



Addressing Geospatial Big Data Management and Distribution Challenges ERDAS APOLLO & ECW

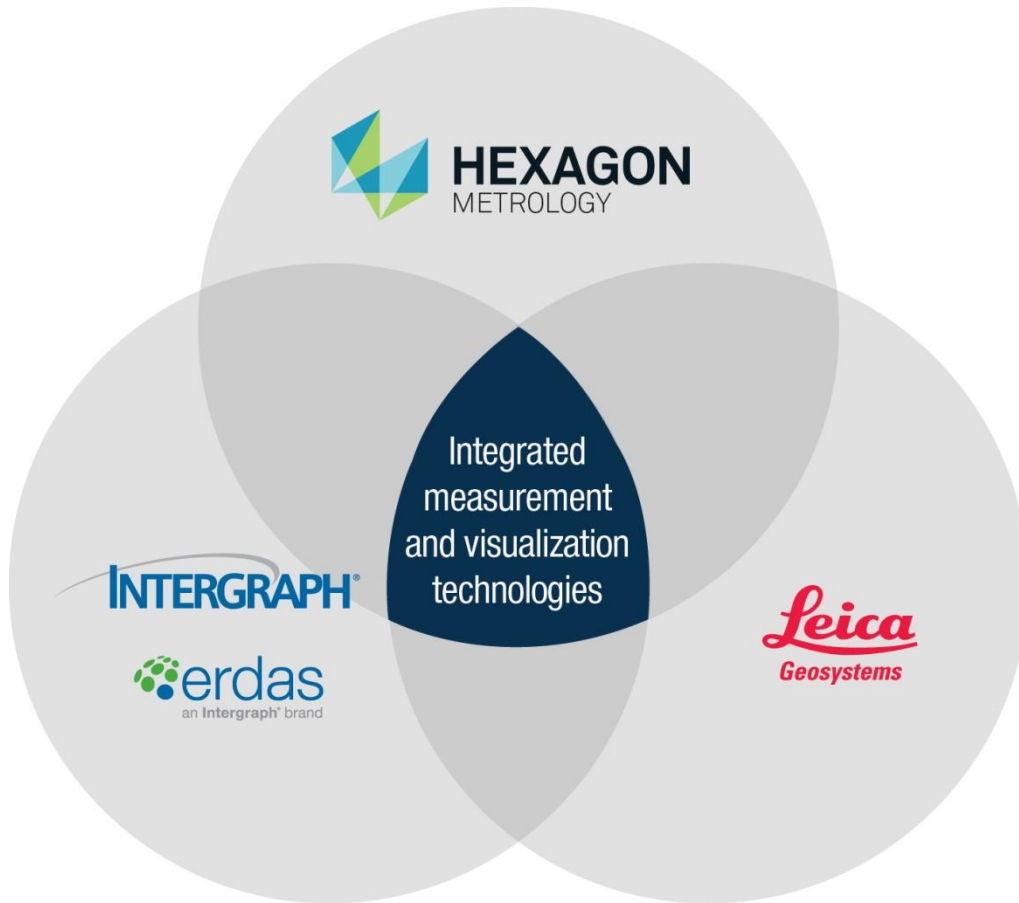
Nouman Ahmed

GeoSystems-Me (Hexagon Geospatial / ERDAS Regional Partner)

Enterprise Solutions Architect



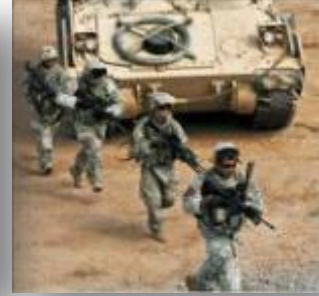
Hexagon Family



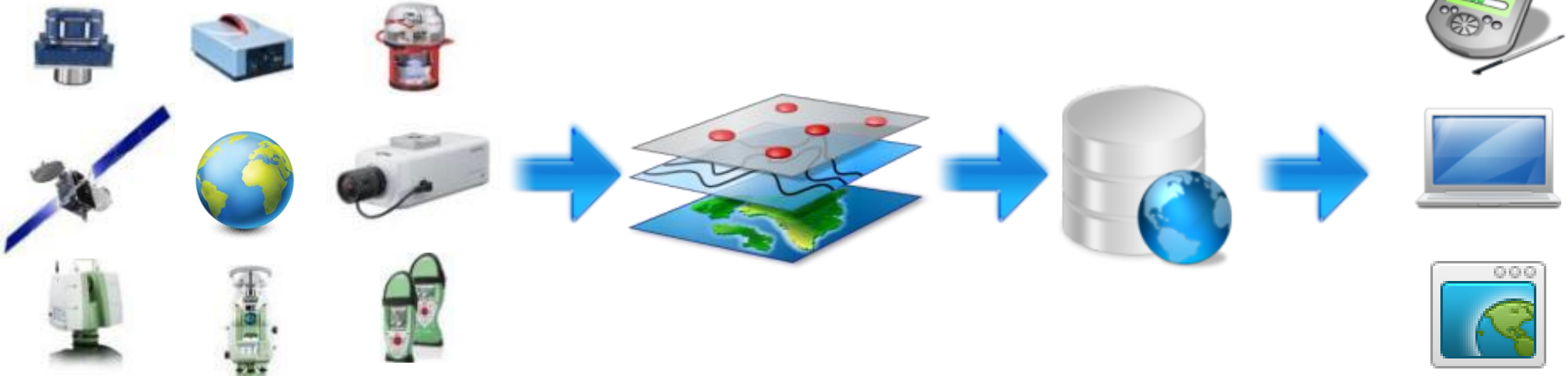
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Dynamic GIS: Measuring Our Changing Earth



Geospatial Information Value Chain



Capture

Process

Share

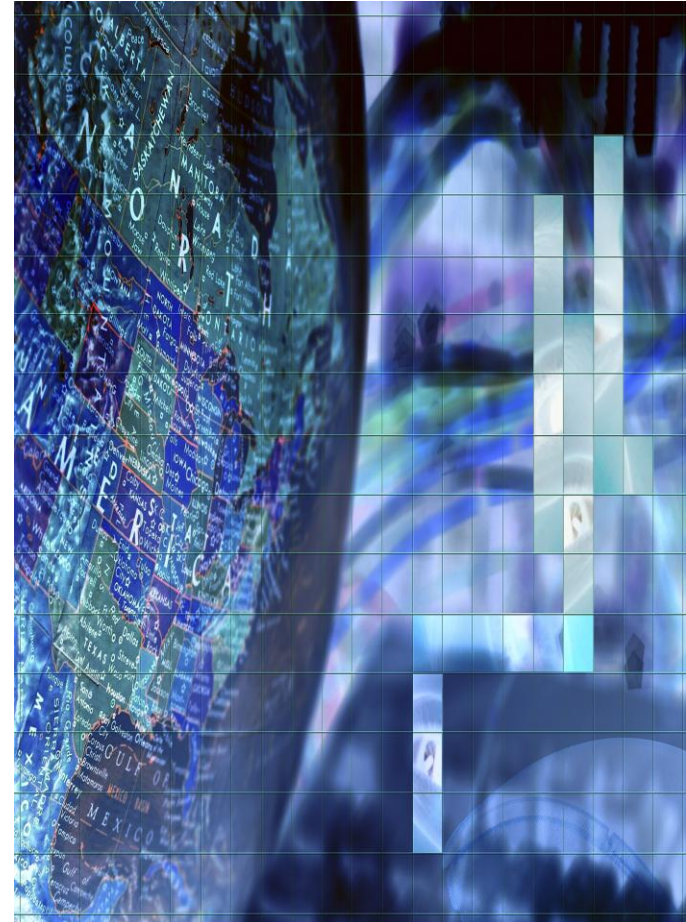
Deliver



HEXAGON
GEOSPATIAL

VOLUME

- Imagery data volumes are growing at an ever increasing rate. Faster than processing and storage costs are falling
- 3 PetaBytes/ year or 8 TerraBytes / day forseen for Copernicus





