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The OpenGIS™ Abstract Specification
Topic 10: Feature Collections

Version 4

The OpenGIS™ Abstract Specification

Revision History

Date	Description
7 April 1999	Replace 98-110r1 (Transfer Technology) in its entirety with contents found here, formerly found in Topic Volume 5 (Features), document 98-105r1.

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1. Introduction

1.1. The Abstract Specification

The purpose of the Abstract Specification is to create and document a conceptual model sufficient enough to allow for the creation of Implementation Specifications. The Abstract Specification consists of two models derived from the Syntropy object analysis and design methodology [1].

The first and simpler model is called the Essential Model and its purpose is to establish the conceptual linkage of the software or system design to the real world. The Essential Model is a description of how the world works (or should work).

The second model, the meat of the Abstract Specification, is the Abstract Model that defines the eventual software system in an implementation neutral manner. The Abstract Model is a description of how software should work. The Abstract Model represents a compromise between the paradigms of the intended target implementation environments.

The Abstract Specification is organized into separate topic volumes in order to manage the complexity of the subject matter and to assist parallel development of work items by different Working Groups of the OGC Technical Committee. The topics are, in reality, dependent upon one another— each one begging to be written first. *Each topic must be read in the context of the entire Abstract Specification.*

The topic volumes are not all written at the same level of detail. Some are mature, and are the basis for Requests For Proposal (RFP). Others are immature, and require additional specification before RFPs can be issued. The level of maturity of a topic reflects the level of understanding and discussion occurring within the Technical Committee. Refer to the OGC Technical Committee Policies and Procedures [2] and Technology Development Process [3] documents for more information on the OGC OpenGIS™ standards development process.

Refer to Topic Volume 0: Abstract Specification Overview [4] for an introduction to all of the topic volumes comprising the Abstract Specification and for editorial guidance, rules and etiquette for authors (and readers) of OGC specifications.

1.2. Introduction to Feature Collections

The Open GIS Consortium has not yet achieved consensus on many issues surrounding Feature Collections. On the one hand, perhaps Feature Collections are not needed at all. This is because:

- a feature can be a composite of other features,

- a "tile" may be a feature composed of the features it contains

- a feature may be "divided" by tile boundaries, yet be "reassembled" on demand by an interface on Feature or by a service.

On the other hand, the real world seems full of Feature Collections that need to be addressed. These include:

- projects, which have assignment boundaries and feature capture criteria and thresholds

- products from Government agencies, such as VPF, ADRG, SDTS, ATKIS, and similar files

- GIS database files

- the persistent or non-persistent ad hoc collection of features present at any moment in a GIS workspace.

Feature Collections seem to need important interfaces in order to support the needs of Catalogs and Catalog Services. These interfaces seem to be tightly coupled with Feature Collection Metadata.

1.3. References for Section 1

[1] Cook, Steve, and John Daniels, Designing Objects Systems: Object-Oriented Modeling with Syntropy, Prentice Hall, New York, 1994, xx + 389 pp.

[2]   Open GIS Consortium, 1997. OGC Technical Committee Policies and Procedures, Wayland, Massachusetts. Available via the WWW as <http://www.opengis.org/techno/development.htm>.

[3]   Open GIS Consortium, 1997. The OGC Technical Committee Technology Development Process, Wayland, Massachusetts. Available via the WWW as <http://www.opengis.org/techno/development.htm>.

[4]   Open GIS Consortium, 1999. Topic 0, Abstract Specification Overview, Wayland, Massachusetts. Available via the WWW as <http://www.opengis.org/techno/specs.htm>.

2. The Essential Model for Feature Collections

> **Editor's Note:** This Section, while Baseline Open GIS Abstract Specification, has been assembled from portions of earlier versions of the Abstract Specification. As a result, it is somewhat disjointed, and needs unification.

We have already introduced the notion of a Feature Collection in Topic 5. We present here a deeper abstraction.

