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Large Image Archive Management Solutions Using Oracle 10g Spatial & IONIC RedSpider Image Archive
Outline

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Abstract

Exploiting the power inherent in Oracle 10g Spatial, J2EE, and OGC interoperability, IONIC’s RedSpider Image Archive has provided the most scalable and feature-rich image archive management solution to customers such as NASA and NGA. RedSpider IA has been deployed to provide real business gains in the dynamic discovery, access and portrayal of imagery from electro-optical, radar, multi-spectral and hyperspectral sensors. This image archive solution offers an open, extensible, and easy-to-deploy platform that allows them to focus their developers on their business problem.
Challenge

- Increasingly, customers are looking to manage large, fast changing archives of recently acquired imagery.
- Users and “image processing chains” are coming to expect near instantaneous discovery of, access to, and portrayal of their imagery.
- Our customers want all this through standard OGC web service interfaces (e.g., WMS, WCS, CS-W)
Challenge

• Customers and processes need not only 8bit images, but also 16+bit “gridded coverages” from EO, MSI, HSI, and radar sources.

• Customers expect a high degree of format conversion capability from any source format to a wide range of target formats (e.g., JPEG2000, NITF, GeoTIFF, TIFF, Mr. Sid, etc.).

• Imagery metadata management is essential to the exploitation of imagery.
Image Archive Solution with IONIC's RedSpider Image Archive on Oracle 10g Spatial
Solution Examples
Image Archive
We selected the IONIC RedSpider Image Archive and Oracle 10g Spatial because they allows us to:

- **index** dynamically incoming data in a catalog.
- **manage** large amount of data following an hierarchical organization model.
- **publish** the catalog content through CSW OGC interface
- enable complex **search** on metadata criteria through CSW OGC interface.
- **serve** raw and rendered data through WCS and WMS OGC interfaces.

This data can be heterogenous (in terms of formats, coordinate systems, and more), and can be both ortho-rectified and non-orthorectified.
Oracle 10g Spatial enables the IONIC RedSpider Image Archive to:

• Support thousands of register, delete and update per day.
• Register more than 25,000 granules per day.
• Serve hundreds of thousands of granules.
• Allows near real time availability of incoming images.
• High availability 24/7.
Oracle 10g Spatial enables:

• Complex search can be performed on Catalog to retrieve desired Coverage Offering records, each of which is encoded in ISO19115/19139 XML.

• Many operators and criteria can be used to build complex filters.

• Fixed search criteria are available through the Web client:
  • id, bounding box, temporal extent (ISO 8601), keywords, acquisition date (ISO 8601), quality (%), price, type (granule or collection), web availability (WCS and/or WMS).

• Other search criteria are available through the API:
  • range description, acquisition level, processing level, error values, last modification date, date of Availability, detected features

• Custom range axis can be used to provide additional search criteria through the API.
Solution Examples

Image Archive

Coverage Offering results that match the criteria

Spatial search criterion

Fixed search criteria

Get ISO 19115/19139, human check

Visualize in interactive viewer
Solution Examples
Auto-image Processing

Auto-image Processing with IONIC's RedSpider Image Archive on Oracle 10g Spatial
Solution Examples
Auto-image Processing
For auto-image processing, the same Oracle Spatial based architecture allows us to index, manage, publish, search and serve:

- raw (unorthorectified) image data
- controlled image base
- elevation data (e.g., DTED, DEM, etc.), and
- orthotectified (processed) imagery

Processed imagery can then be immediately published as maps (via WMS) or data (via WCS).
Benefits and Uses of Oracle Spatial

- Highly transactional
- Spatial index building is dynamic
- Spatial integrated with Oracle XML DB, which lets us manage metadata in international standard XML encodings
- Oracle Label Security offers granual level security
- Oracle Raster offers great management opportunities
Data Management with Oracle Raster

- While we have found file based image archiving best for achieving the desired near-realtime behavior, we have begun exploring the benefits of Oracle Rasters for the purposes of long-term data management.
- Oracle Rasters provide a clean method for data backup, recovery, etc. - while still providing the desired level of availability.
Conclusions

• Oracle is the only spatial database capable of supporting the dynamic spatial data infrastructure our customers seek.

• As an integrated part of the Oracle database, Oracle Spatial implementations can “free ride” on the scalability, security, backup/recovery, failover, and XML support of the core Oracle infrastructure.

• IONIC's products provide a seamless integration with the Oracle product line.
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