ACM SIGACT News Distributed Computing Column 20

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Abstract

The Distributed Computing Column covers the theory of systems that are composed of a number of interacting computing elements. These include problems of communication and networking, databases, distributed shared memory, multiprocessor architectures, operating systems, verification, Internet, and the Web. This issue consists of:

- "A review of the DISC 2005 conference," by Dariusz Kowalski.

Many thanks to Dariusz for his contribution to this issue.

Request for Collaborations: Please send me any suggestions for material I should be including in this column, including news and communications, open problems, and authors willing to write a guest column or to review an event related to theory of distributed computing.

A Review of the DISC 2005 Conference

Dariusz Kowalski [1]

Abstract

This is a review of the 19th International Symposium on Distributed Computing (DISC), that was held September 26-29, 2005, in Cracow, Poland, with proceedings in Springer's *Lecture Notes in Computer Science #3724*. It includes a summary of the invited talks and the papers presented, as well as of the social events.

1   Introduction

The International Symposium on DIStributed Computing (DISC), is the main annual forum held in Europe dedicated to research on all aspects of distributed computing, mostly from a theory perspective. The equivalent forum held in Northamerica is the ACM Symposium on Distributed Computing (PODC), and indeed both conferences collaborate in various ways. For example, an annual joint issue of Springer's journal *Distributed Computing* is dedicated to selected papers of DISC and PODC. Considering the fact that computer science is a relatively young discipline, both conferences can be viewed as established, mature events. PODC celebrated its 20th anniversary in 2001, and DISC will celebrate it next year. Indeed, they have produced many scientific achievements and promoted research on principles of distributed computing, so they

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gave birth to other conferences such as SIROCCO and OPODIS, as well as workshops and special tracks associated to other conferences. DISC started in 1985 in Ottawa (Canada) under the name International Workshop on Distributed Algorithms. DISC 2005 is the 19th edition of the conference, organized in cooperation with the European Association for Theoretical Computer Science (EATCS), and the proceedings are published by Springer in the series *Lecture Notes in Computer Science.*

DISC 2005 took place September 26–29, 2005, in Cracow - the most representative city and the former capital of Poland. Cracow is also very famous for its academic life: the oldest university – Jagiellonian University – was founded in 1364 by the polish king Kazimierz the Great, and to this very day Cracow remains one of the biggest academic centers in Poland. The proposers of Cracow as the host for DISC 2005 were hoping that this academic spirit, more than sixth centuries old, would come upon the participants of DISC 2005, and would stimulate an excellent atmosphere. Having this in mind it was decided to start the conference in the oldest academic building called Collegium Maius.

Figure 1: Cracow, The Main Market Square

2 Conference Organization

There were two workshops co-located with DISC 2005. First, the Locality Preserving Distributed Computing Methods (LOCALITY'05) chaired by Cyril Gavoille from the University of Bordeaux and Dahlia Malkhi from the Hebrew University of Jerusalem and Microsoft Research. Second, the Workshop of the COST Action 295 DYNAMO: Dynamic Communication Networks: Foundations and Algorithms, chaired by Roger Wattenhofer from ETH Zurich. The first one was held before DISC - on Monday September 26, while the second one started at the last day of DISC with a joint invited talk and technical session, and finished the day after.

Pierre Fraigniaud (CNRS and University of Paris Sud) was the Program Committee Chair, in charge of the scientific aspects of DISC 2005, while the organization was the responsibility of Darek Kowalski (University of Liverpool), see Figure 2

Figure 2: Pierre Fraignaud and Darek Kowalski, the DISC05 organizers

The program committee (PC) of DISC 2005 consisted of 16 members. They had to work hard to review 162 regular submissions and 30 brief announcements. Out of these, 32 regular submissions and 14 brief announcements were selected during a 2-day PC meeting in Paris.

DISC 2005

Organizing chair: Dariusz Kowalski (University of Liverpool).