**Greater Resolution, Greater Coverage,
Greater Frequency**

Data Deluge



**New Data Sources beside traditional
airborne and satellite platforms**

Rocketing User Demand



- Every day, new users are demanding imagery, across all applications, on all devices
- Not just 'some imagery', but the latest, highest resolution imagery available
- They want the entire historical archive accessible

Big Data Made Small

“the most common
purpose of Big Data is
to produce Small Data”

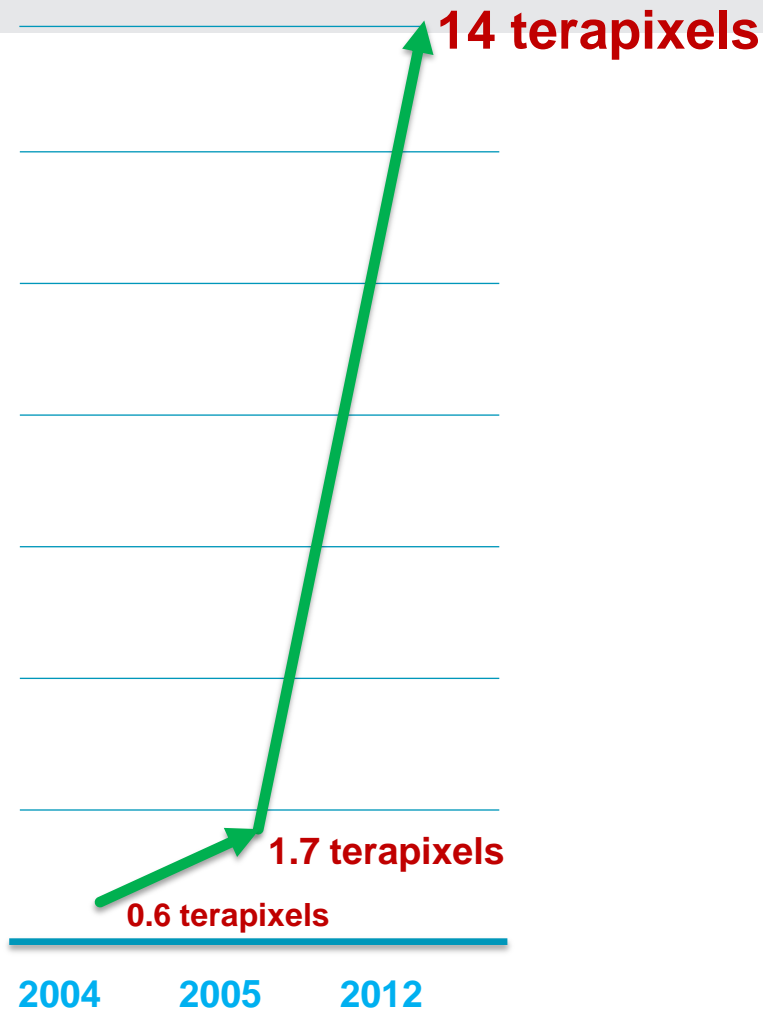
DataInformed 10 Sept 2013

<http://data-informed.com/common-purpose-big-data-produce-small-data>



Pixels in a Single ECW File

Big Data Made Small



“the most common purpose of Big Data is to produce Small Data”

DataInformed 10 Sept 2013

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Pixels in a Single ECW File

Big Data Made Small



The World's Largest Geospatial Image?

A single aerial image covering
Germany @ 20cm GSD
3,210,000 px by 4,340,000px

Big Data Made Small

38,000gb Uncompressed
50,000gb with image pyramids
875gb ECW Compressed
370,000 source files
1 ECW file

38Tb image Germany

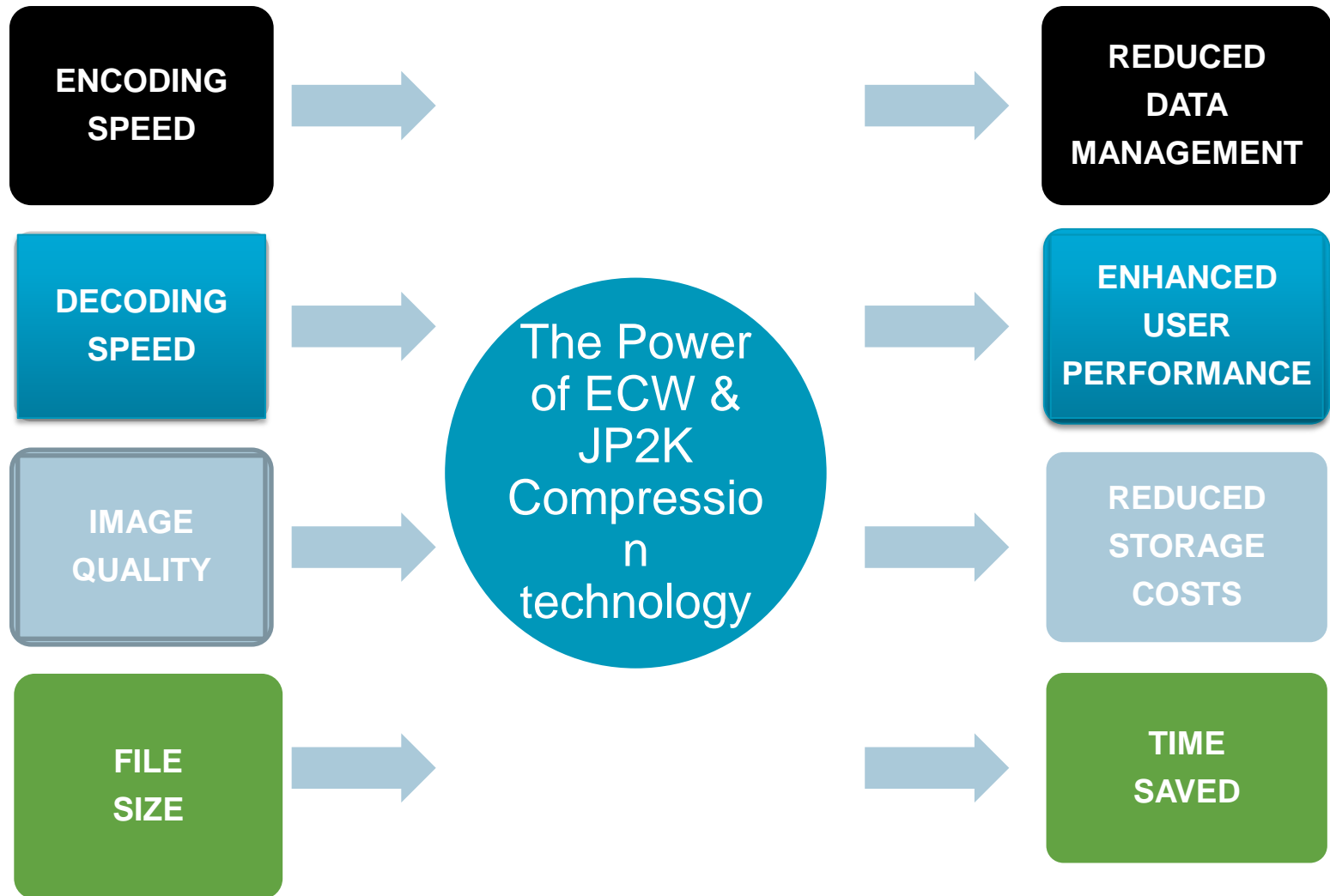
The screenshot displays the ERDAS APOLLO Image Viewer v1.0 interface. The main window shows a workspace with a toolbar at the top containing various navigation and processing tools. On the left, there is a 'Workspace' panel with 'Map Layers' and a 'Properties' panel. A Windows Explorer window is open in the foreground, showing the contents of the 'Barracuda (F:)' drive. The file list includes several folders and one large file, 'Germany_v2_64_20_G_Temp.ecw', which is 918,051,169 KB in size. The file details pane shows it is an ERDAS Compressed Wavelet Image, created on 25/02/2013 3:17 AM, and shared with all domain users. On the right side of the main window, the 'ECW JPEG 2000 Properties' panel is visible, showing settings for Transparency, Contrast, Brightness, Dynamic Range Adjustment, Bands (Red, Green, Blue), Opacity, Display options (Use progressive rendering, Use adaptive pan/zoom), Resample Method (Nearest Neighbour), and Read Line Method (ReadLineRGBA).

