2nd International
Workshop on Measurement-based Experimental Research, Methodology and Tools

Dublin, Ireland - May 7, 2013

http://atc.udg.edu/MERMAT

Workshop collocated with the FIA conference, Dublin (Ireland), May 8 - 10, 2013 (http://www.fi-dublin.eu)

DESCRIPTION

Measurement and associated tools play nowadays a fundamental role in iterative experimental research. This role includes the evaluation of protocols, systems and their associated components, etc., functionality and performance, by means of reliable and verifiable tools following a systematic methodology. It is also anticipated that distributed measurement and associated tools will also become prominent in the context of operation and management of autonomic information communication infrastructures, at the equipment and monitoring level but also in support of higher-level control functionality such as on-line data analysis mining and diagnostic.

This workshop aims at gathering all research projects and initiatives under the measurement-based experimental research, methodology and tools thematic. Participants will present their current research and developments on measurements and tools in the context of experimental research including simulation, emulation, prototypes, etc.

This workshop is organized by the **EULER** (http://www.euler-fire-project.eu) and **CREW** (http://www.crew-project.eu) research projects as part of the pre-FIA workshops and activities in the Future Internet Assembly (FIA) conference in Dublin (May 8 - 10, 2013). The EULER project investigates new routing paradigms so as to design, develop, and validate experimentally a distributed and dynamic routing scheme suitable for the future Internet and its evolution. The main target of CREW project is to establish an open federated test platform, which facilitates experimentally-driven research on advanced spectrum sensing, cognitive radio and cognitive networking strategies in view of horizontal and vertical spectrum sharing in licensed and unlicensed bands.

VENUE

The Helix Center is located on Dublin City University (DCU) Campus in Glasnevin, North Dublin. Further details on the Helix location, as well as a transportation guide, can be found in the venue website http://thehelix.ie/findus.

ORGANIZING COMMITEE

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ACKNOWLEDGEMENTS

PRESENTATION ABSTRACTS
(papers available at MERMAT website http://atc.udg.edu/MERMAT)

SESSION 1 (11:15 – 12:30)

Invited Speaker 1 – "Wireless experimentation: An experimenter's viewpoint"
Ingrid Moerman (Ghent University - iMinds, Department of Information Technology (INTEC), Belgium)

Today, many CR/CN concepts have been conceptually validated, mostly through simulations of theoretical analysis. However, mechanisms like interference and spectrum sharing are very complex and hard to model, leading to oversimplified models in theoretical studies or simulations. Radio transceiver characteristics and spectrum sensing characteristics are further very dependent on hardware capabilities (timing, accuracy, sensitivity parameters, processing & memory capabilities…). Experimentally-supported research is hence crucial for validation of new cognitive radio (CR) and cognitive networking (CN) concepts.

The CREW federated platform offers open access to very exciting research facilities equipped with very advanced CR components. However, for a starting experimenter the threshold for using such facilities is rather high, because It takes quite some time to familiarise with a specific facility and its available CR hardware. In this presentation we want to show how we can lower the threshold for a wireless experimenter by introducing a common CR language. We will illustrate the common CR language approach for a distributed spectrum sensing experiment.

Investigation of One-Way Delay Variation in Substrate and Slice Measurements over a European-wide Future Internet Platform
Susanne Naegele-Jackson[1], Peter Kaufmann[2] ([1] DFN-Verein, Berlin, Germany, [2] Regional Computing Center of Erlangen, Erlangen, Germany)

Virtualization in networks is becoming very popular, because it offers the possibility to address varying demands for network resources in a flexible and cost-efficient way. By combining network hardware, software and network functionalities into virtual topological network units, resources can be shared by providing the illusion of real network environments. While such virtual environments offer the security of an isolated network slice and the possibility for customized platforms to support innovative network technologies without the disruption of general network traffic, the processing of the virtual components introduces a certain amount of performance overhead that needs to be investigated. This paper describes experimental measurements conducted in the Future Internet platform NOVI in order to determine the impact of network virtualization on the IP performance metric One-Way Delay Variation (OWDV). The European-wide measurements are unique as they were set up in a directly comparable implementation over substrate and slice. It is shown that the average median one-way delay variation over a measurement link in a virtual slice compared to the physical substrate increased by at least a factor > 10 for the 75th percentile of all measured values and factors ≥ 20 for higher percentiles.

The EVARILOS Benchmarking Handbook: Evaluation of RF-based Indoor Localization Solutions
Tom Van Haute[1], Eli De Poorter[1], Jen Rossey[1], Ingrid Moerman[1], Vlado Handziski[2], Arash Behboodi[2], Filip Lemic[2], Adam Wolisz[2], Niklas Wiström[3], Thiemo Voigt[3], Pieter Crombez[4], Piet Verhoeve[4], Jose Javier de las Heras[5] ([1] Ghent University - iMinds, Department of Information Technology (INTEC), Belgium, [2] Technische Universitat Berlin, Germany, [3] Swedisch Institute for Computer Sience, Sweden, [4] Televic Health Care, Belgium, [5] Advantic Sistemas y Servicios, Spain)

RF-based indoor localization solutions enjoy consistent efforts of researchers to provide more accurate and sustainable solutions. The multiplicity of RF-based indoor localization solutions makes their evaluation an indispensable part of future Internet. However no unified scheme has been devised for evaluation of these solutions and their robustness against various parameters. To remedy this, the EVARILOS handbook is created in order to objectively evaluate and compare different indoor localization solutions. In this work, we present an overview of the EVARILOS project whose objectives are the development and validation of standardized experiment-based benchmarks for localization solutions.

