

Build Your Own Chatbot

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STAR WARS

CHATBOT

Tell me a Yoda quote

Developer Challenges

**Automated
Speech
Recognition**

Testing

Availability

**Business
Logic**

Mobile

**Natural
Language
Understanding**

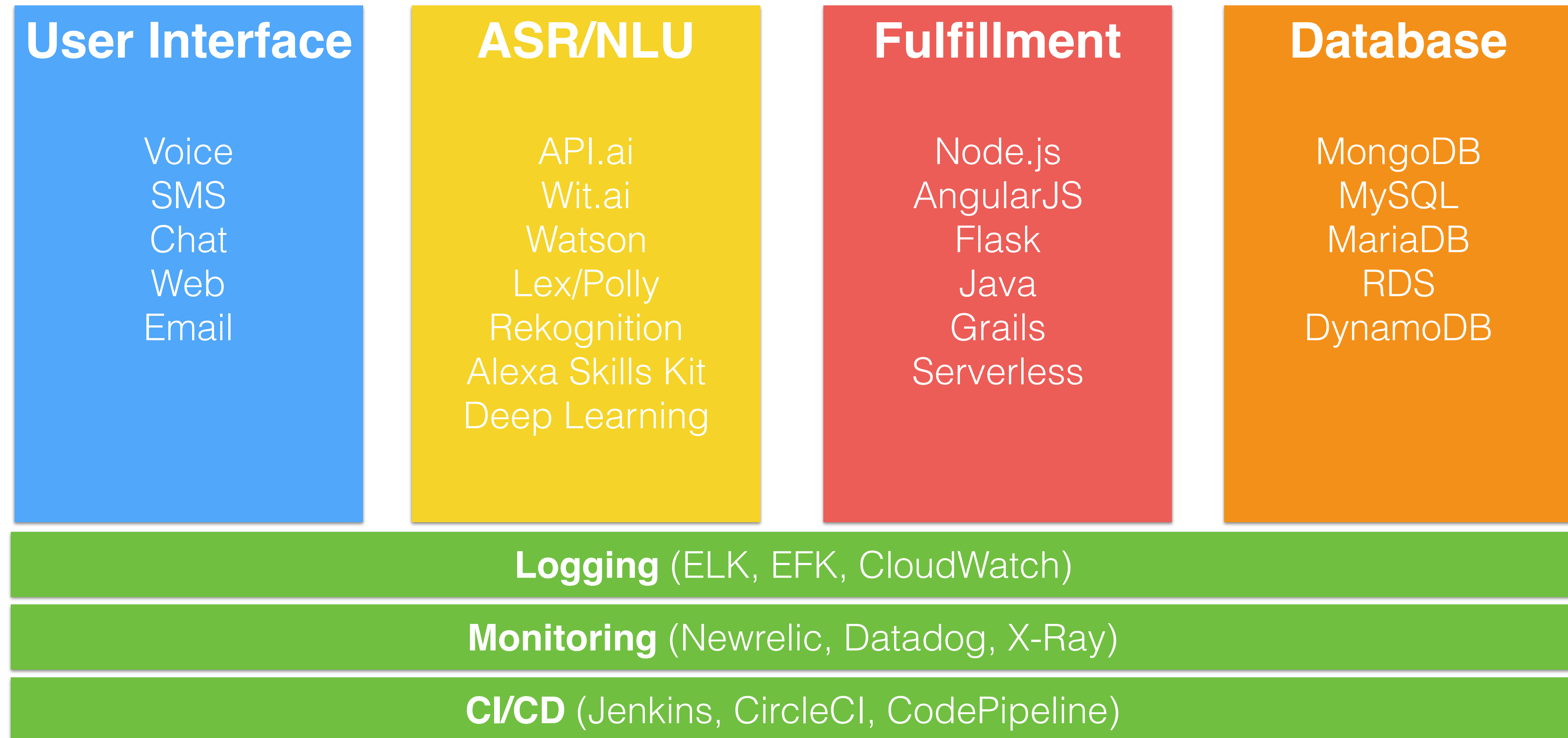
Scalability

Authentication

Dialog Manager

**Disparate
Systems**

Chatbot Components



BookHotel

Intents

A particular goal that the user wants to achieve

I'd like to book a hotel.

Utterances

Spoken or typed phrases that invoke your intent

Sure, which city?

