

**Call for application for research scholarships  
for post-graduate international candidates**

**RESEARCH PROJECT N. 44**

**Title**

Dependability of next generation computer networks

**Scientific responsible (name, surname, role)**

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**Short description of the research activity (max 250 words)**

As computer systems are becoming more and more pervasive, dependability is becoming a fundamental requirement. At the same time, there is a trend to make these dependable systems distributed, i.e. network-based, where the possibility to have interactions between mobile applications or smart devices and the cloud plays a fundamental role. Projects like the Internet of Things (IoT), Smart Grids, and Industry 4.0 are just examples of this trend.

In this scenario, network dependability becomes fundamental. However, the techniques adopted for ensuring network dependability have to be updated, following the upcoming evolution of the networks towards IoT and higher flexibility made possible by virtualization and Software-Defined Networking (SDN). The main objective of the proposed research is to advance the state of the art in the techniques for ensuring network dependability, considering this evolution of the networks. The study will be conducted with a special focus on formal methods, i.e. mathematically-based techniques for modelling and analysing computer-based systems. In this context, the main challenge is how to model next-generation networks and their components, in such a way that the models are accurate enough, and computationally tractable at the same time.

After a study of the state of the art, the candidate will familiarise with the methods and tools already developed by the research group in this direction, and will then investigate how to adapt them to the features of next-generation networks. A specific attention will be paid to usability, by means of the definition of proper and user-friendly modeling languages.

**Specific requirements (experiences, skills)**

The candidate must have very good knowledge of computer networks and very good computer programming skills, which is necessary in order to work proficiently on formal verification tools. Knowledge of formal methods is useful, but it is not a must. A good mathematical background, especially in discrete mathematics, is another important pre-requisite.

**Website of the research group (if any)**

<http://netgroup.polito.it/>

**Keywords (min 3, max 6)**

Dependability, computer networks, formal methods

**Research Area (max 1)**

Computer Engineering