

IT-Symposium 2018

# Using Alexa with your Software Environment

Jürgen Depping  
© CommitWork GmbH

The logo for CommitWork GmbH features a stylized circular graphic composed of binary digits (0s and 1s) in a light green color. To the right of this graphic is a dark blue horizontal bar containing the text "CommitWork" in white. Below this bar is a white horizontal bar containing the text "GmbH für Informationstechnologie" in blue.

**CommitWork**

GmbH für Informationstechnologie

[Info@CommitWork.de](mailto:Info@CommitWork.de)  
[www.CommitWork.de](http://www.CommitWork.de)

# Agenda

---

- What is Alexa?
- How to develop a new custom Alexa Skill in Java?
- A short demo of the Inventory Skill.
- How to integrate the Skill with your software environment?
- Additional requirements of Business Skills.

# Alexa – the Amazon speech assistant

---

- Alexa is the Amazon software solution of the speech assistant
- Hardware for Alexa:
  - Echo Dot (little speaker)
  - Echo (bigger speaker)
  - Echo Pro (with hub to control devices)
  - Echo Spot (with display)
  - Echo Show (with bigger display)
  - Software solution for smartphones reverb, alexa
- New features can be build by developing a new „Skill“

# Skill Types

---

- Smart Home Skill – control devices like lights, switches, door locks,...
- Flash Briefing Skill – like news, weather, traffic,...
- Video Skill – all about Video searching, playing, recording,...
- Kids Skill – Games for Kids (this is very new)
- Custom Skill – all other and mostly developed by third party

# How many skills are available?

More than 10000 skills are available and every day nearly 100 more!

amazon.de  
Prime testen

Alexa Skills

Lieferung an Jürgen  
44263 Dortmund

Alle Kategorien

Jürgens Amazon Angebote Gutscheine Verkaufen Hilfe

Alexa Skills Smart Home Spiele, Quiz & Zubehör Lifestyle Ihre Skills Erste Schritte Hilfe

Ergebnisse anzeigen für

**Neuheiten**  
Letzte Woche  
Letzte Monat  
Letzte 3 Monate

**Alexa Skills**  
Bildung & Nachschlagewerke  
Dienstprogramme  
Essen & Trinken  
Film & Fernsehen  
Gesundheit & Fitness  
Heimdienste  
Kinder  
Kommunikation  
Lifestyle  
Lokales  
Musik & Audio  
Nachrichten  
Neuheiten & Humor  
Produktivität  
Reise & Transport  
Shopping  
Smart Home  
Soziale Netzwerke  
Spiele, Quiz & Zubehör  
Sport  
Vernetztes Auto  
Wetter  
Wirtschaft & Finanzen

Filtern nach

Entdeck Skills für

"Alexa, welche Skills für Kinder gibt es?"

Bibis Welt  
★★★★★ 5

Affenbeste Freunde  
★★★★☆ 13

"Alexa, welche Skills habe ich schon aktiviert?"

# What do you need to develop a customer skill in java

---

- Amazon Accounts:
  - An Amazon Account ([www.amazon.com](http://www.amazon.com))
  - An Amazon Developer Account ([developer.amazon.com](http://developer.amazon.com))
  - An AWS Account ([aws.amazon.com](http://aws.amazon.com))
- Software:
  - Java 8
  - An IDE like Eclipse
  - Maven or Gradle (We use Maven)
  - The Amazon Developer Kit:
    - ASK SDK v2
    - Other kits are optional see documentation
- Remark: Other programming languages are also supported

# The demo Skill - Inventory

---

The Demo Skill is a very simple Inventory.