New York City

Slots

Data the user must provide to fulfill the intent

What date do you check in?

Prompts

Questions that ask the user to input data

...

Fulfillment

The business logic required to fulfill the user's intent



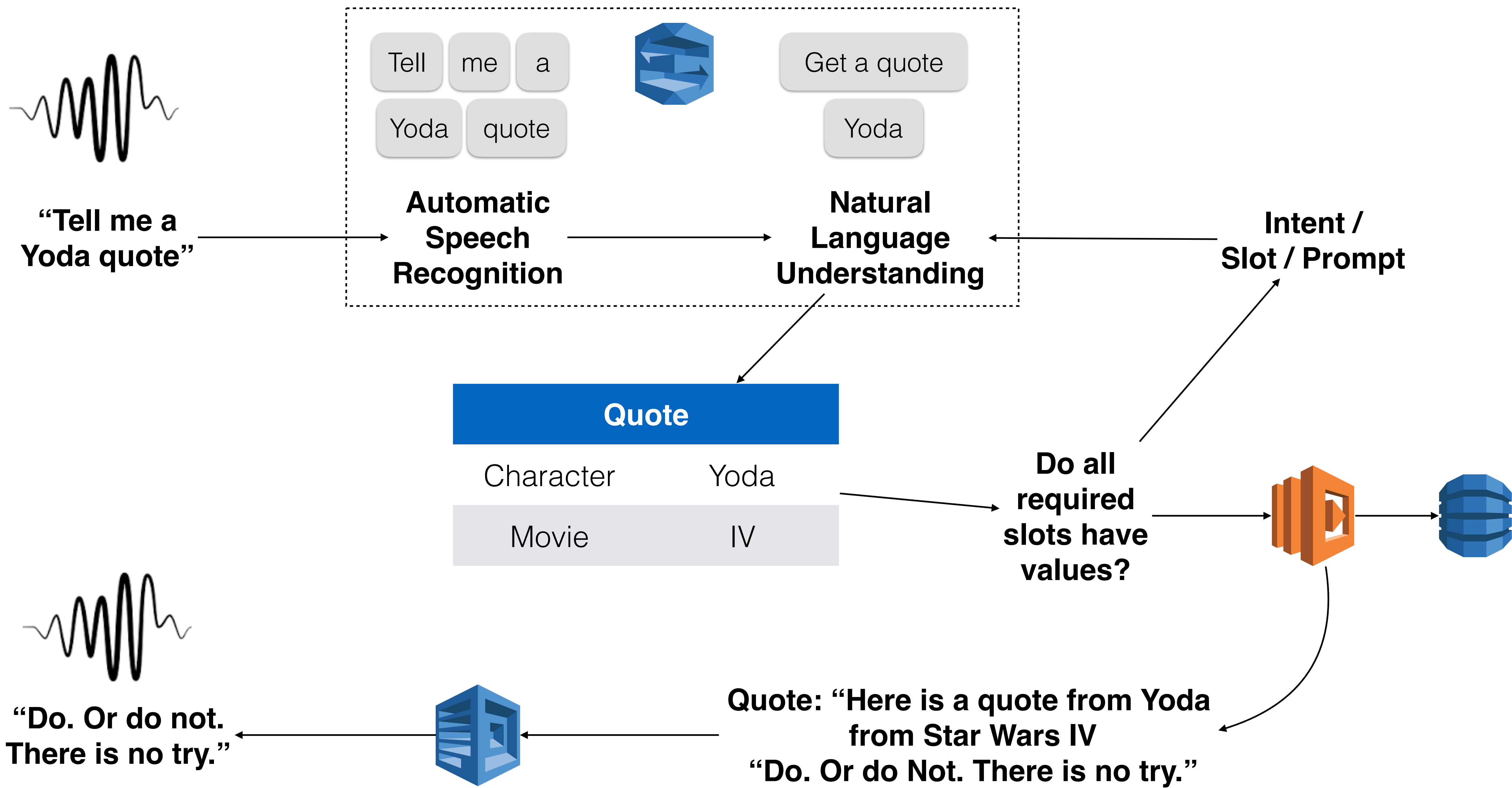
November 30th.



