INTERNATIONAL CONFERENCE FOR INDUSTRY AND ACADEMIA MARCH 26-28, 2008 / ZURICH

www.internet-of-things-2008.org











Editorial

Editorial

Welcome Note

Welcome Note

We are very pleased to welcome you to Zurich for the IOT 2008, the first international conference on the "Internet of Things".

This conference, the first of its kind, brings together researchers, industry experts, and early adopters from around the world to share applications, research results, and experiences. Our speakers will address topics such as

- Emerging Internet of Things business models and process changes
- Communication systems and network architecture
- Embedding sensing and actuation into networked things
- Existing Internet of Things deployments
- Security and privacy issues of Internet of Things infrastructures and applications.

One of our primary objectives is to maintain the highest standard of quality throughout all aspects of the conference. In order to accomplish this, we invited four high-profile keynote speakers and carefully selected 16 distinct speakers from industry and academia. We accepted the best 23 scientific papers from almost 100 international submissions.

We hope that you will enjoy the IOT 2008 conference and that it will prove to be a productive and memorable event.

Friedemann MatternElgar FleischSanjay SarmaIOT 2008 General Chairs

Friedemann Mattern



We are living in exciting times – given the continuing technical progress in computing and communication, it seems that we are heading towards an all-encompassing use of networks and computing power. At the same time, the ongoing miniaturization of electronic devices enables processors and sensors being embedded into more and more everyday things – not only electrical devices, cars, household appliances, toys, and tools, but also very mundane things such as key chains or even clothes. All these devices will soon be interwoven and connected together by wireless networks. In fact, technology is expected to make further dramatic im-

provements, which means that eventually billions of tiny and mobile processors will occupy the environment and be incorporated into many objects of the physical world.

As the Internet of Things presents huge opportunities for the future, it also becomes clear that the technical, economic, and social challenges of these prospects are formidable. The first international conference on the Internet of Things therefore comes at exactly the right time: it is an excellent opportunity to explore these opportunities and challenges, to gain a better understanding of the most important technical issues, to learn about the concerns with respect to the social issues, and to hear about first successful applications from seasoned practitioners. With its unique combination of scientific talks and business-oriented reports, it is perfectly suited to cover the broad spectrum of topics and issues. We are looking forward with anticipation to the Internet of Things conference!

Elgar Fleisch



The Internet of Things does to business administration what magnetic resonance imaging does to medicine: it provides us with a new granularity level of real-time information on the current status of the real world. It helps managers see what is really going on in their physical value network in real time, rather than letting them run and develop their businesses on the foundation of outdated, coarsely meshed, costly, and error-prone data that was fed into computers by human employees. Since one can only manage what one can measure, the Internet of Things is a great means to improve a systems' management capability. This is of

utmost importance in complex domains (e.g. scenarios that involve many goods, machines, suppliers, clerks, or customers) that one can find in every economic sector, from manufacturing to retail, financial services, and service industries.

Sanjay Sarma



We founded the Auto-ID Center in 1999 with the vision that inexpensive and ubiquitous RFID tags would connect the physical world to the networked world. The widespread adoption of the EPC suite of standards appears to have put certain sectors like the supply chain well on that path. The growth of GPS, the emergence of WiFi tags and sensors, and the development of NFC is expanding the variety of physical objects that can now be located and probed on the network. I believe that we can look beyond connectivity to what is the next and more important challenge in the IoT: figuring out what to do with information. Answer-

ing this question will involve changes in the behaviors of individuals and companies.

Conference Chairs • Program Chairs • Industry Track Chair • Workshop and Demo Chair

Conference Chairs

- Prof. Elgar Fleisch (ETH Zurich & University of St. Gallen)
- Prof. Friedemann Mattern (ETH Zurich)
- Prof. Sanjay Sarma (MIT)

Program Chairs

- Christian Floerkemeier (MIT)
- Marc Langheinrich (ETH Zurich)

Industry Track Chair

• Ulrich Eisert (SAP Research)

Workshop and Demo Chair

• Florian Michahelles (ETH Zurich)

Program Committee

- Karl Aberer (EPFL)
- Manfred Aigner (Technical University Graz)
- Michael Beigl (University of Braunschweig)
- Alastair Beresford (University of Cambridge)
- Peter Cole (University of Adelaide)
- Nigel Davies (Lancaster University)
- Jean-Pierre Émond (University of Florida)
- Alois Ferscha (University of Linz)
- Elgar Fleisch (ETH Zurich & University of St. Gallen)
- Anatole Gershman (Carnegie Mellon University)
- Bill C. Hardgrave (University of Arkansas)
- Mark Harrison (Cambridge University)
- Ralf Guido Herrtwich (Daimler AG)
- Lutz Heuser (SAP Research)
- Lorenz Hilty (Empa and University of St. Gallen)
- Thomas Hofmann (Google Labs Zurich)
- Michael ten Hompel (FHG Logistik)
- Ryo Imura (Hitachi & University of Tokyo)
- Sozo Inoue (Kyushu University)
- Yuri Ivanov (MERL)
- Behnam Jamali (University of Adelaide)
- Günter Karjoth (IBM Research Zurich)

