



# EG-CI: The Cloud Infrastructure for the Greek Node

Thanasis Vergoulis, ATHENA RC



[www.elixir-greece.org](http://www.elixir-greece.org)

# At a glance



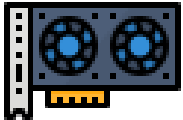
## 32 converged nodes

28 cores / 2.6 GHz / 512GB RAM



## 2 “fat” nodes

48 cores / 2.1 GHz / 1,024GB RAM



## 3 GPU-enabled nodes

28 cores / 2.6 GHz / 768GB RAM / 2GPUs



## 8 I/O nodes

28 cores / 2.6 GHz / 512GB RAM / 2 SSD disks (6GB/s)



## 9 infrastructure nodes

28 cores / 2.6 GHz / 512GB RAM

**1,552 physical cores in total**

<https://egci-beta.imsi.athenarc.gr/>



Delivery of equipment: Dec 2020 (**delayed**)  
EG-CI on new equipment: Feb 2021

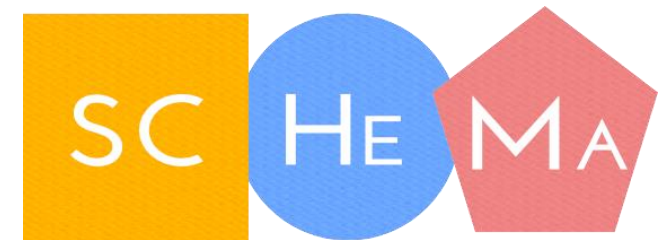


# Access to EG-CI

- Cloud resources managed by **CLIMA**
  - Open source platform developed by ATHENA RC
  - <https://github.com/athenarc/clima>



- Management of on-demand computations: **SCHeMa**
  - Open source, developed by ATHENA RC
  - <https://github.com/athenarc/schema>



- These platforms can be installed on top of OpenStack and Kubernetes

# Access to EG-CI: through three types of projects

## 1. 24/7 services

- Providing virtual private servers (VMs) for 24/7 services

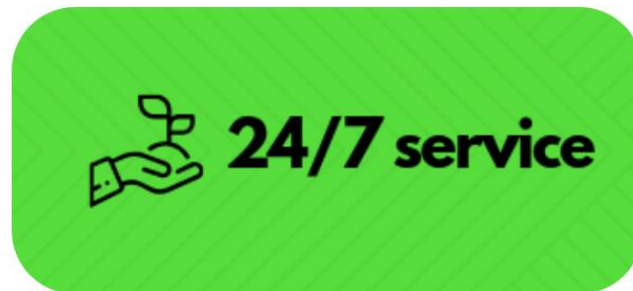
## 2. On-demand computation

- Supporting batch execution of workflows

## 3. Cold storage *[Q1 2021]*

- Providing tape storage to support dataset backup

Access based on ELIXIR AAI



# Main interface

The screenshot shows the main interface of the E-G-C-I system. At the top, there is a navigation bar with the E-G-C-I logo, a 'Dashboard' tab, and links for 'User options', 'Moderator options', 'Admin options', 'Help', and 'Logout (vergoulis)'. A notification bell shows 0 items. Below the navigation bar, the main content area is titled 'Dashboard' and features a 'New project' button and a 'Project requests' button. A callout points to the 'Project requests' button, stating 'History of project requests'. Another callout points to the 'New project' button, stating 'Create new project'. Below these buttons, there is a section for 'Active projects (4)'. A callout points to this section, stating 'List of projects'. Below the 'Active projects' section, there is a table with columns for 'Project', 'Type', 'Owner', and 'Expires in'. Each row in the table has three action buttons: 'Update', 'Details', and 'Access'. A callout points to the 'Access' button, stating 'Redirection to resources management subsystem'. At the bottom left, there is a section for 'Expired Projects (6)' with a dropdown arrow.

EG-CI

Dashboard User options Moderator options Admin options Help Logout (vergoulis) 0

Dashboard

New project Project requests

Gold user ?

List of projects

Create new project

Redirection to resources management subsystem

History of project requests

Active projects (4)

Project	Type	Owner	Expires in
egci-webinar		You	69 days
CAST		You	32 days
genome_assembly_1		kostis_zaggnas@elixir-europe.org	68 days
bufet-diploma-thesis		kostis_zaggnas@elixir-europe.org	81 days

Expired Projects (6) ▾

# VM creation for 24/7 services

## Machine Creation

✓ Create ← Back

### Machine specification:

CPU cores: 2  
RAM: 4 GB  
Operating system disk: 20 GB  
Additional storage: 10 GB

### Select Operating System:

Ubuntu 20.04 Desktop - RDP

### Upload a public SSH key:

ⓘ A public SSH key is required to access the new machine. Follow this [guide](#) to create a public SSH key.