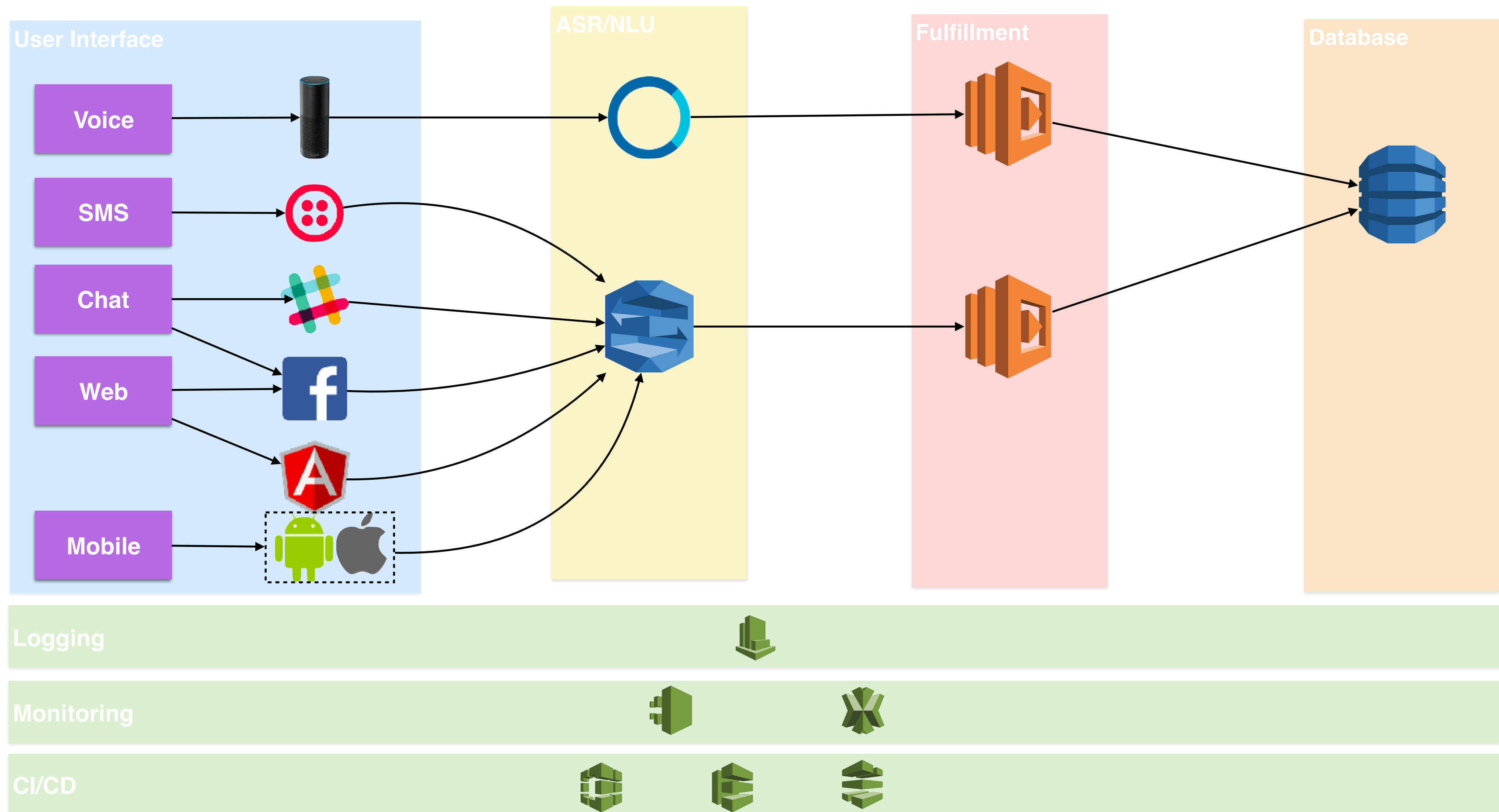
Are you sure you want to book the hotel in New York City?

Yes.

Thank you. The reservation went through successfully.



