

GLUE2.1 schema discussion

Alessandro Paolini

EGI.eu



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Current situation in GLUE2

- The CLOUD services do not publish any information related to the VO enabled on them
- Used classes and attributes defined for the GRID services
 - much information are incomplete and have been adjusted to publish something coherent and consistent with the schema.

What's new in GLUE2.1

- New classes and attributes for cloud computing services
- New classes and attributes for GPGPUs hardware
 - Now called Accelerators

New classes created over last year

- Accelerator classes:
 - ComputingShareAccelerator,
ComputingManagerAccelerator,
AcceleratorEnvironment
 - CloudComputingShareAccelerator,
CloudComputingManagerAccelerator,
CloudComputingImageAccelerator,
CloudComputingInstanceAccelerator
- Network settings
 - CloudComputingImageNetworkConfiguration

New attributes created over last year (I)

- Endpoint/Computing/Cloud:
 - **Authentication:** Name of the authentication method supported by the endpoint (X509, OIDC, SAML2, ...).
- CloudComputingShare
 - **DefaultNetwokType:** The default network type that will be setup for an instance (e.g. public, private, private_only...)
 - **PublicNetwokName:** The name of the public network if any
 - **ProjectID:** The native identifier of the corresponding local project to be used for this share (e.g. used by API users to know what is the project_id for OpenStack)
- CloudComputingVirtualAccelerator
 - **ComputeCapability:** features supported by an accelerator hardware
 - Improving the description for avoiding ambiguity in the values (type String)
 - **VirtualizationType:** The virtualization mode adopted for creating the virtual accelerator device
 - moved here from CloudComputingManagerAccelerator; VirtualizationType can be selected differently for the same image, because is the flavor that enables the access to the accelerator.

New attributes created over last year (II)

- CloudComputingImage (moved from CloudComputingEndpoint)
 - **ContextualizationName**: Compute Capability describes the features supported by an accelerator hardware
 - **ContextualizationVersion**: The virtualization mode adopted for creating the virtual accelerator device
- CloudComputingImage
 - Description
 - Version
- StorageShare
 - NumberOfFiles: Optional attribute that describes the number of files stored in this StorageShare
 - (Paths)? : A list of paths for writing data that should consume resources from this StorageShare. If a Path attribute is specified then the value MUST be included as one of the Paths values. (?)

- CloudComputingInstanceType:
 - **OtherHardware**: generic placeholder for other virtual hardware or feature provided by this resource template
 - **REMOVED. Too generic and unclear: in case of need we can use the OtherInfo attribute**
- Renamed IDFromEndpoint and LocalIDFromManager in the cloud classes:
 - CloudComputingInstanceType:
 - TemplateID: Reference to this particular template to be used during instantiation of a VM via the Endpoint.
 - CloudComputingInstance:
 - VMID: The VM ID as assigned by the Computing Endpoint
 - LocalID: The local ID of the VM as assigned by the Computing Manager (i.e., Hypervisor) or Cloud Middleware

Ldap implementation

GLUE2GroupID=resource

GLUE2ServiceID (CloudComputingService)

GLUE2EndpointID (CloudComputingEndpoint)

GLUE2PolicyID **VO Information**

GLUE2GroupID=CloudComputingInstances

GLUE2ActivityID (CloudComputingInstance)

GLUE2ShareID (CloudComputingShare)

GLUE2ResourceID (CloudComputeInstanceType)

GLUE2BenchmarkID

GLUE2CloudComputingVirtualAcceleratorID

GLUE2CloudComputingShareAcceleratorID

GLUE2CloudComputingImageID

GLUE2CloudComputingImageAcceleratorID

GLUE2CloudComputingNetworkConfigurationID

GLUE2PolicyID **VO Information**

GLUE2Manager (CloudComputingManager)

