Geoscience Australia Explorer – Infrastructure Planning Decision Support

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The project, our approach and influencing factors

• CO2 Infrastructure Assessment Project (CIAP)
• Project overview
• Change of government
• Making the project applicable to other GA projects
• Over complexity (aiming too high)
Detailed Solution Architecture
Registering Assets

Jobs in FME server
How they are initiated

<table>
<thead>
<tr>
<th>Asset Name</th>
<th>Status</th>
<th>Mark DIRTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport areas</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Coast and borders</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Designated land reserves</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Ferry route lines</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Foot bridges</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Foot tracks</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Heliports</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Island</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Landing grounds, Taxiways and Runway centre lines</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Linear structures supporting railway networks</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Linear structures supporting road networks</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Major and minor roads</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Named places and regions</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>National onshore gas pipelines</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Nationally significant regional areas</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Point structures supporting railway networks</td>
<td>PENDING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Point structures supporting road networks</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Railway stations and sidings</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
<tr>
<td>Railways</td>
<td>UPDATING</td>
<td>Mark DIRTY</td>
</tr>
</tbody>
</table>

Assets marked as DIRTY will be run when ETL is triggered.
Editing Publication

"PublishProductionLineMessageFromActiveMQ"

Topics to Publish To:
- ProductionLineInputMessages

Protocol:
- JMS

Provider Type or Context:
- ACTIVEMQ

Provider URL:
- tcp://rhe-ciap-test01.test.lan.61616

Additional Provider Properties:

Connection Factory:
- ConnectionFactory

Username:
- mcollective
Controller Workspace
Component Workspace

**Reader Feature Types**
- Tick "Feature Type"
- Merge Feature Type
- Use "Feature Rule" to identify
- This allows dynamic creating of feature type

**Data Flow**
- Get output functionality value from published parameter
- Use as name of output file: \(<assetID>, <timestamp>\)

**Writer Feature Types**

### DON'T USE AGDB API WRITER - CAUSES LOTS OF ERRORS EVEN USING 32 BIT!!!

**Parameter Fetcher**
- \(<ALL>\) Output

**Terminate Translation**
- Terminator

**Startup Script**
- **(Example)** Python script (e.g., `StartupScript.py`) that writes metadata to the log file and performs any necessary setup.

**Shutdown Script**
- **(Example)** Python script (e.g., `ShutdownScript.py`) that cleans up resources and writes any additional metadata.

**Workspace Functions**
- Read feature type from WPS URL
- Project features to EPSG:4326 (if WGS84)
- Separates JSON files by feature using a Python script.
Nested Tile Index system
Applications of statistical outputs
Demonstration of Dynamic Statistics in UI

Geoprocessing Tools

- Elevation tool
- Least Cost Path tool
- Clip Zip and Ship
- Identify tool
Confirm least cost path relative weightings

Opportunity
- Electricity transmission lines
- Pipelines
- Easements
- Railways
- Roads

Highly constrained
- Lakes
- Reservoirs

Variable rating (from Opportunity to Unsuitable)
- Slope percentage
- Reserves

Unsuitable
- Urban Centres and Localities
- Prohibited areas

Path bounding box buffered by: 25\% 

Note: The processing can take a while. You will be notified when the process is complete.
Tool design and methodologies

- Integrated surfaces (onshore-offshore), Multiple surface profiles.
- PDF generation, KML generation
- Preprocessing data for performance
- Way pointing, segment ordering
Application Provides:

- Intuitive GIS for non technical users to provide decision support for specific and general questions that drive government policy.
- Exposure of Geoscience Australia data and products.
- Proven capability for the delivery of these type of systems and their value to other government agencies.
- Geoprocessing services reused by a range of applications delivered (Service Oriented Architecture).
Where to from here:

- Austrade Project—Northern Australia pre-investment information support system (GIS enabled).
- Economic Fairways – Greenfields decision support for mining investment.
- COSAP – Next version of CIAP project with a wider scope.
- Plus more to come.
Code Snippets
Python toolboxes for Elevation and Least Cost Path
GP tools

DSS_LeastCostPath2.pyt  Transect.pyt
Thank you - Questions

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