

GLUE Schema

Open issues and proposed solutions

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OUTLINE

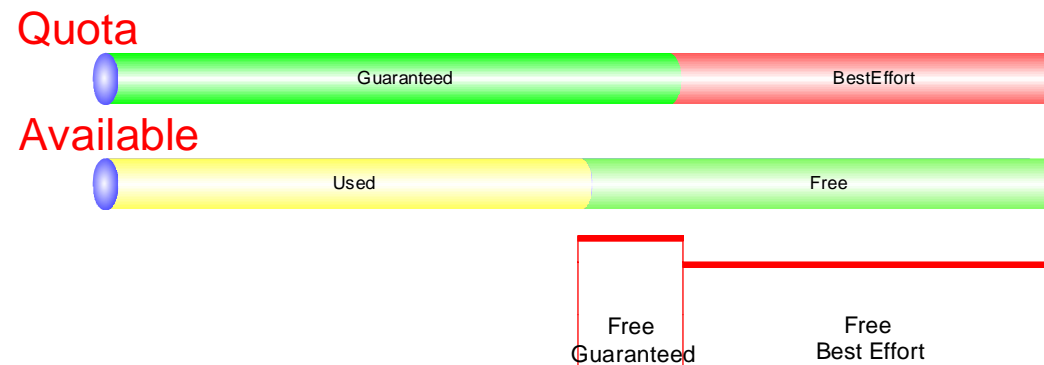
- I. GLUE Schema open issues
 - I. From BugZilla #1414
 - I. SE
 - II. Service
 - III. CE

GLUE Storage Space - Open issue missing Unique ID

- **ISSUE:** missing Unique Identifier (there was the wrong assumption of a 1-to-1 relationship with the directory)
- **SOLUTION:** add GlueSAUniqueID
 - The LDAP DIT will change as follow:
 - ✗ dn: **GlueSARoot=...**,GlueSEUniqueID=...,mds-vo-name=local, o=grid
 - ✓ dn: **GlueSAUniqueID=...**, GlueSEUniqueID=...,mds-vo-name=local,o=grid
and GlueSARoot will be just an attribute not part of the key

GLUE Storage Space - Open issue free space attribute computation

- **ISSUE:** free space attributes are per Storage Space;
 - schema issue: how do I distinguish if the free space is exclusive or shared?
- **SOLUTION:**
 - Split Quota attribute in BestEffortQuota and GuaranteedQuota,
 - Then couple the value of BestEffort/Guaranteed Quota with the Free/Used space, e.g.:



GLUE Storage Space - Open issue used space attribute computation

- **ISSUE:** used space attributes are per Storage Space;
 - Info provider issue: edg-se places files of different SAs under the same dir (/), the used seems to be computed as the whole occupation of the directory, hence does not distinguish per SAs/VOs; (all SAs show the same value)
- **QUESTION:**
 - In the edg-se implementation, is it possible to compute used space per SA?

GLUE Storage Space - Open issue missing state attribute

- **ISSUE:** there is no state attribute for an SE
- **SOLUTION:**
 - Add GlueSEStatus

GLUE Storage Library - Open issues what do we need?

- **ISSUE:**
 - The Storage Library is still a raw concept;
 - Referring to the storage system, the experience says that what need is to represent the state of the machine where the service runs
- **SOLUTION:**
 - Replace the Storage Library with the Host, modeling that it is an access machine to a storage system (it can be done using the HostRole modeled in the extensions for monitoring)

GLUE Data Access Protocol - Open issues missing state attribute

- **ISSUE:** at present a data access protocol is identified by its type;
 - for scalability issues, the same protocol can be used from multiple ports, or from multiple machines
- **SOLUTION:**
 - Add AccessProtocol.URI, this is the key
 - E.g., gsiftp://hostname:port/base_dir
 - Remove AccessProtocol.port (not needed anymore, since it is part of the URI)

