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# ***Grid Information Service: Naming, Discovery and Cataloguing***

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## **Issues**

- .. **Resource naming and discovery**
- .. **Grid Information Object naming and schema registration**
- .. **Grid people/entity naming (X.500 DNs)**
- .. **Grid entity certification (X.509 Certificate Authority) registration**

## [Resource Naming and Discovery](#)

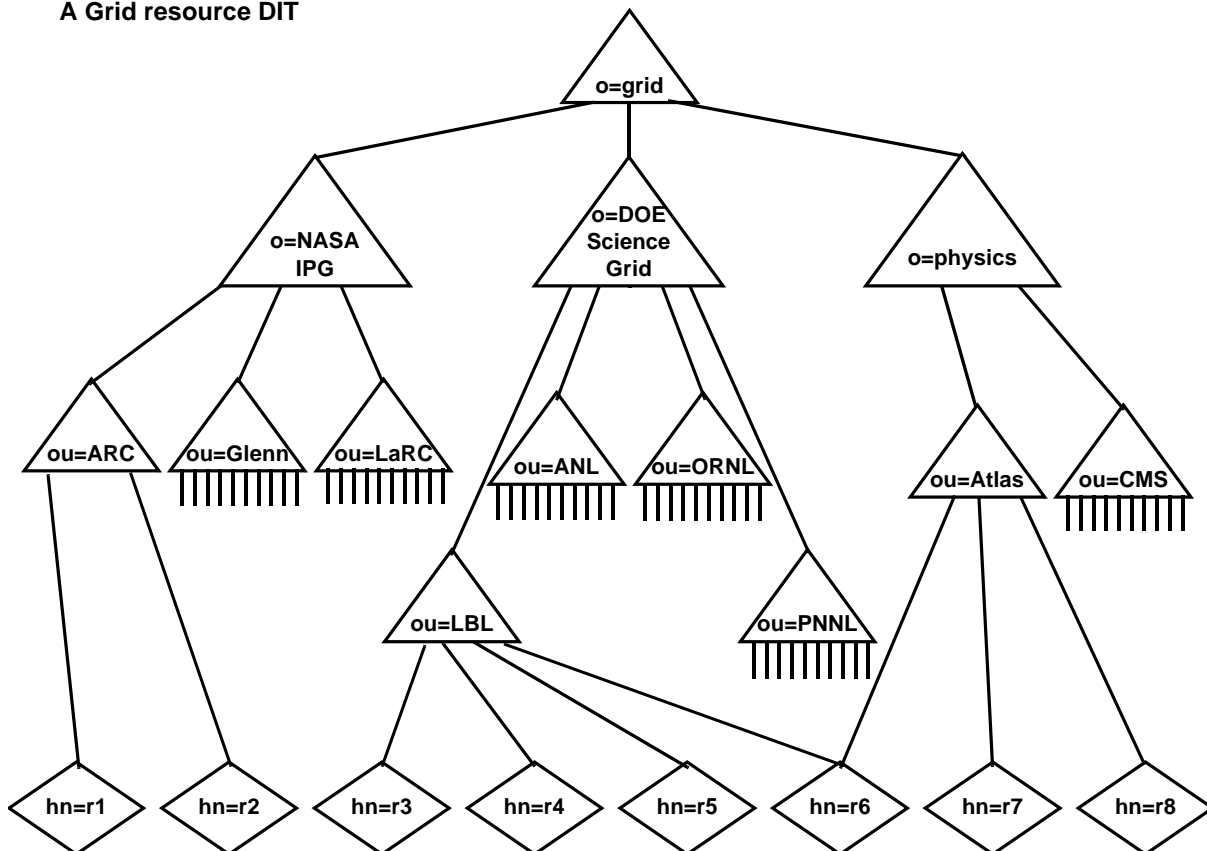
The service is currently provided by LDAP directory servers which provide persistent storage for named objects that have attributes. “Views” will provide a search scope appropriate to particular projects.

Specialized / project views resources can define “Grids” for virtual organizations of various sorts (e.g. Grids like NASA’s IPG and DOE’s Science Grid, and projects like the HEP’s Atlas, CMS, etc.).