- Wolfgang Kellerer (NTT DoCoMo European Research Labs)
- Daeyoung Kim (ICU)
- Kwangjo Kim (ICU)
- Tim Kindberg (HP Labs Bristol)
- Gerd Kortuem (Lancaster University)
- Anthony LaMarca (Intel Research Seattle)
- Friedemann Mattern (ETH Zurich)
- Hao Min (Fudan University)
- Jin Mitsugi (Keio University)
- Paul Moskowitz (IBM Watson Research Center)
- Jun Murai (Keio University)
- Osamu Nakamura (Keio University)
- Paddy Nixon (University College Dublin)
- Thomas Odenwald (SAP Research)
- Ravi Pappu (Thingmagic)
- Joe Paradiso (MIT)
- Aaron Quigley (University College Dublin)
- Hartmut Raffler (Siemens Corporate Technology)
- Matt Reynolds (Georgia Tech)
- Antonio Rizzi (University of Parma)
- Sanjay Sarma (MIT)
- Albrecht Schmidt (University of Duisburg-Essen)
- James Scott (Microsoft Research Cambridge)
- Ted Selker (MIT)
- Andrea Soppera (BT Research)
- Sarah Spiekerman (Humboldt University Berlin)
- Frédéric Thiesse (University of St. Gallen)
- Khai Truong (University of Toronto)
- Kristof Van Laerhoven (Darmstadt University of Technology)
- Harald Vogt (SAP Research)
- Wolfgang Wahlster (DFKI)
- Kamin Whitehouse (University of Virginia)
- John Williams (MIT)

Organization (ETH Zurich)

Steve Hinske:	Local Arrangements, Press, Sponsoring, Student Volunteers, Web
Marc Langheinrich:	Finances, Registration, Web
Philipp Bolliger:	Proceedings
Benedikt Ostermaier:	Publicity

Committees

Program Committee • Organization

Detailed Program • Tutorials

Program Overview

Time		Wednesday, March 20	5
Floor/Room	31 st Floor		31 st Floor
08:30-09:00	Registration		
09:00-10:30	Workshops	Tutorial Smart Items	
10:30-11:00	Coff	ee Break	
11:00-12:30	Workshops	Tutorial Smart Items	
12:30-14:00	L	unch	
14:00-15:30	Workshops	Tutorial RFID	Start-Up Event
15:30-16:00	Coffee Break		See page 9 for detailed program
16:00-17:30	Workshops	Tutorial RFID	

Time	Thursday, March 27		
	«Zurich»		«Bern»
08:30-10:30	R	egistration and Welcome Co	ffee
10:30-11:00		Opening	
11:00-12:30	Keynotes Peter Zencke, Gerd Wolfram		
12:30-14:00		Lunch	
	Karl Aberer	Scientific Track EPC Network	
14:00-15:30	Ken Douglas		Scientific Track Middleware
	Heikki Huomo		
15:30-16:00	Coffee Break		
	Gerald Santucci		
16.00 19.00	Peter Schaar	Scientific Track Business Aspects	Scientific Track RFID Technology and Regulatory Issues
10:00-18:00	Dave Raggett		
	Dirk Trossen		
18:00-19:30	Reception		
19:30		Conference Dinner	

Room«Zurich»«Basel»«Bern»08:30-09:00	Time	Friday, March 28		
08:30-09:00 Registration 09:00-10:30 Keynotes Hannu Kauppinen, Haruhisa Ichikawa 10:30-11:00 Coffee Break 11:00-12:30 Remo Frei Tom Oelsner Mike Roth Marc Oertle Michael Berger	Room	«Zurich» «Basel» «Bern»		
09:00-10:30 Keynotes Hannu Kauppinen, Haruhisa Ichikawa 10:30-11:00 Coffee Break 11:00-12:30 Remo Frei Tom Oelsner Marc Oertle Scientific Track Applications 1 Mike Roth Michael Berger	08:30-09:00	Registration		
Initial Contraction Coffee Break Remo Frei Marc Oertle Tom Oelsner Scientific Track Applications 1 Marc Oertle Mike Roth Michael Berger	09:00-10:30	Keynotes Hannu Kauppinen, Haruhisa Ichikawa		
Remo Frei Marc Oertle 11:00-12:30 Tom Oelsner Scientific Track Applications 1 John Stevens Mike Roth Michael Berger	10:30-11:00		Coffee Break	
11:00-12:30 Tom Oelsner Scientific Track Applications 1 John Stevens Mike Roth Michael Berger		Remo Frei	Scientific Track Applications 1	Marc Oertle
Mike Roth Michael Berger	11:00-12:30	Tom Oelsner		John Stevens
		Mike Roth		Michael Berger
12:30-14:00 Lunch	12:30-14:00	Lunch		
Christof Weinhardt		Christof Weinhardt	Scientific Track	
14:00-15:30 Chris Adcock Scientific Track Scientific Track Sensing Systems	14:00-15:30	Chris Adcock		Scientific Track
Hans-Jörg Vögel		Hans-Jörg Vögel	rippireations 2	Sensing Systems
15:30-15:45 Wrap-Up and Farewell	15:30-15:45	Wrap-Up and Farewell		

