

TESTBED-15



Machine Learning



WFS



WPS



CSW



MACHINE
LEARNING

- Petawawa forest change prediction model
- New Brunswick forest decision maker model
- Quebec lake river differentiation model
- Richelieu River Hydro linked data harvest model
- Arctic web services discovery model



Petawawa Research Forest; located between Chalk River and Petawawa, Ontario, Canada

A photograph of a forest in autumn. The trees have bright red, orange, and yellow leaves. A dirt path leads through the forest, and the ground is covered with fallen leaves.

Detect and remove high altitude cloudlets
(popcorn clouds) from Landsat/Sentinel-2

Produce cloudless image mosaic

Land cover classification



Client

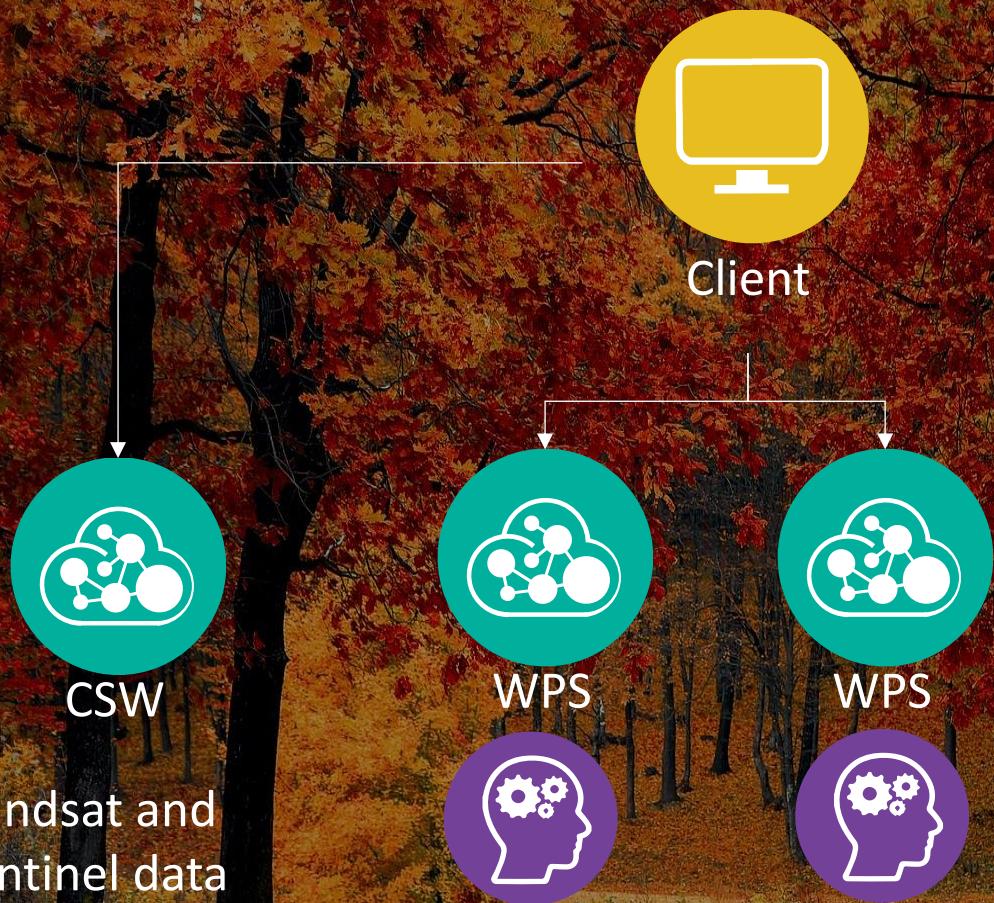


CSW

Landsat and
Sentinel data
discovery (max
cloud cover 70%)