GLUE2CloudComputingManagerAcceleratorID

GLUE2CloudToStorageService

Executes activities on its associated resources

Creates, controls and monitors
Cloud computing activities

Not used for the moment

VMs

Policies and dynamic status

Hardware environment of the VM

Not used for the moment

Usage of the Virtual GPU

Software environment of the VM

Not used for the moment

Cloud framework

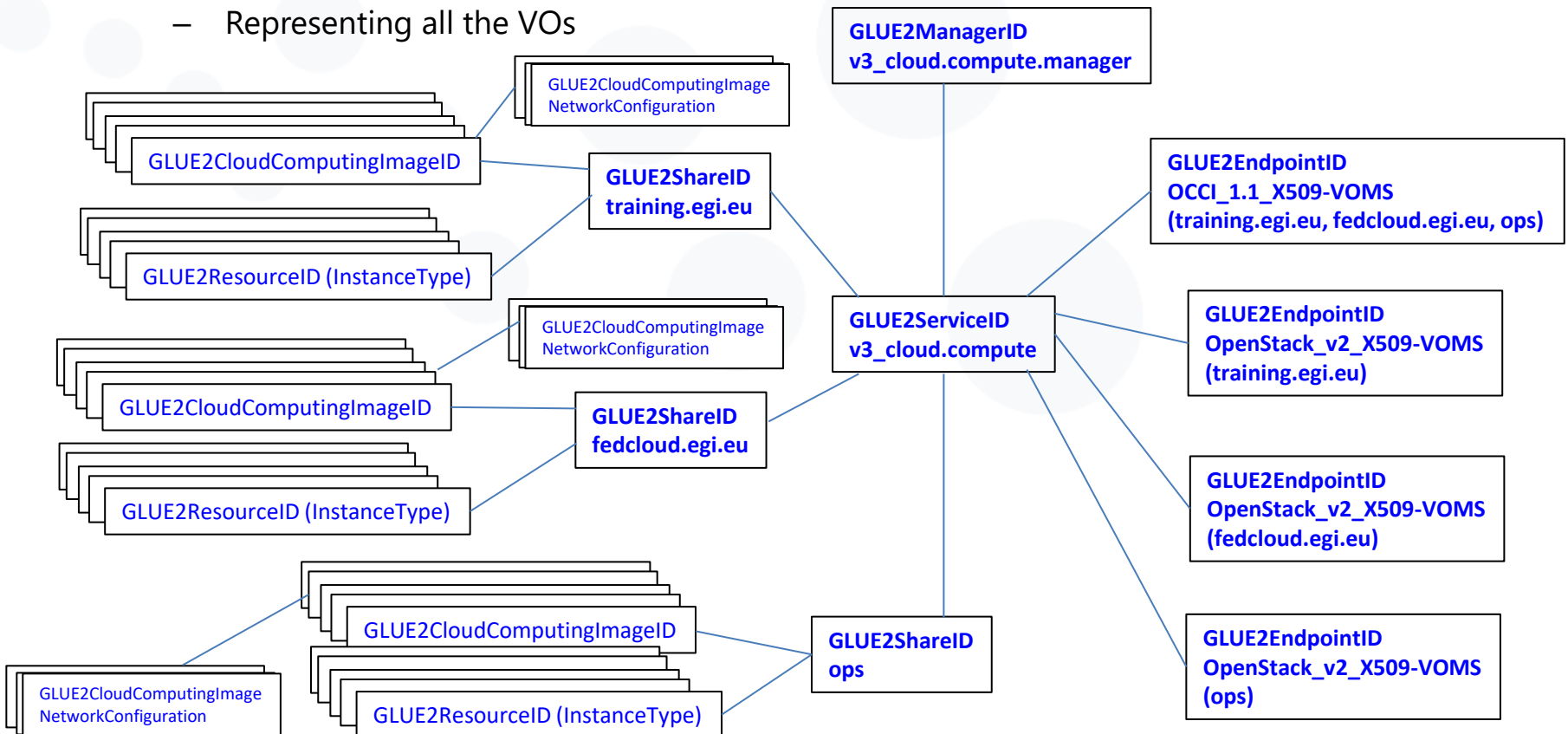
Not used for the moment

Ldap implementation (II)

- Some classes not used for the moment because not needed:
 - CloudComputingInstance, Benchmark, CloudComputingVirtualAccelerators, CloudComputingShareAccelerator, CloudComputingImageAccelerator, CloudComputingManagerAccelerator, CloudServicePrice, Glue2CloudToStorageService
- The value of many attributes retrieved by API queries to the cloud framework
- Other attributes have to be set in a dedicated configuration file
 - Some are optional: if not set, they are not published
- Ready for OpenStack, in progress for OpenNebula

Ldap implementation (III)

- 1 Endpoint object for each OpenStack project
 - Each VO belongs to a different project
- 1 Endpoint for OCCI interface
 - Representing all the VOs



