Mckesson Final Project Deep Azure

Project – Alexa Integrated with Azure

Description – The project is about creating a Alexa Skill to get the ingredients for a recipe. This was achieved by creating the required Skill in Amazon ecosystem and then having the Alexa App connect to Azure services. The Azure Ecosystem is used to host the business logic as well as the data store. The Business Logic was to be able to parse the Intent and get the results and then send them back to Alexa for speech generation. The Skill that I developed was to get the ingredients for a set of recipes.

Hardware/OS – Window 7/Windows 10, Visual Studio 2017.

Technology – Alexa, JSON, Azure, C#(for creating the logic for parsing the intent and then responding back with result to Alexa)

Overview

1) Create the Backend API in Visual Studio with C# for the Intent parsing and response.
2) Publish the project in Azure AD
3) Create the Skill in Alexa on amazon website at http://Developer.amazon.com
4) Map the correct intent and slots to code in the Backend API.
5) Test the App in Alexa test Simulator and check the results.

Challenges – One of the challenges that I ran into is getting the Alexa request to seamless integrate to the Azure with authentication.

Benefits – Using Native Alexa configuration allows to create the Skills on the fly with rich feature set. We can then use Azure given than Mckesson has a subscription and store all the necessary back end data in azure as well as be able to use Single sign on functionality. This model in turn can be used to connect to any of the backend systems to fetch the data based on keywords. The database or data store can be residing in any repository other than Amazon echo system which can help integrate some legacy systems.

Summary – I was successfully able to integrate the New skill on Alexa to the backend in Azure. This can be enhanced to do full authorization and then securely fetch the data from a in house database. My goal to continue this further and create a rich feature set and give new Skill or APP in Alexa suited to the Pharmacy environment while leveraging the data that is housed securely in Mckesson /Azure within permissible constraints.

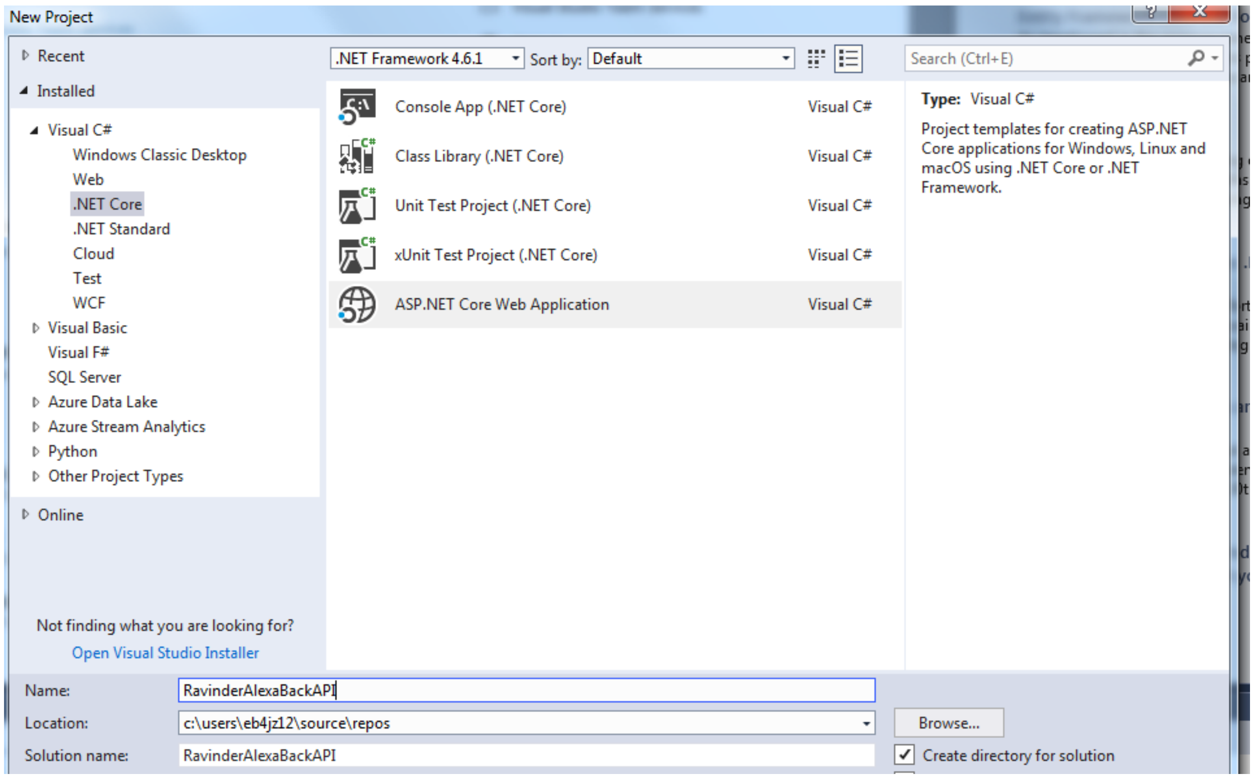
YouTube URL – 2 Minute Video - https://youtu.be/lMYRDxDW0BQ

15 Minute Video Presentation - https://youtu.be/2RMp3OBdQ4w

GitHub URL – https://github.com/avravinder/AlexaWithAzure

Project Description – I had to create a skill in Alexa and be able to configure it talk to azure where the code to parse the intent lies and then return the proper response which can be read by Alexa as a speech.

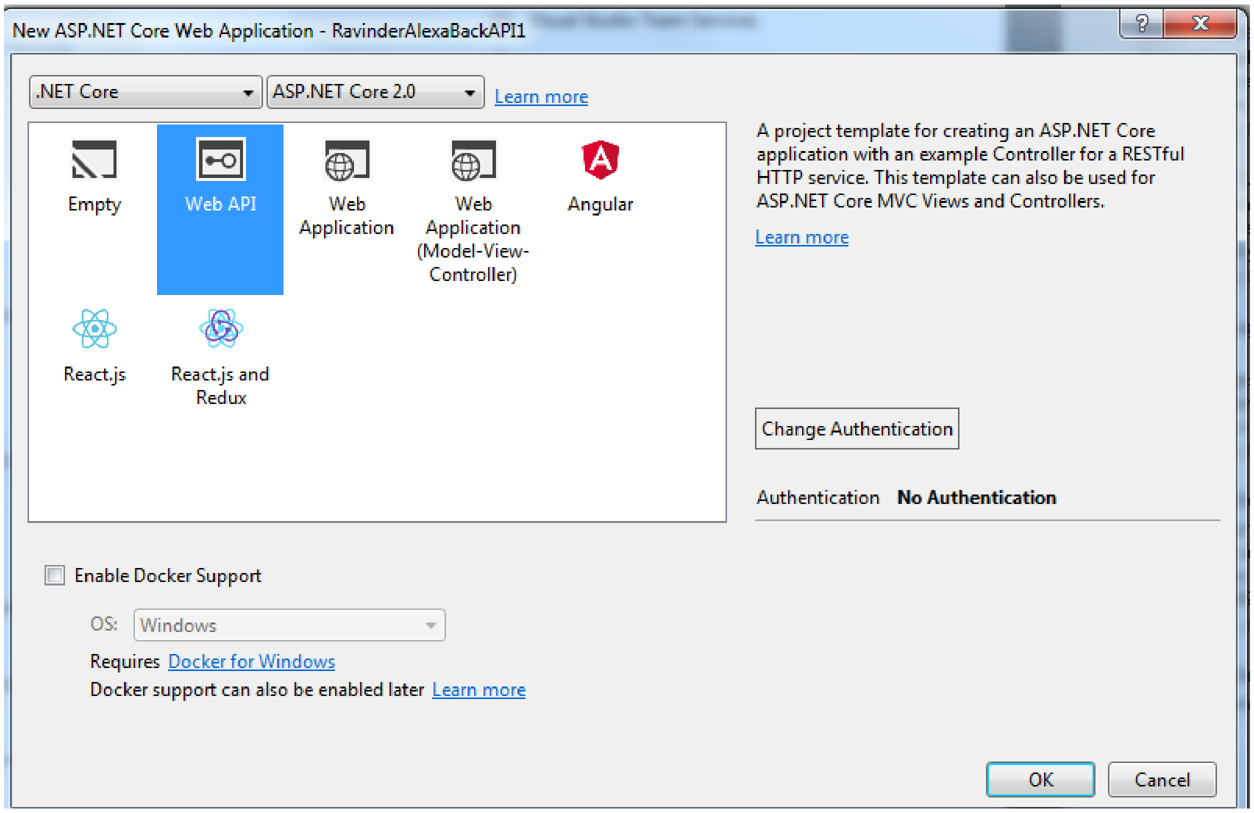
1) Creating the ASP.net Core 2.0 Web API application


New Project
Recent
Installed
Visual C#
Windows Classic Desktop
Web
.NET Core
.NET Standard
Cloud
Test
WCF
Visual Basic
Visual F#
SQL Server
Azure Data Lake
Azure Stream Analytics
Python
Other Project Types
Online
Not finding what you are looking for?
Open Visual Studio Installer
.NET Framework 4.6.1
Sort by: Default
Search (Ctrl+E)
Console App (.NET Core) Visual C#
Class Library (.NET Core) Visual C#
Unit Test Project (.NET Core) Visual C#
xUnit Test Project (.NET Core) Visual C#
ASP.NET Core Web Application Visual C#
Browse...
Create directory for solution

Type: Visual C#

Project templates for creating ASP.NET Core applications for Windows, Linux and macOS using .NET Core or .NET Framework.