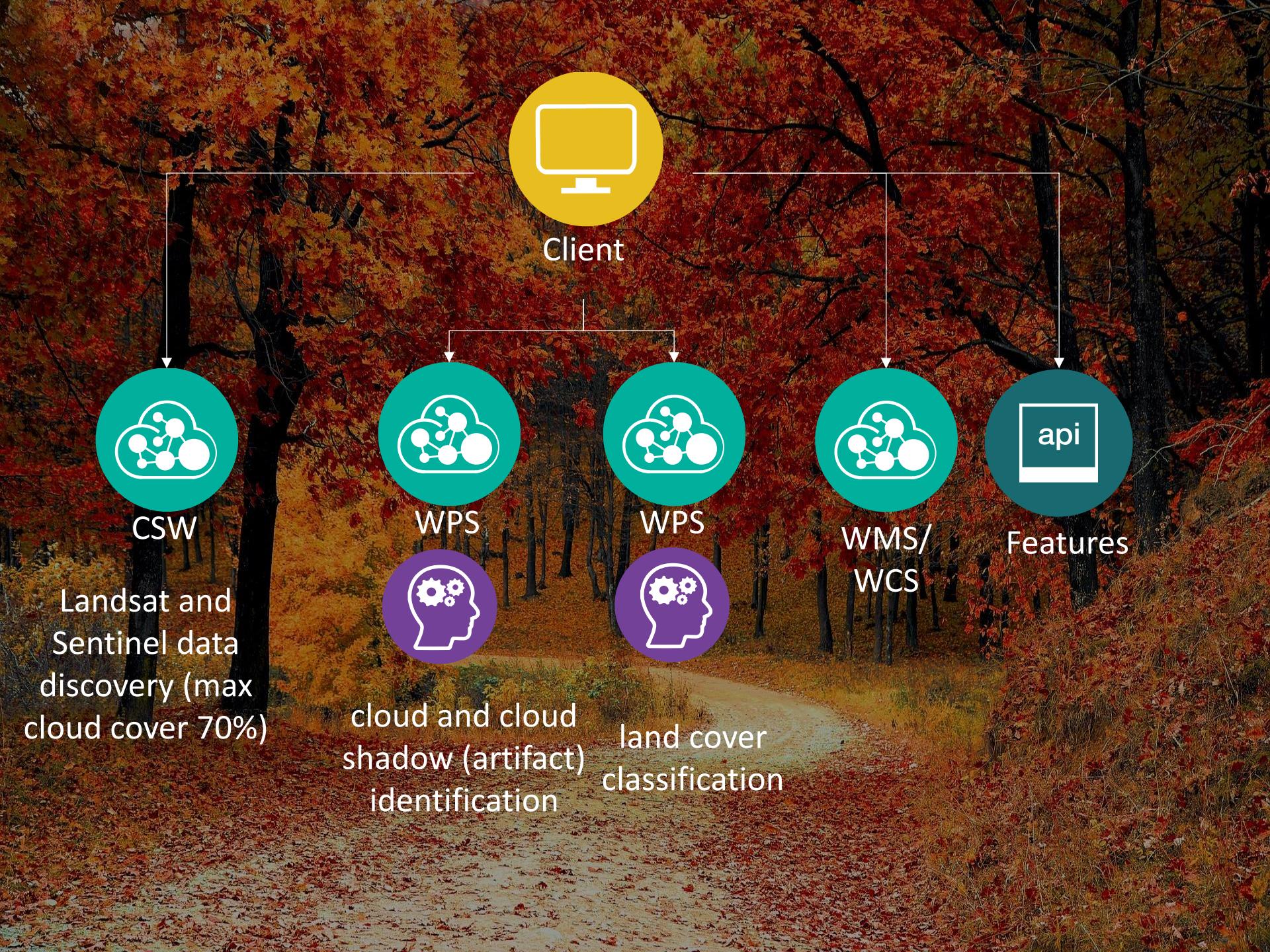
Client

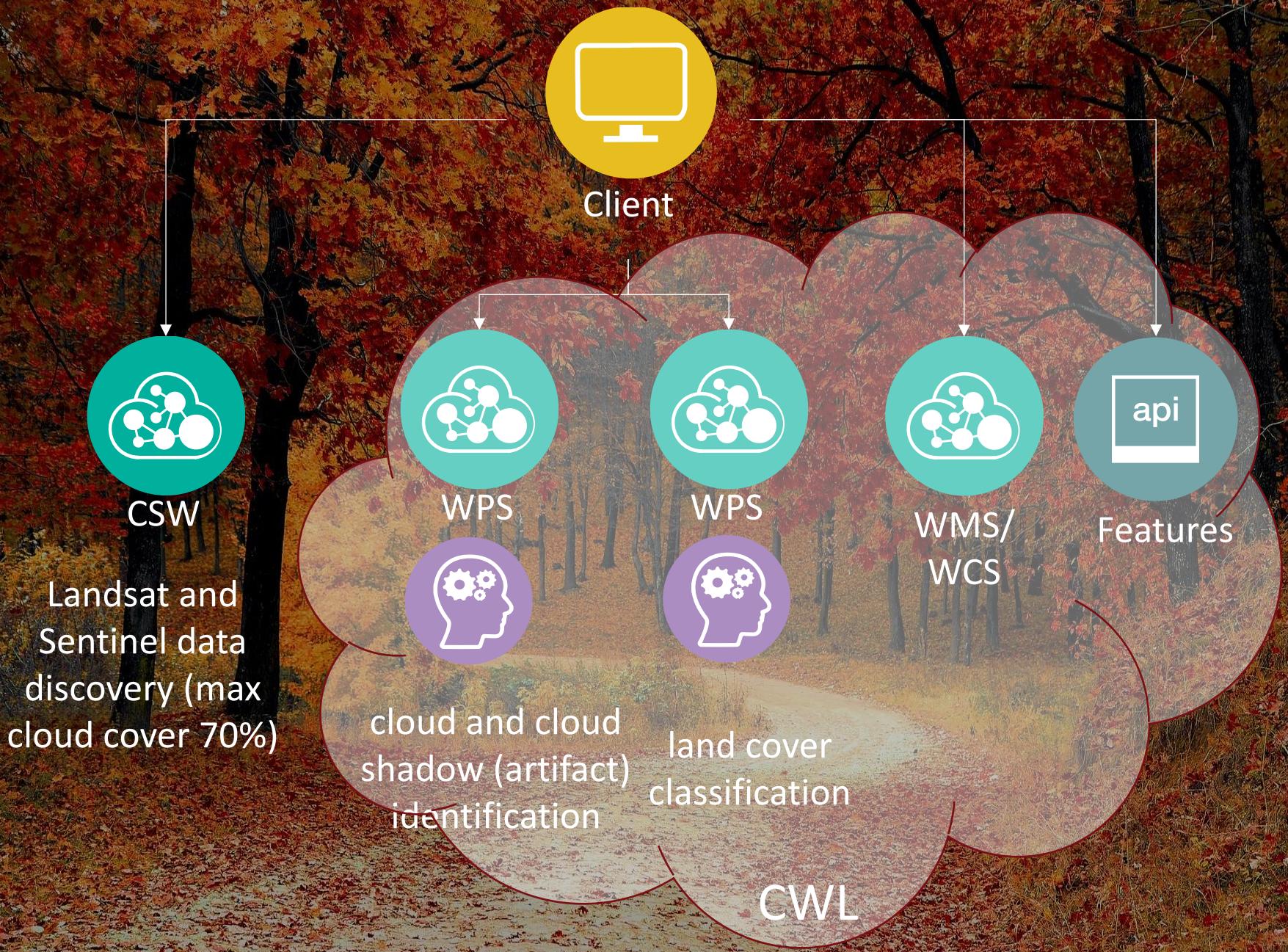


Landsat and
Sentinel data
discovery (max
cloud cover 70%)

