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Trustworthy and Resilient Operations in a Network Environment

Deliverable D19

Report on dissemination and exploitation activity, Year 3

Information and Communication Technologies Institute
Carnegie Mellon | PORTUGAL
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Executive Summary

The purpose of this report is to summarize the dissemination efforts of the TRONE project in the last year and a half. Since this is the last document covering the dissemination efforts, we also cover the efforts of the previous two years, to wrap up the overall work.

The project partners used a number of different means to disseminate their work: a publicly available wiki page, `http://trone.di.fc.ul.pt/`, research papers, presentations, posters, one workshop on the topic of the project and the deliverables of work. In this document, we give details about all these dissemination means. In particular, we show that the dissemination effort ran better than initially planned in the description of work, namely regarding the numbers of published research papers.

1 Introduction

In the third and a half years of the TRONE project, we finished all the TRONE tasks: we produced a final specification and evaluation of the fingerpointing scheme (Deliverable 6 of task 2.1); we did the final specification of the recovery mechanisms (Deliverable 9 of task 2.2); we wrote the complete description of the architecture, protocols and middleware (Deliverables 12 and 13 of task 3.1); and we did the final specification of the enhanced components (Deliverable 16 of task 3.2). Finally, we wrapped our research work in Deliverable 2 and the management efforts in Deliverable 22.

Regarding the dissemination activity, which we summarize in this particular deliverable, D19, in the third and a half years of TRONE, we kept using several means for dissemination, like scientific papers, presentations, and the TRONE web site. Whenever meaningful, we assess the productivity of the dissemination activity, compared to the plans of the description of work. Three students integrated in the works of the project finished their degrees: 2 PhDs and 1 M.Sc. We also invested some effort in the preparation of the second edition of the "Secure and Dependable Middleware for Cloud Monitoring and Management" workshop (SDMCMM), co-located with the ACM/IFIP/USENIX 14th International Conference on Middleware. Unfortunately, this effort was not entirely successful, as we could not attract a sufficient number of submissions to run the workshop.

We also provide information of dissemination efforts during the entire duration of the project, to wrap up the entire dissemination efforts of the TRONE research team.

This report is organized as follows: Section 2 gives a brief overlook of the web site; Section 3 reviews the publications of the period we are reporting; in Section 4 we present the complete list of deliverables, including an enumeration of the deliverables that are specific to the period of this report; Section 5 describes our effort in the organization of the SDMCMM workshop; Section 6 presents the exploitation we did of the TRONE work; Section 7 assesses the scientific work of the TRONE project; Section 8 concludes this report.

2 Web Site

The most visible means of dissemination of TRONE is the publicly available wiki page: `http://trone.di.fc.ul.pt/`. Being a wiki, this site allows us to keep two levels of access to data: one accessible by the general public, and a second one, which is private and protected by a password, which partners use to share documents among them. Figure 1, depicts the welcome page, with general information about the TRONE project. One can access the private and public areas through a common "navigation" menu on the left side of the page.

