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SOFTWARE SERVICES FROM THE CLOUD

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The Finnish Cloud Software program focuses on web software, creating superior user experience, and developing green software technology.

The term "cloud" stands for a platform that provides all forms of information and communication technology (ICT) and computation equipment, even to the scale of large data centers. Using the cloud, ICT services can be outsourced over the web. The user does not need to worry about updating, maintenance, and security issues of servers or applications. Services offered through the cloud cover data storage, applications, and user support.

"This is a radical paradigm change, with the majority of services being transferred to the cloud. In the future, cloud technology will represent a major part of daily life. Active use of Internet applications will become common practice, for example, when consumers store, use, and distribute material they have created themselves. The cloud is a major trend, and yet most companies are not prepared for the change", says **Janne Järvinen**, Director at F-Secure. He leads the Cloud Software program funded by the Finnish Funding Agency for Technology and Innovation Tekes, and ITC companies. The aim of the program is to develop the Finnish software industry's capabilities to create new business based on the cloud platform. This means taking their services to the network for easy availability.

USER EXPERIENCE IS IMPORTANT

Järvinen explains that the transfer to cloud technology has been an easy step for F-Secure. Since 2001, the operating centers maintained around the world over the web prepared the foundation for real-time security web. Cloud technology-based security was taken into use in 2006, when F-Secure started to employ web-based vulnerability detection in its services relating to security against phishing. In 2008 the real-time security web was established.

"As cloud services become more common, users have more alternatives to choose from and changing from one service to another becomes easier. From the point of view of the service supplier, competition is getting tighter and users become more demanding, so the importance of a good and excellent user experience is increasing. The Cloud Software studies include research into what makes a product or service stand out and delight the user. Understanding the factors behind a superior user experience helps us to create products and services that are continuously more competitive", Järvinen believes.

One important research theme in the program concentrates on user experiences. Human-centered software development has been a great challenge in ICT, since technology is advancing at an increasing speed, resulting in applications that are often too complex to use. Currently we are not concentrating on future

applications; we try to find out what we can learn from the current applications used in daily work.

Another topical need is to create the principles for software development to help take into account the developments in web technologies. Cloud Software provides a possibility for us, because it contains the communication and data security between applications, and a possibility for further development of applications.

"In the software field, the most important factors affecting competition are operational efficiency, user experience, web-based software, open systems, data security, and sustainable development. The Cloud Software program is concerned with all of these factors, because programs are increasingly being transferred to the web and becoming service products. The program aims to lead the way in the development of business models and software services relating to the cloud technology.

> "IN THE FUTURE, CLOUD TECHNOLOGY WILL REPRESENT A MAJOR PART OF DAILY LIFE."

During the program a tool box will be designed for cloud computing application development, and the engineering principles will be laid down for open software development. One important target is mashups. They are web applications, in which data or functional properties are combined from several sources to create a new service.

DIRECTLY TO LEADING-EDGE SW DEVELOPMENT

The Cloud Software program partners are 20 companies and 8 research organizations. The current year's funding has been EUR 16.2 million, of which Tekes has provided 8 million. Cloud Software is part of the Tivit, Finnish Strategic Centres for Science, Technology and Innovation (SHOK) program.

Cloud Software strives to be at the forefront of software development. According to **Pekka Abrahamsson**, Professor of Computer Science for the University of Helsinki, Finland possesses a great deal of experience and skill in cloud technologies, open interfaces, and the utilization of agile methods in developing software services.

"We have a good starting position. Now we should quickly combine our skills and meet the needs of the clients. By developing well-made cloud services based on customer needs we can establish a head start."

During the past 20 years software programs have become a success factor in the global competition between companies. Open interfaces, open source code, and communities producing them initiated the paradigm change in the field and have brought new possibilities for software development.

"The next development step is to let users participate in the development of products and services. It is already an essential part of successful business today. Although several open code innovations have emerged from Finland, Finnish companies need to move faster to utilize the business potential that the social networks on the Internet provide."