- Cloud Computing conceptual model:
 - hypervisors are not normally exposed at all to the users and even irrelevant for most cases
 - To remove from the description?
 - CloudComputingManager should be what is described as the Cloud Middleware
- ➔ A Cloud Middleware is a piece of computer software that leverages on hypervisor virtualization capabilities to provide Virtual Machines on-demand to final users. The Cloud Middleware may provide not only virtual servers, but also storage and other rich services (e.g. Platform as a Service).
- CloudComputingManager: propose to remove the sentence:
 - "The Virtual Machine manager is usually referred as Hypervisor, thus a piece of software, firmware or hardware which creates, runs and manages Virtual Machines."
 - Any other references to hypervisor should be updated

- **ComputingManagerAccelerator:**
 - Renamed TotalPhysicalAccelerators in TotalNumbers
 - Does it make sense to have also TotalLogicalAccelerators, just like for CPU?
 - It seems modern accelerators don't consider any multi-core support. But in the next future maybe...
- **ExecutionEnvironment and AcceleratorEnvironment association**
 - An execution environment MAY contains zero or more accelerator environments (*)
 - An accelerator environment MAY be associated with one or more execution environments (1..*)
 - Does it make sense to have a many-to-many relation with EE?
 - Might it be possible that WNs not homogeneous have the same accelerators cards?

- Association (Cloud) VirtualAccelerator to InstanceType
 - A cloud computing instance type provides zero or more virtual accelerator devices
 - A virtual accelerator MAY be associated with one or more CloudComputingInstanceType
 - To change from *.* to *.1 ?
- CloudComputingImageAccelerator:
 - Probably not necessary

Side activities: AppDB & BDII

- AppDB consumes BDII information
 - Some modifications to accept the new schema
- To implement the new schema in the BDII package

Backup slides (OpenStack prototype)

GLUE2CloudComputingService Idif

dn: GLUE2ServiceID=https://192.168.56.105:5000/v2.0_cloud.compute,GLUE2GroupID=resource,o=glue

objectClass: GLUE2Entity

objectClass: GLUE2Service

objectClass: GLUE2CloudComputingService

GLUE2ServiceID: https://192.168.56.105:5000/v2.0_cloud.compute

GLUE2EntityName: Cloud Compute service on TEST

GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684

GLUE2EntityValidity: 3600

GLUE2ServiceAdminDomainForeignKey: TEST

GLUE2ServiceType: org.cloud.iaas

GLUE2ServiceQualityLevel: production

GLUE2ServiceStatusInfo: http://argo.esi.eu/lavoisier/status_report-sf?site=TEST

GLUE2CloudComputingServiceAUP: http://go.esi.eu/aup

GLUE2ServiceComplexity: endpointType=2,share=3

GLUE2ServiceCapability: executionmanagement.dynamicvmdeploy

GLUE2ServiceCapability: security.accounting

GLUE2CloudComputingServiceTotalVM: 4

GLUE2CloudComputingServiceRunningVM: 0

GLUE2CloudComputingServiceSuspendedVM: 1

GLUE2CloudComputingServiceHaltedVM: 3

GLUE2CloudComputingManager Idif (I)

dn:
GLUE2ManagerID=https://192.168.56.105:5000/v3_cloud.compute_manager,**GLUE2ServiceID**=https://192.168.56.105:5000/v3_cloud.compute,**GLUE2GroupID**=resource,o=glue
objectClass: GLUE2Entity
objectClass: GLUE2Manager
objectClass: GLUE2CloudComputingManager
GLUE2ManagerID: https://192.168.56.105:5000/v3_cloud.compute_manager
GLUE2EntityName: Cloud Manager for https://192.168.56.105:5000/v3
GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684
GLUE2EntityValidity: 3600
GLUE2ManagerProductName: Foo Hypervisor
GLUE2ManagerProductVersion: 0.42
GLUE2ManagerServiceForeignKey: https://192.168.56.105:5000/v3_cloud.compute
GLUE2CloudComputingManagerCloudComputingServiceForeignKey:
https://192.168.56.105:5000/v3_cloud.compute

...

GLUE2CloudComputingManager Idif (II)

...

