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## Innovative search for world's biggest physics laboratory

**Huge quantities of data from the particle accelerator experiment at the CERN Research Center converge in Karlsruhe. They are saved and processed in a worldwide networked grid computing centre. The Global Grid User Support at the Research Center in Karlsruhe relies on the ConWeaver search engine technology developed at the Fraunhofer IGD for project-related information management.**

The Research Center in Karlsruhe is one of the biggest research institutions for natural and engineering scientists in Europe. Every day thousands of scientists all over the world access the data saved in the computing centre. Since the beginning of September 2008 there is even more data converging in Karlsruhe. Here is one of the main hubs through which the data for the large-scale experiment with the particle accelerator at the European Research Center (CERN) in Geneva passes.

The experiments of the Large Hadron Collider at CERN generate huge quantities of data. Experts estimate up to several gigabytes per second for individual experiments. In order to be able to analyze this effectively, scientists have built a worldwide grid infrastructure. This includes eleven Regional Operating Centers (ROCs) each with thousands of networked computers in locations including Germany, Taiwan and the USA. As one of the ROCs the Research Center in Karlsruhe provides computing and memory capacity and looks after the coordination of the worldwide grid user support.

The teams of the ROCs provide first-level support on a weekly rotation. They do not get to know the teams personally and the time differences of the different locations make their work

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more difficult. A helpdesk employee in Karlsruhe does not know about the queries that a colleague dealt with in Taipei the week before.

The "Global Grid User Support" (GGUS) project tackles these problems and focuses on intelligent information technology solutions. GGUS integrates a search engine that doesn't only find best-practices and solutions to problems, but also suggests independent solutions and best practices for the given problem.

The search and suggestion function is based on the ConWeaver-technology of the Fraunhofer spin-off ConWeaver GmbH. It was especially adapted for the GGUS by the GGUS team together with ConWeaver employees from the Fraunhofer IGD. "Such innovative information technological solutions are a suitable tool for the large challenge faced by the helpdesk," explains Rainer Kupsch, who at the time was Department Manager of the Research Center in Karlsruhe. "By improving the productivity of the support employees and the quality of the answers, the grid-relevant problems can be solved more quickly," says Dr. Antoni, Group Manager at GGUS.

The ConWeaver team is presenting its technology at the 4<sup>th</sup> Semantics Day "User Workshop – Semantics Search with ConWeaver" on November 12, 2008 in Darmstadt. Further information can be obtained from: [www.conweaver.de](http://www.conweaver.de)

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Fraunhofer Institute for Computer Graphics Research IGD does applied research in the field of computer graphics. Among the core competencies of the institute are visualization and simulation, animation, modeling, virtual and augmented reality, security technologies, and ubiquitous computing. The research work is focusing on three main areas: the maintenance of semantics over the entire modeling process, the correlation of graphics and vision, as well as the handling of library issues in the context of three-dimensional models. The application spectrum of the innovative concepts, models, and practical solutions ranges from virtual product development to medicine and traffic to multimedia learning and training. By order of customers, prototypes and overall systems are developed which are fully tailored to the specific requirements. So the departments in Darmstadt, Rostock, and Singapore develop new technologies, prepare studies, and realize applications and systems (hard- and software) featuring a high user acceptance, great user-friendliness, and a highly ergonomic design. The research and development projects of Fraunhofer IGD directly respond to topical issues of the economy. Several spin-offs guarantee that prototypes are quickly realized as marketable products.

Fraunhofer IGD is closely cooperating with Technische Universität Darmstadt, Technische Universität Graz, and Universität Rostock. The *Centre for Advanced Media Technology* (CAMTech) in Singapore, founded in 1998, ensures the presence in the future markets of Asia. Fraunhofer IGD has a constant staff of about 180 scientists (FTE). In 2007, the budget amounted to over 14 million euros.

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