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# Measurement Methodology and Tools

First European Workshop, FP7 FIRE/EULER Project  
Aalborg, Denmark, May 9, 2012  
Revised and Extended Papers



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# Preface

The Future Internet Research Experimentation (FIRE) initiative of the EU 7th Framework Programme (FP7) aims at promoting multidisciplinary research, design and large-scale experimentation of new network and service architectures for the Future Internet. FIRE brings together European research projects addressing two related dimensions: building of large-scale experimental facilities based on the principle of open coordinated federation of testbeds, and instigating disruptive experimentally driven research validated through large-scale experimentation in these testbeds.

Considering that measurements and measurement tools play a very important role in experimentally driven research, it was deemed worthwhile to dedicate a workshop to this challenging topic. The EULER (Experimental UpdateLess Evolutionary Routing) research project, a 3-year project part of the FIRE initiative, organized the Workshop on Measurement and Measurement Tools as part of the FIRE activities during the Future Internet Assembly (FIA) conference in Aalborg, Denmark, in May 2012. The initial goals of the workshop were to present the current developments on measurements and tools by the FIRE projects in well-established research areas, including wireless and sensor networks, routing, etc., and to anticipate the needs in new research areas including information-centric networking, programmable components/ networks, etc. For this purpose, researchers from most FIRE projects working in different research areas were invited to present their measurement-based experimental research activities and to share their experience in designing, developing, and using measurement tools. The expected outcomes of the workshop were to identify both current needs with respect to well-established research areas and foreseeable needs and their commonality with respect to new areas of research not currently addressed by existing measurement techniques and tools, to determine the lessons learned and best practices in tools development for measurement-based experimental research, and to determine which initiative(s) could be launched by means of cooperation between projects from a directory of measurement tools accessible to the FIRE community at large, up to the joint development of such tools.

The publication of this volume of the *Lecture Notes in Computer Science* series is directly related to the successful realization of the workshop. Given the quality and interest of the presentations, it was considered worth publishing a book compiling extended versions of them. Speakers were invited to write a

chapter focused on the use of measurements and associated tools in experimental research from their experience and the project's perspective, namely, experimental methodology, testbeds, tools developed by the project or external tools, and experiments where such tools are used.

The EULER research project thanks the support of the European Commission through contract number FP7-258307.

June 2013

Lluís Fàbrega  
Pere Vilà  
Davide Careglio  
Dimitri Papadimitriou

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