# VRE for regional Interdisciplinary communities in Southeast Europe and the Eastern Mediterranean

## Accounting Services for Heterogeneous Resources


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# Outline

- Motivation
- Heterogeneous Resources
- Architecture of the accounting system
- Development and Release Processes

# Motivation

The "Cloud" led to a various changes in the computing landscape :

- IaaS – EGI Federated Cloud
- PaaS – EUDAT
- SaaS – European Bioinformatics Institute Services

And we still use the "old" systems:

- Grid
- HPC

# Resources – National Level

- AVITOHOL - A HPC system with TPF: 412.3 TFlop/s
  - 150 HP Cluster Platform SL250S GEN8 servers with 2 Intel Xeon Phi 7120P coprocessors.
  - 20700 Cores
  - FDR Infiniband interconnection
  - 95 TB Storage system
- HPCG - High-Performance Grid Cluster
  - HP Cluster Platform Express 7000 enclosures with 36 blades (576 CPUs) - 3 TFlop/s
  - 16 NVIDIA Tesla M2090 graphic cards - 10.64 TFlop/s
  - 8 Intel Xeon Phi 5110P Coprocessors - 8 TFlop/s
  - 132 TB Storage system

# Resources – Regional Level

| HPC | Cloud | Grid | Storage |
|---|---|---|---|
| ARIS (Greece)<br>Cy-Tera (Cyprus)<br>PARADOX (Serbia)<br>NIIFI SC (Hungary)<br>Leo (Hungary)<br>InfraGRID (Romania)<br>ICAM BlueGene/P (Romania)<br>UPT-HPC (Albania)<br>MK-03-FINKI (FYROM)<br>Armcluster (Armenia)<br>BA-HPC (Egypt)<br>Gamma (Jordan)<br>Zaina (Jordan)<br>IMAN1-Booster/King (Jordan) | Okeanos (Greece)<br>CyI Cloud Facility (Cyprus)<br>InfraGRID Cloud (Romania)<br>UPT-Cloud (Albania)<br>ETFBL-CC01 (Bosnia)<br>MK-04-FINKI_CLOUD (FYROM)<br>MD-RSC (Moldova)<br>IIAP Cloud (Armenia)<br>IUCC InfinityCloud (Israel) | Hellas Grid (Greece)<br>AEGIS01-IPB-SCL (Serbia)<br>MK-03-FINKI (FYRoM)<br>MREN01CIS (Montenegro)<br>MD-GRID (Moldova)<br>ArmCluster (Armenia)<br>GE-01-GRENA (Georgia) | ARIS (Greece)<br>ONYX, Cy-Tera (Cyprus)<br>PARADOX (Serbia)<br>NIIFI HSM Service (Hungary)<br>NIIFI iSCSI Service (Hungary)<br>UVT HPC GPFS (Romania)<br>ETFBL-CS01 (Bosnia)<br>MK-04-FINKI_CLOUD (FYROM)<br>RENAMstor (Moldova)<br>IIAP (Armenia)<br>BA-IA (Egypt)<br>IUCC-InfinityCloud-Storage (Israel) |

# Resources – Regional Level

Vi-SEEM

| Resource | Country Code | Total | | | Dedicated (hours per year) | | |
|---|---|---|---|---|---|---|---|
| | | CPU-cores | GPU-cores | Phi-cores | CPU-hours | GPU-hours | Phi-hours |
| | GR | 8,520 | 253,440 | 2,196 | 7,038,000 | 4,625,280 | 120,231 |
| | CY | 1,392 | 16,128 | - | 1,223,597 | 16,953,754 | - |
| | BG | 2,400 | - | 18,300 | 2,110,000 | - | 16,030,800 |
| | RS | 1,696 | 108,544 | - | 1,000,000 | 47,542,272 | - |
| | HU | 768 | - | - | 421,882 | - | - |
| | HU | 1,344 | 628,992 | - | 588,672 | 275,498,496 | - |
| | RO | 456 | 3,136 | | 798,912 | 5,494,272 | - |
| | RO | 4,096 | - | - | 7,176,192 | - | - |
| | AL | 144 | - | - | 126,144 | - | - |
| | MK | 768 | - | - | 336,384 | - | - |
| | AR | 128 | - | - | 112,128 | - | - |
| | EG | 1,968 | - | - | 3,447,936 | - | - |
| | JO | 8 | 2,496 | - | 70,080 | 21,864,960 | - |
| | JO | 56 | - | - | 147,168 | - | - |
| **Total** | | **23,744** | **1,012,736** | **20,496** | **24,597,095** | **371,979,034** | **16,151,031** |

