NTT’s OSGi Device/Gateway Management

- OSAP: OSGi Service Aggregation Platform -

NTT Laboratories

2007/3/1
Generation Change from DSL to Optical in Japan (NTT)

#FTTH > #ADSL
NTT’s Network Service Strategies

- **Triple Play**: Internet (Web, mail) - 10 Million users
- **IP Telephony**: Voice => Video/Voice - 10 Million users
- **Entertainment**: (Video・Music Distribution) - Forming Community/Personalization - Diversification of Appliance - 10 Million users
- **Mass media**: - Forming Community/Personalization - Diversification of Appliance - 85 Million users
- **Mobile Convergence**: Now

**4th service “Life Support Service”**
Security, Prevention of disaster, nursing care, health care, home control

**New Social Infrastructure**
- Security
- Prevention of Disaster
- Nursing care
- Health Care
- Medical care
- Government
- Commerce
- Energy Saving
- Teleworking
- Ecology

▼2010
Next Generation “ICT Home” based on OSGi Standard

- Service Providers aggregation by OSAP.
- Multiple Service Providers (SPs) provide their services with sharing clients service gateway and Management System.
- Customers can subscribe Applications from multiple SPs.

- We have already applied this system to our customers and our services.
Interface Model

End User

Remote Management Agent

IF3

Management System

IF2

SP Server

IF1

SP Server

IF4

SP Server

IF5

SGW

IF6

SGW

IF7

SGW

SP: Service Provider
Roles

System
• **SP Server**
  – Server system provided by Service Provider.
  – Execute server side functions for typical “server-client” style applications.

• **Management System**
  – Deliver Applications (bundles) to End User.
  – Remote management of SGWs and delivered bundles.

• **SGW**
  – Service Gateway consist of HW, OS, OSGi FW and Remote Management Agent.
  – Execute applications (bundles)

Company/Human
• **End User**
  – User of Home Service.

• **Service Provider (SP)**
  – Provides Applications (realized as bundles) to End User via Management System.
  – Provides bundles and Server for enabling Applications.

• **Management Operator**
  – Operates Management System

• **SGW Supplier (Management Operator may act this role too.)**
Interface Model

End User

Remote Management Agent

SP: Service Provider

SP Server

SGW

IF1

IF2

IF3

IF4

IF5

IF6

IF7
IF1 (Service Provider - Mgt. System )

• Service Provider -> Mgt. System
  – Register Bundles onto Management System.
  – Update/ Delete Bundles on Management System.
  – Associate end user with an Application.
  – Monitoring SGW (health check)
  – Get Statistics of SGW

• Service Provider <-> Mgt. System
  – Mutual Authentication
  – Message/Event Delivery
IF2 (Mgt. System – SGW)

- **Bundle Level Functions**
  - Message/Event delivery
  - Bundle Download
  - Bundle life cycle control
  - Bundle Configuration
    - Configuration Admin
    - Permission Admin

- **SGW Level Functions**
  - SGW Authentication
  - Log gathering
  - Monitoring SGWs (Health Check)
IF3 (End User – Mgt. system)
IF4 (End User – SP Server)

• Both IF3/ IF4
  – Subscribe/unsubscribe Applications
  – Browse list of Applications
  – Confirm update of Applications
    • Update requires Application halt.

• IF4
  – Application Specific Interface
  – We have developed this IF by each customers requirements.
Basic Concept of SP Separation

- With “Separation”, a bundle can not access other SP’s resource (bundles, devices, and server).

- Security issue for “separation” should be considered on Management System, and some Interfaces (IF1, IF2, IF5).
• Remote Management Agent (RMA) is a privileged bundle, which implements IF2 and IF5.

• RMA allows SP bundles to execute privileged operations through IF5.

• i.e. Bundles in Separated Region is running with limited permissions to keep “separation”.

• Example functions on IF5
  - A SP bundle can control bundles provided by the same SP.
  - A SP bundle sends message/ events to the SP server.
IF6/ IF7

• IF6 (End User - Remote Managed Agent)
  – We haven’t use this IF for security reasons.

• IF7 (End User – Application Bundle)
  – Application Specific
Our requirements to the e2e specifications

- Adaptability to non-DSL devices.
- Sharing Model of Management system and service gateway.
- Security consideration for “Separation” is required.