



Future Trends in Service-Oriented Computing 2010

5th Symposium of the
HPI Research School



Annual Symposium on
Future Trends in Service-Oriented Computing

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Hasso Plattner Institute for IT Systems Engineering

The Hasso Plattner Institute for IT Systems Engineering (HPI) at the University of Potsdam is unique in Germany for two key reasons: It was the first university institute in Germany financed entirely by private funds, and second, it is a prime example of a successful public-private partnership. The Hasso Plattner Institute offers the Bachelor's and Master's degree in "IT Systems Engineering" that emphasizes the ability to design, develop, and control large, complex, and distributed IT systems. A particular specialty of the HPI is the strong engineering orientation that intensively incorporates industrial projects in its curriculum.

10 Research Groups shape the profile of the HPI in IT systems engineering. At the HPI, 279 undergraduate and 149 graduate students are currently enrolled and 112 research assistants and Ph.D. students are researching in their respective field. Since October 2005, the HPI runs the Research School on "Service-Oriented Systems Engineering", an international Ph.D. school with 33 students in three different countries: Potsdam in Germany, Cape Town in South Africa, and Haifa in Israel.

The Hasso Plattner Institute tightly cooperates with scientific partners, both nationally and internationally. Among the partners - apart from renowned European universities - are the Stanford University, the Massachusetts Institute of Technology (MIT) in the US, as well as Technical University of Beijing in China. Furthermore, the HPI cooperates with renowned major IT companies, such as EMC, Fujitsu, HP, IBM, Microsoft, SAP, Siemens, T-Mobile, and others.

The HPI Future SOC Lab

Together with industrial partners Hasso-Plattner-Institut (HPI) is currently establishing a "FutureSOC Lab," which will provide a complete infrastructure for research on on-demand systems. The lab will utilize the latest, multi/many-core hardware and its practical implementation and testing as well as further development.

The necessary components for such a highly ambitious project are provided by renowned companies: Fujitsu and Hewlett Packard provide their latest 4 and 8-way servers with 1-2 TB RAM, SAP will make available its latest Business by Design (ByD) system in its most complete version. EMC will place high performance storage systems to the disposal. The lab will operate on the basis of real data from large enterprises.

The HPI FutureSOC Lab, which will be open for use by interested researchers also from other universities, will provide an opportunity to study real-life complex systems and follow new ideas all the way to their practical implementation and testing. Major research areas include:

- Service-Oriented Computing; Service-Oriented Architectures
- Cloud Computing
- New security concepts
- Multicore
- In-Memory data storage (Ad-hoc ETL on main-memory databases)
- Green IT
- NUMA - Non-Uniform Memory Architecture

The Lab will provide an experimental base for research on innovative concepts for real-life highly complex IT systems outside of closed industry labs. Users are supported in carrying out excellent research; the lab again demonstrates HPI's key role in current IT research.

A steering committee, which is led by HPI Director Prof. Dr. Christoph Meinel, will be in charge of the program's strategic direction. The committee consists besides of Prof. Dr. Hasso Plattner of representatives of the faculty of the HPI: Prof. Dr. Andreas Polze, and Dr. Alexander Zeier. In addition, the committee includes executive representatives of the contributing sponsors: Dieter Herzog, Vice President, Fujitsu Germany, Volker Smid, Managing Director, Hewlett-Packard Germany, Gerhard Oswald, Chief Operating Officer, SAP AG, and Doc D'Errico, Vice President, EMC. The steering committee will issue an international call for applications, inviting researchers from academic institutions to apply for access to the high-performance computers. The chosen researchers can use the lab's infrastructure free of charge.

There will be regular colloquia and other events, usually in connection with and with the participation of the HPI Research School and its activities. The partners will participate in these events and will have access to research findings obtained in the lab.

Agenda

Wednesday, June 16, 2010

- 10:00-10:30 **Welcome and Introduction**
Prof. Dr. Christoph Meinel, HPI, Director
- 10:30-12:00 **Session 1 - Project Presentations**
Prof. Dr. Reiner Thome, BWI, Univ. Würzburg
IBIS-Labs Vision for Business Matrix Processing
Prof. Dr. Wolfgang Lehner / Matthias Böhm, TU Dresden
Query Processing on Prefix Trees
Dr. Alexander Zeier, EPIC, HPI
An Architecture-Aware Compaction Process
- 12:00-12:15 **Coffee break**
- 12:15-13:00 **Keynote**
Doc D'Errico, Vice President & General Manager, EMC
Current Trends in Storage
- 13:00-14:15 **Lunch**
- 14:15-15:15 **Session 2 - Project Presentations**
Ionut Subasu, ETH Zurich
Multicores as Platform for Distributed Databases
Dmitri Perelman, Technion, Haifa, Israel
On Maintaining Multiple Versions in Software Transactional Memory
- 15:15-15:30 **Coffee Break**
- 15:30-16:30 **Session 3 - Project Presentations**
Dr. Peter Tröger, OSM, HPI
Towards Dependable Multicore Computing
Dr. Harald Sack, ITS, HPI
Linked Open Data Universe
- 16:30-17:00 **Coffee Break**

Official Opening Ceremony FutureSOC-Lab

Hasso Plattner Institute, Hörsaal 1

- 17:00-19:00 **The HPI Future SOC Lab**
Prof. Dr. Christoph Meinel, Director, HPI
Prof. Dr. Hasso Plattner, Chairman of the Advisory Board, SAP

Prof. Dr. Reinhard Hüttel, Deutsches GeoForschungsZentrum GFZ, Potsdam
Vom System Erde zum System Erde-Mensch - und jede Menge Daten
- 19:00-20:30 **Welcome Reception**

Hasso Plattner Institute, Hörsaal 3

- 20:30 **Public Viewing: 2010 FIFA World Cup**
South Africa vs. Uruguay

Thursday, June 17, 2010

- 09:00-09:30 **Opening of FutureSOC-Symposium**
Prof. Dr. Christoph Meinel, HPI, Director
Prof. Dr. Andreas Polze, HPI, Speaker of Research School
- 09:30-10:15 **Keynote**
Gerhard Oswald, COO, SAP AG / Peter Lorenz, Executive Vice President,
Small and Midsize Enterprises, SAP AG
The SAP Vision on Cloud Computing
- 10:15-11:00 **Keynote**
Ambuj Goyal, IBM, General Manager Development and Manufacturing,
Systems and Technology Group
The Future of Systems
- 11:00-11:30 **Coffee Break**
- 11:30-12:30 **Session 1**
Dr. Gilad Bracha
The Brave New World of Full Service Computing
Prof. Dr. Donald Kossmann, ETH Zurich
An Evaluation of Architectures for Transaction Processing in the Cloud
- 12:30-13:30 **Lunch**

- 13:30-15:00 **Session 2**
 Prof. Dr. Jörg Nolte, BTU Cottbus
Virtual Memory for MultiCore
 Prof. Dr. Frank Bellosa, Univ. Karlsruhe
Energy Aware Scheduling in Many-Core Systems
 Dr. Fritz Schinkel, Fujitsu
Resource Virtualization in Infrastructure-as-a-Service Environments
- 15:00-15:30 **Coffee Break**
- 15:30-17:00 **Session 3**
 Dr. Barbara Burkhard, Capgemini sd&m
Managing Application Landscape by Means of Service Orientation
 Michael Menzel, Robert Warschofsky, Ivonne Thomas, HPI
The Service Security LAB: A Model-Driven Platform to Compose and Test Services in the Cloud - IEEE Service Cup Finalists
 Mohammad M. R. Chowdhury, Post-Doctoral Fellow, UNIK-Oslo, Norway
Applicability of Semantic Technologies in Ensuring Security, Privacy and Trust
- 17:00-17:30 **Coffee Break**
- 17:30-18:30 **Keynote**
 Prof. Dr. Hasso Plattner
Real-Time Enterprise Data Management
- 19:00-22:00 **Social Event**

Friday, June 18, 2010

- 09:00-11:00 **Session 1**
 Werner Haas, Intel Labs Braunschweig
Research Projects on the Intel SCC
 Alexander Schmidt, HPI Research School
Tool Support for Monitoring Parallel Systems
 Einar Lück, IBM Systems & Technology Group
Building Clouds on System z
 Amit Berman, Technion, Haifa, Israel
Solid-State Drive (SSD) Future Architectures
- 11:00-11:30 **Coffee Break**
- 11:30-13:00 **Session 2**
 Dr. Andreas Eberhart, fluid Operations GmbH
Managing Heterogeneous Hardware Resources to Provide a Compute Cloud for Enterprise Applications
 Artem Polyvyanyy, HPI Research School
Connectivity-based Analysis of Process Models
 Prof. Dr. Roy Friedman / Alex Kogan, Technion, Haifa, Israel
Toward Long Living Scalable Ad-hoc Networks
- 13:00 **Closing Remarks**



The HPI Future SOC Lab

Prof. Dr. Christoph Meinel

Director Hasso Plattner Institute, Germany

Bio

Dr. sc. nat. Christoph Meinel (1954) is President and CEO of the Hasso-Plattner-Institut for IT-Systems Engineering (HPI) and full professor (C4) for computer science at the University of Potsdam.

