DIRAC services at CC-IN2P3

Development in EGI-ACE project

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1: CC-IN2P3
2: CPPM

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Dissemination level: Public

Disclosing Party: EGI-ACE Dirac team

Recipient Party: DIRAC community

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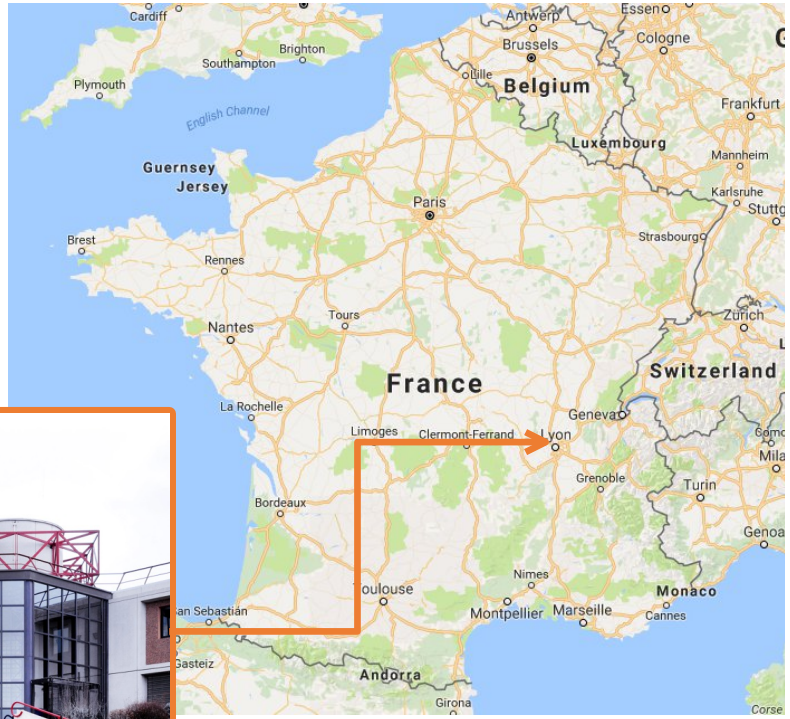
Overview

- Introduction
  - EGI-ACE and France-Grilles projects
  - DIRAC Interware
- Platforms description
  - Main 2021 event:
    EGI-WMS migration from CYFRONET (Krakow) to CC-IN2P3 (Lyon)
- Use case examples
  - Management of different usage policy and/or computing models
  - REST API
  - Development framework
- Conclusion

CC-IN2P3 at a glance

- Academic data center in Lyon, France
  - Compute (37kslots)
  - Storage (Disk 25 PB, MSS 80 PB)
  - IT services
- LHC Tier-1+ many other experiments (~70)
  - Mainly HEP but not only
- Hosting EOSC/EGI services
  - Operation portals
  - EGI WMS
- Hosting FG service
  - DIRAC