Chatbot Architecture



BYOC: Build Your Own Chatbot

■ **Build a Lex bot**

- Voice User Interface (VUI)
 - Define intent, utterances, slot types, slots, prompts
- Write Lambda function for business logic (intent -> database)
 - Prepare database, setup indexes
- Integrate with Twilio/SMS, Slack, Facebook, Web, mobile

■ **Build an Alexa skill (optional)**

- Export Lex bot configuration
- Write Lambda function for business logic (intent -> database)

Prepare database

```
{
  "dead": true,
  "force-sensitive": true,
  "force-side": "light",
  "id": 1,
  "lightsaber": "green",
  "planet": "Dagobah",
  "quotes": [
    "When nine hundred years old you reach, look as good you will not.",
    "Truly wonderful, the mind of a child is",
    "A Jedi uses the Force for knowledge and defense, never for attack",
    "That is why you fail.",
    "Adventure. Excitement. A Jedi craves not these things.",
    "Judge me by my size, do you?",
    "Fear is the path to the dark side",
    "Wars not make one great",
    "Do, or do not. There is no try",
    "Size matters not",
    "The dark side clouds everything",
    "Impossible to see the future is",
    "Clear your mind must be",
    "Much to learn you still have .",
  ],
  "weapon": "lightsaber",
  "whoami": "Yoda"
}
```

starwars Close									
Overview		Items		Metrics		Alarms		Capacity	
Indexes		Triggers		Access control		Tags			
Create index		Delete index							
Name		Status		Type		Partition key		Sort key	
Attributes		Read capacity		Write capacity		Size			
whoami-index		Active		GSI		whoami (String)		-	
						ALL		5	
								5	
								4,856	

DynamoDB

- Fast, fully-managed NoSQL database service
- Capable of handling any amount of data
- Durable and highly available
- All SSD storage
- Simple and cost effective





Amazon Lex

- Service for building conversational interfaces using voice and text
- Provides
 - Automatic Speech Recognition (ASR): speech -> text
 - Natural Language Understanding (NLU): text -> intent
- Powered by the same deep learning technologies as Alexa
- <http://aws.amazon.com/lex>



BYOC #2: Build a Lex bot

 Services ▾ Resource Groups ▾ 

Lex

Bots

Intents

Slot types

Bots

Create

Actions ▾

Filter:

	Name	Status	Last updated
<input type="radio"/>	OrderFlowers	READY	September 3, 2017 at 6:59:18 PM UTC+2
<input type="radio"/>	StarWars	READY	September 9, 2017 at 3:31:22 AM UTC+2

Multi-turn conversations

- Default session timeout is 5 mins, can be up to 24 hours

BYOC #2: Twilio

StarWars Latest ▾

Editor Settings **Channels** Monitoring

Chatbots

- Facebook
- Slack
- Twilio SMS**

Fill in the form below and click activate to get a callback URL to use with Twilio. You can generate multiple callback URLs

Name* ⓘ

Description ⓘ

IAM Role [AWSServiceRoleForLexChannels](#) ⓘ
Automatically created on your behalf