See page 19 for floor plan.

Detailed Program Day 1

Wednesday, March 26

Floor/Room	31 st Floor	«Basel»	31 st Floor
08:30-09:00	Regi	istration	
09:00-10:30	Workshops	Tutorial Smart Items	
10:30-11:00	Coff	ee Break	
11:00-12:30	Workshops	Tutorial Smart Items	
12:30-14:00	Lunch		
14:00-15:30	Workshops	Tutorial RFID	Start-Up Event
15:30-16:00	Coffee Break		detailed program
16:00-17:30	Workshops	Tutorial RFID	

Tutorials

Tutorial 1: Smart Items - Business Logic on the Items 09:00-12:30 | Room «Basel»

Smart Items are wireless sensor networks embedded into physical goods, items and assets. Smart-Items-enabled, perishable goods autonomously and continuously monitor and report their transport conditions. Complex conditions, such as the integrity of a compound of several items, are supported through instantaneous collaboration among Smart Items in order to prevent the loss of goods in transit. The items themselves provide this functionality; hence, no infrastructure support, e.g. reader installation, is required. Smart Items enable a novel form of business information systems by re-locating business process logic down to the items. As a result, the items operate as a partly autonomous and process-embedded real-world interface of a business information system.

The tutorial's objective is to enable the attendees to design, implement and integrate Smart Items appliances for their field of work. We will study various available wireless sensor network platforms for building Smart Items and explain programming concepts for implementing business logic on these platforms as well as collaboration concepts to let Smart Items collectively work together. We will also review modern state-of-the-art technologies, such as UPnP and webservices, as candidates for the integration of Smart Items with business information systems and investigate how they cope with the scalability, mobility and process dynamics of Smart Items appliances. Finally, the tutorial offers the possibility to exercise hands-on the design, implementation and integration of a Smart Items appliance using the particle sensor network platform.

Organizers
Christian Decker, University of Karlsruhe, Germany
Philipp Scholl, University of Karlsruhe, Germany

Workshops

Program Day 1

Tutorials • Workshops

Tutorial 2: Radio Frequency Identification (RFID) Application Development with the Accada Open Source Middleware Platform 14:00-17:30 | Room «Basel»

Radio Frequency Identification (RFID) technology has evolved from a tool mainly used to facilitate niche applications, such as cattle tracking, into a general purpose identification technology that is expected to become as omnipresent as the barcode. As interest in RFID is no longer limited to a few industries, there is a growing need for standardization. While standardization initially focused on RFID hardware and tag organization, it today also covers RFID-related information systems. The most widely used software standard in this domain is the EPC Network by EPCglobal, which allows businesses to capture and share RFID data in a unified way. The complete RFID software stack as specified in the EPC Network standards has been implemented in the Accada RFID middleware. Accada is an open source project that allows researchers, application developers, or system integrators to rapidly prototype EPCglobal-compliant RFID solutions.

In this tutorial, participants will learn how to build their own RFID systems based on current RFID industry standards. While the focus will be on the three major concerns of the EPC Network, i.e., reader access, data filtering, and data exchange, we will also give a brief introduction into RFID basics, including hardware aspects and transmission technologies. In the second part of this tutorial, we will demonstrate how participants can take advantage of Accada by integrating it into their own projects.

The tutorial will cover the following aspects:

- RFID technology overview
- RFID standards
- EPC Network standards
- Open source RFID middleware Accada (including hands-on exercises)

Organizers
Matthias Lampe, Zuehlke Engineering, Switzerland
Christof Roduner, ETH Zurich, Switzerland

Workshops

Workshop A: Producing Standards for the Internet of Things (PROSIT)

09:00-17:30 | 31st Floor

Imagine a network with literally billions of mobile nodes, without any pre-defined communication infrastructure, whose nodes are primarily sensors and actuators with limited processing capabilities. Such networks exhibit specific communication requirements between individual nodes, and between nodes and central access points that provide connectivity with the outside world. Many, if not most of these nodes are integrated into everyday devices; they will be found inside cars, at home, and in the shopping mall. The application areas based on such networks are varied and numerous, including, for example, intelligent homes, car safety, and item tracking. Many such applications will become part of our lives, and are prone to collect information that would be considered as private by many. For the average user, it will be next to impossible to establish who has access to these information, and for which purposes.

