



# Alexa Enabled Smart Home Programming with Python



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PyCon India 2018  
Hyderabad, IN



# Hello!

## I am Sonal Raj

2 year old Alexa user. 10 year old Pythonista.



# IOT

Internet of Things





**“**It's not so much about the emergence of new technology, it's the convergence – the ability to use sensors for everything in the world to basically be a computer, whether it's your contact lens, your hospital bed or a railway track**”**

**Harriet Green**, Chief of IoT at IBM



Woah!!

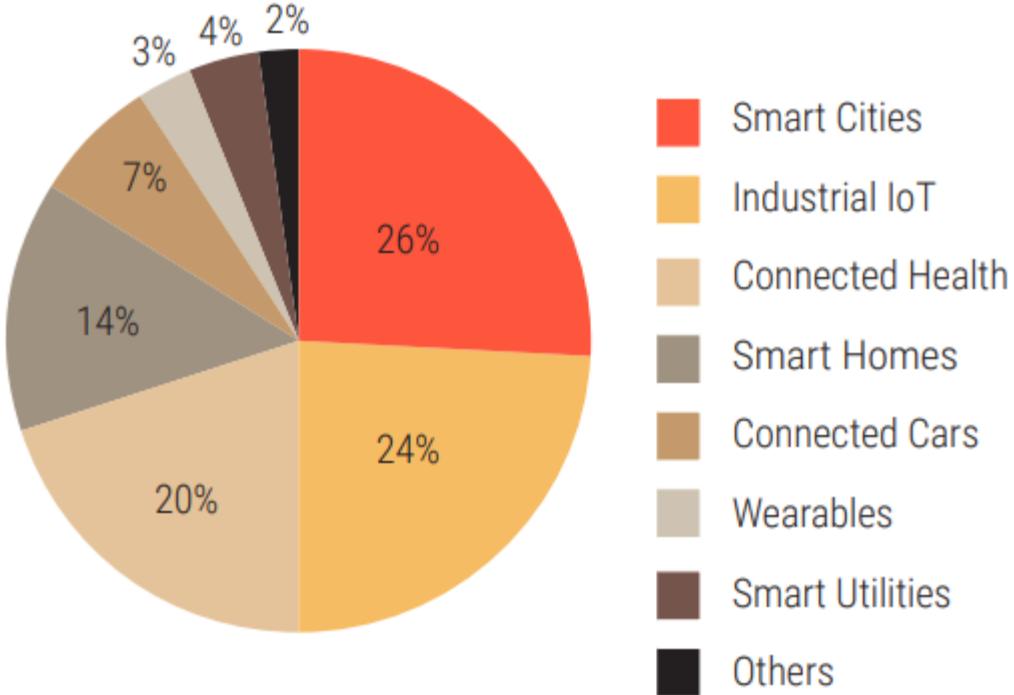
Total Adult  
Population  
**252**  
**MILLION**