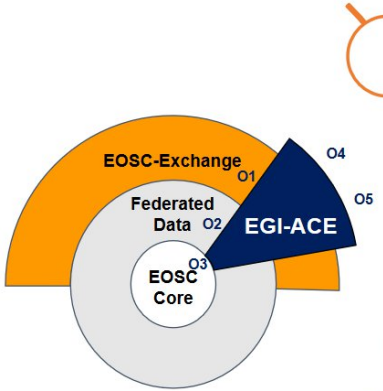


Communities

FRANCE GRILLES

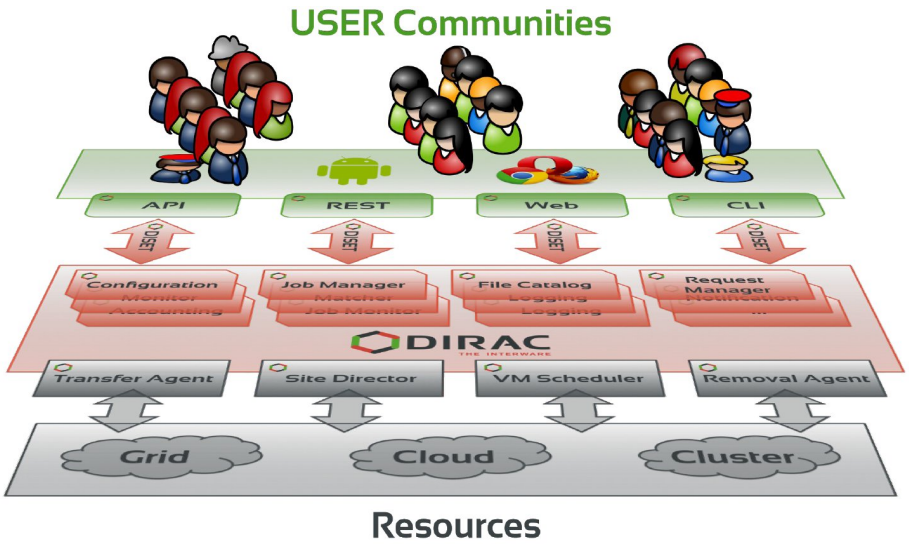
Building and operating a multidisciplinary national Distributed Computing Infrastructure open to all sciences and to developing countries

Implement the **Compute Platform of the European Open Science Cloud** and contribute to the **EOSC Data Commons** by delivering integrated computing, platforms, data spaces and tools as an integrated solution.



- Objective 1. Deliver the European Open Science Cloud Compute Platform and expand the supply-side
- Objective 2: Contribute to the implementation of the EU Data Strategy and the EOSC Data Commons to support the Green Deal, Health and Fundamental Research
- Objective 3: Integrate the EOSC Compute Platform with the EOSC Portal and the EOSC Core
- Objective 4: Contribute to the realization of a global Open Science Cloud
- Objective 5: Expand the demand-side of EOSC across sectors and disciplines

DIRAC Interware



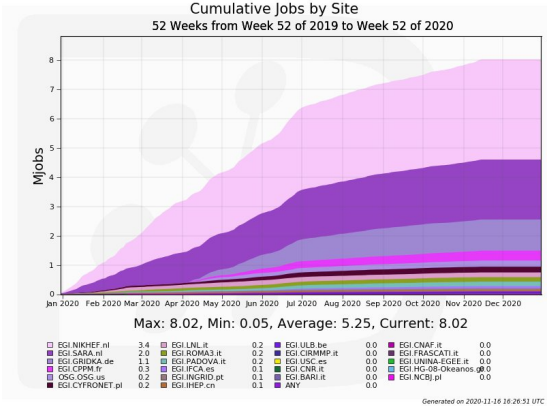
http://diracgrid.org

- Development team in CPPM
- A software framework for distributed computing
- Builds a layer between users and resources
- A complete solution to one or more user community

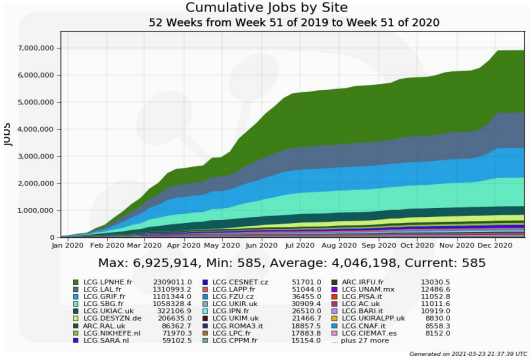
- One of the services in the EOCS Marketplace Catalogue
  https://marketplace.eosc-portal.eu/services/egi-workload-manager

EGI & FG service infrastructures

- EGI WMS hosted by CYFRONET
  - 5 medium size VM servers
  - 3TB storage
  - MySQL database service
  - ~8 million user jobs in 2020

