



Self-Organising, Self-Managing Heterogeneous Cloud

Results

Project Information

CloudLightning

Grant agreement ID: 643946

[Project website](#)

DOI

[10.3030/643946](https://doi.org/10.3030/643946)

Project closed

EC signature date

15 December 2014

Start date

1 February 2015

End date

31 January 2018

Funded under

INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

Total cost

€ 3 957 050,00

EU contribution

€ 3 934 425,00

Coordinated by

UNIVERSITY COLLEGE CORK -
NATIONAL UNIVERSITY OF
IRELAND, CORK



Ireland

CORDIS provides links to public deliverables and publications of HORIZON projects.

Links to deliverables and publications from FP7 projects, as well as links to some specific result types such as dataset and software, are dynamically retrieved from [OpenAIRE](#) .

Deliverables

[Documents, reports \(23\)](#)



[Simulation execution and evaluation](#)

D7.2.1 Simulation execution and evaluation. (Due date - month33)

[Evaluation](#)

D3.3.1 Evaluation Report. (Due date - month 36)

[D2.3.1 Report on use case testing](#)

This report will describe the testbed environment that is being used for evaluation and the results of execution of the use case applications on the testbed.

[Local Decision Strategies](#)

D4.2.1 Local Decision Strategies. (Due date - months 12,18)

[Service Description Format](#)

D5.1.1 Service description format specification. (Due date - month15)

[D8.3.2 Report on CloudLightning Concertation](#)

A follow-up deliverable to D8.3.1, this report will provide updates on targets, detailed figures and progress towards implementing the concertation plan.

[D8.1.3 Exploitation Plan and Strategic Guidelines for Exploitation](#)

A separate report relating to the outputs from the Delphi Method research Task 8.1.1 Industry Exploitation.

[Gateway Service](#)

D5.2.1 Gateway service. Due date (month 24)

[Gateway service user interface](#)

D5.3.1 Gateway service user interface. (Due date - month30)

[Coalition Formation](#)

D4.3.1 Coalition Formation. (Due date - month20)

[Prototype Specification and API](#)

D4.1.1 Protocol specification and API. (Due date - month12)

[Simulation Report](#)

The simulation report that will constitute all results obtained from the exhaustive experimentation on large scale simulations. The report will constitute qualitative metrics along with the results of several parameterised executions, mainly resulting from the testbed of WP2. Theoretical models will accompany the results for validation purposes in order to predict the behaviour of the proposed models

of even larger scale executions. The results of simulation execution will validate the proposed methodology against the initial project objectives.

[D8.1.1 Exploitation Plan and Strategic Guidelines for Exploitation](#)

The first deliverable will provide details about the exploitation plan and Strategic Guidelines for exploitation as laid out in Task 8.1.

[D8.2.3 CloudLightning Dissemination](#)

The final report under Task 8.2 will provide updates on targets, detailed figures and progress towards the implementation of the dissemination strategy, including a review of all dissemination activities undertaken during the project.

[D8.3.3 Report on CloudLightning Concertation](#)

The final report will include a review of all concertation activities undertaken during the project under Task 8.3.

[D8.1.4 Exploitation Plan and Strategic Guidelines for Exploitation](#)

This final report will include a review of all exploitation activities undertaken during the project including updates on targets, detailed figures and progress towards implementing the exploitation strategy.

[Large scale modelling and simulation framework](#)

D7.1.1 - Large scale modelling and simulation framework. (Due date - month29)

[Integration](#)

D3.2.1 Final Integration Plan (Due date - month 30)

[Service Deployment and Management](#)

D4.4.1 Service Deployment and Management.(Due date - month21)

[D8.2.1 CloudLightning Dissemination](#)

The first deliverable will provide details about the Dissemination Plan, implementation of the project website, Basecamp and social networking accounts and a progress report on agreed activities to raise public awareness and participation, and impact against planned metrics in the first 12 months.

[D8.1.2 Exploitation Plan and Strategic Guidelines for Exploitation](#)

A follow-up report to D8.1.1 that will provide updates on targets, detailed figures and progress towards implementing the exploitation strategy.

