

# HyVar



**HyVar proposes a development framework for continuous and individualized evolution of distributed software applications running on remote devices in heterogeneous environments processes.**

## AT A GLANCE

### Project title:

Scalable Hybrid Variability for Distributed Evolving Software Systems

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### Partners from:

Santer Reply S.p.A  
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Technical University of Braunschweig  
University of Oslo  
Atbrox  
Magnetis Marelli S.p.A.

### Duration:

36 months (February 2015 – January 2018)

**Total cost:** 2.793.870,00 €

**EC Contribution:** 100%

### Programme:

H2020-ICT-2014-1  
ICT-09-2014  
Tools and Methods for Software Development

## Context and motivation

The goal of HyVar is a development framework for continuous and highly individualized evolution of distributed software applications. The aim is to support the enterprises that manufacture, operate or maintain those systems to efficiently manage frequent and sudden varying events and situations, such as frequently changing designs and software patches to a configuration, where agility is required. Our vision is that state-of-the-art structuring concepts for variability from research on software product lines can be combined with cutting edge industrial technology for software evolution and incremental analysis techniques from research on formal methods.

## Challenge

We target a breakthrough in the development and maintenance of large, complex, highly distributed, data-intensive and business-critical applications.

In order to make this breakthrough possible the following three steps must be achieved:

1. Development of a Domain Specific Variability Language (DSVL) and methodology that makes it possible to

encompass hybrid variability and unanticipated evolution of Multi Software Product Lines (MSPL) in production.

2. Development of a cloud infrastructure that enables scalable hybrid feature reconfiguration for highly customized remote devices.

3. Development of an over-the-air updating that supports secure and efficient updates of the system of systems represented by the ECUs on a car.

## Solution

HyVar goes beyond the state-of-the-art by proposing hybrid variability; i.e., the automatic generation and deployment of software updates combines the variability model describing possible software configurations with sensor data collected from the device. HyVar's scalable cloud infrastructure will elastically support monitoring and customization for numerous application instances. Software analysis will exploit the structure of the variability models. Upgrades will be seamless and sufficiently nonintrusive to enhance the user quality experience, without compromising the robustness, reliability and resilience of the distributed application instances.

## Expected impact

By mastering distributed software variability in connection with virtualization and evolution in the engineering of applications, HyVar has the potential to significantly improve the growth and competitiveness of the European industry and to encourage faster product innovation cycles. In HyVar, this technology push from European research meets a user pull from industry. In particular the HyVar approach will enable to dramatically decrease the maintenance costs of software and will enable remote patching and updating of highly distributed software applications currently impossible to address with conventional techniques. The demonstration will be executed on a real-world scenario of connected cars, challenging the tool onto a secure, reliable and efficient adaptation of software toward highly distributed onboard systems. The results can be then applied also to other sectors such as home automation, environmental control, surveillance camera, remote healthcare devices and many more.

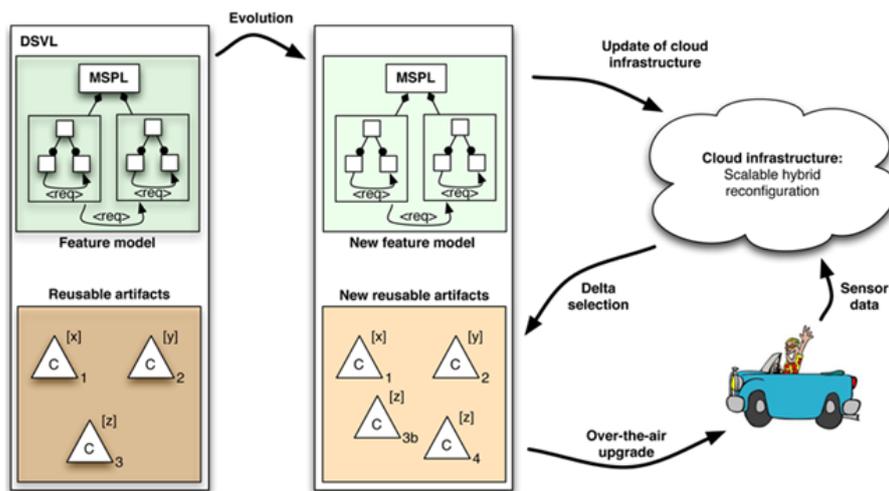


Figure 1 - HyVar Architecture