Program chair: Pierre Fraigniaud (CNRS and University of Paris Sud).

Program Committe: Lenore Cowen (Tufts University), Panagiota Fatourou (University of Ioannina), Hugues Fauconnier (University of Paris VII), Pierre Fraigniaud (CNRS, University of Paris Sud) (Chair), Roy Friedman (Technion), Yuh-Jzer Joung (National Taiwan University), Dariusz Kowalski (Warsaw University), Victor Luchangco (Sun Microsystems Laboratories), Maged Michael (IBM T.J. Watson Research Center), David Peleg (Weizmann Institute), Greg Plaxton (University of Texas at Austin), Sergio Rajsbaum (National Autonomous University of Mexico), Sylvia Ratnasamy (Intel Research Laboratory), Nicola Santoro (Carleton University), Sebastiano Vigna (University of Milano), Jennifer Welch (Texas A&M University).

Steering Committee Alex Shvartsman (University of Connecticut), chair.
Paul Vitanyi (CWI and University of Amsterdam), vice-chair.

Hagit Attiya (Technion)
Faith Fich (University of Toronto)
Pierre Fraigniaud (CNRS, University of Paris Sud)
Rachid Guerraoui (EPFL)
Roger Wattenhofer (ETH Zurich)

Some of the attendants to the PC dinner can be seen in Figure 3. The organizing team consisted of Darek

Figure 3: At the PC dinner, left to right: Alex Shvartsman, Michel Raynal, Hagit Attiya, Shlomi Dolev, Marek Zayonc, Marek Piotrow, Brigitte Rozoy, Andre Schiper, and half of Sam Toueg (the other half can be seen in Figure 5)

Kowalski from Liverpool, Krzysztof Diks and Adam Iwanicki from Warsaw University, Kazimierz Grygiel and Krzysztof Szafran representing the Foundation for Information Technology Development, Marek Zaionc and 8 other people from Jagiellonian University in Cracow helped to coordinate the activities on place. Thanks to all of them the conference took place successfully.

The work of the organizing committees was really hard this year, due to the record attendance: 90 participants, not counting the organizing team and the additional 25 participants who came only for workshops.

The conference was opened and closed by Alex Shvartsman from the University of Connecticut, who is currently the chair of the steering committee. Apart of him, there were six additional SC members: Paul Vitanyi (CWI and University of Amsterdam) who is a vice-chair, Hagit Attiya (Technion), Faith Fich (University of Toronto), Pierre Fraigniaud (CNRS, University of Paris Sud), Rachid Guerraoui (EPFL), and Roger Wattenhofer (ETH Zurich). During DISC 2005 one committee member was exchanged: Faith Fich – DISC 2003 program committee chair – was replaced by Shlomi Dolev - next DISC 2006 program committee chair. We would like to thank Faith for her great job while chairing DISC 2003 in Sorrento (Italy) and her activity as DISC SC member (as the symbolic token of gratitude Faith received a small "disc" plate with Cracow paintings). It is also worth to mention that DISC 2005 was the first when all five previous steering

Figure 4: Shmuel Zaks and Andre Pelc in front of the Cracow Cathedral

committee chairs were present, namely Sam Toueg (1996-1998), Shmuel Zaks (1998-2000), Andre Schiper (2000-2002), Michel Raynal (2002-2004) and the current chair Alex Shvartsman (2004-2006). See Figure 5.

We would like to thank all sponsors and organizers (in random order): Warsaw University, Jagiellonian University, The University of Liverpool, INRIA, LRI, as well as the Microsoft Research for sponsoring LOCALITY'05.

3 Social Part

The conference started officially on Monday evening, September 26, with a reception in the Collegium Maius (Figure 6). This is the oldest and the most representative Jagiellonian University building from the XIV century. It started with a toast in the chamber called Stuba Communis (refectory for Professors). During a guided visit of the building participants also visited the Library (added c.1515-1519), the Treasury rooms and the Asembly Hal.

