HGI OPEN PLATFORM 2.1:
OVERVIEW AND SERVICES

WWW.HOMEGATEWAY.ORG

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SERVICES: BASIC ARCHITECTURE

- CLOUD
- APPS PLATFORM
- WAN
- Home Gateway
- LAN
- APPLIANCES

Cloud APIs for services
Northbound APIs for services
Access network/internet

Home & Service Gateways - Platform capabilities & APIs for services

Selection and capabilities of wireless home networks

User portals for smart home services

Smart devices and sensors

HGI WORKS HERE FOR INTEROPERABILITY
SOFTWARE MODULARITY IS KEY

Services updated frequently

Firmware runs continuously

hg core functions

sw execution env. incl. abstraction layer

3rd party services

broadband service provider

over the top (ott)

access

services

home network

devices

home gateway

lan

wan

apps platform

cloud

appliances
HGI REQUIREMENTS FOR OPEN PLATFORM 2.1

• modular software applications must run in a dedicated virtual execution environment
  – to avoid conflicts and interferences with the natively installed software.
  – allowing the installing, updating, uninstalling, starting and stopping of additional software modules
    .....while the underlying firmware image remains untouched.
HGI REQUIREMENTS FOR GENERIC ARCHITECTURE

HGI defined SWEX independent of operating system
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HGI defined SWEX independent of operating system
<table>
<thead>
<tr>
<th>N°</th>
<th>Requirement</th>
</tr>
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<tbody>
<tr>
<td>OP2.0-1</td>
<td>The HG MUST have an <strong>internal system clock</strong> to provide the date and time of day. Note: Valid date and time are crucial for the validation of certificates.</td>
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<tr>
<td>OP2.0-2</td>
<td>The HG MUST support synchronisation of its internal system clock with an external time server via its broadband connection. The <strong>synchronization</strong> interval MUST be configurable so that the time deviation is less than 10 seconds.</td>
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<td>OP2.0-3</td>
<td>A user interface to set time and date locally MUST only be made available to the end user when network based time sync is lost.</td>
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<td>OP2.0-4</td>
<td>The HG_Core SHOULD support the installation of <strong>additional USB drivers as kernel modules</strong>.</td>
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<tr>
<td>OP2.0-4a</td>
<td>The HG_SP SHOULD support the installation of additional USB drivers</td>
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<tr>
<td>OP2.0-5</td>
<td>The HG_Core MUST provide a way to place a <strong>strict upper limit on the CPU load</strong> used by the HG_EE. This limit applies only when the HG_Core needs the resources.</td>
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<tr>
<td>OP2.0-6</td>
<td>The HG_Core MUST provide a way to <strong>strictly limit the runtime memory used</strong> by the HG_EE.</td>
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OSGI REQUIREMENTS TOOK ACCOUNT OF HGI GUIDELINES

• OSGi Residential Release 6 (latest release)
  https://www.osgi.org/developer/downloads/release-6/

  "It is highly recommended to choose the mandatory and optional services defined by the "HGI Requirements for HGI Open Platform 2.0" as a basis. A solution can further include other core and compendium services ..."
HGI DEFINED A SWEX OSGI INSTITUTION

HG_EE The underlying JRE, the OSGi Service Platform, and all installed bundles

HG_SP is OSGi Service Platform core components as specified in Release 5 [15] or Release 6 [16], and the JRE
SOFTWARE EXECUTION ENVIRONMENT (SWEX)

- Modularization
- Resource sharing
- Security
- Reusability
- Flexibility
- Logging
- Life cycle management
- Configuration Management

HGI results:
- Generic requirements for SWEX
- Specific requirements for OSGi
- Hardware and Software requirements for HG’s
- Test Event requirements for HG’s

Tested, Tried and True!
SWEX HISTORY: 2009 → 2016

1) HGI-RD008 static
   – "HG Requirements for a Software Execution Environment", known as “SWEX”

2) HGI-RD48v1 static
   – specified the requirements for Open Platform 2.0.
   – added basic requirements to support USB based hardware extendibility for Smart Home services, details for usage for OSGi technology and system clock management.

3) HGI_RD048v2, is update for OS2.1
   – ANNEX A: JAVA COMPATIBILITY GUIDELINES
   – ANNEX B: RESOURCE CONTROL GUIDELINES FOR JAVA

... AND OPERATOR EXPERIENCES →
ORANGE "OPEN THE BOX" SINCE 2011

- Create a dynamic market of applications with Home players:
  - Application designers (bundles & services)
  - Platform administrators & application stores
  - Techno providers (SW part of the platform)
  - Hardware providers (HW part of the platform)

- Standardize the infrastructure: OSGi, HGI, BBF, UPnP … and ZigBee

- Keep in touch for the using of Orange APIs! [http://openthebox.org](http://openthebox.org)
• NTT carefully considered customer services and enabled a flexible/modular system, taking account of HGI and OSGi requirements.

- Key components:
  - Home gateway (HGW) installed with OSGi framework.
  - Center server that manages / delivers software modules (bundles).
  - Various kinds of services by 3rd parties can be provided flexibly on this platform.
    The collaboration with 3rd parties is one of the essential keys to expand Home ICT services.
• QIVICON took account of HGI SWEX requirements and referenced latest OSGi specifications
• The B2B solution allows partners to bring their own smart home products to market based on the QIVICON platform
• QIVICON Alliance: a growing number of partners
TELIASONERA

• Use OSGi in their RGWs, taking account of HGI SWEX specifications

Future-proof full service platform supporting: OSGi execution environment, with extensive remote management
Telekom Austria have had extensive experience based on OSGi and on guidelines from HGI for gateways. Whole new areas of applications are being researched.
TELECOM ITALIA

- TI is leveraging on OP 2.0 to build up its smart home service, as reported in DECT World 2014 and 2015 (see http://www.dect.org/downloads.aspx)

  - Telecom Italia is mainly making use of the following standards for:
    - Prototyping new implementations, solutions and services based on OSGi.
    - Defining internal and external (to vendors) requirements and specifications for tenders
  - Broadband Forum (http://www.broadband-forum.org/)
  - HGI (http://www.homegateway.org)
  - UPnP Forum (http://www.upnp.org/)
  - OSGi Alliance (http://www.osgi.org/)
1) Modular software (services + firmware) became the de-facto industry norm

2) HGI SWEX and Open Platform 2.0 guidelines became the baseline for setting RFI and RFQ requirements in the HGW industry

3) HGI practical experience of SWEX and OP 2.1 continuously "raised the bar" for expected Service Platform performance