

# An Outline of the Global Grid Forum Data Access and Integration Service Specifications

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**Abstract.** Grid computing concerns itself with building the infrastructure to facilitate the sharing of computational and data resources to enable collaboration within virtual organisations. The Global Grid Forum (GGF) provides a framework for users, developers and vendors to come together to develop standards to ensure interoperability between middleware from different service providers. Central to this effort is the Open Grid Services Architecture (OGSA), and its associated specifications. These define consistent interfaces, generally couched as web services, and the components required to construct grid infrastructures. Both the web service and grid communities stand to benefit from the provision of consistent and agreed web service interfaces for data resources and the systems that manage them. This paper describes, motivates and presents the context for the work that has been undertaken by the GGF Data Access and Integration Services Working Group (DAIS-WG). The group has defined a set of data access and integration interfaces that are consistent with the OGSA vision. A brief overview of the current family of DAIS specifications is given: WS-DAI specifies a collection of generic data resource properties and messages that are specialised by WS-DAIR and WS-DAIX for use with relational and XML data resources, respectively. The WS-DAI specifications can be applied in regular web services environments or as part of a grid fabric.

**Keywords:** Data, Databases, Grid, DAIS, OGSA-DAI.

## 1 Introduction

The *Database Access and Integration Services* Working Group (DAIS-WG) was formed within the *Global Grid Forum* (GGF) to standardise service types and interfaces to allow databases to be seamlessly integrated into grids. From the very beginning the DAIS-WG has aligned itself with the GGF's *Open Grid Services Architecture* (OGSA)[OGSA] vision. The DAIS specifications would then be consistent with and be able to interoperate with the other services and interfaces being proposed for OGSA based grids. The group has in addition been in communication with other standardisation groups, both inside and outside the GGF, to ensure consistency with adjacent standardisation activities. For

example, DAIS members are active in the refinement of the GGF OGSA data architecture<sup>1</sup>, and outside the GGF, the group has provided use cases for the OASIS *Web Services Resource Framework* (WSRF) technical committee that is producing standards for identifying and interacting with resources in web services. The group has also worked with the Distributed Management Task Force (DMTF) to extend its *Common Information Model* (CIM) with an XML rendering of the CIM model that includes relational metadata.

The primary outcome of the DAIS-WG has been a collection of specifications:

1. *WS-DAI*, which defines properties and message patterns that are independent of the type of data resource that is being accessed [WS-DAI].
2. *WS-DAIR*, which extends WS-DAI with properties and messages for accessing relational data resources [WS-DAIR].
3. *WS-DAIX*, which extends WS-DAI with properties and messages for accessing XML data resources [WS-DAIX].

This paper describes these services, outlining design decisions that have influenced their scope and relationships to existing and emerging standards. The paper is structured as follows. Section 2 describes and motivates the scope of the specifications, and describes how the specifications relate to other web service standards. Section 3 provides an overview of the specifications, which is expanded on in Sections 4. Section 5 describes how the specifications make use of the Web Services Resource Framework, a family of specifications for representing resources in web services. Section 6 presents some conclusions.

## 2 Scope and Context

In common with most other standardisation activities, the DAIS-WG has iterated towards stable positions on *what* should be included in the standards and *how* these capabilities should be supported. This section reviews several design decisions, with a view to clarifying the role of the DAIS specifications in relation to other web and grid service standards.

### 2.1 Transparency

Distributed data management is associated with various forms of transparency, which may or may not be supported by an infrastructure. For example, [Ozsu-99] includes the provision of *language*, *fragmentation* and *replication* transparencies as important functionalities that a data management infrastructure may support. The key design feature behind the DAIS specifications that affects their relationship to such transparencies is that they are designed to provide access to *existing* data management systems. As such, the DAIS specifications are silent with respect to both *fragmentation* and *replication* transparencies; the specifications can be used to access database management systems that support such

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<sup>1</sup> See <http://forge.gridforum.org/projects/ogsa-d-wg> for more details.