# OSGi Alliance Community Event

## Combining OSGi™ Technology and Web Services to realize the Plug-n-Play Dream in the Home Network

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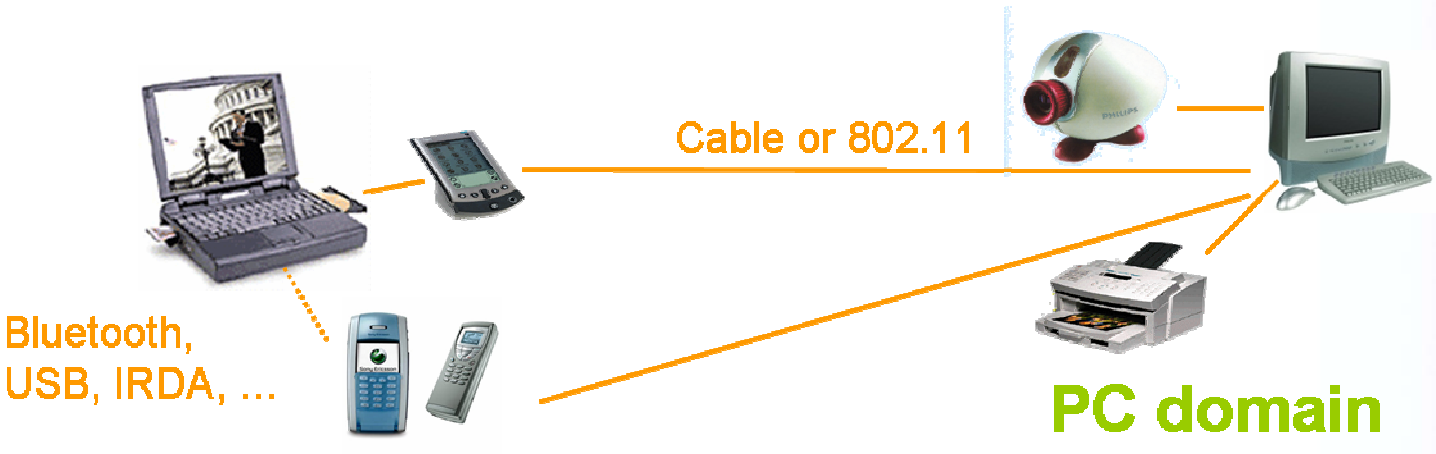
# Summary

- Application design in the home network
  - The technical challenges of the home network
  - Home Plug-n-Play technologies today
- The OSGi™ platform for plug-n-play services
  - A platform-centric vision
  - Handling distribution and heterogeneity: OSGi™ Device Access chapter
- Designing a DPWS Base Driver
  - Devices Profile for Web Services (DPWS)
  - Architecture and design patterns
  - Roadmap

# 1

# Application design in the Home Network

# The home network




# Home Plug-n-Play technologies today

- UPnP™: Multimedia and IP connectivity markets
- Apple Bonjour: Multimedia market (iPod, iTV, …)
- IGRS: Multimedia on the Chinese Market

