

WICE: Automotive telematics, fleet management, rapid prototyping and software download for connected vehicles

Mathias Johanson
Alkit Communications AB

Introduction

The WICE system is a powerful and flexible automotive telematics platform developed by Alkit Communications AB providing access to measurement data from connected vehicles, enabling fleet management and state-of-health services, rapid prototyping of new in-vehicle services and functions, and remote ECU software download.

The WICE platform and services

The WICE system consists of two main parts (see Figure 1):

1. An **in-vehicle data logging and measurement system** (also known as Wireless Communication Unit, WCU), including connectivity and telematics services. A number of different hardware platforms are available for in-vehicle installation, including the MX-4 platform from Host Mobility and the MIIPS platform from Fältcom. The in-vehicle hardware unit supports communication interfaces for measuring and logging vehicular data (including CAN and FlexRay buses, analog inputs, digital inputs, USB and Ethernet).
2. A **back-end server infrastructure** including data storage, database with meta-information, and a web-based front-end user interface (known as the “WICE Portal”).

The following application services are supported by the WICE system:

- A **metrology service**, enabling engineers (or other users) to collect measurement data of different kinds (signals, frames, logs, etc.) from connected vehicles. Measurement assignments can be sent to connected vehicles through the WICE Portal interface, and measurement data can be accessed and downloaded for analysis.
- A **fleet management service**, keeping track of the status of fleets of connected vehicles, including map-based positioning, mileage, uptime, Diagnostic Trouble Codes, ECU software version numbers, etc.
- A rapid **prototyping platform**, enabling emulated execution of ECU services in the in-vehicle WICE unit, for proof-of-concept testing of new automotive functions and services.
- A **remote software download** (SWDL) service, making it possible to remotely re-program in-vehicle ECUs, enabling continuous deployment of ECU software in connected vehicle fleets.

A high-level overview of the WICE system is shown in Figure 1.

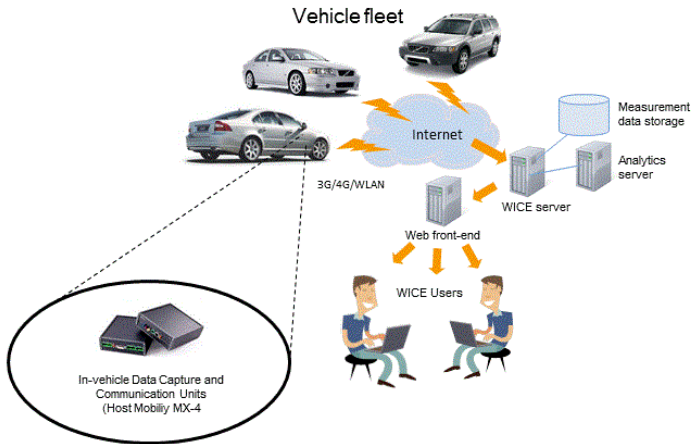


Figure 1. Overview of the WICE system

The WICE Portal

The WICE Portal is the core software component realizing the main server-side functionality of the service for vehicle testing, verification and development. The WICE Portal is a complex software system composed of many parts. A high-level model of the system architecture is shown in Figure 2.

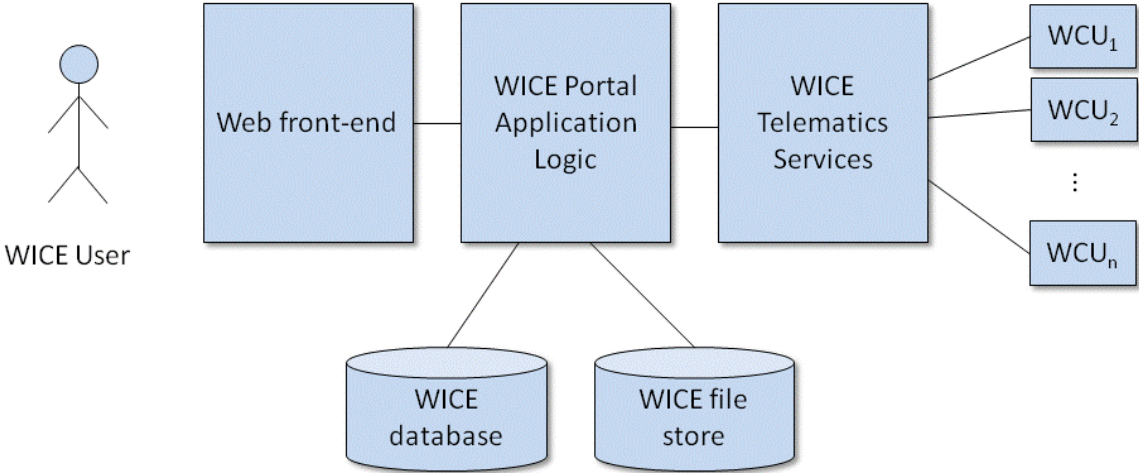


Figure 2. High level architecture of the WICE Portal and back-end infrastructure

The WICE Users interact with the system through a web front-end. The WICE Portal Application Logic implements the core functionality of the supported services, including management of measurements tasks and data, fleet management of connected vehicles, data presentation, user management and administration. The Telematics Services provide the

communication interface to the fleets of connected vehicles. Each connected vehicle has a WCU (Wireless Communication Unit) installed, which contains the vehicle side of the system, including data capture and monitoring modules, vehicle diagnostics modules, GPS positioning and vehicle status information.

The state of the WICE system is kept in the WICE database, which is a relational DBMS. The measurement data uploaded from vehicles is stored in the WICE File Store which is a Network Attached Storage (NAS) file system.

Contacts

For more information contact Mathias Johanson, mathias@alkit.se