This unprecedented penetration of virtually everyone's life suggests the need for a close scrutiny of the various processes to be associated with the development of such a technology and its subsequent wide deployment. International standardisation of information and communication technologies (ICT) is among the most important of these processes. It is linked to both the technological development and the policy and legal frameworks within which the technology is to be developed and deployed. Accordingly, this workshop aims to discuss the development of adequate standards setting processes for the Internet of Things. The analysis of the current situation in ICT standards setting, the current legal situation with respect to the role of standards, and the development of recommendations on how to adapt the processes to adequately serve the environment created by the IoT will be addressed through insights from various disciplines.

Organizers
Kai Jakobs, RWTH Aachen, Germany
Robin Williams, University of Edinburgh, UK

Workshop B: 1st International Workshop on Interoperable Vehicles (IOV 2008)

09:00-17:30 | 31st Floor

For a couple of years, some initial telematics services that inform the driver about current road and traffic conditions are already in the market. With new wireless communication capabilities available like WLAN, WiMAX or UMTS, many additional services become feasible. Therefore, one of the major automotive trends is keeping both the vehicle and the driver seamlessly connected with their environment, providing high-quality traffic related information, increasing active safety and offering passengers high-bandwidth internet connectivity. On the one hand, the vehicles require information from the environment in order to optimally support the driver. On the other hand, the local knowledge of vehicles which is based on a variety of on-board sensor systems can also contribute to support other (not necessarily automotive) services.

Enabling new opportunities of interaction between vehicles, passengers, (mobile) devices and services, there are a couple of topics that have to be thought of e.g. novel applications, network management and scalability, security and privacy, market introduction, and roll-out strategies.

Organizers

Markus Strassberger, BMW Group Research and Technology, Germany Robert Lasowski, Softlab Group, Germany

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Start-Up Event

Workshops

Workshop C: Designing the Internet of Things for Workplace Realities: Social and Cultural Aspects in Design and Organisation (Social-IoT) 09:00-17:30 | 31st Floor

The rise of the Internet of Things has important socio-technical implications for organizations. While ubiquitous and wireless technologies are developed to enable new ways of working, to increase safety and to facilitate coordination, they may interfere with established work practices, undermine productivity and individuals satisfaction, and have an unforeseen impact on relations of power and control. These issues, however, are rarely addressed in development and research projects for the Internet of Things and in the public discourses surrounding it. This workshop has the goal to increase awareness of organizational issues of the Internet of Things and to provide a forum for discussion of design approaches to manage critical organisational issues. Furthermore we would like to build a bridge between the various research communities exploring organizational, social and cultural aspects of the Internet of Things and ubiquitous computing. We welcome contributions from practitioners, technologists, designers and social scientists in organizational studies, science and technology studies, anthropology and human computer interaction.

Organizers

Daniel Boos, ETH Zurich, Switzerland Katharina Kinder, Lancaster University, UK

Gerd Kortuem, Lancaster University, UK

RFID - GOOD IDEAS SPREAD FAST





METRO Group Future Store Initiative

Start-Up Event

Special Event on Start-up and Venture: From R&D to ROI 13:30-17:30 | 31st Floor

The IOT 2008 hosts a special event on start-up and venture with a focus on the topics related to the "Internet of Things". It bridges the gap between venture capital companies, young entrepreneurs, researchers, and students.

The event opens with expert talks. An entrepreneur will share his experience from foundation to transfer of his enterprise and a venture capital expert will outline important issues on raising funds. In addition, Siemens Venture Capital will reveal how they support innovative companies. In the second part of the event, potential company founders will present their ideas to the audience in an elevator pitch and receive feedback from the expert consortium.

The takeaways for you as a participant will be a clear understanding on the steps to take to transform a brilliant idea into a successful start-up company. You will gather valuable contacts to peer company-founders, prospective employees, and venture capitalists in the adjacent drink reception.