Name: RavinderAlexaBackAPI
Location: c:\users\eb4jz12\source\repos
Solution name: RavinderAlexaBackAPI
✓ Create directory for solution


New ASP.NET Core Web Application - RavinderAlexaBackAPI1

.NET Core | ASP.NET Core 2.0 | Learn more

A project template for creating an ASP.NET Core application with an example Controller for a RESTful HTTP service. This template can also be used for ASP.NET Core MVC Views and Controllers.

Learn more

Authentication **No Authentication**

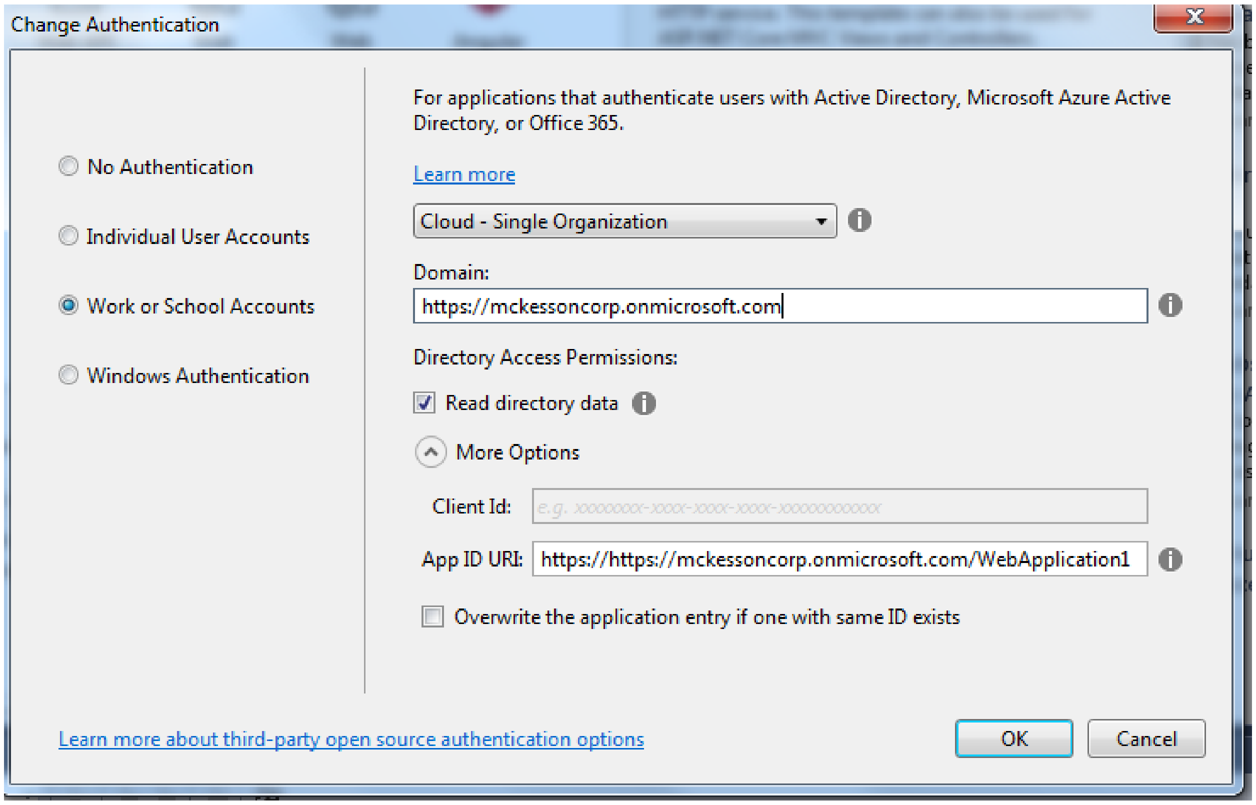
Enable Docker Support

OS: Windows

Requires Docker for Windows

Docker support can also be enabled later Learn more

2) We will need to change the client authentication and also check the “Read directory Data”


Change Authentication

( ) No Authentication
( ) Individual User Accounts
(●) Work or School Accounts
( ) Windows Authentication

For applications that authenticate users with Active Directory, Microsoft Azure Active Directory, or Office 365.

Learn more

Cloud - Single Organization

Domain: https://mckessoncorp.onmicrosoft.com

Directory Access Permissions:

☑ Read directory data

More Options

Client Id: e.g. xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx

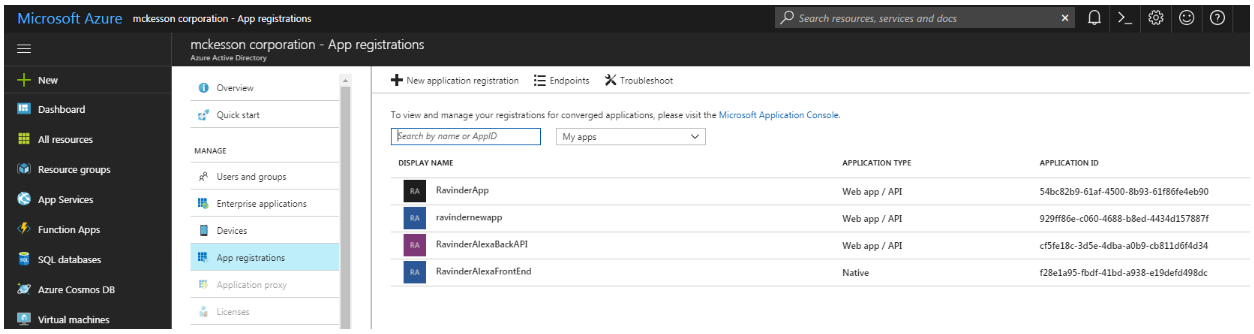
App ID URI: https://https://mckessoncorp.onmicrosoft.com/WebApplication1

☐ Overwrite the application entry if one with same ID exists

Learn more about third-party open source authentication options

OK Cancel

3) At this point the VS will create the project. This then gets deployed to the Azure.

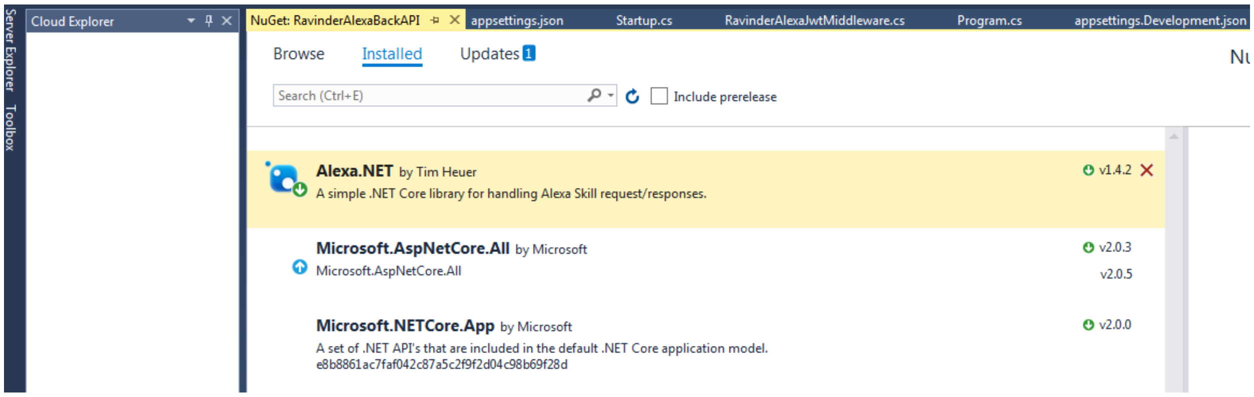


mckesson corporation - App registrations
Azure Active Directory

To view and manage your registrations for converged applications, please visit the Microsoft Application Console.

