



Activity Report 2014

Team COAST

Web Scale Trustworthy Collaborative Service
Systems

RESEARCH CENTER
Nancy - Grand Est

THEME
Distributed Systems and middleware

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Team COAST

Keywords: Collaborative Work, Data Management, Peer-to-peer, Process Engineering, Service Orchestration, Service Oriented Architecture

Creation of the Team: 2014 July 01.

1. Members

Research Scientist

Claudia Ignat [Inria, Researcher]

Faculty Members

François Charoy [Team leader, Univ. Lorraine, Professor, HdR]

Khalid Benali [Univ. Lorraine, Associate Professor, HdR]

Gérôme Canals [Univ. Lorraine, Associate Professor]

Claude Godart [Univ. Lorraine, Professor, HdR]

Gérald Oster [Univ. Lorraine, Associate Professor]

Olivier Perrin [Univ. Lorraine, Professor, HdR]

Pascal Urso [Univ. Lorraine, Associate Professor]

Samir Youcef [Univ. Lorraine, Associate Professor]

PhD Students

Amina Ahmed Nacer [Univ Bejaia, From Oct 2014]

Mehdi Ahmed-Nacer [Univ. Lorraine]

Luc André [Univ. Lorraine]

Ahmed Bouchami [Univ. Lorraine]

Quang Vinh Dang [Univ. Lorraine, from Oct 2014]

Elio Goettelmann [CRP H. Tudor]

Jordi Martori Adrian [Inria]

Guillaume Rosinosky [Univ. Lorraine, from Dec 2014]

Administrative Assistants

Sophie Drouot [Inria]

Delphine Hubert [Univ. Lorraine]

Martine Kuhlmann [CNRS]

2. Overall Objectives

2.1. Overall Objectives

Coast research domain is data centred service oriented computing and collaboration. With the raise of the Web as a platform, people consume applications as services from the web or from mobile apps. These applications are cooperative, human centred and connected to social applications. They must cope with unprecedented load and their deployment in Cloud environment requires sophisticated architectures. Their users are distributed in space (people live in different locations), in time (people participate at different time) and they cross organizational barriers. Coordination is hard and privacy and trust are key issues. New challenges appear every day. We have chosen to consider them regarding three dimensions that are primary for web and service based system stakeholders :

1. The first dimension refers to collaborative management of data, a key aspect in the development of distributed collaborative systems.

2. The second dimension is concerned with assembling and coordinating high level services, involving people, applications, and information sources on the basis of process models.
3. The third dimension concerns non functional aspects of data and service management, and more particularly the security and trust dimensions that are basics to ensure a wide acceptance of the approaches that we advocate.

We consider these dimensions at a Web scale and in contexts where there is no central authority. This raises many issues related to governance, compliance and security, trust and privacy but also to awareness and coordination. At this scale, we are also always facing the recurring problem of interoperability since we want to offer collaborators a flexibility concerning the chosen work models and technologies. We are tackling these dimensions in specific domains where they have strong interrelations:

- in software engineering where it is always difficult to find the best compromise between explicit and implicit coordination and where stands the difficulties related to collaborative software development.
- in crisis management where many organisations have to cooperate in a very ad-hoc way, share data and coordinate with a constantly changing goal, with very big issues at stake and with strong political emphasis.
- and in all domains where there is a strong need for cooperation.

3. Research Program

3.1. Introduction

Our scientific foundations are grounded on distributed collaborative systems supported by sophisticated data sharing mechanisms and on service oriented computing with an emphasis on orchestration and on non functional properties.

Distributed collaborative systems enable distributed group work supported by computer technologies. Designing such systems require an expertise in Distributed Systems and in Computer-supported collaborative activities research area. Besides theoretical and technical aspects of distributed systems, design of distributed collaborative systems must take into account the human factor to offer solutions suitable for users and groups. The COAST team vision is to move away from a centralized authority based collaboration towards a decentralized collaboration where users have full control over their data that they can store locally and decide with whom to share them. The Coast team investigates the issues related to the management of distributed shared data and coordination between users and groups.

