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://hostaname: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 redifine 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?

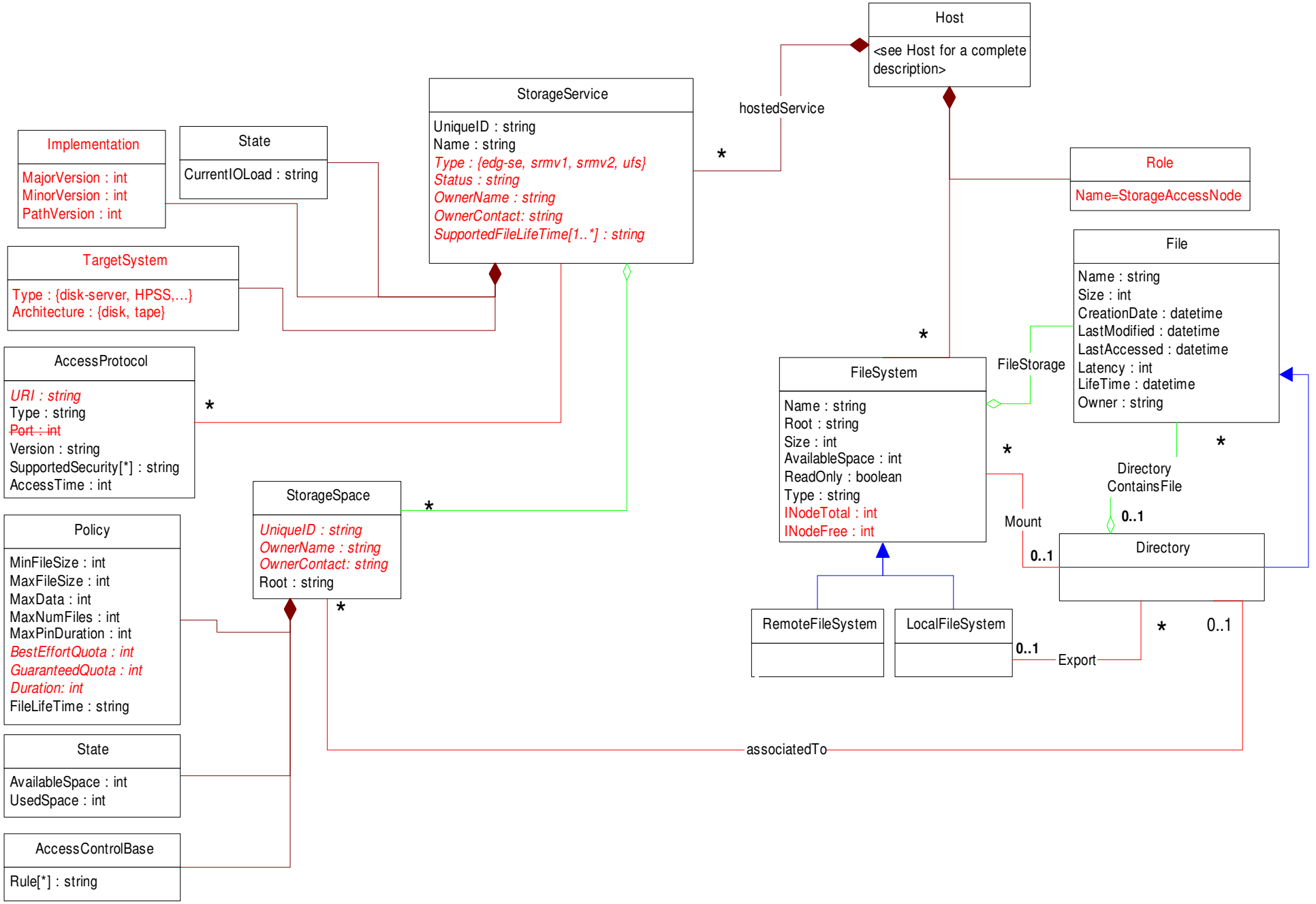
GLUE
Storage Service/Space/Library

- **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

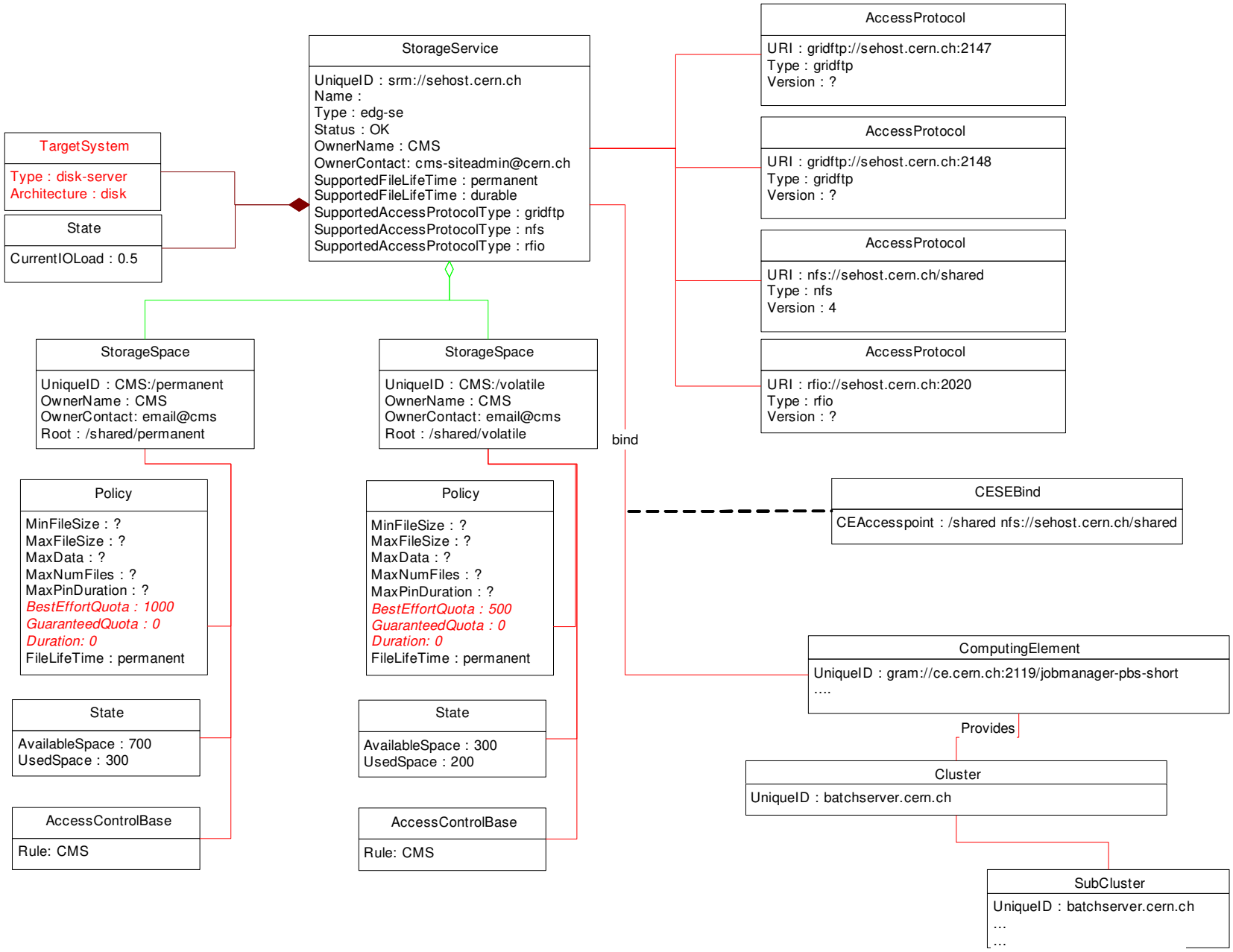
GLUE
Storage Service/Space/Library

- **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 - proposal revision



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 inherits all its attributes)

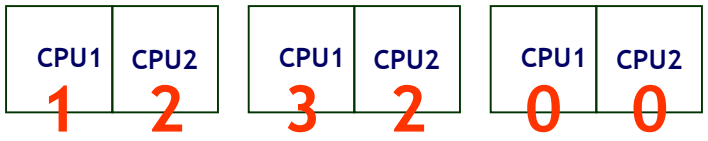
Service
URI: string {key} EndPointURL[*] : string Type : string Secure : boolean Status: string Data[*] : string OwnerName : string OwnerContact : string HostingOrganization : string MajorVersion : int MinorVersion : int PatchVersion : int AuthorizationRule[*] : string InformationServiceURL[*] : string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

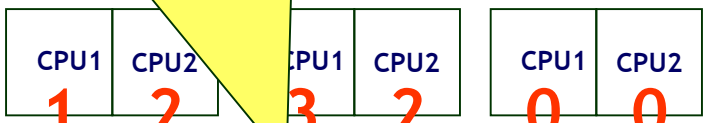
CE.Info.TotalCPUs=?
CE.State.FreeCPUs=?