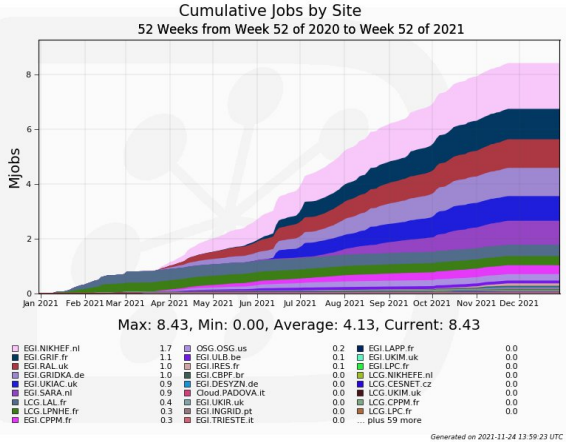


- WMS service provided by France-Grilles NGI (CC-IN2P3)
  - 7 medium size VM servers
  - 2TB storage
  - MySQL database service
  - ~7 million user jobs in 2020



EGI WMS in CC-IN2P3

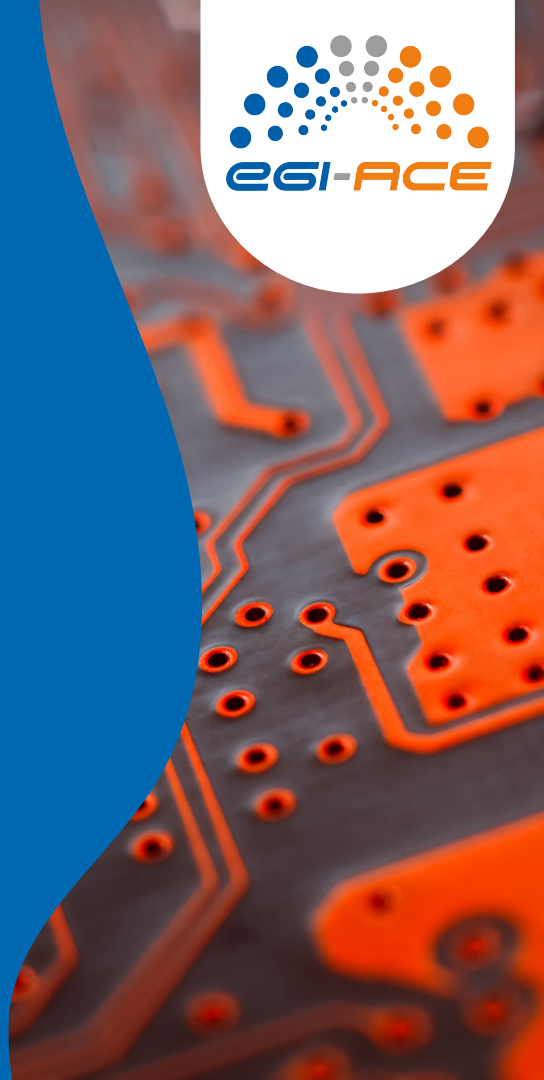
- From January (EGI-ACE kick-off) to March 2021
  - Migration WMS from CYFRONET to CC-IN2P3
- Migration result for EGI and FG
  - Optimized maintenance and operations
  - Single administrator team (CC-IN2P3 + CPPM +…)
- Combined service inherited all the communities
  - 43 registered VOs
  - ~700 registered users
  - Accessible via the same endpoint: https://dirac.egi.eu/DIRAC/
- Evolution and consolidation...