Service oriented Computing [27] is an established domain on which the ECOO, SCORE and now the Coast team have been contributing for a long time. It refers to the general discipline that studies the development of computer applications on the web. A service is an independent software program with a specific functional context and capabilities published as a service contract (or more traditionally an API). A service composition aggregates a set of services and coordinates their interactions. The scale, the autonomy of services, the heterogeneity and some design principles underlying Service Oriented Computing open new research questions that are at the basis of our research. They span the disciplines of distributed computing, software engineering and computer supported collaborative work (CSCW). Our approach to contribute to the general vision of Service Oriented Computing and more generally to the emerging discipline of Service Science has been and is still to focus on the question of the efficient and flexible construction of reliable and secure high level services through the coordination/orchestration/composition of other services provided by distributed organizations or people.

3.2. Consistency Models for Distributed Collaborative Systems

Collaborative systems are distributed systems that allow users to share data. One important issue is to manage consistency of shared data according to concurrent access. Traditional consistency criteria such as locking, serializability, linearizability are not adequate for collaborative systems.

Causality, Convergence and Intention preservation (CCI) [30] are more suitable for developing middleware for collaborative applications.

We develop algorithms for ensuring CCI properties on collaborative distributed systems. Constraints on the algorithms are different according to the type of distributed system and type of data. The distributed system can be centralized, decentralized or peer-to-peer. The type of data can include strings, growable arrays, ordered trees, semantic graphs and multimedia data.

3.3. Optimistic Replication

Replication of data among different nodes of a network allows improving reliability, fault-tolerance, and availability. When data are mutable, consistency among the different replicas must be ensured. Pessimistic replication is based on the principle of single-copy consistency while optimistic replication allows the replicas to diverge during a short time period. The consistency model for optimistic replication [29] is called eventual consistency, meaning that replicas are guaranteed to converge to the same value when the system is idle.

Our research focuses on the two most promising families of optimistic replication algorithms for ensuring CCI:

- the operational transformation (OT) algorithms [25]
- the algorithms based on commutative replicated data types (CRDT) [28].

Operational transformation algorithms are based on the application of a transformation function when a remote modification is integrated into the local document. Integration algorithms are generic, being parametrized by operational transformation functions which depend on replicated document types. The advantage of these algorithms is their genericity. These algorithms can be applied to any data type and they can merge heterogeneous data in a uniform manner.

Commutative replicated data types is a new class of algorithms initiated by WOOT [26] a first algorithm designed Without Operational Transformations. They ensure consistency of highly dynamic content on peer-to-peer networks. Unlike traditional optimistic replication algorithms, they can ensure consistency without concurrency control. CRDT algorithms rely on natively commutative operations defined on abstract data types such as lists or ordered trees. Thus, they do not require a merge algorithm or an integration procedure.

3.4. Process Orchestration and Management

Process Orchestration and Management is considered as a core discipline behind Service Management and Computing. It includes the analysis, the modelling, the execution, the monitoring and the continuous improvement of enterprise processes and is for us a central domain of studies.

Much efforts has been devoted in the past years to establish standard business process models founded on well grounded theories (e.g. Petri Nets) that meet the needs of both business analysts but also of software engineers and software integrators. This has lead to heated debate as both points of view are very difficult to reconcile between the analyst side and the IT side. On one side, the business people in general require models that are easy to use and understand and that can be quickly adapted to exceptional situations. On the other side, IT people need models with an operational semantic in order to be able transform them into executable artefacts. Part of our work has been an attempt to reconcile these point of views. It has lead to the development of Bonita product and more recently on our work in crisis management where the same people are designing, executing and monitoring the process as it executes. But more generally, and at a larger scale, we have been considering the problem of process spanning the barriers of organisations. This leads us to consider the more general problem of service composition as a way to coordinate inter organisational construction of applications providing value based on the composition of lower level services [24].

3.5. Service Composition

More and more, we are considering processes as pieces of software whose execution traverse the boundaries of organisations. This is especially true with service oriented computing where processes compose services produced by many organisations. We tackle this problem from very different perspectives, trying to find the best compromise between the need for privacy of internal processes from organisations and the necessity to publicize large part of them, proposing to distribute the execution and the orchestration of processes among the organisations themselves, and attempting to ensure non functional properties in this distributed setting [23].