cloud and cloud
shadow (artifact)
identification

land cover
classification

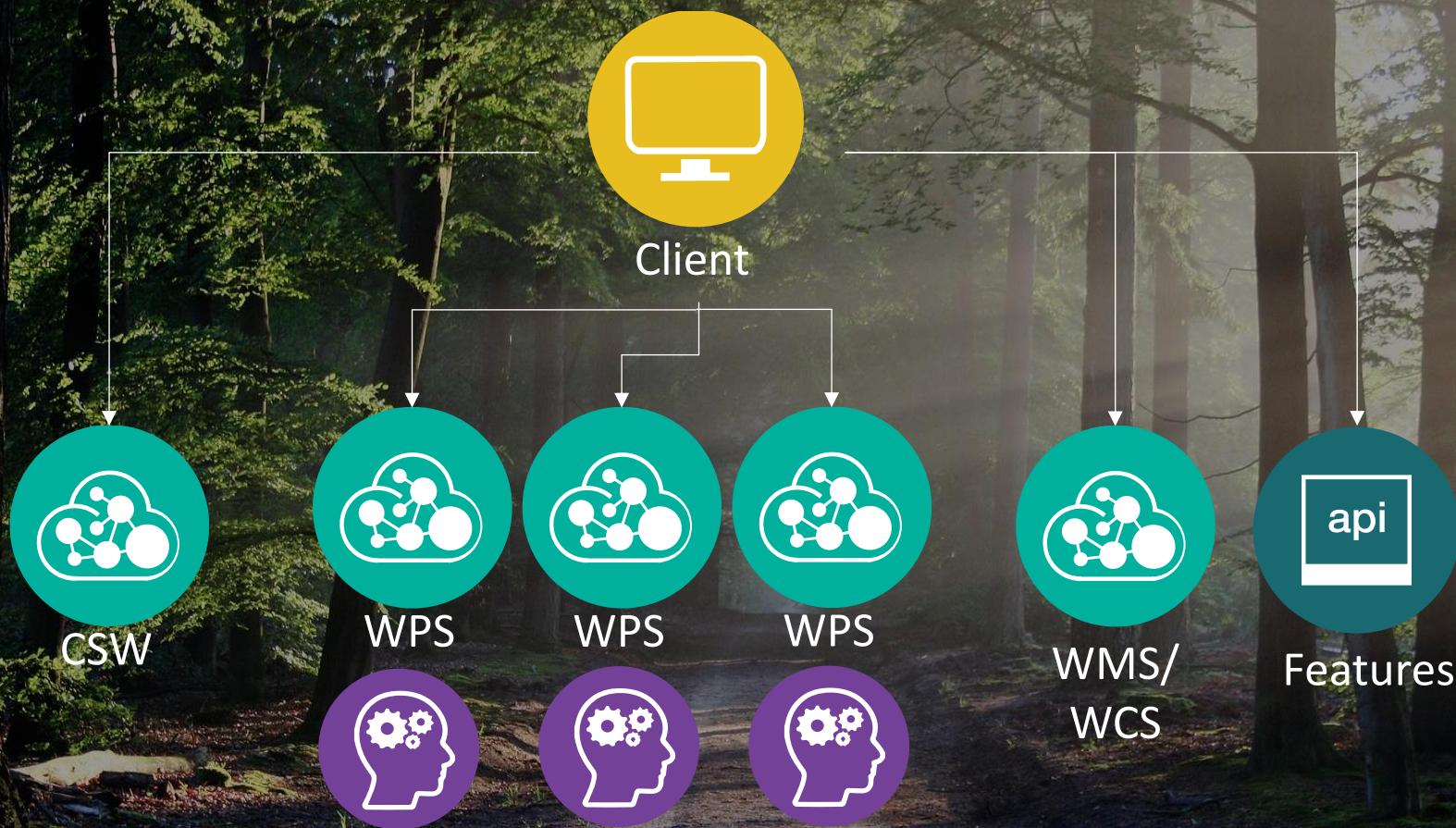


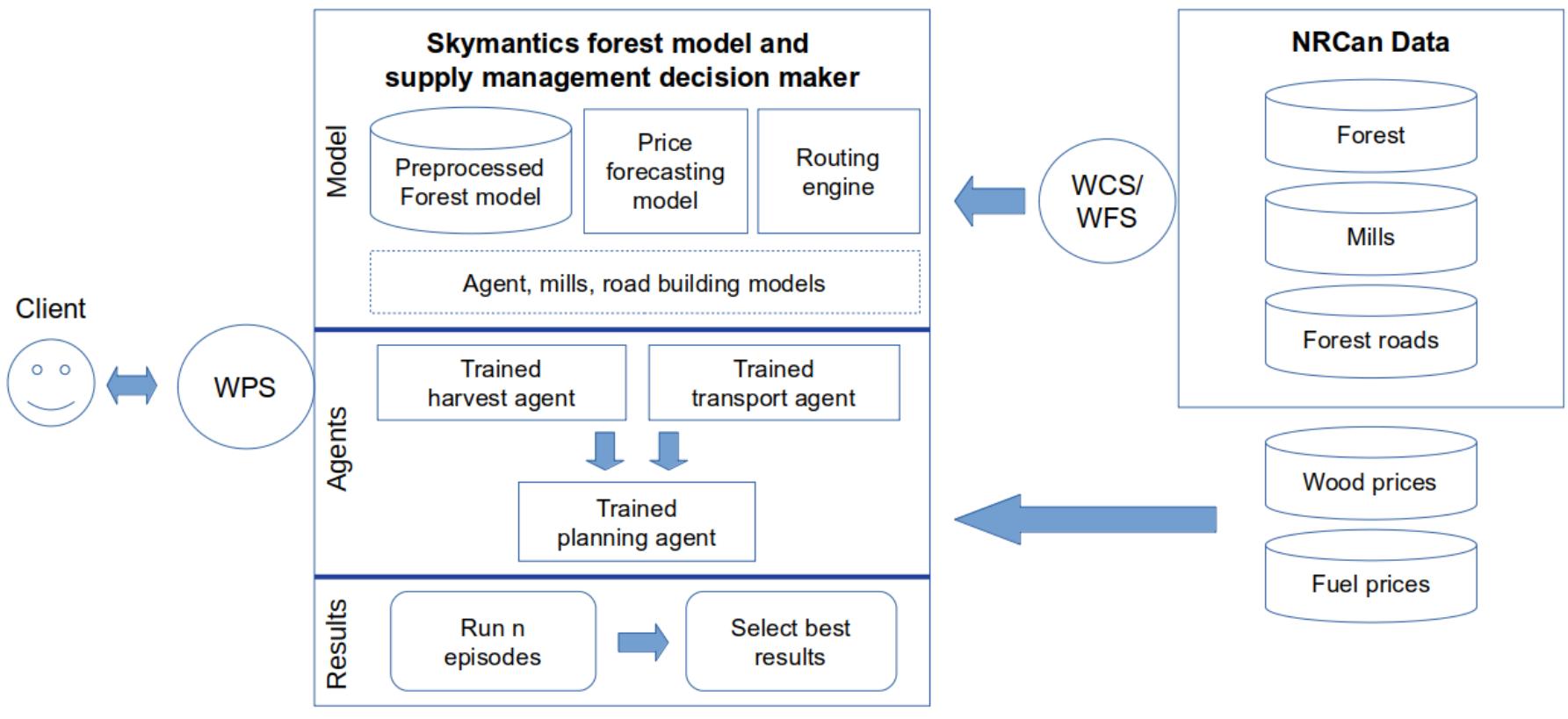


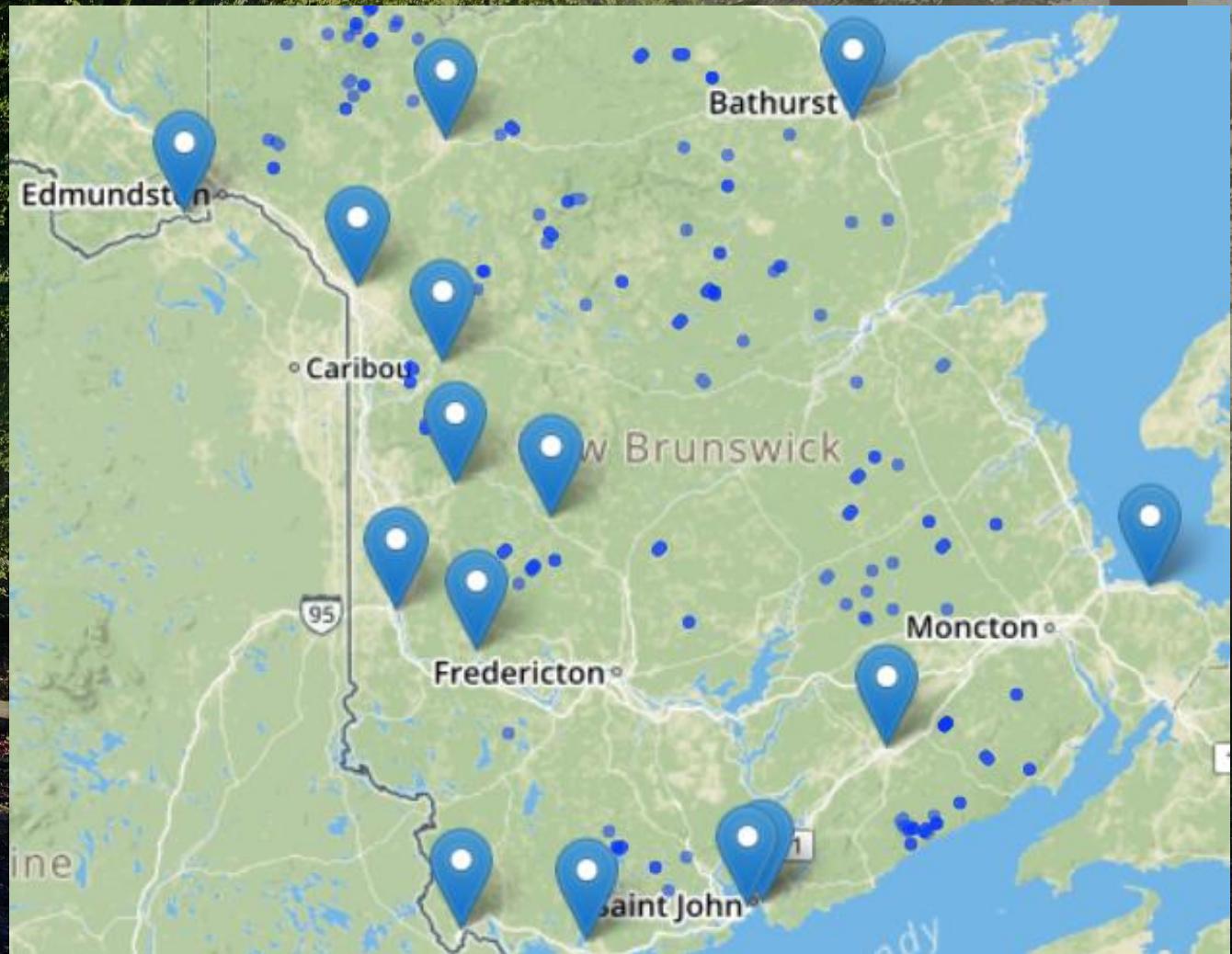


New Brunswick forest supply management decision maker ML model scenario

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1. Create a "wood flow model" to optimize routing for timber from source to market.