- EGI & FG in CC-IN2P3
  - 11 VM servers
  - 8TB storage
  - MySQL database service
  - Elasticsearch service

Use case examples

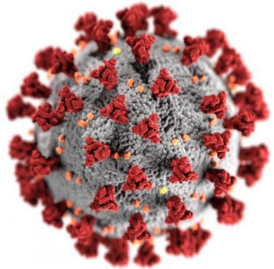
- *WeNMR*
- *Virtual Imaging Platform*
- *Pierre Auger Observatory*
- *OpenMOLE*
- *ConCORDIA*

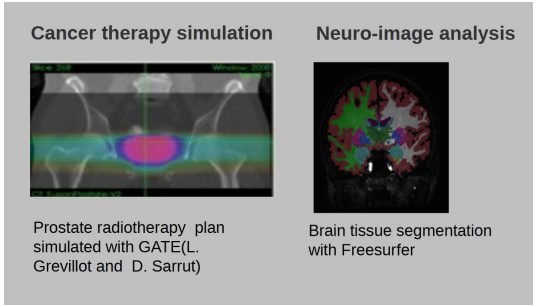


Different usage policies and computing models

A quick overview – some more information in the backslides

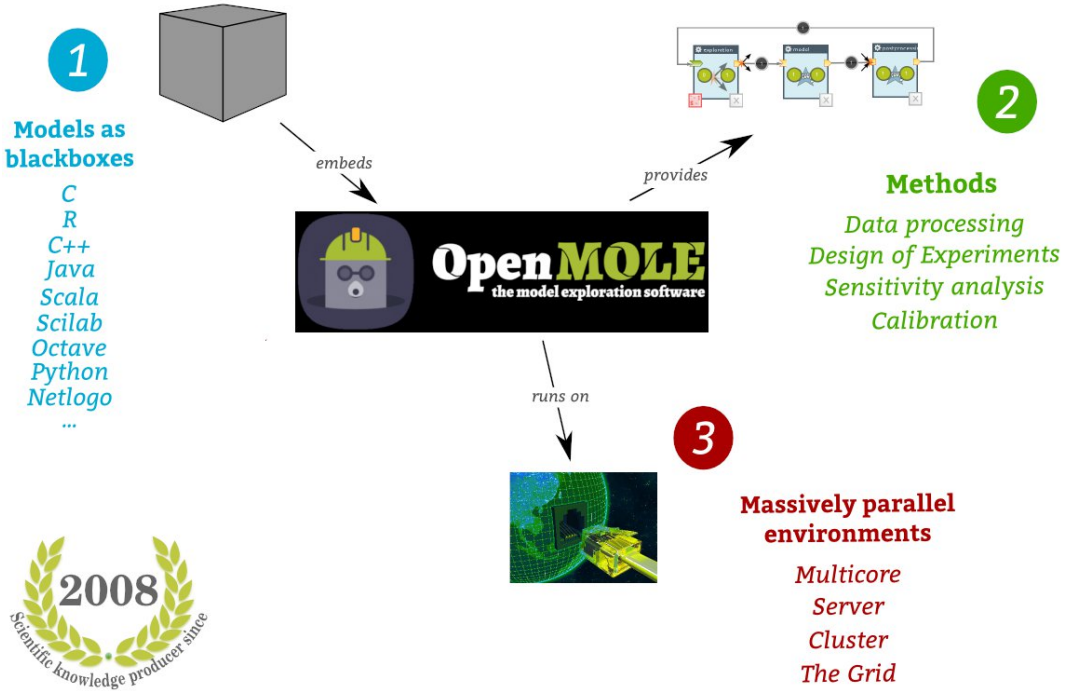
- WeNMR Collaboration
  - COVID-19 tag allowed high resources exploitation
- Virtual Imaging Platform
  - Cloud computing (GPU)
- Pierre Auger Observatory
  - Several hours to week long simulations





OpenMOLE

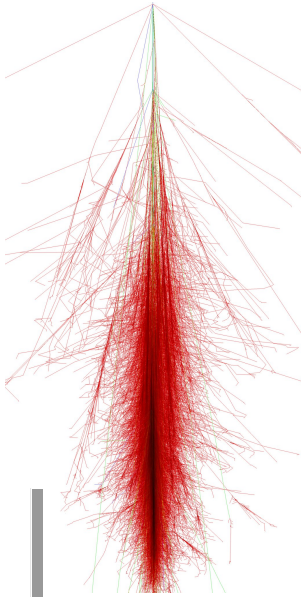
- Workflow engine for the distributed exploration of models