[D8.3.1 Report on CloudLightning Concertation](#)

The first deliverable will provide details about the Concertation Plan and a progress report on concertation activities and impact against planned metrics in the first 12 months.

[D8.2.2 CloudLightning Dissemination](#)

Follow-up report to D8.2.1 will provide updates on targets, detailed figures and progress towards implementing the dissemination strategy.

Demonstrators, pilots, prototypes (3)

[Integrated use cases](#)

D2.2.1 Integrated use cases This report will describe the integrated use case applications and document their capabilities and structure. (Due date - month 24)

[Architecture](#)

D3.1.1 Report on State of the Art and Draft Architecture (Draft, internal). (Due date - month 6) D3.1.2 Report on State of the Art and Architecture (updated, public, for review). (Due date - month 12)

[Use Case Requirements Report](#)

D2.1.1 Use case requirements report This report will detail the requirements of, opportunities for and means to evaluate the identified use case applications. (Due date - month 8)

Publications

Other (1)

[Benchmarking the Numascale Shared Memory Cluster System with MPI](#)

Author(s): Malik M. Khan, Anne C. Elster

Published in: Workshop on Exascale MPI at Supercomputing Conference, 2015

Publisher: Epigram Project Website

DOI: 10.13140/RG.2.1.3660.9364

Conference proceedings (31)

On Autonomic HPC Clouds

Author(s): Petcu, Dana

Published in: Proceedings of the Second International Workshop on Sustainable Ultrascale Computing Systems (NESUS 2015), Issue NESUS 2015,

[On the Next Generations of Infrastructure-as-a-Services](#)

Author(s): Dana Petcu, Maria Fazio, Radu Prodan, Zhiming Zhao, Massimiliano Rak

Published in: Proceedings of the 6th International Conference on Cloud Computing and Services Science, Issue CLOSER 2016, 2016, Page(s) 320-326, ISBN 978-989-758-182-3

Publisher: SCITEPRESS - Science and and Technology Publications

DOI: 10.5220/0005912503200326

[CLOUDLIGHTNING: A Framework for a Self-organising and Self-managing Heterogeneous Cloud](#)

Author(s): Theo Lynn, Huanhuan Xiong, Dapeng Dong, Bilal Momani, George Gravvanis, Christos Filelis-Papadopoulos, Anne Elster, Malik Muhammad Zaki Murtaza Khan, Dimitrios Tzovaras, Konstantinos Giannoutakis, Dana Petcu, Marian Neagul, Ioan Dragon, Perumal Kuppudayar, Suryanarayanan Natarajan, Michael McGrath, Georgi Gaydadjiev, Tobias Becker, Anna Gourinovitch, David Kenny, John Morrison

Published in: Proceedings of the 6th International Conference on Cloud Computing and Services Science, Issue CLOSER 2016, 2016, Page(s) 333-338, ISBN 978-989-758-182-3

Publisher: SCITEPRESS - Science and and Technology Publications

DOI: 10.5220/0005921503330338

[Benchmarking the WRF Model on Bluegene/P, Cluster, and Cloud Platforms and Accelerating Model Setup Through Parallel Genetic Algorithms](#)

Author(s): Liviu Oana, Marc Frincu

Published in: 2017 16th International Symposium on Parallel and Distributed Computing (ISPDC), 2017, Page(s) 78-84, ISBN 978-1-5386-0862-3

Publisher: IEEE

DOI: 10.1109/ISPDC.2017.24

[A Generic Framework Supporting Self-Organisation and Self-Management in Hierarchical Systems](#)

Author(s): Christos Filelis-Papadopoulos, Huanhuan Xiong, Adrian Spataru, Gabriel G. Castane, Dapeng Dong, George A. Gravvanis, John P. Morrison

Published in: 2017 16th International Symposium on Parallel and Distributed Computing (ISPDC), 2017, Page(s) 149-156, ISBN 978-1-5386-0862-3

Publisher: IEEE

DOI: 10.1109/ISPDC.2017.18

[CloudLightning: a Self-Organized Self-Managed Heterogeneous Cloud](#)