Name	Date modified	Type	Size
74236c1da0a3b66a92c5ba37c1	25/02/2013 2:17 PM	File folder	
CTweedie-backup	25/02/2013 12:05 ...	File folder	
Germany_Temp	8/01/2013 6:35 PM	File folder	
Virtual Machines	13/05/2013 12:06 ...	File folder	
Germany_v2_64_20_G_Temp.ecw	8/01/2013 6:35 PM	ERDAS Comprese...	918,051,169 KB

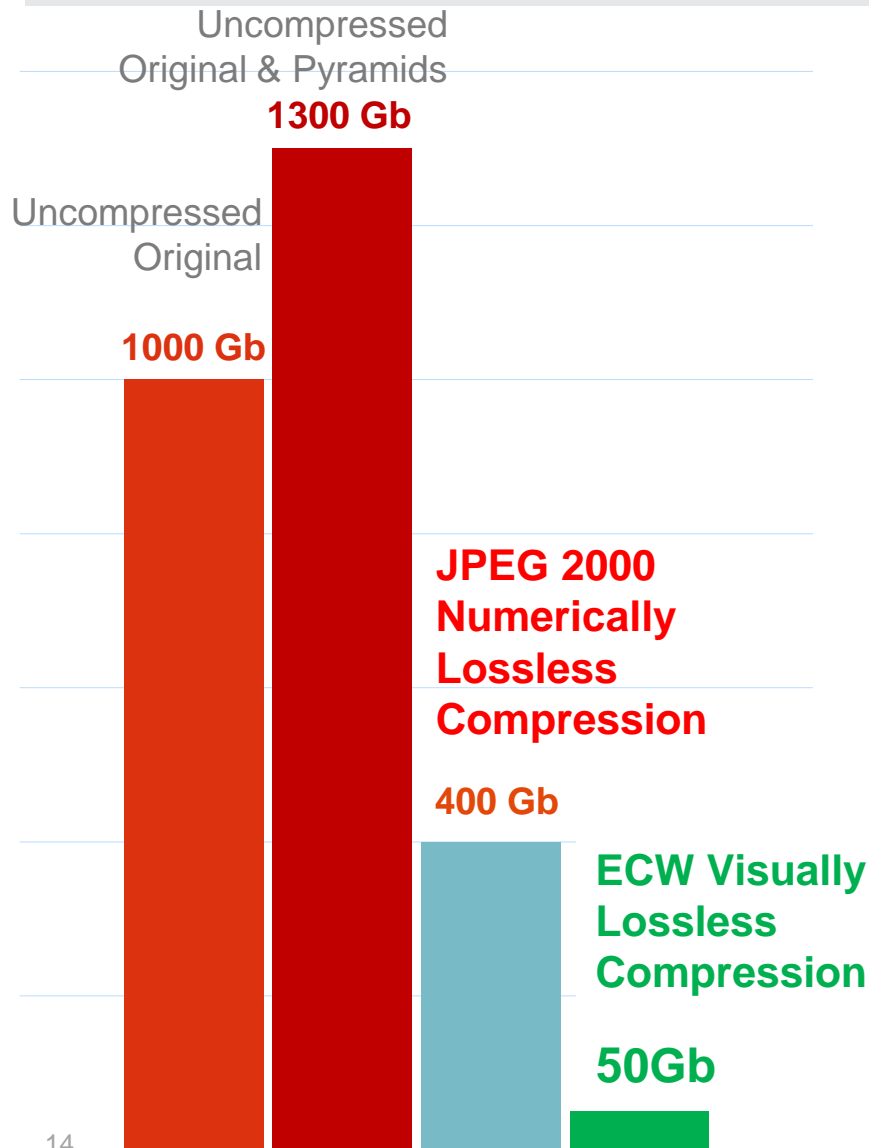
Germany_v2_64_20_G_Temp.ecw
Size: 875 GB
ERDAS Compressed Wavelet Image
Date created: 25/02/2013 3:17 AM
State: Shared
Date modified: 8/01/2013 6:35 PM
Shared with: All domain users

INTERGRAPH

ECW & JPEG2000 Compression Technology

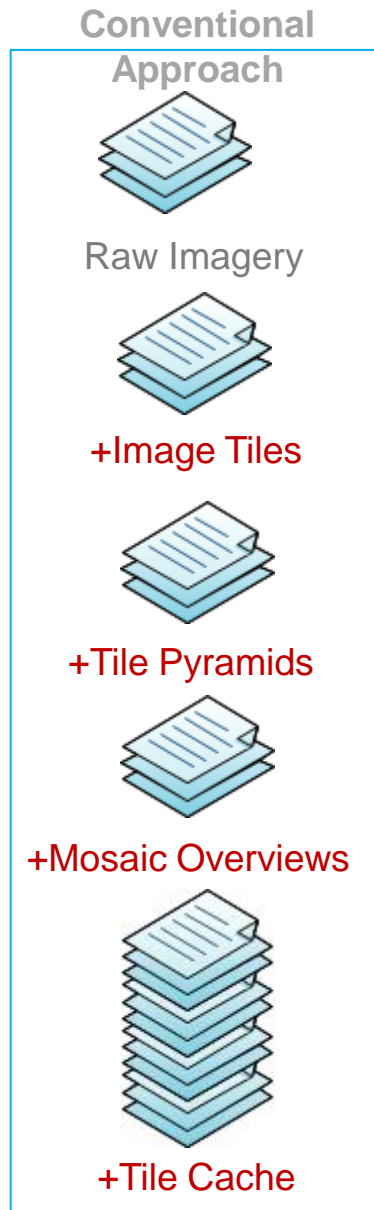
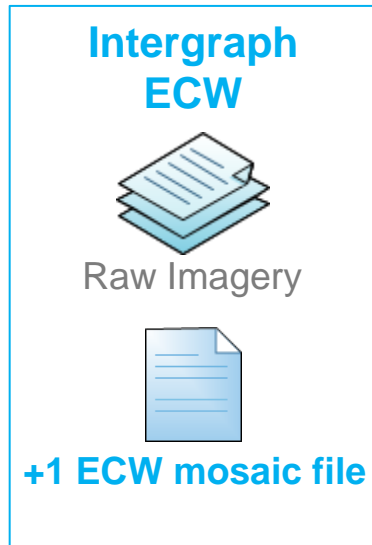


