Activity Report 2013

Section highlights of the Team

ACES Project-Team (section vide)

ADAM Project-Team

2.2. Highlights of the Year

Romain Rouvoy received the Best Paper Award on distributed systems of the 28th Symposium On Applied Computing (SAC) for the paper *Improving Context Interpretation by Using Fuzzy Policies: The Case of Adaptive Video Streaming* written in collaboration with Lucas Provensi, Frank Eliassen, and Roman Vitenberg from the University of Oslo (Norway) within the context of the *Sensor-as-a-Service* (SEAS) associate team. Furthermore, Romain Rouvoy has been invited as a keynote speaker of the French conference on software architectures (CAL - *Conférence sur les Architectures Logicielles*) to report on the contributions of the SEAS associate team in the area of designing distributed software architectures for sensor-based systems.

The APISENSE[®] crowd-sensing platform developed by the project-team has been awarded a research grant by the Microsoft Azure for Research program to work on the elastic processing of crowd-based datasets. This grant intends to leverage APISENSE[®] to support the real-time processing of big datasets collected in the physical world by a large crowd of smartphones. Examples of case studies covered in this area include the automatic inference of roadmaps, the continuous cartography of network coverage quality, or even the detection and the dynamic analysis of earthquakes. In particular, the unpredictable volume of data to be collected in the wild requires the adoption of elastic computation models and infrastructures to continuously provision the processing capabilities to fit uploads of information reports.

Gabriel Tamura has won the 2013 PRES Université Lille Nord de France International PhD Award for his PhD dissertation [85] on the reliable preservation of quality of service (QoS) contracts in self-adaptive distributed systems. The contribution is twofold. The first one is a model for component-based software systems where reconfiguration rules are viewed as typed attributed graphs [64] and where QoS-contracts are viewed as state machines in which transitions correspond to software reconfigurations. The second contribution is the characterization of adaptation properties to evaluate self-adaptive software systems in a standardized and comparable way. This work led to the development of the QOS-CARE framework that was the topic of several major publications [42], [43], [86], [84] in addition to the thesis dissertation itself.

BEST PAPERS AWARDS :

[36] **28th ACM Symposium on Applied Computing (SAC) - 8th Track on Dependable and Adaptive Distributed Systems (DADS)**. L. PROVENSI, F. ELIASSEN, R. VITENBERG, R. ROUVOY.

ARLES Project-Team

2.2. Highlights of the Year

This year has seen the following acknowledgments of the team's contributions:

PRIZES:

- Valérie Issarny was awarded one of the twelve "Etoiles de l'Europe" for the year 2013. The prize rewards French teams that coordinate European projects as part of the research and innovation framework program, which Valérie received for the FP7 ICT FET CONNECT (Emergent Connectors for Eternal Software-intensive Networked Systems – https://www.connect-forever.eu/) project that examined issues facing the Future Internet.

- Animesh Pathak, Sara Hachem, Giorgios Mathioudakis, and George Rosca were awarded the Best Mashup prize of the OpenDataLab organized by RATP, for their "neverBLate" app.

BEST PAPERS AWARDS :

[12] **REFSQ 2013 - 9th International Working Conference on Requirements Engineering: Foundation for Software Quality**. N. BENCOMO, A. BELAGGOUN.

LOGNET Team

2.2. Highlights of the Year

- The contrat Alcotra Interreg *myMed: a peer-to-peer programmable social network and cloud platform* 2010-2013 ends. LogNet was the head of this ambitious project. The project can be visited at the page http://www.mymed.fr Please have a try, see Fig 2 !

```
../../../../projets/lognet/IMG/splash1.png
```

```
../../../../projets/lognet/IMG/splash2.pr
```

Figure 2. http://www.mymed.fr

- Four articles on myMed has been published in the newspaper "Nice Matin"
    - http://www.nicematin.com/article/lapplication-myriviera-lancement-en-fevrier.689848.html
    - http://www.nicematin.com/papier/tout-sur-la-riviera%E2%80%A6-a-portee-de-doigt.831703.html
    - http://www.nicematin.com/derniere-minute/myriviera-bientot-sur-les-smartphones.831394.html
    - See Fig 3 .
- A quite nice "artistic video" on myMed can be seen on www-sop.inria.fr/teams/lognet/multimedia/myMed_v3.mov. Please enjoy it!