Author(s): Huanhuan Xiong, Dapeng Dong, Christos Filelis-Papadopoulos, Gabriel G. Castañé, Theo Lynn, Dan C. Marinescu, John Morrison

Published in: Proceedings of the 2017 Federated Conference on Computer Science and Information Systems, 2017, Page(s) 749-758, ISBN 978-83-946253-7-5

Publisher: IEEE

DOI: 10.15439/2017F274

[Towards a Scalable and Adaptable Resource Allocation Framework in Cloud Environments](#)

Author(s): Huanhuan Xiong, Christos Filelis-Papadopoulos, Dapeng Dong, Gabriel G. Castane, John P. Morrison

Published in: 2017 46th International Conference on Parallel Processing Workshops (ICPPW), 2017, Page(s) 137-144, ISBN 978-1-5386-1044-2

Publisher: IEEE

DOI: 10.1109/ICPPW.2017.31

[Reusing Resource Coalitions for Efficient Scheduling on the Intercloud](#)

Author(s): Teodora Selea, Adrian Spataru, Marc Frincu

Published in: 2016 16th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid), 2016, Page(s) 621-626, ISBN 978-1-5090-2453-7

Publisher: IEEE

DOI: 10.1109/CCGrid.2016.45

[The CloudLightning approach to cloud-user interaction](#)

Author(s): Teodora Selea, Ioan Drăgan, Teodor-Florin Fortiș

Published in: Proceedings of the 1st International Workshop on Next generation of Cloud Architectures - CloudNG:17, 2017, Page(s) 1-5, ISBN 9781-450349369

Publisher: ACM Press

DOI: 10.1145/3068126.3068130

[Utility-Driven Deployment Decision Making](#)

Author(s): Radhika Loomba, Thijs Metsch, Leonard Feehan, Joe Butler

Published in: Proceedings of the 10th International Conference on Utility and Cloud Computing - UCC '17, 2017, Page(s) 207-208, ISBN 9781-450351492

Publisher: ACM Press

DOI: 10.1145/3147213.3149375

[Online Resource Coalition Reorganization for Efficient Scheduling on Intercloud](#)

Author(s): Adrian Spataru, Teodora Selea, Marc Frincu

Published in: ICA3PP 2016, 2016, Page(s) 143-161, ISBN 978-1-5090-2453-7

Publisher: Springer International Publishing

DOI: 10.1007/978-3-319-49583-5_11

Understanding the Determinants of Cloud Computing Adoption for High Performance Computing

Author(s): Theo Lynn, Xiaoning Liang, Anna Gourinovitch, John Morrison, Grace Fox, Pierangelo Rosati

Published in: Proceedings of the 51st Hawaii International Conference on System Sciences, 2018, Page(s) 3894-3903, ISBN 978-0-9981331-1-9

Publisher: Hawaii International Conference on System Sciences

[A comparative study of CPU power consumption models for cloud simulation frameworks](#)

Author(s): Antonios T. Makaratzis, Christos K. Filelis-Papadopoulos, Konstantinos M. Giannoutakis, George A. Gravvanis, Dimitrios Tzovaras

Published in: Proceedings of the 21st Pan-Hellenic Conference on Informatics - PCI 2017, 2017, Page(s) 1-6, ISBN 9781-450353557

Publisher: ACM Press

DOI: 10.1145/3139367.3139409

GPU Power Modeling of HPC Applications for the Simulation of Heterogeneous Clouds

Author(s): A. Makaratzis (CERTH), M. Khan (NTNU), K. Giannoutakis (CERTH), A. Elster (NTNU) and D. Tzovaras (CERTH)

Published in: Proceedings of the 12th International Conference on Parallel Processing and Applied Mathematics (PPAM 2017), 2018

Publisher: Springer

Characterizing Numascale Clusters with GPUs: MPI-Based and GPU Interconnect Benchmarks

Author(s): Malik M. Khan, Anne C. Elster

Published in: The 2016 International Conference on High Performance Computing and Simulation (HPCS), 2016, ISBN 978-1-5090-2086-7

