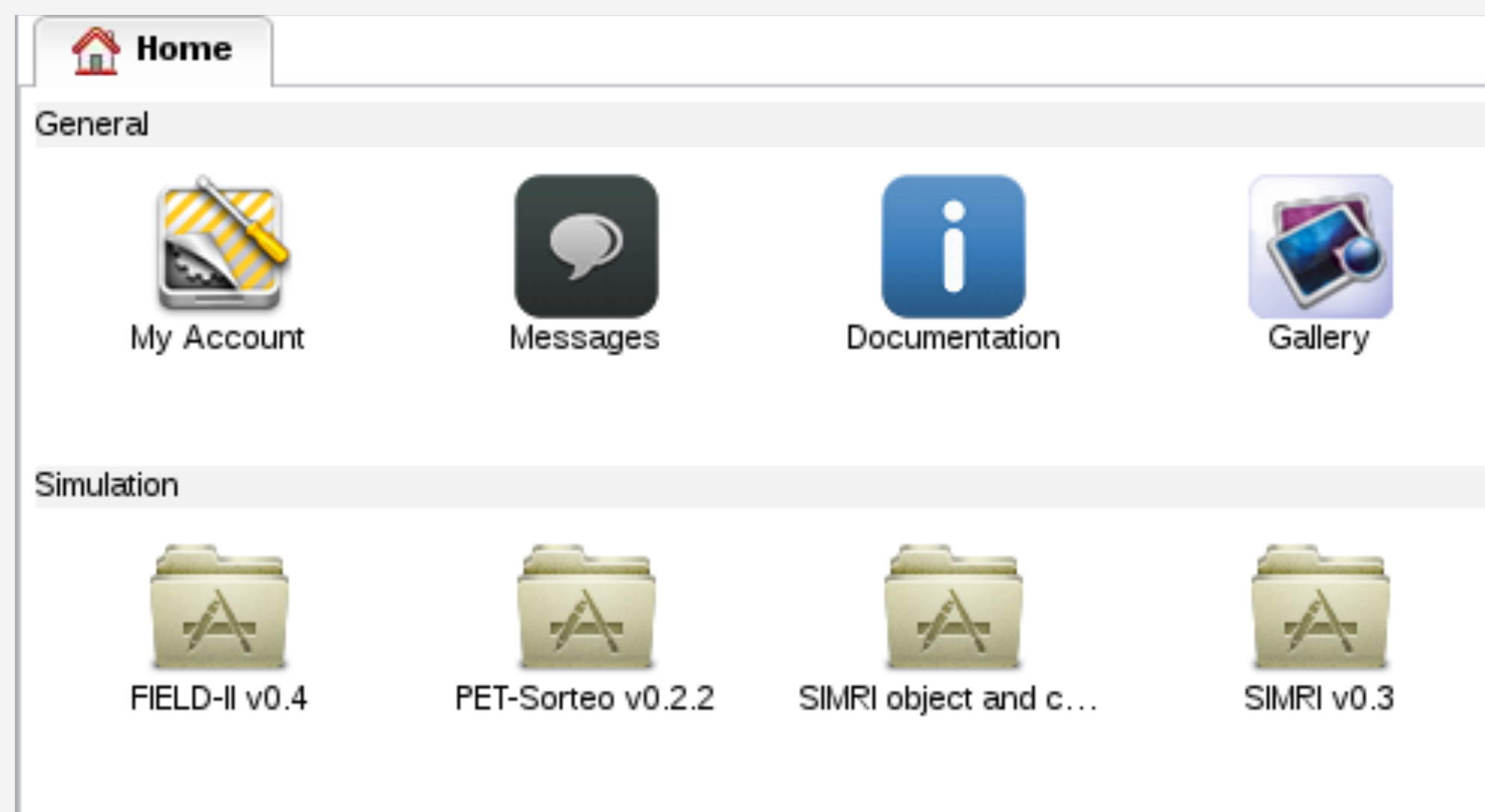


Virtual Imaging Platform (VIP)

