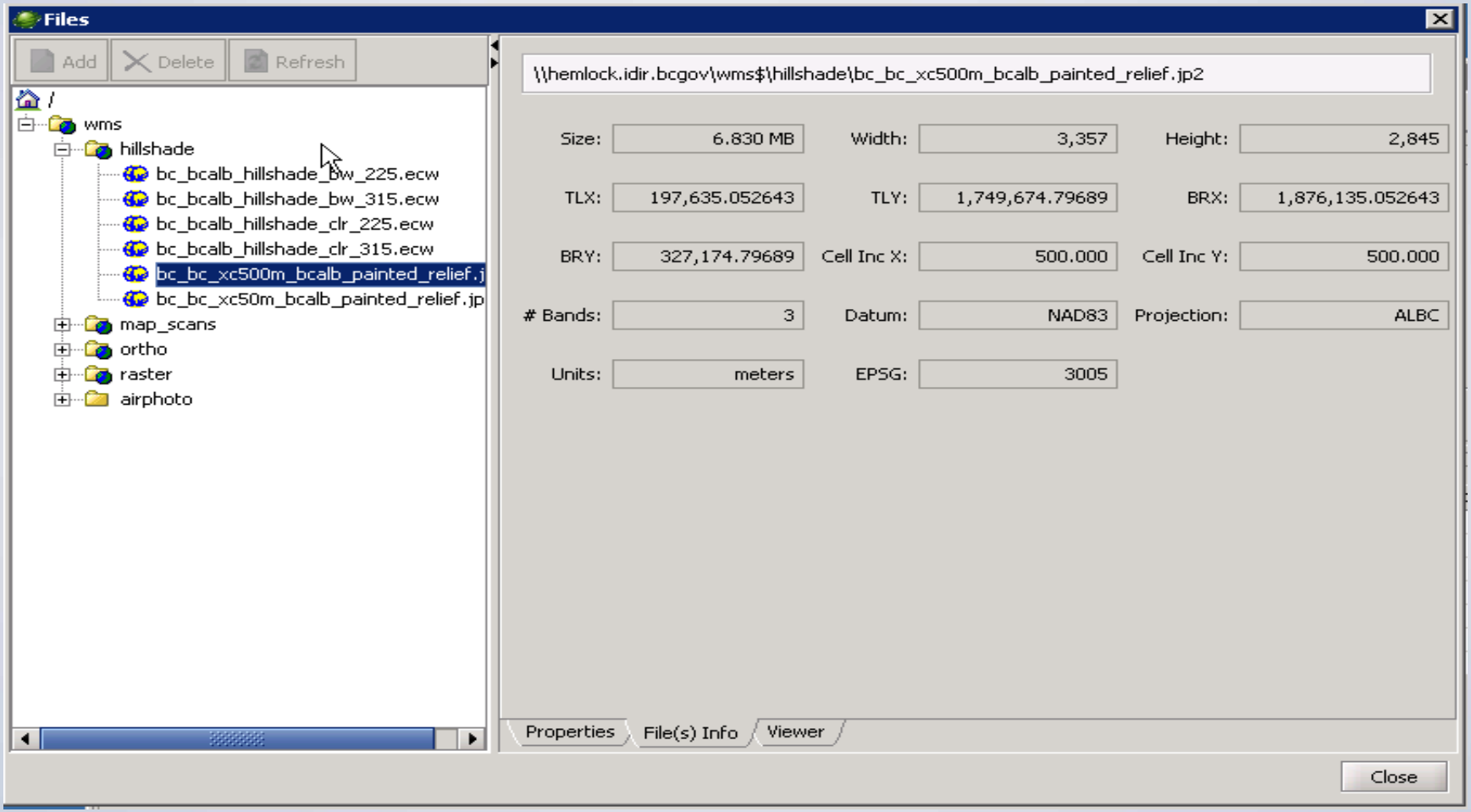
# ER Mapper Image Web Server - Setup



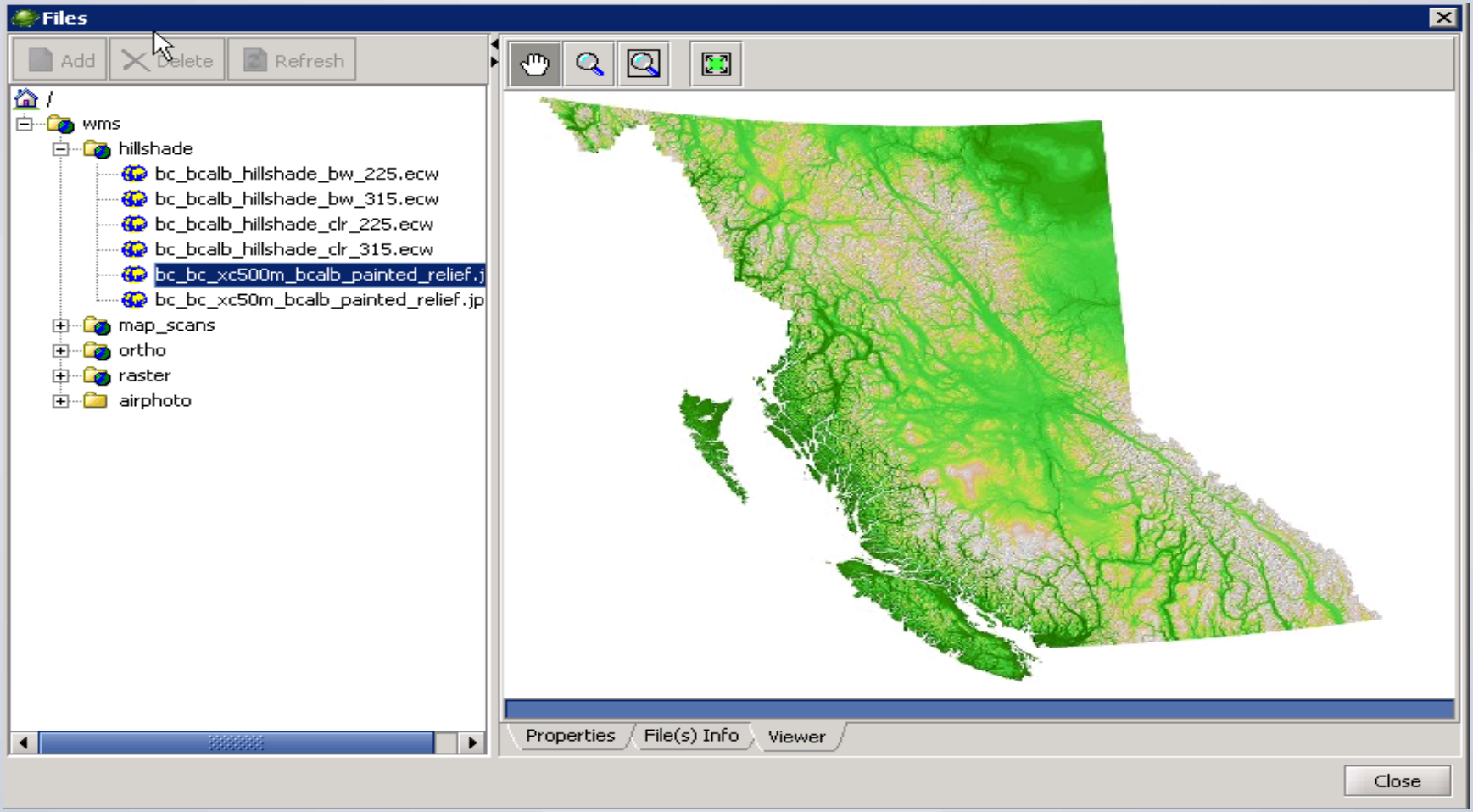
# ER Mapper Image Web Server - Setup



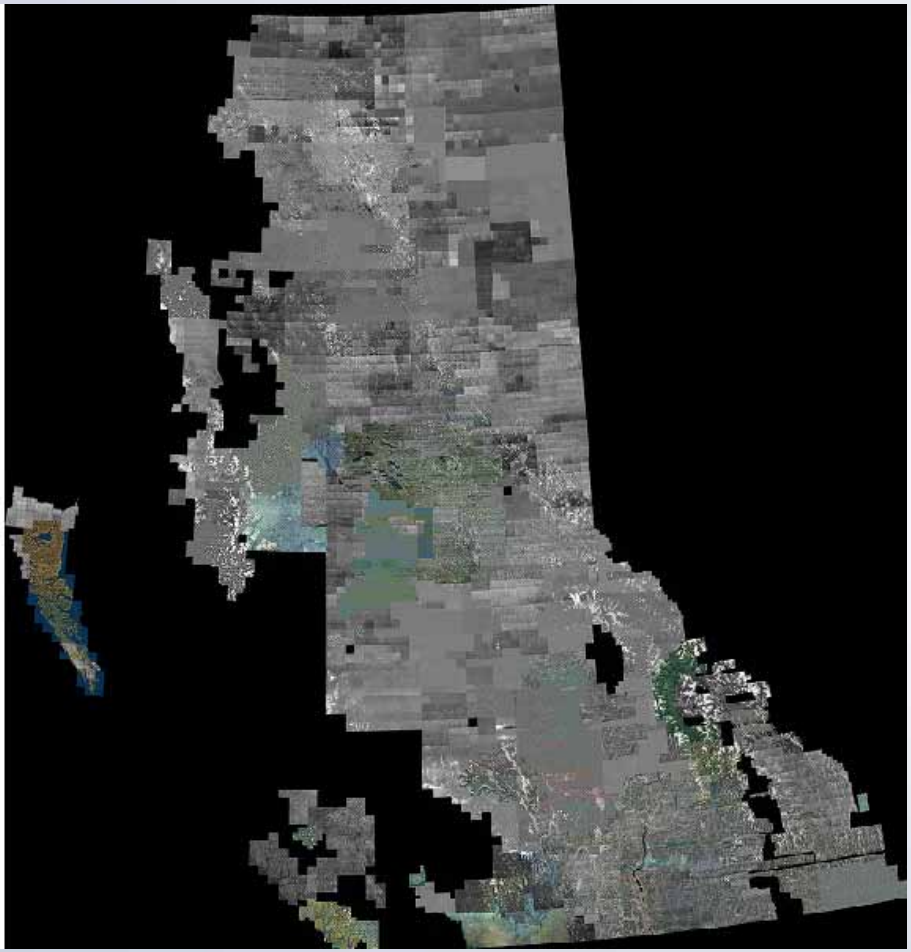
# ER Mapper Image Web Server - Setup



# ER Mapper Image Web Server - Setup



# ER Mapper IWS – Sample Image



- 186Gb ecw file
- Covers entire Province
- Data collected from 1995 to 2004
- Created in 2005
- Took 2 weeks of processing
- Compiled on a 1.5GHz dual Xeon workstation

# ER Mapper IWS - Observations

- May take a long time to prepare data
- Once setup, very easy to manage
- Add more files to the service with only a copy of the file/s
- Easy to add additional services using XML config files
- Response is extremely good
- Makes use of multiple cores if setup correctly

# LizardTech's Express Server

- Designed to distribute large volumes of image data
- Reads images in MrSID and JPEG 2000
- Projects data on the fly using the EPSG codes
- Reads directly from the file system or Database
- Simple configuration