COMPRESS



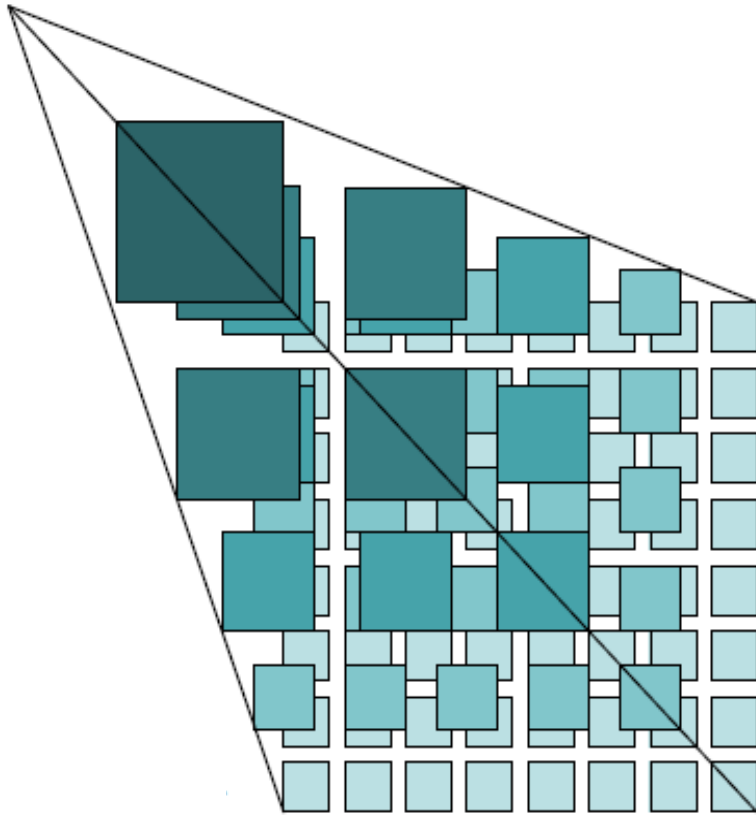
- **ECW image compression:**
 - Instant storage savings
 - Faster performance
 - Full visual quality
- **JPG2000:**
 - Strongly reduce size
 - Keep data integrity

ECW - COMPRESS and SIMPLIFY



- Efficient processing and simple data structure:
- Easier to manage
- Time effective
- Provides a single source of truth
- One format to serve all software clients.

Imagery & Tile Cache Storage

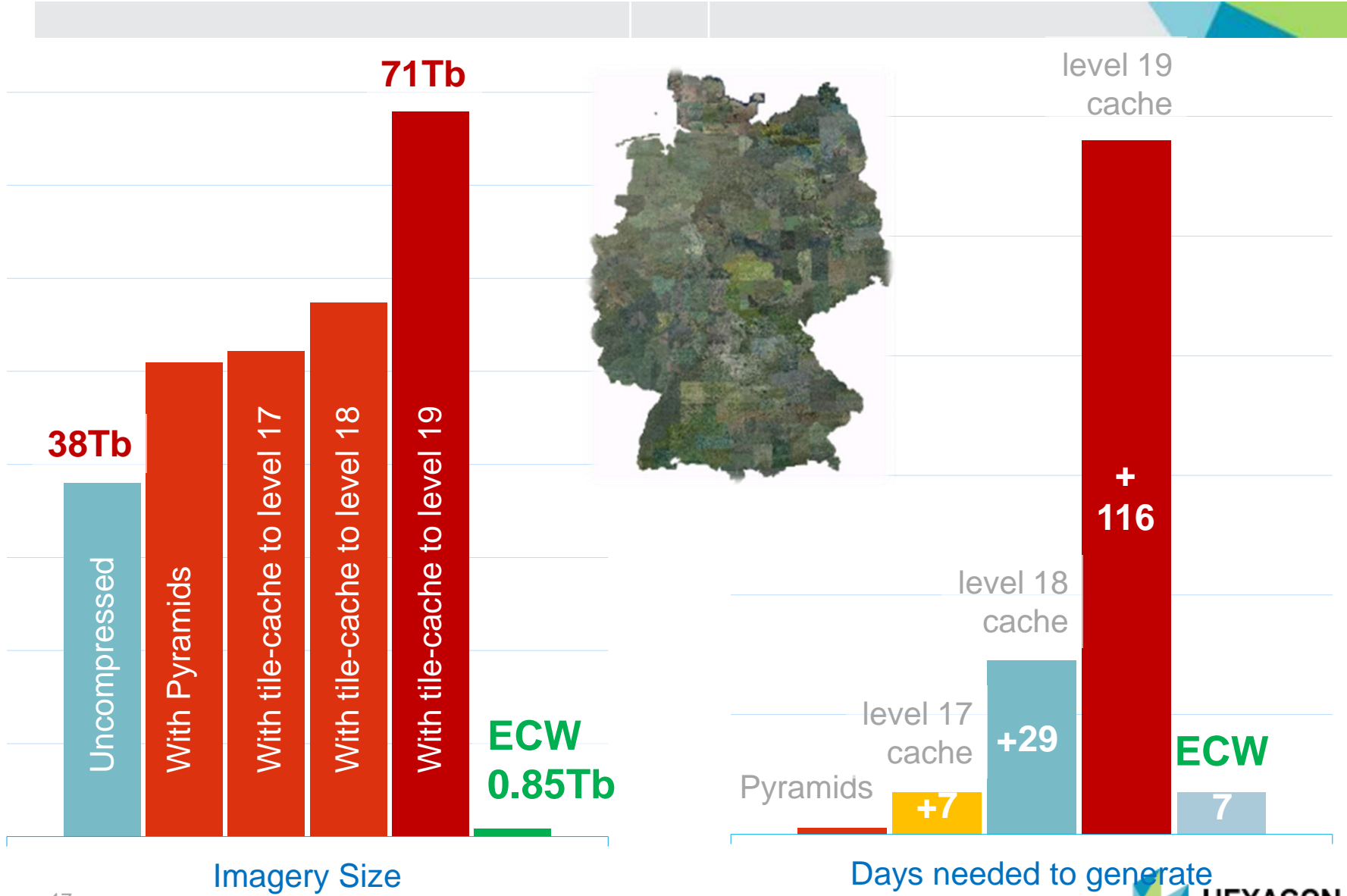


Non-scalable solutions

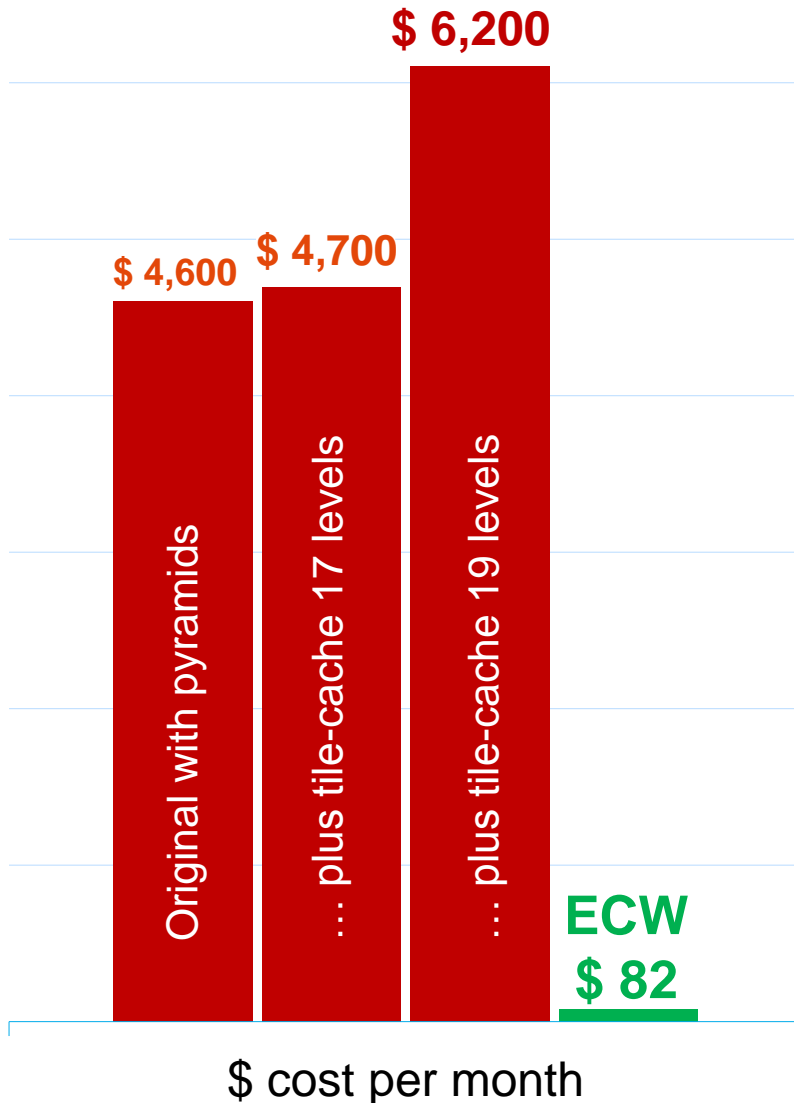
- Duplicates data
- Complicates data publishing
- Restricts users to specific projections
- Restricts users to specific resolutions/scales