SESSION 2 (13:45 – 15:00)

A Framework for Modeling and Execution of Infrastructure Contention Experiments
Carmelo Ragusa, Philip Robinson, Sergej Svorobej (SAP UK Ltd., The Concourse, Queen's Rd, Queen's Island, Titanic Quarter, Belfast, United Kingdom)

Comprehensive testing of multi-tenant cloud-based applications has to consider the effects of co-location with workloads of other tenants, which may be characteristically, accidentally or maliciously contentious. Otherwise the execution and scaling of the application can demonstrate unpredictable behaviours that make it difficult for users to guarantee behaviour and providers to safely and efficiently optimise their physical infrastructure. We present motivations, principles and work in progress on the COntrolled COntentious and MAlicious (COCOMA) framework towards supporting the design and execution of these tests in a coherent and reproducible manner.

Network design for the LOG-a-TEC outdoor testbed

Tomaž Šolc[1], Zoltan Padrah[2] ([1] Jožef Stefan Institute, Ljubljana, Slovenia, [2] Jožef Stefan International Postgraduate School, Ljubljana, Slovenia)

We present steps involved in planning a wireless sensor network for the LOG-a-TEC outdoor testbed, part of the CREW federation for cognitive radio experiments. Based on initial testbed requirements and estimates of the management network load we have selected two clusters of locations from a large pool of possible locations. We have then performed a verification step. By measuring signal strength and packet loss with a mobile setup we have verified that nodes in the chosen testbed configuration would be able to form a usable mesh network. Finally, we compare our initial estimates of network performance with measurements obtained from the deployed testbed.

SESSION 3 (15:30 – 16:30)

Invited Speaker 2 – "Experiment scaling properties with finite-size facilities"
Dimitri Papadimitriou (Alcatel-Lucent Bell Labs, Belgium)

Reducing Power Consumption in Body-centric Zigbee Communication Links by means of Wearable Textile Antennas

P. Vanveerdeghem[1,3], B. Jooris[2], P. Becue[2], P. Van Torre[3], H. Rogier[3], I. Moerman[2], J. Knockaert[1] ([1] Electronics and Information Technology (ELIT) lab, Ghent University campus Courtray, [2] iMinds-Ghent University, Ghent, Belgium, [3] IMEC-Ghent University, Department of Information Technology (INTEC), Ghent, Belgium)

Smart-fabric interactive textile systems have been studied intensively during the last decades and are ready to penetrate the market. Such systems are being tested in different application domains, such as health monitoring, coordination of military and emergency operations monitoring, sports and gaming. To make such systems attractive to consumers, they need to be low cost, low weight, flexible and primarily energy-efficient. We experimentally evaluate the deployment of efficient textile patch antennas in fire fighter garments to reduce the transmit power in a wireless sensor node network. The measurements performed in an advanced testbed setup, demonstrate the potential of on-body textile patch antennas to increase the power received at the nodes of a wireless sensor network and reduce the packet loss in the network, compared to using a rigid integrated PCB antenna with the same transmit power. The additional margin in received power may be exploited to reduce the transmit power while maintaining the same packet, resulting in a reduced energy consumption, paving the way towards smaller, lower-weight and less expensive consumer products.

Accepted as a poster:

A Network Traffic Classification based on Coupled Hidden Markov Models

Fei Zhang, Wenjun Wu (State Key Laboratory of Software Development School of Computer Science, Beihang University Beijing, China)

Analysis and classification of massive network traffic that consists of multiple data sources is a challenging task for both network providers and system administrators. In this paper, we introduce a novel network traffic classifier PL-CHMM based on Coupled Hidden Markov Models (CHMM) using the Packet-Level features in network traffic flows. Results show that our PLCHMM based traffic classifier can achieve more than 90% accuracy, in classifying every test dataset, which outperforms other separate HMM based traffic classifiers.

PROGRAM

10:30 Welcome and introduction

10:45 Coffee Break

11:15 Session 1

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12:30 Lunch break

13:45 Session 2

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15:00 Coffee break

15:30 Session 3

Invited Speaker 2 — *"Experiment scaling properties with finite-size facilities"*
Dimitri Papadimitriou (Alcatel-Lucent Bell Labs, Belgium)

Reducing Power Consumption in Body-centric Zigbee Communication Links by means of Wearable Textile Antennas
P. Vanveerdeghem[1,3], B. Jooris[2], P. Becue[2], P. Van Torre[3], H. Rogier[3], I. Moerman[2], J. Knockaert[1] ([1] Electronics and Information Technology (ELIT) lab, Ghent University campus Courtray, [2] iMinds-Ghent University, Ghent, Belgium, [3] IMEC-Ghent University, Department of Information Technology (INTEC), Ghent, Belgium)

16:30 End of the workshop

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Fei Zhang, Wenjun Wu (State Key Laboratory of Software Development School of Computer Science, Beihang University Beijing, China)