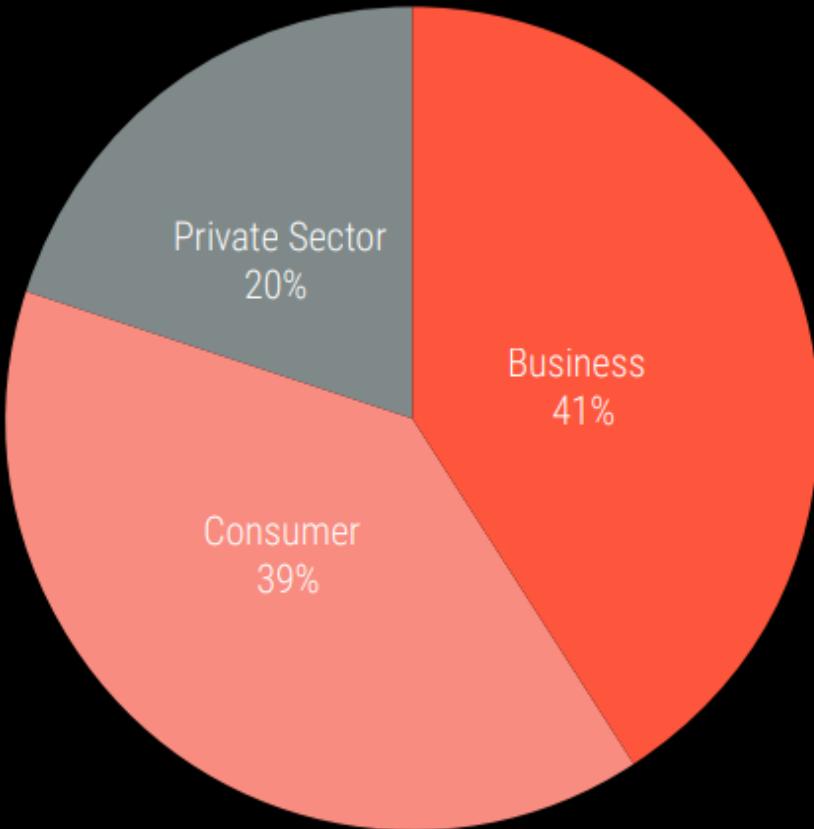


Smart Device  
Owners  
**47.3**  
**MILLION**

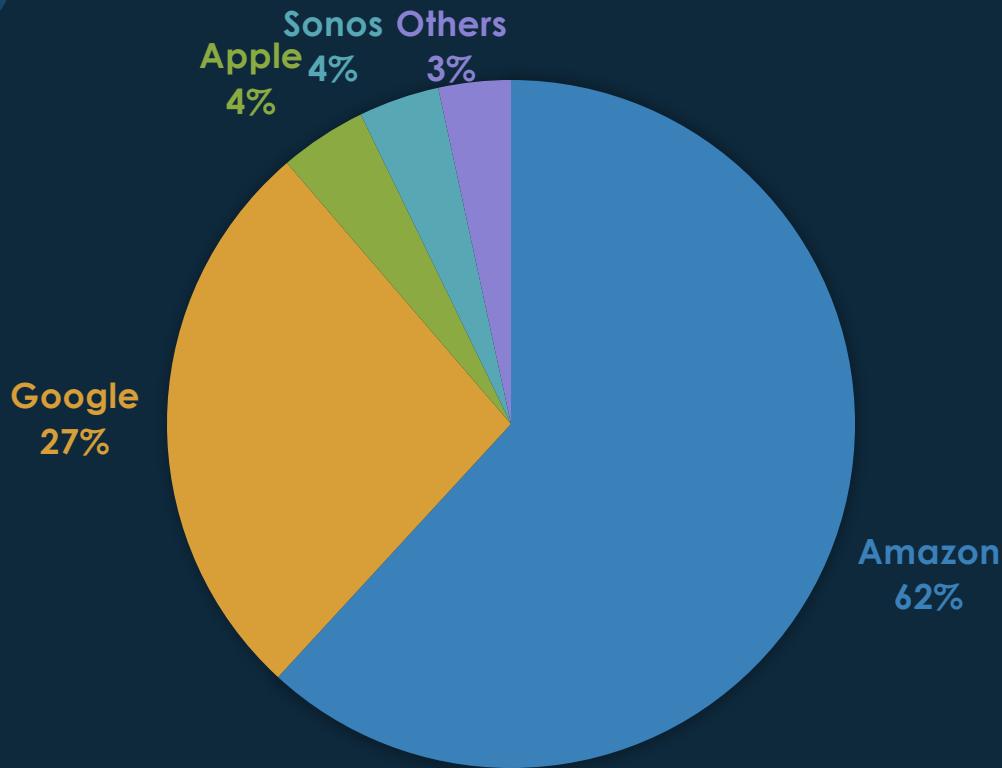
*Source:* Voicebot voice shopping US Consumer Adoption and Attitudes 2018 Report







[Source: IoT.uk]