Agenda			
13:30 - 13:50	Welcome and Overview	Prof. Dr. Elgar Fleisch (ETH Zurich / Univ. St.Gallen)	
13:50 - 14:10	Experiences of a Successful Start-Up Company	Erich Gebhardt (Media Streams / Microsoft)	
14:10 - 14:30	Insights into Venture Capital	Dr. Oliver Grabherr (Gamma-Capital)	
14:30 - 14:50	Corporate Venturing at Siemens	Alexander Rietz (Siemens Venture Capital)	
14:50 - 15:00	Break		
15:00 - 16:30	Elevator Pitch: Promising Start-Up Ideas	Young Entrepreneurs / Researchers / Students	
16:30 - 16:45	Wrap-Up	Felix Graf von Reischach (ETH Zurich / SAP AG)	
16:45 - 17:30	Drink Reception		

Fees

- Participation fee: 100 CHF (payment on-site cash)
- Students participation: free

THE TECHNOLOGY DOMINO EFFECT: THE METRO GROUP RFID ROLLOUT CONTINUES

Keynotes • Industry Track

Detailed Program Day 2

Thursday, March 27

Room	«Zurich»	«Basel»	«Bern»
08:30-10:30	Registration and Welcome Coffee		
10:30-11:00		Opening	
11:00-12:30	Keynotes Peter Zencke, Gerd Wolfram		
12:30-14:00		Lunch	
	Karl Aberer		
14:00-15:30	Ken Douglas	Scientific Track	Scientific Track Middleware
	Heikki Huomo	LICINCTWOIR	
15:30-16:00	Coffee Break		
	Gerald Santucci		
16.00 19.00	Peter Schaar	Scientific Track	Scientific Track
10.00-18.00	Dave Raggett	Business Aspects	Regulatory Issues
	Dirk Trossen		
18:00-19:30	Reception		
19:30	Conference Dinner		

The exhibition space will be accessible during lunch, coffee breaks, and welcome reception.

Keynotes

Dr. Peter ZenckeExecutive Board MemberSAP AGThursday, March 27, 11:00-11:45

Presentation Title: The Business Value of the Internet of Things

Presentation Abstract:

With increased computing intelligence and connectivity capabilities, discrete everyday objects in the real world become Smart Items. These Smart Items can sense, communicate and interact with information systems and other Smart Items, thus becoming active participants in information

processes. In his keynote Dr. Peter Zencke will talk about this emerging world of Smart Items commonly named the Internet of Things and its value proposition for business. Furthermore, he will speak about business applications and enterprise Service-Oriented Architecture as key enablers to unlock the potential of the Internet of Things.



Dr. Gerd Wolfram Managing Director

MGI Metro Group Thursday, March 27, 11:45-12:30

Presentation Title:

Driving the Future with RFID - Advanced Retailing at METRO Group

Presentation Abstract:

In his keynote, Dr. Gerd Wolfram will provide a sneak preview into the future of retailing. Within its Advanced Retailing initiative METRO Group addresses a broad range of different technologies to enhance collaboration and efficiency – internally and externally. Based on RFID as a key technology,



METRO Group has developed a comprehensive approach to utilising advanced connectivity solutions to connect its merchandize and inventory management systems. The presentation will cover the vision that guides the deployment of technologies like RFID at METRO Group and offer an overview of the business realities of enhanced supply chain collaboration, real-time localization and intelligent inventory management systems in modern retailing. Taking the broad theoretical concept of the "Internet of Things" as an intellectual starting point, the keynote features firsthand insights into the business challenge of making scientific ideas relevant under commercial requirements.

Industry Track

Thursday, March 27, 14:00-15:30 | Room «Zurich»

Session Chair: Dirk Trossen

Swiss Experiment: From Wireless Sensing to E-Science
Karl Aberer (EPFL, Director NCCR-MICS)

An Industrial View of the Challenges and Opportunities
Ken Douglas (BP, Technology Director)

Next Step for Smart Objects, Communicate with Them

Heikki Huomo (Innovision, CTO and Technical Director of Innovision Research and Technology PLC)

Thursday, March 27, 16:00-18:00 | Room «Zurich»

Session Chair: Hans-Jörg Vögel

• Policy and Technological Drivers in the Internet of Things

Gerald Santucci (Head of Unit for RFID, European Commission, Directorate General for Information Society and Media)

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Scientific Track

• Developments of the Privacy Debate in the Internet of Things - Status, Issues and Outlook, Europe – Worldwide

Peter Schaar (German Federal Commissioner for Data Protection and Freedom of Information)

- Towards the Web of Things
- Dave Raggett (W3C Fellow / Justsystems)
- Information-Centric Networking: A Large-Scale Challenge for Today's Internet Dirk Trossen (BT Group Chief Technology Office)

Scientific Track

EPC Network

Thursday, March 27, 14:00-15:30 | Room «Basel»

Session Chair: Thorsten Staake

Multipolarity for the Object Naming Service

Sergei Evdokimov (Humboldt University Berlin, DE); Benjamin Fabian (Humboldt University Berlin, DE); Oliver Günther (Humboldt University Berlin, DE)

Discovery Service Design in the EPCglobal Network - Towards Full Supply Chain Visibility

Cosmin Condea (SAP Research, CH); Chris Kürschner (SAP Research, CH); Oliver Kasten (SAP Research, CH); Frederic Thiesse (University of St. Gallen, CH)

Fine-grained Access Control for EPC Information Services

Eberhard Grummt (SAP AG, DE), Markus Müller (TU Dresden, DE)