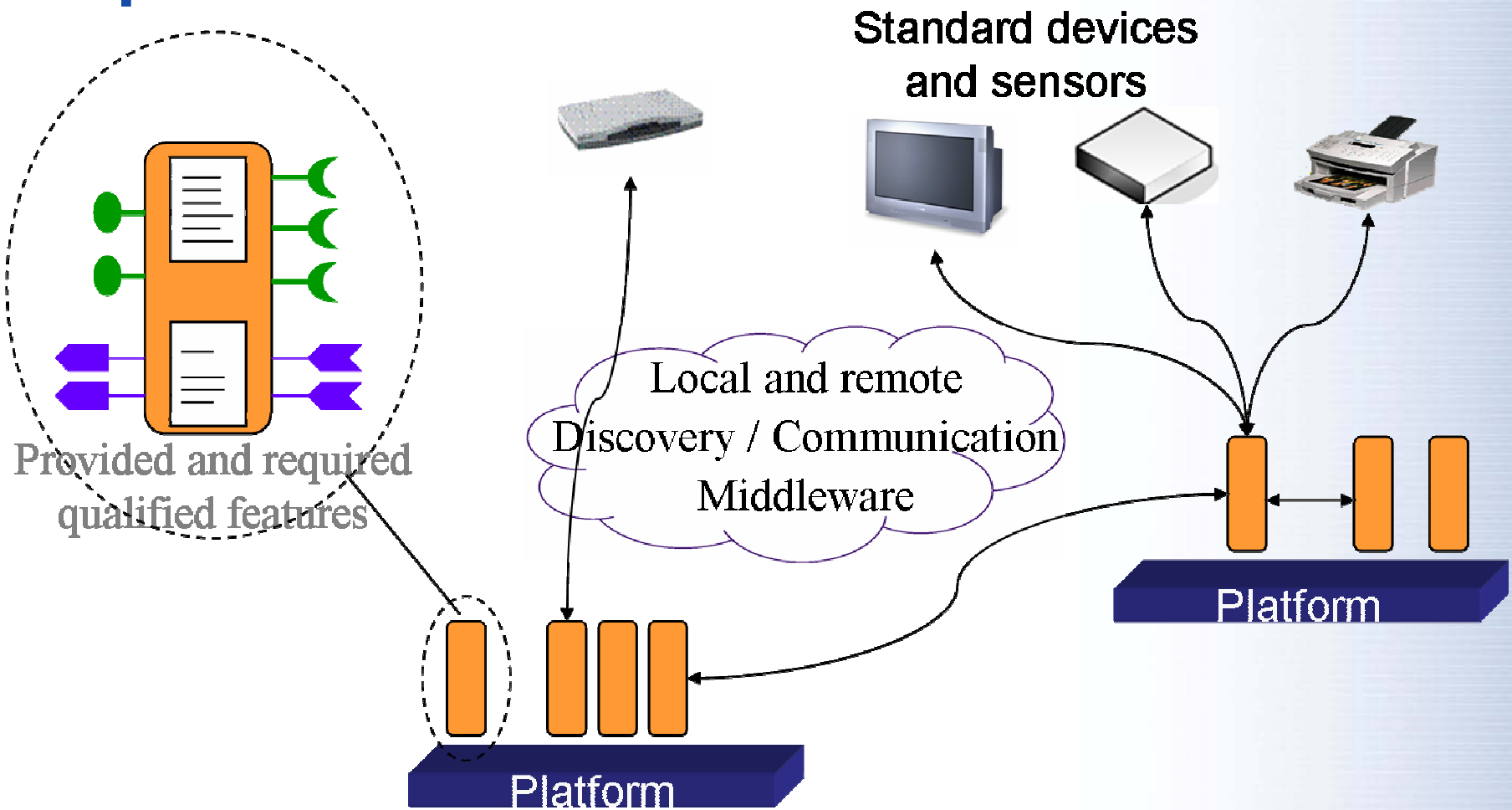
- DPWS
  - Devices Profile for Web Services, initially meant to be UPnP™ v2
  - Pushed by Microsoft with Vista OS
  - Home and industrial automation markets
    - Legrand, Schneider Electric, etc.
    - Ricoh, Lexmark, Canon, etc. participation in the specification process
    - Printer and Scanner profiles delivered by Microsoft

- Has-beens: SLP, Jini, Salutation, etc.