Tile caching places decoding speed above all other needs

Tile cache – Worked example (Storage)



Storage Costs - Tile-cache & Pyramid vs. ECW



- Amazon S3 Cloud storage Costs comparison example
- 98% lower costs using ECW
- >\$4.6k monthly saving
- Up to \$73k annual saving



VELOCITY

ERDAS APOLLO

Big Data Management - Managing and Delivering Geospatial Information Across the Enterprise

Imagery, Raster , LIDAR, CAD and Business Data Management; Cataloguing, Processing, Analysis & Delivery across the Enterprise – Extremely High Performance Imagery Streaming & Data Delivery.

ERDAS APOLLO - Geospatial Data Portal

Geospatial Data Portal

The screenshot displays the ERDAS APOLLO Geospatial Data Portal interface. The main map area shows a grid overlay on a satellite image of Riyadh, Saudi Arabia, with various data layers and a search bar. The interface includes a top navigation bar with tabs for Data Sources, Tools, Selection, Edit, Time, Measurements, and Authentication. A left sidebar contains a tree view of the data catalog, including folders for Services, Coverage Catalog, and Vector. A bottom panel shows search results for various data files, including RASTER1.img, raster1.ecw, and several final_1967.ecw, final_1960.ecw, final_1973.ecw, final_1963.ecw, final_1956.ecw, jrt2_subset_2, dec08_subset_1, final_1967.img, final_1960.img, final_1973.img, final_1963.img, final_1956.img, Part_4.img, part_3_1.img, Part_3.img, Part_2.img, riyyadh-landsat.img, riyyadh-landsat.e..., riyyadh-landsat (...), riyyadh-landsat (...), riyyadh-geocye..., Riyyadh_DTM_5..., riyyadh_dem3.img, and riyyadh_dem2.img. The interface also includes a search bar, a scale bar, and a coordinate display.

3D Geospatial Portal

The screenshot displays the 3D Geospatial Portal interface. The main view shows a 3D city model of Klagenfurt, Austria, with various buildings and a central square. The interface includes a top navigation bar with tabs for Tools, Measurements, Data Sources, Selection, Search, Time, Edit, Authentication, and Quality Monitor. A left sidebar contains a 'Map Content' panel with 'Layers', 'Data Sources', and 'Categories' sections. The 'Layers' section shows 'Klagenfurt' and 'Open Street Map'. A 'New Data Source' dialog box is open, showing a list of 'Public data sources' with columns for 'No.', 'Name', and 'URL'. The 'URL' column contains the URL 'http://demo.geospatial.intergraph.com/js/Klagenfurt.json'. A red arrow points from the 'Klagenfurt' layer in the 'Map Content' panel to the 'New Data Source' dialog box, and another red arrow points from the dialog box to the 3D city model.

Map Content

- Layers
- Data Sources
- Categories

Klagenfurt

Open Street Map

New Data Source

Type: 3D Map Tiles

URL: http://demo.geospatial.intergraph.com/js/Klagenfurt.json

Register and choose layers | Register and display

No.	Name	URL
1	BiebrzaSurface	http://demo.geospatial.intergraph.co...
2	BiebrzaTerrainPart	http://demo.geospatial.intergraph.co...
3	BiebrzaTerrainPartTwo	http://demo.geospatial.intergraph.co...
4	BiebrzaWithTrees	http://demo.geospatial.intergraph.co...
5	Hawaii	http://demo.geospatial.intergraph.co...
6	Klagenfurt	http://demo.geospatial.intergraph.co...
7	TatraWithoutBuildings	http://demo.geospatial.intergraph.co...

Search geographic names +

Search for data (metadata) +

Analyses +

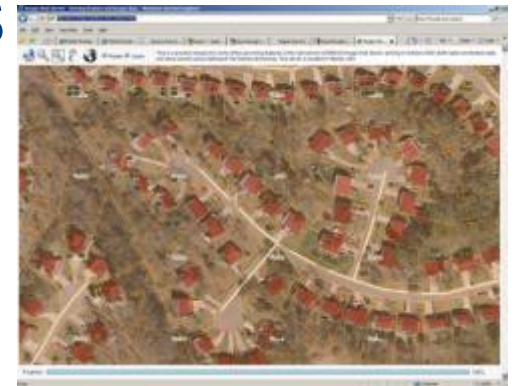
Settings +


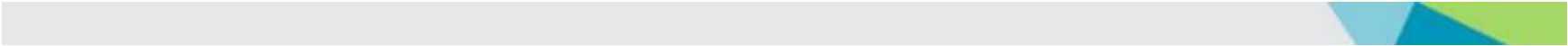
© OpenStreetMap contributors



ERDAS APOLLO Essentials

- Fastest geospatial imagery server in the world, period
- Deliver terabytes of image data to thousands of people
 - ECWP high-speed streaming imagery
 - 5,000 users simultaneously
 - Optimized Tile Delivery (OTDF) - Fast tile-based delivery of tiled data
 - 4000+ tiles a second
 - 10,000 users simultaneously
- Supports common industry standards for deployment
- Easily integrates data from existing GIS
- Highly cost-effective
 - Requires only standard server hardware





Supports massive imagery - Deliver terabytes of image data with a single server

ECWP Streaming protocol: scales efficiently to support thousands of concurrent users on a dual processor system.

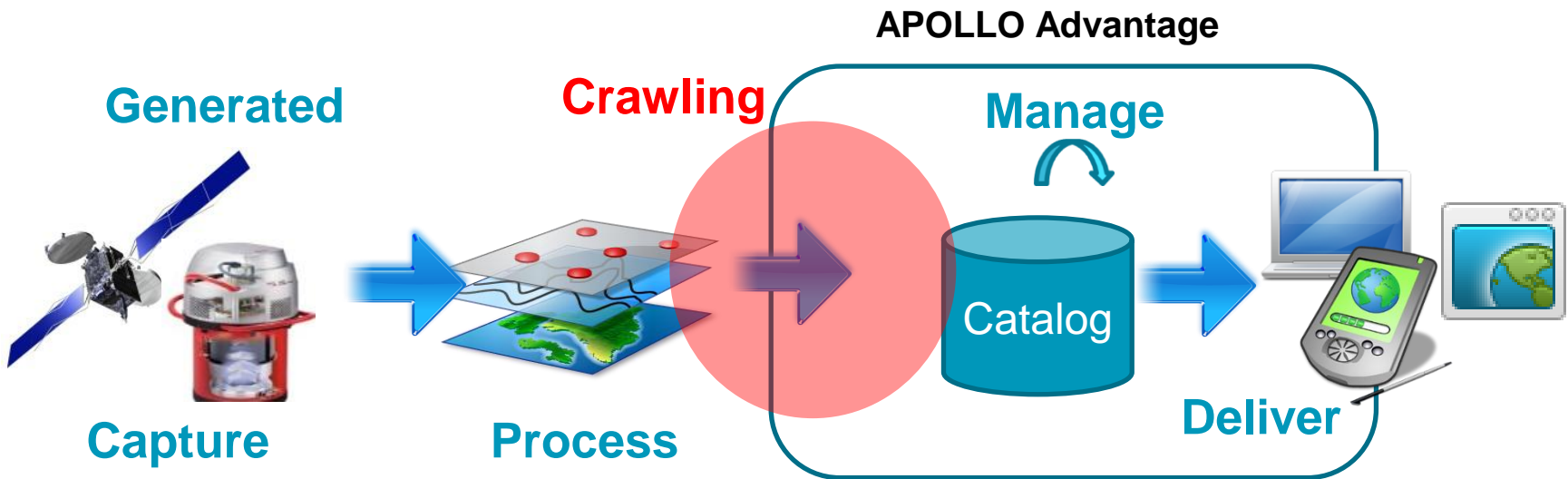
OGC-compliant Web Map Service (WMS) and Web Map Tiling Service (WMTS) protocols but also ESRI GeoServices REST.