2.1. Introduction to Feature Collection

An OpenGIS Feature Collection is an abstract object consisting of Feature Instances, their Feature Schema, and Project Schema. Figure 2-1 shows OpenGIS Feature Collections in a Syntropy diagram.
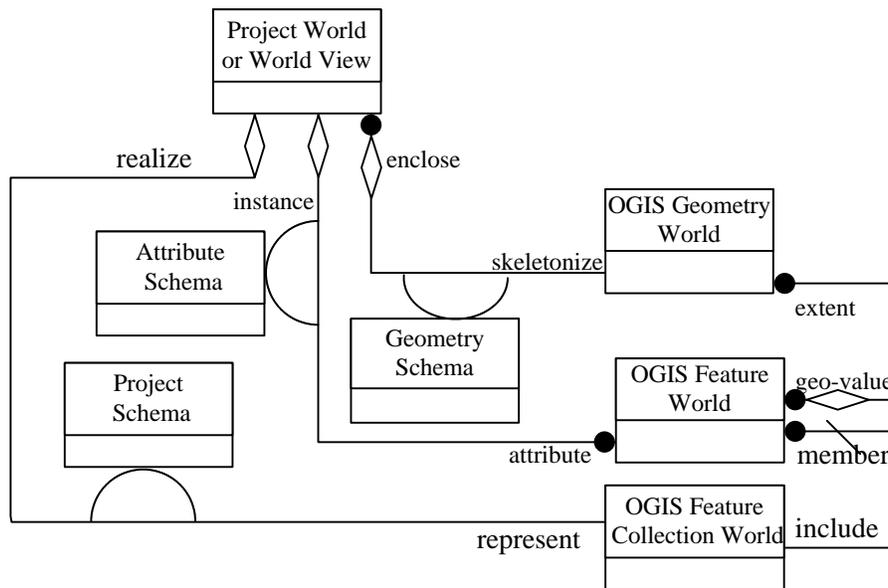
Figure 2-1. Navigation Near the OpenGIS Feature Collection World

2.2. Feature Schema are the Key to Feature Collections

Figure 2-1 can be simplified by collapsing the Geometry Schema and the Attribute Schema into the Feature Schema, as we did in Topic 5. Doing this yields Figure 2-2.
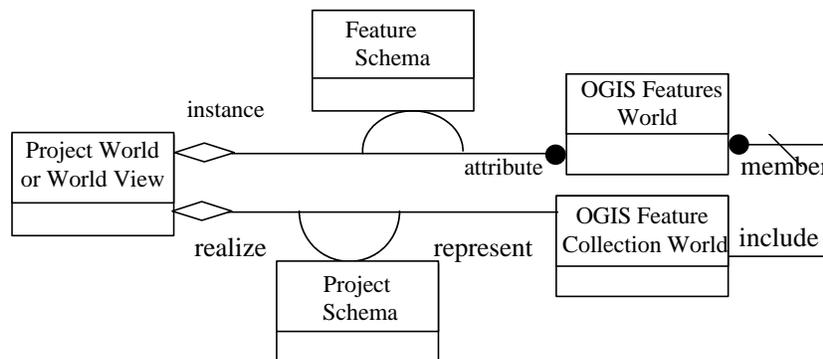
Figure 2-2. Feature Collections Consist of Features, their Feature Schema, and a Project Schema

2.3. Interfaces on Feature Collections

The interface between the OpenGIS Feature Collection World and the OpenGIS Feature World is called the Project Structure Interface. This interface is transparent, but it is derived from paths through the Project World. This is because the members of the OpenGIS Feature Collection World correspond directly to phenomenon in the Project World, not to a feature in the OpenGIS Feature World. Never-the-less, the methods across the Project Structure Interface, called *member* and *include*, are obvious.

The interface between the OpenGIS Feature Collection World and the Project World is called the Project Schema Interface. Its methods are also obvious, and are called *realize* and *represent*.

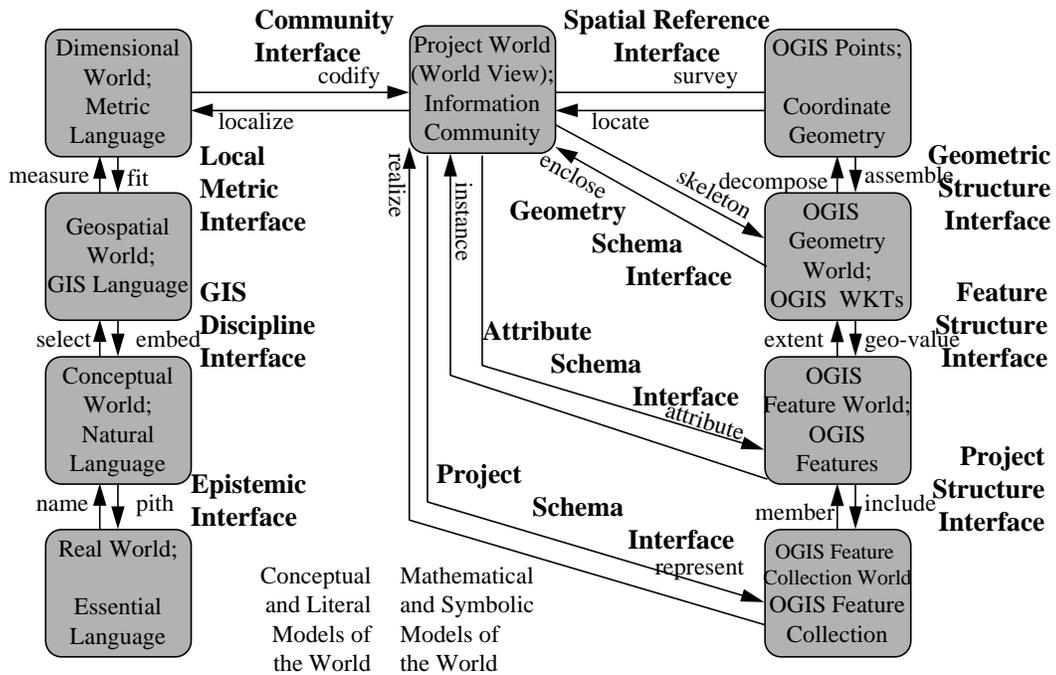As a summary of the above, and as a reformulation of Figure 2-1, we present Figure 2-3.