The user should :

- Count screws or pencils
- Ask for a report

# Alexa Console – Define new Skill Inventory

The screenshot shows the Amazon Alexa Console interface. At the top, the navigation bar includes 'Your Skills', 'Inventory', 'Build' (selected), 'Test', 'Launch', and 'Measure'. Below the navigation bar, there is a language selector set to 'English (U.S.)' and two buttons: 'Save Model' and 'Build Model'. The left sidebar is titled 'CUSTOM' and contains several menu items: 'Interaction Model', 'Invocation' (highlighted in blue), 'Intents (6)' with an '+ Add' button, 'Slot Types (2)' with an '+ Add' button, 'JSON Editor', 'Interfaces', and 'Endpoint'. The main content area is titled 'Invocation' and contains the following text: 'Users say a skill's invocation name to begin an interaction with a particular custom skill. For example, if the invocation name is "daily horoscopes", users can say:'. Below this text is a green-bordered box containing the example user utterance: 'User: Alexa, ask daily horoscopes for the horoscope for Gemini'. Further down, there is a section for 'Skill Invocation Name' with a help icon (?). A text input field below this section contains the word 'inventory'.



# Default Intents

---

- Every Skill has default intents:
  - Help Intent – give a description of the skill
  - Stop Intent – stops the skill
  - Cancel Intent – in most cases equal to stop  
Sometimes it stops only current action

# Defining the Intents

---

- Our Inventory Skill has additionally:
  - Count Intent – to count pencils or screws
  - Report Intent – to give a counting report

# The Count Intent - Utterances

The screenshot displays a configuration interface for a custom intent named 'countIntent'. On the left, a sidebar menu under the 'CUSTOM' header includes 'Interaction Model', 'Invocation', 'Intents (6)', and 'countIntent' (which is selected and highlighted in blue). Below 'Intents (6)', there is an 'Add' button and a list of entities: 'counter' (blue dot), 'item' (orange dot), and 'reportIntent'. The main area on the right shows the intent name 'Intents / countIntent' and 'Sample Utterances (3)' with a help icon. A text input field contains the prompt 'What might a user say to invoke this intent?'. Below this, three sample utterances are listed: 'i count {item}', 'i count {counter}', and 'i count {counter} {item}'. The placeholders '{counter}' and '{item}' are highlighted in light blue and light orange respectively to show their corresponding entities.

# The Count Intent - Slots

ORDER	NAME	SLOT TYPE
1	counter	AMAZON.NUMBER
2	item	ItemType

A Slot is parameter!

Counter has a predefined Type AMAZON.NUMBER  
Item has an owner defined Type

# The owner defined type ItemType

## Slot Types / ItemType

Slot Values (4) ?

VALUE ?	ID (OPTIONAL) ?	SYNONYMS (OPTIONAL) ?	
pencils	Enter ID	Add synonym	+
pencil	Enter ID	Add synonym	+
screws	Enter ID	Add synonym	+
screw	Enter ID	Add synonym	+

pencils,  
pencil,  
screws,  
screw

# Slot Filling, if counter is missing

## Alexa speech prompts ?

What will Alexa say to prompt the user to fill this slot?

how many items did you count?

## User utterances ?

What might a user say in response to the above prompt(s)?

{counter}

I count {counter}

# Slot Filling, if Item is missing

---

## Alexa speech prompts ?

What will Alexa say to prompt the user to fill this slot?

Which item did you count?

## User utterances ?

What might a user say in response to the above prompt(s)?

{item}

i count {item}

# The Report Intent

---

Intents / reportIntent

Sample Utterances (3) ?

What might a user say to invoke this intent?

list inventory

list the items of the inventory

give me the report



# The AWS Lambda ARN Endpoint

## Endpoint



The Endpoint will receive POST requests when a user interacts with your Alexa Skill. The request body contains parameters that you use to perform logic and generate a JSON-formatted response. Learn more about Lambda endpoints [here](#). You can host your own HTTP service endpoint as long as the service meets the requirements described [here](#).

## Service Endpoint Type

Select how you will host your skill's service endpoint.

