OSGi in the France Telecom PLUGS platform

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Context

• Last year, France Telecom R&D introduced at OSGi World Congress the Cocooning project, highlighting the relevance of the OSGi paradigm for multimedia content services

• BUT, most of the home gateways deployed world-wide are still communication gateways

• One of the key points to the deployment of service gateways appears to be the management issue
Context

• The PLUGS platform is intended at evaluating and confronting the management issue

• Results presented here cover both
  – The management field
  – Architecture recommendation / toolbox for service development
The all-in-one management requirement
Gateway modelisation

- Network conf: ATM QoS, connexion parameters, …
- Firmware: operating system and basical utilitary software layers
- Middleware: utility software layer add-ons (OSGi framework, JVM, …)
- Services: application software (OSGi services)
Several management levels (I)

- For large scale or operational deployments, the park of gateways may be heterogeneous in terms of:
  - hardware (several manufacturers)
  - firmware / middleware for a given hardware
  - network options subscribed by the customer

- OSGi paradigm copes almost naturally with the two first issues enabling services to be developed as generic as possible
Several management levels (II)

- However, value-added services need to rely on lower-level layers:
  - Middleware: what are the capabilities of the running OSGi framework?
  - Firmware: what are the capabilities of the gateway? How to communicate with built-in services?
  - Network: what are the QoS parameters of the gateway?
Several management levels

- The PLUGS platform is an integrated management platform:
  - From the firmware level
  - Up to the service level
Managing firmwares / middlewares
Managing firmwares / middlewares (I)

• Firmware and middleware management are out of the scope of the OSGi specifications

• Several existing norms cope with this problematic
  – OMA DM
  – SNMP
  – TR-069 from DSL Forum
Managing firmwares / middlewares (II)

• The firmware update module of PLUGS
  – a dedicated protocol based on TR-069 dataflows (TR-069 enabled in midterm)
  – the firmware version may be update according to the gateway capacities or to the customer subscriptions
  – Maintains an inventory of the gateways and of the operations performed on them
  – will be deployed for France Telecom 's LiveBox by the end of year
Managing services
Building the catalogue of services

• One of the goals of the platform is to build the most accurate service offer for a customer

• The accuracy of a service depends on
  – the capacities of the gateway and the network
  – the devices connected to the local network

• With the knowledge of the gateway and its connected devices PLUGS is able to build a personnalized catalogue of service for each user
Customised services (I)

An end-user service is composed of:
- A main bundle
- Mandatory bundles
- Optional bundles

Main bundle is used to start/stop service.
Optional bundles are enhancements dedicated to specific devices.
Customised services (II)

- Each bundle may be specialised according to gateway constraints such as:
  - Hardware (processor, ram, …)
  - Operating System
  - JVM
  - Framework

- Of course most of the bundles are linked to a single jar file

- Native code may be used for low-level bundles such as communication management (USB, bluetooth, …)
And more…

• At service level, new management problematic appear
  – A service is used by a user, and has to be customised for that particular user
  – A service may be billable, and access should be checked regarding bought access rights

• The PLUGS platform is also in charge of these topics, tightly linked with IT services
  – User management, single sign-on
  – Access right checking
The Toolbox
Building multi-device services

- Several devices in the home may be used to access services
  - The functionalities of the service may depend on the device used to access it

- Services may be accessed remotely by nomadic users

- PLUGS proposes an architecture to easily implement multi-device services based on the model-view-controller paradigm

- This architecture may be extended to the remote access
Building multi-device services

- The 'model' and 'controller' of the service are grouped in a core service bundle
- A 'view' bundle is defined for each targeted device
- The optional bundles mechanism is used to install the right combination of bundles on the gateway
Building multi-device services

• When service is launched it automatically registers to the right portal(s)
  – Each service 'view' implements a device-specific interface
  – Each portal implements a specific service tracker on the corresponding device-specific interface
Dynamic multi-device portals (I)

- A STB is connected to the home network
- Familibrary service has been subscribed

Installed bundles:
- STB portal
- Familibrary core
- Familibrary STB

STB Portal
Access Familibrary STB
Dynamic multi-device portals (II)

- A device is detected by the gateway: a PDA
- Information is propagated to PLUGS

Installed bundles:
- STB portal
- Familibrary core
- Familibrary STB

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Dynamic multi-device portals (III)

- PDA portal is installed

Installed bundles:
- STB portal
- PDA portal
- Familibrary core
- Familibrary STB

STB Portal

Access Familibrary STB

PDA Portal

(no service)
Dynamic multi-device portals (IV)

- All subscribed services with PDA interfaces are updated

Install Familibrary PDA

Installed bundles:
- STB portal
- PDA portal
- Familibrary core
- Familibrary STB
- Familibrary PDA

STB Portal
Access Familibrary STB

PDA Portal
Access Familibrary PDA
Thank You!