DISPLAY NAME	APPLICATION TYPE	APPLICATION ID
RavinderApp	Web app / API	54bc82b9-61af-4500-8b93-61f86fe4eb90
ravindernewapp	Web app / API	929ff86e-c060-4688-b8ed-4434d157887f
RavinderAlexaBackAPI	Web app / API	cf5fe18c-3d5e-4dba-a0b9-cb811d6f4d34
RavinderAlexaFrontEnd	Native	f28e1a95-fbdf-41bd-a938-e19defd498dc

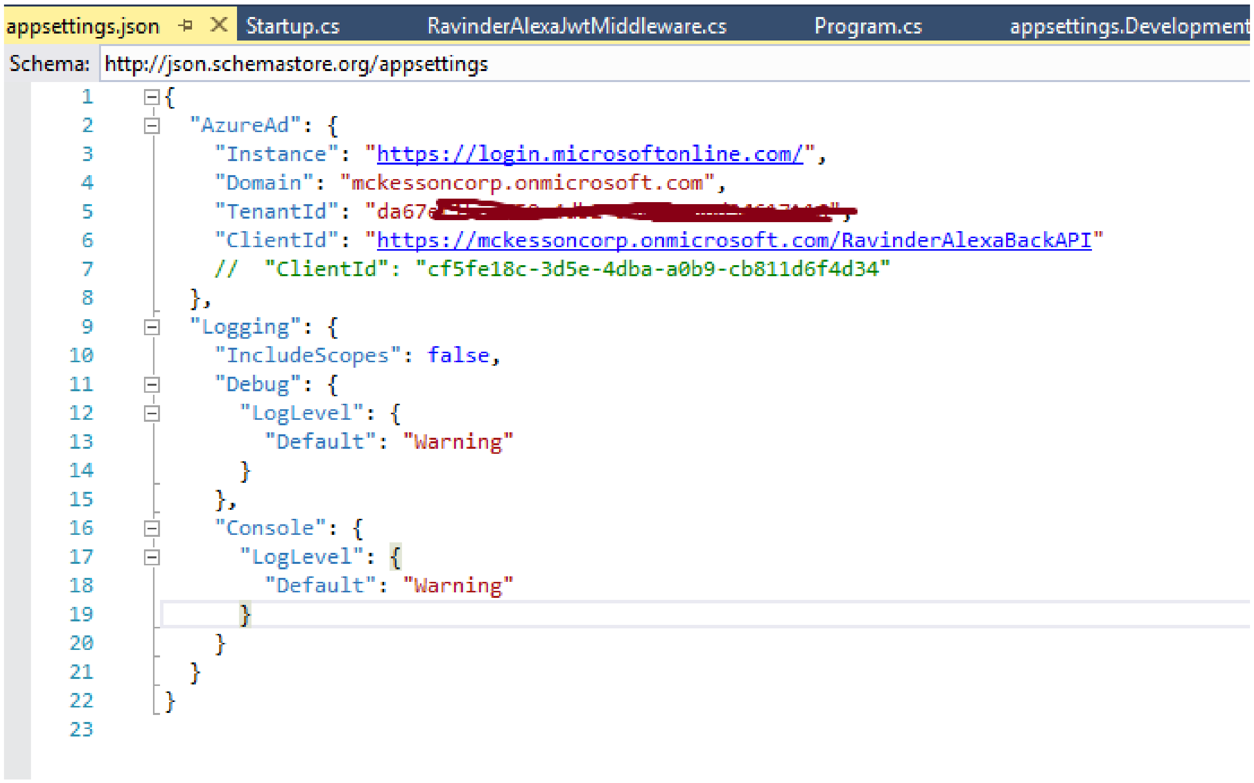
4) At this point we will need to check the appsetting.json for the Domain, TenatID and clientID. The clientID will need to be updated with the proper App URI. For the tenantID we need to go to Azure AD resource and then the Properties.
5) At this point we need to configure the method to handle the request coming from alexa. For that we will need a package called Alexa.net. We get this package from the NuGet Package manager for the project. This gives the method and properties that are needed to process the request and send the reponse back to Alexa for speech.



Alexa.NET by Tim Heuer v1.4.2
A simple .NET Core library for handling Alexa Skill request/responses.

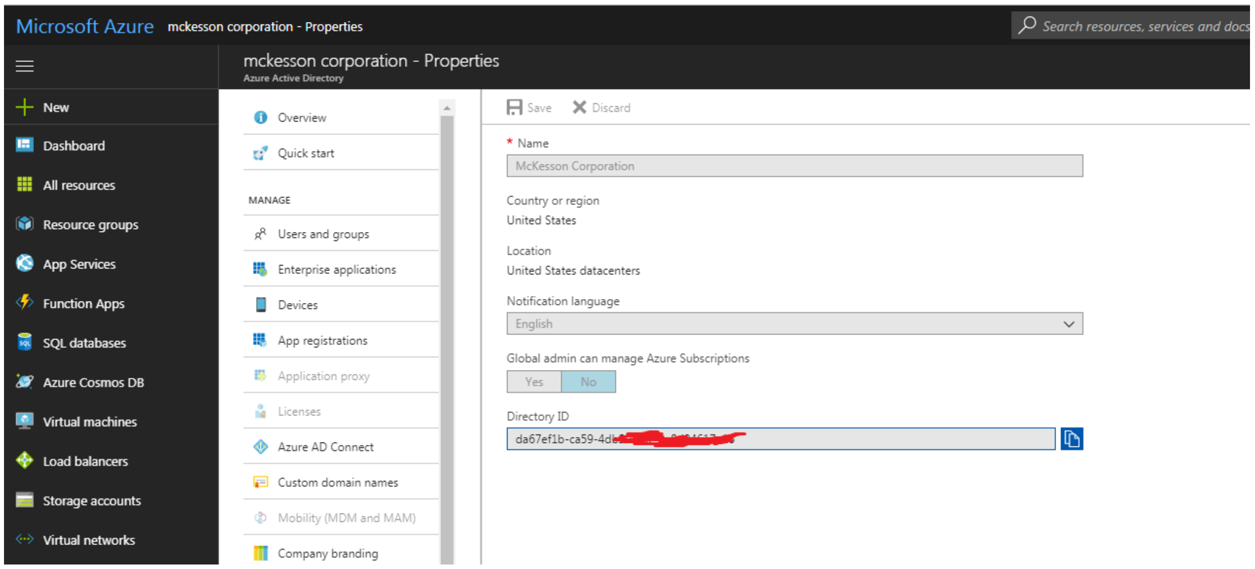
Microsoft.AspNetCore.All by Microsoft v2.0.3 v2.0.5
Microsoft.AspNetCore.All

Microsoft.NETCore.App by Microsoft v2.0.0
A set of .NET API's that are included in the default .NET Core application model.
e8b8861ac7faf042c87a5c2f9f2d04c98b69f28d



Schema: http://json.schemastore.org/appsettings

```
{
  "AzureAd": {
    "Instance": "https://login.microsoftonline.com/",
    "Domain": "mckessoncorp.onmicrosoft.com",
    "TenantId": "da67[redacted]",
    "ClientId": "https://mckessoncorp.onmicrosoft.com/RavinderAlexaBackAPI"
    //  "ClientId": "cf5fe18c-3d5e-4dba-a0b9-cb811d6f4d34"
  },
  "Logging": {
    "IncludeScopes": false,
    "Debug": {
      "LogLevel": {
        "Default": "Warning"
      }
    },
    "Console": {
      "LogLevel": {
        "Default": "Warning"
      }
    }
  }
}
```



