



RESEARCH CENTER

FIELD

**Networks, Systems and Services,  
Distributed Computing**

Activity Report 2012

# Section highlights of the Team

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## **ACES Project-Team**

### **2.2. Highlights of the Year**

Aces designed and developed several applications based on the coupled objects (see section 3.3). Our results have been recognized: the paper that presents the principle of "pervasive integrity checking" has received a best paper award in ANT 2011. And a part of Ubi-check software has been demonstrated at IEEE Percom 2012, and has received the Best Demo Award [7].

## ADAM Project-Team

### 2.2. Highlights of the Year

We highlight two results that are of particular interest with respect to our annual activity. Both of them deal with the reconfiguration of software systems and are related to PhD theses that have defended in 2012. The first one is concerned with the application of the notion of reconfiguration to software processes in service-oriented architectures. The second one deals with the formalization of quality of service contracts in reconfigurable software systems.

Gabriel Hermosillo's PhD thesis [11], that was defended on 5 June 2012, deals with reconfigurable middleware, and has provided a solution for dynamically reconfiguring business processes in service-oriented architectures. So far, our results in terms of reconfiguration were mainly in terms of fine-grained artefacts, such as components. This thesis has demonstrated that this property can be achieved for coarse-grained artefacts, such as business processes. This opens interesting perspectives, especially in terms of industrial impact, since many complex workflow activities in IT systems are expressed as business processes with stringent needs for adaptation to evolving execution conditions. Furthermore, the thesis demonstrated that the domains of Complex Event Processing (CEP) [107] can be integrated in a comprehensive framework where events and their processing rules are the triggering conditions for process adaptation. This has resulted in the development of the CEVICHE framework that was the topic of several major publications [104], [103], [114] in addition to the thesis manuscript itself.

Gabriel Tamura's PhD thesis [12], that was defended on 28 May 2012, deals with the reliable preservation of quality of service (QoS) contracts in component-based software systems under changing conditions of execution. In response to this challenge, the presented contribution is twofold. The first one is a model for component-based software applications, QoS contracts and reconfiguration rules as typed attributed graphs, and the definition of QoS-contracts semantics as state machines in which transitions are performed as software reconfigurations. Thus, we effectively use (formal) models at runtime to reliably reconfigure software applications for preserving its QoS contracts. More specifically, we show the feasibility of exploiting design patterns at runtime in reconfiguration loops to fulfill expected QoS levels associated to specific context conditions. We realize this formal model through a component-based architecture and a reference implementation that can be used to preserve the QoS contracts of executed middleware applications. The second contribution is the characterization of adaptation properties to evaluate self-adaptive software systems in a standardized and comparable way. By its own nature, the adaptation mechanisms of self-adaptive software systems are essentially feedback loops as by defined in control theory. Thus, it is reasonable to evaluate them using the standard properties used to evaluate feedback loops, re-interpreting these properties for the software domain. We define the reliability of our formal model realization in terms of a subset of the characterized adaptation properties, and we show that these properties are guaranteed in this realization. This has resulted in the development of the QOS-CARE framework that was the topic of several major publications [66], [67], [63], [127] in addition to the thesis itself.

## **ARLES Project-Team**

### **2.2. Highlights of the Year**

During this year, while we have pursued our research on advanced service-oriented architectures and related middleware solutions for next generation networking environments, we have also made advances over our initial progress in research on several new subjects, called for by the ongoing drastic evolution of the networking environment:

- Dynamic interoperability among networked systems towards making them eternal, by way of on-the-fly generation of connectors based on adequate system models. This research is part of a major European collaborative project within the Future and Emerging Technology program of the EC FP7-ICT (§ 6.2 , § 7.2.1.1 ), which was successfully completed in November 2012 with the highest rating of “Excellent progress (the project has fully achieved its objectives and technical goals for the period and has even exceeded expectations)”.
- Interaction paradigm abstractions and service oriented middleware for choreographies in the ultra-large scale future Internet. This research is also part of a major European collaborative project within the Software and Service Architectures and Infrastructures programme of the EC FP7-ICT (§ 6.4 , § 7.2.1.2 ).