Source: Voicebot voice shopping US Consumer Adoption and Attitudes 2018 Report



Source: Google



# Commands





# Commands Conversations

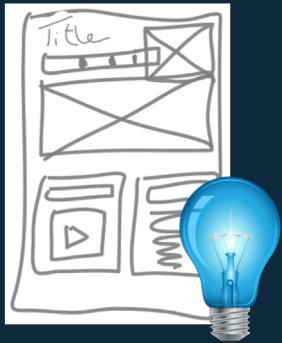




# Interactions



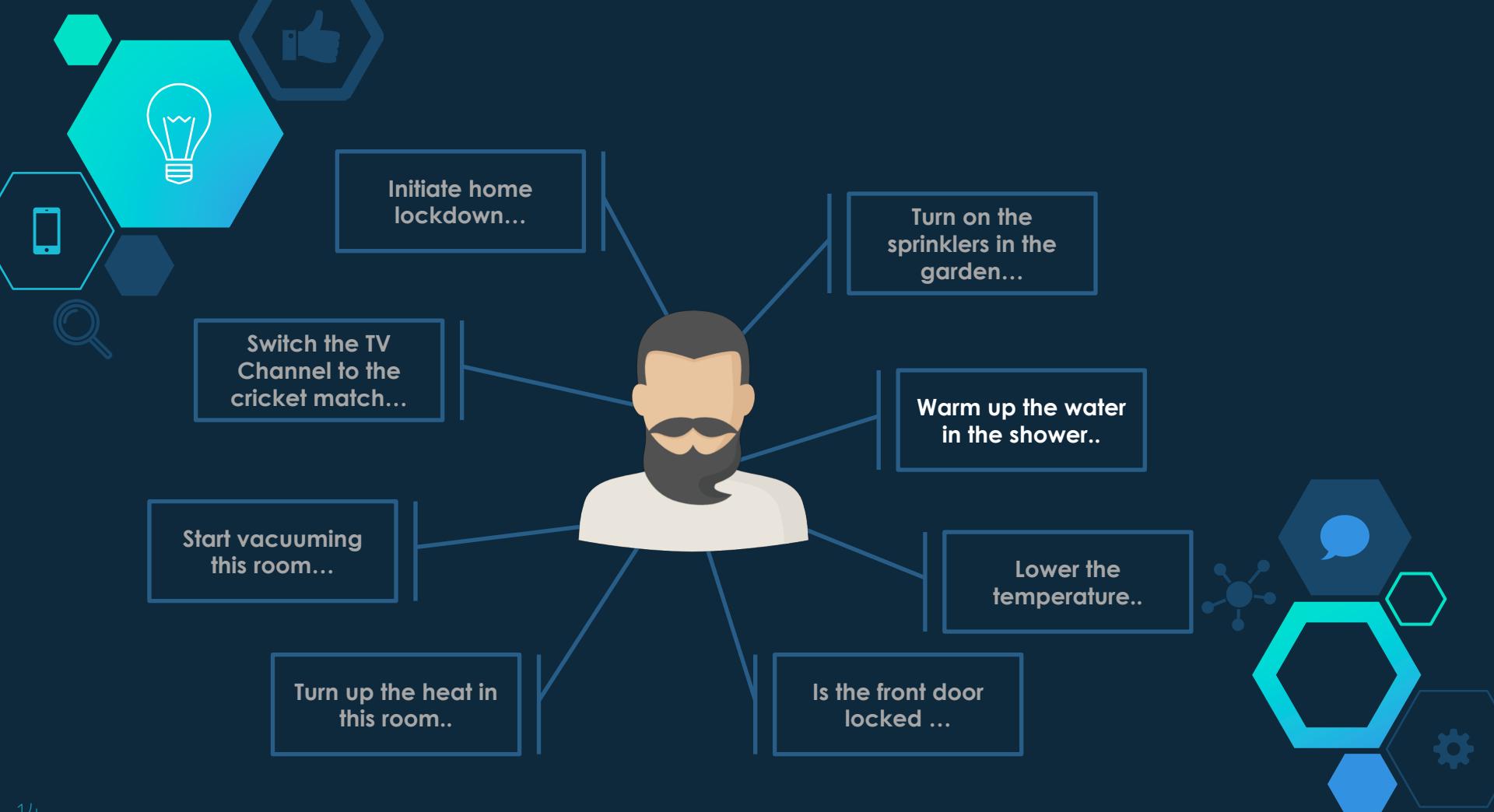
Light



Name  
On/Off  
Color  
Brightness  
State  
Location



Alexa, initiate  
night mode in  
living room





# The Alexa Framework

# Skill

## Service

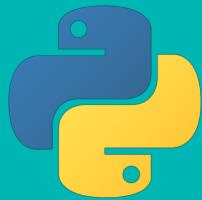
Where the actual intelligence resides  
( HTTPS Server / AWS Lambda function )

## Interface

The voice configurations to run the skill.