../../../../projets/lognet/IMG/nice-matin4.png

Figure 3. Nice Matin

ASAP Project-Team

2.3. Highlights of the Year

- Google Focused Award (only 2 in Europe this year).
- ERC Proof of Concept Grant AllYours (2013)
- New associate team with the University of Calgary, Canada (RADCON).
- Michel Raynal published two new books on Concurrent Programming and Distributed Algorithms.
- Anne-Marie Kermarrec was elected the Vice Chair of *ACM Eurosys (ACM European Chapter of SIGOPS).*
- Anne-Marie Kermarrec is a member of *Academia Europea* since Sept 2013.
- Michel Raynal has been nominated adjunct professor of University of Hong Kong.

ATLANMOD Project-Team

2.3. Highlights of the Year

Two new European projects to support new research directions for the team.

AtlanMod becomes an official Inria team.

CIDRE Project-Team

2.2. Highlights of the Year

As highlights of the year, we wish to mention four best paper awards.

Mounir Assaf PhD thesis focusses on the verification of security properties in C programs. While investigating the domain, Mounir Assaf has created a static analysis for programs written in an imperative language with pointer aliases whose objective is to verify a property called Terminating-Insensitive Non Interference (TINI). Briefly speaking, this property guarantees that the content of secret variables of a program do not leak into public ones. Hence, this property is of paramount importance for the security of some critical software components. This work has conducted to the publication of two articles. The first one appeared in (IFIP SEC 2013, a renowned international conference in the domain of security), while the second one has been published in [45] (SAR-SSI 2013), a national conference dedicated to the spreading of work in progress to the French speaking security community. Both papers received the best paper award.

Stephane Geller has proposed a language (namely BSPL) for specifying and composing information flow policies. Such policies detail how a piece of data owned by an application is allowed to disseminate in an operating system. Thomas Saliou, Radoniaina Andriatsimandefitra and Valerie Viet Triem Tong have experimented the relevance of this language. They have proposed a semi-automatic way to compute such policies. They have also show that when such policies are enforced it is possible to detect if an application is infected by a malware. This work has led to the publication of an article in an international conference of the security domain . This article received the best student paper award of the conference.

In , we propose an inference attack called the de-anonymization attack, by which an adversary tries to infer the identity of a particular individual behind a set of mobility traces. The implementation of this attack is based on a mobility model called Mobility Markov Chain (MMC), which is built out from the mobility traces observed during the training phase and is used to perform the attack during the testing phase. Experiments led on real datasets demonstrate that the attack is both accurate and resilient to sanitization mechanisms such as downsampling. This paper has received the IEEE best student paper award at the conference TrustCom 2013.
BEST PAPERS AWARDS :

[27] **SEC**. M. ASSAF, J. SIGNOLES, F. TRONEL, E. TOTEL.

[25] **IAS - Information assurance and security - 2013**. R. ANDRIATSIMANDEFITRA, T. SALIOU, V. VIET TRIEM TONG.

[31] **The 12th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (IEEE TrustCom-13)**. S. GAMBS, M.-O. KILLIJIAN, M. NUNEZ DEL PRADO CORTEZ.

MYRIADS Project-Team

2.5. Highlights of the Year

- Eugen Feller has been awarded the second PhD prize of the MATISSE doctoral school by the Fondation Rennes 1 in March 2013 for his thesis entitled *Autonomic and Energy-Efficient Management of Large-Scale Virtualized Data Centers* [53] defended in December 2012 under the supervision of Christine Morin.

- Matthieu Simonin, Eugen Feller, Yvon Jégou, David Margery, Christine Morin and Anne-Cécile Orgerie have been awarded the second prize at the Scale Challenge organized with the ACM/IEEE CC-Grid 2013 conference held in Delft, the Netherlands in May 2013. They demonstrated the scalability and resilience of Snooze IaaS management system [26], developed as part of Eugen Feller's PhD thesis and that has been supported by an Inria technology development action since October 2012.