GLUE CE-SE Bind - Open issues mounted dir/exported dir

- **ISSUE:** a CE cannot have more than one SE nfs-mounted since mount dir is supposed to be equal to exported dir
- **SOLUTION:**
 - Represents scenario as it is:
 1. SE nfs-exports a directory, this is one of the available access protocols to data → for each exported dir, I add an access protocol which URI is `nfs://hostname:port/base_dir`
 2. a CE mounts the URI `nfs://hostname:port/base_dir` on `local_dir`, then we redefine the `CESEBind.Accesspoint` as the couple `<mount point> <exported dir, full URI>`
- **ADVICE:**
 - with this solution, from a WN, a storage space can be nfs-accessed iff there is an accesspoint which type is nfs and which `base_dir` is ancestor of the SA root
 - Is it enough flexible? Do we need to direct express CE-SA binding?

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Storage Service/Space/Library

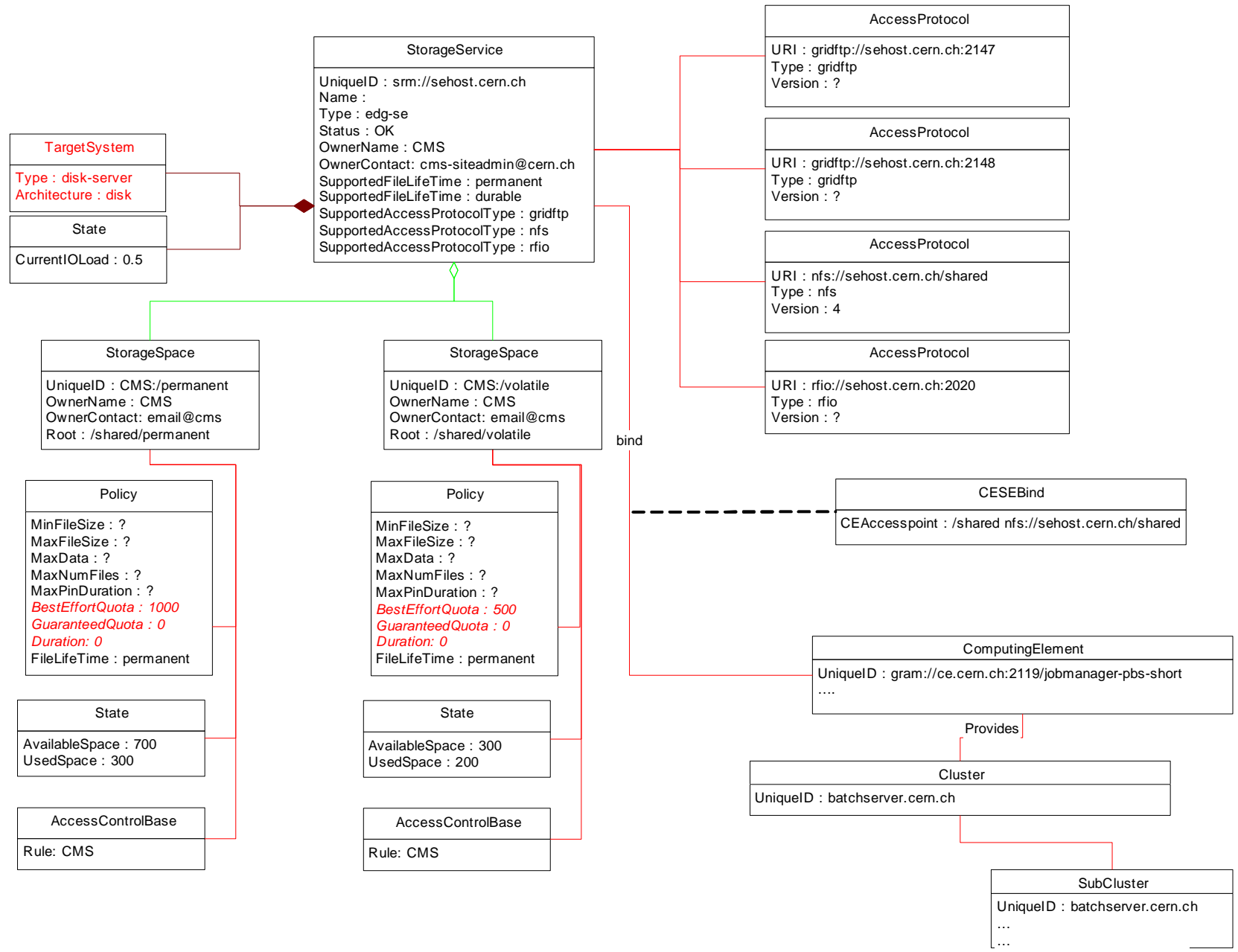
- **Storage Service:**
 - grid service identified by a **URI**
 - it manages storage extents in term of Storage Spaces
 - it has a **type** (e.g., edg-se, fs-only, srm)
 - it offers a **set of data access protocols** to access files in the Storage Spaces or transfer them in/out