Browse... No file selected.



## VM details

🖥️ Console × Delete ← Back

Image: Ubuntu 18.04  
IP (for SSH): ██████████  
Username: ubuntu

### Useful tips:

#### ❓ Additional Storage

In order to partition, format and mount the additional storage, which is attached to /dev/vdb, follow this [guide](#).

Additional storage: /dev/vdb

#### ❓ Graphical UI

If your VM supports a Graphical User Interface (GUI) you need to use a [VNC client](#) to connect to it.

#### ❓ Extra Users

It is possible to give access to the VM to other users by following this [tutorial](#)

# On-demand software catalogue

**SCHEMA SCHEDULER** | Software | Workflows | Data | Job history | Help | Admin Options | Logout (vergoulis) | 0

+ New image | + Existing image | + Image Request

Software Name	Version	Image	Uploader	
Augur ?	translate	dockerHub: nextstrain/base	kostis_zaggnas	Run Edit Delete
BUFET ?	1.0	localImage: bufet-1.0:latest	kostis_zaggnas	Run Edit Delete
NAMD ?	2.12	dockerHub: researchcomputing/namd_212_multicore_osgvo-el6	kostis_zaggnas	Run Edit Delete
PEMA ?	v.1.3	dockerHub: hariszaf/pema:v.1.3	hariszaf	Run Edit Delete
StochMPI ? <span>OpenMPI</span>	latest	dockerHub: spyroukostas/mpi-ssa-sbml-simulator:latest	spyroukostas	Run Edit Delete
biowardrobe-FASTQC ?	0.11.5	dockerHub: biowardrobe2/fastqc:v0.11.5	kostis_zaggnas	Run Edit Delete

Working Project:  
bufet-diploma-thesis  
Remaining Jobs: 9776  
[Create new project in EG-CI](#)

### New job (BUFET v.1.0)

Input/Output directory ?

Select Clear

#### Arguments

miRNA-Gene interactions file	<input type="text"/>	<span>File</span> <span>×</span>
Output file name	<input type="text"/>	<span>File</span> <span>×</span>
miRNA query File	<input type="text"/>	<span>File</span> <span>×</span>
Ontology file	<input type="text"/>	<span>File</span> <span>×</span>
Number of random miRNA groups	<input type="text"/>	<span>File</span> <span>×</span>
Number of threads	<input type="text"/>	<span>File</span> <span>×</span>
Synonyms file	<input type="text"/>	<span>File</span> <span>×</span>
miRanda free energy	<input type="text"/>	<span>File</span> <span>×</span>
miRanda score	<input type="text"/>	<span>File</span> <span>×</span>
Species (human/mouse)	<input type="text"/>	<span>File</span> <span>×</span>
Alternative form interactions File (1/0)	<input type="text"/>	<span>File</span> <span>×</span>
Alternative form ontology File(1/0)	<input type="text"/>	<span>File</span> <span>×</span>

Run Run example



# On-demand workflow catalogue

The screenshot displays the SCHEMA Scheduler interface. At the top, there is a navigation bar with the SCHEMA logo and menu items: Software, Workflows (active), Data, Job history, Help, Admin Options, Logout (vergoulis), and a notification bell with 0 items. Below the navigation bar, there is a '+ New workflow' button and a 'Resources from project:' dropdown menu set to 'bufet-diploma-thesis (9776 remaining jobs)', with a '+ New project' button next to it.

The main content area shows a table of workflows:

Software Name	Version	Uploader	Actions
GWAS-workflow ?	1.0	kostis_zagganas	Run Edit Delete
Hashsplitter ?	1.0	kostis_zagganas	Run Edit Delete
MSA ?			Run Edit Delete
RNA-seq-workflow ?			Run Edit Delete

A modal window titled 'Run workflow (GWAS-workflow v.1.0)' is open, showing the following fields and buttons:

- Output directory ?**: A text input field with 'Select' and 'Clear' buttons.
- Arguments**: A section with two rows of input fields. The first row is labeled 'metadata' and the second 'variants'. Each row has a green 'Add' button and a red 'Remove' button.
- Run buttons**: A green 'Run' button and a green 'Run example' button.

A blue arrow points from the 'Run' button in the table to the modal window.





# New and upcoming features

The screenshot shows a web interface with a navigation bar (Software, Workflows, Data, Job history, Help, Admin Options, Logout) and a section titled "Available Workflows". A table lists workflows with columns for Software Name, Version, and Uploader. A "Visualize" button is highlighted for the "Test-workflow" entry, which is linked to a workflow diagram. The diagram shows a sequence of steps: split\_single\_paired, trim\_galore\_single, trim\_galore\_paired, decompress\_single, fastqc\_single\_trimmed, fastqc\_paired\_trimmed, decompress\_paired, fastx\_trimmer\_single, rename\_fastqc\_single, rename\_fastqc\_paired, and fastx\_trimmer\_paired. A "fastqc\_raw" step is also shown leading to "rename\_fastqc\_raw".

