



- RO-LCG 2016, Bucharest-Magurele, 26-28 October 2016 -



# **CLOUDIFIN, the first NGI-RO site participating to the EGI Federated Cloud**

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# Romanian Advanced Computing Infrastructure

- ❑ 9 EGI-certified Grid sites providing more than 8200 cores and 2.9 PB online storage capacity to 9 user communities
- ❑ Until 2015, 98% of the CPU time was consumed by the HEP community (WLCG, ILC, etc.)
- ❑ There is a growing need of computing resources for research in different fields such as biology, nanophysics and new materials, nuclear physics, and for supporting large-scale projects such as ELI-NP
- ❑ A (HTC and HPC) site, GRIDIFIN, is dedicated to the support of national communities of scientists that were not involved in High Energy Physics research.
- ❑ GRIDIFIN also supports the NGI\_RO Operation Centre

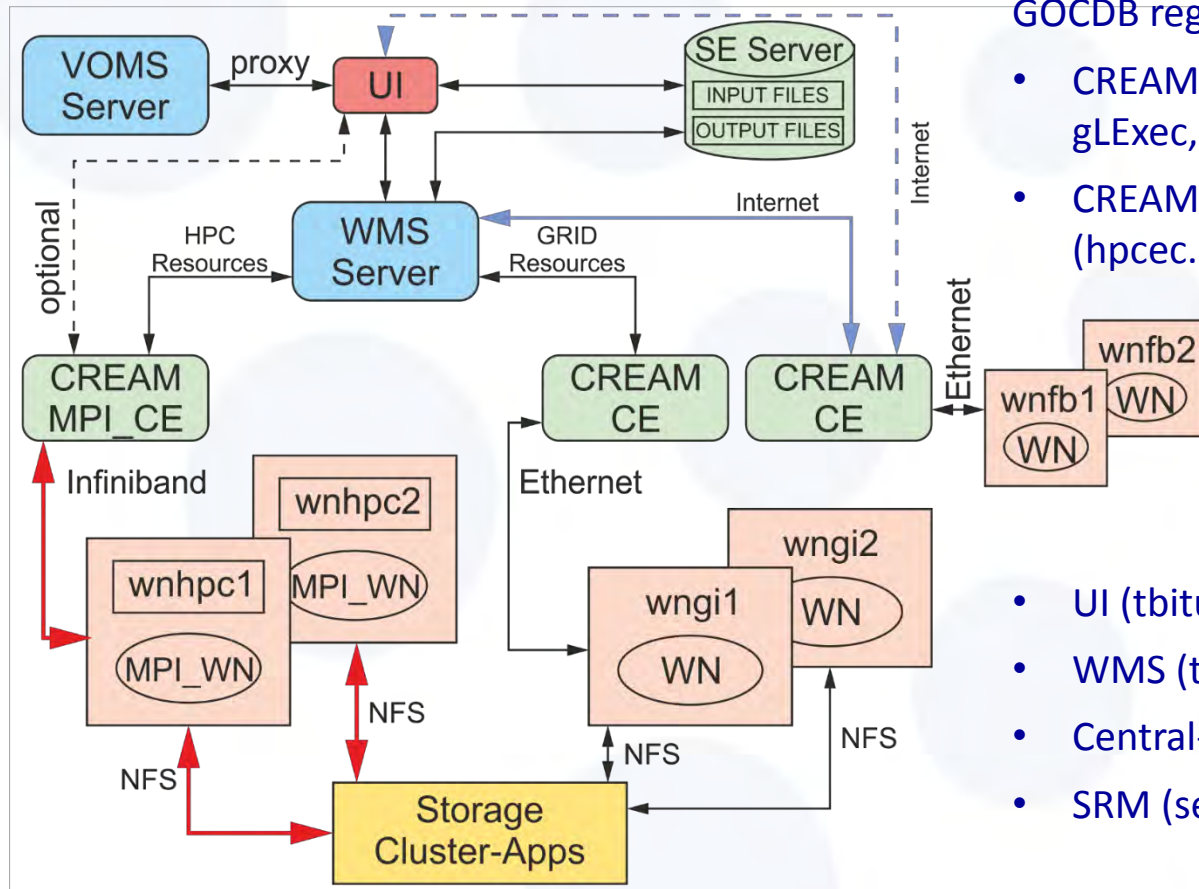


# User communities supported by GRIDIFIN

- ❑ GRIDIFIN provides computing and storage resources for three research communities (VOs):
  - Experimental groups related of the Extreme Light Infrastructure – Nuclear Physics (ELI-NP) project
    - eli-np.eu** VO (9 registered users)
  - National community of researchers in computational biology
    - ronbio.ro** VO (7 registered users)
  - Researchers interested in condensed state physics and nanomaterials technology
    - gridifin.ro** VO (6 registered users).
  