- The paper entitled *Resilin: Elastic MapReduce over Multiple Clouds* presented by Ancuta Iordache was amongst the three best paper finalists at the CCGRID'2013 conference [31].

<p style="text-align:center">**REGAL Project-Team**</p>

2.2. Highlights of the Year

- Suman Saha received the William C. Carter Award from DSN 2013 . The award recognizes an outstanding paper based on a graduate dissertation, and is the only form of best paper award given at DSN. The award was given for the paper Hector: Detecting Resource-Release Omission Faults in Error-Handling Code for Systems Software.

- Nicolas Geoffray received the 2nd prize for the best PhD thesis in Operating System, from the French Chapter of ACM SIGOPS for his thesis titled "Fostering Systems Research with Managed Runtimes".

- Inria is the leader of the new European project SyncFree, started in October 2013, described in more detail in Section 7.2.1.1 . SyncFree is based on the CRDT (see Section 5.3.5) and SwiftCloud (Section 4.2) technologies, invented here. CRDTs are data types that are guaranteed to ensure eventual consistency by construction. SwiftCloud is a distributed store that leverages CRDTs to support fast and reliable updates to shared data. This European project, which involves several internet start-ups and academic partners, aims to develop cloud-scale applications that are simpler, more scalable and cheaper.

BEST PAPERS AWARDS :

[44] **DSN 2013 - 43rd Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)**. S. SAHA, J.-P. LOZI, G. THOMAS, J. LAWALL, G. MULLER.

SCORE Team (section vide)

ALGORILLE Project-Team (section vide)

ALPINES Team

2.2. Highlights of the Year

- Frédéric Hecht was awarded the EADS Foundation's annual prize for Information Science and its Applications, attributed by the French Academy of Science.

- Best paper finalist at IEEE/ACM Supercomputing 2013 conference, P. Jolivet, F. Hecht, F. Nataf, C. Prud'homme, *Scalable Domain Decomposition Preconditioners For Heterogeneous Elliptic Problems*.

- Best student paper finalist at IEEE/ACM Supercomputing 2013 conference, L. Qu, L. Grigori, F. Nataf, *Parallel Design and Performance of Nested Filtering Factorization Preconditioner*.

AVALON Team (section vide)

CEPAGE Project-Team (section vide)

GRAND-LARGE Project-Team (section vide)

HIEPACS Project-Team

2.2. Highlights of the Year

The `PaStiX` solver is now able to handle efficiently multiple GPU accelerators using runtime systems (`StarPU` or `PaRSEC`). On the Plafrim machine, one GPU card can provide almost the same performance than 12 cores and we get a good scalability while mixing multicores and upto 3 GPUs accelerators.

The first implementation of the Fast Multipole method over a runtime system has been developed in the context of the FASTLA associated team. The main outcome of this work will be published in a paper to appear in the SIAM SISC journal.

<h1 style="text-align:center; color:red">KERDATA Project-Team</h1>

2.2. Highlights of the Year

Team: Shadi Ibrahim, a former Post-Doc fellow at the KerData project-team, has been hired as a permanent Junior Researcher at Inria (CR2) starting in October 2013.

A-Brain MSR-Inria project: The TomusBlobs data-storage layer developed in the framework of the A-Brain MSR-Inria project was demonstrated to scale up to 1000 cores on 3 Azure data centers; it exhibits improvements in execution time up to 50 % compared to standard solutions based on Azure BLOB storage. Based on this storage infrastructure, the A-Brain project has provided the first statistical evidence of the heritability of functional signals in a failed stop task in basal ganglia, using a ridge regression approach, while relying on the Azure cloud to address the computational burden.

Joint Lab for Petascale Computing: The Damaris middleware for I/O and in-situ visualization, initiated in 2010 in the framework of the Joint Laboratory for Petascale Computing, was ported to NCSA's Blue Waters supercomputer and provided in-situ visualization capabilities to the CM1 atmospheric simulation on up to 6400 cores.