Skill  
Service

The Service



Interface  
The voice configurations  
to run the skill.

# Skill Interface

Service  
Where the actual  
intelligence resides  
( HTTPS Server /  
AWS Lambda  
function )

## The Interface

Utterances

SLOT  
TYPES

INTENT  
SCHEMA



# Terminologies

Building a Skill



**“Alexa, ask Zomato for the nearest [restaurantType]”**

---

Invocation Name

Slot

Utterance

maps to



Intent



# Invocation Name

What a user must say to “start” the skill. Each skill has a unique Invocation Name





**“Alexa, ask Zomato for the nearest [restaurantType]”**

---

Invocation Name

Slot

Utterance

maps to



Intent



# Utterance

A spoken phrase that maps to an intent. A skill can have many utterances.





**“Alexa, ask Zomato for the nearest [restaurantType]”**

---

Invocation Name

Slot

Utterance

maps to



Intent



# Slot

A variable within an utterance. Variable possibilities must be defined.





**“Alexa, ask Zomato for the nearest [restaurantType]”**

---

Invocation Name

Slot

Utterance

maps to



Intent



# Intent

Whenever you speak to an Alexa Skill, your message is mapped to an intent which decides what code to run within your skill.





**“Alexa, ask Zomato for the nearest [restaurantType]”**

---

Invocation Name

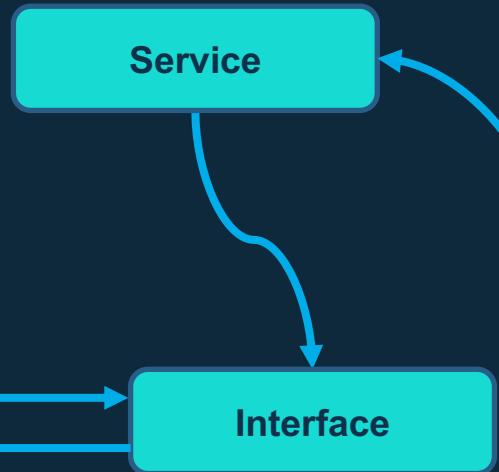
Slot

Utterance

maps to

Intent

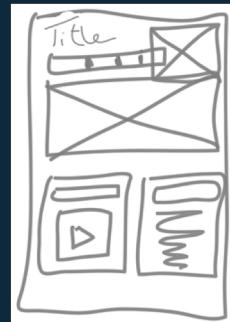




Interaction Model



Utterances





# Flask-Ask

A Flask extension that has wrappers for the common constructs for the Alexa skills API.



# Flask-Ask

A Flask extension that has wrappers for the common constructs for the Alexa skills API.

- Has decorators to map Alexa requests and intent slots to view functions
- Helps construct ask and tell responses, re-prompts and cards
- Makes session management easy
- Allows for the separation of code and speech through Jinja templates
- Verifies Alexa request signatures

