2 open PhD positions in a research project at the University of Oslo

SIRIUS: Sensing, Adapting and Protecting Pervasive Information Spaces

Adminsitrative Information:

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Abstract

Emerging pervasive applications, like eHealth, emergency and rescue, and control and automation, depend on optimal support from the underlying system and infrastructure. Both the convergence of the current Internet with mobile networks and the increasing number of small, mobile, and cheap electronic devices are promising, but also challenging building blocks for new pervasive infrastructure solutions. Applications require support to utilize the new capabilities optimally while at the same time keeping the complexity of the underlying infrastructure transparent. However, the success of new architectures for future network and service infrastructures depends not only on technical factors but also on the availability, usefulness, and costs of end-user services and applications that utilize them. Thus, solutions that provide support for pervasive infrastructures have to take these factors into account. There are a number of major issues hindering the development of successful end-user services and applications, especially in pervasive environments:

- The *complexity*, *dynamicity*, and *scale* of pervasive networks make it very hard to implement properly functioning end-user services and applications. It is unrealistic to expect all application developers to address issues such as heterogeneity, robustness, security, privacy, and trust within their application. A distributed platform is needed that enables effective, dependable and secure application development in such environments.
- The *dynamicity* and *mobility* of pervasive systems lead to severe yet unsolved robustness, security, privacy, and trust issues. These issues need to be solved before any commercially relevant or mission critical pervasive applications can be deployed.
- The *rapid evolution* of related technology (e.g. in the electronics and ICT sector) leads to a continuous introduction of new technologies. To fully leverage the capabilities of pervasive environments for end-user services and applications, continuous and burdensome changes to the infrastructure and existing applications are required to keep abreast with these developments.

The major challenge is therefore twofold: First, system developers need concepts and mechanisms that will make it possible to create large-scale pervasive systems with the above mentioned properties. Second, service and application programmers need a platform that provides support for developing robust and reliable services and applications shielding them from complexity of the underlying system. It is our view that this can only be achieved by making the system inherently adaptive and resilient, i.e., enabling it to protect itself. Adaptation and protection in turn require context awareness, which is achieved through sensing the environment.