

# N E W S L E T T E R

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International workshop at EPFL

## PLANETLAB DRAWS ITS FUTURE DIRECTIONS (by Manfred Hauswirth)

On October 27-28, EPFL hosted an international workshop sponsored by the NCCR MICS, the Evergrow EU project, and PlanetLab (Princeton University), to discuss the future development of PlanetLab, a global testbed for large-scale experiments with distributed systems that has become the de-facto standard in this domain. The opportunity PlanetLab provides for real-world experimentation at an unprecedented scale has sparked an explosion of research activities, with hundreds of active projects transmitting an average of 1 terabyte of data per day on the current system. At present, PlanetLab consists of 580 machines based on 275 sites in 30 countries. A single operations center hosted at Princeton manages all these machines.

The goal of the workshop was to discuss new directions to expand PlanetLab's user base to literally every researcher or student who wants to conduct a wide-area experiment and expand its hardware base to every machine on the planet. The specific areas of interest included:

- **Clusters:** How to integrate PlanetLab with cluster environments such as Rocks, Oscar, etc.? Such integration will drastically increase the amount of hardware resources a site can devote to PlanetLab.
- **Private PlanetLab:** The existing infrastructure has served well to manage hundreds of widely distributed machines providing value added services. This could also be of use to large institutions or corporations to

manage such machine configurations via a Private PlanetLab infrastructure.

- **Machine virtualization:** PlanetLab uses Linux Vserver support to virtualize slices at the operating system level. Other systems (Intel VT, VMware, Xen, MSFT Virtual Server) are now becoming viable options and open the door to better remote machines management, improved availability, and even "piggy-backing" PlanetLab on regular machines at home or at the office when these are idle.

- **Federated PlanetLab:** PlanetLab is growing globally, introducing problems such as time and language differences. PlanetLab Central is therefore trying to decentralize operations.

PlanetLab's designers, developers and users participated to the meeting, including its mastermind Larry Peterson. "The workshop marks an important milestone: institutions are finally using and/or extending the infrastructure for their own purposes", says Marc E. Fuiczynski of PlanetLab Central. Research consortia such as MICS or Evergrow, conducting experiments on PlanetLab, will help to shape and improve the testbed through their specific use cases and novel services. EPFL's Global Computing Center, headed by Martin Rajman, is trying to make PlanetLab usable on a larger scale at the School. Its specific interest is targeted at private PlanetLab and machine virtualization.

Further information and presented material can be found at <http://lsirwww.epfl.ch/PlanetLabEverywhere>.

Monika Henzinger

## A PERSONALIZED SEARCH ON SENSOR DATA

Previously Google's research director, Monika Henzinger has started her duty on October 1<sup>st</sup> at EPFL School of Computer and Communication Sciences. She is also bringing her expertise to MICS program through a project on information retrieval in sensor networks.

- You have worked for almost ten years within the industry. What attracted you to return to an academic environment, especially to EPFL?

Regarding the academic environment, I was interested in the freedom of research. As for EPFL choice in particular, I wanted to return to Europe and EPFL has one of the top computer science departments in Europe.



- What are your expectations regarding your involvement in EPFL?

I will teach, supervise undergraduate and graduate students and work on committees.

- You are German and you have spent many years in the United States. What main differences do you see between research in Europe and in the US?

There are many differences. This would deserve a long discussion!

- Please explain your specific field of interest within computer science?

It concerns applied algorithms. I like problems that have a direct practical application, but

also an interesting theoretical problem behind them. For example, sample pages from the web uniformly at random is such a problem.

- A year ago, although you had already been hired by EPFL, you received the European Young Investigators Awards, which aims at encouraging leading scientists to come to Europe. How will you use this award?

I will use it for hiring PhD students.

- What is your activity within MICS projects?

My role will be personalized search on sensor data. A problem I am particularly interested in is to use wireless sensor technology in our daily environment. Imagine you are losing things in your office, like books, and would like to find them again. This is an interesting search problem! Can sensor technology help us to more easily find these things again? This is one example of an important problem considering people generally are getting older and many will be having increasingly difficulties to orient themselves in their environment.

### A SHORT BIOGRAPHY...

Born in 1966 in Weiden, in Germany, Monika Henzinger has a large academic and industrial experience. She holds a PhD in computer science from Princeton University. She started her career at NEC Research Institute and at Cornell University. In 1996, she moved to the industry environment, working at Compaq Research Center, in Palo Alto. After a short time in Germany at Saarland University, she crossed back the ocean to enter Google enterprise in 1999.

### **BTnode rev3**

## **FAST PROTOTYPING OF SENSOR NETWORKS** (by Jan Beutel)

The BTnode is an autonomous wireless communication and computing platform based on a Bluetooth radio and a microcontroller. It serves as a demonstration platform for research in mobile and ad-hoc connected networks (MANETs) and distributed sensor networks. It has been jointly developed at ETH Zurich by the Computer Engineering and Networks Laboratory and the Research Group for Distributed Systems with a substantial part of the development supported by the NCCR MICS. Currently, beside MICS, the BTnode is primarily used in the Smart-Its research project which also supported the initial funding for the development of the platform.



