i_OBU

The Internet Onboard Unit

– An embedded platform for seamless wireless communications –

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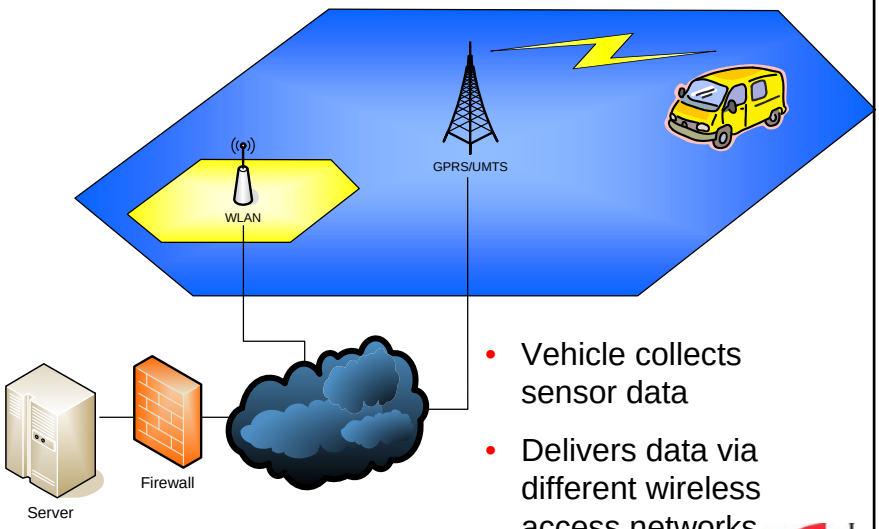
Motivation

- Universal Mobile Data Access – an important feature of electronic systems.
- Machines become connected: M2M Machine-to-Machine communications.
- Mainly access using fixed access technologies
  - DSL,
  - TV cable, or
  - fiber optics.

Wireless access technologies

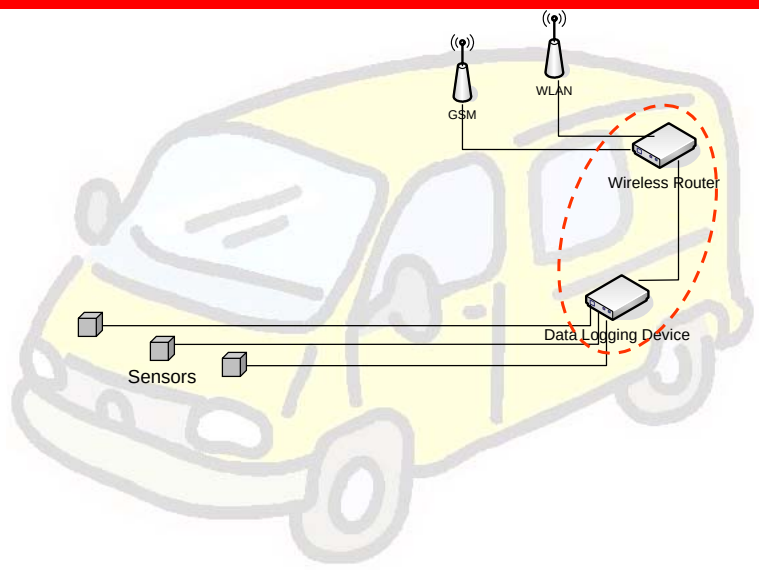
- Rapidly growing
- Advantage:
  - inherent feature of portability or
  - mobility support.
- Different wireless access technologies used:
  - short range technologies (Wireless LAN, DECT, Bluetooth),
  - fixed wireless access technologies (WiMAX, proprietary Wireless Local Loop systems) and
  - mobile radio systems (GSM, CDMAone, UMTS, HSxPA).

Application Example



- Vehicle collects sensor data
- Delivers data via different wireless access networks

Application Example



Generic Requirements

- Need for wireless access routing devices.
- World of telecommunications and IT rapidly changes.
- Integration with different mobile equipment (e.g. embedded systems).

⇨High degree of flexibility required.

Requirements: Networking

- Radio Access Networks
  - 2G/3G GPRS/UMTS/HSDPA
  - IEEE802.11a/b/g WLAN (client/AP/peer to peer)
  - IEEE802.16 WiMAX
- Routing
  - NAT
  - Roaming

Requirements: Profiles

- Fastest data connection
- Cheapest data connection
- Securest data connection
- Data connection with highest availability
- Black-/Whitelist of service providers

Requirements: Security and Management

- Security
  - VPN (IPsec, PPTP)
  - WEP, WPA/WPA2 (TKIP, AES)
  - EAP (802.1x) with Authentication (PSK, PEAP, TTLS, EAP-SIM)
- Management
  - Web based
  - SMS
  - SNMP

Other Requirements

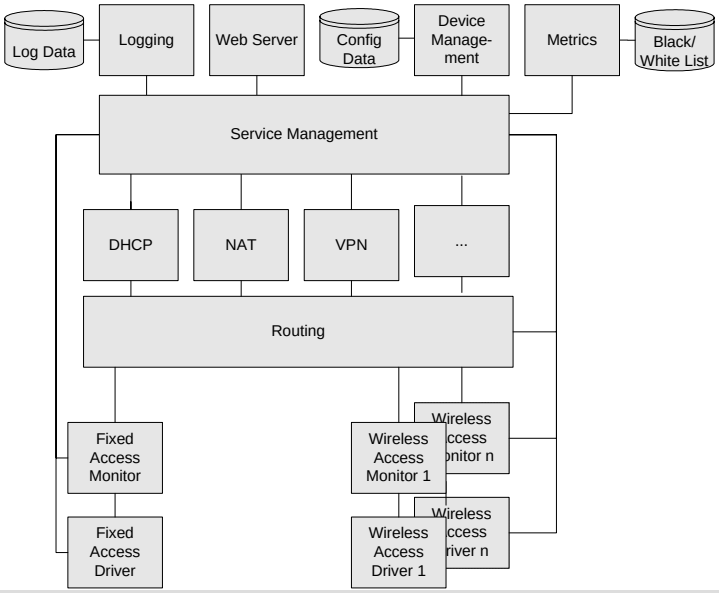
- NTP client
- Bluetooth framework
- GPS positioning
- Support of alternative positioning using radio
- Java based plug-ins

i_OBU – Internet Onboard Unit

i_OBU

- Seamless wireless connectivity
- Flexible software framework for embedded devices
- Implementation on various Linux platforms
- Reference implementation: ARM mycable XXS embedded system

i_OBU – Internet Onboard Unit



i_OBU automotive

- Application: Access to car manufacturer intranet to deliver field test data
- Access Technologies: GSM/GPRS/WLAN
- Hardware Platform: ePC by BMC Messsysteme GmbH (different ETX based CPU modules)
- Size: 220 x 116 x 44 mm
- Supply: 10-36 V DC, typ. 10W, max. 25 W
- Temperature range: -20°C..75 °C

Outlook

- Porting to different embedded platforms.
- Adoption for solutions in different markets, like
  - telecommunications and IT,
  - automation technology,
  - automotive technology, and
  - medical technology.

Conclusion

- Universal Mobile Data Access and M2M communications – important features of electronic systems.
- Requirements to flexibility of wireless access routing device, to networking, profiling, security, and manageability.
- Flexible software platforms are the key to match the requirements
- Family of different Internet Onboard Units as base for wireless access routing devices

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- Thank you for your attention!
- Further questions and feedback:

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