- Builds folder of images into a single catalogue
- Tools provided for building the catalogues
- Supports load balancing of servers
- Runs on Windows using either Apache or IIS

# LizardTech's Express Server – Define Catalogue

```
<Catalog name="070">
  <Property name="wms-layer-Title">
    <Title>2006 Natural Colour UTM 10</Title>
  </Property>
  <Provider name="file" root="\DIM2_PROD19\imgwhse\2006\natural\utm10"
    volume="\\hemlock.idir.bcgov"/>
  <SpatialIndex classID="{D090DD8B-3D12-4631-9787-0DC2CACDC3EA}"/>
  <Property name="wms-layer-list-
    SRS">EPSG:3005,EPSG:4326,EPSG:32608,EPSG:32609,EPSG:32610,EPSG:3261
    1</Property>
</Catalog>
```

# LizardTech's Express Server – Build Catalogue

isindex -create -c 2006 Natural Colour UTM 10 -srs EPSG:32610

isindex -update -c 2006 Natural Colour UTM 10

isindex -overview create -c 2006 Natural Colour UTM 10

# LizardTech's Express Server – View Catalogue

# LizardTech's Express Server – Observations

- Takes a little time to setup as each catalogue needs to be compiled ie about 1 minute per file
- Output quality not the best when viewing at a large scale, but pretty good when zoomed in
- Did observe some image artifacting

# ESRI ArcGIS Image Server

- Designed to distribute large volumes of image data
- Reads images in many formats
- Projects data on the fly
- Reads directly from the file system or Database
- Multi-stage image preparation and publication
- On-the-fly image processing

# ESRI ArcGIS Image Server - Observations

- Two components need to be installed – Server and Client Manager (ArcCatalog)
- Two licenses are required
- Server and Client versions need to match 100%
- Build of Image Catalogues takes a long time
- Need to copy/move catalogues to server once built
- Need to build a path mapping file for built catalogues

# Demo…

http://delivery.openmaps.gov.bc.ca/imfows13/imf.jsp?site=foss4g2008

# Any questions?

# For more information….

Contact:

Bruce.Tonkin@gov.bc.ca

or

Michelle.Douville@gov.bc.ca

Visit:

http://GeoBC.gov.bc.ca

Or

http://OpenMaps.gov.bc.ca