Non functional aspects of service composition relate to all the properties and service agreements that one want to ensure and that are orthogonal to the actual business but that are important when a service is selected and integrated in a composition. This includes transactional context, security, privacy, and quality of service in general. Defining and orchestrating services on a large scale while providing the stakeholders with some strong guarantees on their execution is a first class problem for us. For a long time, we have proposed models and solutions to ensure that some properties (e.g. transactional properties) were guaranteed on process execution, either through design or through the definition of some protocols. Our work has also been extended to the problems of security, privacy and service level agreement among partners. These questions are still central in our work. Then, one major problem of current approaches is to monitor the execution of the compositions, integrating the distributed dimension. This problem can be tackled using event-based algorithms and techniques. Using our event oriented composition framework DISC, we have obtained new results dedicated to the runtime verification of violations in service choreographies.

4. New Software and Platforms

4.1. Rivage

Participant: Claudia-Lavinia Ignat [contact].

Rivage (Real-time Vector graphic Group Editor) is a real-time collaborative graphical editor. Several users can edit at the same time and in real-time a graphical document, user changes being immediately seen by the other users. The editor relies on a peer-to-peer architecture where users can join and leave the group at any time. Each user has a copy of the shared document and user changes on the document copies are merged in real-time by using a CRDT (Commutative Replicated Data Type) algorithm. The code is available at <https://github.com/stephanemartin/rivage/>

4.2. Replication Benchmark

Participants: Pascal Urso [contact], Mehdi Ahmed-Nacer, Gérald Oster.

The Replication Benchmark is a performance evaluation framework for optimistic replication mechanisms used in collaborative applications. It contains a library of implementation of several CRDT (Commutative Replicated Data Type) and OT (Operational Transformation) algorithms for different data types: text, set, trees. The framework is able to evaluate the performance of comparable algorithms on different corpus of events traces. These events traces can be produced randomly according to different parameters, can be extracted from real real-time editing session that have been recorded, or can be automatically extracted from distributed version control repositories such as the one produced with Git. Performances of the algorithms are measured in term of execution time, memory footprint and merge result quality (compared to manual merge history stored in git repositories). The source code of this evaluation framework is available at <https://github.com/score-team/replication-benchmark/>.

4.3. BeGood

Participant: Gérôme Canals.

BeGood is a generic system for managing non-regression tests on knowledge bases. BeGood allows to define test plans in order to monitor the evolution of knowledge-bases. Any system answering queries by providing results in the form of set of strings can be tested with BeGood. BeGood has been developed following a REST architecture and is independent of any application domain. BeGood is a part of the Kolflow infrastructure and is available at <https://github.com/kolflow/>.

4.4. MUTE

Participants: Claudia Ignat, Luc André, François Charoy, Gérald Oster [contact].

MUTE (Multi-User Text Editor) is a web-based text editing tool that allows to edit documents collaboratively in real-time. It implements our recent work on collaborative editing algorithms and more specifically the LOGOOTSPIT+ approach [22]. Compared to existing web-based collaborative text editing tool this editor does not require a powerful central server since the server is not performing any computation and acts as a simple broadcast server. Our editor offers support for working offline while still being able to reconnect at a later time. This prototype is distributed under the term of GNU GPLv3 licence and is freely available at <https://github.com/score-team/mute-demo/>. A demo server is hosted at <http://mute-editorcrdt.rhcloud.com/>.

5. New Results

5.1. An authentication/authorization framework for federated environments

Participants: Ahmed Bouchami, Olivier Perrin.

Collaborative environments have put an enormous challenge on the security of information processing systems used to manage them. In the context of the Open PaaS project, we worked on a decentralised hybrid framework for managing access control designed for support of these environments. In our proposal, we manage three dimensions: the authentication, the access control, and the governance of the security.

Our authentication framework supports an interoperable authentication, a combination of RBAC, XACML for decentralized multiple administration (authorization). Both identities and resources are federated: the former are controlled by PaaS Federated Security Modules, while the later are by a PaaS Federated Security Modules. This work has been presented in the I-ESA conference ([10]).

