Grid3 and LCG (GLUE) Schema Interoperability
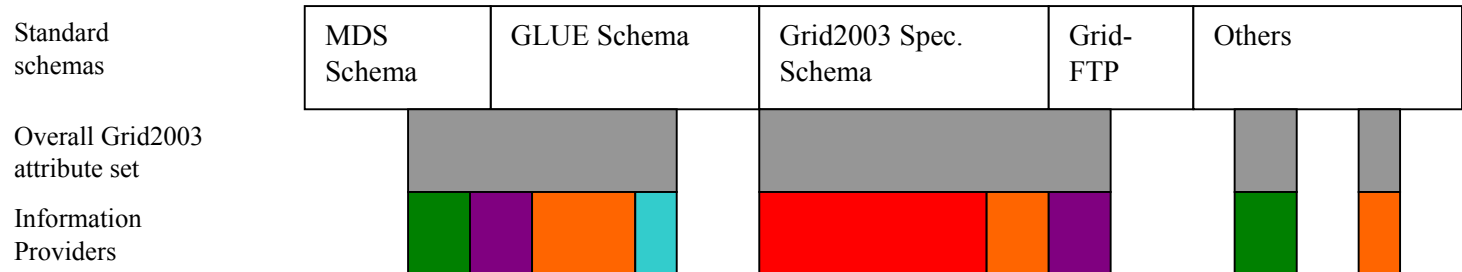
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October 20, 2003

Grid3 Attribute set

Standard schemas	MDS Schema	GLUE Schema	Grid2003 Spec. Schema	Grid-FTP	Others

Overall Grid2003 attribute set

Information Providers

- Schemas
- Attributes
- Information providers

Grid3 schema principles

- Use of each schema following its specification and purpose, without overloading and stretching the interpretation of attributes
- Mapping whenever possible the attributes required by Grid2003 to attributes present in standard and widely accepted schemas, first of all the GLUE Schema.
- Defining a Grid2003 Schema in a reserved OID space
  - OID 1.3.6.1.4.1.3536.2.6.3536.28, subset of OID space reserved for Globus
  - common requirements for Grid2003 participants (like the invocation string for the job manager)
  - similar requirements by different participants (like ATLAS_LOCATION and CMS_LOCATION)
- Including schemas that will accommodate the needs specific to the participating VOs or to a particular software.
- Provide enough flexibility for the data in order to keep the schema stable with the time.

Main attributes (1)

- Information describing the site includes the **name** of the site, the **VO sponsoring** the site

- "**mount points**" (or directory hierarchy) to reach applications and data and two contact lists. In more detail these are the following.

  - **Grid3Dir**: Grid3 package cache or installation directory ($GRID3 in the site preparation document).

  - **Grid3AppDir**: directory available for application installation ($APP in the specification document)

  - **Grid3DataDir**: shared directory available for application data ($DATA in the specification document)

  - **Grid3TmpDir**: shared directory available for temporary files and execution directories ($TMP in the specification document)

