
EarthByte Information and Computing Services Roadmap

<https://www.seegrid.csiro.au/twiki/bin/view/Compsrvices/EarthByteRoadmap>

Summary

The development of this Roadmap for Implementing Interoperability of plate tectonic data and geodynamic computing services for applied and fundamental research purposes.

The development of this project is supported by the APAC Geosciences project, and this architectural roadmap draws on the SEEGrid Roadmap. The architecture described is thus consistent with national and international directions.

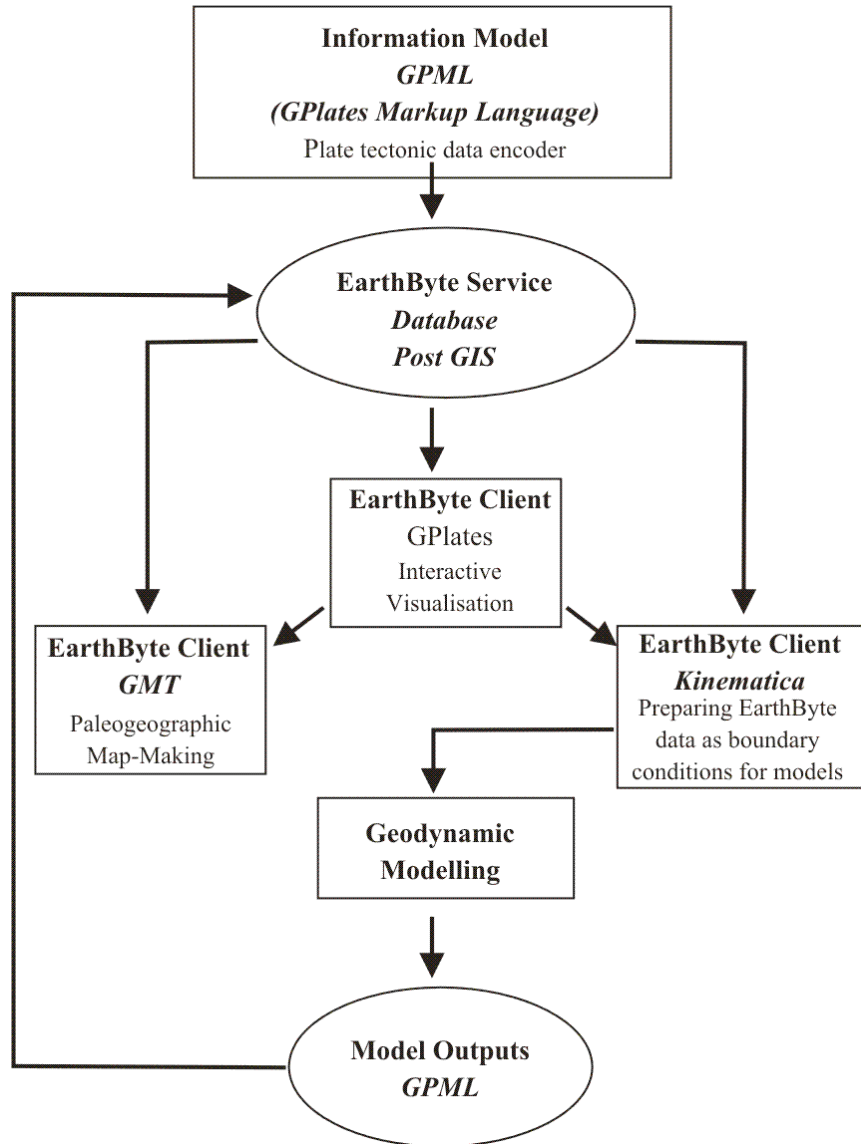
This provisional Roadmap is a "**living document**" and as such its authors welcome comments and suggestions to improve its content, style and implementation into the community of practice. It was written by a consortium consisting of:

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Goals

1. EarthByte will provide an infrastructure for linking geological/geophysical observations and models to each other via palaeogeographic/plate kinematic models.
2. EarthByte will seek to leverage technologies developed in international "sister" projects such as the NERC Data Grid and CHRONOS through helping to coordinate international efforts in interoperability in paleogeography and dynamic earth modeling
3. EarthByte will not be based on any single technology platform, but will allow open source and proprietary solutions to co-exist.
4. EarthByte aims to connect the open source and architecture-independent GPlates (Müller et al., 2005) and GMT software (Wessel and Smith, 1991) into a Web accessible service oriented software component embedded in the APAC Geoscience grid infrastructure.
5. The use of standard encoding patterns, based on ISO Geography Markup Language (GML), will maximise interoperability and flexibility of the solution.
6. EarthByte further aims to explore test-beds for linking GML-encoded paleogeographic data to numerical modelling software such as Snark/Underworld.
7. The EarthByte infrastructure will encompass the technical standards, policy and governance framework to allow for semantic interoperability to be established within the community of practice.
8. EarthByte will provide the bridge between plate tectonic and paleogeographic data management, research, and associated computing and business needs. In particular, it will provide the means for technical collaboration between these functions
9. EarthByte will be implemented within the context of the APAC Geosciences Project. This means that it will:
 - conform to relevant government policies
 - be able to seamlessly access services provided by external agencies

- become the primary mechanism for delivery of paleogeographic data and models to external agencies
- be a focal point for resourcing the resolution of technical and institutional issues hindering interoperability within and across the community



Flowchart illustrating some initial components of the EarthByte system and how each component is linked to the EarthByte Database

Summary of requirements for interoperable Web-based Services

This section highlights the critical issues underlying interoperability of data access services.

Information standards

- Gplates data conforms to the general feature model in ISO 19109 "Geographic Information - Rules for Application Schema" and thus can (and should) be described using the GML encoding standard.
- Community data models
 - GML/GPML Application schema(s) for feature types of interest
 - code-lists/authority tables
 - feature-type index/classification (ontology?)

Access Protocols

- Given that GPML is a GML Application Schema, then the OGC Web Feature Server access interface is an appropriate means to query and access for specific data elements.
- The EarthByte system will also act as a repository and registry for data elements to be managed, and thus some form of catalog service interfaces will be required
- Additional processing functions may require or be more conveniently accessed via specific access protocols. These will extend the available OGC Web Services specifications as required.

Software

- server-side WFS software
 - connecting to existing DB and GIS systems
 - supporting a mapping to arbitrary (community) information model/schema
- client (desktop, browser and/or server application) WFS software (to explore design, exercise and demonstrate information services)
 - basic semi-interactive portrayal service (i.e. constructing paleogeographic maps)
 - query-building interface
- access to shared infrastructure services
 - service catalog - somewhere to advertise service access point to a user community
 - feature type catalog - a means of deploying the community schema as reference point so that the delivered data can be described

Softer-ware (process and governance)

- conformance testing
 - WFS software
 - GML application schemas
 - service instances
 - design
 - clear "use cases" for the system
 - modelling of what information is required to support use cases
 - policy
 - access control strategy
 - accounting strategy
 - versioning strategy
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