## **ASAP Project-Team**

### **2.3. Highlights of the Year**

- **Best Paper Award PODC 2012** ACM Symposium on Principles of Distributed Computing (G. Giakkoupis and P. Woelfel, *On the time and space complexity of randomized test-and-set*).
- **Chair of the ACM Software System Award committee** (A.-M. Kermarrec)
- **ERC Proof of Concept Grant** (A.-M. Kermarrec)



## **ASCOLA Project-Team**

### **2.2. Highlights of the Year**

This year we have produced three major scientific results. Concerning the foundations of programming, we have extended the Calculus of Construction, the type theory underlying the Coq theorem prover by new logical principles that haven't been tractable before [22], see Sec. 6.1 . We have also extended the A Calculus, the currently most comprehensive foundational calculus for AspectJ-like and history-based aspect models, by a non-deterministic semantics and have provided a type soundness proof that is close to standard mathematical reasoning and automated using Coq [12], see Sec. 6.2 . In the domain of efficient Cloud infrastructures, we have proposed DVMS, a fully-distributed and autonomous system for VM scheduling, that includes one of the currently most highly-scalable scheduling algorithm [13], see Sec. 6.3 .

ASCOLA is part of the new EU FP7 IP project A4Cloud on Accountability for the Cloud, a project with 13 industrial and academic partners, see Sec. 8.2 .

Finally, ASCOLA members have organized the Grid'5000 international winter school at École de Mines de Nantes, which brought together seventy, mostly European, PhD students and senior researchers, see Sec. 9.1 .

## ATLANMOD Team

### 2.3. Highlights of the Year

- Jordi Cabot has successfully defended his HdR. Title of the habilitation thesis: *MDE 2.0.: pragmatic model verification and other stories*
- Publication of the book *Model-Driven Software Engineering in Practice* (Morgan and Claypool) co-authored by Jordi Cabot. See also the popularization section.

**CIDRE Project-Team (section vide)**

## **FOCUS Project-Team**

### **2.2. Highlights of the Year**

- Jacopo Mauro's PhD thesis, entitled "Constraints meet concurrency", has been awarded a price as the best dissertation for the two years 2010 and 2011 by the Italian Association for Logic Programming (GULP).

**INDES Project-Team (section vide)**

## 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 !

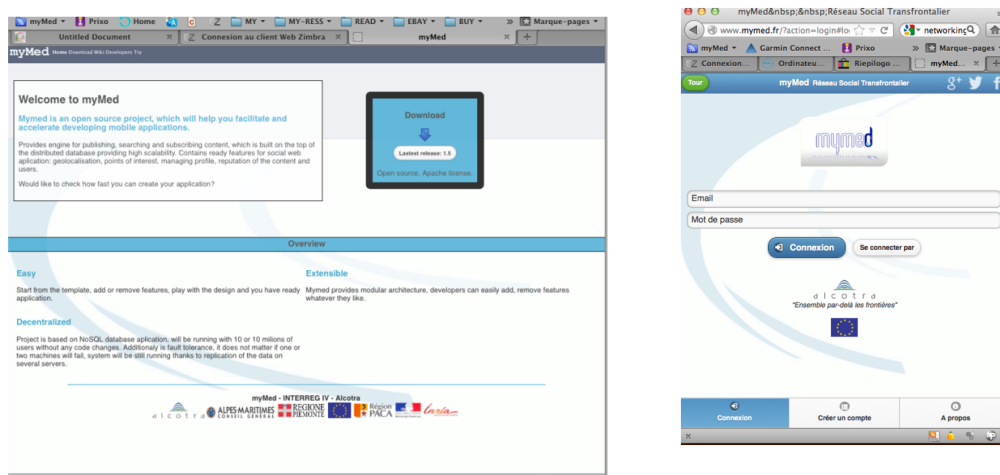


Figure 2. <http://www.mymed.fr>

- 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](http://www-sop.inria.fr/teams/lognet/multimedia/myMed_v3.mov). Please enjoy it!