Middleware

Thursday, March 27, 14:00-15:30 | Room «Bern»

Session Chair: Michael Beigl

• SOCRADES: A Web Service based Shop Floor Integration Infrastructure

Luciana Moreira Sà de Souza (SAP Research, DE); Patrik Spiess (SAP AG, DE); Dominique Guinard (SAP Research / ETH Zurich, CH); Moritz Koehler (SAP Research / ETH Zurich, CH); Stamatis Karnouskos (SAP Research, DE); Domnic Savio (SAP Research, DE)

Automation of Facility Management Processes using Machine-to-Machine Technologies

Sudha Krishnamurthy (Deutsche Telekom Labs, DE); Omer Anson (Ben-Gurion University, IL); Lior Sapir (Ben-Gurion University, IL); Chanan Glezer (Ben-Gurion University, IL); Mauro Rois (Ben-Gurion University, IL); Ilana Shub (Ben-Gurion University, IL); Kilian Schloeder (Deutsche Telekom Labs, DE)

The Software Fabric for the Internet of Things

Jan Rellermeyer (ETH Zurich, CH); Michael Duller (ETH Zurich, CH); Ken Gilmer (Bug Labs Inc., US); Damianos Maragkos (ETH Zurich, CH); Dimitrios Papageorgiou (ETH Zurich, CH); Gustavo Alonso (ETH Zurich, CH)

Business Aspects

Thursday, March 27, 16:00-18:00 | Room «Basel»

Session Chair: Karl Aberer

• The Benefits of Embedded Intelligence - Tasks and Applications for Ubiquitous Computing in Logistics

Reiner Jedermann (University of Bremen, DE); Walter Lang (University of Bremen, DE)

• User Acceptance of the Intelligent Fridge: Empirical Results from a Simulation Matthias Rothensee (Humboldt University Berlin, DE)

• Sensor Applications in the Supply Chain: The Example of Quality-Based Issuing of Perishables

Ali Dada (University of St. Gallen, CH); Frederic Thiesse (University of St. Gallen, CH)

Cost-Benefit Model for Smart Items in the Supply Chain

Christian Decker (TecO, University of Karlsruhe, DE);

Martin Berchtold (University of Karlsruhe, DE); Michael Beigl (TU Braunschweig, DE); Leonardo Weiss F. Chaves (SAP Research, DE); Daniel Roehr (TU Braunschweig, DE); Till Riedel (TecO, University of Karlsruhe, DE); Monty Beuster (TU Braunschweig, DE); Daniel Herzig (University of Karlsruhe, DE); Thomas Herzog (University of Karlsruhe, DE)

RFID Technology & Regulatory Issues Thursday, March 27, 16:00-18:00 | Room «Bern»

Session Chair: Sarah Spiekermann

• Generalized Handling of User Specific Data in Networked RFID

Kosuke Osaka (Keio University, JP); Jin Mitsugi (Keio University, JP); Osamu Nakamura (Keio University, JP); Jun Murai (Keio University, JP)

• A Passive UHF RFID System with Huffman Sequence Spreading Backscatter Signals

Hsin-Chin Liu (National Taiwan University of Science and Technology, TW); Xin-Can Guo (National Taiwan University of Science and Technology, TW)

Radio Frequency Identification Law Beyond 2007

Viola Schmid (Technische Universität Darmstadt, DE)

• Why Marketing Short Range Devices as Active Radio Frequency Identifiers Might Backfire: A Hypothesis

Daniel Ronzani (Copenhagen Business School, DK)

Keynotes • Industry Track

Detailed Program Day 3



The exhibition space will be accessible during lunch and coffee breaks.

Keynotes

Dr. Hannu Kauppinen Chief Research Strategist Nokia Research Friday, March 28, 09:00-09:45

Presentation Title:

Scaling Innovation in a Fused Physical and Digital World

Presentation Abstract:

As devices, objects and physical locations offer increasingly more information about ourselves and the world around us, we face new challenges relating to organizing and scaling that information as well as developing the databases and infrastructures needed for managing that information. We also

need to build new awareness about how to intersect these challenges within the most valuable and relevant benefits while also allowing for the best opportunities to build business growth and ensure secure solutions. These challenges offer new opportunities to both drive and scale innovation, in order to extend solutions towards some of the driving issues of our time, such as energy efficiency, universal access and sustainable lifestyles.