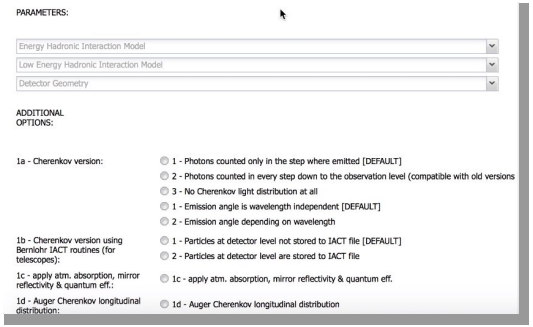
- Use of EGI-WMS (through REST-API):
  - Job submission
  - Automatic user registration
  - Monitoring and accounting

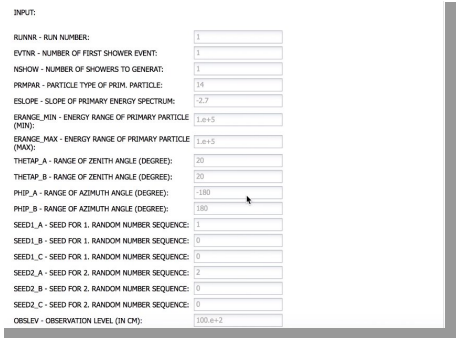
ConCORDIA (DIRAC in ESCAPE)

a DIRAC extension to produce simulations of cosmic ray air showers

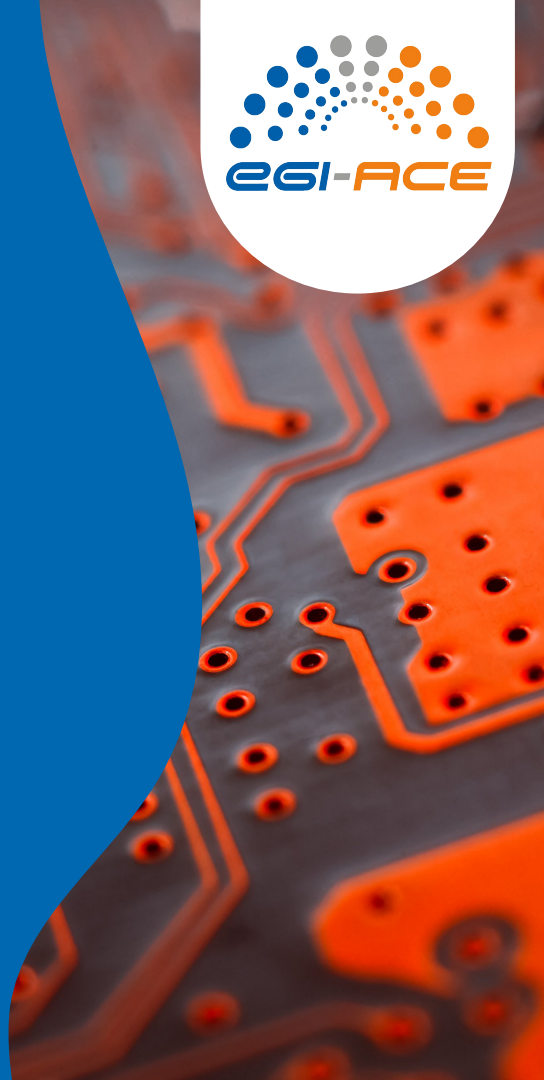


- Provide a common simulation tool between experiments
  - Singularity containers to be deployed on the GRID
- Integrated as a DIRAC WebApp
  - Access to GRID job submissions and existing resources utilities
- EGI resources for DIRAC access
  - First developments in the EGI DIRAC-client docker
  - First tests on EGI-connected resources
- Work in progress…