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Storage Service/Space/Library

- **Storage Space:** portion of a logical storage extent identified by an URI that:
 - is assigned to a **Virtual Organization**
 - is associated to a **directory** of the underlying file system (e.g., /permanent/CMS); this association may be many-to-one
 - has a **set of policies** (MaxFileSize, MinFileSize, MaxData, MaxNumFiles, MaxPinDuration, Quota)
 - has a set of **access control base rules** (e.g., to privilege some VO user against some other)
 - has a **state** (e.g., available space)

Storage Element - example application for edg-se



GLUE Service - Open issue missing common schema among R-GMA and MDS

1. Do we need accounting attributes at this level?
2. Do we need multiple informationServiceURL per service (e.g., R-GMA producer, GRIS, proprietary monitoring tool)?
3. Should this be a generalization for both CE and SE? (They will inherit all its attributes)

Service
URI: string {key}
EndPointURL[*] : string
Type : string
Secure : boolean
Status: string
Data[*] : string
OwnerName : string
OwnerContact : string
HostingOrganization : string
MajorVersion : int
MinorVersion : int
PatchVersion : int
AuthorizationRule[*] : string
InformationServiceURL[*] : string
BankAccountContact : string
PriceAuthorityContact : string

SITE INFO - Open issue what do we need to bring in GLUE?

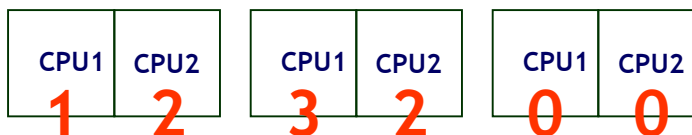
- **ISSUE:** EDG is still using an old piece of schema related to Site;
 - What do we need of this?
- **SOLUTION:**

GLUE CE - Open issues

Free/Total CPU concept

- **ISSUE (by example):**

- I have three worker nodes dual-processor managed by LSF;
- I configure one queue and I assigned all $2*3=6$ CPUs, **each CPU can run three jobs ($MaxRunJobs=3*6=18$)**;



X=RunJobs

CE.Info.TotalCPUs=? Do we refer to physCPU
CE.State.FreeCPUs=? or to job slots?

GLUE CE - Open issues

Free/Total CPU concept

- **ISSUE (b)**

- I have a processor managed by
- I have 3 nodes, each with 2 CPUs, each node has 3 jobs (3*2=6 CPUs, each CPU has 3 jobs=3*6=18);

With this solution you can have information about both physical CPUs and job slots