* Name
McKesson Corporation

Country or region
United States

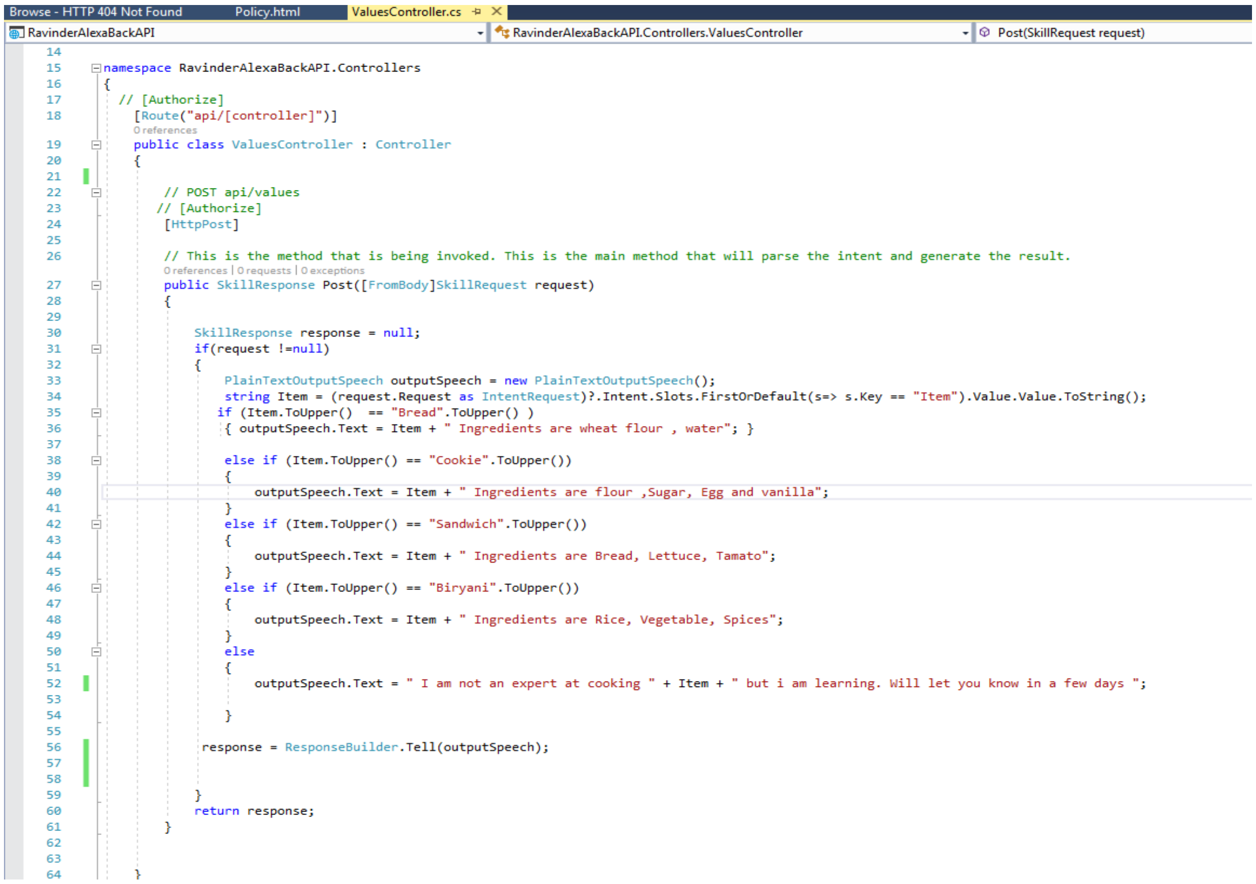
Location
United States datacenters

Notification language
English

Global admin can manage Azure Subscriptions
Yes [✓ No]

Directory ID
da67ef1b-ca59-4d[redacted]

6) At this point we need to handle the request coming in which comes as HTTP Post method. We need to configure and modify the post method in Values controller class. Here we override the post method to as follows.

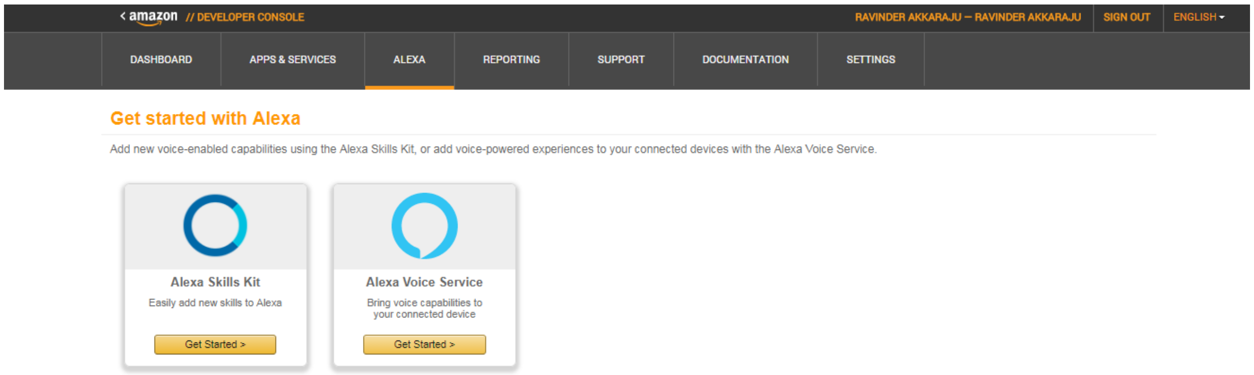

Browse - HTTP 404 Not Found
Policy.html
ValuesController.cs
RavinderAlexaBackAPI
RavinderAlexaBackAPI.Controllers.ValuesController
Post(SkillRequest request)

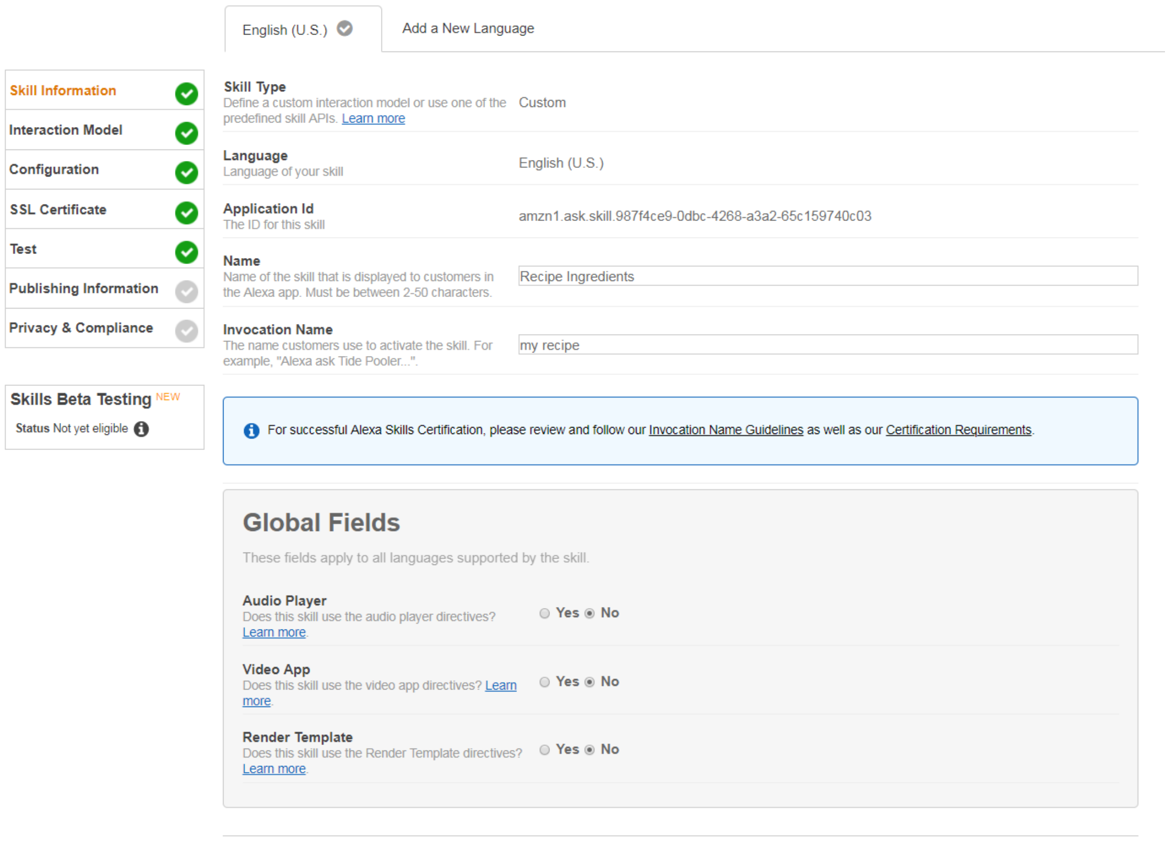
```
namespace RavinderAlexaBackAPI.Controllers
{
  // [Authorize]
    [Route("api/[controller]")]
    0 references
    public class ValuesController : Controller
    {

        // POST api/values
       // [Authorize]
        [HttpPost]

        // This is the method that is being invoked. This is the main method that will parse the intent and generate the result.
        0 references | 0 requests | 0 exceptions
        public SkillResponse Post([FromBody]SkillRequest request)
        {

            SkillResponse response = null;
            if(request !=null)
            {
                PlainTextOutputSpeech outputSpeech = new PlainTextOutputSpeech();
                string Item = (request.Request as IntentRequest)?.Intent.Slots.FirstOrDefault(s=> s.Key == "Item").Value.Value.ToString();
               if (Item.ToUpper()  == "Bread".ToUpper() )
                { outputSpeech.Text = Item + " Ingredients are wheat flour , water"; }

                else if (Item.ToUpper() == "Cookie".ToUpper())
                {
                    outputSpeech.Text = Item + " Ingredients are flour ,Sugar, Egg and vanilla";
                }
                else if (Item.ToUpper() == "Sandwich".ToUpper())
                {
                    outputSpeech.Text = Item + " Ingredients are Bread, Lettuce, Tamato";
                }
                else if (Item.ToUpper() == "Biryani".ToUpper())
                {
                    outputSpeech.Text = Item + " Ingredients are Rice, Vegetable, Spices";
                }
                else
                {
                    outputSpeech.Text = " I am not an expert at cooking " + Item + " but i am learning. Will let you know in a few days ";

                }

             response = ResponseBuilder.Tell(outputSpeech);


            }
            return response;
        }


    }
```