KMS key ⓘ

Alias* ⓘ

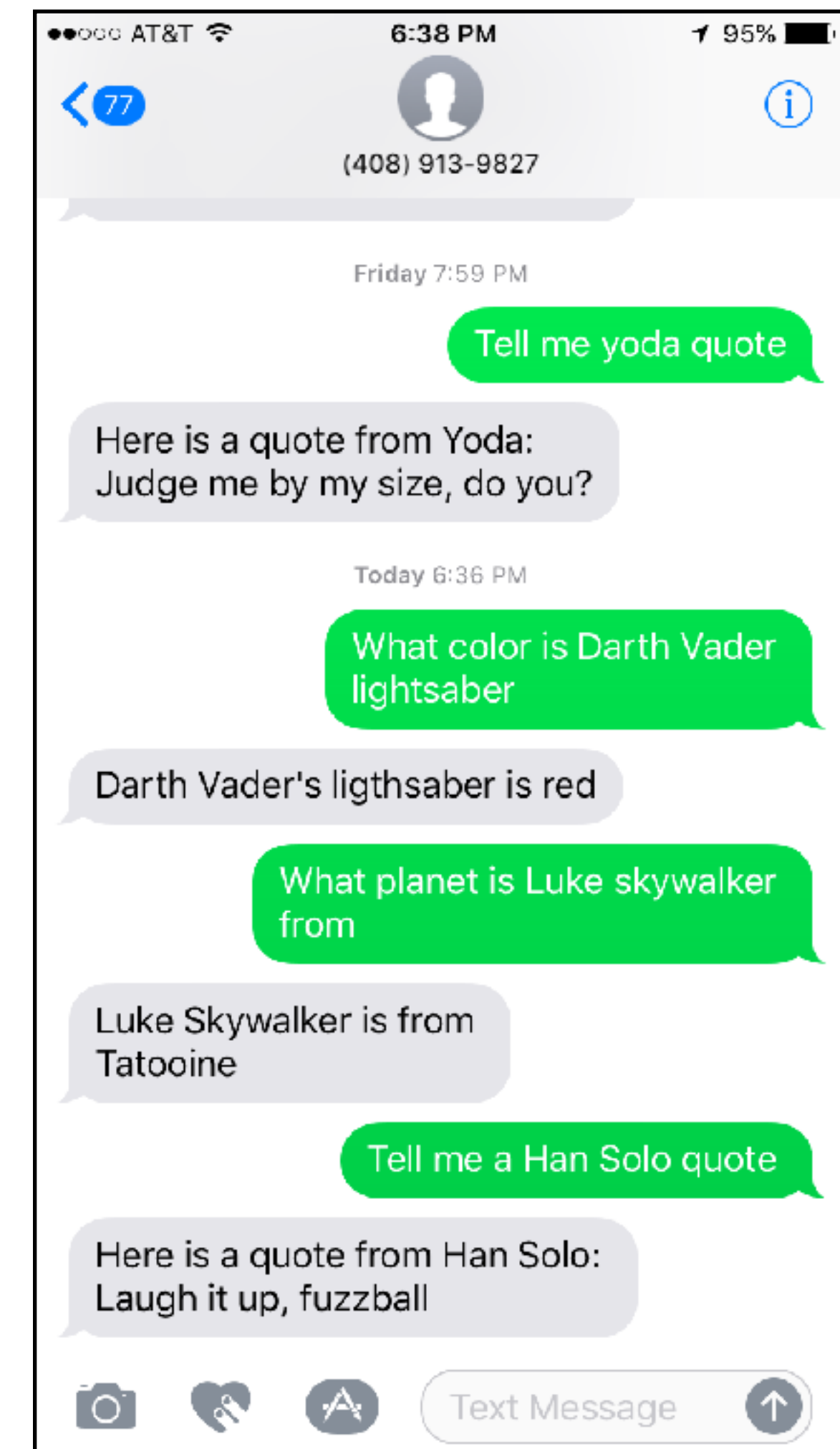
Account SID* ⓘ

Authentication Token* ⓘ

Callback URLs

starwars_sms (starwars)

Endpoint URL: <https://channels.lex.us-east-1.amazonaws.com/twili...>



Lex and Twilio/SMS Integration

- Twilio: Build software that communicates with everyone in the world
- Create a Twilio SMS endpoint
- Specify Twilio credentials in Lex bot
- Create a Twilio SMS endpoint (phone #)
- Set Callback URL in Messaging of Twilio SMS endpoint
 - When message comes in

BYOC #2: Slack

StarWars Latest

Editor Settings Channels Monitoring

Chatbots

Facebook

Slack

Twilio SMS

IAM Role

AWSServiceRoleForLexChatbot

Automatically created on your behalf

KMS key

aws/lex

Alias*

Alias

Client Id*

Client Id

Client Secret*

Client Secret

Verification Token*

Verification Token

Success Page URL

Success Page URL

Activate

Callback URLs


StarWarsSlack (starwars)

Postback URL:

https://channels.lex.us-east-1.amazonaws.com/starwars-slack

OAuth URL:

https://channels.lex.us-east-1.amazonaws.com/starwars-slack




star_wars_chatbot

star_wars_chatbot

This is the very beginning of your direct message history with **star_wars_chatbot**.

[How does star_wars_chatbot work?](#)


Today



arungupta

9:14 PM

tell me a yoda quote




Star Wars Chatbot

APP

9:14 PM


Here is a quote from Yoda: That is why you fail.



arungupta

9:14 PM

what color is Luke skywalker lightsaber




Star Wars Chatbot

APP

9:14 PM


Luke Skywalker's lightsaber is blue



arungupta

9:14 PM

which planet is Darth Vader from



Star Wars Chatbot

APP

9:14 PM

★

Darth Vader is from Tatooine

18

Lex and Slack Integration

- Create a Slack application: api.slack.com
- Add a Bot to the application
 - Always online
 - Enable interactive messages
- Specify Slack credentials in Lex bot
- Specify URLs in Slack application
 - Postback: Lex bot's endpoint that listens to Slack events
 - OAuth: Lex bot's handshake with Slack