Prof. Haruhisa Ichikawa University of Electro-**Communications Tokyo**

Friday, March 28, 09:45-10:30

Presentation Title:

ADUN: Appliance Defined Ubiquitous Network; Network Infrastructure for Real World Sensing

Presentation Abstract:

Small wireless appliances such as radio frequency identification (RFID) tags and sensors are expected to be widely used for real world sensing, which will enable innovative value creation. However, the wireless systems for those appliances tend to be part of the solutions. It will be difficult to reduce



the solution costs and to use the solutions ubiquitously by standardizing the wireless systems. In this talk, I will introduce the appliance defined ubiquitous network (ADUN) to contribute to the cost reduction of the solution system constructions and operations using the drastically enhanced network capacity to share the resources such as antennas and human operators between the solutions. The network capacity will have expanded 100 to 1,000 times in 10 years if the current growth rate is maintained. For supporting broad range of wireless systems and dependable security / privacy control, the architectural principles of ADUN are different from those of the Internet and the ADUN will be a post-IP network when the major traffic comes from small RFID and sensors rather than PCs and the like.

Industry Track

Friday, March 28, 11:00-12:30 | Room «Zurich»

Session Chair: Stephan Haller

- TurnLog Innovate C-part Logistics Using RFID Remo Frei (SFS unimarket AG)
- Business-Integrated Intelligent Device Management

Tom Oelsner (Heidelberger Druckmaschinen AG, Director Remote Services)

• A Brief History of Time – the Amazon Way Mike Roth (Amazon, Director EU Supply Chain)

Friday, March 28, 11:00-12:30 | Room «Bern»

Session Chair: Oliver Christ

• RFID-based Identification System in a Swiss Acute Care Hospital: Is it the End of Errors? Marc Oertle (Spital STS AG, Spital Thun)

• High Security Government and Healthcare Applications: The Elimination of Eavesdropping, Tempest and Target Risk in Wireless Networks John Stevens (Visible Assets)

Scientific Track • Exhibitors and Demos

Industry Track • Scientific Track

Intelligent Agents for Smart Environments – From Consumer to Industrial Applications Michael Berger (Siemens AG, Intelligent Autonomous Systems, Competence Field Leader «Agent Technologies»)

Friday, March 28, 14:00-15:30 Room «Zurich»

Session Chair: Ulrich Eisert

- Enabling Business Services in the Internet of Things Christof Weinhardt (Universität Karlsruhe)
- EPCglobal Developing the Global Standards Infrastructure Chris Adcock (EPC Global, CEO)

Car2X - Challenges and Tasks

Hans-Jörg Vögel (BMW, General Manager, Projects Information and Communication)

Scientific Track

Applications 1

Friday, March 28, 11:00-12:30 | Room «Basel»

Session Chair: Harald Vogt

Object Recognition for the Internet of Things

Till Quack (ETH Zurich, CH); Herbert Bay (ETH Zurich, CH); Luc Van Gool (KU Leuven, Belgium, and ETH Zurich, CH)

• The Digital Sommelier: Interacting with Intelligent Products

Michael Schmitz (DFKI GmbH, DE); Jörg Baus (Saarland University, DE); Robert Dörr (Saarland University, DE)

Socially Intelligent Interfaces for Increased Energy Awareness in the Home

Jussi Karlgren (SICS, SE); Lennart Fahlén (SICS, SE); Pär Hansson (SICS, SE); Olov Ståhl (SICS, SE); Jonas Söderberg (SICS, SE); Anders Wallgren (SICS, SE); Karl-Petter Akesson (SICS, SE)

Applications 2

Friday, March 28, 14:00-15:30 | Room «Basel»

Session Chair: Lorenz Hilty

Social Devices: Autonomous Artifacts that Communicate on the Internet

Juan Ignacio Vazquez (University of Deusto, ES), Diego Lopez-de-Ipina (University of Deusto, ES)

Connect with Things through Instant Messaging

Jong Choi (Mokpo University, KR), Chae-Woo Yoo (Soongsil University, KR)

• Developing a Wearable Assistant for Hospital Ward Rounds: An Experience Report

Kurt Adamer (Steyr Hospital, AT), David Bannach (University of Passau, DE), Tobias Klug (SAP Research, DE), Paul Lukowicz (University of Passau, DE), Marco Luca Sbodio (Hewlett Packard Italy Innovation Center, IT), Mimi Tresman (Edna Pasher Ph.D. & Associates, IL), Andreas Zinnen (SAP Research, DE), and Thomas Ziegert (SAP Research, DE) Friday, March 28, 14:00-15:30 | Room «Bern»

Session Chair: Gerd Kortuem

• Indoor Location Tracking Using Navigation Sensors and Radio Beacons

Wolfgang Schott (IBM Zurich Research Laboratory, CH); Pedro Coronel (ETH Zurich, CH); Simeon Furrer (Broadcom Corporation, USA); Beat Weiss (IBM Zurich Research Laboratory, CH)

Tandem: A Context-Aware Method for Spontaneous Clustering of Dynamic Wireless Sensor Nodes

Raluca Marin-Perianu (University of Twente, NL), Clemens Lombriser (ETH Zurich, CH), Paul Havinga (University of Twente, NL), Hans Scholten (ETH Zurich, CH), Gerhard Tröster (ETH Zurich, CH)

Stream Feeds: an Abstraction for the World Wide Sensor Web

Robert Dickerson (University of Virginia, US); Jiakang Lu (University of Virginia, US); Jian Lu (University of Virginia, US); Kamin Whitehouse (University of Virginia, US)

Exhibitors and Demos

The exhibition space is accessible on Thursday, March 27, and Friday, March 28, during all lunch and coffee breaks.