- .. **Named objects in the Grid have characteristics specified by attributes and values**
- .. **The Grid Forum is defining schema for a standardized set of objects – e.g.**
  - **Grid::PhysicalResource**
  - **Grid::ImageResource**
  - **Grid::ComputeResource**
  - **Grid::OperatingSystemInformation**
  - **Grid::MemoryInformation**
  - **Grid::CacheInformation**
  - **Grid::BenchmarkInformation**
  - **Grid::CpuInformation**
  - **Grid::SystemDynamicInformation**

- Resource discovery is done by a hierarchical search of the LDAP Directory Information Tree (“DIT”):
- LDAP permits the creation of nodes that represent the root of a project hierarchy – these nodes provide search scoping by establishing project “roots” that sit at the top of a hierarchy of project resources

A Grid resource DIT



## **Example:**

**Within the Atlas Grid find all SPARC architecture machines:**

- **start the search at o=grid, o=physics, ou=Atlas**
- **collect pointers to all LDAP objects that have the “architecture” attribute**
- **request and examine these objects for architecture==SPARC**

**Need sufficient redundancy of directory servers so that local sites are not dependent on accessing remote servers to access local resources.**

- **Both LDAP nodes and servers may be placed at appropriate tree and physical locations**

## [Grid Information Object Naming](#)

Beyond Grid resources, there is a general need to ensure naming consistency for various catalogues:

- Grid Information Object names and their schema
- Certification Authorities
- Database registries

## [Strawman](#)

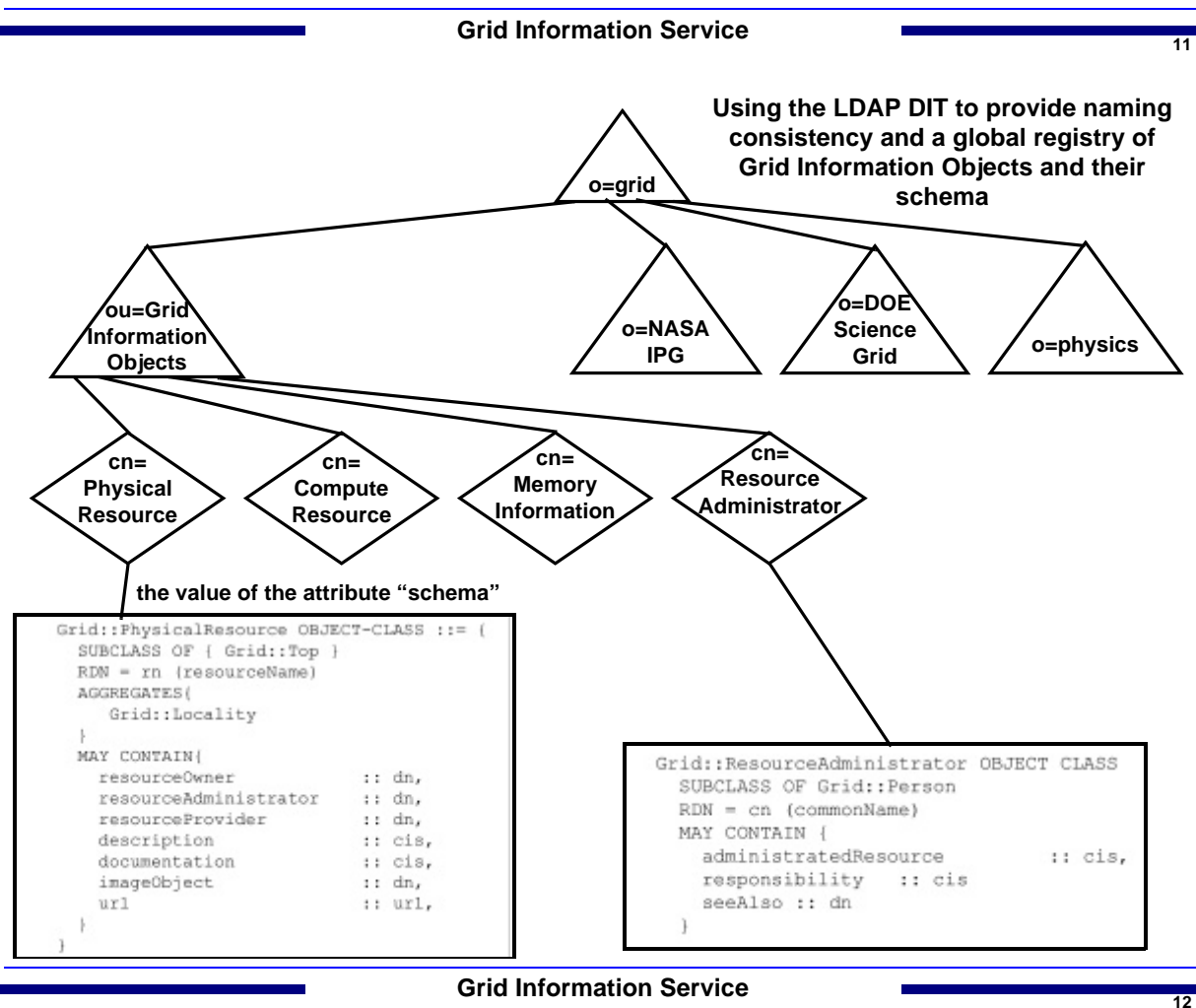
A general naming consistency service can be provided using the infrastructure of a Grid resource naming service. This service would provide a namespace root that is, or comes close to, a “global” registry for top-level names.