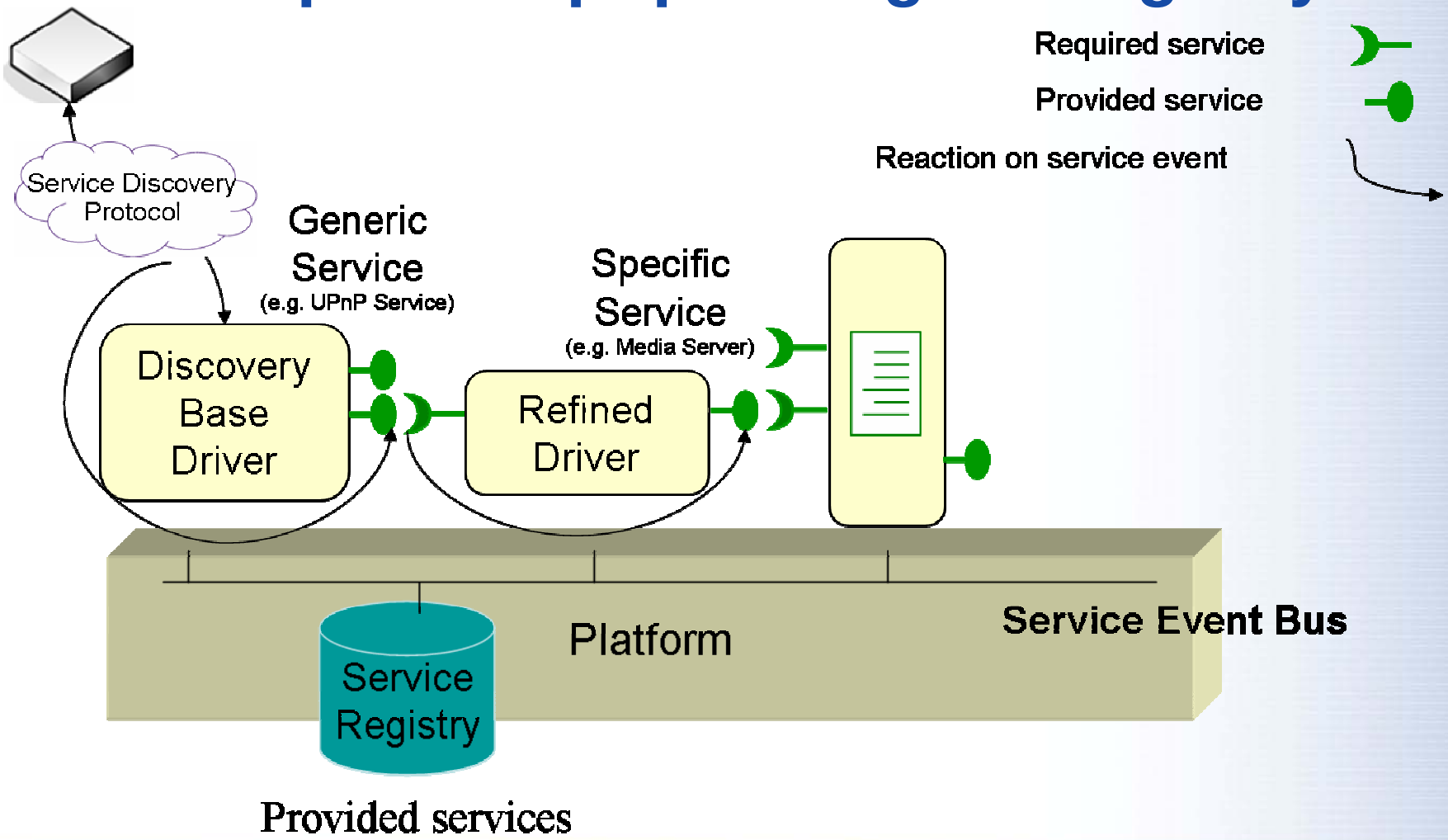
# 2

The OSGi™ platform for plug-n-play services

# A platform centric vision



# Service proxies populating the registry

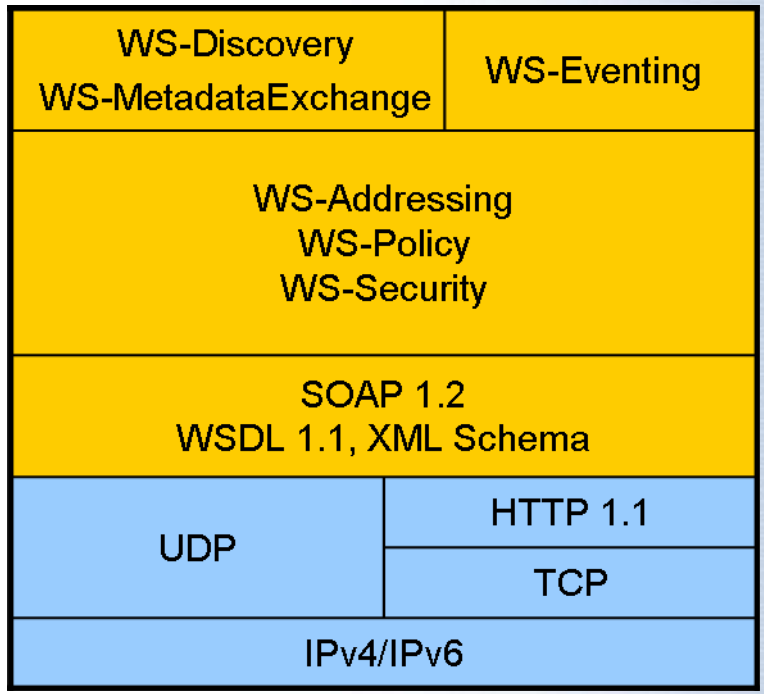


# 3

## Designing a DPWS Base Driver

# Devices Profile for Web Services (DPWS)

- Generic homogeneous specification
  - SOAP 1.2 as the base layer
  - WSDL description language
  - ws-* technologies (ws-discovery, etc.)
- Built upon UPnP™ experience
  - Lower network traffic
  - Richer types
  - Scalable discovery: Discovery Proxy
  - Fine-grained eventing mechanisms