GLUE2CloudComputingManagerTotalCPUs: 0
GLUE2CloudComputingManagerTotalRAM: 0
GLUE2CloudComputingManagerTotalAccelerators: 0
GLUE2CloudComputingManagerInstanceMaxCPU: 8
GLUE2CloudComputingManagerInstanceMinCPU: 1
GLUE2CloudComputingManagerInstanceMaxRAM: 16384
GLUE2CloudComputingManagerInstanceMinRAM: 512
GLUE2CloudComputingManagerInstanceMaxDedicatedRAM: 0
GLUE2CloudComputingManagerInstanceMinDedicatedRAM: 0
GLUE2CloudComputingManagerInstanceMaxAccelerators: 0
GLUE2CloudComputingManagerInstanceMinAccelerators: 0
GLUE2CloudComputingManagerVirtualdiskFormat: OVA
GLUE2CloudComputingManagerFailover: False
GLUE2CloudComputingManagerLiveMigration: False
GLUE2CloudComputingManagerVMBackupRestore: False

Optional, to set in a configuration file:

- OtherInfo
- NetworkVirtualizationType
- CPUVirtualizationType
- AcceleratorVirtualizationType

CloudComputingEndpoint Idif (I)

dn: **GLUE2EndpointID**=https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS,**GLUE2ServiceID**=https://192.168.56.105:5000/v3_cloud.compute,**GLUE2GroupID**=resource,o=glue

objectClass: **GLUE2Entity**

objectClass: **GLUE2Endpoint**

objectClass: GLUE2CloudComputingEndpoint

GLUE2EndpointID: https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS

GLUE2EntityName: Cloud Computing Endpoint OCCI (1.1/X509-VOMS) at https://192.168.56.105:8787/occi1.1

GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684

GLUE2EntityValidity: 3600

GLUE2EndpointURL: https://192.168.56.105:8787/occi1.1

GLUE2EndpointServiceForeignKey: https://192.168.56.105:5000/v3_cloud.compute

GLUE2EndpointCapability: executionmanagement.dynamicvmdeploy

GLUE2EndpointCapability: security.accounting

GLUE2EndpointQualityLevel: production

GLUE2EndpointInterfaceName: eu.esi.cloud.vm-management.occi

GLUE2EndpointHealthState: ok

...

CloudComputingEndpoint Idif (II)

...

GLUE2EndpointHealthStateInfo: Endpoint functioning properly

GLUE2EndpointServingState: production

GLUE2EndpointTechnology: webservice

GLUE2EndpointInterfaceVersion: 1.1

GLUE2EndpointImplementor: CSIC

GLUE2EndpointImplementationName: ooi

GLUE2EndpointImplementationVersion: 0.3.2

GLUE2EndpointDowntimeInfo: See the GOC DB for downtimes:

https://goc.esi.eu/portal/index.php?Page_Type=Downtimes_Calendar&site=TEST

GLUE2EndpointSemantics: <http://occi-wg.org/about/specification>

GLUE2EntityOtherInfo: Authn=X509-VOMS

GLUE2EndpointIssuerCA: /C=--

/ST=SomeState/L=SomeCity/O=SomeOrganization/OU=SomeOrganizationalUnit/CN=packstack.localdomain/emailAddress=root@packstack.localdomain

GLUE2EndpointTrustedCA: /C=FR/O=CNRS/CN=CNRS2

[...]

CloudComputingEndpoint Idif (III)

dn: **GLUE2EndpointID**=https://192.168.56.105:8774/v2/f4812fc14d094a5fba4a9868793c3f61_OpenStack_v2_X509-VOMS,**GLUE2ServiceID**=https://192.168.56.105:5000/v2.0_cloud.compute,**GLUE2GroupID**=resource,o=glue

objectClass: **GLUE2Entity**

objectClass: **GLUE2Endpoint**

objectClass: GLUE2CloudComputingEndpoint

GLUE2EndpointID: https://192.168.56.105:8774/v2/f4812fc14d094a5fba4a9868793c3f61_OpenStack_v2_X509-VOMS

GLUE2EntityName: Cloud Computing Endpoint OpenStack (v2/X509-VOMS) at
https://192.168.56.105:8774/v2/f4812fc14d094a5fba4a9868793c3f61

GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684

GLUE2EntityValidity: 3600

GLUE2EndpointURL: https://192.168.56.105:8774/v2/f4812fc14d094a5fba4a9868793c3f61

GLUE2EndpointServiceForeignKey: https://192.168.56.105:5000/v2.0_cloud.compute

GLUE2EndpointCapability: executionmanagement.dynamicvmdeploy

GLUE2EndpointCapability: security.accounting

GLUE2EndpointQualityLevel: production

GLUE2EndpointInterfaceName: org.openstack.nova

GLUE2EndpointHealthState: ok

...