- ❑ The 3 VOs are locally administered
- ❑ Hardware resources:
  - 6 servers providing grid core services
  - 31 WNs with 364 CPU cores and 2048 GPU cores



# GRIDIFIN topology and data flow



GOCDDB registered services and hosts:

- CREAM-CE for concurrent jobs, Site-BDII, gLExec, APEL, gLite-APEL (tbit06.nipne.ro)
- CREAM-CE for parallel jobs, eu.egi.MPI (hpcec.nipne.ro)
- UI (tbitui.nipne.ro)
- WMS (tbit04.nipne.ro)
- Central-LFC, Local-LFC (lfc.nipne.ro)
- SRM (segi.nipne.ro)

Software: GEANT, ROOT, EPOCH (for eli-np.eu); VASP, (Tran)Siesta (gridifin.ro);  
NAMD, CHARMM C37, GROMACS 5, GAMESS-US, AMBER, OpenBabel, VINA... (for ronbio.ro)  
Libraries: CUDA, OpenMPI, MVAPICH, Intel compilers, GNU compilers, etc.



## eli-np.eu VO

It is the most active VO on GRIDIFIN, with 670K CPU-hours (2.82% of total NGI\_RO CPU-hours, 99% of total GRIDIFIN accounting) accounted by EGI in the last year.

It is the only active VO for ELI.

Allocated resources for scientific computing and data processing: 336 cores (Intel Xeon X5650 hex core), Infiniband QDR.

Data storage and management: 60 TB XFS in RAID6, shared through NFS over Infiniband QDR.

Community software run in the Grid, as MPI jobs:

- Epoch,
- Fluka,
- Geant,
- ROOT



# CLOUD INFRASTRUCTURE

Recent implementation of a new cloud computing site CLOUDIFIN

Purpose:

- to provide Infrastructure-as-a-Service (IaaS) - virtual machines - to the national research and education community;
- to support within the EGI Federated Cloud the European ESFRI projects in which Romania is involved

VOs supported:

- fedcloud.egi.eu, dteam, ops
- eli-np.eu
- ronbio.ro , gridifin.ro



Based on Centos 7.2 and OpenStack Mitaka

GOCD registered services and hosts:

- Cloud controller (cloud-ctrl.nipne.ro): eu.egi.cloud.vm-management.occi, eu.egi.cloud.accounting
- Site BDII (cloud-bdii.nipne.ro): eu.egi.cloud.information.bdii