Integrates into your GIS directly of via Plug-ins
ArcGIS®, ArcView®, MapInfo™, AutoCAD®, Bentley

ECWP Demonstration

- *Progressive display*
- *High performance*
- *Intelligent caching*

APOLLO Advantage



CRAWLING

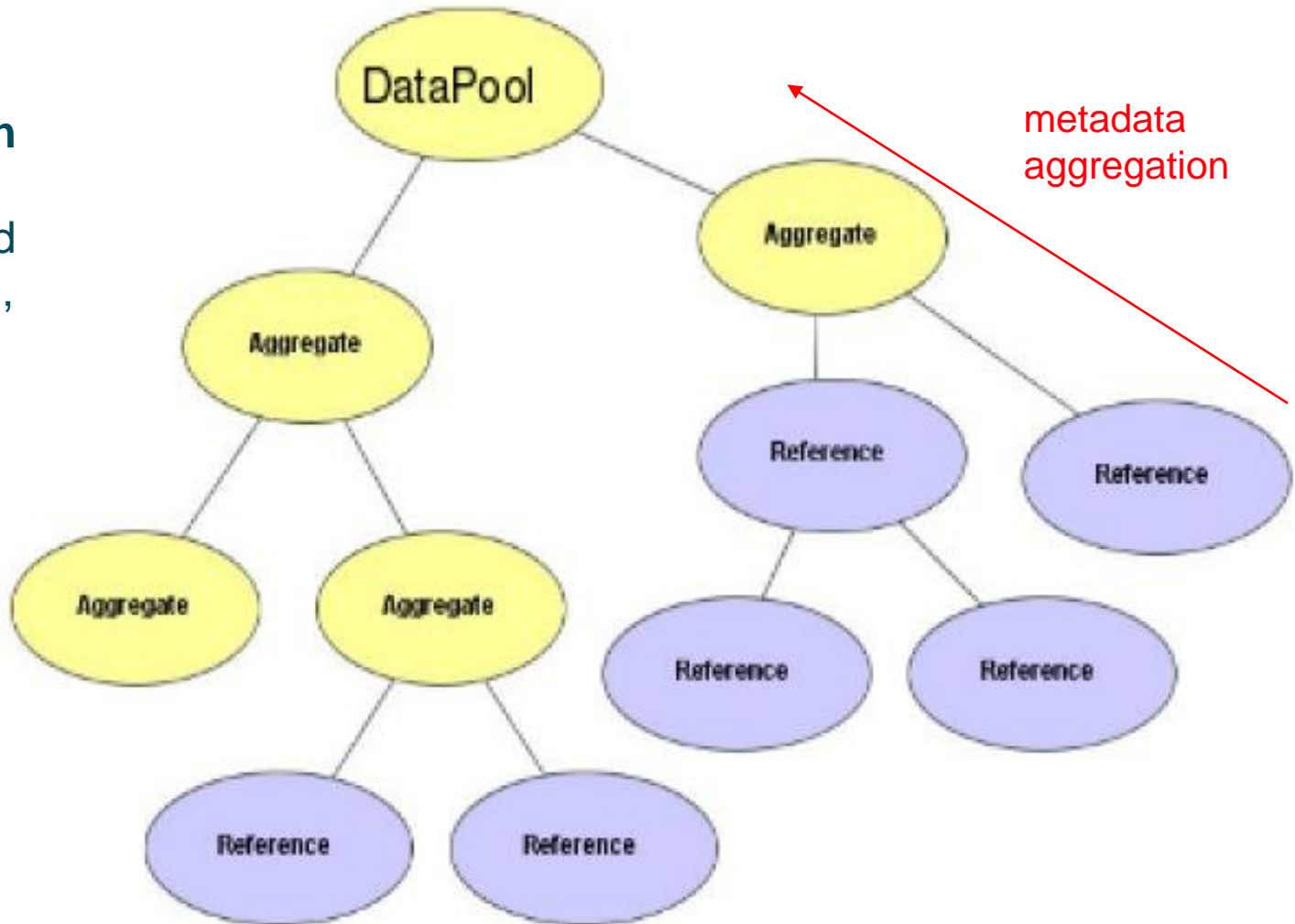
- The Geospatial Information crawlers are scheduled server jobs for continuous discovery of Geospatial data at user specified dataset store locations.


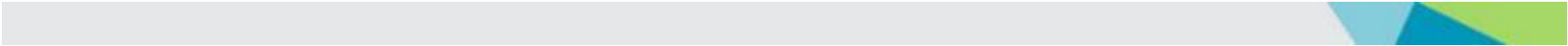
The crawlers :

- Run asynchronously on the Server: “**Set it and forget it!**”
- Run on a repeated **scheduled** basis to enable the catalog auto update
- **Auto-discover** imagery and terrain data
- **Drop box** concept
- Auto-harvest imagery/sensor **metadata** like LANDSAT, QUICKBIRD, SPOT, DIMAP, ISO 19115/19139, etc...
- Auto-provision data for optimized end user consumption (**pyramids, thumbnails and metadata generation, footprint computation and security configuration**)
- API available

Hierarchical Data Model (**Variety, Value**)

- **Hierarchical classification** of Data
- Data gathered by **collection, theme, type, domain**
- Ascendant metadata aggregation through hierarchy





Advanced Data Management – remotely crawl, provision, manage and secure geospatial imagery, Lidar, Vector, terrain and non-spatial business data.

Catalog Data Model – Define complex hierarchical data models of heterogenous disparate grided data.

Advanced Security – Secure your Geospatial Information Centrally.