Christoph Meinel studied Mathematics and Computer Sciences at the Humboldt-University Berlin from 1974-79. He received his PhD degree from the Humboldt-University in 1981 and his State Doctorate ("Habilitation") from the Academy of Sciences in Berlin in 1988. After research stays at the Max-Planck-Institute in Saarbrücken in 1992 he was appointed a full professor (C4) for computer science at the University of Trier. Since 2004 he is president and CEO of the HPI in Potsdam and full professor (C4) for Internet- and WWW-Technologies. Beside he is a teacher at HPI D-School, a visiting professor at the School of Computer Science of the Technical University of Beijing (China), and a research fellow of the interdisciplinary center SnT (Security and Trust) of the University of Luxembourg. Since 2008 he is program director of the HPI-Stanford Design Thinking Research Program.

Christoph Meinel is author or co-author of 8 text books and monographs and of various conference proceedings. He has published more than 350 peer-reviewed scientific papers in highly recognised international scientific journals and conferences. His high-security solution Lock-Keeper is internationally patented and licensed by Siemens AG. Most of his publications and recordings of his lectures can be freely accessed on the Internet (www.hpi.uni-potsdam.de/meinel). Actually his main research interests focus on Future Internet Technologies - particularly on Trust and Security Engineering and Web 3.0 (Social, Semantic, Service Web) - and innovative Internet applications for Teleteaching and e-Health. He also scientifically works in innovation research and leads the HPI-Stanford Design Thinking Research Program as program director. In the past he has scientifically contributed to

the field of Complexity Theory and has (BDD-based) data structures and algorithms developed for formal verification of chip design.

Beside his work as a university professor, from 1998 to 2002 Christoph Meinel was CEO and director of the Research Lab "Institute for Telematics" in Trier for applied research with industrial partners. The expertise of the institute was mainly in the fields: Internet Security, Electronic Publishing / E-Learning and Telemedicine. In between 1996-2007 Christoph Meinel was also a member of the scientific board of the IBFI Schloß Dagstuhl, speaker of the special interest group on complexity of the German society "Gesellschaft für Informatik" (GI) and member of various international programs committees and scientific boards.

In 2006, Christoph Meinel hosted together with Hasso Plattner the first German "National IT-Summit" of the German Federal Chancellor Dr. Angela Merkel. Since 2007 he is chairman of the German IPv6 council and of the advisory board of UTD Meraka in South Africa. Christoph Meinel is chief editor of the scientific electronic journal "ECCC - Electronic Colloquium on Computational Complexity" (www.eccc.hpi-web.de), the "IT-Gipfelblog" (www.it-gipfelblog.de), and the "tele-TASK"-archive (www.tele-task.de).



Prof. Dr. Reiner Thome

University of Würzburg, Germany

IBIS-Labs Vision for Business Matrix Processing

Bio

Rainer Thome, born in 1948, in Karlsruhe, gained 1972 his Ph. D. from University of Heidelberg. Four years later, in 1976, he completed Habilitation (qualify as a professor) at the University of Heidelberg (venia legendi) for business and management economics.

In October of the same year, he became professor for business administration at University of Hamburg in the faculty of business administration. 1978 he was offered a professorship at the institute of business administration and applied information science at University of Heidelberg. He stayed there for three years until he pursued a vocation as Full professor for general business and business computing (C 4) at the University of Bamberg in 1981.

Since October 1985 Dr. Rainer Thome has a post as Full professor for business administration and business computing at the University of Wuerzburg.

He is joint founder and chairman of the supervisory board of IBIS Prof. Thome AG, MULTA MEDIO Informationssysteme AG and Administration Intelligence AG.

Since April 2002 Dr. Thome has been the eGovernment-advisor of the Bavarian government.

His main focus in research is application-oriented and is put into practice in many middle-sized and big enterprises.

Further research topics are:

- Information processing as an integrated solution within the ranges of production, trade, service and administration, ERP-Implementation
- Development of communal access systems for citizens - eGovernment
- Intelligent tools for the implementation and advancement of standard software
- Electronic commerce, electronic business
- Supply-Chain- and Customer-Relationship-Management
- Data Warehouse, Document Warehouse, Business Intelligence
- Logistics and simulation

An Architecture-Aware Compaction Process

The latest trends in computer technology -- e.g. blade architecture, many-core and the vast increase of available RAM -- allows for significant change in how enterprise data is stored. Our research shows that modern enterprise applications require an enterprise application-specific data store that leverages the available hardware. One approach is to use an in-memory compressed column-store to persist all data. In this talk we will show how the advantages of in-memory column stores can be used for enterprise applications and how to approach the asynchronous compaction process to achieve best possible compression both for performance and storage saving reasons.

Bio

Dr. Alexander Zeier graduated from the University of Würzburg with a degree in business management focused on information systems and successfully completed his studies in information technology at the Technical University of Chemnitz. He gained his doctorate in the faculty of information systems at the University of Erlangen-Nuremberg. He has 18 years experience with SAP/IT Systems, started working for SAP in 2002 as product manager overall responsible for the SCM Software and e.g. as director strategic projects for RFID. Since 2006 he is Deputy Professor of Prof. Hasso Plattner at the Hasso Plattner Institute in Berlin/Potsdam focusing on Enterprise Platforms, Integration and RFID Technologies. He is the author of numerous publications, including five books on IT and SAP. In addition he is the Executive Director of the European Section of the MIT Forum for Supply Chain Innovation and Visiting Professor at MIT.



Dr. Alexander Zeier

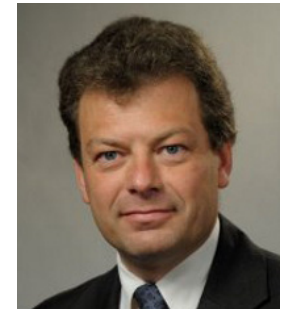
Enterprise Platform and Integration Concepts, Hasso Plattner Institute, Germany

Query Processing on Prefix Trees

There is a trend towards Operational BI (Business Intelligence) that requires immediate synchronization between the operational source systems and the data warehouse infrastructure in order to achieve high up-to-dateness for analytical query results. The high performance requirements imposed by many ad-hoc queries are typically addressed with in-memory column stores and distributed system architectures. However, operational BI additionally requires transactional and update-friendly main-memory indexing due to the existence of high update rates. For example, main-memory indexing with prefix trees exhibits a well-balanced read/write performance because no index reorganization is required. The vision of this project is to use the underlying main-memory index structures, in the form of prefix trees, for query processing as well. Prefix trees are used as intermediate results of a plan and thus, all database operations can benefit from the structure of the main-memory index by pruning working indices during query execution. While, this is advantageous in terms of the asymptotic time complexity of certain operations, major challenges arise at the same time. Efficient query processing over huge evolving data sets will enable a broader use of the consolidated enterprise data. Finally, this is a fundamental prerequisite in order to extend the scope of BI from strategic and dispositive levels to the operational level as well. In this talk, we sketch our preliminary results and outline open research challenges.

Bio

Wolfgang Lehner is full professor and head of the Database Technology Group at TU Dresden. He received his Master's degree in Computer Science from the University of Erlangen-Nuremberg in 1995. He continued his studies until 1998, when he earned his Ph.D. (Dr.-Ing.) with a dissertation on the optimization of aggregate processing in multidimensional database systems. He then joined the Business Intelligence group of Hamid Pirahesh at the IBM Almaden Research Center, where he was involved in projects on materialized view support and multiple query optimization techniques. From 10/2000 to 2/2002, he temporarily held the professorship for Database Systems at the University of Halle-Wittenberg before he finished his habilitation in 7/2001 with a thesis on subscription systems. Prof. Lehner also spent a period at Microsoft Research (SQL-Server Group of Paul Larson) as visiting scientist in 2004 and 2006. In 2008, Wolfgang Lehner enjoyed his sabbatical at the SAP BWA team.