We have also proposed a formal cloud-based authorization framework. We have considered trust to be a dynamic attribute to facilitate authorization decisions and have proposed models to handle different qualitative, quantitative and periodicity based temporal constraints. Further, we have presented an architecture for policies evaluation in the cloud. We presented our model in the CollaborateCom conference [17]. The model relies on a formal event-calculus based approach. We have introduced an architecture that considers different levels at which authorization policies can be specified and decisions can be taken and combines user level policies with the enterprise policies, and it considers real-time and dynamic environment changes (context), supports timed delegation, and the computation and specification of attributes based on trust. An implementation has been integrated in the Open PaaS platform.

A third aspect deals with the governance of the security aspects (mainly authorization). In this part, we have proposed to audit the various accesses to the resources, and we have proposed a model which is able to lower/raise the trust level of a member of the federated community.

During this year, we have also implemented and integrated the framework in the Open PaaS prototype, and all the code is now accessible in the repository of the project. The integration is done, and the other components of the project are now using the authentication/authorization component.

5.2. Experimental user studies for collaborative editing

Participants: Mehdi Ahmed-Nacer, François Charoy, Claudia-Lavinia Ignat, Gérald Oster, Pascal Urso.

With several tools to support collaborative editing such as Google Drive and Etherpad, the practice of collaborative editing is increasingly common, e.g., group note taking during meetings and conferences, and brainstorming activities. While collaborative editing tools meet technical goals, the requirements for group performance are unclear. One system property of general interest is delay between a modification of a user is performed and this modification is visible to the other users. This delay can be caused by different reasons such as network delay due to physical communication technology, the complexity of various algorithms for ensuring consistency and the type of underlying architectures. No prior work questioned the maximum acceptable delay for real-time collaboration or the efficacy of compensatory strategies.

In [14] we studied the effect of delay on group performance on an artificial collaborative editing task where a group of four participants located the release dates for an alphabetized list of movies and re-sorted the list in chronological order. The experiment was performed with eighty users. We measured sorting accuracy based on the insertion sort algorithm, average time per entry, strategies (tightly coupled or loosely coupled task decomposition of the task) and chat behavior between users. We found out that delay slows down participants which decrements the outcome metric of sorting accuracy. Tightly coupled task decomposition enhances outcome at minimal delay, but participants slow down with higher delays. A loosely coupled task decomposition at the beginning leaves a poorly coordinated tightly coupled sorting at the end, requiring more coordination as delay increases.

In asynchronous collaborative editing, such as version control, the main feature to allow collaboration is the merge feature. However, software merging is a time-consuming and error-prone activity, and if a merge feature return results with too many conflicts and errors, this activity becomes even more difficult. To help developers, several algorithms have been proposed to improve the automation of merge tools. These algorithms aim at minimising conflict situations and therefore improving the productivity of the development team, however no general framework is proposed to evaluated and compare their result.

In [9] we propose a methodology to measure the effort required to use the result of a given merge tool. We employ the large number of publicly available open-source development histories to automatically compute this measure and evaluate the quality of the merging tools results. We use the simple idea that these histories contains both the concurrent modifications and their merge results as approved by the developers. Through a study of six open-source repositories totalling more than 2.5 millions lines of code, we show meaningful comparison results between merge algorithms and how to use the results to improve them.

5.3. Optimization and security of business processes in SaaS contexts

Participants: Claude Godart, Elio Goettelmann, Samir Youcef.

Globalization and the increase of competitive pressures created the need for agility in business processes, including the ability to outsource, offshore, to take opportunity of the cloud, or otherwise distribute its once-centralized business processes or parts thereof. While hampered thus far by limited infrastructure capabilities, the increase in bandwidth and connectivity and decrease in communication cost have removed these limits. This is even more true with the advent of cloud, particularly in its “Service as a software” dimension. To adapt to such a context, there is a growing need for the ability to fragment one’s business processes in an agile manner, and be able to distribute and wire these fragments so that their combined execution recreates the function of the original process. Our work is focused on solving some of the core challenges resulting from the need to dynamically restructure enterprise interactions. Restructuring such interactions corresponds to the fragmentation of intra- and inter-enterprise business process models. It describes how to identify, create, and execute process fragments without loosing the operational semantics of the original process models. In addition, this fragmentation is complicated by the constraints of quality of service, in particular the execution time and the cost, and of security, especially privacy. During the year, we consider this problem at two levels: the design of privacy-aware process models, and the optimization of process schedules. We developed a methodology to integrate privacy concerns in the design of a business process before distribution in the cloud [11]. Based on a risk analysis, the result of the design is a set of process (re)modeling actions, a set of constraints on process fragments assignments to clouds, and a set of constraints for cloud selection based on cloud properties [12].