Abrahamsson thinks that openness in business and consequent transparency are essential factors.

"Tailored, license-based software production and its role will be less important in the future. The answer will be provided by emerging companies specializing in lean-agile software services creating new dynamics, with the main emphasis on providing high-quality services and, perhaps, locality. It is clear already that the organizations utilizing information technology will have no business advantage through owning the software they use. Open software platforms will become

Finnish research into data security is internationally recognized. The two Cloud Software partners, CSC and F-Secure, have performed pioneering work on security issues. Funet CERT of CSC was the first Computer Emergency Response Team (CERT) in Finland, founded in 1995. The security services of F-Secure Oyj, founded in 1988, are used globally through more than 180 Internet service providers and mobile phone operators.

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more common in the future, and both cloud technologies and services will be important. "

Abrahamsson thinks that software development is also going through a period of change. "Fast and well-coordinated open source software development will play a key role. It is based on continuous collaboration between different communities. In this way good practices will be created for software development, taking into consideration customer needs and company goals."

Abrahamsson is the academic coordinator for the Cloud Software program. He emphasizes that the project involves trying out a new way of developing services. The starting point is not in technology but a comprehensive customer-based operational model that follows the principles of lean and agile software development. The results will be packaged into a model and will be published with guidebooks by 2013.

EMBEDDED SYSTEMS AND GREEN ICT CONNECTED TO THE CLOUD

Finnish software development has traditionally represented the global peak. Embedded systems, such as Kone Corporation's elevator software or Metso Automation's process industry applications, are good examples of this. Elektrobit, one of the companies participating in the Cloud Software program, develops state-of-the-art embedded technology solutions for the automobile industry and mobile systems.

> "THE REAL BREAKTHROUGHS WILL OCCUR WHEN SERVICES INVOLVING BROAD INTEREST IN USERS ARE BEING DEVELOPED."

Intelligence has been added to integrated systems by smart microprocessor technology. Various automation applications contain a great number of embedded systems. For example, current internal combustion engine control systems, microwave ovens, robot controllers, elevator control systems, mobile phones, and exchange units contain one or more integrated microprocessors. Future devices and domestic appliances will be complex embedded systems communicating with each other over the web.

"The coupling of embedded systems with cloud-based services is only a matter of time", says Abrahamsson. He has a broad experience on collaboration with industrial companies, specifically on embedded systems.

"The mobile cloud is one of the hot topics in the field, but the real breakthroughs will occur when services involving broad interest in users are being developed."

Environmental friendliness has also been important. Improved programs have helped to reduce energy consumption, optimize raw materials use, and offer new services in a sustainable manner.

A good example of this is the Sustainability Intelligence Service of Tieto Oyj; the software enables real-time monitoring of environmental and financial data at different phases of the production chain over the Internet. The data is efficiently maintained in databanks and it helps companies in their process planning in an environmentally friendly way.

One of the research themes in the Cloud Software program is sustainable development. Finland has always had a strong foothold in producing low-energy solutions for the mobile phone industry. Finland can also offer a good environment for the realization of green information technology: cool climate, water resources, good educational level, safety, and inexpensive and green energy. The project involves investigation into how environmental friendliness can be improved with the help of software programs and algorithms. ■

TIVIT is one of the Finnish Strategic Centres of Science, Technology and Innovations, (SHOKs).

Tivit was founded in February 2008 for the purpose of predicting the products and services of the future. Tivit is owned by 46 companies and public research communities. It is one of the SHOKs funded by Tekes that provide top-level research units and companies utilizing research results with a new way to conduct close and long-term collaboration.

Currently ongoing programs at Tivit:

- **Future Internet**
- **Flexible Services**
- **Devices and Interoperability Ecosystems**
- **Cooperative Traffic**
- **Cloud Software**
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http://www.tivit.fi/en/

CLOUD SOFTWARE FINLAND

http://www.cloudsoftwareprogram.org/

Tivit webinar:
Seeking Competitiveness for Finnish Software Industry (Janne Järvinen)

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