**Prof. Dr.-Ing.
Wolfgang Lehner**

*Database Technology
Group, Dresden
University of
Technology, Germany*

Bio

Matthias Böhm is a research assistant of Professor Wolfgang Lehner at the Database Technology Group at TU Dresden. He received his master's degree in Business Informatics from the Dresden University of Applied Sciences in 2006 with a thesis on integration flows. From 2006 to 2007 he was employed at the SQL Project AG, a vendor of a commercial integration platform. Since 2007, he is a Ph.D. student at TU Dresden. His current research interests include the optimization of integration flows, main-memory indexing and query processing as well as time series forecasting.



Matthias Böhm

*Database Technology
Group, Dresden
University of
Technology, Germany*



Current Trends in Storage

Doc D'Errico

EMC Corporation, USA

Information Demands continue to grow at steady rates every year despite economic and other conditions. This growth is driven by several non-traditional sources, but has placed steadily increasing demands on systems infrastructure and is driving costs up. Storage technologies have been facing this challenge for close to 20 years, yet, evolutions in storage including Flash/SSD, tiering, and other factors have enabled users to drive costs of acquisition and operation down, while driving efficiency up. Capping this session, we'll discuss how next generations of storage will build on this foundation while driving towards service-oriented models of consumption.

Bio

With more than a decade at EMC and nearing 30 years in the information technology industry, Doc has become a respected expert and technical leader. He holds fourteen storage technology related patents, has submitted nine others and is recognized for driving EMC and the industry to better and broader ways to deal with system interoperability and standardization. Doc is also the author of the Introduction to the Universal Command Guide and is a sought after speaker at many customer and Industry events.

Doc takes a strong leadership position in the development of EMC's strategy and direction as it pertains to connectivity, interoperability and software & systems integration, enabling time-to-market while reducing support costs associated with product introduction in the field. Doc is also an Executive Sponsor to EMC's Six Sigma Corporate Quality Initiative, a member of EMC's CTO Advisory Board, and EMC's Global Centers-of-Excellence Board of Directors.

Under Doc's leadership, EMC developed the world's premier interoperability lab, eLab, which is responsible for the integration, connectivity and interoperability of EMC's products with products from major server, connectivity, and software. Doc is also instrumental in working on strategic planning with customers, channel resellers, equipment suppliers and even competitors. These vital business relationships significantly impact EMC's business success, and the „eLab Tested“ logo is a badge of honor among EMC's connectivity partners and competitors. Doc also was responsible for EMC's Infrastructure Software Group which develops products that integrate directly into the IO stack, and enable secure, simple, seamless, and ubiquitous access to information throughout its lifecycle and are crucial foundation enablers for EMC.

Today, Doc is responsible for the Strategic Technology Direction of EMC's Storage Division, the world leader in Information Infrastructure. Doc's leadership expands across all products in EMC's Storage Portfolio driving EMC's integration into the worlds of Virtualization and Cloud Computing. The main focus for Doc's Strategic team is to drive the transformation of Data Centers to the next generation of Information Infrastructure in a dynamic and fluid fashion.

Doc attended Polytechnic Institute of New York where he studied electrical engineering, and was granted a PhD in Computer Science from Hamilton University. He joined EMC in 1995 and prior to that held technical and management positions with CCH Legal Information Services, Magna Software Corporation, and Manufacturers Hanover Trust, as well as various technical consulting positions in NYC.



Ionut Subasu

*ETH Zurich,
Switzerland*

Multicores as Platform for Distributed Databases

The internal architecture of today's infrastructure software (e.g., operating systems and database engines) is ill suited for multicore computers. Taking advantage of the parallelism inherent in multicore often requires radical changes to the system. Within this project we argue that, as recently proposed for operating systems, multicore architectures should be seen as a distributed system rather than as a parallel machine in the context of databases. This project uses an unmodified database engine in a distributed configuration with the resulting system exhibiting better and more stable performance for a wide range of common loads. As results indicate, this approach offers a faster path towards exploiting large scale multicore architectures than having to completely redesign the database engine.

Bio

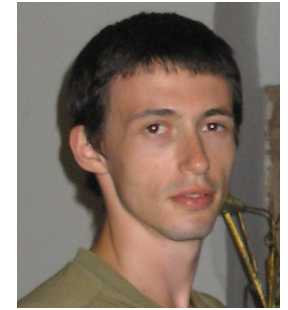
Ionut Subasu is a research assistant (Ph.D. student) in Computer Science at ETH Zurich (Switzerland) since August 2008, under the supervision of Prof. Dr. Gustavo Alonso. From August 2006 till 2008 he was as a research assistant in the Database Technology Research Group from the University of Zurich under the supervision of Prof. Dr. Klaus Dietrich. He received a Diploma in Computer Science from the Technical University of Cluj Napoca, Romania in 2006. His Diploma Project was done at ETH Zurich under the supervision of Prof. Dr. Thomas Gross. His current research interests are primarily information and distributed systems with focus on databases on modern hardware.

On Maintaining Multiple Versions in Software Transactional Memory (STM)

Software transactional memory (STM) is an increasingly popular paradigm for concurrent computing in the multi-core architectures. STMs speculatively allow multiple transactions to proceed concurrently, before knowing all possible data dependencies between them. This optimistic approach inevitably leads to aborting transactions in some cases, such as when data dependencies introduce inconsistencies. An effective way to reduce the number of aborts in STM is to keep multiple versions of transactional objects. In the first part of the talk we present SMV, a new STM that reduces the number of aborts for read-only transactions. SMV strives to keep old object versions as long as they might be useful for some transaction to read. It is able to do this while still allowing reading transactions to be invisible by relying on automatic garbage collection to dispose of obsolete versions. In the second part of the talk we study some inherent properties of STMs that use multiple versions. We show that these STMs cannot be disjoint-access parallel and that no STM can be optimal in the number of previous versions kept. Moreover, we show that garbage collecting useless versions is impossible in STMs that implement invisible reads.

Bio

Dmitri Perelman received B.Sc. in Computer Engineering (summa cum laude) in the Technion, Israel. His job experience includes five years of programming in Intel and IDF Navy. Dmitri started his PhD studies in 2008 under the supervision of Prof. Idit Keidar in the Technion. He is mainly interested in concurrent and distributed systems. Specifically, his current research is focused on transactional memory.



Dmitri Perelman

*Technion - Israel
Institute of
Technology, Israel*



Towards Dependable Multicore Computing

Dr. Peter Tröger

Operating Systems and Middleware Group, Hasso Plattner Institute, Germany

Moore's law about the ever-increasing number of transistors per chip brings parallelism of massive scale to all modern server systems. In this talk, we want to discuss the dependability implications of this development. We argue that - due to their complexity - modern parallel server systems must be taken as reliability threat, but also as new source of redundancy for possible reliability improvements. The talk introduces two accepted FutureSOC projects in this context: The first project aims at better reliability assessment of modern server systems, by adding fault injection capabilities below operating system and hypervisor in a non-intrusive way. The second project aims at the utilization of redundant server resources for fault tolerant virtual machines, based on a new predictive migration scheme.

Bio

Dr. Peter Tröger is a senior researcher at the Hasso-Plattner-Institute. He is also co-chair of the Open Grid Forum DRMAA working group and acts as head of the IEEE TCSC young researcher forum. Peter received a doctoral degree from University of Potsdam in 2008. He previously worked as docent at the Blekinge Institute of Technology (Sweden) and as post-doctoral researcher at the Humboldt University. Peter's current research focus is on dependable multi-core systems. This includes the proactive management of hardware faults on the level of processors and operating systems, and the research towards better programming models for dependable parallel systems. Peter wrote his doctoral thesis about dynamic resource management in service-oriented architectures and grid environments. He co-edited 3 books and published several scientific and standardization body documents.

Linked Open Data Universe



Dr. Harald Sack

Internet Technologies and Systems, Hasso Plattner Institute, Germany

The Semantic Web has recently gained a huge momentum by the ongoing implementation of the vision of a "Web of Data" in which formerly fragmented data is connected and interlinked with each other based on so-called Linked Data principles. In 2007 the Linked Open Data (LOD) community project has been launched bootstrapping the Web of Data, which by today includes more than 100 different datasets from heterogeneous sources and domains. It comprised more than 4.5 billion triples and 124 million links. Linked Data can be found distributed over the World Wide Web (WWW) stored in dedicated triple stores, simple RDF files or as RDFa addendum in HTML files. Computations with large sets of distributed Linked Data are rather complex concerning computation time and storage requirements. Regarding the size of the ever growing LOD cloud with current computing technology it is almost not possible to determine global data consistency in terms of simple data duplicity, more complex data redundancy, data contradictions, or questionable data.