That is, *the LDAP server that provides the top of the Grid DIT (o=Grid) can also be used as the top of a set of catalogues that index various objects of interest in the Grid community, and provide naming consistency and discovery for those objects.*

## Schema catalogue example:

To provide globally unique names for Grid Information Objects (“GIO”) create an **ou=GridInformationObjects** DIT node that indexes GIO names as DIT nodes (e.g. **cn=ComputeResource**)

To use this as a GIO schema catalogue, provide the GIO definitions as an attribute of the leaf nodes of this branch of the DIT.



## CA registration example:

To provide a list of CAs that certify Grid users, and to provide the public keys of these CAs, create an **o=GridCertificationAuthorities** node that indexes X.509 CAs and provides their location and public keys as attributes of that DIT leaf

This is a catalogue of CAs, not a hierarchy of CAs. These CAs do not necessarily have any relationship to each other (e.g. trust) except that they all provide certificates to Grid users.

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Using the LDAP DIT to discover and manage name consistency for Certification Authorities

```
graph TD
    o_grid["o=grid"] --- o_grid_info["o=Grid Information Objects"]
    o_grid --- o_grid_certs["o=Grid Certification Authorities"]
    o_grid --- o_nasa_ipg["o=NASA IPG"]
    o_grid --- o_doe_science_grid["o=DOE Science Grid"]
    o_grid --- o_physics["o=physics"]
    o_grid_certs --- ou_nasa_ames["ou=NASA Ames CIO CA"]
    o_grid_certs --- ou_doe_science_grid["ou=DOE Science Grid CA"]
    o_grid_certs --- ou_cren_ca["ou=CREN CA"]
```

the value of the attribute "certificate" (however, there are also standard attributes for all of the components of an X.509 cert.)

Certificate:  
Data:  
Version: v3 (0x2)  
Serial Number: 109 (0x6d)  
Signature Algorithm: PKCS #1 MD5 With RSA Encryption  
Issuer: CN=IDCG-CA, OU=ICSD, O=Lawrence Berkeley National Laboratory, C=US  
Validity:  
Not Before: Tue Jul 27 18:38:44 1999  
Not After: Thu Jul 26 18:38:44 2001  
Subject: CN=IDCG-CA, OU=ICSD, O=Lawrence Berkeley National Laboratory, C=US  
Subject Public Key Info:  
Algorithm: PKCS #1 RSA Encryption  
Public Key:  
Modulus:  
00:c0:ae:5c:be:b6:75:f9:79:6e:ef:e0:a4:f9:09:57:ff:23:04:7c:ac:39:2a:9e:20:d4:ab:7e:31:ff:0a:ab:29:b3:34:01:8f:92:57:68:44:1f:3f:8c:08:38:12:96:63:ce:5d:fc:04:a6:55:d6:e4:86:18:5e:a2:77:f9:d2:b4:e9:eb:7b:99:4a:1d:3a:10:01:fb:46:fa:6b:c7:55:c2:e9:75:fa:04:70:12:2f:34:bd:fb:78:f9:6b:c3:51:41:cc:65:08:aa:dd:4a:85:4e:c3:cd:fb: 4f:6c:5b:ed:a9:6a:a5:cd:41:9b:c1:ab:6a:fe:eb:fa:2f:33: 83:aa:57

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## Grid Information Service: A Suite of Grid Catalogues

Where this is headed is to use a single approach and infrastructure to name and discover many different objects of interest in the Grid.