AWS Lambda ARN ?  
(Recommended)

Your Skill ID ?

amzn1.ask.skill.1273682a-e5e[REDACTED]

Copy to Clipboard

Default Region ?  
(Required)

arn:aws:lambda:us-east-1[REDACTED]

Alternate Endpoint is „HTTPS Webservice“

# Eclipse Projekt Inventory – pom.xml

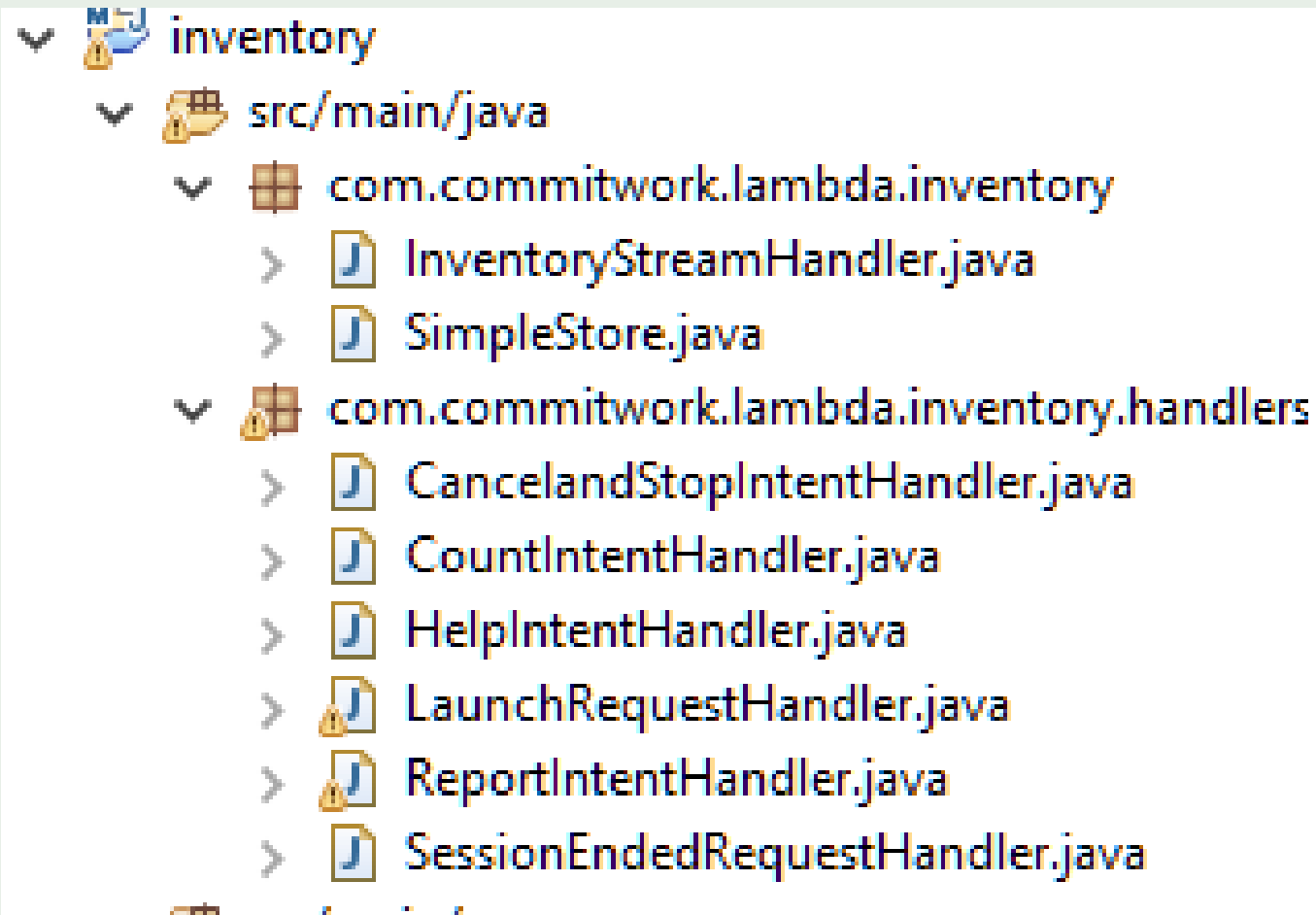
---

The required dependency com.amazon.alex.ask-sdk

```
<dependencies>
  <dependency>
    <groupId>com.amazon.alex</groupId>
    <artifactId>ask-sdk</artifactId>
    <version>2.0.0</version>
  </dependency>
</dependencies>
```