Bio

Dr. Harald Sack is a senior researcher at the HPI in Potsdam, Germany. He received his Diploma in Computer Science from the University of the Federal Forces, Munich, in 1990, and a Ph.D. in Computer Science from the Universität Trier in 2002. From 1990 - 1997 he was software engineer at the Signal Intelligence Corps of the German Air Force. 1997-2002 he was working as a research assistant at the Universität Trier and the Fraunhofer Institut für Telematik in Trier as managing director of the «Center for Electronic Publishing». From 2002- 2008 he was working as a scientific assistant at the Friedrich-Schiller-Universität Jena with a visiting position at HPI from 2007 - 2009, where he is now leading the Semantic Technologies Research group as a senior researcher. He published 2 textbooks on computer networks, web technologies, and multimedia encoding, more than 40 refereed articles for journals and conferences. His main research interests include Multimedia Retrieval, Video Analysis, Semantic enabled Information Retrieval, and Semantic Technologies.



Prof. Dr. Reinhard Hüttl

*Deutsches
GeoForschungs-
Zentrum GFZ,
Germany*

Vom System Erde zum System Erde-Mensch - und jede Menge Daten

Das rasante Bevölkerungswachstum und die damit einhergehende intensive Nutzung unseres Planeten erfordern ein international abgestimmtes Handeln zum Erhalt des Lebensraums Erde, zur Sicherung der Lebensgrundlagen unserer und der nachfolgenden Generationen.

Ziel der Geowissenschaften ist es, über ein umfassendes Erdsystem-Management dem Menschen eine lebenswerte Umwelt mit kalkulierbaren Umweltveränderungen und -soweit möglich - Georisiken zu erhalten bzw. wieder herzustellen. Eine erweiterte Betrachtung des Systems Erde als System Erde-Mensch bedeutet deshalb nicht nur die konsequente Weiterentwicklung der Geowissenschaften vor dem Hintergrund neuer wissenschaftlicher und gesellschaftlicher Herausforderungen. Angesichts von vermutlich bis zu neun Milliarden Menschen auf unserem Planeten im Jahre 2050 werden die Geowissenschaften sich notwendigerweise zu Leitwissenschaften der kommenden Dekaden entwickeln.

Dabei werden wir ohne innovatives Datenmanagement sensu Geoinformatik nicht auskommen.

Bio

Nach Studium und Promotion an der Universität in Freiburg bzw. Corvallis, Oregon, USA (1978-1985) leitete Reinhard Hüttl ein internationales Forschungsreferat des Bergbauunternehmens Kali und Salz AG/BASF Group in Kassel (1986-1992). Nach seiner Habilitation an der Universität in Freiburg und einer Vertretungsprofessur an der University of Hawaii (1990/91) im Bereich Geobotanik folgte 1992 die Übernahme des Lehrstuhls für Bodenschutz und Rekultivierung an der Brandenburgischen Technischen Universität Cottbus. Als Prorektor bzw. Vizepräsident begleitete er den Aufbau dieser 1991 neu gegründeten Universität von 1993 bis 2000.

Seit 1996 ist Reinhard Hüttl Mitglied der Berlin-Brandenburgischen Akademie der Wissenschaften, seit 2005 Mitglied der Königlich Schwedischen Akademie für Agrikultur und Forstwirtschaft, seit 2006 Mitglied der Österreichischen Akademie der Wissenschaften und seit 2008 Mitglied der Schweizer Akademie der Technikwissenschaften.

Seit 2002 ist Reinhard Hüttl Mitglied der Deutschen Akademie der Technikwissenschaften, seit 2005 deren Vizepräsident und seit 2008 deren Präsident.

Von 1995 bis 2000 war er Mitglied des Sachverständigenrates für Umweltfragen der Bundesregierung sowie von 2000 bis 2006 Mitglied bzw. Vorsitzender der Wissenschaftlichen Kommission des Wissenschaftsrates.

Seit 2004 ist er Ehrendoktor der Universität für Bodenkultur in Wien.

Seit Juli 2007 ist er Sprecher des Sonderforschungsbereichs/Transregio 38 „Künstliches Wassereinzugsgebiet“ gemeinsam mit der TU München und der ETH Zürich an der BTU Cottbus.

Seit Mitte 2007 ist Reinhard Hüttl Wissenschaftlicher Vorstand und Vorstandsvorsitzender des Deutschen GeoForschungsZentrums in Potsdam.

Im Juli 2008 verlieh der Bundespräsident Reinhard Hüttl das Bundesverdienstkreuz 1. Klasse des Bundesverdienstordens der Bundesrepublik Deutschland.



The SAP Vision on Cloud Computing

Gerhard Oswald

SAP AG, Germany

Bio

Gerhard Oswald is Chief Operating Officer (COO) of SAP AG and has been a member of the Executive Board of SAP AG since 1996. He is responsible for SAP Active Global Support, Quality Governance & Production, and Operations.

Oswald joined SAP in 1981 where he was instrumental in the development of the sales support network for SAP R/2, responsible for quality control. He then assumed responsibility for quality control in the critical development project of SAP R/3 software. From 1987 until 1993, Oswald was a member of the project management team responsible for the conception, development, and delivery of SAP's flagship enterprise resource planning software, SAP R/3.

Following the completion of this project in 1993, Oswald was appointed to the SAP Extended Management Board. In 1994, he assumed responsibility for the SAP R/3 Services division. Two years later, in 1996, he was appointed a member of the Executive Board. During his leadership, the foundation of SAP Active Global Support, the worldwide SAP global support infrastructure, and the continuous improvement of innovative support offerings have demonstrated SAP's thought leadership in the industry.

Oswald began his career at Siemens AG, as an applications consultant for SAP R/2 business processes from 1977 to 1980. He studied business administration at the University of Mainz, Germany.



Peter Lorenz

SAP AG, Germany

Bio

Peter Lorenz is executive vice president of Small and Midsize Enterprises (SME), reporting to Jim Hagemann Snabe, co-CEO of SAP AG and member of the Executive Board leading Products & Solutions. He is a member of the SAP Executive Council and a corporate officer of the SAP Group.

As head of SME, Lorenz is responsible for all aspects of SAP's SME solutions - SAP Business ByDesign, SAP Business One, and SAP Business All-in-One, including development, solution management, delivery, and deployment, as well as service and support.

In his previous role, Lorenz was chief technology officer of SAP Business ByDesign, including enterprise service-oriented architecture for the solution. In addition, he was in charge of the enterprise services architecture modeling, product management within the application platform, and the application platform Supplier Relationship Management (SRM) development organization.

Previously, Lorenz was head of GBU Commerce responsible for SAP SRM and the eCommerce scenario of SAP CRM, with dedicated development teams in Germany and Palo Alto, California. Prior to this, Lorenz ran the application development team of SAP Markets from 1999-2002. In 1996, Lorenz became the board assistant to Dr. Peter Zencke. Two years later, Lorenz started the development team of SAP's first eProcurement solution. Lorenz began his career at SAP after completing his studies in 1993 in the R/3 logistics development. Lorenz holds a master's degree in industrial engineering.



The Future of Systems

Dr. Ambuj Goyal

IBM, USA

The world is experiencing an unprecedented explosion of transactions, information and change across the IT landscape - in every organization, across both private and public sectors. At the same time, technology innovation is accelerating faster than ever before - continuing advances in processor and memory designs, dense packaging techniques, and real-time analytics just to name a few. Optimizing individual workloads and the entire IT infrastructure is now essential to create the flexibility, business velocity and cost efficiency that companies demand to be competitive in today's world. With unmatched innovation and research in systems and technology, IBM enjoys a unique vantage point. Ambuj Goyal will lay out how these dynamics are impacting the future of systems.

Bio

Ambuj Goyal was named general manager of Systems and Technology Group's Development and Manufacturing organization in January, 2010, and leads the IBM team charged with the advanced engineering and development required to build the foundation for smarter planet solutions.

He is responsible for all of IBM's global server and storage systems hardware and software development. In addition, he leads the company's microelectronics business which includes semiconductor process technology development and semiconductor manufacturing operations for microprocessors and application specific integrated circuits used by IBM and its OEM clients.

Prior to his current assignment, Dr. Goyal served as general manager of the Business Analytics and Process Optimization unit of IBM's Software Group. In that role, he was responsible for creating and delivering solutions that help organizations transform and optimize their businesses through use of IBM's analytics and process optimization capabilities and industry-aligned expertise across software, hardware and services organizations.

He was general manager of IBM Information Management Soft-

ware from 2005 to 2009, driving IBM's emergence as a leader in the business analytics space, combining organic innovation with strategic acquisitions including Cognos, and FileNet.