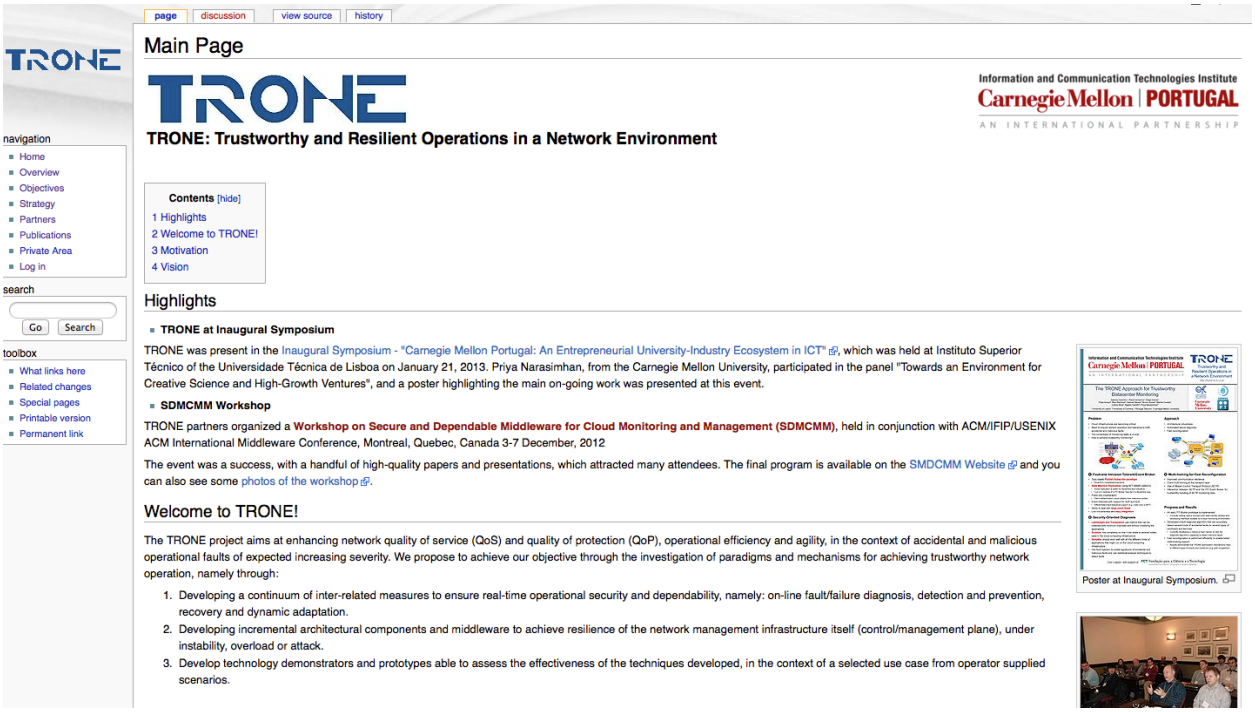

Figure 1: Home page

It is important to mention here that we made all the public documentation available under the URL `http://trone.di.fc.ul.pt/index.php?title=Publications`: papers, presentations, deliverables and other documents. Hence, any person can have a very easy access to the public details of the work we developed so far.

3 Publications

During the third and a half year of this project we published eight papers in International Conferences and Workshops, thus increasing the numbers from the previous periods. We also published a paper in a National Conference. We point out the fact that all these papers were presented in their conferences by one of their authors. We enumerate these publications here:

1. A Fault-Tolerant Session Layer with Reliable One-Way Messaging and Server Migration Facility. Naghmeh Ivaki, Serhiy Boychenko, Filipe Araujo. 3rd Symposium on Network Cloud Computing and Applications (NCCA). Rome, Italy, February 2014.

2. EVA: Enhancing VoIP Applications. Bruno Sousa, Kostas Pentikousis, Marilia Curado. Globecom 2013: 9-13. Atlanta, Georgia, USA, December 2013.

3. Experiences with Fault-Injection in a Byzantine Fault-Tolerant Protocol. Rolando Martins, Rajeev Gandhi, Priya Narasimhan, Soila Pertet, Antnio Casimiro, Diego Kreutz, and Paulo Verssimo. In Proceedings of the 14th ACM/IFIP/USENIX International Middleware Conference. Beijing, China, December 2013.

4. Predicting Traffic in the Cloud: A Statistical Approach. Bruno Dalmazo, Joo P. Vilela, Marilia Curado. In IEEE International Conference on Cloud and Green Computing 2013. Karlsruhe, Germany, October 2013.

5. Engineering Nonlinear Pseudorandom Number Generators. Samuel Neves and Filipe Araujo. 10th International Conference on Parallel Processing and Applied Mathematics. Warsaw, Poland, September 2013.