Summary

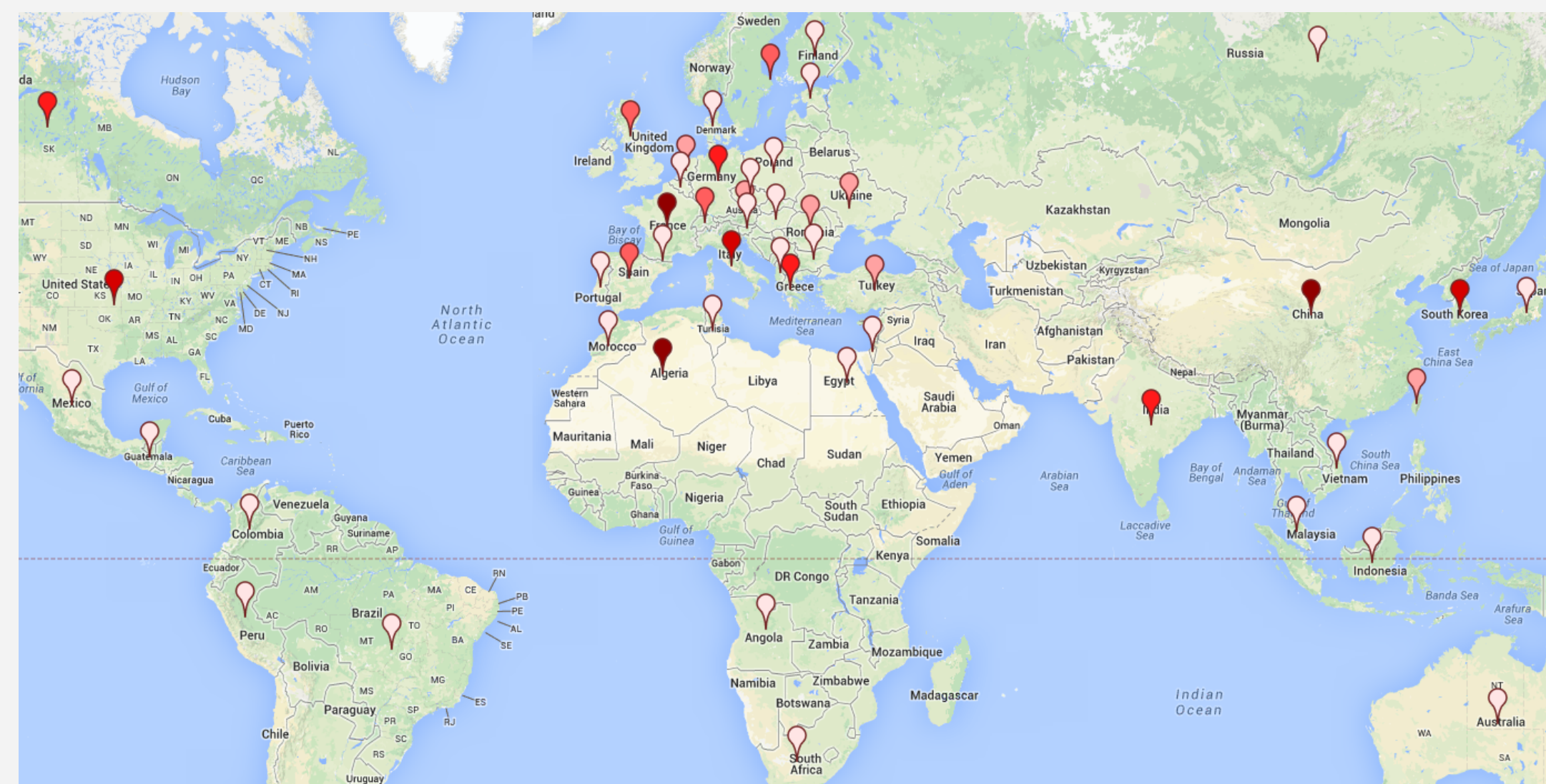
- VIP is an open platform for high-throughput medical simulation and data processing.
- Web portal available at <https://vip.creatis.insa-lyon.fr>



- T. Glatard, C. Lartzien, B. Gibaud, R. Ferreira da Silva, ... , and D. Friboulet, "A Virtual Imaging Platform for multi-modality medical image simulation", IEEE Transactions on Medical Imaging, vol. 32, no. 1, pp. 110-118, 2013.

Users

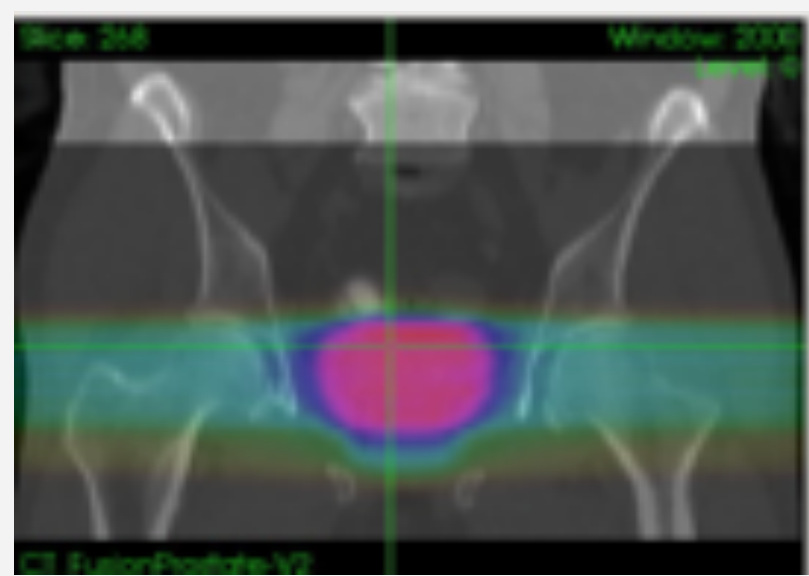
- 739 registered users (Jan 2015)
 - 500 for Monte-Carlo simulation with GATE
 - 241 for neuroimaging with FSL and Freesurfer
- 26 publications in journals (16) and conferences (10) since 2011