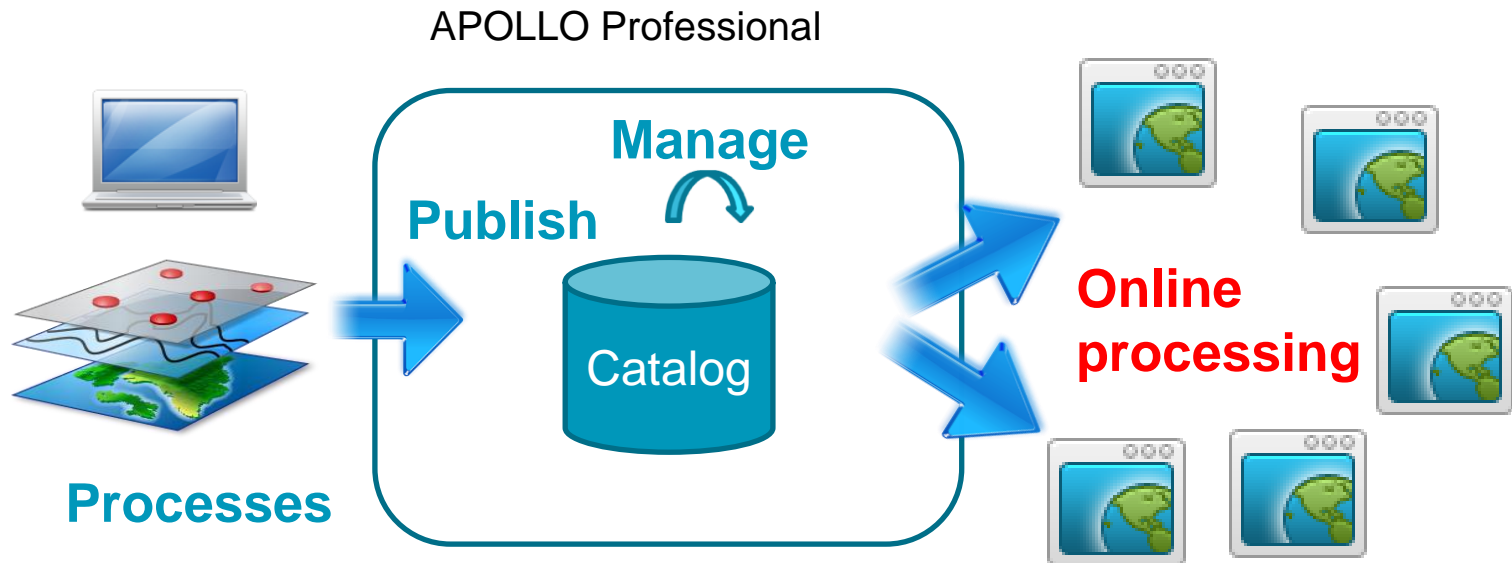
Data and Metadata Delivery – the most comprehensive grided data delivery protocols available on the market in a single server.

Web Client Interface – **Geospatial Data Portal** to search, discover, view and download data online from a web browser.



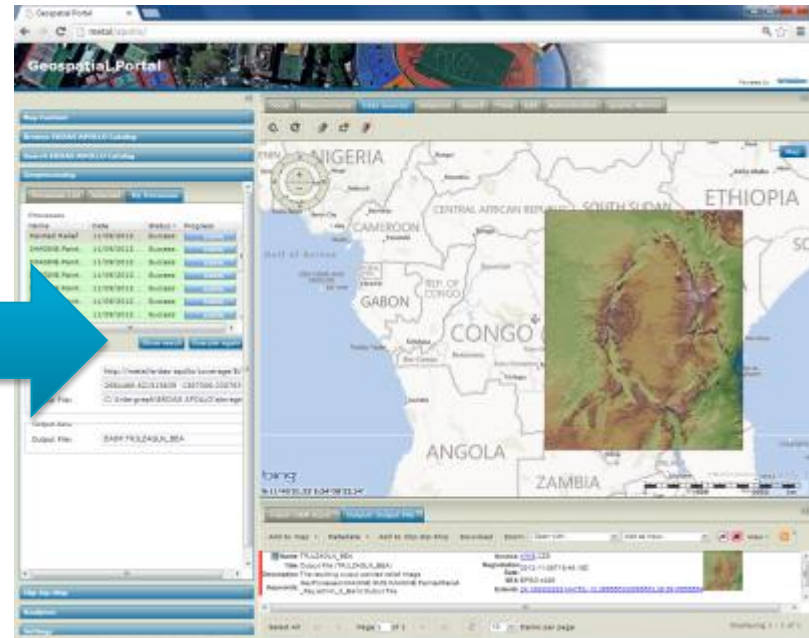
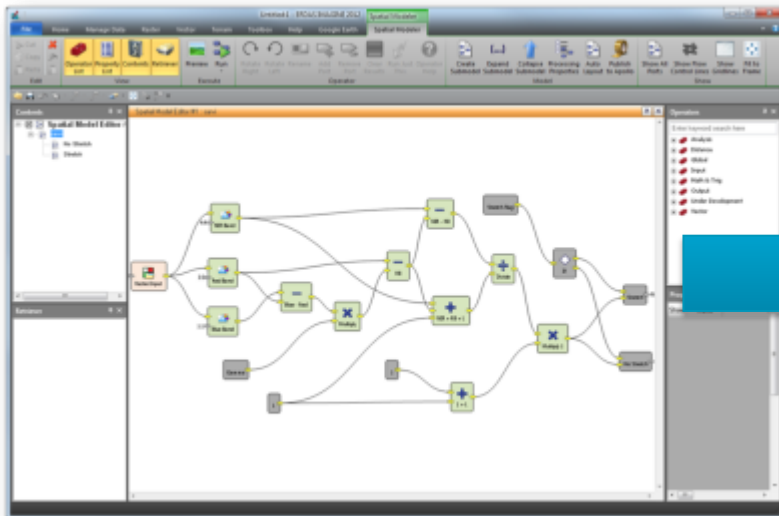
Online Processing

APOLLO Professional



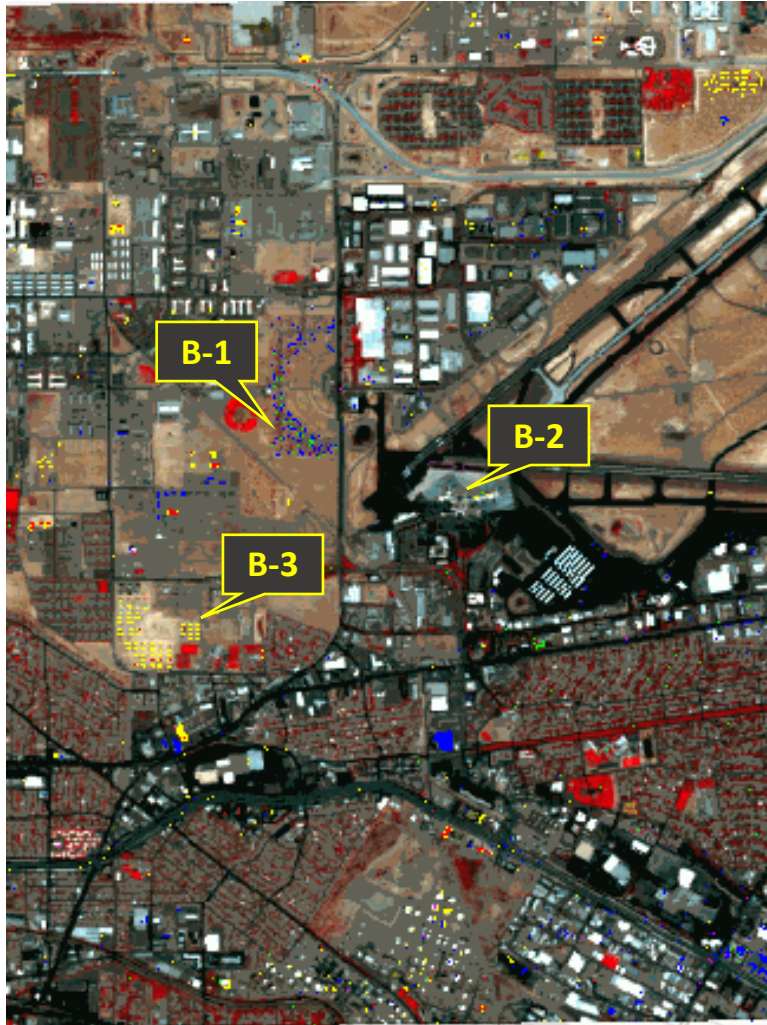
ERDAS APOLLO Professional

- Clip, Zip and Ship LAS-formatted Point Cloud data
- Geoprocessing
 - Extract value-added information products
 - OGC Web Processing Service (WPS)
 - Integrates ERDAS IMAGINE Spatial Modeler Engine