6. Bilateral Contracts and Grants with Industry

6.1. Bilateral Grants with Industry

6.1.1. CIFRE Grant with Bonitasoft

Participants: François Charoy, Samir Youcef.

Bonitasoft is a leading software company in the domain of open source Business Process Management Systems. The objective of this grant is to help Bonitasoft to support effective elastic BPM operation in the Cloud by leveraging both the business knowledge, the process models and the execution history of process instances and correlate them with cloud resource consumption. Guillaume Rosinoski has been recruited as a PhD Student to work on this project. We will define models that will be validated based on a detailed analysis of existing use cases that we have started to collect from Bonitasoft and its clients.

7. Partnerships and Cooperations

7.1. National Initiatives

7.1.1. ANR ConcoRDanT ANR-10-BLAN-0208 (2010–2014)

Participants: Pascal Urso [contact], Mehdi Ahmed-Nacer, Claudia-Lavinia Ignat, Gérald Oster.

Partners: REGAL project-team (Inria Paris - Rocquencourt / LIP6, coordinator), CITI institute (Universidade Nova de Lisboa, Portugal), GDD team (University of Nantes) and SCORE team.

Website: <http://concordant.lip6.fr/>

Massive computing systems and their applications suffer from a fundamental tension between scalability and data consistency. Avoiding the synchronisation bottleneck requires highly skilled programmers, makes applications complex and brittle, and is error-prone.

The ConcoRDanT project (oct. 2010 – apr. 2014) investigates a promising new approach that is simple, scales, and provably ensures eventual consistency. A Commutative Replicated Data Type (CRDT) is a data type where all concurrent operations commute. If all replicas execute all operations, they converge; no complex concurrency control is required. We have shown in the past that CRDTs can replace existing techniques in a number of tasks where distributed users can update concurrently, such as co-operative editing, wikis, and version control. However CRDTs are not a universal solution and raise their own issues (e.g., growth of meta-data).

The ConcoRDanT project engages in a systematic and principled study of CRDTs, to discover their power and limitations, both theoretical and practical. Its outcome will be a body of knowledge about CRDTs and a library of CRDT designs, and applications using them. We are hopeful that significant distributed applications can be designed using CRDTs, a radical simplification of software, elegantly reconciling scalability and consistency.

7.1.2. ANR STREAMS ANR-10-SEGI-010 (2010–2014)

Participants: Gérald Oster [coordinator], Luc André, Claudia-Lavinia Ignat, Pascal Urso.

Partners: SCORE team (coordinator), ASAP project-team (University of Rennes 1 / Inria Rennes - Bretagne Atlantique), CASSIS project-team (Inria Nancy - Grand Est / Nancy University), REGAL project-team (Inria Paris - Rocquencourt / LIP6) and GDD team (University of Nantes / LINA)

Website: <http://streams.loria.fr/>

The STREAMS project (nov. 2010 – may 2014) proposes to design peer-to-peer solutions that offer underlying services required by real-time social web applications and that reduce the disadvantages of centralised architectures. These solutions are meant to replace a central authority-based collaboration with a distributed collaboration that offers support for decentralisation of services.

The STREAMS project aims to advance the state of the art on peer-to-peer networks for social and real-time applications. Scalability is generally considered as an inherent characteristic of peer-to-peer systems. It is traditionally achieved using replication techniques. Unfortunately, the current state of the art in peer-to-peer networks does not address replication of continuously updated content due to real-time user changes. Moreover, there exists a tension between sharing data with friends in a social network deployed in an open peer-to-peer network and ensuring privacy. One of the most challenging issue in social applications is how to balance collaboration with access control to shared objects. Interaction is aimed at making shared objects available to all who need them, whereas access control seeks to ensure this availability only to users with proper authorisation. STREAMS project aims at providing theoretical solutions to these challenges as well as practical experimentations.