Geographical distribution of users

Applications

Monte-Carlo simulation



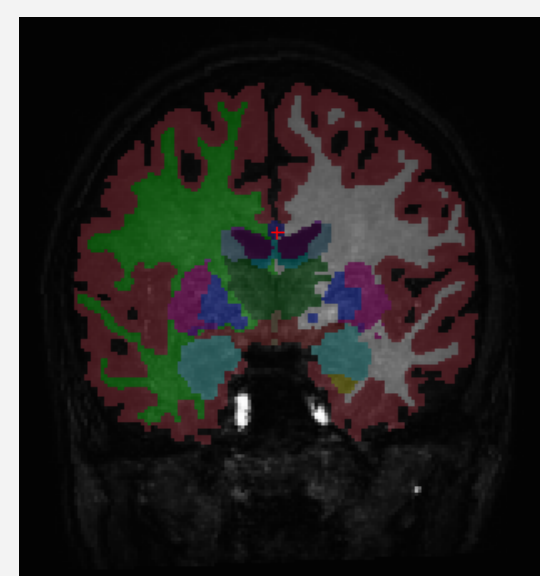
Prostate radiotherapy plan simulated with GATE (L. Grevillot and D. Sarrut)

Image simulation



Echocardiography simulated with FIELD-II (O. Bernard et al.)

Neuroimage analysis



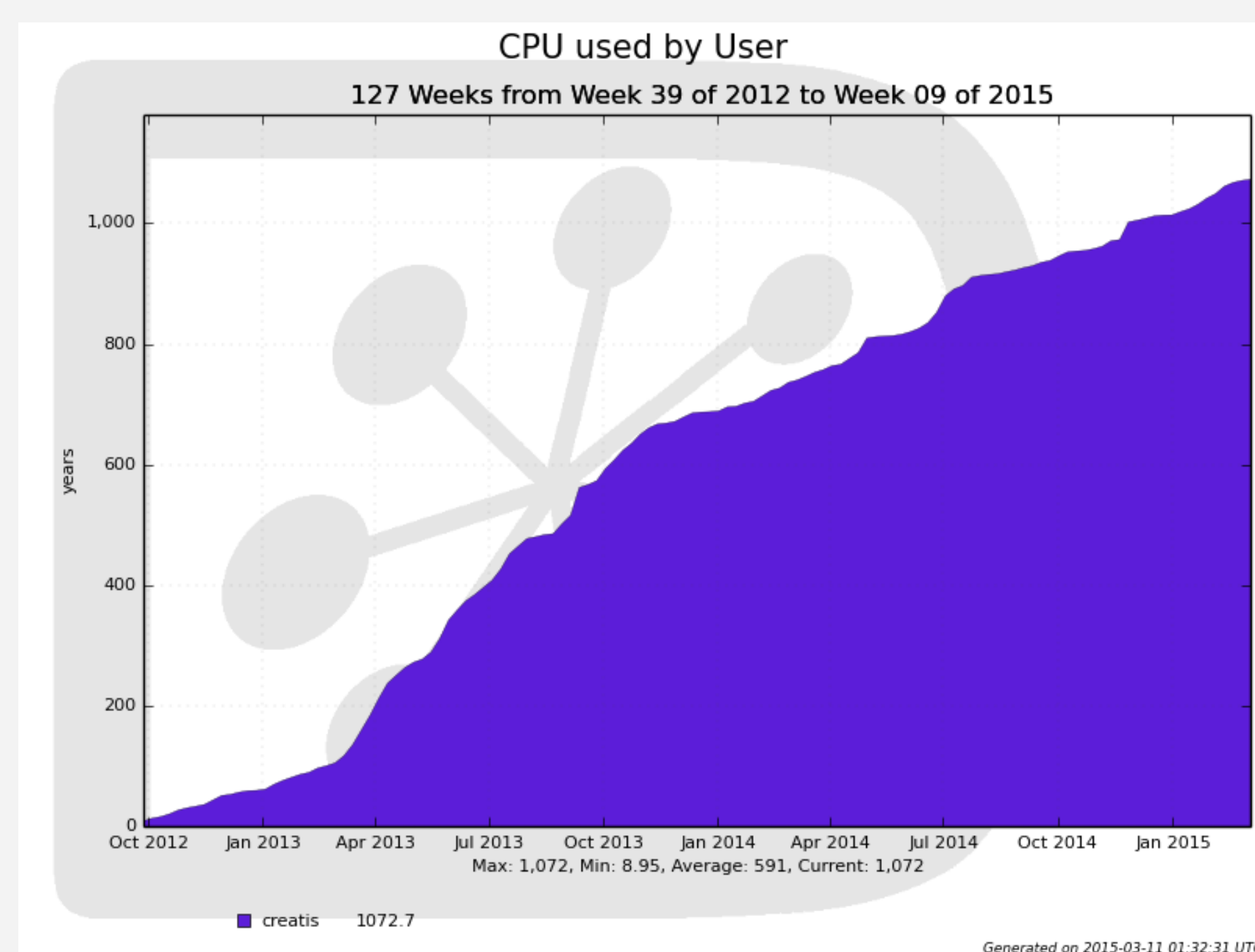
Brain tissue segmentation with Freesurfer

