STEFANIA VICTORIA COSTACHE

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SUMMARY

I am a cloud technology freelancer with a research background in distributed systems and cloud resource management. I have experience with HPC, data analytics, cloud infrastructures and container cloud systems (Kubernetes, Mesos). I am interested in automatic, possibly data-driven, solutions to solve various issues from running heterogeneous workloads in the cloud: performance, cost effective resource management, resilience.

EDUCATION

PhD in Computer Science   2010 – 2013

University of Rennes 1, France
Funded by EDF (French Electricity Company)
Advisors: Christine Morin, Nikos Parlavantzas and Samuel Kortas
PhD Thesis title: "Market-based autonomous resource and application management in the cloud"

Master of Computer Science   2008 - 2010

Automatic Control and Computers Faculty
University "Politehnica" of Bucharest, Romania
Specialization: System Software and Advanced System Applications

Bachelor of Engineering   2003 -2008

Automatic Control and Computers Faculty
University "Politehnica" of Bucharest, Romania
Specialization: Computers

SKILLS

Programming Languages/Technologies: C, C++, Java, Golang, Python, Scala.
- Familiar with Ansible, MySQL, shell, Jupyter Notebook

Cloud Platform: Kubernetes, Mesos, Docker, Spark
- Familiar with IBM Cloud, Google Cloud, AWS, Microsoft Azure, OpenStack, Hadoop, NoSQL datastores, Flink, Pytorch, AutoML technologies

EXPERIENCE

Freelancer, Sweden   **January 2019 - present**
- Projects related to cloud and machine learning technologies

IBM T.J.Watson Research Center, New York, US   **January 2016 - November 2018**
Research Staff

- I lead the architecture design and implementation of solutions to use spot market concepts in resource management to maximize the efficiency of the cloud infrastructure for serverless data analytics and deep learning workloads.
- I experimented with container orchestration frameworks (Mesos, Kubernetes), prototyped custom controllers and schedulers, designed scalability experiments and investigated using machine learning for workload performance estimations and scheduling.

Chalmers University of Technology, Sweden   **September 2015 - December 2015**
Postdoctoral Researcher

- I lead an investigation on the performance of stream processing frameworks (Spark and Flink) in the IoT context using intelligent vehicular systems as experimental case study and outlining the advantages and limitations of the different technology stacks.

Vrije University Amsterdam, The Netherlands   **February 2014- August 2015**
Postdoctoral Researcher

- I developed an online scheduler for scientific data-intensive workflows, integrated with an elastic in-memory data storage, a solution that leads to increased scheduling performance and minimized resource waste of the workflow.
- I implemented a simulator for multi-cloud provisioning policies for heterogeneous workloads, showing that sharing larger virtual machines of different types across applications leads to hosting cost reductions.
- Several other projects I was involved in: analysis of scalability of cloud stacks, algorithms for profiling the energy consumption and performance of many tasks computing applications, elastic in-memory data storage.

INRIA Rennes-Bretagne Atlantique, France   **September 2013 - January 2014**
Research Engineer

- I designed and ran scalability experiments of a cloud middleware software that interfaces multiple infrastructure clouds (European funded project), showing that the middleware brings low performance overheads for a typical application deployment while decreasing configuration overheads for users.

EDF R&D/INRIA Rennes-Bretagne Atlantique, France   **May 2010 – July 2013**
Research Engineer

- I designed a resource management framework for running HPC applications (batch MPI and task farming) on a private cloud using spot market and virtual economy concepts for prioritizing and scaling application resources.
- I proposed SLO-driven scaling policies for vertical (in terms of CPU and memory per virtual machine) and horizontal (in terms of number of virtual machines) resource allocation, allowing more users to run applications at the same time and leading to maximized utilization of the infrastructure.
- I developed a incremental placement algorithm for virtual machines that reduced the number of virtual machine migrations below a threshold, thus decreasing resource management performance overheads noticed by applications.
- Results were published in several top-tier conferences and journals.
- Awarded as the *Best paper on Cloud Computing* from the french academic community, at the annual meeting ComPAS 2014.

INRIA Rennes-Bretagne Atlantique, France   **May 2009 – October 2009**
Intern in the Myriads Group

- I designed a high availability framework for stateful geo-distributed services in large scale distributed systems.
- Large scale tests of the framework on geographically distributed resources showed that services experienced low latency overheads and an improvement in the number of reconfiguration decisions due to nodes leaving or failing.
- Results were published at a top-tier domain specific conference.