7.1.3. ANR Kolflow (2011–2014)

Participant: G r me Canals.

Partners: GDD team (University of Nantes / LINA), Loria (Orpailleur and SCORE Teams), Silex Team (LIRIS, University of Lyon), Edelweiss (Inria Project).

Website: <http://kolflow.univ-nantes.fr/>

Kolflow aims at building a social semantic space where humans collaborate with smart agents in order to produce knowledge understandable by humans and machines. Humans are able to understand the actions of smart agents. Smart agents are able to understand actions of humans. Kolflow targets the co-evolution of content and knowledge as the result of interactions of humans and machines. Our work in the Kolflow project focus on implementing knowledge base testing strategies.

7.1.4. FSN OpenPaaS (2012–2015)

Participants: Olivier Perrin, Ahmed Bouchami.

Partners: Samovar team (Telecom SudParis), SCORE team (Universit  de Lorraine, Loria), ARMINES (Ecole des Mines d'Albi), Brake France, Linagora.

Website: <http://www.open-paas.org/>

The OpenPaaS project aims at developing a PaaS (Platform as a Service) technology dedicated to enterprise collaborative applications deployed on hybrid clouds (private/public). OpenPaaS is a platform that allows to design and deploy applications based on proven technologies provided by partners such as collaborative messaging systems, integration and workflow technologies that will be extended in order to address Cloud Computing requirements. Available as an open-source Enterprise Social Network, the OpenPaaS project innovates both at the collaborative level and by its capacity to leverage heterogeneous cloud technologies at the IaaS level (Infrastructure as a Service). This project is funded under the French FSN umbrella (Fond National pour la soci t  Num rique).

7.2. European Initiatives

7.2.1. FP7 & H2020 Projects

7.2.1.1. SyncFree (2013-2016)

Participants: Pascal Urso [contact], Jordi Martori Adrian.

Program: FP7-ICT-2013-10

Project acronym: SyncFree

Project title: Large-scale computation without synchronisation

Duration : October 2013 - September 2016

Coordinator: Marc Shapiro, Inria

Other Partners: REGAL project-team (Inria Paris - Rocquencourt / LIP6, coordinator), Basho Technologies Limited (United Kingdom), Trifork AS (Denmark), Rovio Entertainment OY (Finland), Faculdade de Ciências e Tecnologia (Universidade Nova de Lisboa, Portugal), Université Catholique de Louvain (Belgium), Koç University (Turkey), Technische Universität Kaiserslautern (Germany) and COAST team.

Abstract: Large-scale on-line services including social networks and multiplayer games handle huge quantities of frequently changing shared data. Maintaining its consistency is relatively simple in a centralised cloud, but no longer possible due to increased scalability requirements. Instead, data must be replicated across several distributed data centres, requiring new principled approaches to consistency that will be explored by the SyncFree project. <http://syncfree.lip6.fr/>

7.3. International Initiatives

7.3.1. Inria Associate Teams

7.3.1.1. USCOAST

Title: User Studies on Trustworthy Collaborative Systems
International Partner (Institution - Laboratory - Researcher):
Wright State University (USA)
Duration: 2013 - 2015

See also: <http://uscoast.loria.fr/>

USCoast has as main objective the validation of trustworthy collaborative systems using experimental user studies. This type of validation requires the expertise of both computer scientists that designed the systems and social scientists for conceptualizing and measuring human behaviour in collaborative work. The project will focus on the real-time requirements and trust policies in collaborative editing, resulting in a theory for the effect of real-time constraints in collaborative editing and awareness management for the coordination of work in the presence of conflict and disruption. The project includes also validation of proposed light security mechanisms for decentralised collaboration, based on posted measures of voluntary compliance with data sharing restrictions. We will develop new methods for the cost-effective evaluation of collaborative work to compensate for otherwise unrealistic sample sizes and costly engineering, using game theory to inspire task analogues and simulated users along with human users.