From 2003 to 2005, he served as general manager, Workplace, Portal, and Collaboration Software, planning and executing the transformation of IBM Lotus Software by expanding its focus beyond the traditional "Collaboration" marketplace to encompass the "People Productivity" market. In addition, he set the business strategy and direction for the Websphere Portal, the Lotus Software, and the IBM Workplace product sets.

Dr. Goyal served from 2001 to 2003 as General Manager, Solutions and Strategy, IBM Software Group, and also served as Chief Technology Officer, Application & Integration Middleware Division, which includes the WebSphere and MQ product families.

He joined IBM Corporation in 1982 as a research staff member at the T.J. Watson Research Center in Yorktown, N.Y. His early work in scalable databases led to IBM's Universal Database (DB2) family. He was also responsible for setting the early direction in Web application servers, which led to the WebSphere product family. He also led the research efforts to create the RS/6000 SP supercomputer and the Deep Blue World Chess Champion computer.

In 1996, Dr. Goyal was named Vice President, Services and Software, and Director, Computer Sciences in 1996. In this dual role, he was responsible for setting IBM's long-term research direction in computer sciences, as well as ensuring that the best emerging technologies contribute to IBM's services offerings and software products. He had approximately 1,500 researchers reporting to him in seven labs worldwide.

Dr. Goyal has authored more than 25 articles in various fields and has received five Outstanding Innovation awards from IBM for his work. He is an IEEE Fellow as well as a Fellow of the Association for Computing Machinery. Dr. Goyal received his Ph.D. degree in Electrical Engineering from The University of Texas at Austin in 1982, and his Bachelor's degree from the Indian Institute of Technology at Kanpur, India in 1978.



Dr. Gilad Bracha

The Brave New World of Full Service Computing

For the past generation, the world of personal computing has been a world of self-service computing. The persons using/owning a personal/self service computer are responsible for managing that computer themselves. All the digital chores - installing and updating software, preventing malware infection, backing up storage etc. are the user's responsibility.

Today we are at an inflection point, as we transition to the world of full service computing. Network based services are positioned to take over the responsibilities of digital house-keeping. This transition carries both risks and opportunities in platform design, programming language design and development methodologies. We focus on the opportunities using the notion of /objects as software services/, being developed in the context of the Newspeak programming language.

Bio

Gilad Bracha is the creator of the Newspeak programming language. Previously, he was a Distinguished Engineer at Cadence, and a Computational Theologist and Distinguished Engineer at Sun. He is co-author of the Java Language Specification, and a researcher in the area of object-oriented programming languages. Prior to joining Sun, he worked on Strongtalk, the Animorphic Smalltalk System. He received his B.Sc in Mathematics and Computer Science from Ben Gurion University in Israel and a Ph.D. in Computer Science from the University of Utah.

An Evaluation of Architectures for Transaction Processing in the Cloud

Cloud computing promises a number of advantages for the deployment of data-intensive applications. Most importantly, cloud computing promises unlimited scalability and elasticity, reduced cost, and better cost predictability. This talk presents the results of a study that evaluates alternative cloud computing services from major vendors such as Amazon, Google, and Microsoft. The results are surprising because it seems that all these services were optimized for different workloads. Furthermore, this talk tries to give a look behind the „scenes“, explain the differences, and outline a way to achieve the cloud promises.

Bio

Donald Kossmann is a professor for Computer Science at ETH Zurich (Switzerland). He received his MS in 1991 from the University of Karlsruhe and completed his PhD in 1995 at the Technical University of Aachen. After that, he held positions at the University of Maryland, the IBM Almaden Research Center, the University of Passau, the Technical University of Munich, and the University of Heidelberg. He was an associate editor of ACM Transactions on Databases and ACM Transactions on Internet Technology. He is a member of the board of trustees of the VLDB endowment and was the program committee chair of the ACM SIGMOD Conf., 2009. He is a co-founder of i-TV-T (1998), XQRL Inc. (acquired by BEA in 2002), and 28msec Inc. (2007). His research interests lie in the area of database and information systems; in particular, Web-based information systems and database applications.



Prof. Dr. Donald Kossmann

*ETH Zurich,
Switzerland*

Virtual Memory for MultiCore

Prof. Dr. Jörg Nolte

*Brandenburg
University of
Technology, Germany*

CPUs with dozens to hundreds of computing cores are expected to be available soon, but typical legacy operating systems only scale to a moderate number of cores. Accesses to shared data structures of the OS typically suffer from cache coherence protocols and inter process synchronization via contended shared locks. Even worse, unlike traditional ccNUMA architectures, multicore systems additionally have serious memory bandwidth limitations, since the amount of memory controllers that can be built into the chip is small compared to the possible number of processing cores. Thus the virtual memory system must be carefully designed to cope with these limitations. This talk discusses some of those issues in the context of shared libraries and memory mapped files. We argue that future virtual memory systems must be able to allow traditional ccNUMA sharing where the cost of sharing is low and apply distributed shared memory mechanisms otherwise.

Bio

Jörg Nolte is professor for computer science at the Brandenburg University of Technology in Cottbus (Germany) where he holds the chair for distributed systems and operating systems. Prior to that position he was a senior researcher at the Fraunhofer Gesellschaft, Institute for Computer Architecture and Software Technology (FIRST), Berlin. He received his M.S. (Dipl.Inform.) in computer science in 1988 and his Ph.D. (Dr.-Ing.) in 1994, both from the Technical University of Berlin. He was a principal member and finally the deputy head of the PEACE group that developed the operating system for Germany's first massively parallel supercomputer. In 1996 he became the head of FIRST's research group for parallel runtime systems. Dr. Nolte was FIRST's representative in the Tsukuba Research Center (TRC) of the Real World Computing Partnership (RWCP) in Tsukuba Science City, Japan. He was also a member of the EC Europa working group on parallel C++ as well as a steering committee member of ISCOPE, the International Symposium on Computing in Object-Oriented Parallel Environments. His major research interests are operating systems, middleware and programming languages for parallel, distributed and embedded systems.

Energy Aware Scheduling in Many-Core Systems

Prof. Dr. Frank Bellosa

University of Karlsruhe, Germany

Over the past decades, microprocessors have seen an enormous increase in integration density and power consumption. Today, we have reached a point where on-chip temperature has become a severe problem, and energy efficiency is of paramount importance. In addition, increasing the frequency or the complexity of a processor core is no longer economical. This has led to the introduction of explicit thread-level parallelism on processor chips (simultaneous multithreading, chip multiprocessing). Threads running in parallel on a chip compete for shared chip resources and are affected by chip-wide power management, which leads to interdependencies between those threads.

All three aspects - temperature, energy efficiency, and interdependency between threads of execution - are strongly connected to the characteristics of the applications (tasks) executed by the processor. Different tasks utilize chip-related resources such as integer or floating point units, caches, or the memory interface to different degrees. Since power dissipation is caused by activity on the chip, processor temperature is inherently coupled to the utilization of the resources on the chip and thus depends on the running task. Tasks that run in parallel and utilize the same shared chip resources to a high degree lead to contention, poor performance, and poor energy efficiency.

The operating system scheduler - managing the running tasks - can take great influence on temperature and resource contention by virtue of its scheduling decisions, i.e., by deciding which tasks to run at what time and in combination with which other tasks. Schedulers found in today's general purpose operating systems are unaware of the utilization of chip resources caused by the tasks they manage. Uninformed scheduling decisions lead to thermal problems, resource contention and, overall, inefficient use of the processor's resources.

Bio

Frank Bellosa holds a Diploma and PhD in Computer Science from University of Erlangen-Nürnberg, Germany. He worked in industry on the design of operating systems for ISDN and mobile telephone switching systems. He is now a professor for Computer Science at University of Karlsruhe (TH), Germany. His principal field of interest is design and building of operating systems. Currently he is working on OS-directed power management for energy-aware systems, virtualization and HW/OS Co-Design. He is speaker of the GI special interest group on operating systems and vice-chair of ACM SIGOPS.



Dr. Barbara Burkhard

*Capgemini sd&m,
Germany*

Managing application landscape by means of service orientation

Monolithic core, heterogeneous processes and a multitude of platforms and applications - this is a typical depiction of IT application landscapes within an organisation. Advancement of such historically grown structures has mostly been selective to date. If changes are necessary in one place, this has non-foreseeable effects on other IT systems. However, businesses have since recognised that adaptation of their IT systems necessitates consideration of the structure of the overall application landscape and that service orientation is the right paradigm to structure the application landscape. Capgemini sd&m has developed a set of consulting methods and engineering patterns, called „Quasar Enterprise“ in order to support this approach. The main objective is a better alignment between IT and Business: We start with developing the vision of an application landscape, service oriented and components based, that fits the business needs ideally. Contrasting the vision with existing IT and application infrastructure, a roadmap for stepwise approximating the business vision and for continuous service oriented application management can be deduced. Thus, Quasar Enterprise can be seen as an enabler for service virtualization in an organisation.