BYOC #2: Facebook Messenger

StarWars Latest

Editor Settings Channels Monitoring

Chatbots

- Facebook
- Slack
- Twilio SMS

Name*
Name

Description*
Description

IAM Role
AWSServiceRoleForLambda
Automatically created role

KMS key
aws/lex

Alias*
Alias

Verify Token*
Verify Token

Page Access Token*
Page Access Token

App Secret Key*
App Secret Key

Activate

Callback URLs

- StarWarsChatbot (starwars)

Endpoint URL: https://channel

S

Star Wars Chatbot

1 person likes this

Movie

5:21PM

tell me a yoda quote

6:27PM

tell me a yoda quote

S

Here is a quote from Yoda: When nine hundred years old you reach, look as good you will not.

what is the color of luke skywalker lightsaber

S

Luke Skywalker's lightsaber is blue

what planet is darth vader from?

S

Darth Vader is from Tatooine

S

Lex and Facebook Integration

- Create a Facebook application
- Specify application credentials in Lex bot
 - Gives Callback URL
- Setup webhooks for Facebook application
- Specify Callback URL and enable subscription
- Optionally, publish the application (for public consumption)

BYOC #2: Web Application

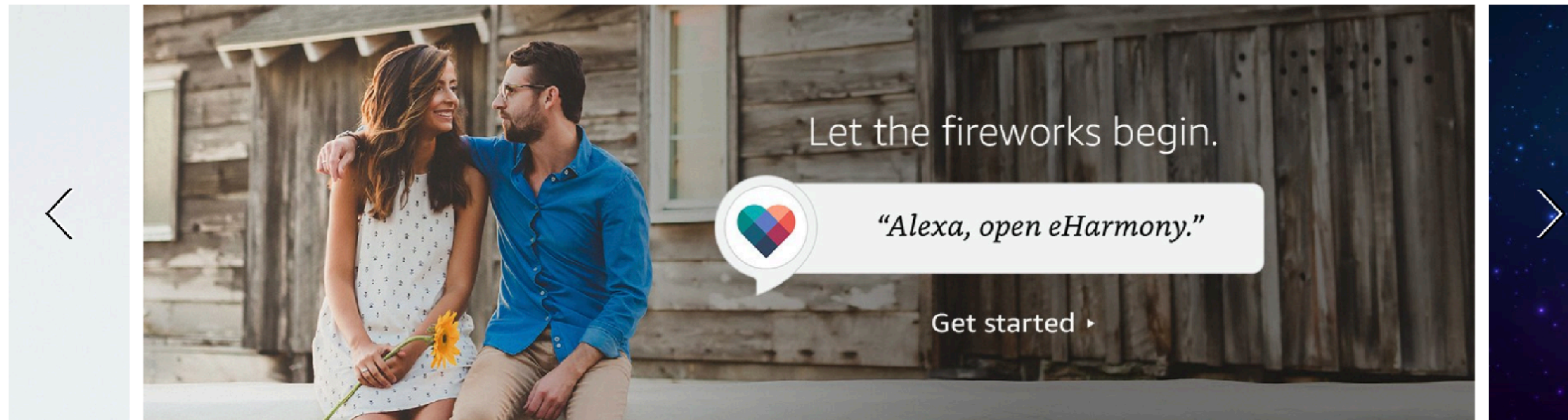
BYOC #2: Mobile

What is Alexa?






- Alexa is a cloud-based service that can answer questions, play music, read the news and more
- Echo is an always-on always-connected hands-free device that connects to Alexa



Alexa has skills!



"Alexa, what are your top skills?"