  - **Grid3WNTmpDir**: local directory available for temporary files and execution directories ($TMP in the specification document)
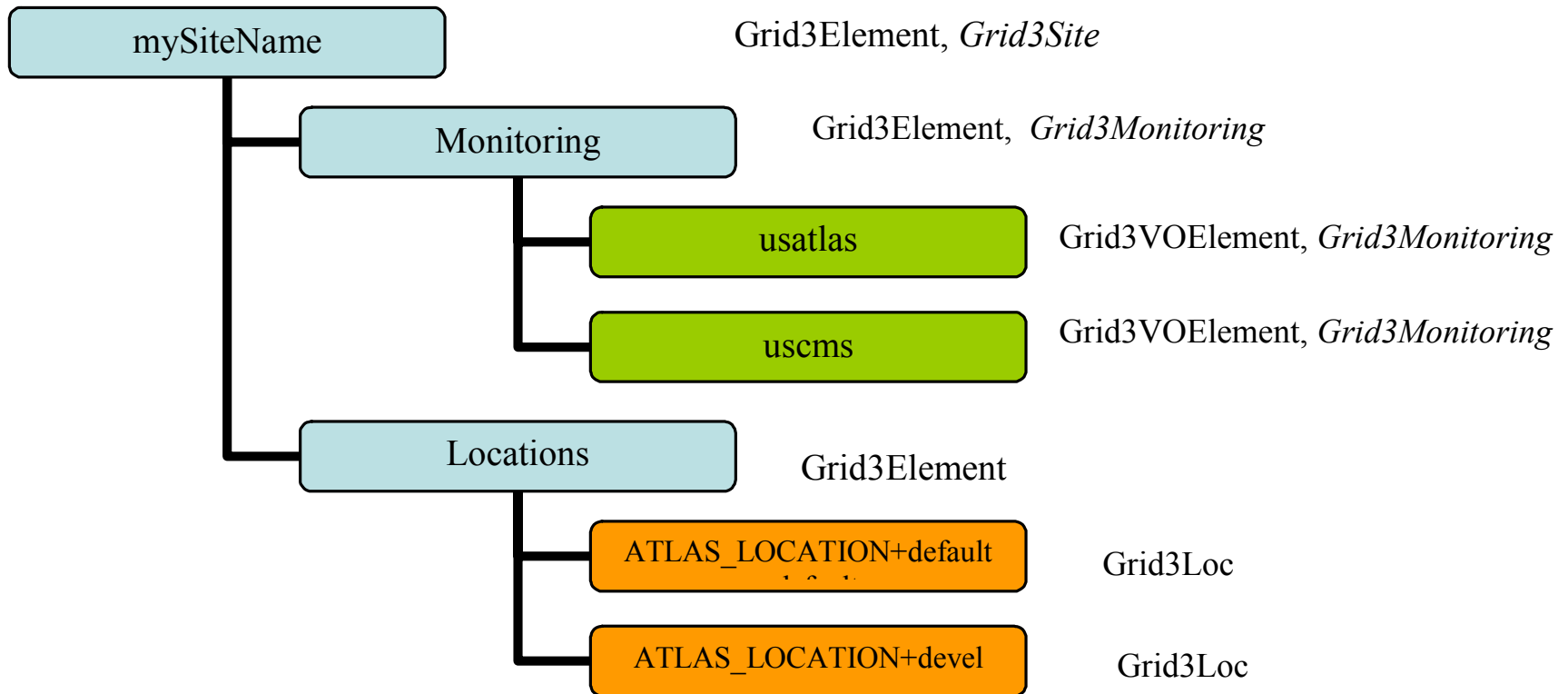
Main attributes (2)

- Contacts, used for job submission and file transfer
  - **Grid3JobContact**: containing the contact string of the job manager used for submitting jobs (the $EXEC_CONTACT variable in the specification document); multiple instances of this attribute may exist
  - **Grid3UtilContact**: containing the contact string of the job manager used for utilities, like file transfer with GridFTP (the $UTIL_CONTACT variable in the specification document); multiple instances of this attribute may exist

Main attributes (3)

- **Location**: a multi value attribute that allows defining arbitrary locations.
  - Each VO may use to define further references within their own assigned space (e.g. ATLAS_LOCATION)
  - versioning mechanism may help to allow the coexistence of more installation of the same application.
  - Currently it is equivalent to a variable storing a pathname, with the possibility to have multiple version of it. It is intended to be expanded including file system specific information like the used and available space. (file "grig3-locations.txt" in the Grid3AppDir/etc directory)
- **monitoring information** about the site
  - broken down by VO, like CPU number, job information and I/O information.

DIT structure

```
mySiteName                          Grid3Element, Grid3Site

        Monitoring                  Grid3Element,  Grid3Monitoring

                usatlas             Grid3VOElement, Grid3Monitoring

                uscms               Grid3VOElement, Grid3Monitoring

        Locations                   Grid3Element

                ATLAS_LOCATION+default      Grid3Loc

                ATLAS_LOCATION+devel        Grid3Loc
```

Goals for LCG-Grid3 interoperability

- have Grid3 LCG and NorduGrid able to submit job each others
  - provide through a common Schema (GLUE) information sufficient for Site discovery/knowledge (know which site are available, where are resources, how to access them) this is the bare job submission
  - provide useful information for monitoring
  - provide useful information for scheduling (job placement, knowing which Site will complete earlier the job)
- enhance a common Schema (GLUE, maintained by Sergio Andreozzi): this means no overlapping of multiple schemas, reduced redundancy
- allow private extensions but coordinate them putting in GLUE elements with similar semantic (if an atribute is used by a Grid3 extension and a similar one by a LCG extension with different names/format, is desirable to converge to a common attribute/format extending GLUE; if an attribute is used only by Grid3 with no corrispondent it can be in a Grid3 extension)

Current status

- Grid3 is flexible in application installation
    - site directory structure discovery
    - PIPPY, "Locations"
    - automatic installation
- LCG/DataGrid has more complete procedures to choose the right site when submitting jobs
    - resource matching,
    - authorized DNs/VOs published
- From the adoption of a common schema/IPs both can obtain more information and improve

Integration of Grid3 schema in GLUE

- Initial ideas for integration
  - a TargetSystem object could add to the CE some attributes like MiddlewareDir, ApplictionDir, DataDir, ...
  - connected to the target system there may be environment variables as the "locations"
  - the Monitoring information can become VO-specific information related to the CE
  - the CE UniqueID is the JobContact, the UtilContact could be a Storage element (but not all implications are clear)
- discussion on concept of "Site" for both (EU/US), (domain, middleware installation, gatekeeper, processing queue ?) – set of grid resources under homogeneous administration, sharing direct access (non through the Grid) to local resources like worker nodes or disks, usually reporting to a single GRIS

