Ubiquitous service composition for all users

UbiCompForAll is a research project founded by the Research Council of Norway. The project started in October 2008, with planned duration 4 years. It involves academia and industry.

UbiCompForAll vision

Intelligent objects and devices are becoming part of the environment where people live, providing information and offering services that can assist them in everyday life. In such settings, it is desirable that services offered to the users are meaningful, i.e. services should satisfy the user's tasks and needs. The more intelligent the environment become, the greater opportunity users potentially have to customize the computing activities that take place around them. For some people this offers possibilities for tailoring things to exactly what one wants. For some others the large number of devices and services represents a problem: how to manage the complexity? Service access happens literally everywhere, there is no "service technician" to assist the user and the roles of "developer" and "configurator" are delegated to the user.

Why not increase the possibilities and diminish the problems by providing users with good tools? Service discovery and composition should not require expert knowledge, but be done by ordinary users. The key is a service composition framework that is sophisticated enough to support correct service composition, while being intuitive enough for ordinary end-users. This is what UbiCompForAll is about: providing end-users with support for tailoring and composing services adapted to their needs.

UbiCompForAll goals

The project overall objective is **to develop an approach for user driven service composition.** The approach will build upon theoretical foundations such as runtime semantic service discovery and validation, and comprise end-user composition tools, development method & tool extensions and middleware. It will be assessed through trial services. The sub-goals are to:

- develop theoretical solutions for flexible, safe and useful compositions of collaborative services;
- support service browsing, selection and composition driven by user goals;
- support goal-based service discovery allowing for transparent service composition at runtime;
- assess the theoretical solutions in a runtime environment through prototyping;
- assess the visual composition approach through prototyping;
- assess the overall approach through development of pilot services;
- demonstrate pilot services in a large-scale network infrastructure.

UbiCompForAll users

The users of UbiCompForAll composition tools - we call them *composers* - do not need to have any professional software development or programming background. However we expect the composers to be familiar with desktop computers and commonly used office tools, such as text editors and email client applications.

UbiCompForAll application domain

The city-wide wireless broadband infrastructure provided by Wireless Trondheim will be exploited to perform experiments in a large scale ubiquitous environment. We focus on the city and mobile services provided to urban users, since this is a user group seeking innovative solutions, and a group with potentially many non-professional developers. City portals exist today that support users in retrieving information about the city. In the future, we envision interactive services allowing the users to easily navigate in the city, plan work and activities in the city and exchange experience with other urban users.

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Scenario-based approach

Scenario building is a widely accepted approach to generate design ideas for new systems and products and to identify the possible users and contexts of use for these systems and products. Scenarios describe individual users in individual usage situations. The value of scenarios is that they concretise something for the purpose of analysis and communication.

UbiCompForAll will exploit scenarios both for the design of new services that might be composed by the end-users and for the design of the composition approach itself. In that way we aim at establishing a clear understanding of what end-user service composition is, and we will illustrate the potentials of an end-user service composition approach.

Early end-user participation

In order to ensure that UbiCompForAll approach is useful and easy to understand, we will involve the potentials users of our results during all phases of the project. To get an early feedback, we will organize interviews with users during the specification of scenarios in order. We will also involve users early in the assessment of the end-user notations, using techniques such as paper prototyping. Further we will let users test the composition tools and create the case services described in UbiCompForAll scenarios and their own services.

Mobile platform

The Android platform has been chosen to execute the mobile services composed in UbiCompForAll. Android-enabled devices provide an easy-to-use user interface, and the Android platform comprises a wide range of components that can be easily personalized and composed. Further the platform is available as open source allowing for extensions, and the Android software development kit includes a comprehensive set of development tools facilitating experimentation.

UbiCompForAll partners

- SINTEF ICT has expertise in service engineering and end-user development. SINTEF ICT will contribute to the specification of the architecture of UbiCompForAll tools and MW, and the development of visual composition methods and tool prototypes.
- NTNU, Department of Telematics has expertise in model-driven service engineering, and formal service modelling and validation. The department will contribute to the definition of methods for flexible and safe dynamic service composition from fine-grained reusable building blocks.
- NTNU, Department of Computer science has expertise in information retrieval and ontology engineering. The department will contribute to the development of ontology-based techniques for effective semantic service discovery and automated service composition.
- Gintel is an independent software vendor building solutions and providing platforms/applications to telecommunication operators. Gintel will exploit UbiCompForAll results to provide end-users support for composing their services as part of their subscription agreement with a service or network provider.
- Tellu is a provider of middleware and services, with expertise on mobile platforms. Tellu will exploit UbiCompForAll results to deliver new methods and tools that simplify service composition. They will also extend their middleware platform ActorFrame with service discovery and composition features.
- Wireless Trondheim is a wireless broadband provider in Trondheim. They collaborate with NTNU offering a citywide infrastructure laboratory for testing of new wireless products and services. Wireless Trondheim is interested in UbiCompForAll services and their potential for commercialisation.

Project Coordinator

Jacqueline Floch, SINTEF ICT — Tel: +47 73 59 30 12 / +47 930 08 536

Email: jacqueline.floch@sintef.no — Fax: +47 73 59 43 02