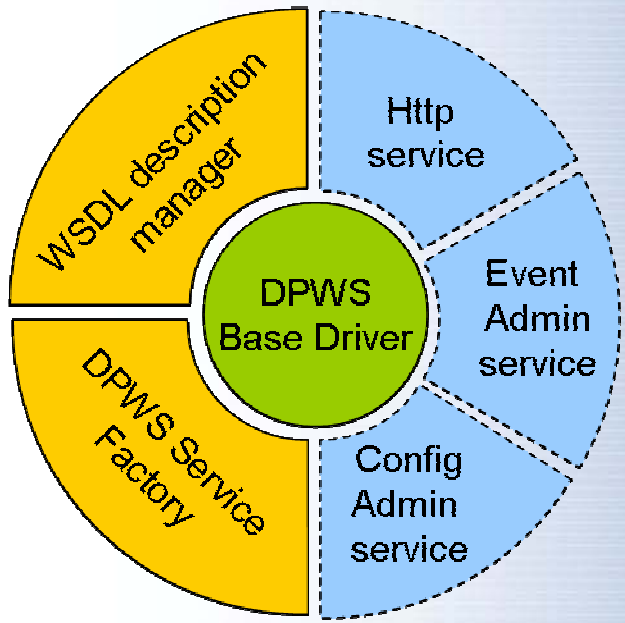

Devices Profile for Web Services (DPWS) protocol stack

# Requirements

- Main technical use cases
  - Generic network control points
    - WSDL parsing needed
    - No need for export mechanisms
  - Specific application clients
    - No need for WSDL parsing
    - Metadata retrieval optionality
  - Exportation of specific DPWS services
    - No need for WSDL online generation
- Deliver a modular API and reference implementation
  - Full implementation for smart devices
  - Limited implementation for constrained devices
  - Specification open to various Java™-Web Services mappings

# Architecture and design patterns

- Architecture
  - Build upon OSGi R4 services
  - Small core targeting highly constrained environments.
  - Optional modules for easier export and service description management.
- Technical choices
  - OSGi™ device access model
  - OSGi™ whiteboard design pattern
  - Symmetric API for import/export
  - Factory facilitating service export
  - Immediate/lazy networking possibilities
  - Immediate/lazy loading possibilities



