**Software Detail Design for AWS Lambda Function**

*Figure 1. Overview of AWS Lambda Function*

1. **Handle Intent Request Block**

**Intent Request** from Alexa Custom Skill includes *intent name* and *intent slots.*  
DeviceName and Action Information is included in *intent slots*

*Figure 2. Detail Design of Parse Intents Block*

In this block, each input intent will be processed and output two elements: deviceId and actionId. This information sent to block Compare deviceId and actionId to confirm accuracy of information and sent to **Generate HTTPS Request Block**.

1. **Generate deviceId**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Generate deviceId | | | | |
| **Description** | Parse Intent Request to take value of slot device and convert this to **index** (*integer*) | | | | |
| **Function**  **prototype** | int generateDeviceId(intent); | | | | |
| **Argument** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| 1 | Intent request | intent | IN | JSON format contains deviceId |
| 2 | int | deviceId | OUT | int |
| **Global variable** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| - | - | - | - | - |
| **Return value** | **Value** | | **Explanation** | | |
| deviceId = 0 | | Kitchen light | | |
| deviceId = 1 | | Living room light | | |
| deviceId = 2 | | TV | | |
| deviceId = -1 | | Undefined Device | | |
| **Processing**  **explanation** |  | | | | |
| **Remarks** | (none) | | | | |

1. **Generate actionId**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Generate actionId | | | | |
| **Description** | Parse Intent Request to take value of slot Action and convert this to **state** (*integer*) | | | | |
| **Function**  **prototype** | int generateActionId(intent); | | | | |
| **Argument** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| 1 | Intent request | intent | IN | JSON format contains actionId |
| 2 | int | actionId | OUT | int |
| **Global variable** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| - | - | - | - | - |
| **Return value** | **Value** | | **Explanation** | | |
| actionId = 0 | | Turn on | | |
| actionId = 1 | | Turn off | | |
| actionId = 2 | | Volume up | | |
| actionId = 3 | | Volume down | | |
| actionId = 4 | | Channel up | | |
| actionId = 5 | | Channel down | | |
| actionId = -1 | | Undefined Action | | |
| **Processing**  **explanation** |  | | | | |
| **Remarks** | (none) | | | | |

1. **Compare**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Compare | | | | |
| **Description** | Compare actionId and deviceId to confirm accuracy of information or send error response to Handle Response | | | | |
| **Function**  **prototype** | int compare(deviceId,actionId); | | | | |
| **Argument** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| 1 | int | deviceId | IN | Id of device |
| 2 | int | actionId | IN | Id of action |
| 3 | int | error | OUT | Result to Handle Response |
| **Global variable** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| - | - | - | - | - |
| **Return value** | **Value** | | **Explanation** | | |
| error = 0 | | Valid, deviceId & actionId is sent | | |
| error = 1 | | Invalid deviceId, error is sent | | |
| error = 2 | | Invalid actionId, error is sent | | |
| error = 3 | | actionId not match with deviceId | | |
| **Processing**  **explanation** |  | | | | |
| **Remarks** | (none) | | | | |

1. **Generate HTTPS Request Block**

This block generates HTTPS Request which contains fields:

* Predefined HTTPS Post message’s **HEADER** (include **Particle’s server, path**; Particle Authentication (**deviceID**, **token**))
* Function name (in order to call Particle Device function)
* Argument of function (**deviceId** and **actionId**) passed in the request body
* Access token to access Particle Cloud passed in the request body

Structure:

Header of HTTPS Request contained

* Hostname: api.particle.io
* Port: 443 (HTTPS)
* Method: “POST”
* Path: api.particle.io/v1/devices/<deviceId>/<functionName>
  + <deviceIdParticle> = "7ab75ab97f24773b16a16978" **// Pi’s Particle Device ID**
  + <functionName> = “controlHome” **// Function defined in Firmware**

Body of HTTPS Request contained

* Structure: body = "access\_token=" + *accessToken* + "&" + "args=" + *arg*;
* Access Token: access token of Particle Cloud API
* Arg: Function argument (string) contains *deviceId* and *actionId* with structure :
* arg = “deviceId=actionId”

1. **Handle Response**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Handle Response | | | | |
| **Description** | Get variable error from Handle Intent Requests and variable response from Particle Device Cloud to check and generate speech response | | | | |
| **Function**  **prototype** | string handleResponse(error); | | | | |
| **Argument** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| 1 | int | error | IN | Id of device |
| 2 | string | textResponse | OUT | Text response to Alexa Custom Skill |
| **Global variable** | **No** | **Type** | **Definition** | **IN/OUT** | **Explanation** |
| - | - | - | - | - |
| **Return value** | **Value** | | **Explanation** | | |
| textResponse | | Control Home Ok | | |
| Device not available | | |
| Action not available | | |
| Action not match with device | | |
| Error occurred. Check your connection | | |
| **Processing**  **explanation** |  | | | | |
| **Remarks** | Check Timeout by setTimeout function in javascript | | | | |