The main thing to keep in mind is the Key in the Lambda expression. That will match the slot in the JSON string which comes in when we create the intent in Alexa configuration later. Since I am looking for the ingredients I named it the item. I had mistyped it originally and kept getting an 500 internal error. I have kept the implementation simple but all the key/value pairs or the ingredients can be moved to either a JSON file, any other document or stored in the DB on the Azure.

7) Now we can compile and publish the code to Azure. At this juncture we can either publish it to the Azure, local IIS. This is also the place where we assign the app name and either assign to the resource group or create a new one.
8) At this point in case we need to authenticate as single sign on then we can create another class. I had trouble being able to integrate it this way so had to comment the code out. We need to comment out the [authorize] line in the values controller class.

9) Now at this point we need to create the skill in Alexa.


amazon // DEVELOPER CONSOLE
RAVINDER AKKARAJU – RAVINDER AKKARAJU
SIGN OUT
ENGLISH
DASHBOARD
APPS & SERVICES
ALEXA
REPORTING
SUPPORT
DOCUMENTATION
SETTINGS
Get started with Alexa
Add new voice-enabled capabilities using the Alexa Skills Kit, or add voice-powered experiences to your connected devices with the Alexa Voice Service.
Alexa Skills Kit
Easily add new skills to Alexa
Get Started >
Alexa Voice Service
Bring voice capabilities to your connected device
Get Started >



English (U.S.) | Add a New Language

Skill Information	✓
Interaction Model	✓
Configuration	✓
SSL Certificate	✓
Test	✓
Publishing Information	
Privacy & Compliance	

Skills Beta Testing NEW
Status Not yet eligible

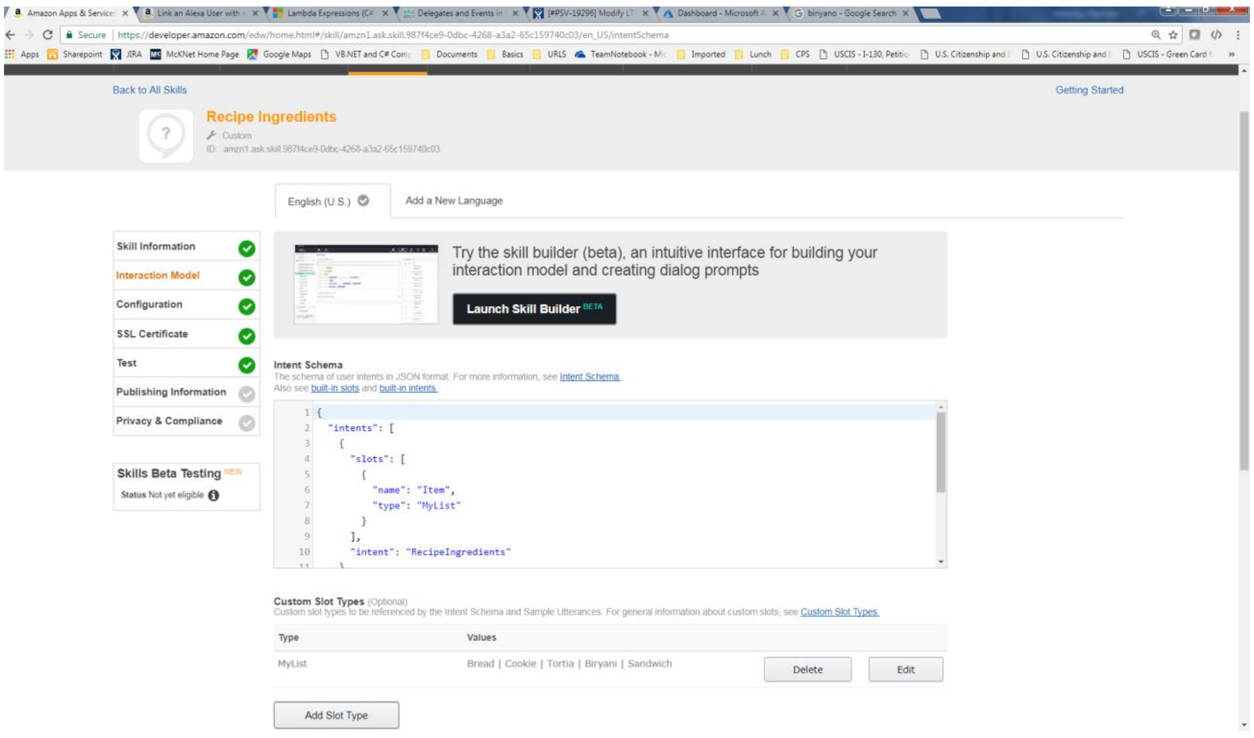
Skill Type Define a custom interaction model or use one of the predefined skill APIs. Learn more	Custom
Language Language of your skill	English (U.S.)
Application Id The ID for this skill	amzn1.ask.skill.987f4ce9-0dbc-4268-a3a2-65c159740c03
Name Name of the skill that is displayed to customers in the Alexa app. Must be between 2-50 characters.	Recipe Ingredients
Invocation Name The name customers use to activate the skill. For example, "Alexa ask Tide Pooler...".	my recipe

For successful Alexa Skills Certification, please review and follow our Invocation Name Guidelines as well as our Certification Requirements.

Global Fields

These fields apply to all languages supported by the skill.

Audio Player Does this skill use the audio player directives? Learn more.	Yes [✓ No]
Video App Does this skill use the video app directives? Learn more.	Yes [✓ No]
Render Template Does this skill use the Render Template directives? Learn more.	Yes [✓ No]



https://developer.amazon.com/edw/home.html#/skill/amzn1.ask.skill.987f4ce9-0dbc-4268-a3a2-65c159740c03/en_US/intentSchema

Back to All Skills | Getting Started

Recipe Ingredients
Custom
ID: amzn1.ask.skill.987f4ce9-0dbc-4268-a3a2-65c159740c03

English (U.S.) | Add a New Language

Skill Information	✓
Interaction Model	✓
Configuration	✓
SSL Certificate	✓
Test	✓
Publishing Information	
Privacy & Compliance	

Skills Beta Testing NEW
Status Not yet eligible

Try the skill builder (beta), an intuitive interface for building your interaction model and creating dialog prompts

Launch Skill Builder BETA

Intent Schema
The schema of user intents in JSON format. For more information, see Intent Schema.
Also see built-in slots and built-in intents.