6. Expedient Reconfiguration in the Cloud. Bruno Sousa, Ricardo Santos, Marilia Curado, Soila M. Pertet, Rajeev Gandhi, Carlos Silva, Kostas Pentikousis. CAMAD 2013: 243-247. Berlin, Germany, September 2013.

7. Enhancing Path Selection in Multihomed Nodes. Bruno Sousa, Kostas Pentikousis, Marilia Curado. MONAMI 2013: 69-82. Cork, Republic of Ireland, September 2013.

8. Towards Secure and Dependable Software-Defined Networks. Diego Kreutz, Fernando Ramos, Paulo Verissimo. In ACM SIGCOMM Workshop on Hot Topics in Software Defined Networking (HotSDN). Hong Kong, China, August 2013.

We presented all the conference papers in their respective events.
We also published or are in the final steps of publishing two articles in journals:

1. Replica Placement to Mitigate Attacks on Clouds. Filipe Araujo, Serhiy Boychenko, Raul Barbosa, Antnio Casimiro. The Journal of Internet Services and Applications (to appear).

2. MeTHODICAL: Towards the next generation of multihomed applications. Bruno Sousa, Kostas Pentikousis, Marilia Curado. Elsevier Computer Networks 65: 21-40 (2014).

During this period, two students finished their PhDs and one student finished his M.Sc.:

1. Bruno Miguel Oliveira Sousa. Multihoming Aware Optimization Mechanismv January 2014. PhD Thesis.

2. Soila Pertet Kavulya. Automated diagnosis of chronic problems in production systemsv May 2013. PhD Thesis.

3. Igor Daniel Cristina Antunes. FIT-BROKER: Delivering a Reliable Service for Event Dissemination. November 2013. M.Sc. Thesis.

We published more papers on Conferences than promised in the proposal. We can say the same of the number of publications for the entire duration of the project, as this number exceeded the initial numbers promised in the description of work.

4 Deliverables

Overall, after the end of the TRONE we produced all the deliverables foreseen in the description of work. Of the following list, we produced the deliverables D2, D6, D9, D12, D13, D16, D19 and D22 during the last year and a half.

- D1: Use Case Scenarios Analysis. This deliverable introduces the Use Case Scenario evaluated by Portugal Telecom for the TRONE project, chosen to be the one that the academic affiliates are going to work with.

- D2: Overall evaluation of project solutions. This deliverable presented the overall conclusions about the applicability of the project results, and a roadmap for their potential deployment.

- D3: First Specification of the Diagnosis Algorithm. In this deliverable we present RAMS, a lightweight and scalable algorithm for distributed systems which detects failures using only correlations of operating system metrics collected transparently.

- D4: First evaluation of the failure diagnosis scheme, with concrete results for target faults.

- D5: Increased scope of faults to target for diagnosis, with increased instrumentation.

- D6: Final specification and evaluation of the fingerpointing scheme

- D7: First specification of the recovery mechanisms. This and the following two deliverables focus on the reconfiguration and adaptation of infrastructure components to accidental and intentional faults.

- D8: Experimental evaluation of the recovery mechanisms.

- D9: Final specification of the recovery mechanisms.
- D10: First Specification of the Architecture. In this document, we introduce the First Specification of the Architecture for the Fault and Intrusion Tolerant system for the TRONE project. The presented architecture is useful to solve the problem of improving cloud infrastructure monitoring systems resiliency and trustworthiness (as stated in the deliverable D1).
- D11: First specification of the communication protocols and middleware.
- D12: Complete description of the architecture
- D13: Complete description of the protocols and middleware
- D14: First specification of the enhanced components.
- D15: Experimental evaluation of the enhanced components.
- D16: Final specification of the enhanced components
- D17: Report on dissemination and exploitation activity, Y1.
- D18: Report on dissemination and exploitation activity, Y2.
- D19: Report on dissemination and exploitation activity, Y3. This document
- D20: First management report.
- D21: Second management report.
- D22: Final management report.