# Roadmap

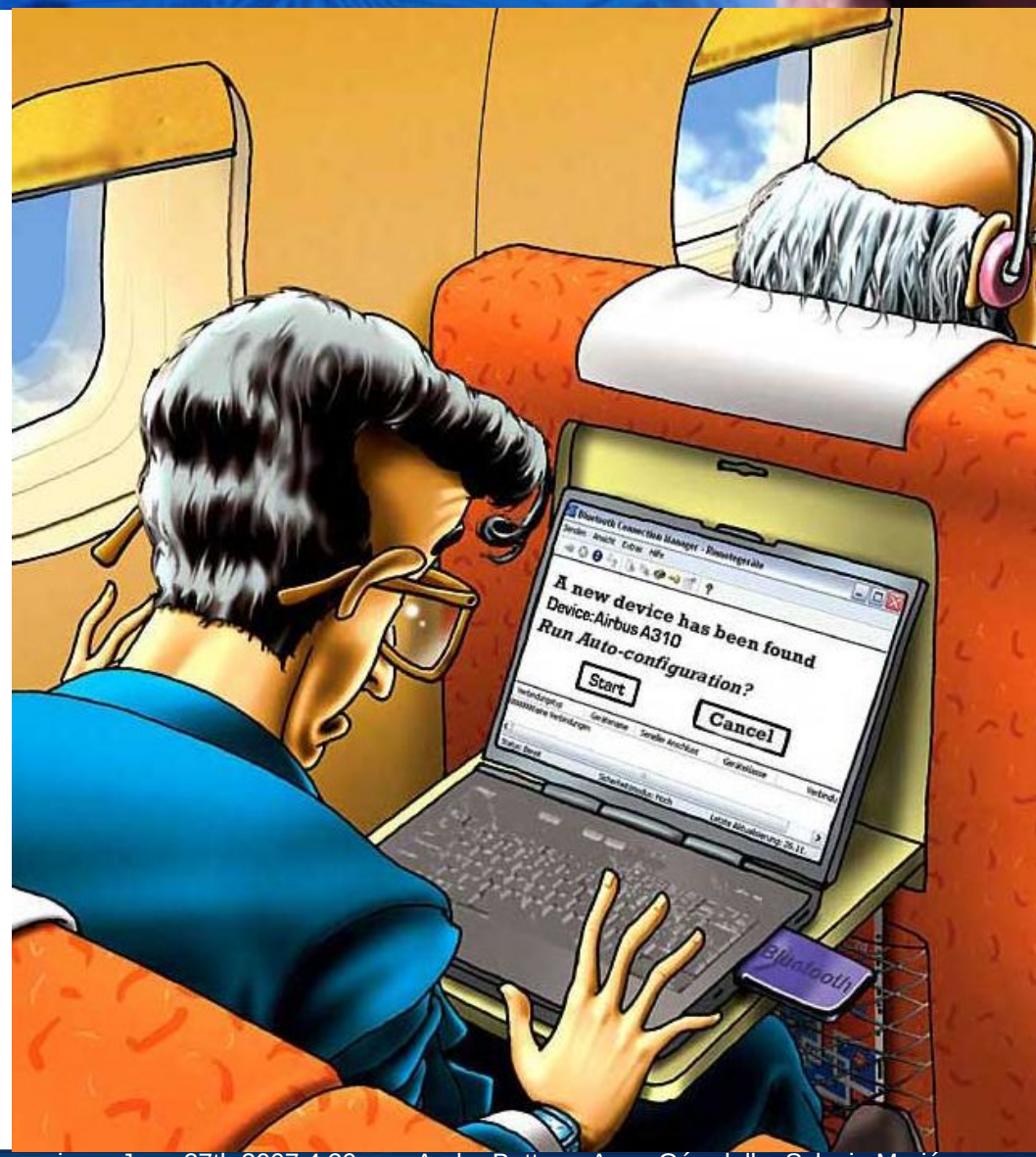
- DPWS Java™ stack delivered by Schneider Electric
  - Since January 2007 (C stack delivered in 2006)
  - Open Source Licence: LGPL
  - http://www.soda-itea.org/Downloads/SoftwareComponents/default.html
- OSGi discovery, communication and eventing bundles delivered by France Telecom
  - Since March 2006
  - Open Source Licence: LGPL
  - Link http://amigo.gforge.inria.fr/obr/v2/repository.xml
- RFP 86 DPWS Discovery Base Driver
  - Accessible in the OSGi™ Alliance repository since May 7th, 2007
- DPWS Base Driver specification under work
  - RFC-like specification to be published Q3 2007
- 2 reference implementations of the DPWS Base Driver under work
  - France Telecom's RI and Schneider Electric's RI to be published Q3 2007

# 4

## Conclusion

# Conclusion

- OSGi™technology facilitates home application development
- DPWS: another plug-n-play protocol middleware, aligned with Web Services
- Ready to fill your house with plug-n-play devices ?
  - ⇒ Beta-testers wanted
  - ⇒ Specification experts wanted



# Thanks

- ITEA ANSO project
  - Autonomic Networks for SOHO users
  - Partially supported by the French Ministry of Industry under the European ITEA program.
  - http://www.itea-office.org/public/project_leaflets/ANSO_profile_oct-05.pdf
- IST Amigo Project
  - Ambient intelligence for the networked home environment
  - Partially supported by the European Union under the IST program
  - http://www.hitech-projects.com/euprojects/amigo

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## Appendix

# Challenges of Web Services integration

- Problems faced with Web Services specifications
  - Ambiguity brought by specification novelty
  - Complexity brought by specification genericity
  - Extensibility demanded by specification extensibility

# Web Services Specifications

- **WS-Addressing**: a SOAP extension for handling message addressing and routing in a transport-independent way
- **WS-Discovery**: a Web Services-based discovery protocol in unmanaged networks
- **WS-MetadataExchange**
- **WS-Eventing**: a Web Services-based publish/subscribe protocol
- **WS-Security**: a SOAP extension for securing message exchanges

# Technical references


- André Bottaro, Anne Gérodolle, Philippe Lalanda, *Pervasive Service Composition in the Home Network*, 21st Int. IEEE Conference on Advanced Information Networking and Applications (AINA-07), Niagara Falls, Canada, May 2007

- OSGi™ Alliance, RFP 86 DPWS Discovery Base Driver, May 2007. Authors: André Bottaro, Anne Gérodolle, Sylvain Marié, Stéphane Seyvoz, Eric Simon

- OSGi™ Alliance, RFP 72 Extended Mapping for UPnP Discovery Transparency, April 2006. Author: André Bottaro.

# Links

- OSGi™ Users' Group France
  - http://france.osgiusers.org
- Apache Felix Project
  - http://incubator.apache.org/felix
- France Telecom Group
  - http://www.francetelecom.com
- Schneider Electric
  - www.schneider-electric.com