University of Groningen, The Netherlands   ***February 2009- March 2009***
Intern in the Molecular Dynamics Group   ***March 2008 – July 2008***

- I designed a parallel implementation of multiscale algorithms for molecular dynamics simulations used for scientific research.
- Large scale runs showed significant reduction in simulation time.

TEACHING EXPERIENCE

Vrije University Amsterdam, The Netherlands
- Lecturer for the Advanced Topics in Distributed Systems course, (2nd year master), Fall 2014
- Teaching Assistant for the Performance of Networked Systems course, (1st year master), Spring 2014, 2015

- Co-advised several master thesis projects:
  - *"User-centric Distributed Framework for NoSQL Datastore Comparison"*, Dorin Rusu. Defended 2016
  - *"Energy-Aware Scheduling for Bag-of-Task Applications in Private Clouds"*, Alexandra Vintila. Defended 2014
  - *"Scaling vm deployment in an open source cloud stack"*, Andrea Gardiman. Defended 2014

"Politehnica" University of Bucharest, Romania

Teaching Assistant for the following courses
- Computer Graphics (3rd year course), Fall 2008
- Graphic Processing Systems (4th year course), Fall 2008
- Operating Systems (3rd year course), Fall 2007

PUBLICATIONS

- *Resource Management in Cloud Platform as a Service Systems: Analysis and Opportunities.* <u>Stefania Costache</u>, Djawida Dib, Nikos Parlavantzas, Christine Morin. *Journal of Systems and Software*, Elsevier, 2017.
- *MemEFS: A network-aware elastic in-memory runtime distributed file system.* Alexandru Uta, Ove Danner, Cas van der Weegen, Ana-Maria Oprescu, Andreea Sandu, <u>Stefania Costache</u>, Thilo Kielmann. *Future Generation Computer Systems*, Elsevier, 2017
- *Market-based autonomous resource and application management in private clouds*. <u>Stefania Costache</u>, Samuel Kortas, Christine Morin, Nikos Parlavantzas. *Journal of Parallel and Distributed Computing*, 2016
- *Understanding the data-processing challenges in Intelligent Vehicular Systems*. <u>Stefania Costache</u>, Vincenzo Gulisano, Marina Papatriantafilou. *Intelligent Vehicles Symposium (IV), 2016*
- *E-BaTS: Energy-Aware Scheduling for Bag-of-Task Applications in HPC Clusters. Alexandra Vintila-Filip, Ana-Maria Oprescu, <u>Stefania Costache</u>, Thilo Kielmann. Parallel Processing Letters, 2015*
- *MemEFS: an elastic in-memory runtime file system for escience applications. Alexandru Uta, Andreea Sandu, <u>Stefania Costache</u>, Thilo Kielmann . e-Science, 2015*
- *Scaling vm deployment in an open source cloud stack. Kaveh Razavi, <u>Stefania Costache</u>, Andrea Gardiman, Kees Verstoep, Thilo Kielmann. Proceedings of the 6th Workshop on Scientific Cloud Computing, 2015.*
- *Merkat: A Market-based SLO-driven Cloud Platform*. Stefania Victoria Costache; Nikos Parlavantzas; Christine Morin; Samuel Kortas. *CloudCom, 2013*
- *On the Use of a Proportional-Share Market for Application SLO Support in Clouds*. Stefania Victoria Costache; Nikos Parlavantzas; Christine Morin; Samuel Kortas. *EuroPar, 2013* (26.8%)
- *Themis: Economy-Based Automatic Resource Scaling for Cloud Systems*. Stefania Victoria Costache; Nikos Parlavantzas; Christine Morin; Samuel Kortas. *HPCC, 2012* (26.2%)
- *Semias: Self-Healing Active Replication on Top of a Structured Peer-to-Peer Overlay*. Stefania Costache, Thomas Ropars, Christine Morin, *SRDS, 2010* (21%)
- *Multiscaling Algorithms for Molecular Dynamics Simulations with GROMACS*. Nicolae Goga, Siewert Marrink, Stefania Victoria Costache*, Florica Moldoveanu, IEEE International Systems Conference, 2009

ADDITIONAL ACTIVITIES

- Reviewer for International Journal of Transactions on Parallel and Distributed Systems since 2016
- External reviewer for the following conferences: IPDPS (2011, 2012), ISPDC (2011), Cluster (2011), CCGrid (2012, 2013) and the VTDC workshop (2012).

LANGUAGES

- English (fluent)
- French (intermediate)
- Romanian (native)