7.4. International Research Visitors

7.4.1. Visits of International Scientists

Weihai Yu

Date: August 2013 - June 2014
Institution: University of Tromsø (Norway)

Weihai Yu examined issues concerning undo in collaborative editing and proposed an approach using a layered commutative replicated data type (CRDT) for strings.

Valerie Shalin

Date: Nov 2013 - Jul 2014
Institution: Wright State University (USA)

Valerie Shalin worked on experimental user studies of real-time collaborative editing and on the design of a game theory approach for the validation of trust-based collaboration.

Ehtesham Zahoor

Date: June, 1 2014 - July, 31 2014
Institution: National University of Computer and Emerging Sciences (Pakistan)

7.4.1.1. Internships

Fox Olivia

Date: Apr 2014 - Jul 2014

Institution: Wright State University (USA)

8. Dissemination

8.1. Promoting Scientific Activities

8.1.1. Scientific events organisation

8.1.1.1. Organizing committee membership

- Claudia-Lavinia Ignat was member of the organizing committee of the workshop IWCES (International Workshop on Collaborative Editing Systems) in 2014 in conjunction of CSCW 2014 conference.

8.1.2. Scientific events selection

8.1.2.1. Chair of conference program committee

Co-organisation of the first ISCRAM MED conference on Information Systems for Crisis Response and Management in Mediterranean countries in Toulouse <http://irit.fr/ISCRAMMED2014/>

- Olivier Perrin was demonstration program co-chair of ICSOC 2014

8.1.2.2. Conference program committee membership

- Claude Godart was member of the conference program committee of BPM (Business Process Management), BPMDS (Business Process Modeling, Development and Support), CBI (IEEE Conference on Business Informatics), IEEE CLOUD Computing, EDOC (The enterprise computing conference), ESOC (European Services Oriented and Cloud Computing), ICSOC (International Conference on Services Oriented Computing), ICWS (IEEE International Conference on Web Services), Inforsid, RCIS (Research challenges in Information Systems), and SCC (IEEE International Conference on Services Computing) conferences.
- Claudia-Lavinia Ignat was or is a PC member of CSCW (International Conference on Computer Supported Cooperative Work and Social Computing) 2015 and 2016, SIGMOD Demo 2014 and CDVE (International Conference on Cooperative Design, Visualization and Engineering) 2014
- Olivier Perrin was PC Member of ICSOC 2014, I3E 2014 (13th IFIP Conference on e-Business, e-Services and e-Society), VECOS (8th International Workshop on Verification and Evaluation of Computer and Communication Systems) 2014, SITIS 2014, KASA (International Workshop on Knowledge Aware Service Oriented Applications) 2014, WSS (Web Service Symposium) 2014
- François Charoy was PC Member of ICEBE (International Conference on Business Engineering) 2014, CTS 2014 (International Symposium on Collaborative Technologies and Systems), DG.O (International Conference on Digital Government Research) 2014, IEEE International Conference on Business Information Systems and of several workshops.
- Gérald Oster was a PC member of CoopIS 2014 (International Conference on Cooperative Information Systems).

8.1.3. Journal

8.1.3.1. Editorial boards membership

- Claude Godart is member of the editorial board of “IEEE transaction on Service Computing”, “International Journal of Services Computing”, “International Journal of Cloud Computing” and “International Journal of E-adoption”.

- Claudia-Lavinia Ignat is member of the editorial board of Journal of CSCW (Computer Supported Cooperative Work).
- François Charoy is member of the editorial board of Service Oriented Computing and Applications Journal (Springer).

8.1.3.2. Reviewer

- Claude Godart was member of the review board of the “International Journal of Next Generation Computing”.
- Claudia-Lavinia Ignat reviewed in 2014 papers for Concurrency and Computation: Practice and Experience journal.
- François Charoy reviewed papers for ACM Transaction on the Web and IEEE Transactions on Network and Service Management.
- Olivier Perrin reviewed papers for Transactions on Services Computing.
- Gérald Oster reviewed paper in Oxford Computer Journal.

8.2. Teaching - Supervision - Juries

8.2.1. Teaching

Permanent members of the Coast team are leading teachers in their respective institutions. They are responsible of lecture in disciplines like software engineering, database systems, object oriented programming and design, distributed systems, service computing and even more advanced topics at all levels and in all kind of departments in the University. Most of the PhD Students have also teaching duties in the same institutions. As a whole, the Coast team accounts for more than 2500 hours of teaching. Members of the Coast team are also deeply involved in the pedagogical and administrative life of their departments.

