Smart Home White Paper

January 2014

Status: Published
Version: 1.0.1
Date: 27th January 2014
Author: Smart TV Alliance Inc.
Category: White Paper

1. Introduction

This white paper is intended to provide an overview of the Smart TV Alliance Smart Home specification working draft hereafter, "Smart Home specification" which is being discussed within Smart TV Alliance. Smart Home specification is being designed not only for TV manufactures but also application developers for fast and broad acceptance of the Smart Home appliances which supports the Smart Home specification.

Our target of the Smart Home specification is not limited to a specific geographic region, but is global unlike many existing Smart Home consortia.

1.1.   Scope of Smart Home specification

Smart Home specification is being created by focusing on the role which TV can take in Smart Home environment where various home appliances from different companies are connected together. We assume that TVs will be one of the most important devices in the Smart Home environment as well as smart phones and tablets.

In order to realize Smart Home environments including TVs, a common interface and a protocol definition which abstracts a generic home appliance concept and provides methods to control, monitor and notification, are defined to communicate between an application on the TV and other devices as follows.

  ① Application on the TV and Home Appliance using home network connection
  ② Application on the TV and Home Gateway using home network connection
  ③ Application on the TV and External Server in the cloud using internet connection

Smart TV Alliance Smart Home Architectural Overview

- 2 -
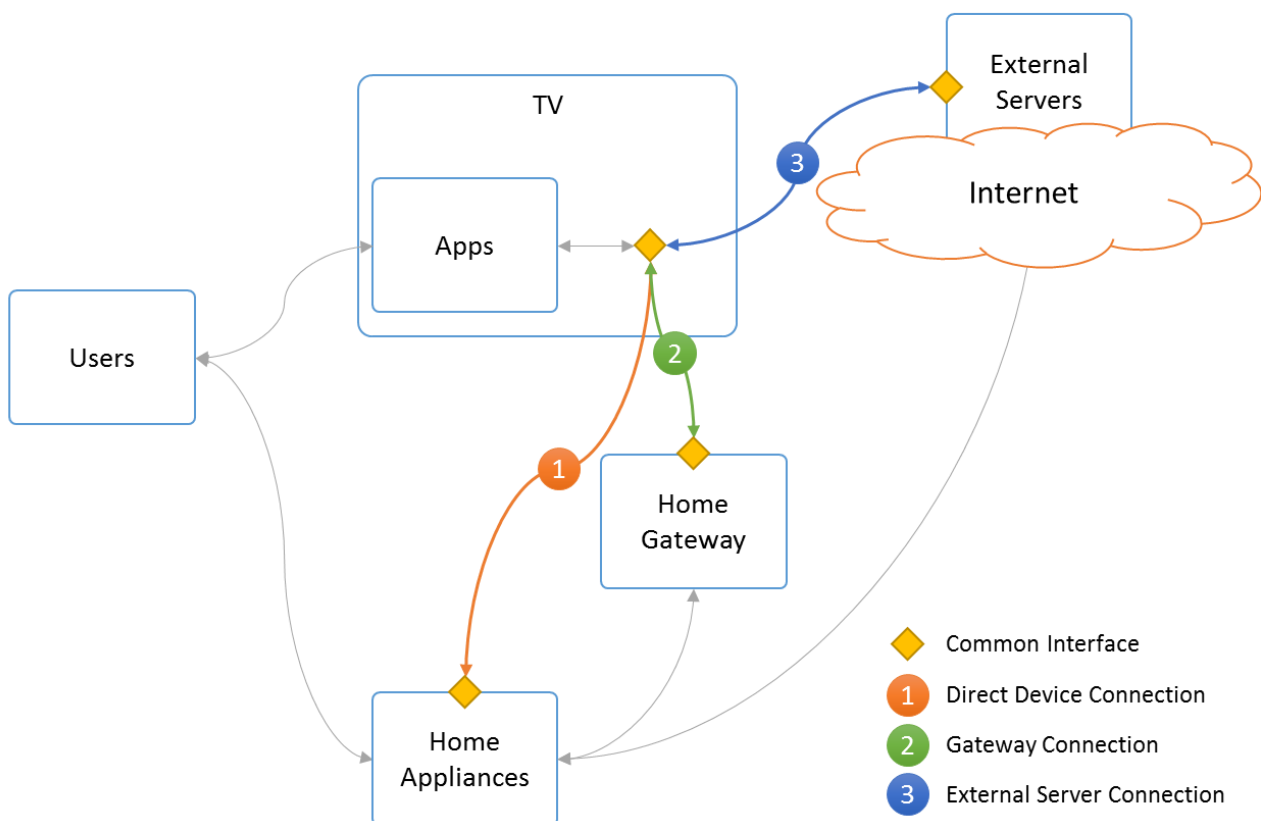
1.2.   Definitions

AJAX	Asynchronous JavaScript and XML
API	Application Programming Interface
HTML	Hypertext Markup Language
JSON	JavaScript Object Notation