Available tools

- Simulation**
 - Multi-modality
 - Gate
 - Sindbad
 - MRI
 - SIMRI, SimuBloch, DWI
 - Ultrasound
 - FIELD-II, CREANUIS
 - PET
 - PET-SORTEO
- Neuroimaging**
 - FSL (7 tools)
 - Freesurfer (2 tools)
 - France-Life Imaging tools
- Other**
 - Mean-Shift segmentation
 - Liver cartography

Infrastructure

- Supported by EGI Infrastructure
- Uses biomed Virtual Organization (~100 sites in Europe and beyond)
- Consumes ~32 CPU years every month



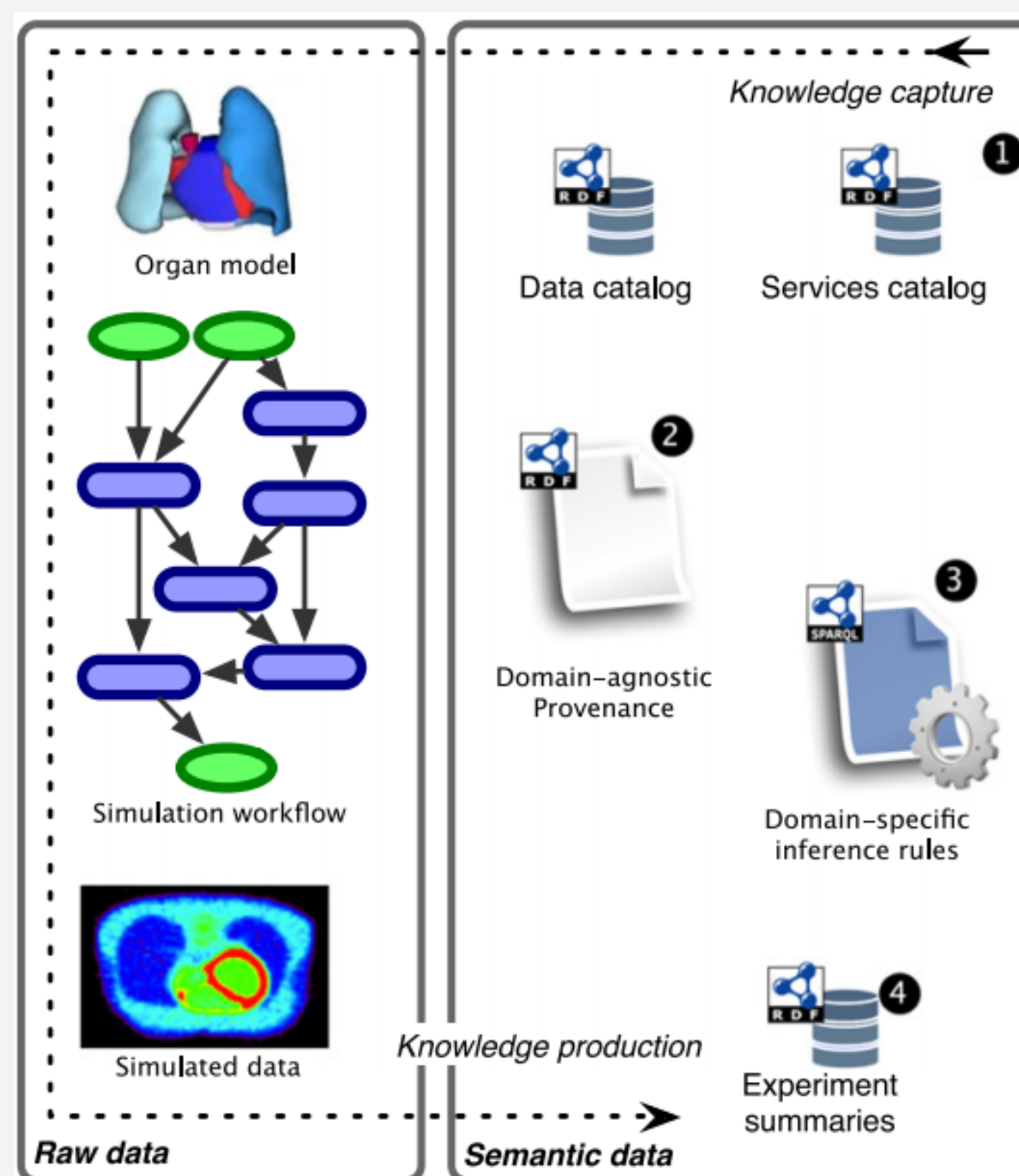
