### Smart Transport

#### Fleet Management

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What makes a fleet system different compared to other IoT systems are:
- The edge devices move around, are not always-on and are not always connected.
- When the devices are connected, the connection speed and cost may vary (e.g., Wi-Fi vs. Edge/3G/4G/5G)

Often there are several edge devices within one vehicle, typically sharing a single WAN connection, and all with the need to find/use each other within the vehicle.

Other typical fleet management characteristics/requirements are:
- Software updates/reconfigurations are common
- Ability to verify source of all software
- A software update should never fail.

The modular platform is based upon two key components provided by Makewave.

**Knopflerfish OSGi** – Every vehicle has one or more on-board computers that runs an embedded Knopflerfish OSGi platform. The on-board computers are connected to the in-vehicle network (FMS) and to each other (LAN/IP).

**Ubicore** – Manages the embedded edge device.
- Ubicore knows exactly which bundles are installed and started in which edge device.
- Ubicore pre-resolves and defines what needs to be installed => software packages for deployment are created
- These can be tested, verified and signed before deploying

Makewave’s solution with OSGi technology provides the foundation for a cost-efficient, dynamic and secure fleet management solution.

**Clear Separation** – Clear separation between business logic (implemented as OSGi bundles) and lower lever parts device code (C/ C++).

**Remotely Managed and Flexible** – It is very easy to add, remove or update functionality in the business logic layer over time.

**Uniform Architecture** – Exactly the same business logic bundles can be used regardless of on-board computer architecture (ARM, X86). No need to recompile, or support different versions.

**Secure Software Updates** – Ubicore is in control and guarantees the correct software is installed and is executing.

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*From the enterprise to the edge Makewave’s products puts you in control*