1.3.   References

[1] HTML5 Candidate Recommendation 17 December 2012
http://www.w3.org/TR/2012/CR-html5-20121217/

[2] ECMAscript Language Specification (5.1 Edition), June 2011,
http://www.ecma-international.org/ecma-262/5.1/

[3] Smart TV Alliance Specification 3.0
https://sdk.smarttv-alliance.org/download.php?file=SmartTVAlliancev3.0specification.pdf

[4] HTML5 WebSockets – Candidate Recommendation September 2012
http://www.w3.org/TR/2012/CR-websockets-20120920/

[5] ECMA-404 The JSON Data Interchange Standard
http://www.ecma-international.org/publications/files/ECMA-ST/ECMA-404.pdf

[6] *Bindings for OBIX: Web Socket Bindings Version 1.0*.
http://docs.oasis-open.org/obix/obix-websocket/v1.0/obix-websocket-v1.0.html

[7] The application/json Media Type for JavaScript Object Notation (JSON), July 2006
http://tools.ietf.org/html/rfc4627

2. Use cases

2.1. Introduction

For the purposes of providing a user with a comfortable Smart Home environment, four basic functions; discovery, monitoring, control, and notification; are provided for various kinds of Smart Home appliances. Application developers can develop an application which integrates all Smart Home appliances in the home by using these basic functions and provide a user with a more comfortable application. This white paper provides an outline of these basic use cases.

Discovery	Monitoring	Control	Notification

2.1.1. Discovery

It is expected that more and more Smart Home appliances will be introduced to the home in near future. In order to reduce a user's burden with the introduction of a new Smart Home appliance, an easy method of discovering a new Smart Home appliance is necessary.

The Smart Home specification will provide a discovery function by which an application on the TV can detect Smart Home appliances within the local network.

2.1.2. Monitoring

Monitoring is the function that an application on the TV can use to monitor information from Smart Home appliances and show the information to the user.

For example, a user of the application can monitor
- the temperature setting of an air conditioner,
- progress of a washer machine, such as spin, wash, dry, rinse,
- on/off status of light

2.1.3. Control

Control is the function that an application on the TV can use to control appliances.

For example, a user of the application can
- turn on and off a robot cleaner
- turn on and off lights
- change timer setting of washer

2.1.4. Notification

On a television a user may want to be notified about important or urgent events from the appliances in the home.

For example, a user of the application can get notified from
- a refrigerator when temperature of its compartment is abnormal
- a washer when washing program is done
- a robot cleaner when the cleaning is finished

3. Technologies

3.1.   Overview

Smart Home specification will be based on open web standards such as HTML5 [1], JavaScript [2] and Smart TV Alliance Specification [3] in order to realize the Smart TV Alliance's motto of "Build Once, Run Everywhere". Examples of technologies / standards that are being discussed within Smart TV Alliance are WebSocket [4], JSON [5], and OBIX [6] to realize the use cases described in Section 2.

1. **WebSocket** can be used to establish a bi-directional communication path between an application and each connected home appliance / home gateway.
2. **JSON** can be used for message description which is coming from and going to between an application and each connected home appliance.
   - JSON encoded OBIX style description is also an additional candidate for the message format.

3.2.   API and tools

For the purposes of providing application developers with easy an implementation way of Smart Home functions, an API and tools supporting the Smart Home specification will be provided. By using the API and tools, application developers can easily integrate with applications and functionality in the existing Smart TV Alliance ecosystem.

4. Supported devices

The following Smart Home appliances are supported in the current working draft.

Smart Home appliance	Overview of supported functions
Air conditioner	- On and Off - Operation Mode: - Automatic, Cooling, Heating, Drying, Ventilating - Room temperature, Outside temperature - Target temperature - Fan speed, fan direction - Power On/Off timer
Light	- On and Off - Dimming - Color - Power On/Off timer
Refrigerator	- Target temperature of compartment - Ice maker: - Enabled/Not enabled - Status: Water in tank or No water in tank - Door status: Open/Close
Washer	- Stage: Washing, Rinsing, Spinning, Completed - Wash program - Spin speed - Rinsing mode - Remaining time
Dryer	- Power state - Dry program - Stage - Remaining time - Operation state
Washer & Dryer	(Combination of Washer and Dryer)
Robot Cleaner	Operation mode: Clean, Homing, Stop

	• Battery state • Error