We have all the available deliverables online on the project's web page: `http://trone.di.fc.ul.pt/index.php?title=Publications`.

5 The SDMCMM 2012 & 2013 Workshops

An important part of our dissemination efforts in this project went to the organization of the "Secure and Dependable Middleware for Cloud Monitoring and Management Workshop 2012 (SDMCMM)" held in conjunction with ACM/IFIP/USENIX ACM International Middleware Conference, to take place in Montreal, Quebec, Canada, from 3 to 7 of December, 2012. The effort to organize this workshop was mainly a joint work of the three co-chairs

of the Workshop: Antnio Casimiro, Filipe Araujo and Rajeev Gandhi, respectively from the Universities of Lisboa, Coimbra and Carneggie-Mellon.

The organization took place in several steps:

- Select an appropriate Program Committee.
- Submit a workshop proposal to the Conference Organizers.
- Create a Call For Papers.
- Create a Web Site.
- Select papers via peer review, with the help of the PC members.
- Organize the accepted papers for the proceedings and create a Workshop program.

To display information of the workshops we used a web site, with the URL `http://sdmcmm.dei.uc.pt`. The web site contains most information related to the workshop, like the call for paper, the PC members, etc.. In Figure 2 we show information of the second edition, but the web page of the first edition is still online as well.

We used the EasyChair Conference System (`http://www.easychair.org`) to ensure all the communication between co-chairs, program committee and authors. For a first edition of the workshop we can deem the results achieved as good: we received 9 papers from 31 authors, 23 peer reviews and accepted 6 papers from 23 authors.

We must also acknowledge the work of other researchers unrelated to the TRONE project, namely Pedro Peixoto, who maintained the web page, the Middleware conference organization, the researchers responsible for the Middleware workshops, authors of submitted papers, the program committee of SDMCMM, and other reviewers.

In 2013 we tried to organize a second edition of the workshop, co-located with the ACM/IFIP/USENIX 14th International Conference on Middleware. Unfortunately, the number of submissions was not enough to run a workshop and, this time, we did not take our effort to the end.

6 Exploitation

The work we produced during the project was mainly used for research and educational purposes, to create new research opportunities, and to improve the materials in our academic courses. In particular, we have published most results we achieved so far in International Conferences and Workshops.

Figure 2: The SDMCMM web site

7 Assessment of the Dissemination Work

Besides the web site, the poster and leaflets (which we did in previous years), in the Table 1, we quantitatively summarize the dissemination efforts we did in TRONE, by comparing the numbers we promised in the description of work versus the real numbers that we were able to achieve in the project. We used the official numbers, separated by civil year on the left side of the table and the years of the project on the right side of the table. One can see from the Total numbers that exist on both sides that we overachieved in the TRONE project. Although we slightly underperformed in National Conference publications and M.Sc., we believe that the publications in International Conferences and the two PhD students that concluded their thesis more than compensate the former metrics.

Table 1: Output Indicators

	Promised Publications						Delivered Publications			
	2010	2011	2012	2013	2014	Total	Y1	Y2	Y3 & 1/2	Total
Journals	0	1	1	1	0	3	1	0	2	3
National Conferences	1	1	1	0	0	3	0	1	0	1
International Conferences	2	3	3	1	0	9	4	5	8	17
Deliverables	-	-	-	-	-	22	5	9	8	22
PhD	0	0	0	0	0	0	0	0	2	2
M.Sc.	0	1	1	0	0	2	0	0	1	1

8 Conclusions

As a final balance, we believe that the dissemination efforts of TRONE were quite successful. The number of publications was above expected, we kept an active web page, and we managed to organize the Secure and Dependable Middleware for Cloud Monitoring and Management Workshop (SDMCMM), co-located with Middleware 2012, in a common effort of the Universities of Lisboa, Coimbra and Carneggie-Mellon. The TRONE team also participated in conferences, some of them supported by the CMU-Portugal program, to present posters and leaflets.