The remaining part of the conference took place in the Cracovia hotel - conveniently located within a walking distance to the old part of the city, the castle, the Jagiellonian University and the Jewish district Kazimierz. Participants enjoyed walking through the old Cracow center, sampling traditional Polish food in some of the over 200 restaurants located nearby.

There was an excursion on Wednesday, to the amazing salt-mine Wieliczka, on the UNESCO's first World List of Cultural and Natural Heritage list since 1978 together with 11 other sites from all over the world. Wieliczka is the only salt-mine in the world where mining has continued since the Middle Ages. There are more than 300 kilometers of corridors and chambers, stretching up in nine levels up to a depth of 327 meters below the surface. Wieliczka is very famous for its original excavations such as longitudinals, traverses, chambers, lakes, lesser and major shafts. Original handmade art pieces done by miners remain in many places of the mine, many of them, especially sacral art, in the famous St. Kinga chapel.

Figure 5: All DISC SC chairs were present, from left to right: Shmuel, Alex, Michel, Andre, Sam

Figure 6: At the Collegium Maius

Shortly after the trip, the conference dinner took place in one of the most famous and traditional restaurants in all of Poland, the Wierzynek Restaurant, located in the Main Market Square of Cracow. We were greeted at the reception by hostesses dressed up as princesses. One of them told us the history of the place. Wierzynek has been linked with Krakow since 1364 when, under the cover of the wedding of King Kazimierz granddaughter, the first European peace conference took place. There was a magnificent feast hosted by Mikolaj Wierzynek, the city councilor. Then, as a token of appreciation, the king granted special permission to the house of Wierzynek to receive foreign Royalties and dignitaries. The legendary feast was immortalized by Jan Matejko, the greatest polish historical painter, in his painting "Uczta u Wierzynka." On Wednesday we occupied three splendid rooms: Wierzynkowa, Kolumnowa, and Tatrzanska. Besides the historical aspect of these rooms, their beauty is additionally emphasized with antique wall-clocks, candelabrums, silvers and Flemish tapestries.

4 Technical Program

This year the technical program was very dense - it included 2 invited talks, 32 regular presentations and 13 brief announcements. The technical part started on Tuesday, September 27th, with an invited talk on *Digital Fountains* by Michael Mitzenmacher from Harvard University, Figure 7. He described the digital fountains

Figure 7: Michael Mitzenmacher giving an invited talk on Digital Fountains

paradigm, its history, and its applications to networking This replaces the standard paradigm where a user receives an ordered stream of packets to one where a user must simply receive enough packets in order to obtain the desired data. Obviating the need for ordered data simplifies data delivery, especially when the data is large or is to be distributed to a large number of users. He focusing on recent advances in coding that allow efficient implementations of digital fountains. He also described his previous work showing the effectiveness of digital fountains for reliable multicast and parallel downloading. This subject should be of

interest to the DISC community, especially those involved in network algorithms. And vice versa; we hope that the DISC community can contribute to this research topic.

The second invited talk was by Amir Herzberg from Bar-Ilan University, on *Securing the Net: Challenges, Failures and Directions*. This talk was just before the last session of DISC 2005, and was joint with DYNAMO workshop. Amir discussed the problems of insecurity of the Internet: fraudulent and spoofed sites, phishing and spam e-mail, viruses and Trojans, Denial of Service attacks, etc. He gave a nice overview of security issues in the Internet with some outlines of of solutions and directions for future applied and analytical research.

Figure 8: Amir Herzberg giving an invited talk on security

This year the award for the best student paper was given to two students Yaron De Levie and Amos Korman, for their papers:

- *Space and Step Complexity Efficient Adaptive Collect* by Yaron De Levie and Yehuda Afek, and

- *General Compact Labeling Schemes for Dynamic Trees* by Amos Korman.