The BTnode rev3 has been designed with two radios and power conversion and distribution systems. The low-power radio is the same as used on the Berkeley Mica2 Motes, making the BTnode rev3 a twin of both the Mote and the old BTnode rev2. Both radios can be operated simultaneously or be independently

powered off completely when not in use, considerably reducing the idle power consumption of the device. Being the only dual-radio platform for sensor networks available today, the BTnode rev3 is ideally suited for versatile and flexible functional prototyping of a broad range of applications with the tradeoff possibility of the two radios and the flexibility offered by ample memory resources. The C-based BTnut system software support uses a threaded OS core that allows an extremely fast jumpstart, even on complex applications.

This BTnode was made available for public sale through our partner Art of Technology. The BTnode rev3 is now successfully used in many research projects spanning from rather simple ubiquitous computing applications with few nodes to large, interactive networking applications. It has been used to scale up Scatternet experiments to 70+ nodes. Additionally the BTnodes are used in university education and training, as part of the NCCR MICS program mandated by the SNF.

### **How to get started**

To get going on BTnodes is quite straightforward. Using our tutorial the first steps are typically accomplished in less than an hour. This tutorial originated in the Embedded Systems lecture, a graduate course taught at the Department of Information Technology and Electrical Engineering, at ETH Zurich. It requires basic knowledge of C-programming and embedded systems and should give an overview of the capabilities of networked embedded systems and their key properties. Apart from usage in the lecture, it is a basic introduction to programming on the BTnode platform.

All information is available on the web page <http://www.btnode.ethz.ch>.

4th site visit

**EXCERPT FROM THE FEEDBACK BY THE SNF REVIEW PANEL** (by Jacques Bovay)

On 20 October 2005, the SNF provided the NCCR MICS with the official approval of its 4th progress report and full proposal for phase II. An excerpt of the accompanying comments is given below. The contract for phase II is currently in the process of being finalized.

The Review Panel is very impressed by the work realized within the NCCR MICS and could see no scientific deficiencies. The integration of the NCCR has considerably improved, and an impressive number of interactions and collaborations were established by the end of phase I.

**A selection of excellent projects**

The Review Panel is happy with the way the NCCR management reacted to the recommendations of the last site visit. The experts particularly appreciate the aggressive pursuit of applications. Progress is also apparent in the involvement of Universities of Applied Sciences (FHS/HES), from which three groups are now actively involved.

For the preparation of the full proposal for phase II the NCCR management defined a clear renewal process that resulted in a selection of excellent projects. The Review Panel is unanimously of the opinion that the proposed projects are of high quality and that they are a natural next step after the achievements of phase I. The Panel is encouraging the NCCR to exploit the synergies that exist already as a result of phase I and to work aggressively on tying in the new projects quickly. The way of collaboration between the application groups and the technology groups must be worked out more clearly.

The Panel thinks that the choice of research topics for phase II is very good. The NCCR found a good balance between being ambitious, but still realistic.

The choice of applications presented in the proposal challenges different aspects of wireless systems (e.g. different degrees of mobility, variable energy sensitivity). There is a strong focus on scientific applications for the time being, it may be necessary to explore more industrial applications in the future. This may be a promising strategy to strengthen the technology transfer of the NCCR.

Next year's site visit will take place in fall 2006, in Zurich.

**UWB4SN 2005**

The 2005 edition of the UWB4SN (UWB for Sensor Networks) workshop took place at EPFL on November 4. It intended to bring together researchers from academia and industry, with the aim of unleashing the potential of the UWB technology to empower tomorrow's sensor network platforms. Topics addressed included: modulation and detection, synchronization, mobility, channel measurement/modeling, interference mitigation, spectrum analysis, multiple-access techniques, MAC design, ranging and localization. Target applications of the UWB technology comprise industrial inventory control, home sensing, safety/health monitoring and many others. The workshop welcomed 60 participants, mainly from Europe, and will continue in the future. It was co-organized by MICS (Prof. J.-Y. Le Boudec) and STMicroelectronics (G.M. Maggio), which was also the main sponsor. Thanks also to R. Merz (MICS) for local support. For more information: <http://icawww1.epfl.ch/uwb/uwb4sn/>.

## Mentoring for female IT students

(by Anne-Christine Gugler)

We held our first meeting November 23. Seventeen students responded to the invitation of the MICS-women-in-science promotion program. The primary goal of this supper was to create bonds between women in IT and to encourage a forum for discussion and support. In addition, we put forward the idea of pairing 1<sup>st</sup> and 2<sup>nd</sup> year female students (Little Sisters) with upperclassmen (Big Sisters). The Big Sister/Little Sister relationship would serve as an excellent way for students in their first two years to get to know someone in the department - someone they can look up to and ask for guidance. Furthermore, the program encourages all the participants to share their experiences of computer science. Each student filled in a short presentation CV to introduce herself to others.