Software Name	Version	Uploader
GWAS-workflow ?	1.0	kostis_zagganas
Hashsplitter ?	1.0	kostis_zagganas
MSA ?	1.0	kostis_zagganas
RNA-seq-workflow ?	1.0	kostis_zagganas
Test-workflow ?	1.0	loukas_kavouras
[Redacted]	0.5	[Redacted]

Until Jan 2021:

1) Interconnection with data repositories:

2) Support packaging executed analyses in RO-crate objects:



# Using international standards

- EG-CI's SCHeMa implements:
  - GA4GH's **TES** specification for simple job execution
  - GA4GH's **WES** specification for workflow execution
- By providing **TES & WES endpoints** we make it very easy to federate our resources with those of other ELIXIR Clouds
  - We test this feature using GRNET's resources during various events.

## Task Execution Service (TES)

Every compute environment has a different API for the batch execution of tasks. For example, each of the three major cloud vendors provides this service, but using completely different APIs. By providing a common interface that abstracts over their differences, compute engines can quickly move from one compute system to the next.

## Contributors



WORK STREAMS Cloud, Discovery, Data Security



DRIVER PROJECTS TBD

## workflow-execution-service-schemas



**Global Alliance**  
for Genomics & Health  
Collaborate. Innovate. Accelerate.

## Workflow Execution Service (WES) API

develop branch status: build passing INVALID [-]

The [Global Alliance for Genomics and Health](#) is an international coalition, formed to enable the sharing of genomic and clinical data.

## Cloud Work Stream

The [Cloud Work Stream](#) helps the genomics and health communities take full advantage of modern cloud environments. Our initial focus is on "bringing the algorithms to the data", by creating standards for defining, sharing, and executing portable workflows.

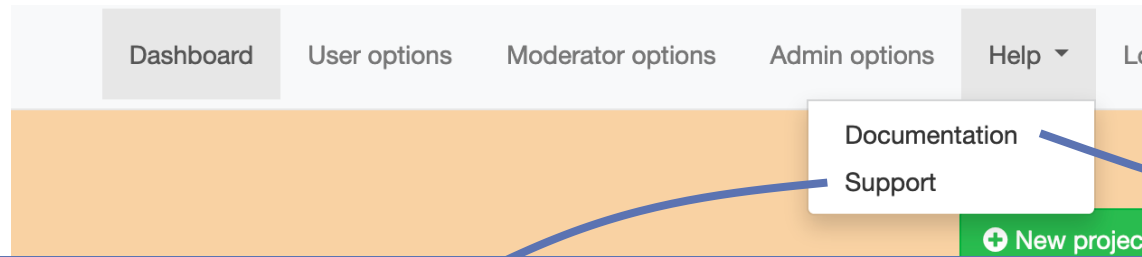
We work with platform development partners and industry leaders to develop standards that will facilitate interoperability.

## What is WES?

The Workflow Execution Service API describes a standard programmatic way to run and manage workflows. Having this standard API supported by multiple execution engines will let people run the same workflow using various execution platforms running on various clouds/environments. Key features include:

- ability to request a workflow run using CWL or WDL
- ability to parameterize that workflow using a JSON schema
- ability to get information about running workflows

# Help, support & bug reporting



User manual for the ELIXIR-GR Cloud Infrastructure (EG-CI)