Bio

Barbara Burkhard has received a doctors degree in informatics at Humboldt-University Berlin. After researching at department of computer science for about 10 years she changed to private sector. Since 2005 she is working as principal consultant at Capgemini sd&m. Her main focus in IT-consulting is service orientation from business and technical point of view, where she could gain valuable experiences in several projects. Furthermore, she works as business analyst and architect in custom software development projects.

Resource Virtualization in Infrastructure-as-a-Service Environments

Cloud Computing brings up a new role allocation in the IT supply chain. Infrastructure-as-a-service providers for their part leverage virtualization and automation technology. To enable appropriate business and operational processes fully automated selection, assignment and orchestration of resources to infrastructure services are necessary. A resource virtualization combining technical and financial aspects is beneficial for this endeavor. The presented approach allows economically reasonable decisions for a wide range of resource allocation in typical cloud computing scenarios.

Bio

Dr. Fritz Schinkel started his career in IT industry in 1991 when joining Siemens Nixdorf Computers. He has broad experience in system software development amongst others in compiler development, CASE tools, application server development and infrastructure solutions. Today he works as chief architect for Dynamic Infrastructures und Infrastructure Solutions in the Enterprise Server and Software department of Fujitsu Technology Solutions. Fritz earned a doctoral degree in mathematics from the Leibniz University of Hannover.



Dr. Fritz Schinkel

*Fujitsu Technology
Solutions GmbH,
Germany*



Michael Menzel

*HPI Research School,
Germany*

The Service Security LAB: A Model-Driven Platform to Compose and Test Services in the Cloud - IEEE Service Cup Finalists

Cloud computing enables the provisioning of dynamically scalable resources as a service. Next to cloud computing, the paradigm of Service-oriented Architectures emerged to facilitate the provisioning of functionality as services. These approaches come along with new security risks that require the usage of identity and access management solutions and information protection.

In this presentation, our cloud-based Service Security Lab is introduced that supports the on-demand creation and orchestration of composed applications and services. Our cloud platform enables the testing, monitoring and analysis of Web Services regarding different security configurations, concepts and infrastructure components. Since security policies are hard to understand and even harder to codify, we foster a model-driven approach to simplify the creation of security configurations. Our model-driven approach enables the definition of security requirements at the modelling layer and facilitates a transformation based on security configuration patterns.

Bio

Michael Menzel is working as a PhD Candidate in the research school 'Service-oriented System Engineering' at the Hasso-Plattner-Institute in Potsdam. His research work is focused on security in Service-oriented Architectures with a particular interest in model-driven security and security patterns. He studied computer science at the University of Trier and wrote his diploma thesis at Hasso-Plattner-Institute in 2006, working in the field of Web Service security. In addition, his involvement in several security projects with partners such as the Bundesamt für Sicherheit in der Informationstechnik (BSI) and police Brandenburg gained him valuable input/experience for his research work.

Applicability of Semantic Technologies in Ensuring Security, Privacy and Trust



**Mohammad M. R.
Chowdhury**

UNIK-Oslo, Norway

Service-oriented Computing (SOC) paradigm congregates application components into loosely coupled network of services span across organizational boundaries in a platform independent way. Application components are distributed over the network and the network of connected devices. The latter is envisioned as Internet of things. It has added new dimension to the information and communication technologies (ICTs) which enable communication at any time, from any place and between any things. Internet of things may bring SOC closer to realizing its full potential by including the heterogeneity, dynamicity, mobility, and granularity. New service composition and adaptation can be supported by the mobile devices and thus can address the growing demand of personalization and context awareness. Recently, privacy has become an important issue while dealing with user's profiles and preferences to tailor and personalize services according to user's needs. The presentation will focus how connected devices with their heterogeneity, dynamicity, and mobility can contribute to enrich SOC.

Bio

Mohammad Mushfiqur Rahman Chowdhury is a PhD candidate at the University of Oslo and working as Research Fellow at University Graduate Center -UNIK, Norway in the area of User Mobility and Service Continuity. He received his MSc from Helsinki University of Technology in Radio Communication. Before joining UNIK, Mr. Chowdhury worked as RF engineer in GrameenPhone, Bangladesh (a subsidiary of Telenor ASA, Norway).

His current areas of interest are identity representations and identity based service interactions, security and privacy on the Web, semantic technologies, seamless user experience in heterogeneous wireless networks and development of innovative service concepts for mobile environment.



Prof. Dr. Hasso Plattner

SAP and Hasso Plattner Institute, Germany

Real-Time Enterprise Data Management

The nature of RDBMSs, being organized along rows, prohibited an instant analytical insight and finally led to the introduction of so-called data warehouses. This talk will question some of the fundamentals of the separation between OLAP and OLTP. Based on the analysis of real customer environments and experience with some prototypical implementations, a new proposal for an enterprise data management concept will be presented. Using the relational algebra and a column-based data storage will allow to revolutionize transactional applications while providing an optimal platform for analytical data processing. The unification of OLTP and OLAP workloads on a shared architecture and the reintegration of planning activities promise significant gains in application development while simplifying enterprise systems dramatically.

Bio

Prof. Dr. h.c. Hasso Plattner is a co-founder of SAP AG, where he served as the CEO until 2003 and has since been chairman of the supervisory board. SAP AG is today the leading provider of enterprise software solutions. In his role as chief software advisor, he concentrates on defining the mid- and long-term technology strategy and direction of SAP.

Hasso Plattner received his diploma in communications engineering from the University of Karlsruhe. In recent years, he has been focusing on teaching and research in the field of business computing and software engineering at large. In 1998, he founded the Hasso-Plattner-Institute (HPI) in Potsdam, Germany. At the HPI, approximately 450 students are currently pursuing their Bachelors' and Masters' degrees in IT Systems Engineering with the help of roughly 50 professors and lecturers. The HPI currently has about 100 PhD candidates.

Hasso Plattner leads one of the research groups at HPI which focuses mainly on In-Memory Data Management for Enterprise Applications and Human-Centered Software Design and Engineering.

Tool Support for Monitoring Parallel Systems

We present KStruct, a monitoring framework incorporated in an operating system kernel, e.g., the Windows Research Kernel, which facilitates consistent access to any application data with respect to the consistency constraints of the application. KStruct therefore provides a domain specific language to make the application's locking model explicit through annotations, which are then used to generate an access driver. If annotations are missing or incomplete, KStruct can perform a data flow analysis to infer the locking model itself. The access driver can then be used either by a tracing or sampling monitor to gather consistent data.

Bio

Dipl.-Inf. Alexander Schmidt studied computer science at the Chemnitz University of Technology where he graduated and received his diploma. In 2006 Alexander Schmidt joined the Operating Systems and Middleware group at Hasso Plattner Institute (HPI) as a Ph.D. student. His main research focus is in the area of application monitoring and especially in the operating system context.

At HPI, Alexander is involved in teaching operating systems courses as well as the Windows Research Kernel project. He contributes to the Windows Monitoring Kernel, an efficient event-logging infrastructure for monitoring arbitrary applications based on Windows systems as well as the NTrace tool for dynamically instrumenting applications at function boundaries. As part of his thesis, he created the KStruct OS kernel inspection framework, which focuses on consistently accessing shared data structures while the OS is running.

Alexander has been an intern with Microsoft in Redmond in 2008 and 2009.



Alexander Schmidt

HPI Research School, Germany



Research Projects on the Intel SCC

Werner Haas

*Intel Labs
Braunschweig,
Germany*

We will present the design of the experimental Single-chip Cloud Computer (SCC) by Intel Labs. The SCC is a research microprocessor containing the most Intel Architecture cores ever integrated on a single silicon chip - 48 cores. We envision the SCC as a concept vehicle for research in the areas of parallel computing including system software, compilers and applications. It incorporates technologies intended to scale multi-core processors to hundreds of cores including an on-chip network, advanced power management technologies, new data-sharing options using software managed memory coherency or hardware accelerated message passing, and intelligent resource management.