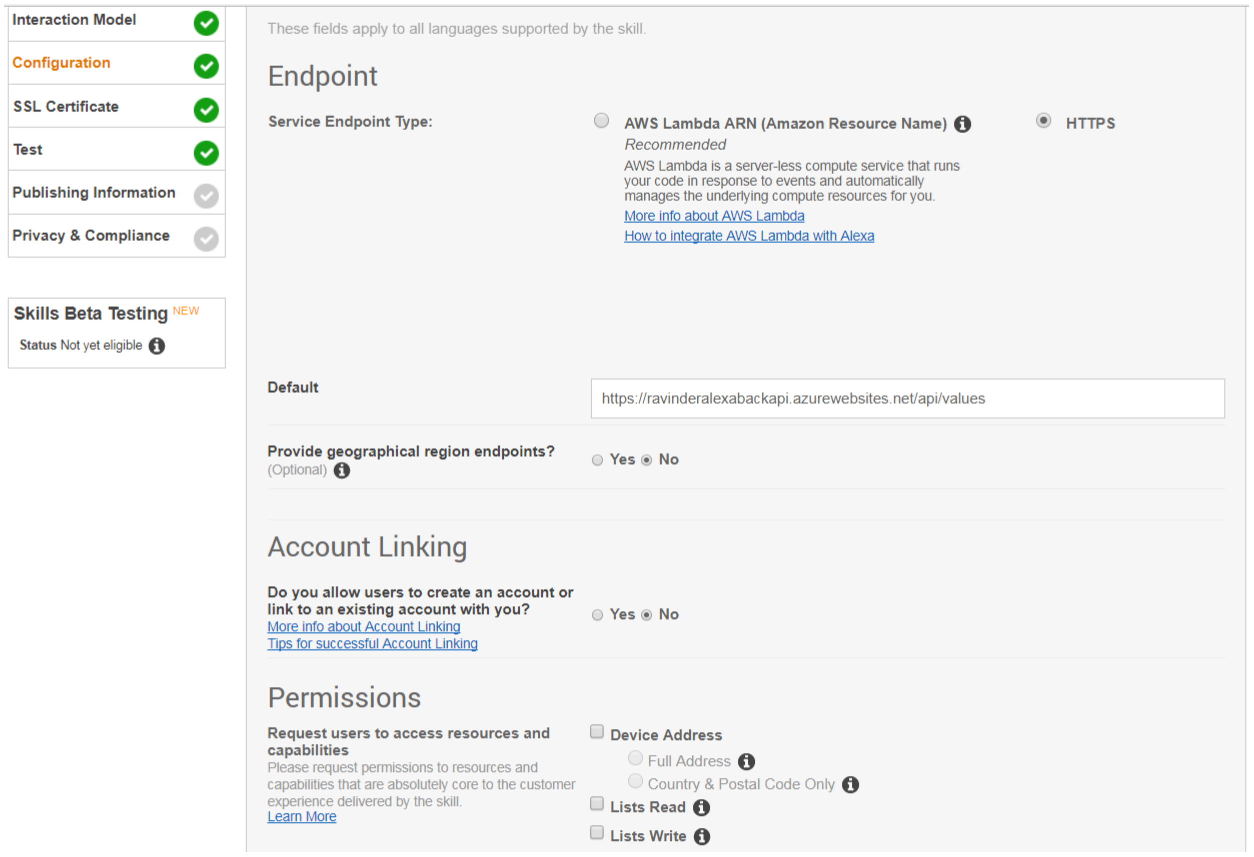
```
{
  "intents": [
    {
      "slots": [
        {
          "name": "Item",
          "type": "MyList"
        }
      ],
      "intent": "RecipeIngredients"
```

Custom Slot Types (Optional)
Custom slot types to be referenced by the Intent Schema and Sample Utterances. For general information about custom slots, see Custom Slot Types.

Type	Values
MyList	Bread | Cookie | Tortia | Biryani | Sandwich

Add Slot Type

Here we need to create a new List which is custom. In the MyList I create the various items like Bread, Cookie etc. which will be the key words which will be gleaned from the intent to be sent to the backend in azure to be processed. Any values in the list can be used to get the response back. This will be used as key's in the backend to send an appropriate response.



Interaction Model ✓
Configuration ✓
SSL Certificate ✓
Test ✓
Publishing Information
Privacy & Compliance

Skills Beta Testing NEW
Status Not yet eligible

These fields apply to all languages supported by the skill.

Endpoint

Service Endpoint Type: AWS Lambda ARN (Amazon Resource Name) [✓ HTTPS]
Recommended
AWS Lambda is a server-less compute service that runs your code in response to events and automatically manages the underlying compute resources for you.
More info about AWS Lambda
How to integrate AWS Lambda with Alexa

Default: https://ravinderalexabackapi.azurewebsites.net/api/values

Provide geographical region endpoints? (Optional) Yes [✓ No]

Account Linking

Do you allow users to create an account or link to an existing account with you? Yes [✓ No]
More info about Account Linking
Tips for successful Account Linking

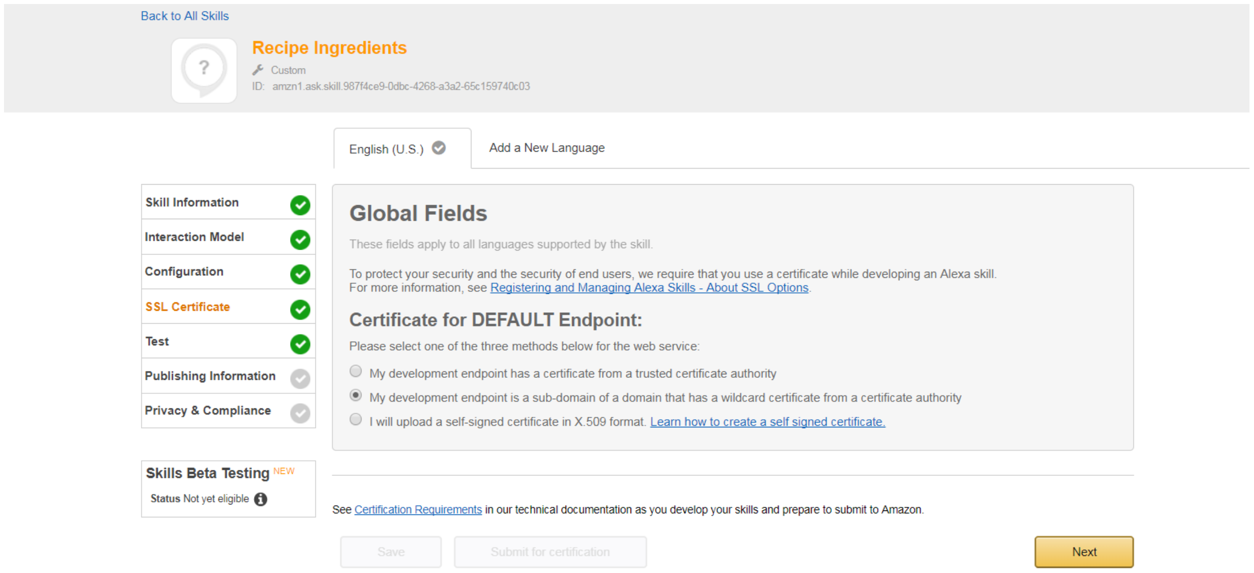
Permissions

Request users to access resources and capabilities
Please request permissions to resources and capabilities that are absolutely core to the customer experience delivered by the skill.
Learn More

- Device Address
  - Full Address
  - Country & Postal Code Only
- Lists Read
- Lists Write

The default URL needs to be set to the method which will handle the call in my case it is https://ravinderalexabackapi.azurewebsites.net/api/values.

Account linking is needed to be able to configure and authorize the user before being able to successfully use the Business logic stored in the Azure which in turn will access the data store.



Back to All Skills

Recipe Ingredients

Custom

ID: amzn1.ask.skill.987f4ce9-0dbc-4268-a3a2-65c159740c03

English (U.S.) | Add a New Language

- Skill Information ✓
- Interaction Model ✓
- Configuration ✓
- SSL Certificate ✓
- Test ✓
- Publishing Information
- Privacy & Compliance

Skills Beta Testing NEW
Status Not yet eligible

Global Fields

These fields apply to all languages supported by the skill.

To protect your security and the security of end users, we require that you use a certificate while developing an Alexa skill.
For more information, see Registering and Managing Alexa Skills - About SSL Options.