nice-matin  
Lundi 29 octobre 2012 5

**CHÂTEAUNEUF-VILLEVIEILLE**

## Le Pays des Paillons aura son propre réseau social sur le web

D'abord, il y a eu la diffusion du guide des transports. Puis, un travail de terrain qui a permis de recenser environ soixante-dix points d'intérêts du Pays des Paillons. Maintenant, l'Association pour le développement du Pays des Paillons (ADPP) caresse un nouveau projet qui s'articulera autour des réseaux sociaux. Le conseil de développement vient de réunir, à Châteauneuf-villevieille, les maires des communes du Pays des Paillons, les membres du conseil de développement, les professionnels du tourisme. Geneviève Bach, vice-présidente de l'ADPP, et Nadine Broch, présidente du conseil de développement, ont présenté le projet.



**Le maire Edmond Mari a accueilli les porteurs du projet MyMed.**  
(Photo N. P.)

MyMed est un réseau social transfrontalier, à coût zéro, élaboré dans le cadre du programme européen Alcotra qui favorise l'échange d'informations à partir d'un ordinateur ou d'un smartphone. Luigi Liquori, chef de file du projet et directeur de recherche à l'Inria, à Sophia Antipolis, a précisé que MyMed se proposait de conjuguer les fonctionnalités offertes par les réseaux sociaux classiques (Facebook, LinkedIn...) et les sites de partage (YouTube, Wikipédia...) aux besoins et particularités de la zone transfrontalière. Différentes applications composent ainsi MyMed, parmi lesquelles MyRiviera. M. Vani, ingénieur, a souligné que cette dernière communiquerait principalement sur des événements comme les manifestations sportives, concerts, festivals... Pour le maire Edmond Mari, « ce réseau social contribue notamment à valoriser les spécificités territoriales du Pays des Paillons, ses richesses patrimoniales et son dynamisme ».

Afin de concrétiser ce projet, des ateliers seront planifiés pour communiquer plus amplement sur ce réseau social.

**NELLY PUJOL**

Figure 3. Nice Matin

## **MYRIADS Project-Team**

### **2.5. Highlights of the Year**

- Support for research and innovation Inria Award received in June 2012 by David Margery, Grid'5000 technical director, hosted in Myriads team;
- ASF (ACM SIGOPS de France) Best PhD thesis in system for Anne-Cécile Orgerie who has joined Myriads team in October 2012 (PhD advised by Laurent Lefèvre and Isabelle Guérin-Lassous at ENS de Lyon and defended in September 2011) ;
- Best Paper finalist at CloudCom 2012 (paper presenting the results of the work of the Master internship of Armel Esnault, co-advised by Eugen Feller and Christine Morin);
- Highly successful second annual review by the European Commission of the Contrail project, coordinated by Christine Morin, assisted by Roberto Cascella, technical manager.



## **OASIS Project-Team**

### **2.2. Highlights of the Year**

Ludovic Henrio defended his HDR entitled: “Formal Models for Programming and Composing Correct Distributed Systems” in September 2012.

BEST PAPER AWARD :

**[22] 8th International ICST Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, Tridentcom. F. HERMENIER, R. RICCI.**

## PHOENIX Project-Team

### 2.2. Highlights of the Year

- Our first user experiments in the domain of digital assistance:
  - Experimental evaluation of a digital assistance for school inclusion of autistic children (first deployment in the *Gérard Philippe* College in Pessac from September 2012),
  - Need analysis and pre-evaluation of DiaSuiteBox with 80 elderly persons, in collaboration with the UDCCAS Gironde (Union Départementale des Centres Communaux d'Action Sociale) managing elderly care and the “Université du Temps Libre” in Bordeaux,
  - Experimental evaluation of a cognitive assistance for supporting the autonomy of persons with intellectual disabilities, in collaboration with the TSA Chair of UQTR (Université du Québec à Trois-Rivières).