CloudComputingEndpoint Idif (IV)

...

GLUE2EndpointHealthStateInfo: Endpoint functioning properly

GLUE2EndpointServingState: production

GLUE2EndpointTechnology: webservice

GLUE2EndpointInterfaceVersion: v2

GLUE2EndpointImplementor: OpenStack Foundation

GLUE2EndpointImplementationName: OpenStack Nova

GLUE2EndpointImplementationVersion: Liberty

GLUE2EndpointDowntimeInfo: See the GOC DB for downtimes:

https://goc.egi.eu/portal/index.php?Page_Type=Downtimes_Calendar&site=TEST

GLUE2EndpointSemantics: <https://developer.openstack.org/api-ref/compute>

GLUE2EntityOtherInfo: Authn=X509-VOMS

GLUE2EndpointIssuerCA: /C=--

/ST=SomeState/L=SomeCity/O=SomeOrganization/OU=SomeOrganizationalUnit/CN=packstack.localdomain/emailAddress=root@packstack.localdomain

GLUE2EndpointTrustedCA: /C=FR/O=CNRS/CN=CNRS2

GLUE2EndpointTrustedCA: /C=FR/O=CNRS/CN=GRID2-FR

...

Policy object (Endpoint)

dn: **GLUE2PolicyID**=https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS_training.egi.eu_Policy,**GLUE2EndpointID**=https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS,**GLUE2ServiceID**=https://192.168.56.105:5000/v3_cloud.compute,**GLUE2GroupID**=resource,o=glue

objectClass: GLUE2Entity

objectClass: GLUE2Policy

objectClass: GLUE2AccessPolicy

GLUE2PolicyID: https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS_Policy

GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684

GLUE2AccessPolicyEndpointForeignKey: https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS

GLUE2PolicyScheme: org.glite.standard

GLUE2EntityName: Access control rules for training.egi.eu on
https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS

GLUE2PolicyRule: VO:training.egi.eu

GLUE2CloudComputingShare Idif (I)

dn:
GLUE2ShareID=https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training,**GLUE2ServiceID**=https://192.168.56.105:5000/v3_cloud.compute,**GLUE2GroupID**=resource,o=glue
objectClass: GLUE2Entity
objectClass: GLUE2Share
objectClass: GLUE2CloudComputingShare
GLUE2ShareID: https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training
GLUE2EntityName: Share in service https://192.168.56.105:5000/v3_cloud.compute for VO training.esi.eu (Project training)
GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684
GLUE2EntityValidity: 3600
GLUE2ShareServiceForeignKey: https://192.168.56.105:5000/v3_cloud.compute
GLUE2ShareDescription: Share in service https://192.168.56.105:5000/v3_cloud.compute for VO training.esi.eu (Project training)
GLUE2CloudComputingShareCloudComputingServiceForeignKey:
https://192.168.56.105:5000/v3_cloud.compute
GLUE2ShareEndpointForeignKey: https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS
...

GLUE2CloudComputingShare Idif (II)

...

GLUE2CloudComputingShareCloudComputingEndpointForeignKey:

https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS

GLUE2ShareEndpointForeignKey:

https://192.168.56.105:8774/v2/f4812fc14d094a5fba4a9868793c3f61_OpenStack_v2_X509-VOMS

GLUE2CloudComputingShareCloudComputingEndpointForeignKey:

https://192.168.56.105:8774/v2/f4812fc14d094a5fba4a9868793c3f61_OpenStack_v2_X509-VOMS

GLUE2CloudComputingShareInstanceMaxCPU: 8

GLUE2CloudComputingShareInstanceMaxRAM: 16384

GLUE2CloudComputingShareSLA: <https://egi.eu/sla/training>

GLUE2CloudComputingShareTotalVM: 1

GLUE2CloudComputingShareRunningVM: 0

GLUE2CloudComputingShareSuspendedVM: 0

GLUE2CloudComputingShareHaltedVM: 1

GLUE2CloudComputingShareNetworkInfo: UNKNOWN

GLUE2CloudComputingShareInstanceMaxAccelerators: 0

GLUE2CloudComputingShareMaxVM: 10

Policy object (Share)

dn:

GLUE2PolicyID=https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training_Policy,**GLUE2ShareID**=https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training,**GLUE2ServiceID**=https://192.168.56.105:5000/v3_cloud.compute,**GLUE2GroupID**=resource,o=glue

objectClass: GLUE2Entity

objectClass: GLUE2Policy

objectClass: GLUE2MappingPolicy

GLUE2PolicyID: https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training_Policy

GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684

GLUE2PolicyScheme: org.glite.standard

GLUE2MappingPolicyShareForeignKey:

https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training

GLUE2PolicyRule: VO:training.esi.eu

GLUE2PolicyUserDomainForeignKey: training.esi.eu

CloudComputingInstanceType Idif

dn:

GLUE2ResourceID=<http://schemas.openstack.org/template/resource#3>,**GLUE2ShareID**=https://192.168.56.105:5000/v3_cloud.compute_share_training.esi.eu_training,**GLUE2ServiceID**=https://192.168.56.105:5000/v3_cloud.compute,**GLUE2GroupID**=resource,o=glue

objectClass: **GLUE2Entity**

objectClass: **GLUE2Resource**

objectClass: **GLUE2CloudComputingInstanceType**

GLUE2ResourceID: <http://schemas.openstack.org/template/resource#3>

GLUE2EntityCreationTime: 2017-06-15T16:25:45.531114

GLUE2EntityValidity: 3600

GLUE2EntityName: <http://schemas.openstack.org/template/resource#3>

GLUE2CloudComputingInstanceTypeIDForEndpoint: <http://schemas.openstack.org/template/resource#3>

GLUE2ResourceManagerForeignKey: https://192.168.56.105:5000/v3_cloud.compute_manager

GLUE2CloudComputingInstanceTypeCloudComputingManagerForeignKey:

https://192.168.56.105:5000/v3_cloud.compute_manager

GLUE2CloudComputingInstanceTypeCloudComputingEndpointForeignKey: https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS

GLUE2CloudComputingInstanceTypePlatform: amd64

GLUE2CloudComputingInstanceTypeevCPU: 2

GLUE2CloudComputingInstanceTypeRAM: 4096

GLUE2CloudComputingInstanceTypeNetworkIn: undefined

GLUE2CloudComputingInstanceTypeNetworkOut: True

GLUE2CloudComputingInstanceTypeNetworkInfo: infiniband

GLUE2CloudComputingInstanceTypeEphemeralStorage: 0

GLUE2CloudComputingInstanceTypeDisk: 40

GLUE2CloudComputingImage Idif

dn: **GLUE2CloudComputingImageID**=http://schemas.openstack.org/template/os#407a0a29-f884-4f80-825a-c19c5c2a6985,**GLUE2ShareID**=https://192.168.56.105:5000/v2.0_cloud.compute_share_training.esi.eu_training,**GLUE2ServiceID**=https://192.168.56.105:5000/v2.0_cloud.compute,**GLUE2GroupID**=resource,o=glue

objectClass: **GLUE2Entity**

objectClass: **GLUE2CloudComputingImage**

GLUE2EntityName: Image for TinyCoreLinux [Other/TinyCoreLinux/QEMU-KVM]

GLUE2CloudComputingImageID: http://schemas.openstack.org/template/os#407a0a29-f884-4f80-825a-c19c5c2a6985

GLUE2EntityCreationTime: 2017-06-01T17:17:55.514684

GLUE2EntityValidity: 3600

GLUE2CloudComputingImageIDForEndpoint: http://schemas.openstack.org/template/os#407a0a29-f884-4f80-825a-c19c5c2a6985

GLUE2CloudComputingImageCloudComputingManagerForeignKey: https://192.168.56.105:5000/v2.0_cloud.compute_manager

GLUE2CloudComputingImageCloudComputingEndpointForeignKey: https://192.168.56.105:8787/occi1.1_OCCI_1.1_X509-VOMS

GLUE2CloudComputingImageMarketPlaceID: https://appdb.esi.eu/store/vm/image/541b01a8-94bd-4545-83a8-6ea07209b440:1525/

GLUE2CloudComputingImageOSName: other

GLUE2CloudComputingImageOSVersion: TinyCoreLinux

GLUE2CloudComputingImageOSFamily: linux

GLUE2CloudComputingImageOSPlatform: amd64

GLUE2EntityOtherInfo: description:Image for TinyCoreLinux [Other/TinyCoreLinux/QEMU-KVM] version UNKNOWN on UNKNOWN
other TinyCoreLinux amd64

GLUE2CloudComputingImageDiskSize: 0

GLUE2CloudComputingImageAccessInfo: none

Thank you for your attention.

Questions?



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