Publisher: IEEE Xplorer

[Supporting Heterogeneous Pools in a Single Ceph Storage Cluster](#)

Author(s): Stefan Meyer, John P. Morrison

Published in: 2015 17th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC), 2015, Page(s) 352-359, ISBN 978-1-5090-0461-4

Publisher: IEEE

DOI: 10.1109/SYNASC.2015.61

[On Issues Concerning Cloud Environments in Scope of Scalable Multi-Projection Methods](#)

Author(s): Byron E. Moutafis, Christos K. Filelis-Papadopoulos, George A. Gravvanis, John P. Morrison

Published in: 2016 18th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC), 2016, Page(s) 343-350, ISBN 978-1-5090-5707-8

Publisher: IEEE

DOI: 10.1109/SYNASC.2016.061

[CloudLightning Simulation and Evaluation Roadmap](#)

Author(s): C. K. Filelis-Papadopoulos, G. A. Gravvanis, J. P. Morrison

Published in: Proceedings of the 1st International Workshop on Next generation of Cloud Architectures - CloudNG:17, 2017, Page(s) 1-6, ISBN 9781-450349369

Publisher: ACM Press

DOI: 10.1145/3068126.3068128

[On the power consumption modeling for the simulation of Heterogeneous HPC clouds](#)

Author(s): Konstantinos M. Giannoutakis, Antonios T. Makaratzis, Dimitrios Tzovaras, Christos K. Filelis-Papadopoulos, George A. Gravvanis

Published in: Proceedings of the 1st International Workshop on Next generation of Cloud Architectures - CloudNG:17, 2017, Page(s) 1-6, ISBN 9781-450349369

Publisher: ACM Press

DOI: 10.1145/3068126.3068127

[Self-Healing in a Decentralised Cloud Management System](#)

Author(s): Paul Stack, Huanhuan Xiong, Dali Mersel, Maxime Makhloufi, Guillaume Terpend, Dapeng Dong

Published in: Proceedings of the 1st International Workshop on Next generation of Cloud Architectures - CloudNG:17, 2017, Page(s) 1-6, ISBN 9781-450349369

Publisher: ACM Press

DOI: 10.1145/3068126.3068129

Elastic Cloud Services Compliance with Gustafson's and Amdahl's Laws

Author(s): Ristov, Sasko; Prodan, Radu; Gusev, Marjan; Petcu, Dana; Barbosa, Jorge

Published in: Proceedings of the Third International Workshop on Sustainable Ultrascale Computing Systems (NESUS 2016), 2016, Page(s) 1-9, ISBN 978-84-617-7450-0

Publisher: Universidad Carlos III de Madrid

[Characterization of hardware in self-managing self-organizing Cloud environment](#)

Author(s): C. K. Filelis-Papadopoulos, E. N. G. Grylonakis, P. E. Kyziropoulos, G. A. Gravvanis, J. P. Morrison

Published in: Proceedings of the 20th Pan-Hellenic Conference on Informatics - PCI '16, 2016, Page(s) 1-6, ISBN 9781-450347891

Publisher: ACM Press

DOI: 10.1145/3003733.3003749

[Cloud Deployment and Management of Dataflow Engines](#)

Author(s): Nemanja Trifunovic, Hristina Palikareva, Tobias Becker, Georgi Gaydadjiev

Published in: Proceedings of the 1st International Workshop on Next generation of Cloud Architectures - CloudNG:17, 2017, Page(s) 1-6, ISBN 9781-450349369

Publisher: ACM Press

DOI: 10.1145/3068126.3068795

[A Preliminary Systematic Review of Computer Science Literature on Cloud Computing Research using Open Source Simulation Platforms](#)

Author(s): Theo Lynn, Anna Gourinovitch, James Byrne, P. J. Byrne, Sergej Svorobej, Konstaninos Giannoutakis, David Kenny, John Morrison

Published in: Proceedings of the 7th International Conference on Cloud Computing and Services Science, 2017, Page(s) 565-573, ISBN 978-989-758-243-1