 2. Recommend areas for new road construction to make the route more efficient.
 3. Provide a list of recommended road closure locations and times to minimize disruption.
 4. Consider data from different sources including: primary infrastructure, secondary infrastructure, and prices of lumber, fuel and energy.

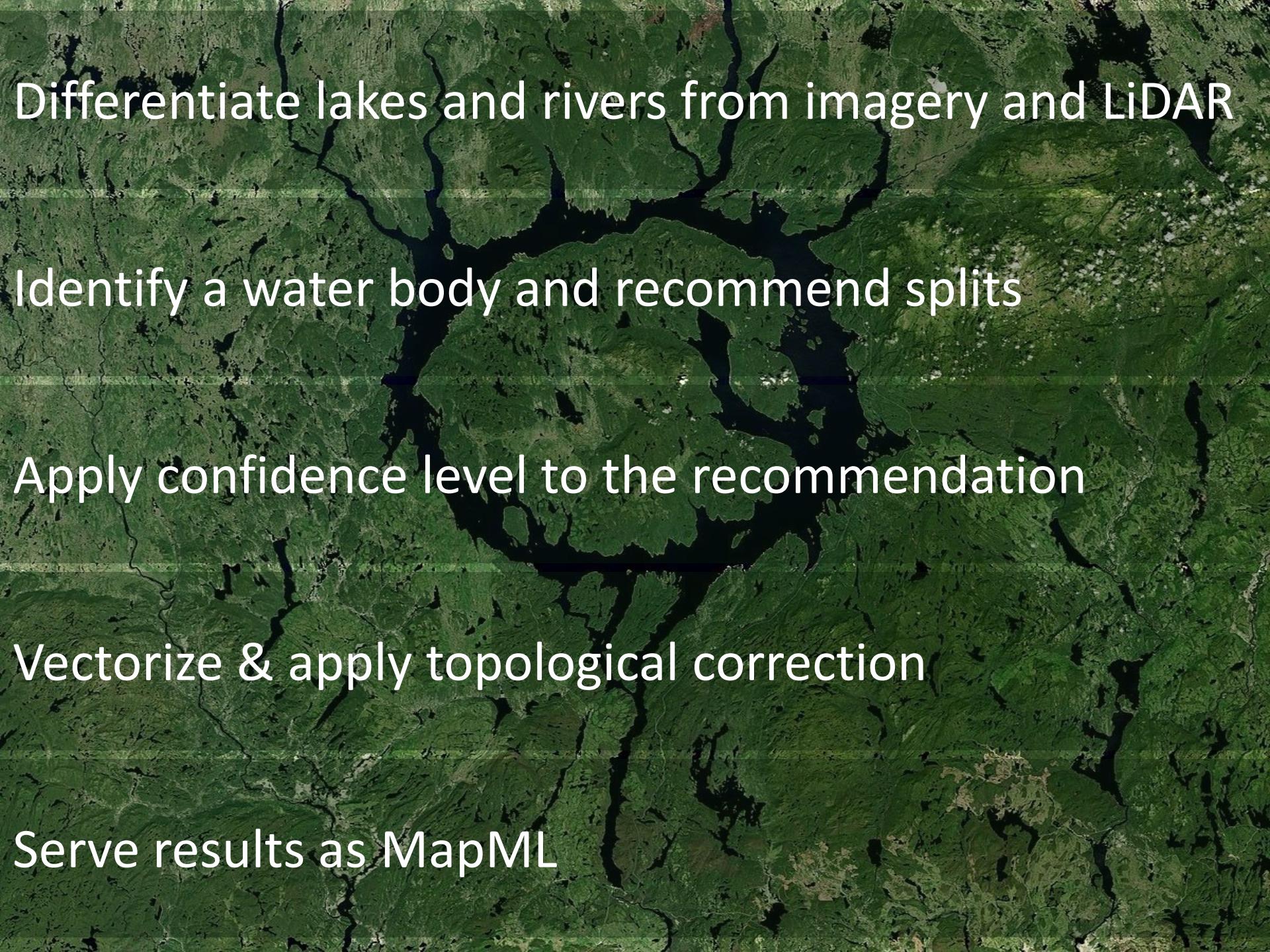








Quebec lake - river differentiation model; *Manicouagan Reservoir in central Quebec, Canada*

A satellite map showing a dense green forest covering most of the land. A large, dark blue body of water is centered in the image, surrounded by forested land. Smaller bodies of water and rivers are visible throughout the landscape.