- Gérôme Canals is the head of the Computer science department of the Nancy University Institute of Technology (IUT Nancy Charlemagne) since sept. 2010, and is responsible for the professional licence degree “Web application programming” since sept. 2001.
- Claude Godart is responsible for the Computer Science department of the engineering school ESSTIN. He was study director of the master degree “Distributed Services, Security and Networks” until September 2013. Claude Godart is member of the board of directors and the recruitment committee of the engineering school ESSTIN.
- Khalid Benali is responsible for the professional Master degree speciality “Distributed Information Systems” of MIAGE and of its international branch in Morocco.
- François Charoy is responsible of the Software Engineering specialisation at the TELECOM Nancy Engineering School of University of Lorraine.
- Gérald Oster is responsible of the 3rd year internship program at the TELECOM Nancy Engineering School of University of Lorraine.
- Pascal Urso is responsible for the “Security, Services, Systems and Network” track of the master degree in computer science at University of Lorraine from September 2013.

8.2.2. Supervision

PhD in progress : Quang Vinh Dang, Trust-based large scale collaboration, started in 10/2014, Claudia-Lavinia Ignat and François Charoy

PhD in progress: Luc André, Réplication et Maintien de la Cohérence en Temps Réel dans les Réseaux Pair-à-pair, started in 9/2011, François Charoy and Gérald Oster

PhD in progress: Mehdi Ahmed Nacer, Title: Evaluation of CRDT for optimistic replication, started in 9/2011, François Charoy and Pascal Urso

PhD in progress: Elio Goettelman, Exécution en confiance de processus dans le cloud, started in 9/2011, Claude Godart

PhD in progress: Ahmed Bouchami , Sécurité des données collaboratives d'une plateforme PaaS, started in 11/2012, Olivier Perrin

PhD in progress: Adrien Devresse , Study of effective sharing and analysis of very large metadata repositories: application to the High Energy Physics computing community, started on 11/2011, Olivier Perrin

PhD in progress: Jordi Martori i Adrian, Data constraints for large-scale collaboration, started in 10/2013, François Charoy and Pascal Urso

8.2.3. *Juries*

- Claudia-Lavinia Ignat was a member of the jury for the recruitment in 2014 of permanent Inria junior researchers at Inria Nancy-Grand Est.

Coast members were members of the following PhD and HDR defense committees:

- Walid Gaaloul, HDR, Université Pierre et Marie Curie, September 2014 (Claude Godart)
- Kahina Bessai, PhD, Université de Paris 1 Panthéon-Sorbonne, December 2014 (Claude Godart)
- Samuel Kaluvuri, PHD, EURECOM, November 2014 (François Charoy)
- Mohamadou Lamine DIOUF, Université de Rennes, October 2014 (François Charoy)
- Juan Li, PhD, INSA de Lyon (Olivier Perrin)
- Samu Yangui, PhD TELECOM Sud Paris (Olivier Perrin)
- Michael Mrissa, HDR Université de Lyon 1 (Olivier Perrin)

8.3. Institutional commitment

- Claudia-Lavinia Ignat is in charge of European affairs for Inria Nancy Grand-Est. She is the Delegate of International Relations for Inria Nancy-Grand Est. She is member of the Inria Nancy-Grand Est COMIPERS researchers committee. She is member of the Inria Nancy - Grand Est committee for health, safety and working conditions.

8.4. Collective Responsibilities outside Inria

Claude Godart is member of the “Conseil d’administration” and “Commission de choix” of the engineering school ESSTIN.

Claude Godart was member of the LIRIS laboratory evaluation committee for the HCERES.

François Charoy is head of the “Commission de choix” of TELECOM Nancy.

Gérald Oster is member of the Administration Council of TELECOM Nancy.

Gérald Oster is member of the “Commission de choix” of TELECOM Nancy.

Olivier Perrin is co-responsible of the “Commission de mention Informatique” of Doctoral School IAEM.

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