 <p>"Alexa open Sleep Sounds"</p> <p>Sleep and Relaxation Sounds ★★★★★ 3,298</p>	 <p>"Alexa, play Classic Vinyl on SiriusXM"</p> <p>SiriusXM ★★★★☆ 1,259</p>	 <p>"Alexa, what's my Flash Briefing?"</p> <p>Fox News ★★★★☆ 595</p>	 <p>"Alexa, start Song Quiz"</p> <p>Song Quiz ★★★★★ 652</p>	 <p>"Alexa, start Jeopardy!"</p> <p>Jeopardy! ★★★★☆</p>
---	--	---	--	--

amazon.com/skills

Two sides of Alexa skill



Voice User Interface

+



Programming Logic

Two sides of Alexa skill



+



developer.amazon.com

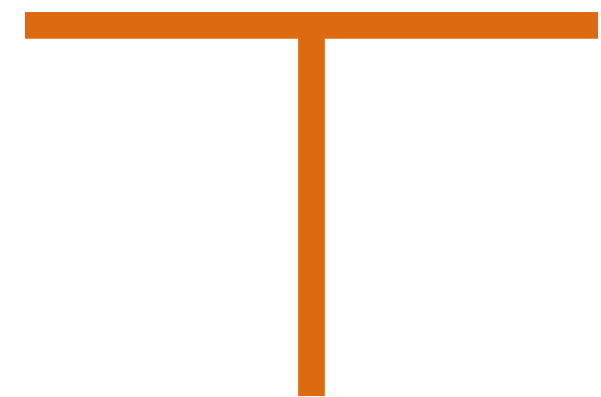
aws.amazon.com

BYOC #3: Build an Alexa Skill

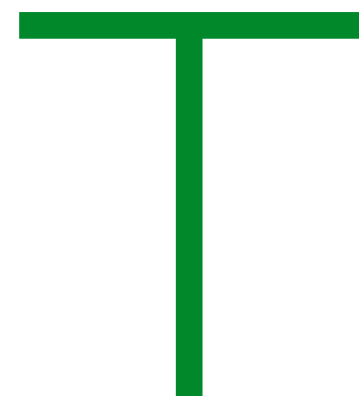
- Front end
 - Voice User Interface (VUI)
 - Intent, utterances, slot types, slots, prompts
 - Export Lex bot configuration
 - Can also be created from scratch (if starting here)
 - developer.amazon.com
- Back end
 - Lambda function with Alexa Skill Kit (ASK) trigger
 - aws.amazon.com
- Skill certification

Alexa Skill Kit

Alexa, ask Star Wars tell me a Yoda quote



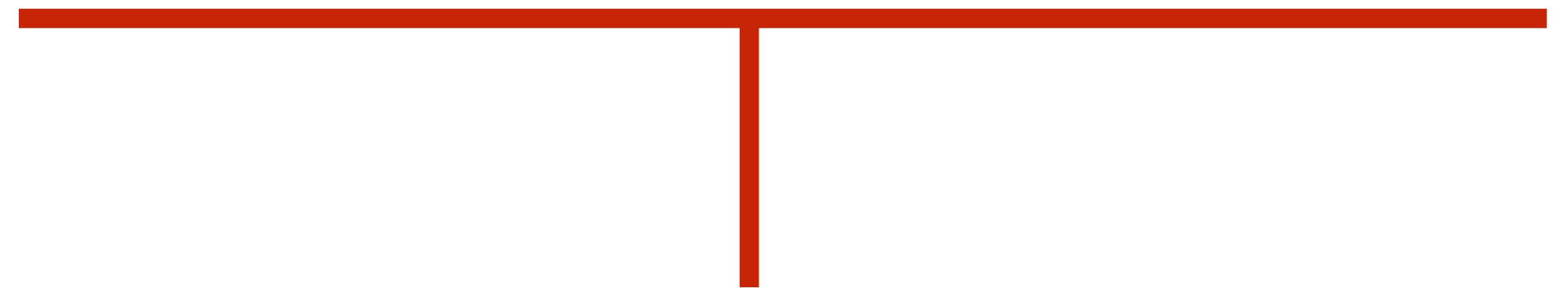
Wake
word



Starting
phrase



Skill
invocation
name



Utterance

Alexa Skill Testing Tool

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

Expect Speech...



Clear

Collapse / Expand

SpeechRecognizer.ExpectSpeech 2017-09-21 01:21:18

```
{
  "directive": {
    "header": {
      "dialogRequestId": "dialogRequestId-18b4f182-d922-4e63-b85d-4f9993f021f0",
      "namespace": "SpeechRecognizer",
      "name": "ExpectSpeech",
      "messageId": "64b4412f-202c-4894-95a5-5a7f8f376dbd"
    },
    "payload": {
      "timeoutInMilliseconds": 8000
    }
  }
}
```

TemplateRuntime.RenderTemplate 2017-09-21 01:21:18

**Welcome to Star Wars Trivia, you
can ask quotes**

Star Wars

Star Wars Welcome

```
{
  "directive": {
    "header": {
      "dialogRequestId": "dialogRequestId-18b4f182-d922-4e63-b85d-4f9993f021f0",
      "namespace": "TemplateRuntime",
      "name": "RenderTemplate",
      "messageId": "8035d9d2-ecf-4e07-b92f-f60e20ea9659"
    },
    "payload": {
```




Security

Role ARN arn:aws:iam::091144949931:role/lambda_services

Role description Allows Lambda Function to call AWS services on your behalf.

