video display systems

Using DPWS
A case study

Railway

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This project has been developed with the kind collaboration of

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Web Services

- *Middleware* technology which has grown in popularity and deployment over the last 10 years
- Set of *standards* for machine-to-machine communications
- Focus on *interoperability* among heterogeneous systems
- Based on TCP/IP, HTTP and XML/SOAP well-known technologies

Device Profile for Web Services

- "A minimal set of implementation constraints to enable secure Web Service [capabilities] on resource-constrained [devices]"
- Evolving specification initially developed by Microsoft in 2004 and now maintained by OASIS since 2008
- Two non-compatible versions published: 1.0 (2008) and 1.1 (2009)

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Standards

DPWS 1.1 (2009) includes:

SOAP 1.2

WSDL 1.1

WS-Addressing

WS-Discovery

WS-Eventing

WS-Policy

WS-PolicyAttachment

WS-MetadataExchange

WS-Security (not mandatory)

Implementations

- Microsoft WSDAPI implementation, available from Windows Vista (some features of DPWS 1.1 are missing)
- Microsoft .NET Micro Framework DPWS implementation
- Web Services for Devices (WS4D) project: C/C++, JavaME, Java/Axis2, Java/CoAP

Case study

- A simplified client/server system for managing multimedia content serving on-board
- Message exchange and event management between client and server implemented with a DPWS-based solution
- Audio and video streams transferred between client and server using RTSP protocol (not part of DPWS)
- Implementation used: ws4d-gSOAP (C/C++)

Pros

- DPWS is actually a usable technology
- DPWS actually eases data handling and transmission with an effective and versatile abstraction
- SOAP/XML is a convenient technology for communicating with web-based applications

Cons

- SOAP/XML implies potentially large messages and more computation for parsing, possibly leading to poor performances
- Code generation and management with chosen implementation showed some pitfalls and incompleteness
- No support for custom events may lead the client to perform inefficiently when monitoring server data

Conclusions

- An effective and promising technology, but there is still some work to do to make it consistent
- Some security issues have to be addressed yet
- Chosen implementation is non-optimized for embedded systems but performed acceptably
- Most available implementations are not yet complete
- A streamlined development process is hard to achieve with current tools

Thank you very much for you attention

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