MESCAL Project-Team (section vide)

MOAIS Project-Team

2.2. Highlights of the Year

- Best Paper - HeteroPar 2013
- Best Long Paper - Second Prize at Web3D 2013

BEST PAPERS AWARDS :

[23] **Proceedings of the 11th HeteroPar workshop (Algorithms, Models and Tools for Parallel Computing and Heterogeneous Platforms)**. S. KEDAD-SIDHOUM, F. MONNA, G. MOUNIÉ, D. TRYSTRAM.

[17] **18th International Conference on 3D Web**. T. FRANKE, V. SETTGAS, J. BEHR, B. RAFFIN.

ROMA Team

2.2. Highlights of the Year

Anne Benoit, Yves Robert and Frédéric Vivien published a textbook entitled "A Guide to Algorithm Design: Paradigms, Methods, and Complexity Analysis" [40].

RUNTIME Project-Team

2.2. Highlights of the Year

- The hwloc software 5.2 is used for node topology discovery and process binding by the most popular MPI implementations, including MPICH2 and OPEN MPI and all their derivatives such as Intel MPI.

- The StarPU software 5.6 is used for dynamic scheduling by EADS for his hmatrix solver.

ASCOLA Project-Team

2.2. Highlights of the Year

This year we have published two groups of major results. In the domain of efficient resource management in the Cloud, we have proposed an elastic consolidation service, new techniques for enforcing SLA guarantees, and new simulation methods for Cloud environments. These results have all been published in major conferences of the domain: IEEE Cloud, IEEE/ACM CCGrid and IEEE CloudCom, see Sec. 6.3 for more information.

The team has also presented several major results on the foundations of software composition. These include new programming language mechanisms for the correct definition of aspects and techniques for their semantic, in particular type-based, definition. These results have also been published through major dissemination channels: Elsevier's journal Science of Computer Programming and the international conference Modularity.aosd, see Sec. 6.2 for more information.

Moreover, Ismael Figueroa Palet, a PhD student co-supervised by Nicolas Tabareau and Prof. Éric Tanter from University of Chile, has finished first place at the ACM Student Research Competition at Modularity:aosd'13 with the work "Taming Aspects with Monads and Membranes."

Finally, Adrien Lèbre has been appointed in September on an Inria research position for three years.

FOCUS Project-Team

2.2. Highlights of the Year

- Jacopo Mauro's PhD thesis "Constraints Meet Concurrency" has won the 2013 award for Best Italian PhD Theses in Theoretical Computer Science (track Logics, Semantics and Programming Theory). The prize is awarded by the Italian Chapter of EATCS.

- Davide Sangiorgi has received the "LICS Test-of-Time" award (this award recognizes a paper from the proceedings of the conference "Logics in Computer Science" from 20 years prior that has best met the "test of time" in term of impact).

- the EU project Envisage (FP7), on the theme of cloud computing, has been approved and has started its activities.

OASIS Project-Team

2.2. Highlights of the Year

Oasis, together with the Coati team, have signed in Dec. 2013 an industrial grant with the Amadeus company, about distributed algorithms for searching paths in very large graphs.

Oasis started in Sep. 2013 the FP7 project DC4Cities. This will promote the data centres role as an "eco-friendly" through the usage of renewable energies. Accordingly, Oasis will propose innovative scheduling techniques to match such a powering method.

PHOENIX Project-Team

2.2. Highlights of the Year

- Charles Consel was on sabbatical in Montreal at McGill Unversity for the academic year of 2012-2013. This sabbatical year has allowed us to strenghten our academic collaborations in the domain of assistive technology (e.g., Institut universitaire de gériatrie de Montréal, Université du Québec à Trois-Rivières).

- iQSpot, our technology-transfer project, has been rewarded by OSEO (15e édition du Concours national d'aide à la création d'entreprises de technologies innovantes, catégorie "En émergence") and accepted to the startup incubation program of the IRA (Incubateur Régional d'Aquitaine).

- David Daney, a researcher in Robotics, left the COPRIN project-team of CRI Sophia Antipolis-Méditerranée to join the PHOENIX project-team in September 2013. He will be investigating research topics such as system design, sensor deployment and data analysis.

