POLITECNICO DI MILANO

PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 37th cycle

Research Area n. 1 - Computer Science and Engineering

THEMATIC Research Field: MODELING OF COMPLEX DISTRIBUTED SOFTWARE SYSTEMS TO AUTOMATE DEPLOYMENT AND OPERATION

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	Automation of deployment and automation of complex software is nowadays possible by developing and executing so called Infrastructure as Code (IaC) software. While this allows teams to move very rapidly from development to operation of software, the way to build IaC software is still not fully engineered. First of all, there are multiple languages for IaC software that are focusing on different aspects of the problem and must be used in combination. Second, the complexity of IaC definition is still quite high. We argue that a model-driven approach could be very suitable to address the aforementioned problems and also to connect the creation of IaC software with the application-level design and development activities of application-level software. The goal of this PhD work is to develop such a model-driven approach and to validate it in industrial-relevant cases. This work is framed in the H2020 project PIACERE. Further information on the project can be found here https://www.piacere-project.eu/
Methods and techniques that will be developed and used to carry out the research	Model-driven engineering techniques will be adopted, including domain modeling, definition of a proper DSL language, validation through case studies and end-users observation. An analysis of the state of the art in IaC languages and approach as well as on the general area of

	DevOps will be needed and may lead to the development of a systematic literature review paper. Other three papers are foreseen as results of the other parts of the work.
Educational objectives	Learn how to develop new research results in software engineeringLearn about model-driven engineeringAdvance the state of the art on approaches for deployment and operation automationLearn how to conduct a case study-based evaluationLearn how to write scientific papers in the area of software engineering
Job opportunities	Based on the experience of previous PhD graduates, we can affirm that, at the end of the PhD studies, the PhD candidate will be able to either join industry in research-oriented laboratories or academia. Moreover, he/she will also be able to act as leading designer or project leader in industrial projects.
Composition of the research group	6 Full Professors 6 Associated Professors 2 Assistant Professors 1 PhD Students
Name of the research directors	Elisabetta Di Nitto, Matteo Pradella

Contacts
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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	564.01 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The candidate for this position should have good programming skills. Technologies to be studied include a wide range of IaC languages and platform, including orchestration systems such as

Kubernetes and Docker Swarm, as well as model-driven engineering techniques.

LIST OF UNIVERSITIES, COMPANIES, AGENCIES AND/OR NATIONAL OR INTERNATIONAL INSTITUTIONS THAT ARE COOPERATING IN THE RESEARCH: 1. Tecnalia (Spain); 2. XLAB (Slovenia); 3. Ericsson (Italia); 4. HPE (Italia); 5. 7Bulls (Poland); 6. Prodevelop (Spain); 7. Republika Slovenija (Slovenia)

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 per year
2nd year: euros per student (1534)
3rd year: euros per student (1534)

TEACHING ASSISTANSHIP: (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: individual use
2nd year: individual use
3rd year: individual use

DESK AVAILABILITY:
1st year: individual use
2nd year: individual use
3rd year: individual use