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**caGRID**

**Identifier Framework**

***Architecture and Design***

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# Introduction

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### Identifier Framework

The functionality provided by caGrid’s Identifier Services Framework is related to having “identifiers” for individual data-objects. The identifier is essentially a forever globally unique name for the data-object such that it can be unambiguously used to refer to the data from different application contexts.

In order to create, modify, delete the name-object bindings, facilities and services have to be defined and provided. Furthermore, in order to find the data-object when only the identifier is known, global resolution services have to be defined to resolve the name to the object.

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### Globally Unique Identifiers

Once we have standardized data-object identifiers that can be globally resolved to the data-objects themselves, applications can reason about and communicate data-objects by references instead of by value.

The identifiers also allow applications to test for data-object equality through identifier-string comparison. This property enables applications to bind arbitrary meta-data to the data-objects through the identifiers.

### Identifier and Data-Object Properties

The identifier is essentially a string and a forever globally unique name for single data-object. Furthermore, identifier can be (globally) resolved to associated data-object.

In order to abstract the identifier’s object properties, the data service implementations and the resolution mechanisms, the identifier’s value must be treated as a “meaningless” opaque string by the consumer applications. Any leaking of design and implementation choices for the identifier framework in the applications, is undesirable from an architecture point of view as it makes the implementations brittle and susceptible to future changes. Of course resolution information will have to be embedded in identifier name, but this should only be meaningful for resolution service related components that are layered below the application.

The implementation choice for the identifier format is the Universal Resource Identifier (URI). This enables the use of existing web standards and protocols, and provides a natural approach to identifier resolution. No special knowledge is needed to know how to resolve identifiers. In other words, an identifier can be resolved by simply “following it”.

### The Data Owner

This is the system or domain where the target data objects reside. These are the objects being identified. *Data owners* specify how data objects are accessed when creating identifiers for their systems. The identifier framework uses this information to build tools that automate the retrieval of the corresponding data objects.

### Identifier Values / Metadata

The framework defines *Indentifier Values or Metadata* as any information stored with the identifier and typically used to help locate the target data-object that is being identified.

### The Naming Authority

The *Naming Authority (NA)* is the entity that issues and manages identifiers and their metadata.

### The Resolution Process

The framework defines *Resolution* as the process of finding the metadata associated or stored by a naming authority, given an identifier.

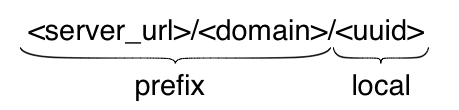
### The Data Retrieval Process

The framework defines Data Retrieval as the process of retrieving the object from the data owner space, giving an identifier’s values (metadata).

# High Level Design

## The Identifier

The general recommended structure of an identifier is as follows:



The purpose of the *prefix* is to uniquely identify the naming authority that hosts the identifier. The local part is unique within the naming authority, for example, a universally unique identifier (UUID).

## The Naming Authority (NA)

The NA maintains a database table of identifiers like the one shown below:

|  |  |  |
| --- | --- | --- |
| **Identifier** | **Data Type** | **Value** |
| <identifier1> | EPR | <ns1:EndpointRerefence…> |
| <identifier1> | CQL | <CQLQuery…> |

The table entries represent the metadata or identifier values associated with identifier <identifier1>. As seen, identifiers can be associated with multiple resources or pieces of information.

The data type indicates the meaning that should be given to the data stored in the value column. The NA is configured to support an specific set of data types.