POLITECNICO DI MILANO

PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 40th cycle

Research Area n. 1 - Computer Science and Engineering

THEMATIC Research Field: PROGRAMMING ABSTRACTIONS AND EXECUTION STRATEGIES FOR THE EDGE-TO-CLOUD CONTINUUM

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	The current practice for building distributed applications is through the composition of loosely-coupled services. This approach is well suited for cloud setups, where services run in a managed environment, abstracting away most deployment concerns and enabling horizontal scaling. At the same time, modern applications increasingly involve geographically distributed actors such as mobile clients and smart devices. In this context, exploiting edge resources has vast potentials for reducing network traffic, distributing computational load, and improving the quality of service perceived by end users, for instance in terms of response time. Unfortunately, established solutions for cloud computing platforms are not suited for large-scale, heterogeneous computing infrastructures. The research will study innovative programming paradigms to design, implement, and operate applications in edge-to-cloud compute continuum environments.
Methods and techniques that will be developed and used to carry out the research	The work will include: •The definition of proper programming abstractions to implement complex distributed applications in heterogeneous edge-to-cloud compute environments. •The design of an execution platform to support the proposed programming abstractions.

	•The implementation of various case studies to validate the effectiveness of the proposed programming and execution solutions. •The empirical evaluation of the performance of the proposed case studies. The research will be mainly carried out at Politecnico di Milano, but visits to other internationally recognized research centers will be possible.
Educational objectives	•Learn about state-of-the-art algorithms, programming abstractions, and software architectures to develop distributed applications in heterogeneous environments. •Advance the state of the art on programming abstractions and execution platforms for edge-to-cloud heterogeneous environments. •Learn how to validate a research idea through an empirical evaluation. •Learn how to write scientific papers in the area of software engineering for distributed applications.
Job opportunities	Considering the central role of large-scale distributed applications today, we expect PhD graduates in this area to be successful in finding suitable job opportunities both in industry and academia.
Composition of the research group	1 Full Professors 1 Associated Professors 0 Assistant Professors 3 PhD Students
Name of the research directors	Prof. Alessandro Margara, Prof. Gianpaolo Cugola

Contacts
alessandro.margara@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

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Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student. 5.707,20 Euro per student   TEACHING ASSISTANTSHIP: availability of funding in recognition of supporting 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.   COMPUTER AVAILABILITY: 1st year: Yes 2nd year: Yes 3rd year: Yes