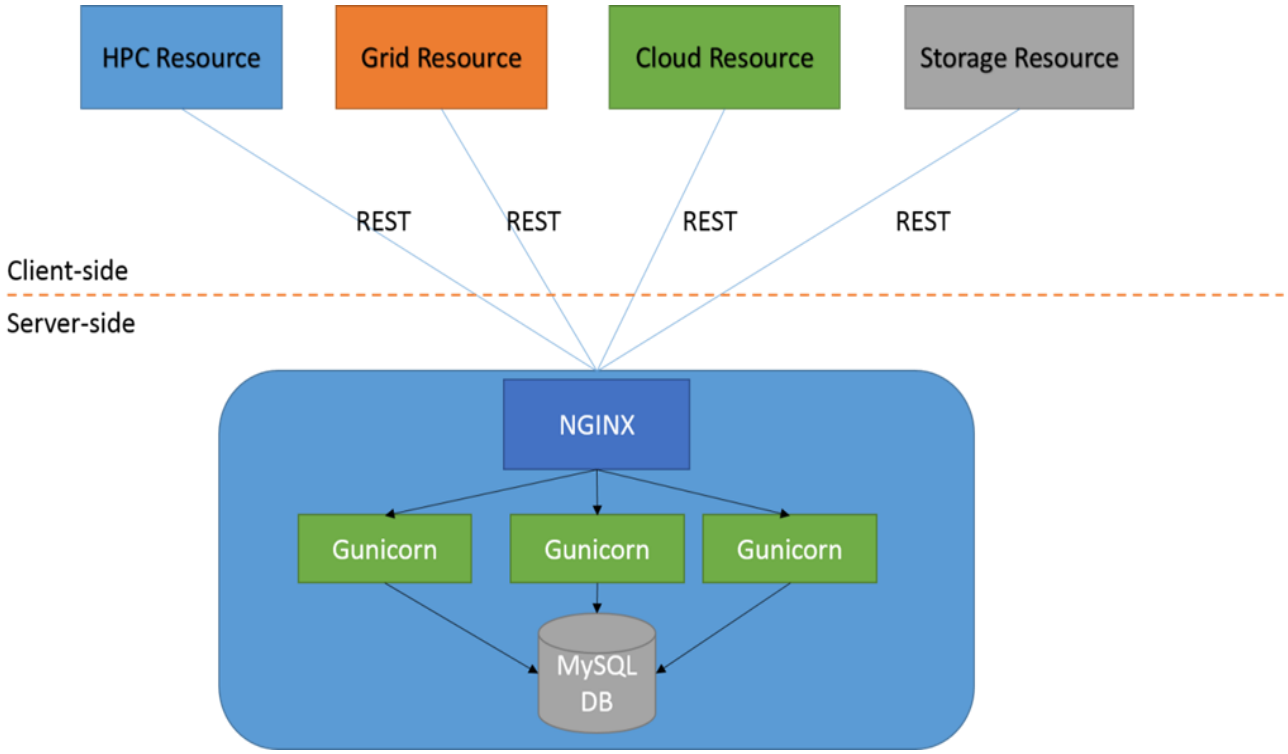
# Requirements

- Support at least 4 resource types: HPC, Grid, Storage and Cloud
- Easy data collection and data resubmission
- Easy integration for new resource types
- Intuitive user interface
- Easy data extraction for reporting
- Easy integration to different project requirements – like user authentication and authorization