Publisher: SCITEPRESS - Science and Technology Publications

DOI: 10.5220/0006351805650573

[Separation of Concerns in Heterogeneous Cloud Environments](#)

Author(s): Dapeng Dong, Huanhuan Xiong, John Morrison

Published in: Proceedings of the 7th International Conference on Cloud Computing and Services Science, 2017, Page(s) 775-780, ISBN 978-989-758-243-1

Publisher: SCITEPRESS - Science and Technology Publications

DOI: 10.5220/0006385507750780

[Architecting a hybrid cross layer dew-fog-cloud stack for future data-driven cyber-physical systems](#)

Author(s): Marc Frincu

Published in: 2017 40th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO), 2017, Page(s) 399-403, ISBN 978-953-233-090-8

Publisher: IEEE

DOI: 10.23919/MIPRO.2017.7973456

[A Review of Cloud Computing Simulation Platforms and Related Environments](#)

Author(s): James Byrne, Sergej Svorobej, Konstantinos M. Giannoutakis, Dimitrios Tzovaras, P. J. Byrne, Per-Olov Östberg, Anna Gourinovitch, Theo Lynn

Published in: Proceedings of the 7th International Conference on Cloud Computing and Services Science, 2017, Page(s) 679-691, ISBN 978-989-758-243-1

Publisher: SCITEPRESS - Science and Technology Publications

DOI: 10.5220/0006373006790691

[Towards the Integration of a HPC Build System in the Cloud Ecosystem](#)

Author(s): Ioan Drăgan, Teodora Selea, Teodor-Florin Fortiş

Published in: CISIS 2016: Conference on Complex, Intelligent, and Software Intensive Systems, 2018, Page(s) 916-925, ISBN 978-3-319-61566-0

Publisher: Springer International Publishing

DOI: 10.1007/978-3-319-61566-0_87

[Managing and Unifying Heterogeneous Resources in Cloud Environments](#)

Author(s): Dapeng Dong, Paul Stack, Huanhuan Xiong, John P. Morrison

Published in: Proceedings of the 7th International Conference on Cloud Computing and Services Science, 2017, Page(s) 143-150, ISBN 978-989-758-243-1

Publisher: SCITEPRESS - Science and Technology Publications

DOI: 10.5220/0006300901430150

Communicating Complex Services Using Electronic Word-of-Mouth on Twitter: An Exploratory Study

Author(s): Anna Gourinovitch, Xiaoning Liang, Pierangelo Rosati, Theo Lynn

Published in: 2017 Summer AMA Proceedings, 2017, Page(s) F14 - F15, ISBN 0-87757-366-2

Publisher: American Marketing Association

[Scheduling Data Stream Jobs on Distributed Systems with Background Load](#)

Author(s): Anca Vulpe, Marc Frincu

Published in: 2017 17th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGRID), 2017, Page(s) 838-847, ISBN 978-1-5090-6611-7

Publisher: IEEE

DOI: 10.1109/CCGRID.2017.139

Peer reviewed articles (9)

[Large-scale simulation of a self-organizing self-management cloud computing framework](#)

Author(s): Christos K. Filelis-Papadopoulos, Konstantinos M. Giannoutakis, George A. Gravvanis, Dimitrios Tzovaras

Published in: The Journal of Supercomputing, 2017, ISSN 0920-8542

Publisher: Kluwer Academic Publishers

DOI: 10.1007/s11227-017-2143-2

[Energy modeling in cloud simulation frameworks](#)

Author(s): Antonios T. Makaratzis, Konstantinos M. Giannoutakis, Dimitrios Tzovaras

Published in: Future Generation Computer Systems, Issue 79, 2018, Page(s) 715-725, ISSN 0167-739X

Publisher: Elsevier BV

DOI: 10.1016/j.future.2017.06.016

[A framework for simulating large scale cloud infrastructures](#)

Author(s): Christos K. Filelis-Papadopoulos, George A. Gravvanis, Panagiotis E. Kyziropoulos

Published in: Future Generation Computer Systems, Issue 79, 2018, Page(s) 703-714, ISSN 0167-739X

Publisher: Elsevier BV

DOI: 10.1016/j.future.2017.06.017

[ImageCL: Language and source-to-source compiler for performance portability, load balancing, and scalability prediction on heterogeneous systems](#)

Author(s): Thomas L. Falch, Anne C. Elster

Published in: Concurrency and Computation: Practice and Experience, 2017, Page(s) e4384, ISSN 1532-0626

Publisher: John Wiley & Sons Inc.