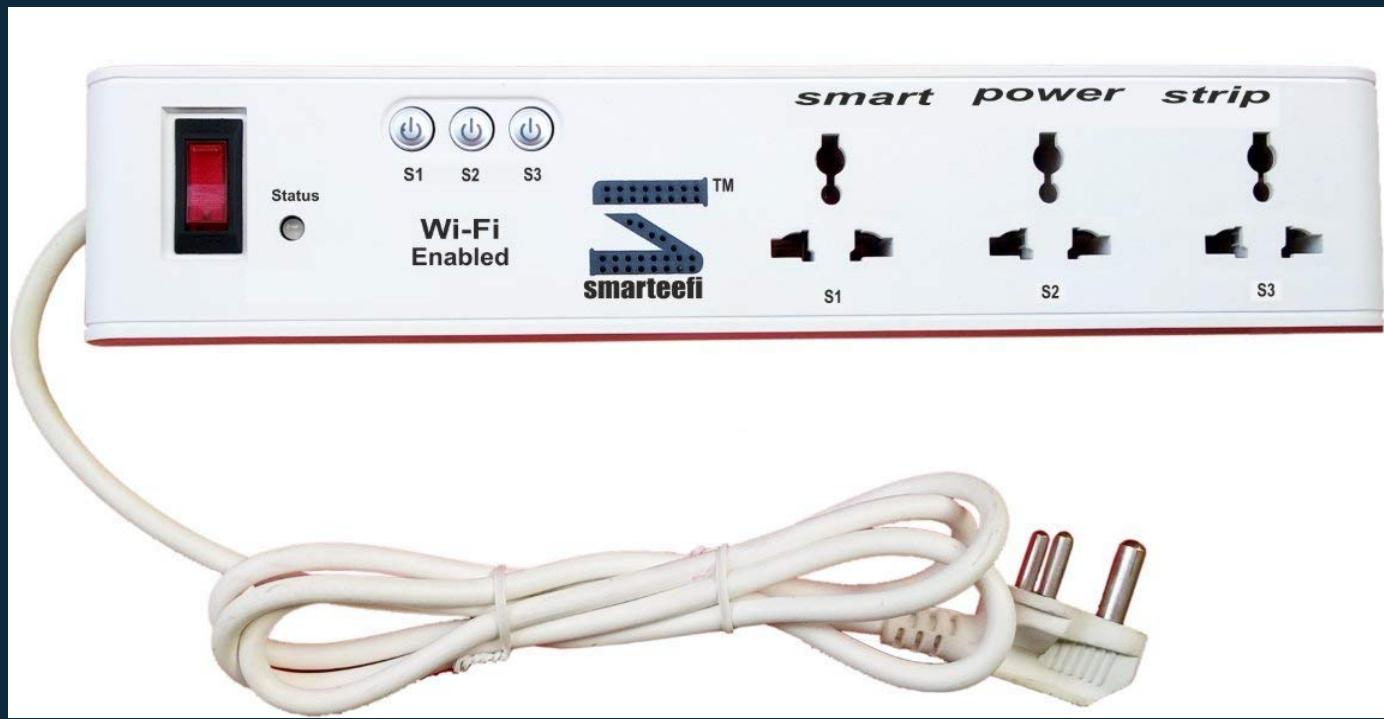


# [ Developer Experience ]

Let's see how the code looks like.









# Testing a Skill



# ngrok

exposes local servers behind NATs and firewalls to the public internet over secure tunnels.



# ngrok

Local http to public https!!!

- Demoing web sites without deploying
- Building webhook consumers on your dev machine
- Testing mobile apps connected to your locally running backend
- Stable addresses for your connected devices that are deployed in the field
- Running personal cloud services from your home



# AWS Lambda

AWS Lambda is a compute service that lets you run code without provisioning or managing servers.



# AWS Lambda

A compute service that lets you run code without provisioning or managing servers.

- Executes your code only when needed
- Scales automatically, from a few requests per day to thousands per second.
- Charged for compute, not downtime
- Any kind of application backend
- build serverless applications composed of functions that are triggered by events



# Alexa Skill Test

# Alexa Simulator

< Return to the developer console

Test is enabled for this skill.

Skill I/O     Echo Show Display     Device Log

Alexa Simulator    Manual JSON    Voice & Tone

English (US)    Type or click and hold the mic

buddhist wisdom

Welcome to Buddhist Wisdom, you can say: Tell us a quote or Share a teaching with me

share a teaching with me

The four seals of Buddhism are...1...All compounded things are impermanent,... 2...All emotions are painful,... 3...All phenomena are without inherent existence...and 4...Nirvana is beyond description

The four seals of Buddhism are...1...All compounded things are impermanent,... 2...All emotions are painful,... 3...All phenomena are without inherent existence...and 4...Nirvana is beyond description

Skill I/O

JSON Input

```
1: {  
2:   "version": "1.0",  
3:   "session": {  
4:     "new": false,  
5:     "sessionId": "amzn1.echo-api.session.fb51b6c",  
6:     "application": {  
7:       "applicationId": "amzn1.ask.skill.6e5510",  
8:     },  
9:     "user": {  
10:       "userId": "amzn1.ask.account.AHALVDPFC6D",  
11:     }  
12:   },  
13:   "context": {  
14:     "AudioPlayer": {  
15:       "playerActivity": "IDLE"  
16:     },  
17:     "Display": {  
18:       "token": ""  
19:     },  
20:     "System": {  
21:       "application": {  
22:         "applicationId": "amzn1.ask.skill.6e5510",  
23:       },  
24:       "user": {  
25:         "userId": "amzn1.ask.account.AHALVDPFC6D",  
26:       }  
27:     }  
28:   }  
29: }
```