These experiments are supervised by Hélène Sauzéon, a researcher in Cognitive Science member of the PHOENIX project-team, on leave from the University of Bordeaux 2 since September 2012.

- The DiaSuiteBox project has been accepted to the startup accelerator program “Le Camping” in Toulouse. This program allows 6 startup projects to be mentored by experienced entrepreneurs during 6 months.
- Five articles accepted in top-ranked journals (IEEE Transactions on Software Engineering, Visual Languages and Computing, 2 Software Practice and Experience, and Science of Computer Programming).

## **REGAL Project-Team**

### **2.2. Highlights of the Year**

: Tegawendé F. Bissyandé (LaBRI, Bordeaux), Laurent Réveillère (LaBRI, Bordeaux), Julia Lawall (Regal) and Gilles Muller (Regal) received the best paper award at ASE 2012 for their work on *Diagnosis: Automatic Generation of a Debugging Interface to the Linux Kernel*.

BEST PAPER AWARD :

[24] **27th IEEE/ACM International Conference on Automated Software Engineering (ASE 2012)**. T. F. BISSYANDÉ, L. RÉVEILLÈRE, J. LAWALL, G. MULLER.

## RMOD Project-Team

### 2.4. Highlights of the Year

- *Emergence Award*: Synectique is a startup project of RMoD around building customized software analysis tools. The project participated in the competition by French Ministry of research and higher education for innovative projects (“Concours OSEO”). The project was selected in the competition and won an award of 30K€ to develop its activities (<http://rmod.lille.inria.fr/web/pier/blog/synectique-oseo>).
- Moose 4.6 (our open-source reengineering platform) was released (<http://www.moosetechnology.org/>).
- Pharo 1.4 (our open-source language and environment) was released (<http://www.pharo-project.org>).
- RMoD organized the first Pharo Conference during two days in May (60 participants).
- RMoD participated to the organization of the ESUG conference in Ghent, Belgium in August (130 participants).
- Marcus Denker got promoted to CR1.
- RMoD launched the Pharo Consortium and the Pharo Association.

## **SARDES Project-Team**

### **2.2. Highlights of the Year**

ICI Vous pouvez ecrire du texte

**SCORE Team (section vide)**

## **TRISKELL Project-Team**

### **2.2. Highlights of the Year**

The evaluation seminar has been the main event for the team in 2012. We believe it is a highlight, since we have been evaluated on all our results and activities on the 2008 - 2012 period, and the feedback from the reviewers panel is very positive. They have emphasized the high quality of our results and also encouraged to pursue our perspectives of software engineering for open systems.

## **ALGORILLE Project-Team**

### **2.2. Highlights of the Year**

- Our team (composed of Luc Sarzyniec, Sébastien Badia, Emmanuel Jeanvoine and Lucas Nussbaum) won the **best challenge entry award during the Grid'5000 winter school**. We successfully demonstrated the deployment of 4500 virtual machines using Kadeploy3 in less than an hour. An earlier iteration of this work was selected as a **finalist of the SCALE challenge, held with CCGrid'2013**.



**AVALON Team (section vide)**

## **CEPAGE Project-Team**

### **2.3. Highlights of the Year**

- A long paper has been presented at the STOC'12 Conference: I. Abraham, S. Chechik and C. Gavoille. *Fully Dynamic Approximate Distance Oracles for Planar Graphs via Forbidden-Set Distance Labels* in 44th Annual ACM Symposium on Theory of Computing (STOC), pp. 1199-1217, New York, May 2012.
- Ralf Klasing was the Conference Chair of the *11th International Symposium on Experimental Algorithms (SEA 2012)*, Bordeaux, France, June 7-9, 2012.
- The members of CEPAGE have been involved in the following program committees: SODA 2013, IPDPS 2013, DISC 2012, ISAAC 2012, ICDCN 2012, IPDPS 2012 FOMC 2012, ADHOC-NOW 2012, IWOCA 2012, SEA 2012, ALGOTEL 2012, FUN2012.