Proposed GLUE CE Modification
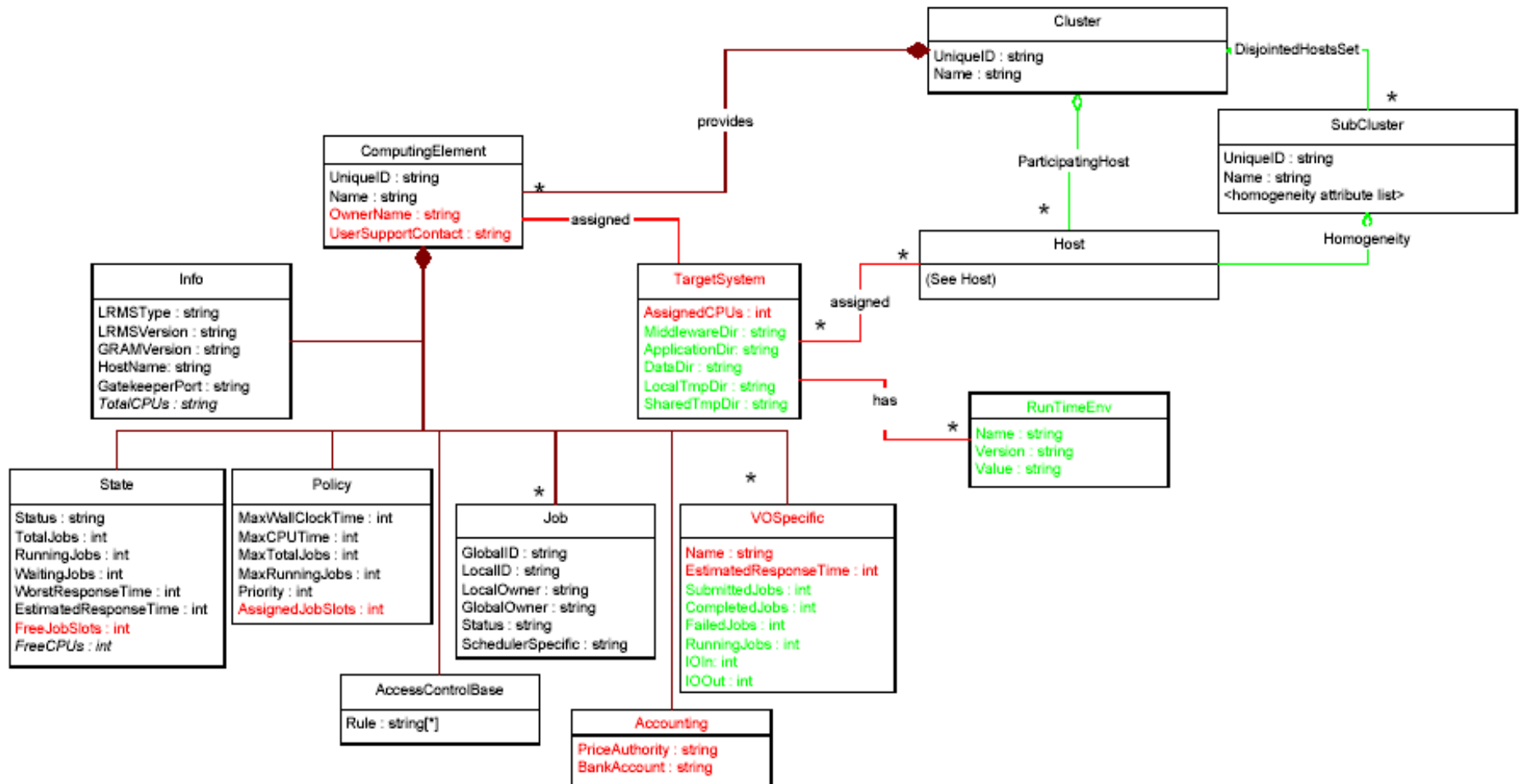
Integration of Grid3 schema in GLUE and future plans

- The current glue schema has some problems in the reported information and will need some redesign (e.g. if more CE/gatekeeper share the same cluster ad more of them have a GRIS, the CPU count could be wrong)

- modification of GLUE are planned and will be distributed

- modifications will have not to break the current working systems (LCG/DataGrid brokers, Grid3 job submissions)

- It is important to coordinate the schema activity with NorduGrid also

- the Grid3 schema will remain until an easy replacement will be possible (IPs will populate both Grid3 and GLUE extensions)