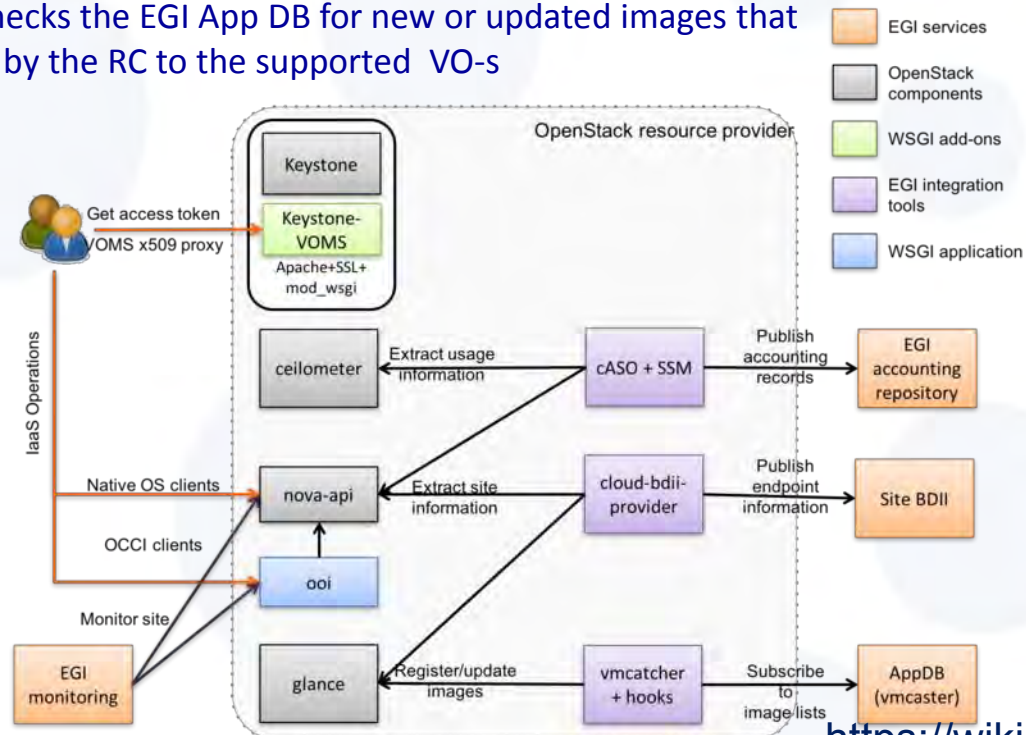


# CLOUD INFRASTRUCTURE

## EGI FedCloud services

We installed EGI extensions on top of the OpenStack components.

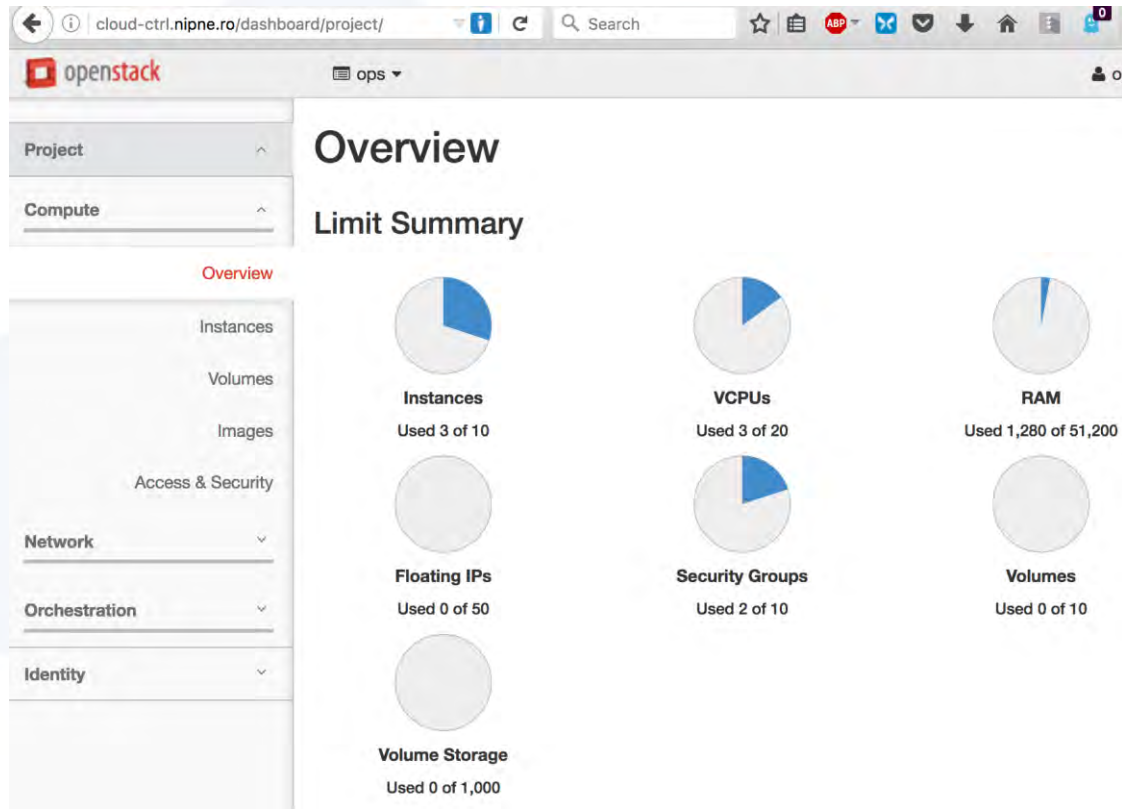
- Keystone-VOMS Authorization plugin allow users with a valid VOMS proxy to access the OpenStack deployment
- cASO collects accounting data from OpenStack
- SSM sends the records extracted by cASO to the central EGI accounting DB
- BDII cloud provider registers the RC configuration and description through the EGI Information System to facilitate service discovery
- vmcatcher checks the EGI App DB for new or updated images that can be provided by the RC to the supported VO-s