**GRAND-LARGE Project-Team (section vide)**

## **HIEPACS Project-Team**

### **2.2. Highlights of the Year**

- With the Lawrence Berkeley National Laboratory (LBNL) and Stanford an associate team has been initiated, which name is FASTLA [http://people.bordeaux.inria.fr/coulaud/projets/FastLA\\_Website/index.html](http://people.bordeaux.inria.fr/coulaud/projets/FastLA_Website/index.html). In this collaborative research initiative we propose to study, design and implement hierarchical parallel scalable numerical techniques to address two challenging numerical kernels involved in many intensive simulation codes: namely, the N-body interaction calculations and the solution of large sparse linear systems.
- In the framework of the EADS-ASTRIUM/Inria/Conseil Régional Aquitaine agreement officially signed on March 29th, HiePACS hosts Guillaume Sylvand, EADS-IW senior engineer, who has a strong expertise in large scale parallel simulation and is an expert of parallel fast multipole techniques. Guillaume Sylvand already plays an active role in the scientific activities and will enable to strength the interaction between the academic applied and industrial research and will contribute to shrink the gap between the two.

## **KERDATA Project-Team**

### **2.2. Highlights of the Year**

- The KerData project-team has been officially created on July 1st 2012 as a Joint Project-Team with ENS Cachan/Brittany and INSA Rennes, for a 4-year term.
- Alexandru Costan, a former Post-Doc fellow at the KerData project-team, has been hired on a permanent position at INSA. Alexandru got his PhD in Valentin Cristea's NCIT group at Polytechnic University of Bucharest (Romania), our partner in the *DataCloud@work* Inria Associate Team.
- The KerData project-team organized the 7th Workshop of the Inria-Illinois Joint Laboratory on Petascale Computing, June 13-15, 2012 <http://jointlab.ncsa.illinois.edu/events/workshop7/>.
- After successful experiments with up to 9000 cores on the Kraken Cray XT5 machine (NICS) in 2011, Damaris scaled up to 16000 cores on Oak Ridge's leadership supercomputer Titan (now first in the Top500), providing in-situ analysis to the CM1 tornado simulation.

## **MESCAL Project-Team**

### **2.3. Highlights of the Year**

- Brigitte Plateau received the *Grand Prix des sciences de l'informatique et de leurs applications* of the EADS foundation.
- Panayotis Mertikopoulos received the best paper award at NETGCOOP 2012.

## **MOAIS Project-Team**

### **2.2. Highlights of the Year**

- Moais participates to the Kinovis project (leaded by E. Boyer, Morpheo team): Kinovis is the successor of the Grimage platform and has been selected in the equipex call for proposal.

**ROMA Team (section vide)**



## **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 5.7 is used for dynamic scheduling by the state-of-the art dense linear algebra library, Magma v1.1 <http://icl.cs.utk.edu/magma/> .

## DANTE Team

### 2.2. Highlights of the Year

#### 2.2.1. *Electronic Sensors to measure the exposition of Health care worker to Tuberculosis*

Direct observation has been widely used to assess interactions between healthcare workers (HCWs) and patients but is time-consuming and feasible only over short periods. We used a wireless sensors (RFID like) system to automatically measure HCW-patient interactions. Methods: We equipped 50 patient rooms with fixed sensors and 111 HCW volunteers with mobile sensors in two clinical wards of two hospitals. For 3 months, we recorded all interactions between HCWs and 54 patients under airborne precautions for suspected ( $n = 40$ ) or confirmed ( $n = 14$ ) tuberculosis. Number and duration of HCW entries into patient rooms were collected daily. Concomitantly, we directly observed room entries and interviewed HCWs to evaluate their self-perception of the number and duration of contacts with tuberculosis patients. The RFID was well accepted by HCWs. This original technique holds promise for accurately and continuously measuring interactions between HCWs and patients, as a less resource-consuming substitute for direct observation. The results could be used to model the transmission of significant pathogens. HCW perceptions of interactions with patients accurately reflected reality. Results are published in PLoS ONE 7(5): e37893. doi:10.1371/journal.pone.0037893 (See[6])