Differentiate lakes and rivers from imagery and LiDAR

Identify a water body and recommend splits

Apply confidence level to the recommendation

Vectorize & apply topological correction

Serve results as MapML

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Identify a water body and recommend splits

Apply confidence level to the recommendation

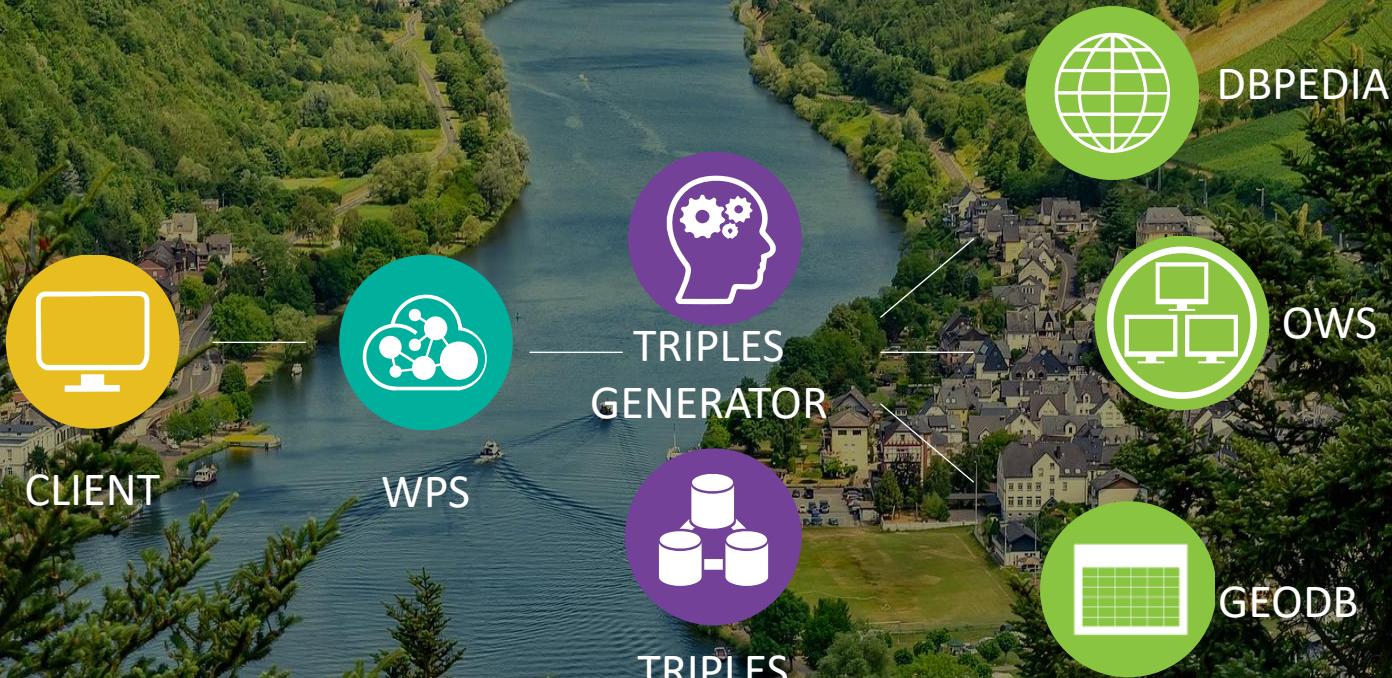
Vectorize & apply topological correction