# The Java AWS Lambda Service - Source

---



# The InventoryStreamHandler

---

Defines only which Intents are implemented

```
public class InventoryStreamHandler extends SkillStreamHandler {  
  
    private static Skill getSkill() {  
        return Skills.standard()  
            .addRequestHandlers(  
                new CancelandStopIntentHandler(),  
                new CountIntentHandler(),  
                new ReportIntentHandler(),  
                new HelpIntentHandler(),  
                new LaunchRequestHandler(),  
                new SessionEndedRequestHandler()  
            )  
            .build();  
    }  
  
    public InventoryStreamHandler() {  
        super(getSkill());  
    }  
}
```

# CountIntentHandler(1)

---

If not all mandatory slots are set,  
delegate and ask for missing slotvalues

Remark:

This class is very short and has only 80 lines of code.  
Here are only the interesting parts.

```
if(!intentRequest.getDialogState().equals(DialogState.COMPLETED)) {  
    return input.getResponseBuilder()  
        .addDelegateDirective(intent)  
        .withShouldEndSession(false)  
        .build();  
}
```

## CountIntentHandler (2)

---

Get the Slot Values, store the Values,  
speak and display: „I count <counter> <item>

```
if(slots.get("item")!=null){
    item=slots.get("item").getValue();
}
if(slots.get("counter")!=null){
    counter=slots.get("counter").getValue();
}

speechText += " "+counter+" "+item;

HashMap<String,String> map=SimpleStore.getInstance().getInventoryMap();
map.put(item,counter);

return input.getResponseBuilder()
    .withSpeech(speechText)
    .withSimpleCard("Inventory", speechText)
    .withShouldEndSession(false)
    .build();
```

# Deploy and install the Lambda InventorySkill

Lambda > Functions > InventorySkill ARN - arn:aws:lambda:us-east-1:112104343985:function:Inve