RMOD Project-Team

2.4. Highlights of the Year

- Stéphane Ducasse got promoted DR1 (December 2012).

- A *Web with Pharo* Conference was held 6 June 2013 @ Euratechnologies, Lille

- Pharo 2.0 (our open-source language and environment) was released. (http://www.pharo.org)

- Three releases of Moose: 4.7, 4.8 and 4.9. Moose is our open-source reengineering platform. (http://www.moosetechnology.org)

- The second PharoConf was held at University of Bern, Switzerland April 2-4.

- The first ever Pharo Tutorial at ECOOP in 2013.

- RMoD helped to Organize the Dyla workshop at ECOOP 2013.

- Creation of Synectique. The company is a spin-off based on the research done in RMoD. Synectique is selling software maintenance solutions based on Pharo. (http://www.synectique.eu)

- RMoD participated to the organization of the ESUG conference in Annecy, France in September (over 100 participants).

- *Deep into Pharo* Book Released. *Deep into Pharo* is the second volume of a series of books covering Pharo. (http://rmod.lille.inria.fr/deepIntoPharo/)

- Organization of the MooseDay in Lille on the 19th December with around 25 persons from all around the world.

TRISKELL Project-Team

2.2. Highlights of the Year

- Prof. Robert France (Colorado State University, USA) has been awarded an Inria International Chair. He will join the team in the next five years to develop a research project on multi-concern software modeling and variability.

- The paper Generating Counterexamples of Model-based Software Product Lines: An Exploratory (J. B. Ferreira Filho, O. Barais, M. Acher, J. Le Noir, B. Baudry.) received a best student paper award at the International Software Product Line Conference

- 9 PhD students defended their thesis in 2013

BEST PAPERS AWARDS :

[49] **SPLC - 17th International Software Product Line Conference**. J. B. FERREIRA FILHO, O. BARAIS, M. ACHER, J. LE NOIR, B. BAUDRY.

COATI Project-Team (section vide)

DANTE Team

2.2. Highlights of the Year

2.2.1. *Model for Time-Varying Graphs.*

We propose a novel model for representing finite discrete Time-Varying Graphs (TVGs). The major application of such a model is for the modelling and representation of dynamic networks. In our proposed model, an edge is able to connect a node u at a given time instant t_a to any other node v (u possibly equal to v) at any other time instant t_b (t_a possibly equal to t_b), leading to the concept that such an edge can be represented by an ordered quadruple of the form (u, t_a, v, t_b). Building upon this basic concept, our proposed model defines a TVG as an object $H = (V, E, T)$, where V is the set of nodes, $E \subseteq V \times T \times V \times T$ is the set of edges, and T is the finite set of time instants on which the TVG is defined. We show how key concepts, such as degree, path, and connectivity, are handled in our model. We also analyse the data structures used for the representation of dynamic networks built following our proposed model and demonstrate that, for most practical cases, the asymptotic memory complexity of our TVG representation model is determined by the cardinality of the set of edges. (See [20])

2.2.2. *Tight bounds on the contiguity and linearity of co-graphs.*

We show that the contiguity and linearity of co-graphs on n vertices are both O(log n). Moreover, we show that this bound is tight for contiguity as there exists a family of cographs on n vertices whose contiguity is Omega(log n). We also provide an Omega(log n / log log n) lower bound on the maximum linearity of co-graphs on n vertices. As a by-product of our proofs, we obtain a min-max theorem, which is worth of interest in itself, stating equality between the rank of a tree and the minimum height of one of its path partitions. (See [3])

2.2.3. *Function analysis through wavelets on dynamic contact graphs.*

Parameters of the diffusion and of the mutations of nosocomial bacteria strains are still today not completely understood. The macroscopic mechanisms involved during the diffusion are opposed to microscopic mechanisms which are well known and understood. At the scale of an hospital, this is a complex system that needs to be be simplified and modelled before an epidemiological study of the whole system. We aim at giving an answer to the question of whether there exists a correlation between the contact graph (dynamic network) and the microbiological diffusion of the strains of Staphylococcus Aureus bacteria. For that purpose, the research project MOSAR (Mastering hOSpital Antimicrobial Resistance) and the i-Bird group (Individual Based Investigation of Resistance Dissemination) designed a large scale experiment that has been carried out at the Hospital of Berck-sur-Mer (FRANCE). Our work focuses on comparing the diffusion of some selected strains to the results obtained with wavelets on the aggregated contact graph, the selection being made such as the strains show a clear diffusion over time. We study the correlation between the spatial diffusion of the wavelets and the spatio-temporal diffusion of those strains.