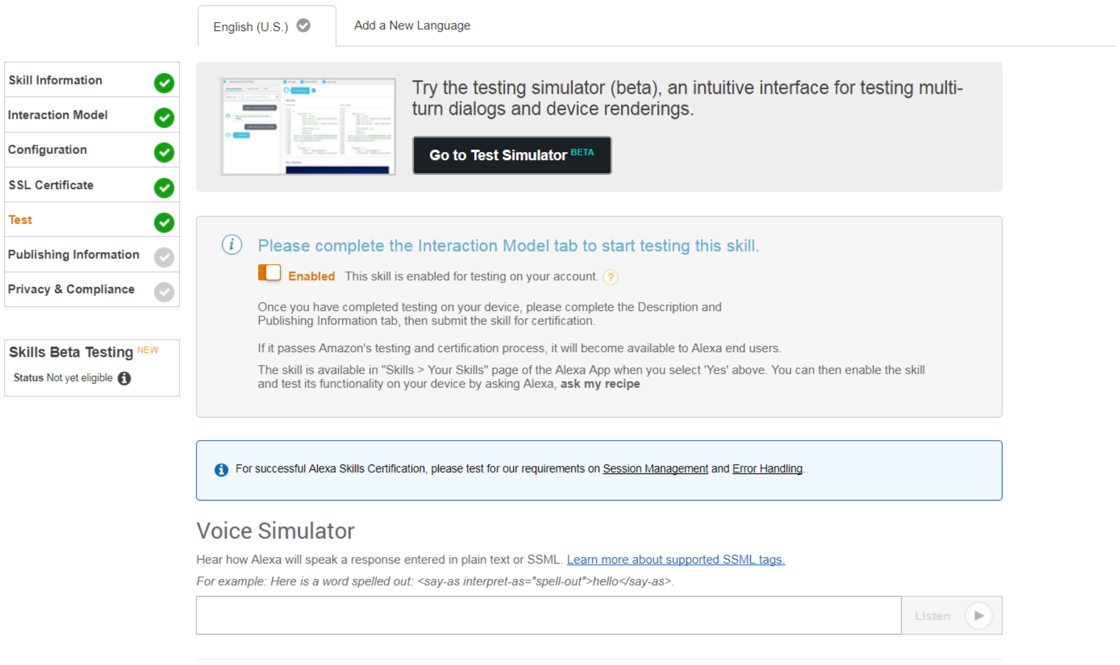
Certificate for DEFAULT Endpoint:

Please select one of the three methods below for the web service:

- ○ My development endpoint has a certificate from a trusted certificate authority
- ● My development endpoint is a sub-domain of a domain that has a wildcard certificate from a certificate authority
- ○ I will upload a self-signed certificate in X.509 format. Learn how to create a self signed certificate.

See Certification Requirements in our technical documentation as you develop your skills and prepare to submit to Amazon.

Save | Submit for certification | Next



English (U.S.) | Add a New Language

- Skill Information ✓
- Interaction Model ✓
- Configuration ✓
- SSL Certificate ✓
- Test ✓
- Publishing Information
- Privacy & Compliance

Skills Beta Testing NEW
Status Not yet eligible

Try the testing simulator (beta), an intuitive interface for testing multi-turn dialogs and device renderings.

Go to Test Simulator BETA

Please complete the Interaction Model tab to start testing this skill.

Enabled This skill is enabled for testing on your account.

Once you have completed testing on your device, please complete the Description and Publishing Information tab, then submit the skill for certification.

If it passes Amazon's testing and certification process, it will become available to Alexa end users.

The skill is available in "Skills > Your Skills" page of the Alexa App when you select 'Yes' above. You can then enable the skill and test its functionality on your device by asking Alexa, **ask my recipe**

For successful Alexa Skills Certification, please test for our requirements on Session Management and Error Handling.

Voice Simulator

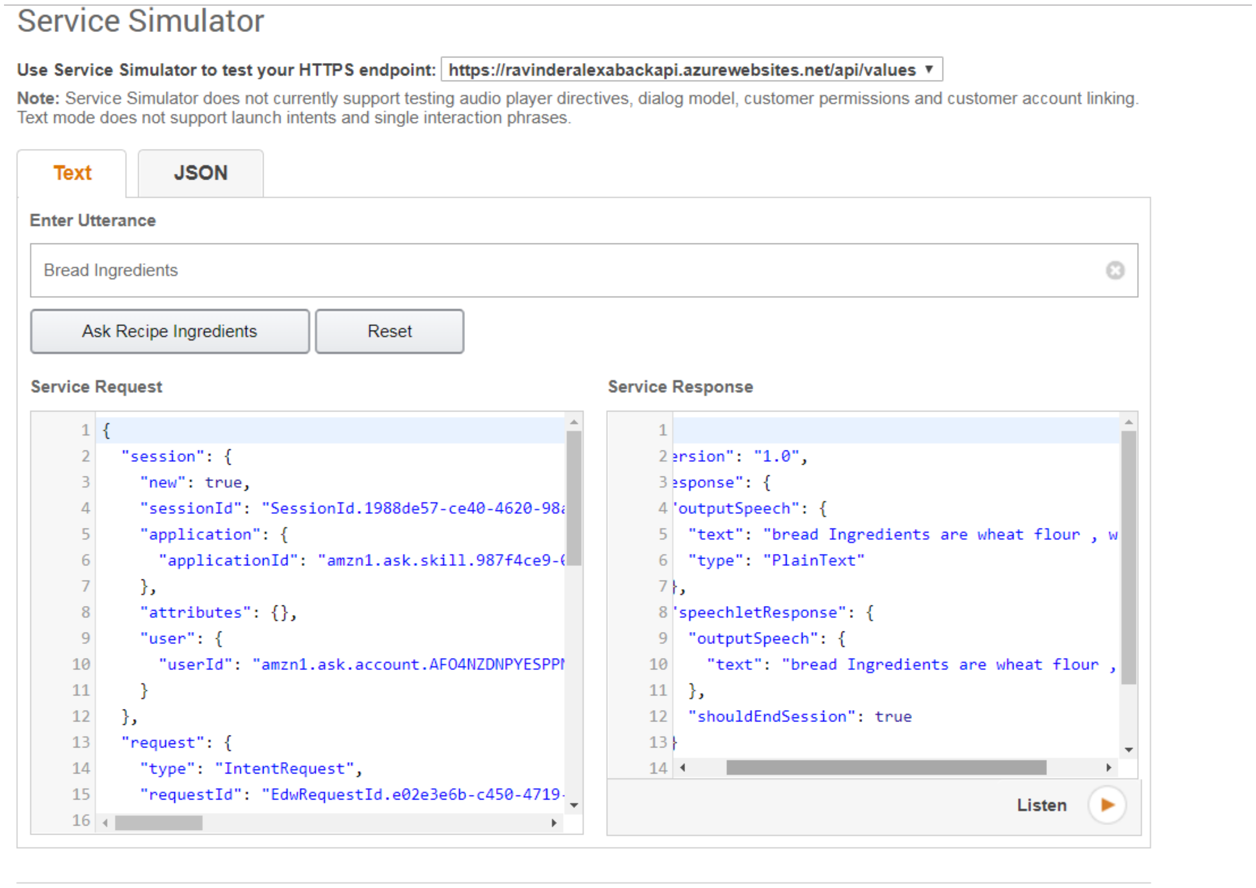
Hear how Alexa will speak a response entered in plain text or SSML. Learn more about supported SSML tags.

For example: Here is a word spelled out: <say-as interpret-as="spell-out">hello</say-as>.

Listen

TESTING --

To test the app, enter the name of the ingredients. The response should be what we configured in the Azure Back end method.



Service Simulator

Use Service Simulator to test your HTTPS endpoint: https://ravinderalexabackapi.azurewebsites.net/api/values ▼

Note: Service Simulator does not currently support testing audio player directives, dialog model, customer permissions and customer account linking. Text mode does not support launch intents and single interaction phrases.