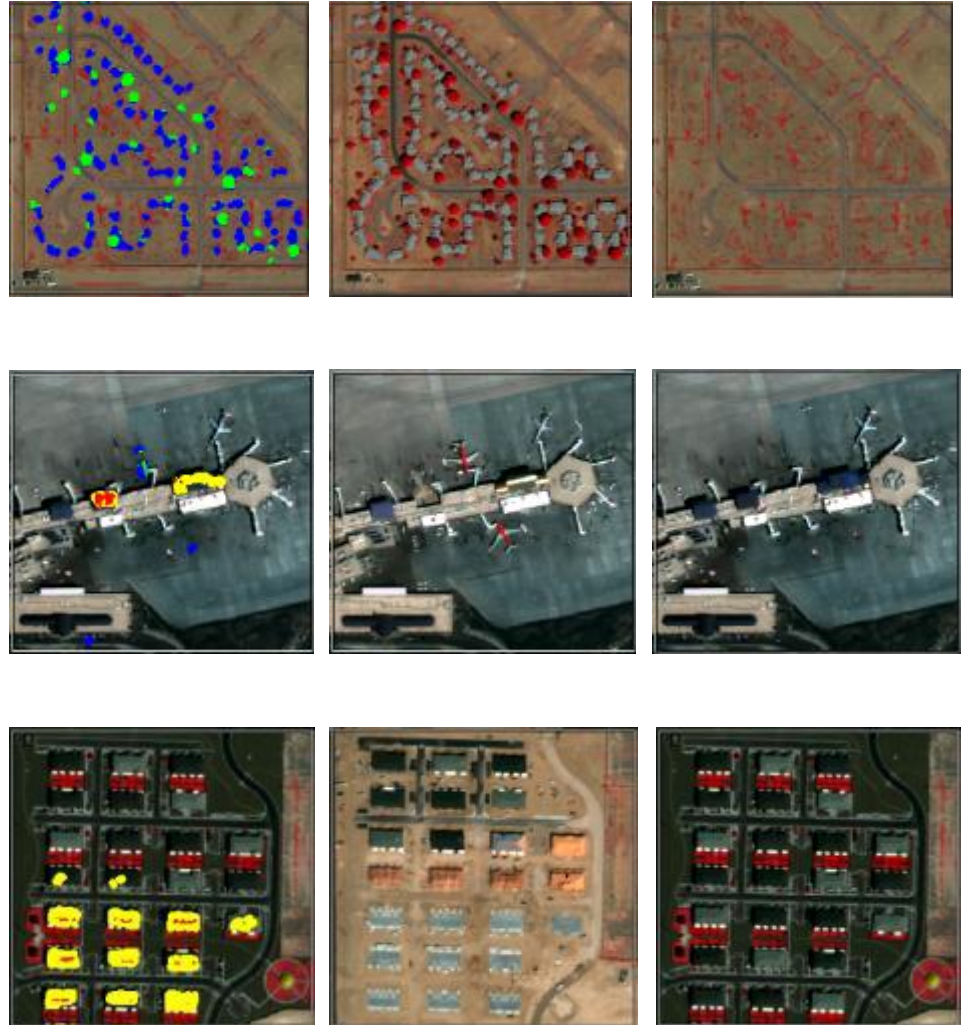


Valtus Data and APOLLO Processing...

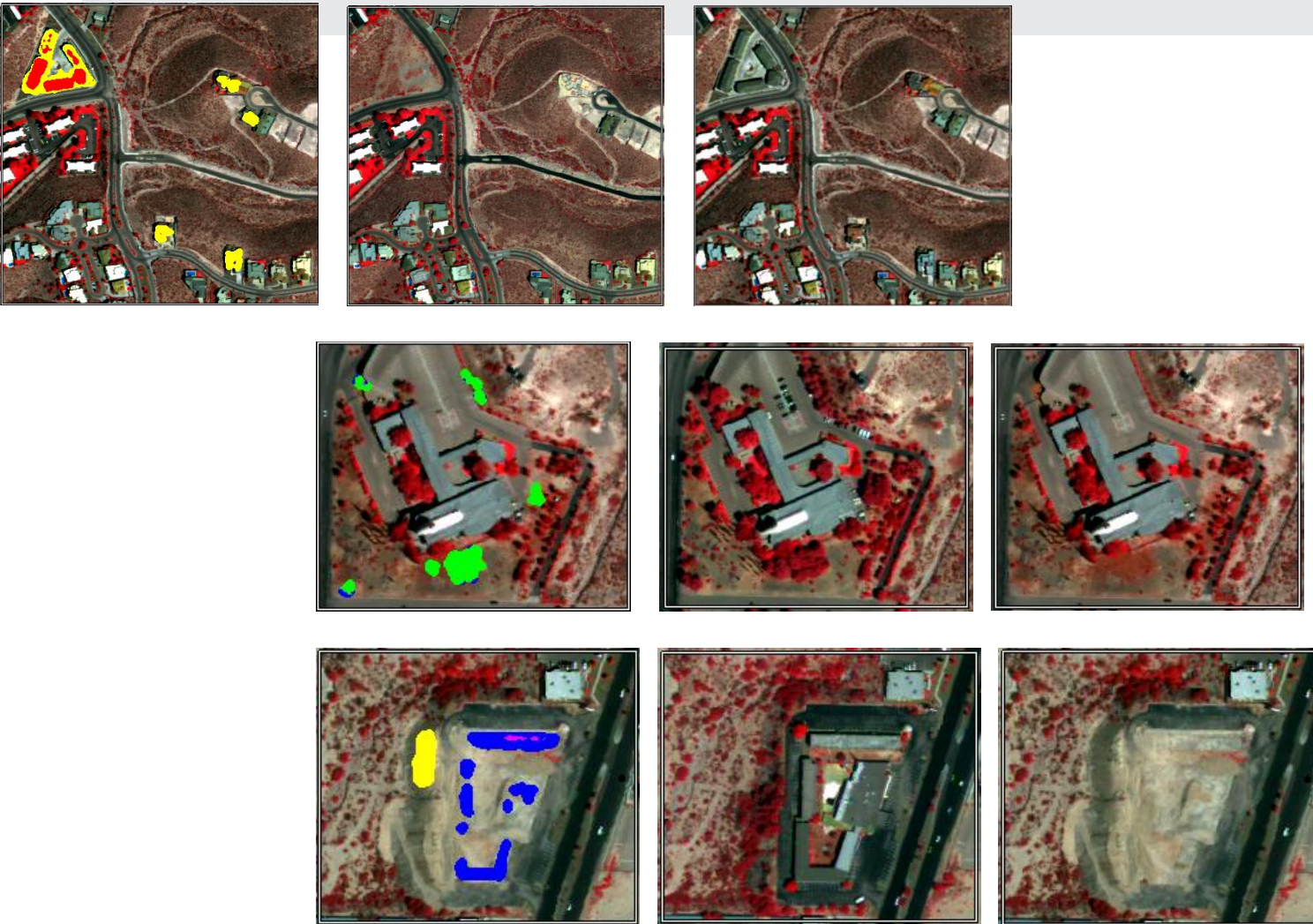
5 Band Data



Produces very clean change detection



Results



Conclusion

- **APOLLO provides tools to address Big Data challenge**
- **Volume:** Big Data to Small Data
 - Hexagon ECW and JPG2000 compression very efficient
 - Easy and fast data dissemination
 - Streaming: ECWP/JPIP
 - WMS, WMS-T, WMTS
 - SDK available to integrate that technology in your own system
- **Velocity :**
 - Dynamic data management:
 - Data crawling
 - Metadata aggregation
 - Automatic metadata parsers for different Satellite products (Landsat, Spot, etc)
 - Variety of interfaces to consume data including OGC
 - Download: WCS (from Level0...), Clip Zip and Ship
 - View : WMS, WMTS, WMS-T
 - Processing : WPS
 - Discovery



QUESTIONS?