<https://wiki.egi.eu/wiki/MAN10>



# CLOUD INFRASTRUCTURE



- ❑ For VMs, the initial hardware provided is: 96 Intel Xeon cores, 4G/core RAM
- ❑ To be expanded as required by the user communities





# CLOUD INFRASTRUCTURE

- Project
- Admin
- Identity

## Projects

Filter

<input type="checkbox"/>	Name	Description	Project ID	Enabled	Actions
<input type="checkbox"/>	dteam	Tenant for VO dteam	024eb692a7984b108b7a512af5aec55e	Yes	Manage Members
<input type="checkbox"/>	fedcloud	Tenant for VO fedcloud	09b2b5c14bcf4a5bb8c5b700865c6ec7	Yes	Manage Members
<input type="checkbox"/>	eli-np.eu	Tenant for VO eli-np.eu	119cecb96bb04ffb9982a01e9b203927	Yes	Manage Members
<input type="checkbox"/>	ops	Tenant for VO ops	6ea43415aafe4e539b3596b3ee92d82c	Yes	Manage Members
<input type="checkbox"/>	admin	admin tenant	a8658aefc7264fbf9dd35e8b2c92a987	Yes	Manage Members
<input type="checkbox"/>	services	Tenant for the openstack services	d967d01716ba441081c3f8272baec056	Yes	Manage Members

Projects

Users



# CLOUD INFRASTRUCTURE

**Site: CLOUDIFIN**  
 National Institute of Physics and Nuclear Engineering, IT Department  
 Computational research in physics and related areas

**Contact Info**

E-Mail: itvasile@nipne.ro  
 Telephone: +40724118586  
 Emergency Tel:  
 CSIRT Tel:  
 CSIRT E-Mail: itvasile@nipne.ro  
 Emergency E-Mail:  
 Helpdesk E-Mail:

**Project Data**

NGI/ROC: NGI\_ROC  
 Infrastructure: Production  
 Certification Status: Uncertified Change  
 Scope Tags: EGI

**Networking**

Home URL:  
 GIIS URL: ldap://cloud-bdii.nipne.ro:2170 /GLUE2DomainID=CLOUDIFIN,o=glue  
 IP Range: 0.0.0.0/255.255.255.255  
 IP v6 Range:  
 Domain: nipne.ro

**Location**

Country:  
 Latitude:  
 Longitude:  
 Time Zone:  
 Location:

**Extension Properties** Export all properties

Name	Value	Edit	Select All
cloud_max_cores4VM	8		<input type="checkbox"/>
cloud_max_RAM4VM	16GB		<input type="checkbox"/>
cloud_max_storage4VM	16GB		<input type="checkbox"/>

[+ Add Properties](#)

Select action... Submit

**Services** (Note, Service scope values marked with (x) indicate the Site does not share that scope)

Hostname (service type)	URL	Production	Monitored	Scope Tags
cloud-bdii.nipne.ro (eu.egi.cloud.information.bdii)	ldap://cloud-	✓	✓	EGI
cloud-ctrl.nipne.ro (eu.egi.cloud.accounting)	CLOUDIFIN	✓	✓	EGI
cloud-ctrl.nipne.ro (eu.egi.cloud.vm-management.occi)	http://cloud-	✓	✓	EGI

[+ Add Service](#)



## Summary and conclusions

- EGI extensions on top of the OpenStack components.
- CLOUDIFIN is under EGI certification.
- In the EGI AppDB we have available specific approved VM with the needed computing software.
- There is a growing need of computing resources for research: HTC, cloud and HPC.
- Infrastructure-as-a-Service (IaaS) to the national research and education community;
- to support within the EGI Federated Cloud the European ESFRI projects in which Romania is involved



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**THANK YOU  
FOR YOUR ATTENTION!**

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