Matthieu NICOLAS

matthieu.nicolas@inria.fr | +33 6 75 98 34 40

CAREER

RESEARCH & DEVELOPMENT SOFTWARE ENGINEER | INRIA, COAST TEAM

September 2014 – September 2017 | Nancy, France

PROJECT OPENPAAS::NG

The goal of this project is to design a open-source entreprise social network providing a suite of peer-to-peer collaborative office applications. The aim is to offer a reliable and free alternative to existing solutions such as Google Apps. This project is a joint work with the team DaSciM (Data Science and Mining) from the computer science laboratory from the Ecole Polytechnique, Linagora, XWiki SAS and Nexedi.
In this project, the COAST team works on topics such as the interorganisational federation of peer-to-peer systems and the securing of communications in this kind of collaboration. Furthermore, the team provides its expertise on eventually consistent data replication mechanisms in distributed systems.
In order to validate them, these works have been integrated in MUTE , the demonstration platform of the team.

- Maintaining of *LogootSplit* [3] [4] implementation
- Study of the literature on Conflict-free Replicated Data Types and of their use cases.
- Development and integration of an anti-entropy mechanism [5]

Publications

[1] M. Nicolas, V. Elvinger, G. Oster, C.-L. Ignat, and F. Charoy. MUTE: A Peer-to-Peer Web-based Real-time Collaborative Editor. In *ECSCW 2017 - 15th European Conference on Computer-Supported Cooperative Work*, volume 1 of *Proceedings of 15th European Conference on Computer-Supported Cooperative Work - Panels, Posters and Demos*, pages 1–4, Sheffield, United Kingdom, Aug. 2017. EUSSET.

[2] OpenPaaS::NG. EC1.1, Prototype : Infrastructure d'édition collaborative P2P. 2016.

[3] OpenPaaS::NG. SP2-L2.9, Rapport décrivant l'implantation du moteur temps réel v1. 2016.

[4] OpenPaaS::NG. SP2-L2.10, Rapport décrivant l'implantation du moteur temps réel v2. 2017.

[5] OpenPaaS::NG. SP2-L2.2, Rapport décrivant l'implantation du composant middleware de réplication hybride pair-à-pair v1. 2017.

ADT INRIA PLM

The PLM is a open-source programming exerciser. Developped by Gérald Oster and Martin Quinson, this application proposes to students to explore and to learn several concepts of the algorithmics through interactive and graphical exercises.
The goal of this project was to enhance this tool in an experimental platform dedicated to the teaching of computer science. To achieve this, a usage data collecting mechanism was required in order to generate a dataset. This dataset, made available to researchers, allows the realisation of research works on topics such as the design of an automatic helping tool which tailors error messages to students. A second objective of this project was to port the application, until then released as a heavy Java software, into a web application to make it available to the greatest number.
My works focused mainly on the realisation of that port. This major change of paradigm introduced several problematics which needed to be adressed.

- Implementation and testing of the usage data collecting mechanism
- Conception and integration of a distributed architecture ensuring the scalability of the application
- Isolation of the execution of student code using containers
- Deployment and monitoring of a multi-components application

ÉLÈVE-INGÉNIEUR | TELECOM NANCY

Diplôme d'ingénieur TELECOM Nancy, spécialité Ingénierie du Logiciel
Septembre 2011 – Août 2014 | Nancy

Realisation d'une plateforme d'edition collaborative | LORIA, equipe COAST

Stage | Avril 2014 – Août 2014 | Nancy

Issue des travaux sur l'édition collaborative, une nouvelle famille d'algorithmes de réplication des données et de maintien de la cohérence à terme est apparue récemment : l'approche CRDT (Conflict-free Replicated Data Type). Cette nouvelle famille d'algorithme répond à plusieurs des limites constatées chez les autres approches existantes, notamment concernant la capacité de passage à l'échelle.
L'équipe SCORE, travaillant sur ce domaine de recherche, a proposé un nouvel algorithme de cette famille : *LogootSplit*.
Afin d'illustrer et de mettre en valeur les travaux de l'équipe sur cette approche, ma tâche a été de concevoir et de développer un éditeur collaboratif temps réel se basant sur cet algorithme.

- Implémentation sous forme de librairie de *LogootSplit*
- Conception et développement de MUTE , un éditeur collaboratif temps réel en ligne reposant sur cette librairie

INTERN | POLYTECHNIQUE MONTRÉAL

September 2009 – June 2011 | Montreal, Canada

Development of a tool to check the correctness of collaborative editing algorithms

Existing collaborative editing tools relies mostly on a specific family of algorithms to ensure the eventual consistency of copies : the operational transformation.
Two consistency properties *TP1* and *TP2* are defined and allow to ensure the correctness of algorithms from this family.
The goal of this internship was to develop a tool to automatically check the respect of these properties for a given algorithm.

- Implementation of several algorithms from the operational transformation family
- Development of the tool allowing to check if the algorithms ensure *TP1* and *TP2*

EDUCATION

DIPLOMED ENGINEER FROM TELECOM NANCY, FRENCH GRANDE ECOLE

Equivalent to a Master Degree in Computer Science
September 2011 – August 2014 | Nancy, France

COMMUNICATION

PRESENTATIONS ABOUT MUTE

August 2017	ECSCW 2017
December 2016	HCERES Evaluation of the LORIA
	Inria Industry Meeting "New technologies to protect digital data and computer systems"
	Visit of a delegation of Technological University presidents from Mexico
November 2016	Inria Industry Meeting "Interaction with digital objects and services"
October 2016	Evaluation seminar of INRIA teams working on "Distributed Systems and Middleware"

PRESENTATIONS ABOUT PLM

February 2016	Junior Software Engineers Seminar
March 2015	Junior Software Engineers Seminar