JSON Output

```
1: {  
2:   "body": {  
3:     "version": "1.0",  
4:     "response": {  
5:       "outputSpeech": {  
6:         "type": "PlainText",  
7:         "text": "The four seals of Buddhism are...1...All compounded things are impermanent,... 2...All emotions are painful,... 3...All phenomena are without inherent existence...and 4...Nirvana is beyond description"},  
8:       "card": {  
9:         "type": "Simple",  
10:        "title": "SessionSpeechlet - The four seals of Buddhism are...1...All compounded things are impermanent,... 2...All emotions are painful,... 3...All phenomena are without inherent existence...and 4...Nirvana is beyond description",  
11:        "content": "SessionSpeechlet - The four seals of Buddhism are...1...All compounded things are impermanent,... 2...All emotions are painful,... 3...All phenomena are without inherent existence...and 4...Nirvana is beyond description"  
12:      },  
13:      "reprompt": {  
14:        "outputSpeech": {  
15:          "type": "PlainText",  
16:          "text": ""  
17:        }  
18:      },  
19:      "shouldEndSession": false  
20:    },  
21:    "sessionAttributes": {}  
22:  }  
23: }
```

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# Echosim.io

Echosim.io

COMMUNITY EDITION BETA

Log Out

Resources

Help

Language EN-US ▾

Console OFF

Echosim.io provided by iQuarius Media. Special thanks to Sam Machin for his Alexa in the Browser [project](#).

## Alexa Skill Testing Tool

Click and **hold** the microphone button  
or hold down the space bar on your keyboard to activate the microphone.

*Input Not Available...*





# Deploying a Skill



# IFTTT

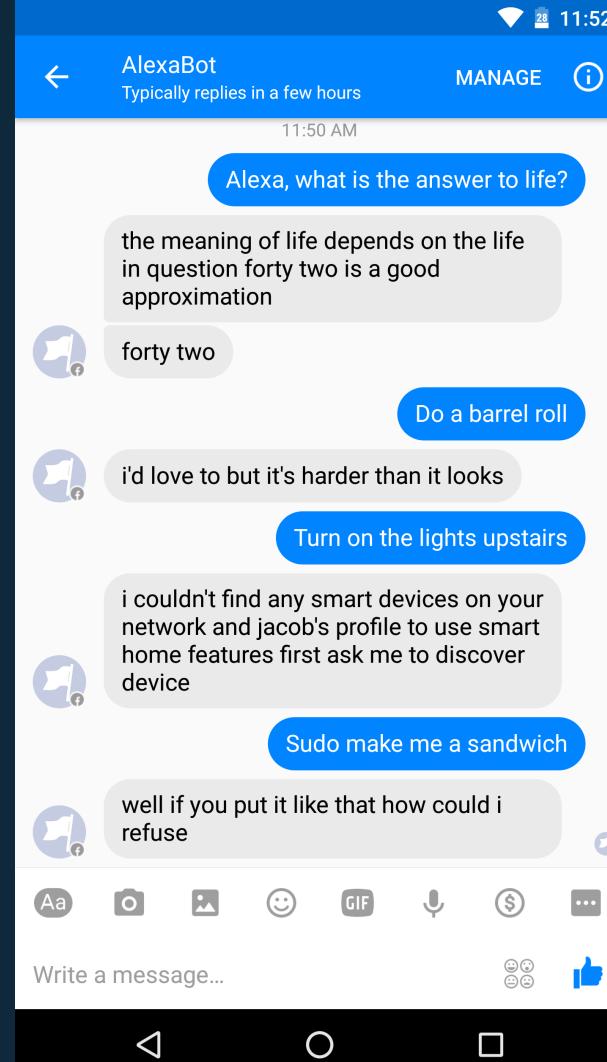




# The Future

- Interactive Social Networks
  - Interactive Idea boards
  - Voice Gaming
  - Crisis Alerting
  - Office Integration – Meeting room bookings, etc.
  - Always aware state!! ( Creepy!! )
- 

# AlexaBot





# Thanks!

## Questions??

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  - [@\\_sonalraj@twitter](https://twitter.com/_sonalraj)
  - [sonalr2@facebook](https://facebook.com/sonalr2)
- 