#### 2.2.2. *Network science as a tool to study the Complex Systems Science field: Dreams of Universality, Reality of Interdisciplinarity...*

Using a large database (more than 215 000 records) of relevant articles, we empirically study the "complex systems" field and its claims to find universal principles applying to systems in general. The study of references shared by the papers allows us to obtain a global point of view on the structure of this highly interdisciplinary field. We show that its overall coherence does not arise from a universal theory but instead from computational techniques and fruitful adaptations of the idea of self-organization to specific systems. We also find that communication between different disciplines goes through specific "trading zones, i.e., sub-communities that create an interface around specific tools (a DNA microchip) or concepts (a network) [5].

#### 2.2.3. *Equipex FIT (Futur Internet of Things)*

Within the FIT project, DANTE is leading the IoT-LAB workpackage and testbeds (Internet of Things Lab). Through its IoT-LAB testbeds, the FIT project will provide a very large-scale infrastructure suitable for testing heterogeneous embedded communicating objects of all sorts. Going beyond the existing SensLAB testbed, a pioneering testbed for small wireless sensor devices, the five ECO testbeds developed within FIT will encompass the following test environments:

- Internet
- wireless networks
- mobile networks
- sensor and actuator networks (SANETs)
- home gateways and access networks
- low-power and lossy networks (LLNs)

The testbeds will include a fleet of mobile robots which can be deployed to simulate a wide variety of different scenarios. The movement of each robot is controllable, and several smart objects can be embedded on each to simulate a Body Area Network. These mobile objects may act as an ad hoc network or use the fixed infrastructure that surrounds them to communicate via a real or emulated network. With full control of the network nodes and an access to the gateways these nodes are connected to, researchers are able to monitor their energy consumption as well as network-related metrics such as the end-to-end delay, throughput or overhead. DANTE leads the design of the software and hardware of all IoT-LAB nodes and a strong collaboration was set up with HiKoB company, created in 2011, an innovative startup in the field of sensor networking and embedded communicating measure.

#### **2.2.4. Awards and honours**

Classification of Content and Users in BitTorrent by Semi-supervised Learning Methods [21] was granted the best paper award at the 3rd International Workshop on Traffic Analysis and Classification (in conjunction with the 8th International Wireless Communications and Mobile Computing Conference, 2012). This result is part of M. Sokol PhD work, which is co-advised by Ph. Nain (Inria MAESTRO) and P. Gonçalves.

BEST PAPERS AWARDS :

**[21] 8th International Wireless Communications and Mobile Computing Conference (3rd International Workshop on Traffic Analysis and Classification). K. AVRACHENKOV, P. GONCALVES, A. LEGOUT, M. SOKOL.**

## **DIONYSOS Project-Team**

### **2.2. Highlights of the Year**

We had two best paper awards in 2012, one on video delivery techniques (see 5.4 and the project VIPEER 7.2.3), and the other one on QoE for Femto cells (see 5.1).

BEST PAPERS AWARDS :

[73] **International Conference on Network of the Future**. L. ZHE, K. SBAL, Y. HADJADJ-AOUL, A. GRAVEY, D. ALLIEZ, J. GARNIER, G. MADEC, G. SIMON, K. D. SINGH.

[71] **IEEE International Conference on Communication (ICC)**. T. TALEB, A. KSENTINI.

**DISTRIBCOM Project-Team (section vide)**

## **FUN Team**

### **2.2. Highlights of the Year**

The DECARTE funding project received the European RFID Award in March 2012 by RFID European Lab of ESCP Europe.