CPU1	CPU2	CPU1	CPU2	CPU1	CPU2
1	2	3	2	0	0

X=RunJobs

~~CE.Info.TotalCPUs~~

~~CE.State.FreeCPUs~~

CE.State.FreeJobSlots=10

CE.Policy.AssignedJobSlots=18

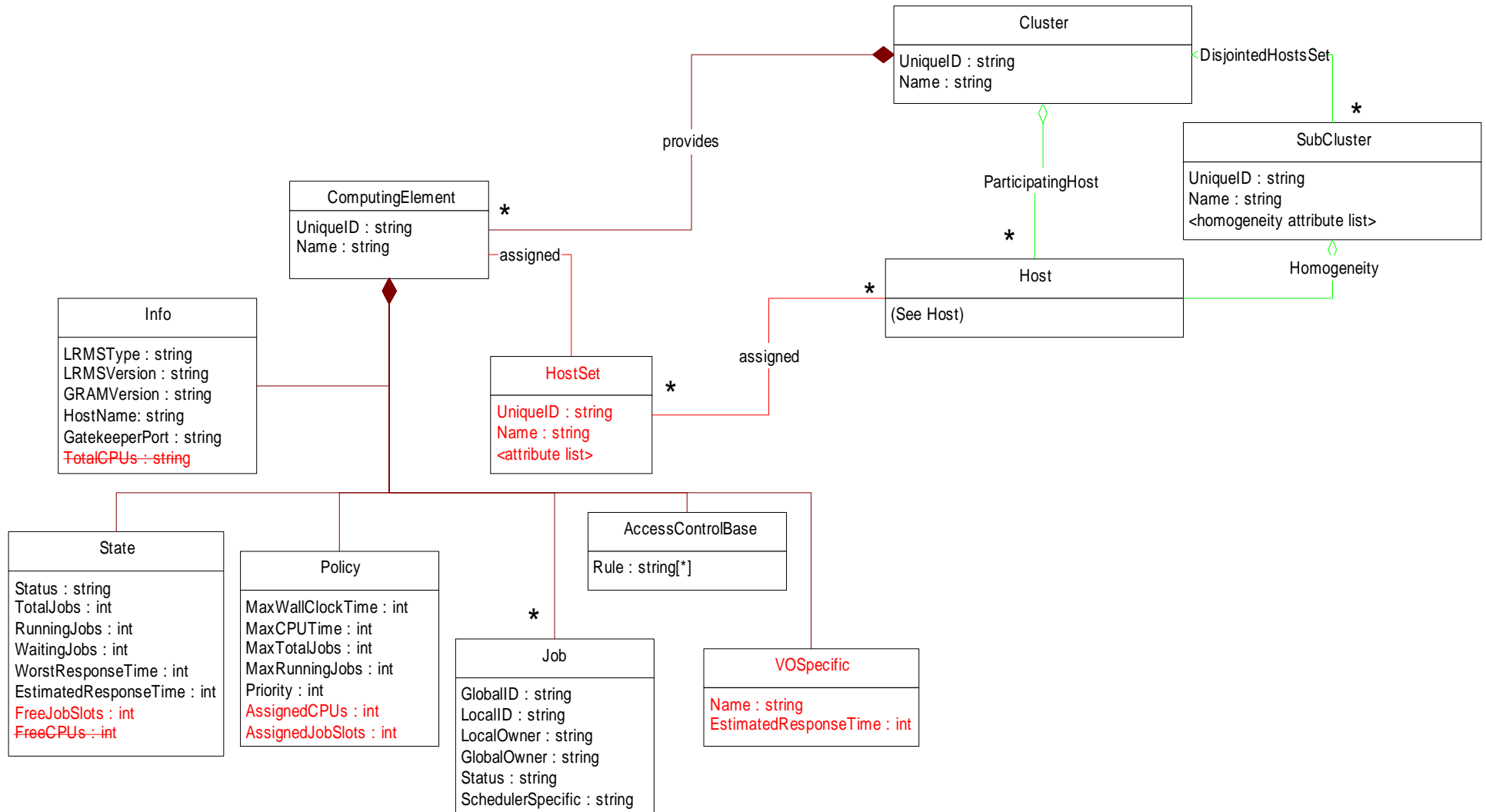
CE.Policy.AssignedCPUs=6

GLUE SubCluster - Open issue

EDG Constraint - only one

- **ISSUE:**
 - The limitation is due to a compromise solution, one entity for two different concepts:
 - How to describe in summary an homogenous set of hosts part of a cluster? (no relationships with queue)
 - How to describe in summary a set of hosts assigned to a queue, so that the matchmaking process is efficient?
- **SOLUTION:**
 - Use an entity for each concept; need for introducing a new entity in relationships with both CE and hosts (given a CE, this describes in summary characteristics of assigned hosts)
- **NOTICE:**
 - the subcluster is in relationships with Cluster and Hosts, since it describes homogeneous set of hosts that holding the property of being part of a certain cluster

Computing Element - proposal revision



REFERENCES

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