Conclusion



Summary

Present and future features

- Oauth/OIDC Authentication
  - ESCAPE, EISCAT,…
- Jupyter Notebooks Interface (EGI requirement)
  - EISCAT,…
- EGI clouds
  - VIP (biomed VO), CTA,…
- REST API
  - OpenMOLE, FG community,…
- iRODS access & Payload proxy renewal for very long jobs
  - auger VO,…
- ConCORDIA
  - KM3Net, CTA,… astroparticle communities

EGI-ACE Call for Use Cases

https://www.egi.eu/projects/egi-ace/call-for-use-cases/

- Who should apply
  - International researchers, research projects, communities and infrastructures, as well as national research groups needing services and support for:
    - Large-scale data processing, scientific analysis, visualization
    - Hosting data analysis platforms and applications in the cloud
    - Federate and make accessible community-specific compute services in EOSC
- Timeline
  - The call is kept open during 2021 and 2022.
  - Cut-off dates with 2-monthly frequency, followed by the evaluation (within 1 month) of the submitted applications.

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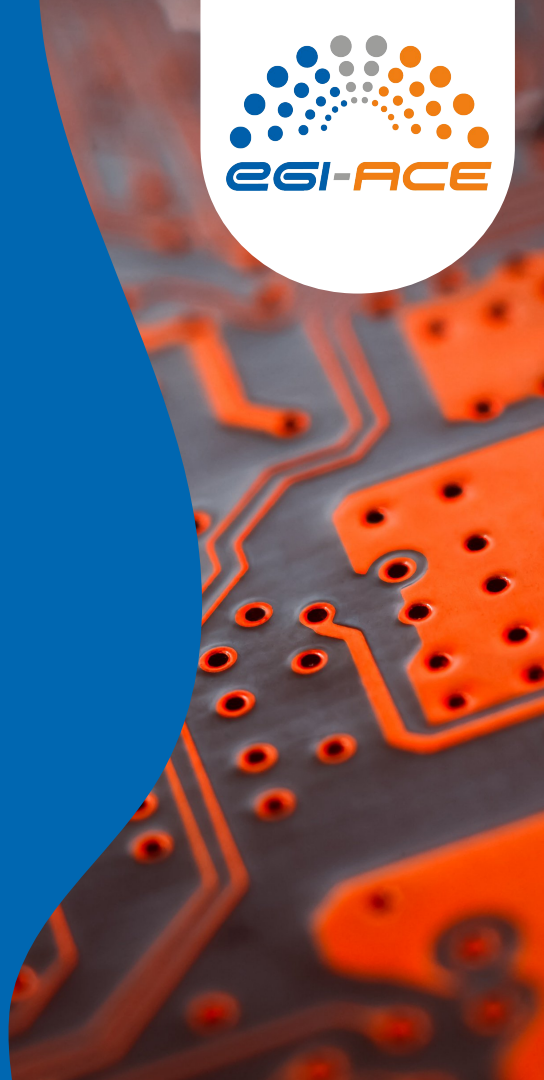
- France-Grilles community, FG-DIRAC service admins, FG animation team.
- Experiences cited in use cases

Thank you for your time

Any questions?



Thank you!

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Website: **www.egi.eu/projects/egi-ace**

EGI Foundation

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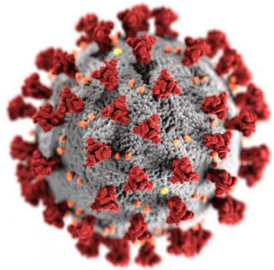
WeNMR response to COVID-19 challenge

