Background

CeBIT: Hasso Plattner Institute foresees a change in information technology
March 2011

Hanover/Potsdam. The Hasso Plattner Institute (HPI) has designed its stand at CeBIT 2011 to resemble an innovative kind of hothouse. It shows visitors that HPI in Potsdam has the ideal climate and excellent conditions to help highly talented new IT engineers and scientists flourish, and to make creative ideas and innovative solutions ripen. The light, bright stand in the CeBIT lab (Hall 9, Stand C15) shows how much energy the university institute, founded and financed by science patron Prof. Hasso Plattner, is investing in cultivating fresh knowledge in the field of IT.

The IT Hothouse – Where new talent and innovation blossom

The approach taken at HPI, a center of excellence for IT systems engineering, is unique in Germany. And its "IT Hothouse" is just as unique among the stands in the CeBIT lab. While the institute's stand does present its exemplary solutions on large screens and smart boards, everything nestles in "beds of soil" to symbolize where the presented projects and new talent are growing. Of course, plants, flowers, grass and humus also play an important role at the exhibition stand by providing a pleasing contrast to the surrounding rampant growth of technology. And what can visitors to the HPI CeBIT Hothouse expect in the way of refreshments? Why the fresh fruits of our labors, of course!

HPI is presenting the following twelve topics at CeBIT 2011:

1. **A watershed in business software development: New data management technology delivers lightning-fast analyses**

New data management technologies promise to dramatically speed up business software. Scientists from HPI's Enterprise Platform and Integration Concepts research group will present these technologies in detail for the first time at CeBIT. They will demonstrate how analytical and transactional data that are traditionally stored separately can be united in a single database that resides in the vast central memory of a high-performance computer. This in-

memory database technology will fundamentally revolutionize business processes, as it will simplify the decision-making process for top-level managers by making quick and flexible analyses available in "real real time" – and by using cloud computing and powerful mobile devices like the iPad. For example, it can reduce the time needed to analyze 280 million jobs in a dunning run from 20 minutes to just one second. The new technology is possible thanks to ultra-modern computer architectures with up to 128 logical cores and two terabytes of main memory, as used in the HPI top-flight research lab, the Future SOC Lab. HPI founder Prof. Hasso Plattner and his deputy, Dr. Alexander Zeier, have produced a book called *In-Memory Data Management – An Inflection Point for Enterprise Applications*, which provides the first comprehensive description of this new system. The book, published by Springer-Verlag, will be presented at CeBIT.

2. Deep insights into the inner workings of software systems

CeBIT visitors can marvel at the innovative tools devised by HPI computer graphics researchers for automatically analyzing complex software systems and for monitoring software development processes. A new technology for software diagnosis visualizes the development history, program structure and run-time behavior of software in dynamic, interactive software maps. These tools can significantly reduce development costs and risks, since they offer software developers, project managers and product managers an early-warning system that enables them to respond to critical situations faster and thus better manage development projects. The software analysis tools are fully automatic and function independently of the programming language and process model. Prof. Jürgen Döllner and his team of scientists from the HPI Computer Graphics Systems group will use well-known systems to provide vivid insights into the inner workings of software systems.

3. Automatic video analysis recognizes genres, scenes, faces and text – Changing the way we search

The amount of multimedia content on the World Wide Web is growing rapidly. Efficiently managing and organizing it requires new technologies. One example of such a technology is the semantic multimedia search. Scientists from HPI's Internet Technologies and Systems group (lead by Prof. Christoph Meinel) will use an automated process for semantically analyzing audiovisual content to demonstrate how it is possible to access the ever-growing mass of information more efficiently. Their Semantic Media Explorer combines the latest media analysis processes, such as automatic scene segmentation, intelligent character recognition, and the ability to recognize genres and faces in videos. As a result, it provides optimal access to video content. This new kind of multimedia search offers users enhanced support with semantically enhanced metadata and intuitive user interfaces. The information extracted via the media analysis is correlated using semantic information so that users

can identify new links and "rummage around" in the multimedia content. In developing the Semantic Media Explorer, the HPI researchers are using highly efficient processes to process the huge volumes of data in the Future SOC Lab's new high-performance computers.

4. How can we make cloud computing more reliable?

Computer architectures are currently undergoing radical changes. Multi-core computers with up to 128 logical cores and giant memories of up to two terabytes are appearing on the market. Fully exploiting their potential for high-performance computing requires new programming models and large-scale parallel data processing. But for cloud computing in particular, higher performance cannot come at the expense of reduced reliability. In the Future SOC Lab, a top-flight research lab inaugurated in June 2010, HPI is investigating new error prediction and prevention processes that can help to avoid disturbances in operation. The researchers from Prof. Andreas Polze's Operating Systems and Middleware group at HPI will be presenting their initial findings at CeBIT. Leading researchers from abroad are also investigating high-performance computing processes at the HPI lab. They include representatives of the University of California, Berkeley and the Blekinge Institute of Technology in Sweden.

5. Award-winning learning platform gives first-hand experience of Internet security

Service-oriented architecture (SOA) in IT promises to make business processes more flexible by providing easily adaptable, highly reusable services. Thanks to these services, software systems can be built more quickly and can be more easily adapted to the specific requirements of the user. But the use of these services, which are accessible via Internet platforms and can be loosely linked together, also throws up many security issues that must be solved. At CeBIT, scientists from HPI's Internet Technologies and Systems group will use their SOA Security Lab to show how learning about and working with security in service-oriented architecture is little more than child's play. They will offer experienced and aspiring experts opportunities to try out security mechanisms for Internet services and analyze their effects. The lab gained an HPI team first prize in the IEEE Service Cup 2010, awarded in Miami, Florida.