Cumulative CPU time consumed



France-Grilles



Semantic annotation



Data provenance

- A. Gaignard, J. Montagnat, B. Gibaud, et al., "Domain-specific summarisation of Life-Science e-experiments from provenance traces", Journal of Web Semantics, vol. 29, pp. 19--30, 12/2014.

Ontology

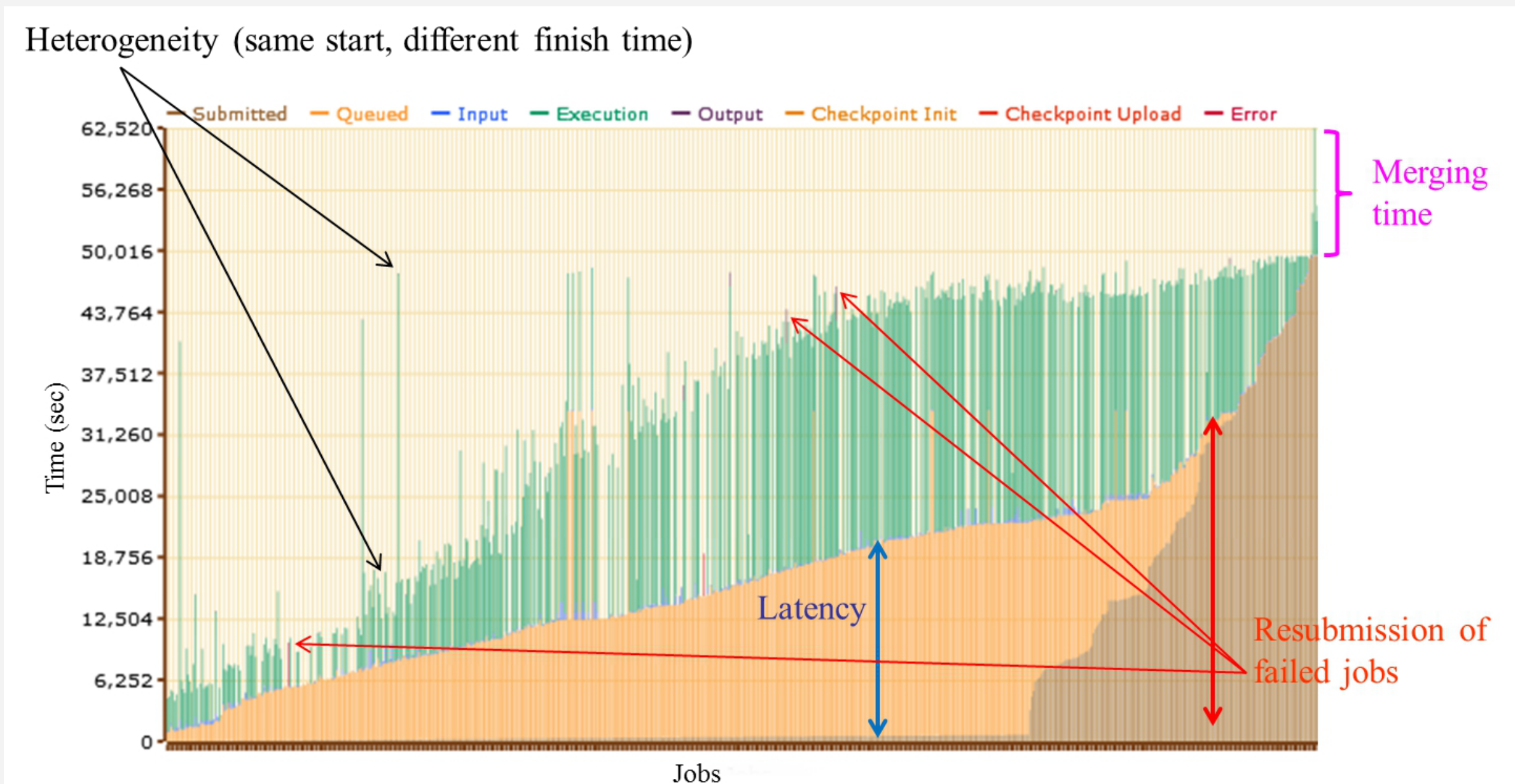
- B. Gibaud, G. Forestier, et al., "OntoVIP: an ontology for the annotation of object models used for medical image simulation", Journal of Biomedical Informatics, vol. 52, pp. 279-292, 2014.