2.2.4. *Hierarchical Modelling of IEEE 802.11 Multi-hop Wireless Networks.*

IEEE 802.11 is implemented in many wireless networks, including multi-hop networks where communications between nodes are conveyed along a chain. We present a modelling framework to evaluate the performance of flows conveyed through such a chain. Our framework is based on a hierarchical modelling composed of two levels. The lower level is dedicated to the modelling of each node, while the upper level matches the actual topology of the chain. Our approach can handle different topologies, takes into account Bit Error Rate and can be applied to multi-hop flows with rates ranging from light to heavy workloads. We assess the ability of our model to evaluate loss rate, throughput, and end-to-end delay experienced by flows on a simple scenario, where the number of nodes is limited to three. Numerical results show that our model accurately approximates the performance of flows with a relative error typically less than 10%.

2.2.5. Awards and honours

Hurst Exponent IntraPartum Fetal Heart Rate: Impact of Decelerations [7] was granted the best paper award in the 26th IEEE International Symposium on Computer-Based Medical Systems (CBMS).
BEST PAPERS AWARDS :
[7] **IEEE 26th International Symposium on Computer-Based Medical Systems (CBMS), 2013**. P. ABRY, S. ROUX, V. CHUDÁČEK, P. BORGNAT, P. GONÇALVES, M. DORET.

DIANA Team

2.2. Highlights of the Year

Our paper , got the Best Paper Award at the ns-3 Workshop (WNS3) at SimuTools, March 2013, Workshop ns-3, Cannes, France.

BEST PAPERS AWARDS :

[26] **Workshop on NS3 (WNS3)**. H. TAZAKI, F. URBANI, T. TURLETTI.

DIONYSOS Project-Team

2.2. Highlights of the Year

This year three books produced by the team appeared: "Markov Chains. Theory, Algorithms and Applications" at Wiley, written by Bruno Sericola first in English, then in French, and "Telecommunication Network Economics: From Theory to Applications", written by Bruno Tuffin with Patrick Maillé, at Cambridge University Press.

DYOGENE Project-Team (section vide)

FUN Project-Team

2.2. Highlights of the Year

CENTR R&D award 2013 have been attributed on October 2nd at CENTR GA meeting. The ANR VERSO WINGS in which the FUN research group is partner has been awarded among 45 nominees. There were 4 categories (Security, R&D, Marketing and Communication, Contributor of the Year), 5 projects have been awarded in each category.

GANG Project-Team (section vide)

HIPERCOM2 Team

2.2. Highlights of the Year

- **PhD Thesis**: Ichrak Amdouni got her PhD Thesis, entitled "Wireless Self-adaptive Ad hoc and Sensor Networks: Energy Efficiency and Spatial Reuse", University Pierre et Marie Curie - Paris VI, February 2013, with Pascale Minet as adviser and Cedric Adjih.

- **PEMWN 2013**: The HIPERCOM2 team actively contributed to the technical and practical organization of the PEMWN 2013 workshop, Performance Evaluation and Modeling of Wireless Networks, held in Hammamet in November 2013. Pascale Minet and Leila Saidane from ENSI (Tunis) were co-general chairs. Cedric Adjih and Paul Muhlethaler were members of the program committee. Christine Anocq was in charge of the pre-registration.

- **Demonstration of OCARI**: The HIPERCOM2 team and more precisely, Cedric Adjih, Ichrak Amdouni, Ines Khoufi, Pascale Minet and Ridha Soua made presentations and demonstrations of the routing protocol and the coloring algorithm of OCARI, an energy-efficient wireless sensor network supporting determinism.