The first paper considered the very important problem of collecting data by processes in shared memory. The authors provided algorithms for this problem which are efficient in terms of time-steps and the size of memory used. Both the paper and the presentation were done in very clear and elegant way, using non-trivial algorithmic blocks. The solutions are still not optimal, so we hope for improvements in a near future. The second awarded paper studied distributed dynamic schemes for labeling the vertices of a graph. Such a scheme defines an algorithm that assigns short labels to the nodes, and an algorithm that allows to infer information about any two vertices from their labels, such as adjacency, distance, tree routing, and others.

Previous work concentrated on the static, centralized case, while this work allows the network to change, and the algorithms to be distributed. He extends the previous approaches, for tree labels. The operations allowed are to add a leaf or remove one from the tree, with applications to routing and distance.

The regular presentations were split into eight sessions.

1. The first one, chaired by Pierre Fraigniaud, included papers related to security and quorums.

2. The main topic of the second session, chaired by Rachid Guerraoui, was wait-free and shared memory algorithms.

3. The third session, chaired by Sergio Rajsbaum, focused on several aspects of shared memory, including atomicity, comparing computational power of registers, etc.

4. Papers on Paxos, plausible clocks, and formal methods especially in message passing systems, were represented in session four chaired by Alex Shvartsman.

5. Session five, moderated by Hugues Fauconnier, had some papers on computational power in anonymous systems. Also, about what is the power of imperfect randomness distributed computing, and what can be computed locally.

6. Victor Luchangco lead session six, with papers on transactional memory, contention management, and a paper on conflicts in optimistic replicated systems.

7. Session seven chaired by Darek Kowalski was about communication problems, like broadcast in message-passing model and collect problem in shared memory, as well as about the issues of correctness and self-stabilization.

8. The last session, managed by Andrzej Pelc, treated mainly about the graph aspects used in distributed computing and networking. Among others, the small-world graphs, routing tables for planar graphs, labeling schemes for dynamic trees, and worst-case graph topologies for deciding stability in packet-switched FIFO networks.

For the first time the selected papers from DISC 2005 will be published in a special issue of *Distributed Computing* journal dedicated to DISC 2005 (joint with PODC 2005). This is very good news and we hope to seeing this fruitful cooperation with Distributed Computing continuing in the future.

It is worth to mention the substantial contribution of the two co-located workshops. First of them – LOCALITY'05 – focused on various aspects of local approaches in distributed computing. It included four keynote talks:

- *Gossip-based Overlay Network for Efficient Content-based Filtering* by Anne-Marie Kermarrec (INRIA/IRISA, Rennes),

- *Metric Dimensionality* by Kunal Talwar (Microsoft Research),

- *Network Positioning for Wide-Area and Wireless Networks* by Emin Gun Sirer (Cornell), and

- *Multicast Communications from the Edge* by Pablo Rodriguez (Microsoft Research).

There were also six technical papers about local computations in networks, faulty environments and in large-scale systems.

The second workshop – organized by DYNAMO Cost Action 295 – started with the joint invited talk and the last session of DISC. The four additional sessions presented the work of DYNAMO members in four topics: P2P Paradigm, Wireless Networks, Small Worlds and Emerging Algorithmic Techniques.

5   Future DISC's

Hoping that DISC 2005 in Cracow will be remembered for a long time, we'd like to invite all the readers to next DISC, in Stockholm (Sweden) 2006. The program committee chair for next DISC is Shlomi Dolev, and the organization is done by Seif Haridi from SICS and Lenka Carr from Lulea University. It seems that after the pretty warm September in Cracow, we'll be a little bit colder the next year, but for those who like higher temperatures there is also hope – during the plenary assembly in DISC 2005 the proposition of Cyprus as the host of DISC 2007 was announced by Chryssis Georgiou from the University of Cyprus and hopefully will be accepted.

Figure 9: Cracow

Acknowledgment. We are very grateful to all people involved in DISC 2005 for giving us wonderful event to review, and additionally we want to thank Adam Iwanicki and Shmuel Zaks for sending us beautiful pictures some of which we used in this article.