Assisted workflow design

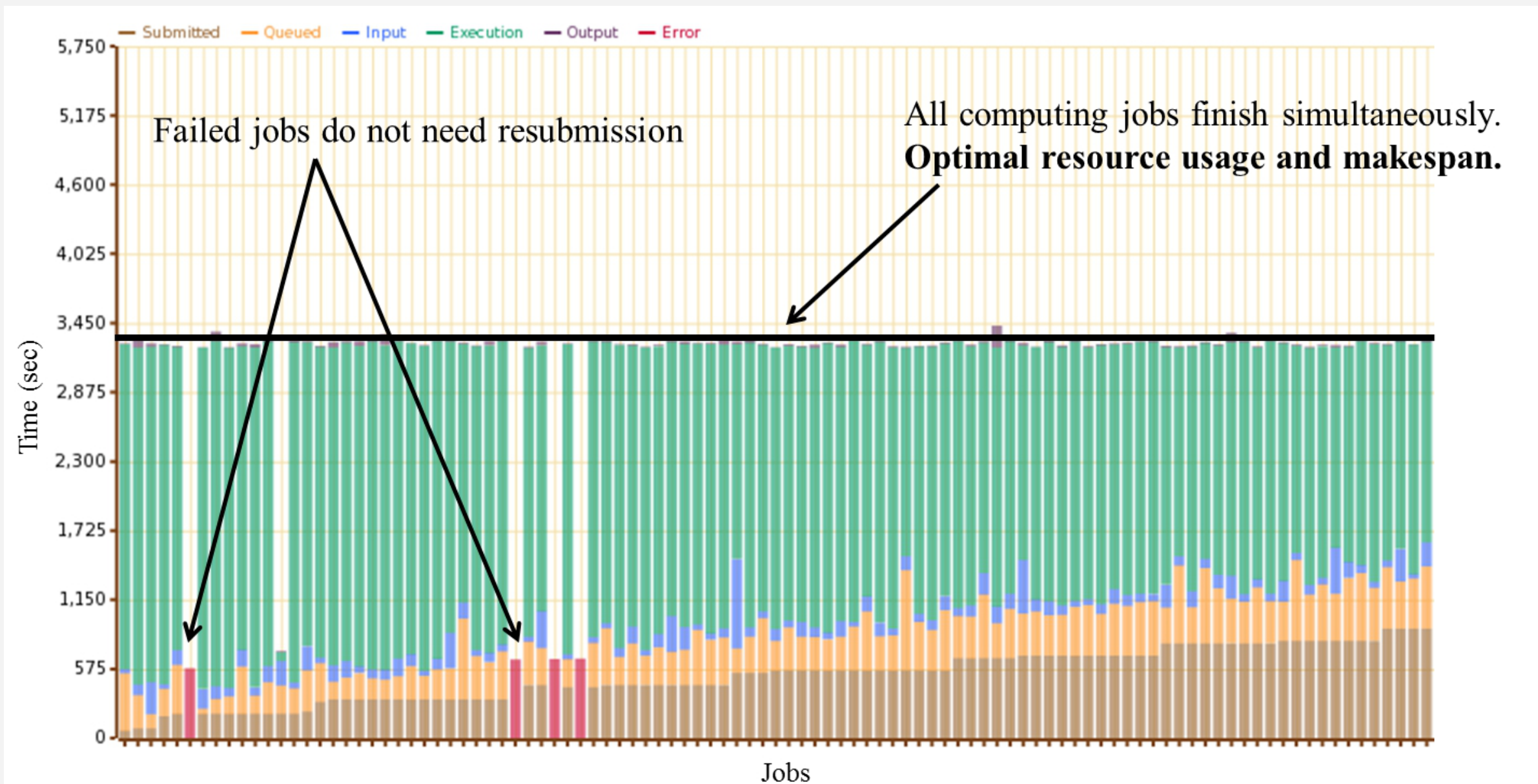
- N. Cerezo, J. Montagnat, M. Blay-Fornarino. Computer-assisted Scientific Workflow Design, Journal of Grid Computing September 2013, Vol. 11, Issue 3, pp 585-612.