Bread Ingredients

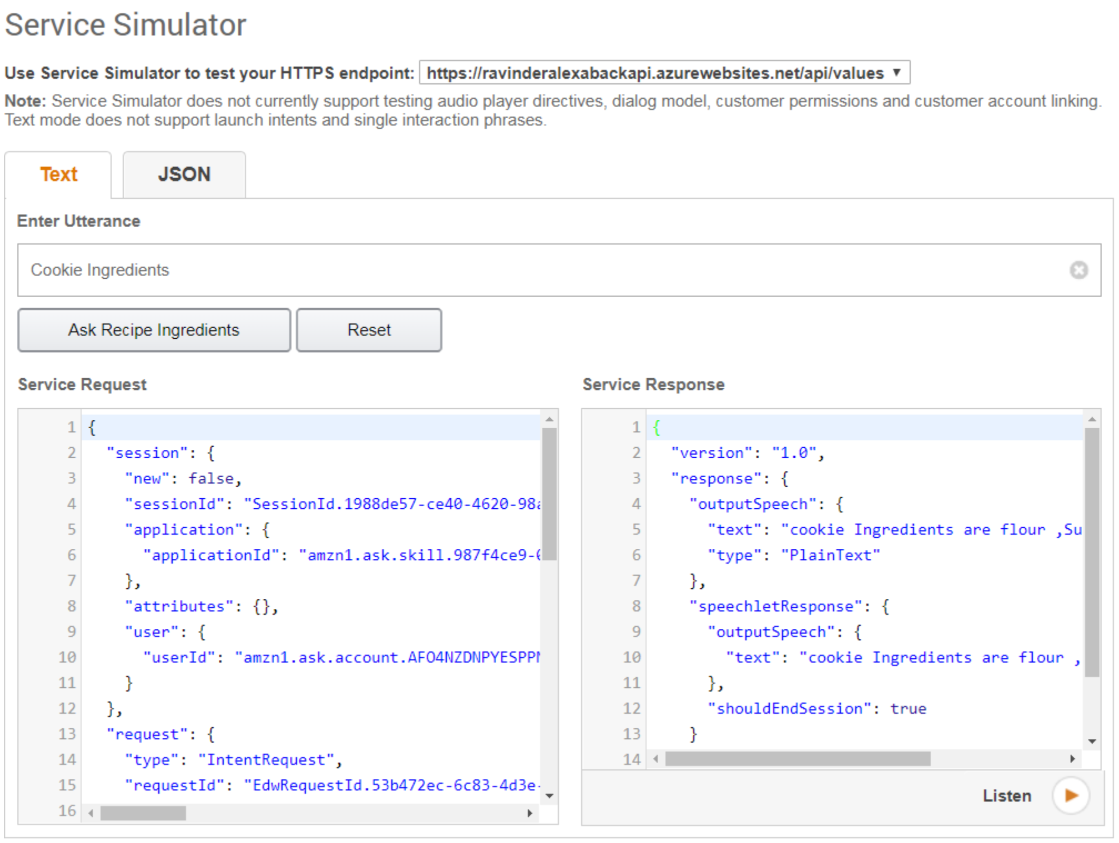
Service Request

```
{
  "session": {
    "new": true,
    "sessionId": "SessionId.1988de57-ce40-4620-98a
    "application": {
      "applicationId": "amzn1.ask.skill.987f4ce9-(
    },
    "attributes": {},
    "user": {
      "userId": "amzn1.ask.account.AFO4NZDNPYESPPI
    }
  },
  "request": {
    "type": "IntentRequest",
    "requestId": "EdwRequestId.e02e3e6b-c450-4719-
```

Service Response

```

ersion": "1.0",
esponse": {
'outputSpeech": {
  "text": "bread Ingredients are wheat flour , w
  "type": "PlainText"
},
'speechletResponse": {
  "outputSpeech": {
    "text": "bread Ingredients are wheat flour ,
  },
  "shouldEndSession": true
}
```

Another test for item cookie.



Service Simulator

Use Service Simulator to test your HTTPS endpoint: https://ravinderalexabackapi.azurewebsites.net/api/values

Note: Service Simulator does not currently support testing audio player directives, dialog model, customer permissions and customer account linking. Text mode does not support launch intents and single interaction phrases.

Enter Utterance

Cookie Ingredients

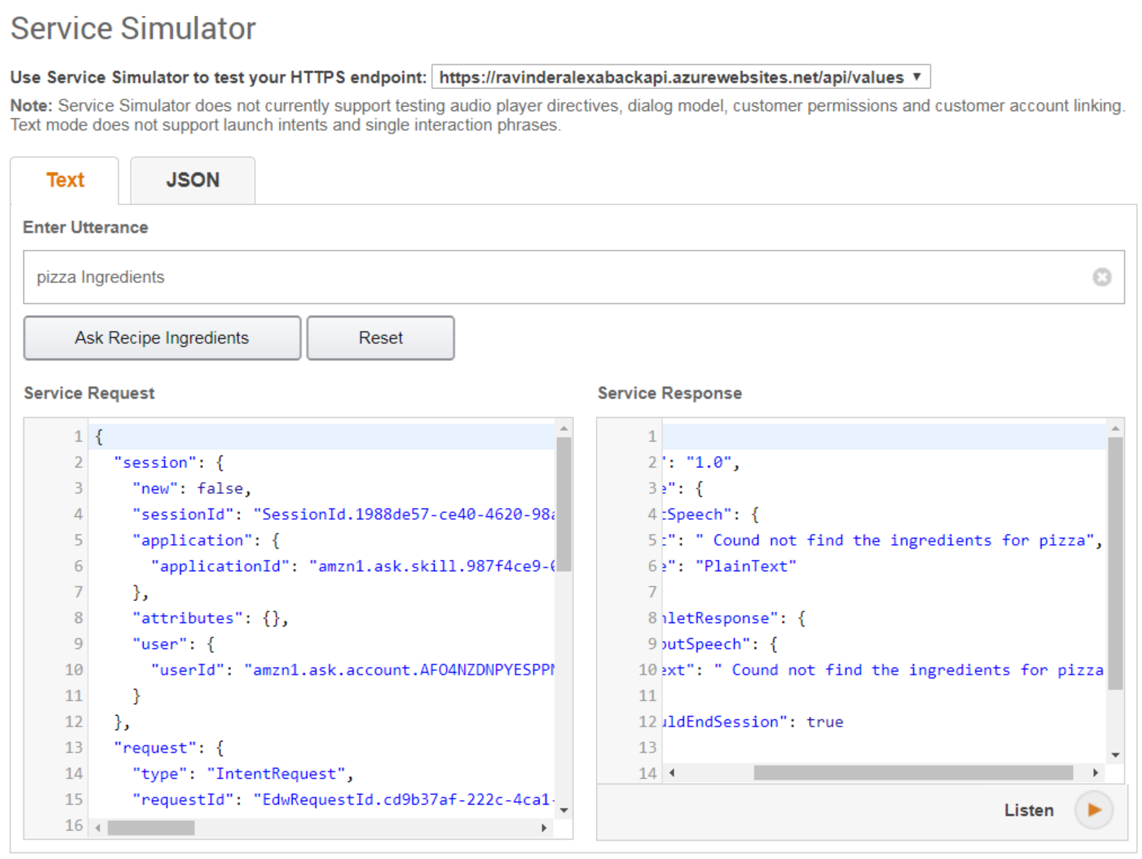
Service Request

```
{
  "session": {
    "new": false,
    "sessionId": "SessionId.1988de57-ce40-4620-98
    "application": {
      "applicationId": "amzn1.ask.skill.987f4ce9-
    },
    "attributes": {},
    "user": {
      "userId": "amzn1.ask.account.AFO4NZDNPYESPP
    }
  },
  "request": {
    "type": "IntentRequest",
    "requestId": "EdwRequestId.53b472ec-6c83-4d3e
```

Service Response

```
{
  "version": "1.0",
  "response": {
    "outputSpeech": {
      "text": "cookie Ingredients are flour ,Su
      "type": "PlainText"
    },
    "speechletResponse": {
      "outputSpeech": {
        "text": "cookie Ingredients are flour ,
      },
      "shouldEndSession": true
    }
```

Testing for the item which is not part of the list



Service Simulator

Use Service Simulator to test your HTTPS endpoint: https://ravinderalexabackapi.azurewebsites.net/api/values

Note: Service Simulator does not currently support testing audio player directives, dialog model, customer permissions and customer account linking. Text mode does not support launch intents and single interaction phrases.

Service Request

```
{
  "session": {
    "new": false,
    "sessionId": "SessionId.1988de57-ce40-4620-98a
    "application": {
      "applicationId": "amzn1.ask.skill.987f4ce9-(
    },
    "attributes": {},
    "user": {
      "userId": "amzn1.ask.account.AFO4NZDNPYESPPI
    }
  },
  "request": {
    "type": "IntentRequest",
    "requestId": "EdwRequestId.cd9b37af-222c-4ca1-
```

Service Response

```

': "1.0",
e": {
:Speech": {
:": " Cound not find the ingredients for pizza",
e": "PlainText"

ıletResponse": {
putSpeech": {
ext": " Cound not find the ingredients for pizza

ıldEndSession": true
```