**GANG Project-Team (section vide)**

## HIPERCOM Project-Team

### 2.2. Highlights of the Year

- **Habilitation à Diriger des recherches:** Emmanuel Baccelli got his HDR entitled "IP-Disruptive Wireless Networking: Integration in the Internet", from the University Pierre et Marie Curie - Paris VI, December 2012.
- **PhD Thesis:** During year 2012, four PhD theses were defended:
  - **Salman Malik**, "Evaluation et Optimisation des Réseaux Sans Fil Denses", University Pierre et Marie Curie - Paris VI, November 2012, with Philippe Jacquet as adviser.
  - **Yacine Mezali**, "Algorithme de Géolocalisation Intérieure par Différenciation de Signaux WiFi", University Pierre et Marie Curie - Paris VI, March 2012, with Philippe Jacquet as adviser.
  - **Iskander Banaouas**, "Analyse et Optimisation des Protocoles d'Accès dans les Réseaux sans fil Ad Hoc", University Pierre et Marie Curie - Paris VI, February 2012, with Paul Muhlethaler as adviser.
  - **Ana Cristina B. Kochem Vendramin**, "Cultural GrAnt: um protocolo de roteamento baseado em inteligência coletiva para redes tolerantes a atrasos", Federal Technological University of Paraná, June 2012, with Anelise Munaretto Fonseca, Myriam R. De B. da Silva Delgado and Aline Carneiro Viana as co-advisers.
- **PEMWN 2012**, Performance Evaluation and Modeling of Wireless Networks is the workshop held in conjunction with the NoF 2012 conference (Network of the Future) : The HIPERCOM team actively contributed to the technical and practical organization of the PEMWN 2012 workshop held in Tunis in November 2012. 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 registration.
- **Demonstration of OCARI:** The HIPERCOM team and more precisely, Cedric Adjih, Ichrak Amdouni, Ines Khoufi, Pascale Minet and Ridha Soua made a presentation and a demonstration of the routing protocol and the coloring algorithm of OCARI, an energy-efficient wireless sensor network supporting determinism, at:
  - the EPRI international workshop organized by EDF, Chatou, April 2012,
  - the ICSSEA international conference in Paris, October 2012.
- **Vulgarisation of computer science:** The HIPERCOM team and more precisely, Cedric Adjih, Ichrak Amdouni, Ines Khoufi and Ridha Soua explained the principles of communication and routing in wireless sensor networks to undergraduates and students.



**MADYNES Project-Team (section vide)**

## MAESTRO Project-Team

### 2.2. Highlights of the Year

- Eitan Altman has received the France Telecom Prize awarded by the French Academy of Sciences.

BEST PAPERS AWARDS :

[47] **8th International Wireless Communications and Mobile Computing Conference (IWCMC)**. K. AVRACHENKOV, P. GONÇALVES, A. LEGOUT, M. SOKOL.

[53] **6th International Conference on Performance Evaluation Methodologies and Tools (VALUE-TOOLS)**. N. CHOUNGMO FOFACK, P. NAIN, G. NEGLIA, D. TOWSLEY.

[58] **14èmes Rencontres Francophones sur les Aspects Algorithmiques des Télécommunications (Algo-Tel)**. F. V. FOMIN, F. GIROIRE, A. JEAN-MARIE, D. MAZAURIC, N. NISSE.