DOI: 10.1002/cpe.4384

[A Cloud Reservation System for Big Data Applications](#)

Author(s): Dan Marinescu, Ashkan Paya, John Morrison

Published in: IEEE Transactions on Parallel and Distributed Systems, Issue 99, 2016, Page(s) 1-1, ISSN 1045-9219

Publisher: Institute of Electrical and Electronics Engineers

DOI: 10.1109/TPDS.2016.2594783

[An approach for scaling cloud resource management](#)

Author(s): Dan C. Marinescu, Ashkan Paya, John P. Morrison, Stephen Olariu

Published in: Cluster Computing, Issue 20/1, 2017, Page(s) 909-924, ISSN 1386-7857

Publisher: Baltzer Science Publishers B.V.

DOI: 10.1007/s10586-016-0700-8

[Topics in cloud incident management](#)

Author(s): Teodor-Florin Fortiș, Victor Ion Munteanu

Published in: Future Generation Computer Systems, Issue 72, 2017, Page(s) 163-164, ISSN 0167-739X

Publisher: Elsevier BV

DOI: 10.1016/j.future.2016.11.003

[Exposing HPC services in the Cloud: the CloudLightning Approach](#)

Author(s): Ioan Dragan, Teodor Florin Fortis, Marian Neagul

Published in: Scalable Computing: Practice and Experience, Issue 17/4, 2016, ISSN 1895-1767

Publisher: universitatea de vest

DOI: 10.12694/scpe.v17i4.1204

[Machine learning-based auto-tuning for enhanced performance portability of OpenCL applications](#) 

Author(s): Thomas L. Falch, Anne C. Elster

Published in: Concurrency and Computation: Practice and Experience, Issue 29/8, 2017, Page(s) e4029, ISSN 1532-0626

Publisher: John Wiley & Sons Inc.

DOI: 10.1002/cpe.4029

Book chapters (2)

[Evaluating Distributed Systems and Applications Through Accurate Models and Simulations](#) 

Author(s): Marc Frincu, Bogdan Irimie, Teodora Selea, Adrian Spataru, Anca Vulpe

Published in: Modeling and Simulation in HPC and Cloud Systems, 2018, Page(s) 1-18

Publisher: Springer International Publishing

DOI: 10.1007/978-3-319-73767-6_1

[Applying Self-* Principles in Heterogeneous Cloud Environments](#) 

Author(s): Ioan Drăgan, Teodor-Florin Fortiș, Gabriel Iuhasz, Marian Neagul, Dana Petcu

Published in: Cloud Computing: Computer Communications and Networks, 2017, Page(s) 255-274

Publisher: Springer International Publishing

DOI: 10.1007/978-3-319-54645-2_10

Monographic books (1)

Heterogeneity, High Performance Computing, Self-Organization and the Cloud

Author(s): D. Dong, I. Drăgan, C. Filelis-Papadopoulos, T-F Fortiș, K. M.

Giannoutakis, G. Gonzalez-Castañe, G. A. Gravvanis, C. S. Kouzinopoulos, T.

Lynn, A. T. Makaratzis, J. P. Morrison, M. Neagul, D. Petcu, T. Selea, A. Spataru, D. Tzovaras, H. Xiong.

Published in: 2018

Publisher: Palgrave Macmillan

Other Research Products

[Benchmarking the Numascale Shared Memory Cluster System with MPI](#) 

Author(s): Khan, Malik M; Elster, Anne C

Published in: Unpublished

Last update: 4 September 2023

Permalink: <https://cordis.europa.eu/project/id/643946/results>

European Union, 2025