The SCC has a NUMA architecture including local caches and on-die distributed memory for low latency, hardware-assisted message passing or scratchpad use as well as an abundant external DRAM bandwidth and capacity. In this talk we will review the chip's architecture along with a little history of the design flow in order to better understand the various trade-offs. We will share initial experiences with system software development and will describe an SCC co-traveler research program where Intel will collaborate with dozens of industry and academic research partners. We expect that this program will significantly accelerate the evolution and adoption of many-core hardware and software technologies.

Bio

Since 2006, Werner Haas is working on digital design and system architecture at Intel Labs Braunschweig (aka Intel Germany Microprocessor Lab) with current focus on the memory subsystem. He developed the Linux network drivers for the Single-chip Cloud Computer (SCC). Before transitioning to Intel Labs he worked two years in Intel's optical networking division on post-silicon validation of its framer products. He was a scientific assistant at the Institute for Computer Aided Design of the University of Erlangen-Nuremberg from 1997-2003, closely collaborating with Lucent/Bell Labs on the design and verification of integrated circuits for optical networking with research focus on the formal specification of event-driven systems. He received the Dipl.-Ing. degree in electrical engineering from the University of Erlangen-Nuremberg in 1997.

His interests include architectures, methods and tools for developing scalable x86 platforms, hardware support for highly parallel software, and system-level design.



Building Clouds on System z

Einar Lück

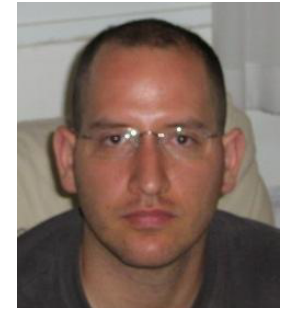
IBM Research & Development GmbH, Germany

System z has a long tradition in transaction based accounting and computing. Hardware, mature software stack and continuous contribution through innovations (e.g. Linux on System z) together with the broad business critical workload put System z into the center of future service oriented computing. The presentation explains from a hardware as well as a software component point of view why and how System z is an excellent platform for cloud computing. It sketches how to build clouds on System z and how service oriented computing based on System z works and will develop in the future.

Bio

Einar Lück is a software engineer in the Linux on System z development team for IBM Deutschland Research and Development in Böblingen. He made his Master in Software Systems Engineering at the HPI in 2005. During his studies and before, he worked for Star Division, Agilent, Oracle, SAP and IBM. In 2005 he wrote his master thesis for IBM on On Demand Computing and started immediately afterwards to work for IBM Deutschland Research and Development as a developer in the systems management space. Since then he worked on IBM Dynamic Infrastructure systems management components with special focus on network and storage management and built key components of Tivoli Service Automation Manager. End of 2008 he joined the Linux on System z kernel development team and now does kernel and user space development around network, I/O and cloud computing. In 2009 he was young talent of the IBM Technical Expert community and became an elected member in 2010.

Solid-State Drive (SSD) Future Architectures



Amit Berman

Technion - Israel Institute of Technology, Israel

The use of non-volatile semiconductor memory has implications at the individual computer level as well as for clusters and other distributed systems: the much lower access latency, combined with the higher cost, makes the sharing of this medium among multiple machines an issue worth considering. This is particularly true when combining magnetic disk drives with SSD for optimal cost-performance. In this research, we intend to explore efficient utilization of solid-state non volatile memory at various levels.

At the physical level: new concepts related to storage of multiple bits per cell, including improvement of endurance and retention. At the architecture level: approaches for high performance as well as power conserving write/read/erase policies. At the software level: file systems for solid-state non-volatile memory, concepts of interconnections and I/O communication protocols, particularly for distributed environments.

Bio

Amit Berman is a Ph.D candidate at the department of electrical engineering, Technion - Israel Institute of Technology. He received B.Sc and M.Sc in electrical engineering at 2006 and 2010 respectively. He is a recipient of several awards, which among them are the Tzalaf award and Intel research award. He held engineering and management positions in the high-tech industry between 2003-2009. He authored several international publications in the field of non-volatile memory and computer architecture and holds several pending US patents.



Dr. Andreas Eberhart

*fluid Operations
GmbH, Germany*

Managing heterogeneous hardware resources to provide a compute cloud for enterprise applications

We present the eCloudManager platform which leverages virtualization, an in memory database and semantic integration technology to integrate and automate all layers (storage, network, compute and applications) in the datacenter. The integration can be achieved vertically from hardware to applications and horizontally, for instance by supporting multiple compute platforms such as VMware, public clouds and non virtualized servers.

We present the eCloud use case SAP Landscape as a Service that allows controlling the entire application lifecycle from a self service portal.

Bio

Dr. Andreas Eberhart, Co-Founder fluid Operations AG Andreas holds a PhD from the University of Saarbrücken, Germany. He has extensive experience in both the industry, where he worked at Hewlett-Packard and Informix Software, as well as the research world, where he led a number of research projects at the University of Karlsruhe. He regularly speaks at conferences on Virtualization, SOA, and Web2.0 and has co-authored several books on these topics.

Connectivity-based Analysis of Process Models

Workflow management deals with formal representations of behavior in process models. Once formalized, processes can be analyzed, monitored, optimized, etc. Structure theory of process models investigates the relation between the structure of a model and its behavior. We propose to employ the connectivity property of process models as an angle to their structural analysis. A model gets stepwise decomposed into components with clear structural characteristics. We show that the obtained components are indeed useful for verification of correctness of process behavior. In particular, we are able to efficiently identify and localize flaws in the behavior of processes and to support process analysts with valuable diagnostic information.

Bio

Artem Polyvyanyy is a research assistant and a PhD candidate at Business Process Technology research group at Hasso Plattner Institute of IT Systems Engineering at the University of Potsdam, Germany. His research areas are business process management and service-oriented computing. Artem has published his research results at international conferences on business process management. He has a strong background in computer science, software engineering, and business process management from the National University of Kyiv-Mohyla Academy in Ukraine and Hasso Plattner Institute in Germany. His industry experience includes internships at Wincor-Nixdorf GmbH in Hamburg, Germany and SAP Labs in Palo Alto, USA.



Artem Polyvyanyy

*HPI Research School,
Germany*



Alex Kogan

Technion - Israel
Institute of
Technology, Israel

Toward Long Living Scalable Ad-hoc Networks

Mobile devices enabled with multiple wireless interfaces, e.g., WiFi and BlueTooth, are becoming increasingly common. An important aspect of these interfaces is their ability to create mobile ad-hoc networks (MANETs), which enable direct communication between devices in an infrastructure independent manner and offer fast and easy deployment in situations where it is not possible or not cost effective otherwise. Along with that, wireless technologies differ vastly in several parameters, e.g., transmission range, energy requirements and available bandwidth.

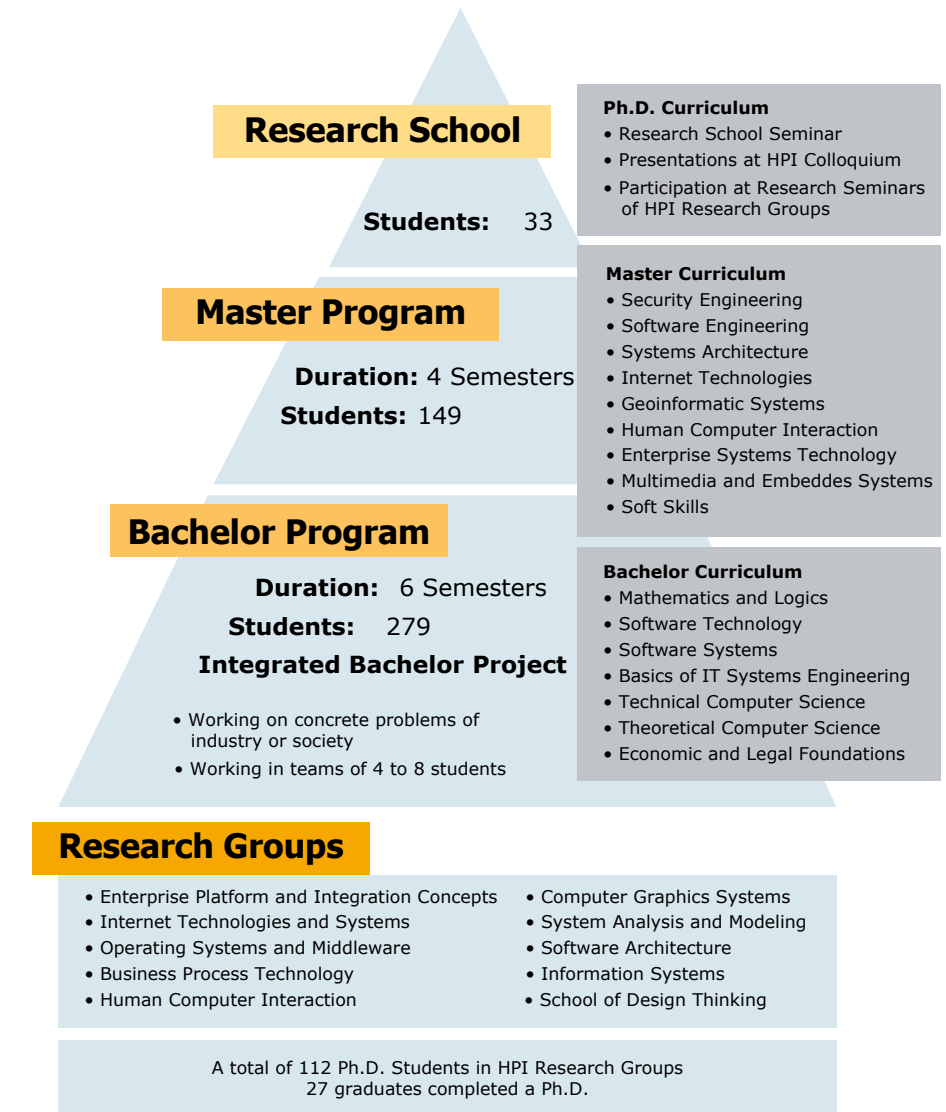
The issue of power utilization plays a crucial role in the ad-hoc networking due to the use of mobile, battery-operated devices. Wireless communication is known as one of the main sources of power consumption in such devices. Consequently, efficient power utilization by the wireless communication sub-system is crucial for the success of such networks, especially those having more than one radio.