An online address book of the students will be created so that participants can keep in touch even after they finish their studies. A web forum is under construction. Visits to industries and workshops, meetings with PhD students, presentations on how to apply to PhD programs, and meetings with women from industry will be soon organized in collaboration with NCCR-QP.

## MICS 5<sup>th</sup>-semester internship for female students: a report

(by Anne-Christine Gugler)

Female students participated to this internship to improve their knowledge, fulfill their academic requirements and discover the lab lifestyle.

In general, they benefited greatly from their internships and from the exposure to the lab work

environment. They found the overall experience stimulating and valuable. The students had varying amounts of coaching, depending on the lab assistants' availability. They would have liked to have been better informed about the goals of the internship and the topics involved before applying. It is proposed that next year, students will make a short presentation of their work to the lab staff after the completion of the report.



Thanks again to MICS professors and lab assistants who welcomed these students for this internship in their lab. I hope you will renew this experience next year.

More about it on:

<http://itfemmes.epfl.ch/page59008.html>

Read the internship reports on:

<http://www.mics.org/micsEducation.php?action=page&name=SumIntF05>

You can have a look at the internship survey:

<http://itfemmes.epfl.ch/page59008.html>.

### Upcoming conferences:

- European Workshop on wireless sensor networks (EWSN), Zurich, February 13-15.  
Call for papers: deadline on December 19.
- International Conference on information processing in sensor networks (PSN), Nashville, April 19-21.
- 25th Annual Conference on computer communications (Infocom), Barcelona, April 23-29.
- 4<sup>th</sup> International Conference on pervasive computing (Pervasive), Dublin, May 7-10.  
Call for papers: deadline on December 2<sup>nd</sup>.
- 4<sup>th</sup> International Conference on wired/wireless internet communications, Bern, May 9-12.
- 7<sup>th</sup> International Conference on mobile data management (MDM), Nara, May 9-12.
- 4<sup>th</sup> International Conference on wired/wireless internet communications (WWIC), Bern, May 9-12. Call for papers: deadline on December 8.
- Third annual IEEE Communications Society Conference on sensor, mesh and ad hoc communications and networks (SECON), Reston, September 25-29.  
Call for papers: deadline on April 7.

### REQUEST FOR SENIOR PROJECTS FOR THE "MATURITE FEDERALE"

*With the goal of encouraging high school girls (17-18 years old) to undertake studies in IT, we would like to provide them with various suggestions of IT-related topics for their Senior projects (« travail de maturité »). In addition, we will award a prize for the best project.*

*In their last year of high-school (senior year), every student must undertake a significant, self-directed project, done either independently or in groups of two. The project includes a written report and an oral presentation. The objectives of the project include the students' demonstration of his/her work organization, methodology and creativity.*

*We would like to offer these young women the possibility of having a mentor who can help them in this project. The mentor can make suggestions, provide guidance on how to find information (bibliography, website), and make him or herself available from time to time to answer questions. Because the students' senior projects must be autonomous, the time resources required of the mentor will be minimal.*

*We are looking for suggestions of topics related to computers / communications and for mentors. We would be very grateful if you can send us your suggestions and/or your willingness to participate by email **by the end of 2005** to:*  
[anne-christine.gugler@epfl.ch](mailto:anne-christine.gugler@epfl.ch).

*This is done in collaboration with NCCR-QP and coordinated with the EPFL Equal Opportunities Office. For a general idea, you can look at the topics that were suggested last year:*  
<http://itfemmes.epfl.ch/page56559.html>.

**MICS calendar 2005-2006:**

- 9 Dec:** Launch of the second call for proposals
- 31 Mar:** Deadline for submission of project proposals
- 2-3 May:** MICS Scientific Board meeting
- 4 May:** MICS Industry Forum
- 3-7 Jul (tbc):** Summer School (at University of Lausanne)
- 15 Jul:** Start of summer internships
- 16-18 Oct:** MICS Scientific Conference
- 19-20 Oct:** 5th Scientific National Fund site visit

**Call for proposals:**

The NCCR MICS launches a second call for proposals for research groups interested in participating to phase II of the Center. Proposers are kindly invited to contact the relevant cluster head with respect to suitability of proposed research within the cluster and insertion into the overall MICS program:

- Theory of self-organized, distributed communication and information (Prof. Ruediger Urbanke, EPFL)
- Mobile communication and processing platforms (Prof. Jean-Yves Le Boudec, EPFL)
- Networked software systems (Prof. Thomas Gross, ETHZ)
- In-network information management (Prof. Gustavo Alonso, ETHZ)

Please refer to the MICS Web site ([www.mics.org](http://www.mics.org)) for more details on addresses and research agendas. The deadline for submission of the proposals is 31 March 2006.

***WISHING YOU A FABULOUS CHRISTMAS AND A PROSPEROUS YEAR 2006!***