Do we refer to physCPU or to job slots?

GLUE CE - Open issues
Free/Total CPU concept

- **ISSUE (b**
  - I h … processor managed by L…
  - I … ned all 2*3=6 CPUs, each CPU … nJobs=3*6=18);

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



X=RunJobs

~~CE.Info.TotalCPUs~~

~~CE.State.FreeCPUs~~

CE.State.FreeJobSlots=10

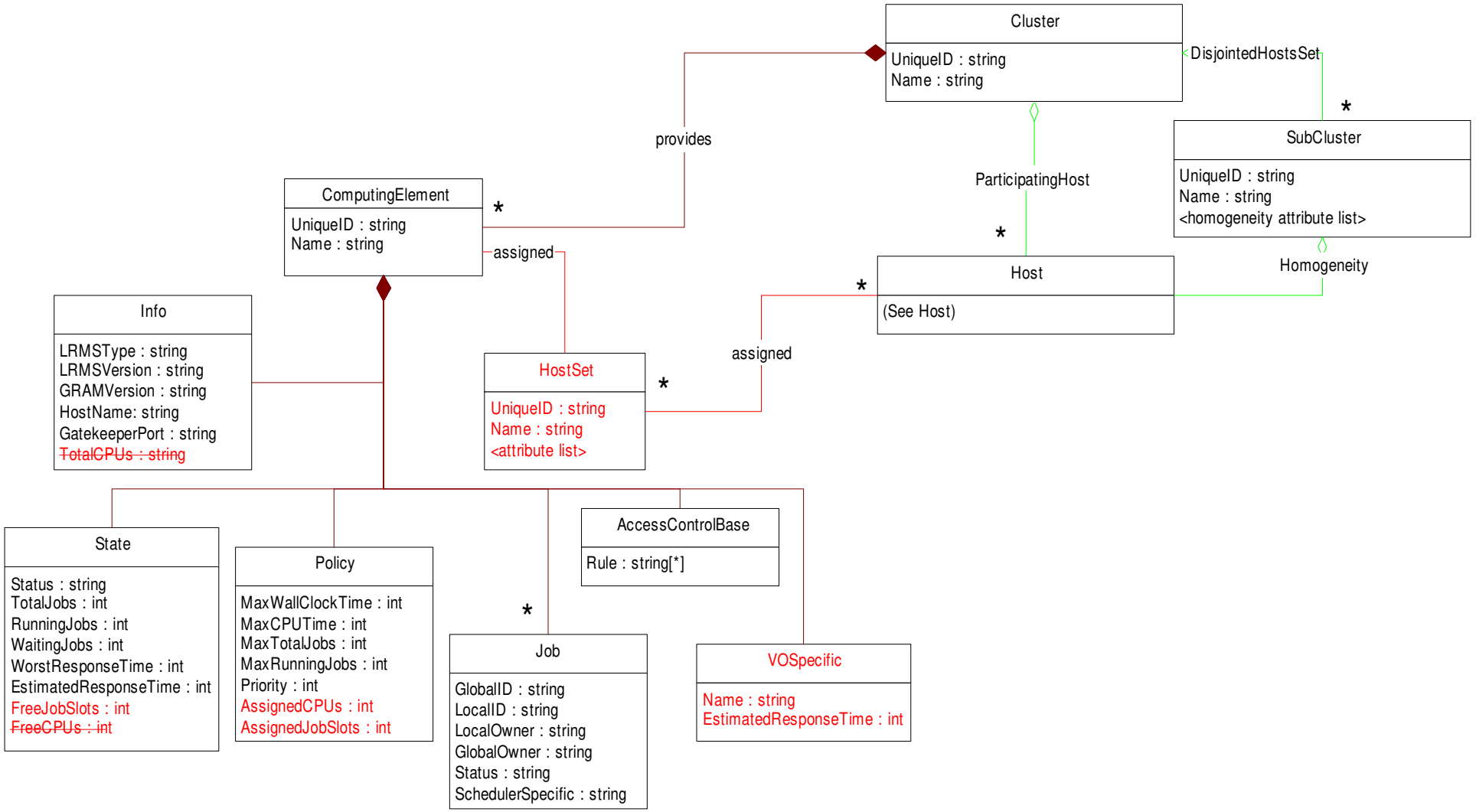
CE.Policy.AssignedJobSlots=18

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



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