Exhibitors

SAP	SAP	Ambient	ambient
Metro	HERO Group Future Store Initiative	ERCIM	W ERCIM
Google	Google	Springer	🖄 Springer

Demos

	1. Analyzing Product Flows with the Supply Chain Visualizer
	A. Ilic, T. Andersen, F. Michahelles (ETH Zurich), E. Fleisch (ETH Zurich & University St. Gallen)
	2. A Web Based Platform for Smart Spaces
	J. van Gurp, S. Tarkoma, C. Prehofer, C. di Flora (Nokia Research Center Helsinki)
	3. Coupling ERP Systems with Shop-Floor Web Service Enabled Devices
	O. Baecker, D. Guinard, S. Karnouskos, M. Koehler, D. Savio, L. Moreira Sá de Souza, P. Spiess, V. Trifa (SAP Research)
	4. Demonstration of a Decentralised Material Flow Control of a Large-Scale Baggage Handling System
	M. Roidl, G. Follert (TU Dortmund), L. Nage (TU Dortmund & Fraunhofer Institute for Material Flow and Logistics)
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Exhibitors and Demos

Exhibitors and Demos

Floor Plan • Internet Access

5. Distributed Coordination in Mobile Wireless Sensor and Actuator Networks
S. Bosch, M. Marin-Perianu, R. Marin-Perianu, H. Scholten, P. Havinga (University of Twente)
6. RFID Tag Pseudonyms with Efficient Reading and Scalable Management
C. Tutsch, A. Soppera (TU Graz), T. Burbridge (BT), M. Aigner (TU Graz)
7. Stop Tampering of Products (SToP) – Integrated Processes for Product Authentication with Special Consideration of Mobile Phones
H. Vogt, C. Magerkurth, A. Dada, J. Müller, N. Oertel, F. Graf von Reischach (SAP Research)
8. Synchronized Secrets Approach for RFID-enabled Anti-Counterfeiting
A. Ilic, M. Lehtonen, F. Michahelles (ETH Zurich), E. Fleisch (ETH Zurich & University St. Gallen)
9. Tomu-R: Real-Time Query for Massive Sensor Databases
K. Kanai, H. Isizuka, Y. Tobe (Tokyo Denki University)
10. BaToo - Enabling the Rapid Prototyping of Mobile Services to Retail Products
R. Adelmann (ETH Zurich)



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Floor Plan



Internet Access

Use the following SSID and password to access the conference WiFi network (1st floor of the hotel):

SSID:	IOT2008	
Password:	ethz2008 (Encryption Method: WPA-PSK)	

You can also access the *public* WiFi network anywhere else in the hotel (e.g., in your hotel room), operated by Monzoon. After connecting to the network, open a Web-Browser and surf to any page, which will redirect you to a login page for authentication:

SSID:	Monzoon	(Open Network)
Username:	iot2008	(use your Web-Browser to enter)
Password:	ethz2008	

If you have problems, feel free to contact our staff for help.

Information

Zurich

Zurich



Zurich is one of the most beautiful cities in Europe, and it is well worth your time to spend a day or two taking in its pleasures. According to Mercer's yearly worldwide quality-of-living survey (which evaluates 215 cities based on 39 criteria), Zurich is the world's top city for quality of life. Zurich hosts important high-tech facilities and has over 50 research centers (such as research labs by Google, IBM, and SAP). Most importantly, it is the hometown of



ETH Zurich, one of the world's leading technology research hubs where important work in the area of the Internet of Things has been conducted for many years.

Zurich's reputation as a shopping paradise and an art centre which is home to highly renowned auction houses has done much to make the city known throughout the world. The main shopping area is concentrated within one square kilometre in the heart of the city, which means it is easily covered on foot. Strolling down the

famous Bahnhofstrasse – one of the most beautiful shopping streets in Europe – you will find elegant boutiques, department stores, specialist shops, banks, and cafés which tempt you to linger and relax for a while.

Zurich is also an ideal departure point for excursions all over Switzerland. You can easily travel to the Rhine Waterfalls, to Lucerne, or to the Säntis or Rigi mountains and back to Zurich in just half a day. Whole-day trips by train or coach will take you to the Ticino, Graubünden, up the Titlis mountain, or to the never-melting snow and ice on the Jung-fraujoch, or even across the border to Austria, Italy or Germany.

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