Serve results as MapML





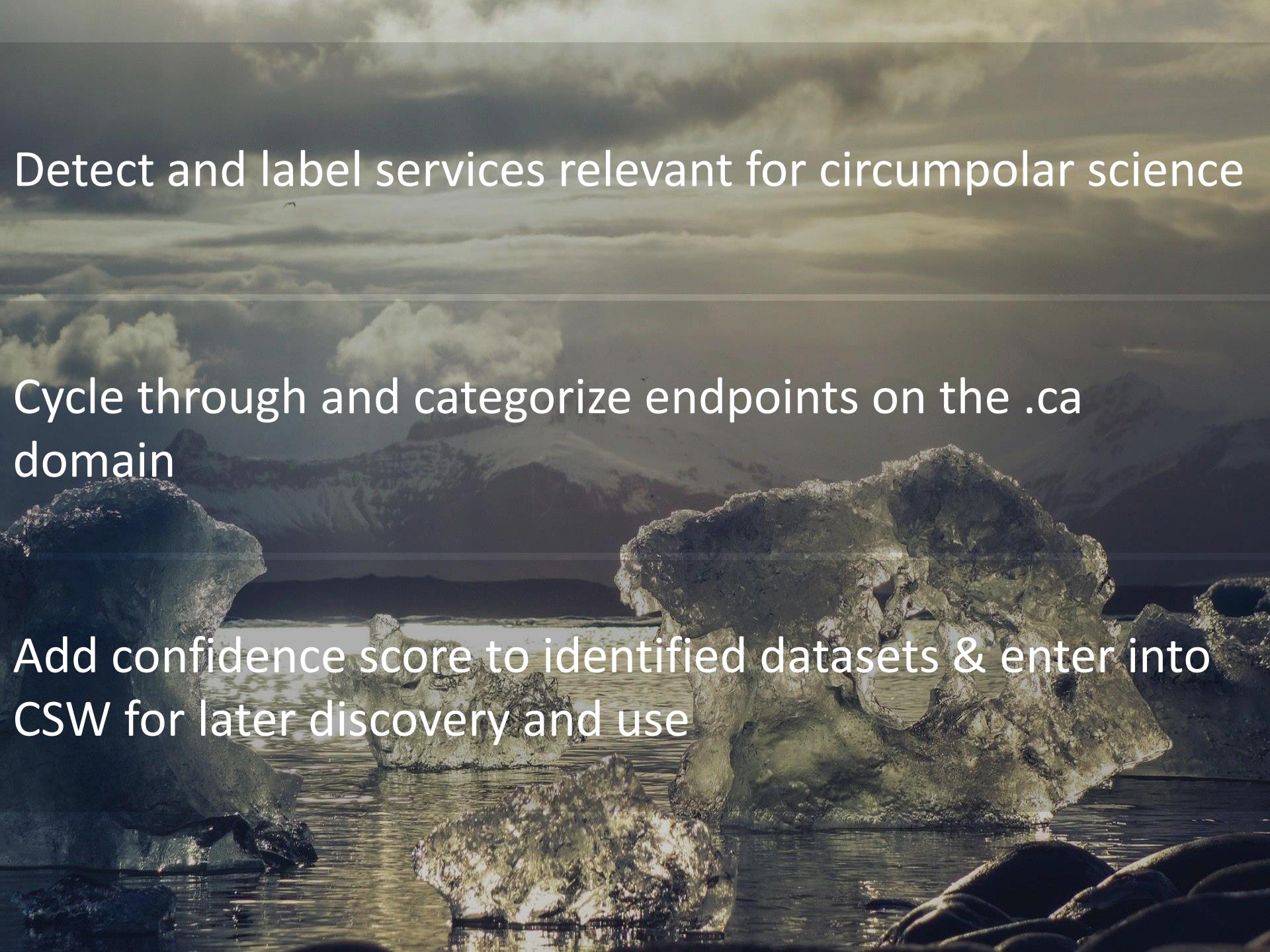
Richelieu River hydro linked data harvest model scenario



Mine the semantic web for relevant relations between datasets
and store the results as triples in the triples store



Arctic Web Services Discovery Scenario

The background of the slide is a photograph of a rugged, polar landscape. In the foreground, several large, dark, textured icebergs are scattered across a body of water. The middle ground features a range of mountains with patches of snow and ice. The sky above is filled with heavy, dark, and textured clouds.

Detect and label services relevant for circumpolar science

Cycle through and categorize endpoints on the .ca domain

Add confidence score to identified datasets & enter into CSW for later discovery and use

Recommendations

- Lightweight direct vs. feature core based:
 - .../ml/anything
 - .../collections/{collectionID}/items/processes/formalized
- Dynamic data vs. mostly static
- Data streaming support

Recommendations

- OGC Standards to compare trained models
 - Pre-trained
 - General feature models
 - Governance
- Support for ML model stress tests in OGC API – Processes
- Metadata profiles for ML models / service endpoints