Load balancing

Before



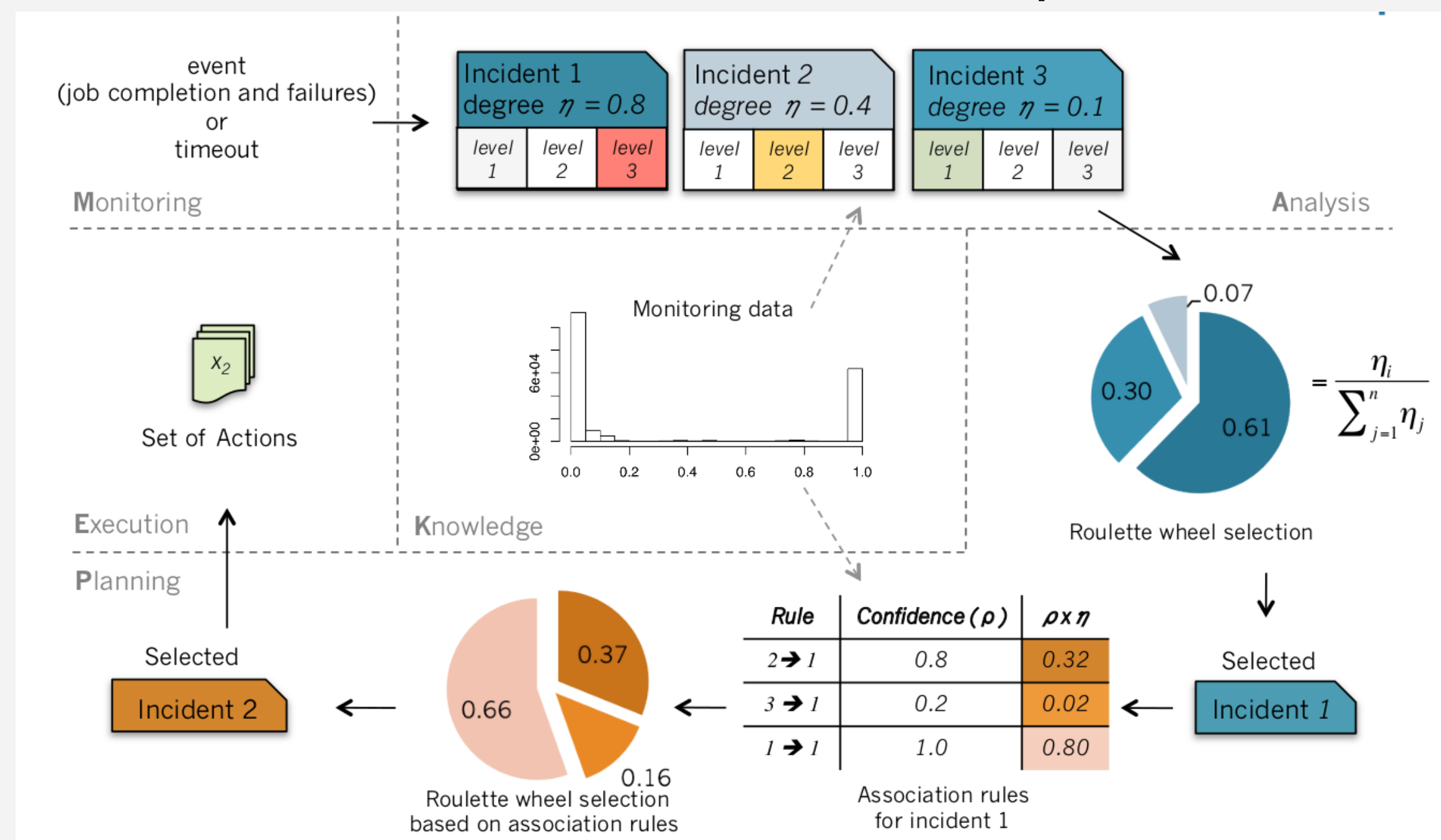
After



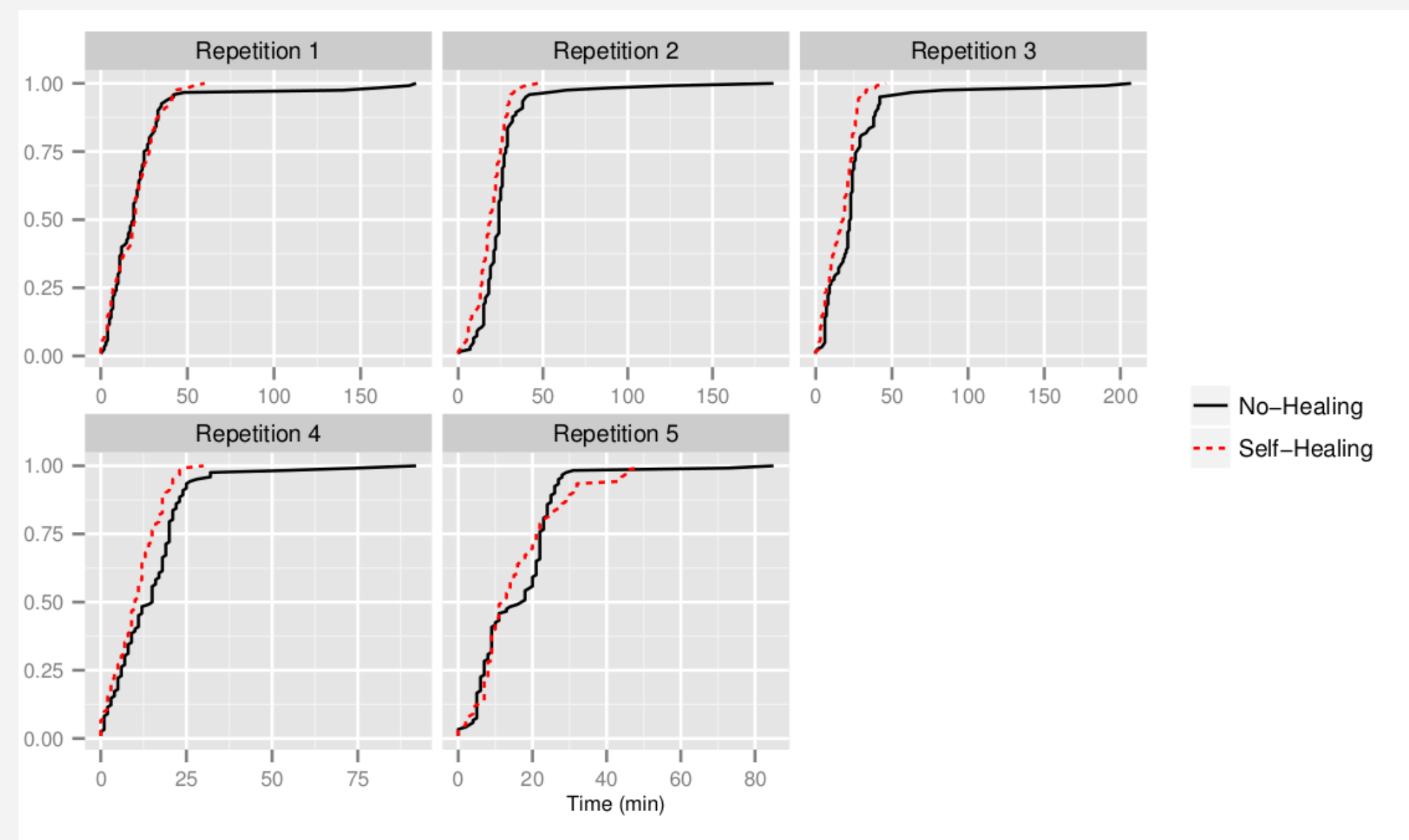
- S. Camarasu-Pop, T. Glatard, R. Ferreira da Silva, P. Gueth, D. Sarrut, and H. Benoit-Cattin, "Monte-Carlo Simulation on Heterogeneous Distributed Systems: a Computing Framework with Parallel Merging and Checkpointing Strategies", Future Generation Computer Systems, vol. 29, no. 3, pp. 728--738, 03/2013.
- S. Camarasu-Pop, T. Glatard, J. T. Moscicki, H. Benoit-Cattin, and D. Sarrut, "Dynamic partitioning of GATE Monte-Carlo simulations on EGEE", Journal of Grid Computing, vol. 8, no. 2, pp. 241-259, 03/2010.

Self-administration

MAPE-K self-administration loop



Application to the handling of blocked tasks



- R. Ferreira da Silva, T. Glatard, and F. Desprez, "Controlling fairness and task granularity in distributed, online, non-clairvoyant workflow executions", Concurrency and Computation: Practice and Experience, vol. 26, no. 14, pp. 2347-2366, 2014.
- R. Ferreira da Silva, T. Glatard, and F. Desprez, "Self-healing of workflow activity incidents on distributed computing infrastructures", Future Generation Computer Systems, vol. 29, no. 8, pp. 2284-2294, 10/2013.

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