

PhD In Information Technology

Research Area n. 1 Title: Computer Science and Engineering

Research Field: “Towards the power-optimal cloud and mobile infrastructure management Computer Architecture / System Architecture”

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. 1.200 (In case of a change of the welfare rates during the three-year period, the amount could be slightly modified)
Number of scholarships	1
Beginning of PhD	1/5/2017
Deadline for application	13/03/2017
Context of the research activity	
Motivations and objectives of the research in this field	Today's cloud platforms and mobile system are closer than ever before. Both run several different workloads, with novel management challenges. Runtime resource allocation is a key component in the optimal infrastructure management. This project aims at improving the management of cloud platforms to meet the performance requirements while minimizing the energy consumption. To this aim, the proposed methodology leverages new resource consumption modeling techniques and a dynamic Observe-Decide-Act loop to quickly react to workload changes.
Methods and techniques that will be developed and used to carry out the research	Starting from the generality of the MARC methodology, this work aims at exploring modeling for generic resource consumption like CPU, RAM, energy, bandwidth, etc, to provide a better control of a cloud infrastructure and of its resources. Leveraging MARC modelling capabilities, a cloud platform can decide at runtime the optimal allocation of workloads, improving both utilization and energy efficiency.

Educational objectives	The student will be required to participate in different activities, from research activity to teaching, mentoring and managing students for didactical purposes. Also external activities are available (Xilinx PYNQ Hackaton xph.necst.it).
Job opportunities	Power management of clusters and cloud infrastructures is playing a more and more important role in the design and management of those systems. Just to cite few companies with which we are collaborating: Draios, Intel.
Composition of the research group	Marco D. Santambrogio Stefano Zanero
Names of the research directors	Marco D. Santambrogio
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List of 5 Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	1. Humanitas Hospital 2. Humanitas University 3. BV TECH SpA 4. Draios 5. Intel
Additional support	
<u>Educational activities</u> (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): financial aid per PhD student per year	2nd year: 1.370 euro per student 3rd year: 1.370 euro per student
<u>Teaching assistantship:</u> availability of funding in recognition of support to teaching activities by the PhD student	There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.
<u>Computer availability:</u>	1 st year: <i>individual use</i> 2 nd year: <i>individual use</i> 3 rd year: <i>individual use</i>
<u>Desk availability:</u>	1 st year: <i>individual use</i> 2 nd year: <i>individual use</i> 3 rd year: <i>individual use</i>