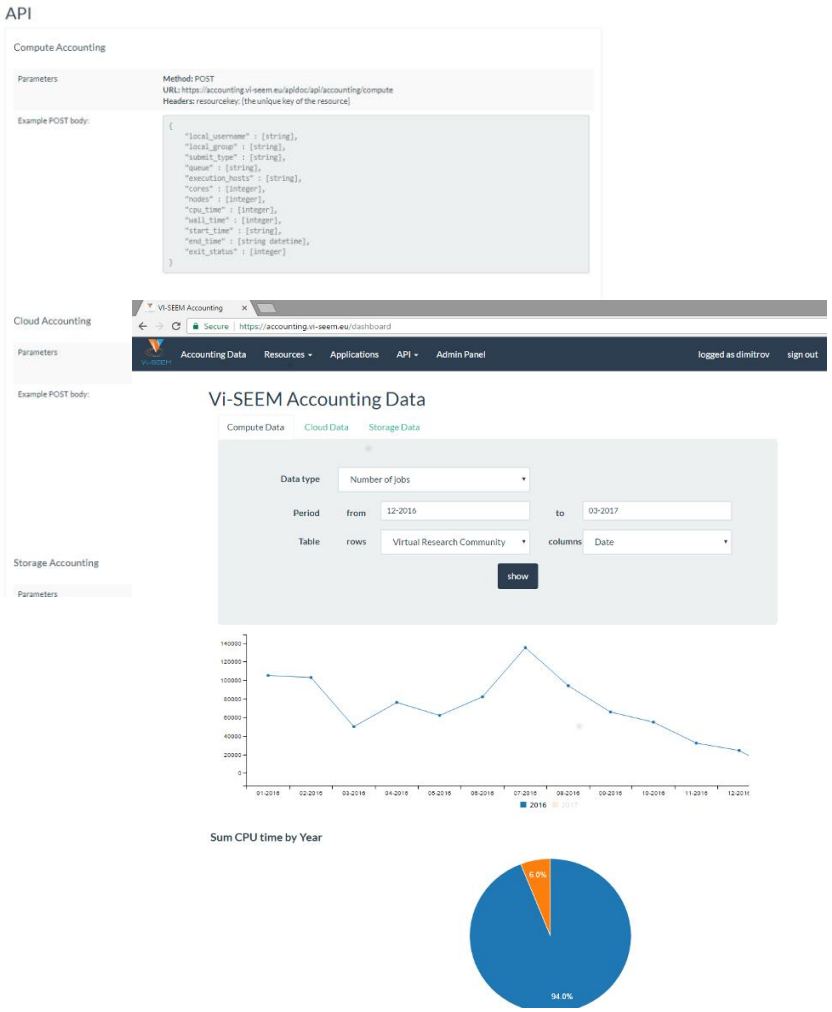
# Architecture Backend

Technologies:

- NGINX
- Gunicorn
- Flask, Python
- MySQL DB
- Docker

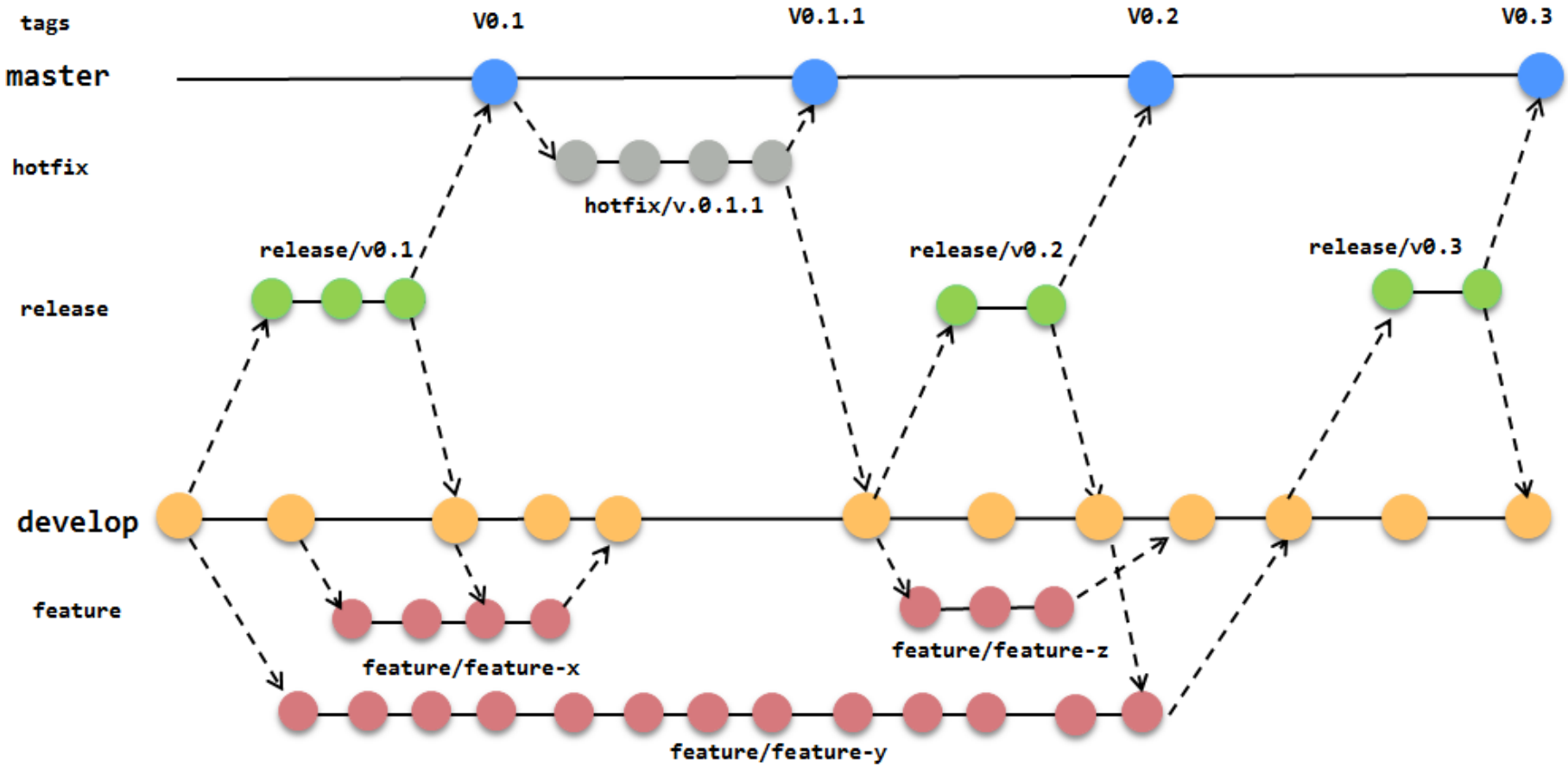


# Architecture User Interface

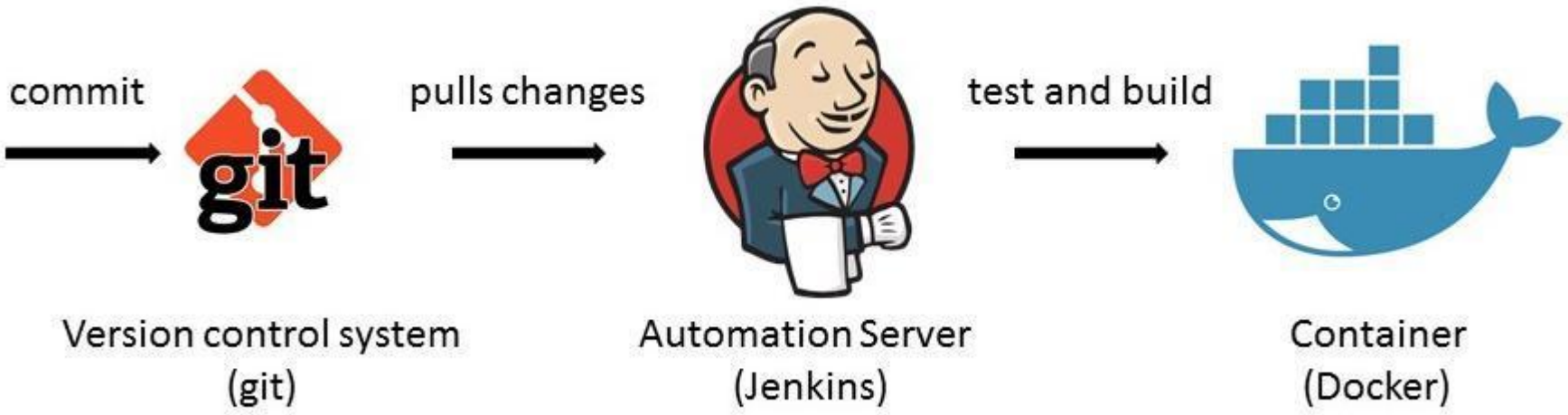



- Build with Flask and JS and C3JS
- Capable of visualizing the data in dynamic OLAP style
- Supports standard data exports like (CSV, Excel and etc.)
- Supports two authentication and authorization types:
  - Local user management
  - Single Sign-On (SSO) - Security Assertion Markup Language (SAML 2.0 ) via VI-SEEM Identity Providerv

# Development Process – Git Flow



# Continious Integration



# Thank you !