CSIRO

Data cubes unlocking Earth observation potential

Petabytes of decades-long Earth observation data are now available globally, and efficiently extracting usable information for decision making can be a challenge. Data cubes address this challenge by linking the highest quality image datasets to powerful computational and analytics systems.

Not just a map

An ever-increasing number of applications and software tools provide access to Earth Observation (EO) datasets from all over the globe and spanning decades. They provide a visual experience that was unthinkable only a few years ago. Some of the images in these systems contain data that can be used to compare changes over space and time, but systems that enable efficient research and decision-making using the best quality data are limited. Data cubes provide a solution.

Powering up the potential of EO data

EO data can be extremely useful across all aspects of society, including public health and safety, urban, agricultural and natural environment management. Historically, processing EO data occupied the largest proportion of project time and budget. Preparing image data is now more complex than ever as researchers draw on multiple datasets to generate meaningful results. This high cost and effort have been barriers to the use of EO data. By automatically processing images to Analysis Ready Data (ARD)—including correcting for noise, sun, elevation and the atmosphere—data cubes reduce the time and cost of using EO data.
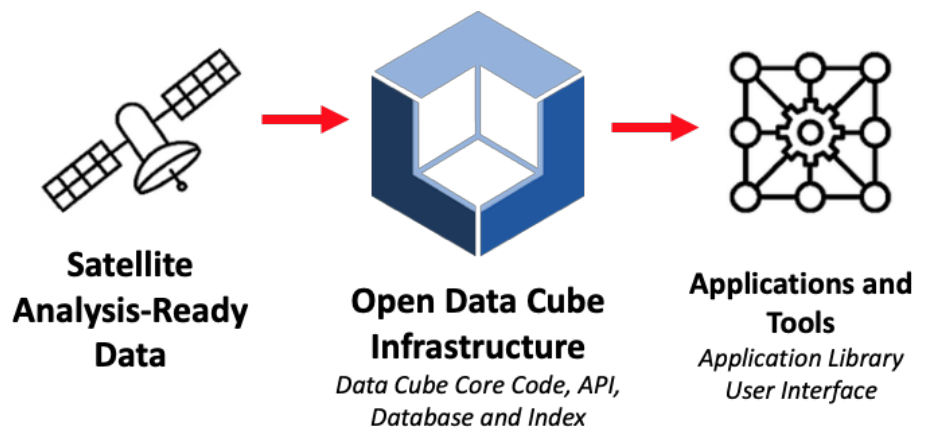
Global adoption of open data cubes

CSIRO, Geoscience Australia and Australia's National Computational Infrastructure created the world's first data cube, for the entire continent of Australia spanning more than 30 years. This technology has now evolved into the Open Data Cube (ODC) partnership (www.opendatacube.org).

Australia's Pre-eminent National Science Organization

Open Data Cubes

- Contain high quality ARD to measure changes in space and time with very high accuracy.
- Are 100% open source and free to install by all users (including commercial entities) on PCs, institutional servers or cloud infrastructure.
- Can contain and process very large volumes of data.
- Let users explore data and create new products.
- Automatically scale processing power to allow for local > continental > global projects.
- Track the provenance of the data for quality control and updates.

Satellite Analysis-Ready Data

Open Data Cube Infrastructure
Data Cube Core Code, API, Database and Index

Applications and Tools
Application Library User Interface

Open Data Cubes use Analysis Ready Data from satellites including Landsat, Sentinel and MODIS in an open source environment for all users to create decision making tools.

50+ ODCs deployed or in development

The ODC partnership embraces open source philosophy, allowing countries to implement a data cube that meets their specific needs, and lets them collaborate with others and utilise new open source technology as it is released.

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