In this talk, I will explain how multiple interfaces can be utilized to save power. First, I will present recent results on power-throughput tradeoffs discovered through measurements conducted with mobile phones. Second, I will introduce a power aware management middleware for multiple radio interfaces and discuss evaluation results showing significant power gains.

Bio

Alex Kogan is a Ph.D. student in the Department of Computer Science at the Technion. He holds M.Sc. (2008) and B.A (Summa Cum Laude, 2002) degrees from the Department of Computer Science, Technion. His research interests include distributed computing and wireless networking.

The HPI-Curriculum



Status: June 9, 2010

The HPI Research School

In October 2005, the HPI started its Research School on "Service-Oriented Systems Engineering", a graduate school based on the model of the DFG (German Research Foundation) "Graduiertenkolleg".

The Vision of the Research School

Design and implementation of service-oriented architectures impose numerous research questions from the fields of software engineering, system analysis and modeling, adaptability, and application integration.

Service-Oriented Systems Engineering represents a symbiosis of best practices in object orientation, component-based development, distributed computing, and business process management. It provides integration of business and IT concerns.

Service-Oriented Systems Engineering denotes a current research topic in the field of IT systems engineering with high potential in academic research as well as in industrial application. Supported by an internationally renowned grant, PhD students at our college participate in joint activities such as lectures, seminars, winter schools and workshops. The Members of the Research School.

The Professors of the HPI with their research group are supporting pillars for our PhD school. With its interdisciplinary structure, the research college on Service-Oriented Systems Engineering interconnects the HPI research groups and fosters close and fruitful collaborations.

In context of the research college, the different groups at HPI work on the following topics:

- Service-Oriented Geovisualization Systems
(Prof. Dr. Jürgen Döllner)
- Tools and Methods for Software Engineering in Service-Oriented Systems
(Prof. Dr. Robert Hirschfeld)
- Security Engineering of Service-Based IT Systems
(Prof. Dr. Christof Meinel)
- Service-Oriented Information Integration
(Prof. Dr. Felix Naumann)
- Evolutionary Transition of Enterprise Applications to Service-Oriented
(Prof. Dr. h.c. Hasso Plattner)
- Operating System Abstractions for Service-Oriented Computing
(Prof. Dr. Andreas Polze)
- Services Specification, Composition, and Enactment
(Prof. Dr. Mathias Weske)
- Quantitative Evaluation and Optimization of Service-Oriented Systems
(Prof. Dr. Werner Zorn)

On the Website of the Research School, please find latest information about the Ph.D. students, their research interests, joint projects, and events:
<http://kolleg.hpi.uni-potsdam.de/>

Research School Members



Prof. Dr. Jürgen Döllner
Computer Graphics



Prof. Dr. Holger Giese
System Engineering and Modeling



Prof. Dr. Robert Hirschfeld
Software Architecture



Prof. Dr. Christoph Meinel
Internet Technologies and Systems



Prof. Dr. Felix Naumann
Information Systems



Prof. Dr. h.c. Hasso Plattner
Enterprise Platform and Integration Concepts



Prof. Dr. Andreas Polze
Operating Systems and Middleware
Speaker of the Research School



Prof. Dr. Mathias Weske
Business Process Technology



Prof. Dr. Werner Zorn
Communication Systems



Mohammed Abujarour
Information Systems



Rehab AlNemr
Internet Technologies and Systems



Malte Appeltauer
Software Architecture



Saurabh Arora
Internet Technologies and Systems



Martin Beck
Computer Graphics Systems



Basil Becker
System Analysis and Modeling



Orna Agmon Ben-Yehuda
Technion



Amit Berman
Technion



Christopher Chepken
University of Cape Town



Frank Feinbube
Operating Systems and Middleware



Felix Geller
Software Architecture



Regina Hebig
System Engineering and Modeling



Dieter Hildebrandt
Computer Graphics



Stephan Kluth
Communication Systems



Thomas Kowark
Enterprise Platform and
Integration Concepts



Michael Menzel
Internet Technologies and
Systems



Raymond Mugwanya
University of Cape Town



Michael Perscheid
Software Architecture



Artem Polyvyanyy
Business Process Technology



Jan-Arne Sobania
Operating Systems and
Middleware



Thomas Vogel
System Analysis and Modeling



Shikoh Gitau
University of Cape Town



Uwe Hentschel
Operating Systems and
Middleware



Jan Klimke
Computer Graphics Systems



Alex Kogan
Technion



Johannes Lorey
Information Systems Group



Andreas Meyer
Business Process Technology



Emilian Pascalau
Business Process Technology



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Harald Meyer
Business Process Technology



Matthias Uflacker
Enterprise Platform and
Integration Concepts

Expansion of the Research School „Service-Oriented Systems Engineering“ at Hasso-Plattner-Institute

8 Ph.D. grants available - starting October 1, 2010

Hasso-Plattner-Institute (HPI) is a privately financed institute affiliated with the University of Potsdam, Germany. The Institute's founder and benefactor Professor Hasso Plattner, who is also co-founder and chairman of the supervisory board of SAP AG, has created an opportunity for students to experience a unique education in IT systems engineering in a professional research environment with a strong practice orientation.

In 2005, HPI initiated the research school in „Service-Oriented Systems Engineering“ under the scientific supervision of Professors Jürgen Döllner, Holger Giese, Robert Hirschfeld, Christoph Meinel, Felix Naumann, Hasso Plattner, Andreas Polze, Mathias Weske and Patrick Baudisch.

We are expanding our research school and are currently seeking

8 Ph.D. students (monthly stipends 1400-1600 Euro) and
2 Postdocs (monthly stipend 1800 Euro)

Positions will be available starting October 1, 2010. The stipends are not subject to income tax.

The main research areas in the research school at HPI are:

- Self-Adaptive Service-Oriented Systems
- Operating System Support for Service-Oriented Systems
- Architecture and Modeling of Service-Oriented Systems
- Adaptive Process Management
- Services Composition and Workflow Planning
- Security Engineering of Service-Based IT Systems
- Quantitative Analysis und Optimization of Service-Oriented Systems
- Service-Oriented Systems in 3D Computer Graphics
- Service-Oriented Geoinformatics

Prospective candidates are invited to apply with:


- Curriculum vitae and copies of degree certificates/transcripts,
- A short research proposal,
- Writing samples/copies of relevant scientific papers (e.g. thesis, etc.),
- Letters of recommendation.

Please submit your applications by July 31, 2010 to the coordinator of the research school:

Prof. Dr. Andreas Polze
Hasso-Plattner-Institute
Universität Potsdam
Postfach 90 04 60
14440 Potsdam
Germany

For additional information, please see:
<http://kolleg.hpi.uni-potsdam.de> or
contact the office:
Telephone +49-331-5509-220
Telefax +49-331-5509-229
Email: office-polze@hpi.uni-potsdam.de

Successful candidates will be notified by September 15, 2010 and are expected to enroll into the program on October 1, 2010.



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