

## Background

MUSIC is open platform technology for software developers, addressing a paradigm of “any network, any device” with relevant content and right context in a secure and trustworthy manner. MUSIC aims to provide technology for the development of innovative mobile applications, which will play a role in the lives of European citizens in the future. As the public gets accustomed to the use of mobile services, expectations about *which services* should be provided, *where* they should be available and *how well* they should be adapted to the users’ expectations has become more topical and demanding. However, the current range of mobile devices (e.g. PDAs, smart phones, GPS, etc.) and the variety of infrastructures has exacerbated the challenges in building and maintaining such services in a user-friendly way. Because of that, software developers must deal with an enormous number of issues related to configuration, operations, maintenance and change management in order to produce systems that can dynamically, securely and automatically adapt to public expectations in different scenarios and circumstances.

## Theme

MUSIC (Self-adapting applications for **M**obile **U**sers In ubiquitous **C**omputing environments) is an Integrated Project under the EU’s 6<sup>th</sup> Framework Programme. MUSIC aims to **provide an open platform** that makes it technically and commercially feasible for the wider IT industry to **develop innovative mobile applications** which:

- ♪ are context-aware – i.e. understand user “context” in the widest possible sense, including aspects related to users themselves (i.e. role, location, environmental conditions, etc.) as well as technical aspects, such as the availability of computing and communications facilities.
- ♪ are self-adapting – i.e. dynamically adapt to changing demands and operational conditions.
- ♪ are inherently distributed and support direct interactions among multiple users.
- ♪ are aimed primarily at mobile users (but may include stationary users, too).
- ♪ address operational aspects such as security, dependability, etc. according to user needs and circumstances.

- ♪ are “innovative” either because they provide users with entirely new services or because they make traditional services available in a practical and usable form in a mobile environment.

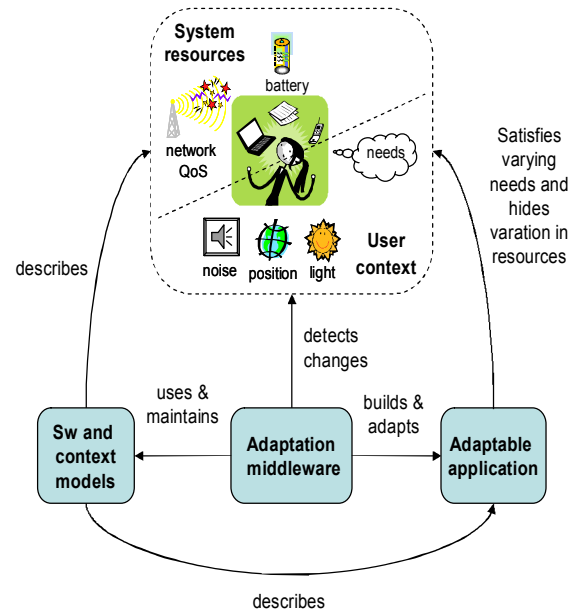


Fig 1. The Challenge

## Activities

To address the technical challenges and to promote the development and widespread deployment of innovative mobile applications, MUSIC will:

- ♪ develop an open platform for the development of self-adaptive mobile applications, including methods, tools and middleware.
- ♪ use the platform to develop trial applications, based on a set of challenging application scenarios.
- ♪ use the trial applications to:
  - drive the R&D work of the project;
  - assess the technical quality of project results;
  - promote project concepts and results to the wider IT industry.
- ♪ carry out research to produce the conceptual underpinning needed for the platform, including the above-mentioned aspects like context-awareness and adaptability.
- ♪ promote standardisation by aligning the work of the project with relevant standards bodies,



# Self-adapting Applications for Mobile Users In Ubiquitous Computing Environments

proposing modifications to existing standards and/or proposing new standards.

- use an Open Source approach for core project results and use this as a key element in the strategy to ensure widespread uptake of the project results.

Research and technology development will focus on:

- modelling of adaptable software and context dependencies.
- mechanisms for implementing adaptable software for ubiquitous environment.
- automatic adaptation planning and decision making based on exploiting software models at runtime.
- context awareness, including modelling, sensing and reasoning for both user and systems context.
- analysis, simulation, testing and tuning of adaptation-related behaviour and support tools.

## Impact and Exploitation

The development of continuously available, ubiquitous computer-based information and communication services is hindered by the lack of services truly usable on handheld devices in mobile settings.

MUSIC aims to remove this obstacle by providing technology that has the potential for dramatically improving the ease of use of computer-based services in mobile settings and for speeding up the transition from current technology to novel concepts.

As a result, MUSIC will impact several sectors of the economy:

- Service providers (both public and commercial) will be better able to reach and satisfy their users and see an increased market for their products.
- By adopting MUSIC methods and tools developers will reach higher levels of productivity in developing self-adapting software.
- Communication infrastructure operators will have better means for optimizing the use and availability of their resources.

- Manufacturers of mobile devices and vendors will see increased demands for their products.

The Consortium will demonstrate the results of MUSIC in a number of trial services in order to assess and determine the impact during the project and the benefits derived. The Consortium will also determine the business model required to market the project results.

## Ongoing Evolution

MUSIC seeks to ensure the continued uptake and evolution of its technology beyond the lifetime of the project by adopting an Open Source strategy, which includes the establishment of an Open Source community during the project lifetime and through the use of development methods and tools that are endorsed by the Open Source community.

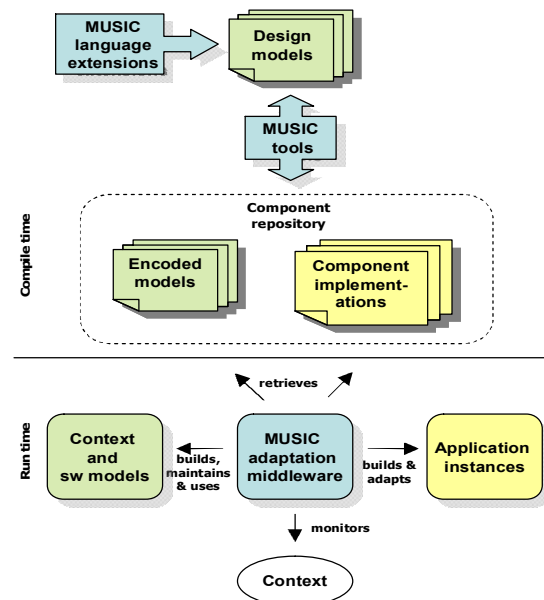


Fig 2. Music Architecture Outline

**Project Coordinator:** Geir Horn. SINTEF ICT  
Tel: +47 93059335 Fax: +47 22067786  
[geir.horn@sintef.no](mailto:geir.horn@sintef.no) [www.ist-music.eu](http://www.ist-music.eu)

**Partners:** SINTEF (NO), Appear Networks (SW), Condat AG (DE), HP Italy (IT), Itegrasys (ES), SID2U.Com (IR), Telefonica I+D (ES), Telecom Italia (IT), RATP (FR), European Media Laboratory GmbH (DE), University of Cyprus (CY), Kassel University (DE), Katholieke Universiteit Leuven (BE), University of Oslo (NO)

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**Regional Contact:**