**Username**  
vergoulis@elixir-europe.org

**Subject**

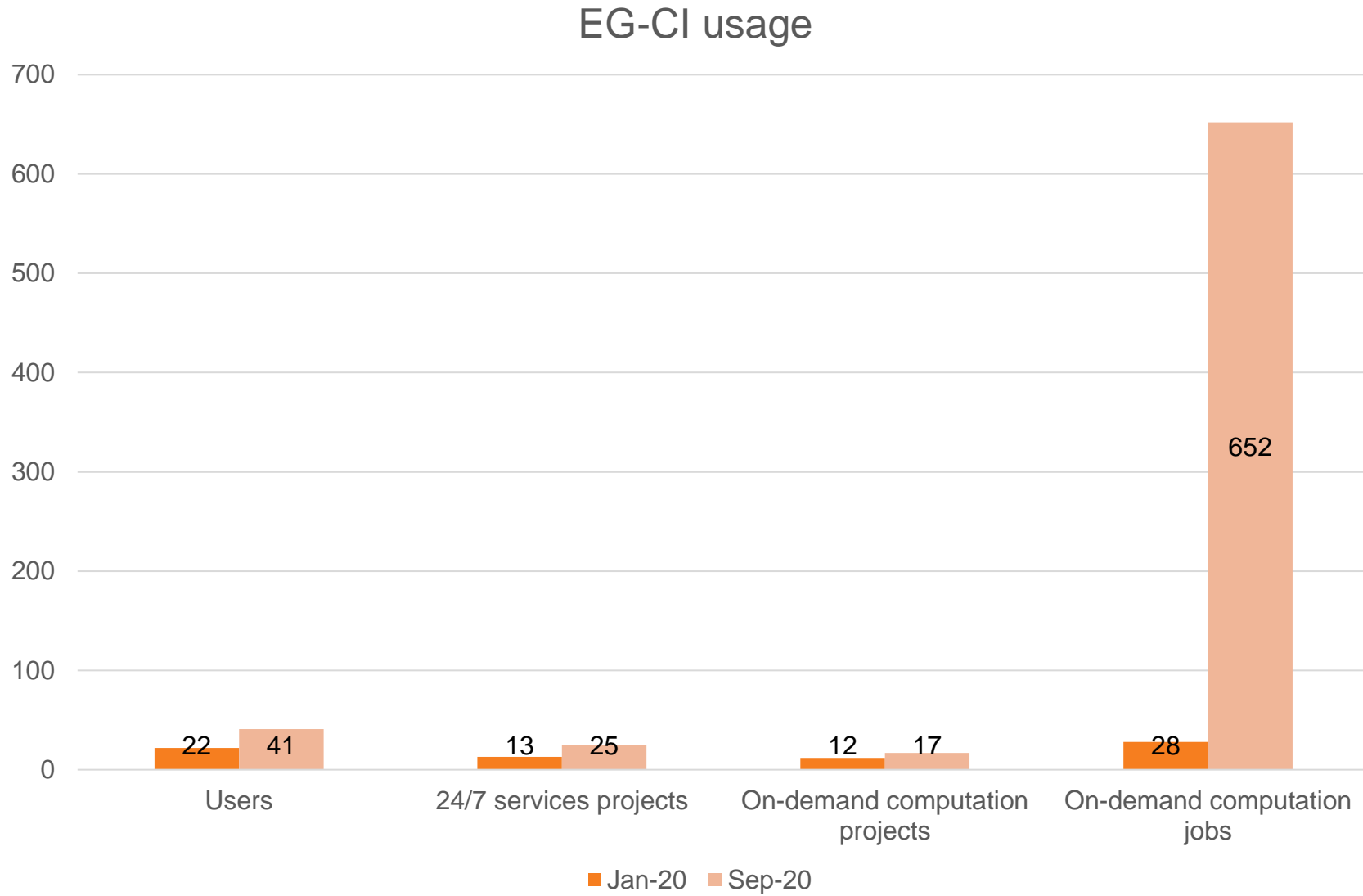
**Department**  
Bug

**Message**

**Attach a screenshot (optional)**  
Browse... No files selected.



# Statistics

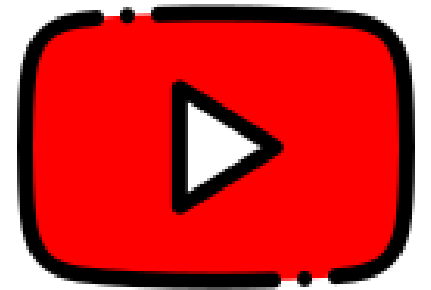


# Stay tuned!



[https://twitter.com/ELIXIRGR\\_Comp](https://twitter.com/ELIXIRGR_Comp)

<https://www.youtube.com/channel/UC6ek-jYFfq0FDEcSJF4UEuw>



\*There are links to the social media accounts at the footer section of EG-CI.



# Thank you!

[vergoulis@athenarc.gr](mailto:vergoulis@athenarc.gr)



[@vergoulis](https://twitter.com/vergoulis)

Third-party graphics used:

- Calm icon (slide 2): Icon made by [Freepik](#) from [www.flaticon.com](http://www.flaticon.com)
- Dragon icon (slide 2): Icon made by [Freepik](#) from [www.flaticon.com](http://www.flaticon.com)
- SSD-drive (slide 2): Icon made by [Nikita Golubev](#) from [www.flaticon.com](http://www.flaticon.com)
- GPU (slide 2): Icon made by [monkik](#) from [www.flaticon.com](http://www.flaticon.com)
- Carpenter (slide 2): Icon made by [Freepik](#) from [www.flaticon.com](http://www.flaticon.com)
- Twitter (slide 11): Icon made by [Freepik](#) from [www.flaticon.com](http://www.flaticon.com)
- YouTube (slide 11): Icon made by [Freepik](#) from [www.flaticon.com](http://www.flaticon.com)