**MASCOTTE Project-Team (section vide)**

## PLANETE Project-Team

### 2.2. Highlights of the Year

- Our paper entitled “I know who you will meet this evening! Linking wireless devices using Wi-Fi probe requests,” got the Best Paper Award – Runner Up, in IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WoWMoM 2012), San Francisco, California, USA.
- After several years of heavy involvement in the IETF activities in the transport and routing areas, four documents authored or co-authored by project-team members reached the RFC status in 2012.
  - RFC 6726 (“Standards Track”) is a revision of the RFC 3926 that specifies FLUTE, the application that enables the reliable transmission of multimedia files to a large set of receivers, typically portable devices (smartphones). Over the years FLUTE and the underlying transport protocol, ALC, became key components that are now part of all the wireless Internet standards. This revision benefits from the insight gained by the deployment and usage of these components since 2006.
  - RFC 6584 (“Standards Track”) explains how to use classic authentication and integrity schemes (i.e. group MAC and digital signatures) in the ALC and NORM reliable multicast protocols. All the applications built on top of them, FLUTE for instance, directly benefit from this service.
  - RFC 6816 (“Standards Track”) specifies how to use the LDPC-Staircase AL-FEC codes (that we previously specified in RFC 5170) in the context of FECFRAME, a framework that enables AL-FEC codes to be dynamically and flexibly inserted in communication stacks for improved robustness. The typical use-case is the reliable delivery of multimedia contents in streaming mode. Therefore this RFC 6816 enlarges the fields of application of our LDPC-Staircase codes, initially designed to address file delivery use-cases (e.g. with FLUTE/ALC), to the realtime transmission of contents in streaming mode.
  - RFC 6834 (“Experimental Track”) specifies a mechanism to enforce state consistency between LISP sites by using version numbers in LISP mappings. LISP (Locator/ID Separation Protocol) uses mappings and encapsulation to improve the scalability of Internet routing and data-centers. This RFC is an enabler for fast and scalable resiliency and mobility techniques in LISP but also for state consistency in complex LISP (e.g., large datacenters).

**RAP Project-Team (section vide)**

## **SOCRATE Team**

### **2.1. Highlights of the Year**

#### **2.1.1. CortexLab room construction start**

**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 2012 the construction of the room started in the Citi lab building basement. Photos of the room are now available [on-line](#).

#### **2.1.2. Socrate at Paris' Marathon**

Former french cycle Champion Laurent Jalabert ran the 42,195 km of Paris Marathon, commenting lively his performances and wearing an experimental set of sensors analysing in real time data from the race (stride, heart, etc.). Data was sent by radio to a motorcycle relaying information with euromedia bus and printed on the TV screen in real time (see the [press release](#) for instance). This experiment was made in a collaboration between socrate, Euromedia and HiKoB, next demonstration should happen tour de France in 2013 targeting full deployment at Olympic Games of 2016 in Rio de Janeiro.

## **TREC Project-Team**

### **2.2. Highlights of the Year**

F. Baccelli was awarded the Simons Math+X Chair to further develop Wireless Stochastic Geometry.

M. Lelarge was the recipient of the 2012 ACM SIGMETRICS Rising Star Researcher Award. <http://www.sigmetrics.org/risingstar-2012.shtml>

## URBANET Team

### 2.2. Highlights of the Year

First, Quentin Lampin, Orange Labs PhD student, co-supervised by Isabelle Augé-Blum and Fabrice Valois in the settings of a bilateral contract with Orange Labs (Dominique Barthel) and contributing for Orange Labs to the ANR ARESA2 project, has been hired by Orange Labs on a permanent researcher position in december 2012.

In september 2012, Razvan Stanica has been hired Associate Professor at INSA Lyon and joined the Urbanet team. He did his PhD thesis at IRIT, Toulouse, supervised by André-Luc Beylot. Khaled Boussetta has also been awarded an Inria "delegation" temporary position and joined the Urbanet team. His permanent Associate Professor position is within University of Paris XIII.

An ARC 7 regional grant has been awarded to the team for hiring a PhD student (namely Trista Lin) and collaborating with the "Agence d'Urbanisme de Lyon" on mobility measurement and service cartography. This research is focusing on networking and software issues of smart parking applications.

Within the second phase of the Inria/Alcatel-Lucent lab, an ADR has been created on green networking issue and granted one postdoc and one PhD positions. The PhD position is dedicated to the topic we are in charge within the ADR: dynamic switch on/off mechanisms for micro-cellular network leveraging wireless sensor techniques.