Figure 2-3. Nine Layers of Abstraction with Additional Interfaces

Summarizing the situation so far, using the notation of [1], we present Figure 2-4.
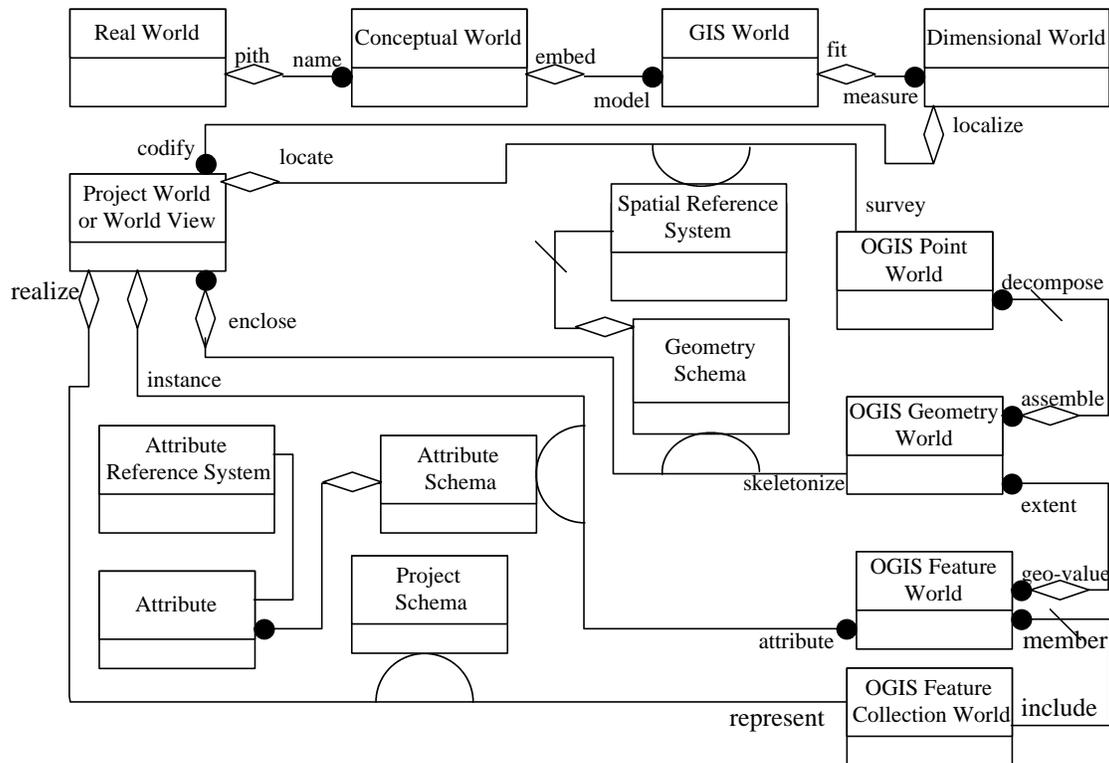
Figure 2-4. The Object Types in an OpenGIS Feature Collection

In Figure 2-4 there are fifteen object types.

2.4. References for Section 2

[1] Cook, Steve, and John Daniels, Designing Objects Systems: Object-Oriented Modeling with Syntropy, Prentice Hall, New York, 1994, xx + 389 pp.

3. Abstract Model for Feature Collections

The Abstract Model for Feature Collections is TBD.

3.1. References for Section 3

[1] OpenGIS™ Abstract Specification, OpenGIS™ Project Documents 99-100 through 99-116, available through www as <http://www.opengis.org/techno/specs.htm>.

4. Future Work

Much fundamental work on Feature Collection is needed. What are the fundamental classes and subclasses of Feature Collection. How do they behave? What are the relations between them and Features, Catalogs, Metadata, Schema, and other objects, and between themselves? What are the essential temporal and spatial behaviors of Feature Collections?

5. Appendix A. Well Known Structures

WKS for Feature Collections are TBD.