## InventorySkill


Throttle Qualifiers Actions Select a test event.. Test


Configuration | Monitoring


### ▼ Designer

**Add triggers**  
Click on a trigger from the list below to add it to your function.

- API Gateway
- AWS IoT
- Alexa Skills Kit
- Alexa Smart Home

 **InventorySkill**  
Saved

 **Alexa Skills Kit**

 **Amazon CloudWatch Logs**

Add triggers from the list on the left

Resources the function's role has access to will be shown here

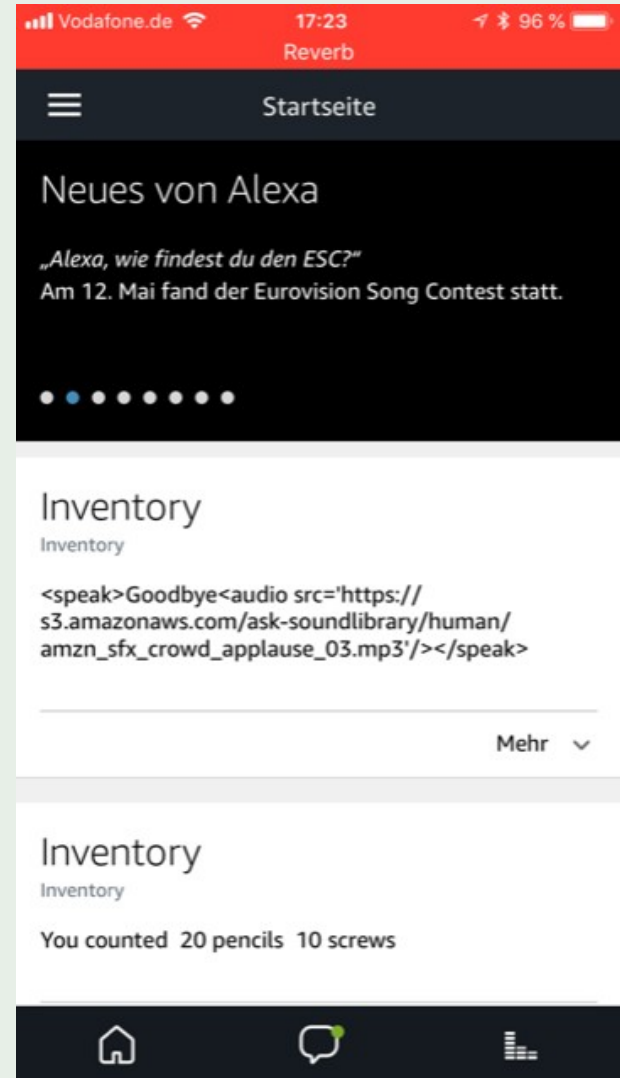
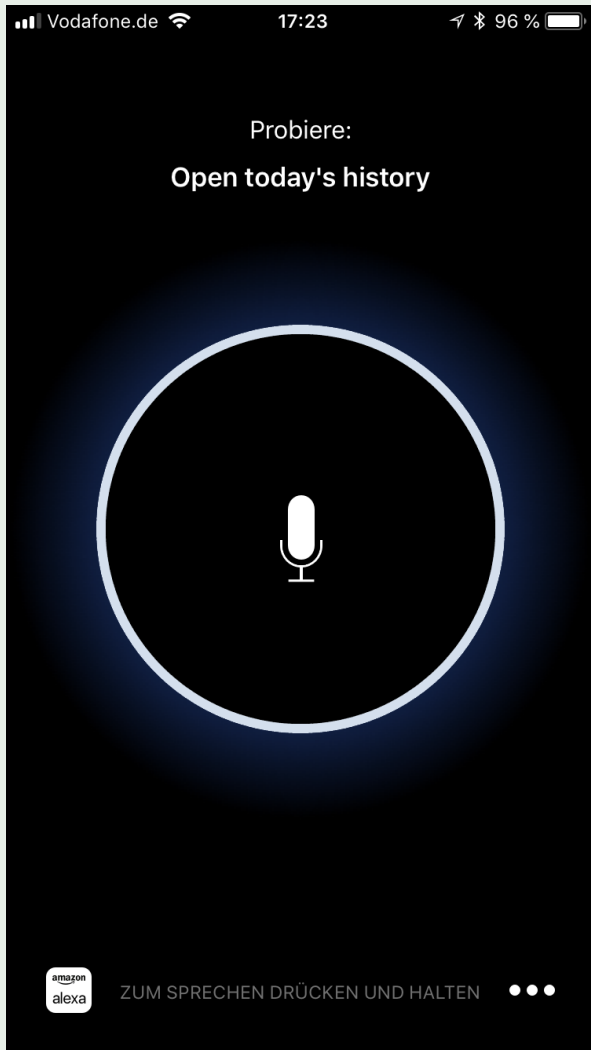
### Function code [Info](#)

Code entry type: Upload a .ZIP or JAR file

Runtime: Java 8

Handler [Info](#): com.commitwork.lambda.inventor

# Demo Inventory





# How to integrate the skill into your software environment?

---

- Out of your Lambda Implementation you can:
  - Call a webservice of your software environment
  - Or call a restful service of your software environment
- Instead of your Lambda Implementation you can use an:
  - AWS Webservice in the cloud
  - Or call an external Webservice of your software environment
- Your communicatoin has to be secure:  
You need a SSL-Certificat!  
There are more requirements! Look into the amazon documentation!

## Additional requirements of Business Skills

---

A mobile Headset for „hands-free“ Alexa Skills is currently in development.

A private Skill-Store is possible, if you have an „Alexa for business account“.  
In this case you can also manage different Alexa devices at different locations (See also <https://aws.amazon.com/de/alexaforbusiness/>)

You can manage different profiles of one device

You can distinguish the users by their voice  
(Currently available in the US. For Germany in development).

# Conclusion

---

You have seen, how to develop a customer skill.

You can use Alexa skills with your software environment.

Some of the special business requirements are in development now.

Think about speech interfaces in your business.

What is possible, what is senseless, where are the pitfalls?

Start to develop your first „Alexa Skill“ and have fun!