6. Operating-system experiments in cloud-computing lab — Hasso Plattner Institute creates easy access

How can the experimental research methods used in natural sciences be applied in informatics? For example, for computer operating systems? At CeBIT, researchers from HPI's Operating Systems and Middleware group will offer visitors an insight into the InstantLab cloud-computing lab. Working

with software giant Microsoft, the Potsdam team are investigating how these kinds of experiments might be carried out on the Azure platform. Their aim is to provide easy access via modern Internet interfaces to complex experimental setups. This will considerably reduce the configuration and maintenance work usually involved.

7. Interactive 3D worlds from the cloud appear in ever-greater detail on mobile devices

At CeBIT, HPI computer graphics researchers will show how virtual 3D worlds – cities, landscapes and objects – can be displayed with greater detail and precision in a service-oriented and interactive way. The new approach uses cloud computing and provides effective server-side 3D rendering and interactive visualization of three-dimensional models – regardless of their complexity. This allows high-quality interactive 3D models to be securely and powerfully streamed on mobile devices and used in web applications. Service-oriented architecture means that client-specific 3D solutions can be systematically and affordably developed, scaled according to requirements and, for example, seamlessly integrated into existing work processes and websites.

8. Security Analytics Lab: stave off computer-network attacks with more powerful weapons

It is becoming increasingly difficult to defend computer networks against organized attackers and their refined techniques. However, help is at hand in the form of the Hasso Plattner Institute's Security Analytics Lab, which will be presented at CeBIT by the Internet Technologies and Systems group. It subjects data delivered by security sensors distributed throughout the network to complex analysis and sounds the alarm if it discovers an attack. Thanks to state-of-the-art algorithms developed by HPI researchers, it can even recognize highly complex strategies. This can prevent network breaches and data theft. At CeBIT, HPI researchers will demonstrate how comprehensively correlating and visualizing security incidents and log data can achieve major steps towards greater network security. As these types of defense techniques are so CPU-intensive, they require state-of-the-art high-performance computers, such as those in use in HPI's top-level research lab, the Future SOC Lab.

9. New web lab aims to increase public awareness of IT security

Researchers from HPI's Internet Technologies and Systems group will present a new generation of virtual IT security labs. This tool allows computer users to train up on IT security issues at any time, wherever they are. Anyone online with a standard web browser can use the IT Security Tele-Lab. It offers a realistic training environment where users can learn the theory

behind IT security and carry out practical exercises on virtual machines. For example, they can learn how to stave off a hacker attack or see what happens when someone hacks a personal password.

10. New Tele Boards help decentralized teams exchange creative ideas more easily

Decentralized teams are often hampered by working in different locations and at separate workspaces, as well as by a lack of team spirit. At this year's CeBIT, HPI Design Thinking researchers will present the Tele Board, a new type of collaboration system that aims to solve these problems. It was developed and tested as part of the joint Design Thinking research program with Stanford University in Palo Alto (Silicon Valley). Whether team members are working in neighboring offices or on different continents, they can post electronic notes (post-its) on the interactive Tele Boards during brainstorming sessions and creative discussions. Thanks to the unique recording functions, the boards make it easy to drive the creative process forward with new ideas and to document and follow it in detail. Decentralized project teams can work even more efficiently by linking a video conferencing system to the boards.

11. How computer scientists and telemedicine staff are improving healthcare, especially in rural areas

At CeBIT, researchers from the HPI Operating Systems and Middleware group will show how telemedical support can improve healthcare in rural areas. As part of a scientific project, patients in northern Brandenburg are being given devices, whose sensors automatically send information about, for example, cardiac function or weight changes via a base station to a telemedical center. There, medical specialists evaluate the data and, if necessary, take action – such as sending an emergency doctor out to the patient. The backbone of the system is a self-adapting communications and resource-management software program, which can set its own priorities and which was developed and tested at HPI. The program supports doctors by analyzing large volumes of data and listing cases according to urgency. This means that just a few doctors in a single telemedical center can take care of several thousand patients at once. The first medical studies using this system are already up and running.

12. HPI researchers build platform for national process library of public administration

The Nationale Prozessbibliothek (national process library) is a research project that aims to collect and present all specialized processes in public administration in Germany that are controlled by information technology. Its technical platform is being developed by researchers in the Business Process Technology group at the Hasso Plattner Institute (HPI) in Potsdam. The

project will be on display at the CeBIT stand of the Federal Commissioner for Information Technology (Hall 9, B60). On March 4, HPI will be presenting the project at the stand. The Federal Ministry of the Interior is funding and leading the project, which HPI is working on with the Humboldt University in Berlin (Institute of Information Systems). The platform is being designed to manage process building blocks and bring together the knowledge of administrative processes that exists at various levels and link it in a way that makes sense. The project is not about routinely aligning existing models of administrative processes at federal, state and municipal levels. Rather, it hopes to pool existing experiences and multiply knowledge by encouraging the different levels to work together. Using the integrated e-government community, information can be documented using modeling processes and exchanged between participants.

Press information

The following **researchers** will be happy to give you more information about the topics:
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Our **PR team** will also be at CeBIT in Hanover.
Press spokesman: Hans-Joachim Allgaier (March 1 and 2)
Stand manager: Barbara Keller from relationship management (March 1 to 5)