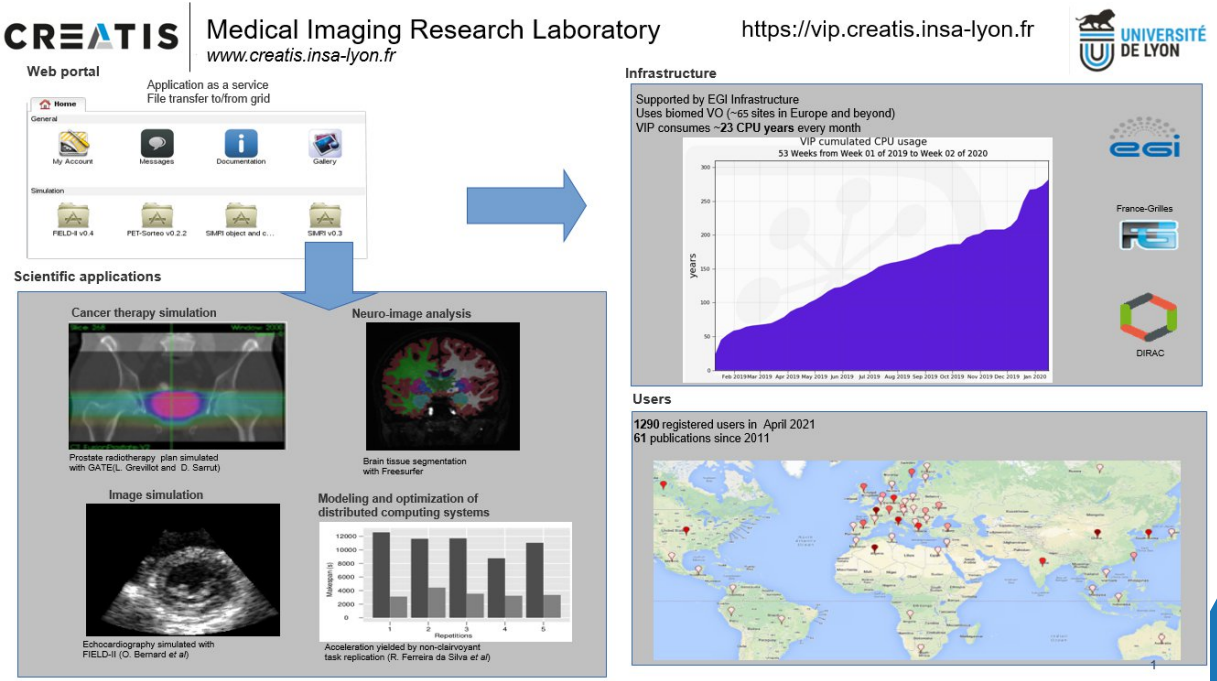
- Multiple centres provided resources related to the COVID-19 research
- OSG admins created a special HTCondorCE gateway
  - Quickly connected to EGI WMS
- WLCG centres opened access to WeNMR payloads
  - Centre de Physique des Particules de Marseille (CPPM)
  - Karlsruhe Institute of Technology
  - Spanish LHCb Tier2 site (USC-LCG2)
- CYFRONET provided 5TB disk storage for WeNMR data
  - An S3 storage plugin was developed by the DIRAC team to integrate it into the infrastructure
- COVID-19 tag to allow high priority on the WMS



Virtual Imaging Platform

Mutualizes object models and medical image simulators, provides access to distributed computing and storage resources

- EGI-WMS (biomed VO)
  - Job submission & monitoring
  - Data management
- Growing needs
  - Cloud computing (GPU)
  - Local cluster integration



Pierre Auger Observatory

- Observation of new particle physics phenomena (~100TeV scale)
  - Extensive simulation libraries are needed!
- Resources
  - DFC at CESNET (Prague)
  - 15 sites supporting VO auger
  - Data accessible via iRODS (Lyon)
- CORSIKA simulations
  - Hundreds of MB output files / ~1 GB memory
  - Several hours to week long simulations
- Future productions
  - Adding radio components or air showers to simulations
    - Considering using MPI (10-20 cores)
  - Offline simulations (Input: CORSIKA simulations files)