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Exploring OGC service wrappers for integrating distributed earth-system science resources

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The "service-oriented" paradigm in distributed systems is proving a powerful pattern for large-scale integration of resources (computers and instruments, as well as data). In this approach, common interfaces encapsulate heterogeneous systems, and are implemented in computational services (e.g. through web protocols such as HTTP or SOAP). Service instances may be published for discovery in service registries.

For geospatial data, an important set of emerging web service interfaces are those of the Open Geospatial Consortium (OGC). Specifications have been defined for accessing rendered ("Web Map Service" - WMS, now ISO standard 19128) and raw ("Web Feature Service" - WFS, and "Web Coverage Service" - WCS) data, and for processing data ("Web Processing Service" - WPS). Web services are increasingly being used as the 'middleware' used to construct computational and data Grids. It is no surprise, therefore, that a number of earth science-related grid projects are experimenting with OGC services.

The Tasmanian Partnership for Advanced Computing (TPAC) is a partner in the Australian national grid program with a focus on Earth Systems Science. We report on recent work investigating OGC service components for a portal-based compute and data grid.

Conceptually, the Web Coverage Service provides similar functionality to TPAC's existing DODS/OPeNDAP data access services. A mapping is defined between these two technologies, and a wrapper implemented to provide WCS access to DODS datasets. Similarly, a mapping is defined between operations of the Web Map Service (WMS)

and the existing Live Access Server visualisation server. Finally, a hierarchy of conceptual models for processing services is defined (including OPeNDAP server-side processing, the OGC Web Processing Service (WPS), and the new Job Submission Description Language for computational grids). By defining a simplified common model, an underlying compute application may be exposed through either OPeNDAP or a WPS binding.