MADYNES Project-Team

2.2. Highlights of the Year

The following points of 2013 deserves to be highlighted:

- Two new permanent members joined the MADYNES team: Bernardetta Addis and Thibault Cholez. They are associate professor at the University of Lorraine with teaching activities at Mines Nancy and TELECOM Nancy, respectively.

- An outstanding publication was achieved in the journal "IEEE Communications Surveys and Tutorials" which has an impact factor of 4.8.

- In relation with research (Aetournos project, R2D2 ADT), the Alérion project has been one of the "15ème concours national de création d'entreprises innovantes" (national innovative startup program) prize-winner in 2013 in the "emerging" category. The Alérion project is offering an e-falconry solution based on interconnected cyber-physical bricks which will allow for the design of advanced and innovative services, and other serious games. Increasingly autonomous vehicles (UAV, UGV ...) and systems are becoming part of our daily world and can offer novel civilian applications (gaming "drones", aerial photography, vacuum cleaners ...).

- To foster the new application domain developed by the team on Software Defined Networking, the team co-organized the SDN Days (GdR CNRS RESCOM) in Loria (Nancy)

MAESTRO Project-Team

2.2. Highlights of the Year

The book by K. Avrachenkov, J. Filar and P. Howlett, "Analytic Perturbation Theory and Its Applications" [68] has been completed and published in December 2013. The book provides a unifying treatment of analytic perturbations with particular emphasis on singular perturbations. The applications considered in the book include: linear and non-linear optimization, Markov chains, Markov Decision Processes.

G. Neglia got the one-minute madness award at the conference IFIP 12th Intl. Conference on Networking (IFIP Networking 2013), for his one-minute presentation of the paper [49].

BEST PAPERS AWARDS :

[58] **ACM PM2HW2N - 8th Workshop on Performance Monitoring and Measurement of Heterogeneous Wireless and Wired Networks**. K. IBRAHIMI, E. ALTMAN, M. HADDAD.

[60] **IEEE VTC - 77th Vehicular Technology Conference**. G. NEGLIA, X. ZHANG, J. KUROSE, D. TOWSLEY, H. WANG.

RAP Project-Team (section vide)

SOCRATE Project-Team

2.4. Highlights of the Year

2.4.1. FIT/CortexLab first on-line demonstration

FIT(Future Internet of Things) is a french Equipex (Équipement d'excellence) which aims to develop an experimental facility, a federated and competitive infrastructure with international visibility and a broad panel of customers. FIT will be composed of four main parts: a Network Operations Center (NOC), a set of Embedded Communicating Object (ECO) testbeds, a set of wireless OneLab testbeds, and a cognitive radio testbed (CorteXlab) deployed by the Socrate team in the Citi lab. In 2013 the construction of the room was finished see Figure 3 . SDR nodes have been bought after setting two call for tenders, 42 industrial PCs (Aplus Nuvo-3000E/P), 22 NI radio boards (USRP) and 18 Nutaq boards (PicoSDR, 2x2 and 4X4) will now be installed in the room. A first version of the software infrastructure has been deployed and small experimentations (involving 2 USRP nodes) have been made from various places (from Brasil, United States, Villeurbanne).

2.4.2. Socrate at Paris-Tours cycling race

France Télévisions, Euro Media France and Amaury Sport Organisation have partnered again to deliver the Paris-Tours cycling race, using a wireless sensor solution to geolocate riders in realtime. These sensors where deployed in a collaboration with HikoB (Inria/Citi-lab start-up) and Socrate who provided the distributed cyclocalisation algorithm

In what was claimed as a world first, Euro Media France equipped the 200 competitors with special HikoB sensors at the beginning of the Paris-Tours race in Authon-de-Perche. This enabled to pinpoint the exact position of every rider and feed the information in real-time.

This collaboration is now held in a FUI project called Smacs. Next demostration should occur in the tour de France in 2014 targeting full deployment at the Olympic Games of 2016 in Rio de Janeiro.

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../../../../projets/socrate/IMG/DSC_0219.jpg
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Figure 3. Photo of the FIT/CortexLab experimentation room before adding SDR *nodes to the ceiling*

URBANET Team (section vide)