Instance Profile ARNs

Path /

Creation time 2017-08-22 18:44 PDT

Permissions

Trust relationships






Access Advisor

Revoke sessions

Attach policy

Attached policies: 5

Policy name ▼

- ▶  AmazonDynamoDBFullAccess
- ▶  AWSLambdaDynamoDBExecutionRole
- ▶  AmazonLexReadOnly
- ▶  AmazonLexFullAccess
- ▶  AmazonLexRunBotsOnly

Permissions

Trust relationships

Access Advisor

You can view the trusted entities that can assume the role and the

Edit trust relationship

Trusted entities

The following trusted entities can assume this role.

Trusted entities

The identity provider(s) lex.amazonaws.com

The identity provider(s) lambda.amazonaws.com

Logging - Amazon CloudWatch

- Monitoring service for AWS cloud resources and applications
- Visibility into resource utilization and operational performance with Metrics and Logs
- Set alarm thresholds to send notifications or trigger Auto Scaling
- Log aggregation, monitoring and troubleshooting with CloudWatch Logs
- Support for Custom Metrics



Search Log Group

Create Log Stream

Delete Log Stream

Filter:	Log Stream Name Prefix	×
<input type="checkbox"/> Log Streams	Last Event Time	
<input type="checkbox"/>	2017/09/21/[\$LATEST]8981e581afb9417d8d89f09b90324ec3	2017-09-20 17:12 UTC-7
<input type="checkbox"/>	2017/09/21/[\$LATEST]f0fa047b8f5d4181ae6d50dc369f7018	2017-09-20 17:08 UTC-7
<input type="checkbox"/>	2017/09/19/[\$LATEST]cbc463340fa248d5b99061d0c9648c42	2017-09-19 13:57 UTC-7
<input type="checkbox"/>	2017/09/12/[\$LATEST]96dc2bf8b7904a1b8685d1b0e3d08959	
<input type="checkbox"/>	2017/09/12/[\$LATEST]827ad8dea94a444c9206f218d0268163	
<input type="checkbox"/>	2017/09/11/[\$LATEST]576b9d3e5c2b41c5a45d4f11d6570258	
<input type="checkbox"/>	2017/09/11/[\$LATEST]a56d79f17ec84e0ca2770893348cea50	
<input type="checkbox"/>	2017/09/11/[\$LATEST]2a1635100f8245e3aff5ac9c73bd9ff7	
<input type="checkbox"/>	2017/09/11/[\$LATEST]6b5ca42c842f44ffb8a7042d7167e39f	
<input type="checkbox"/>	2017/09/09/[\$LATEST]c107c593907642b6994136139dab2c2a	
<input type="checkbox"/>	2017/09/09/[\$LATEST]df2c0fbf61bf4e5392529c3fa854eb81	
<input type="checkbox"/>	2017/09/09/[\$LATEST]beea3b8a5be34868ae39c2df9c46b7a5	
<input type="checkbox"/>	2017/09/08/[\$LATEST]7fd04de005594d5d9e2940971129b75d	
<input type="checkbox"/>	2017/09/08/[\$LATEST]b97bf5fc565d4e43b15ed38e988a5949	
<input type="checkbox"/>	2017/09/08/[\$LATEST]f51c4e28e23c462596a8dab26eb7c255	





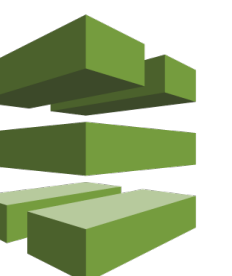
Analyze & Debug - AWS X-Ray

- AWS X-Ray provides an end-to-end view of requests
- Combines the data gathered from each service into singular units called traces
- View the service map to see trace data such as latencies, HTTP statuses

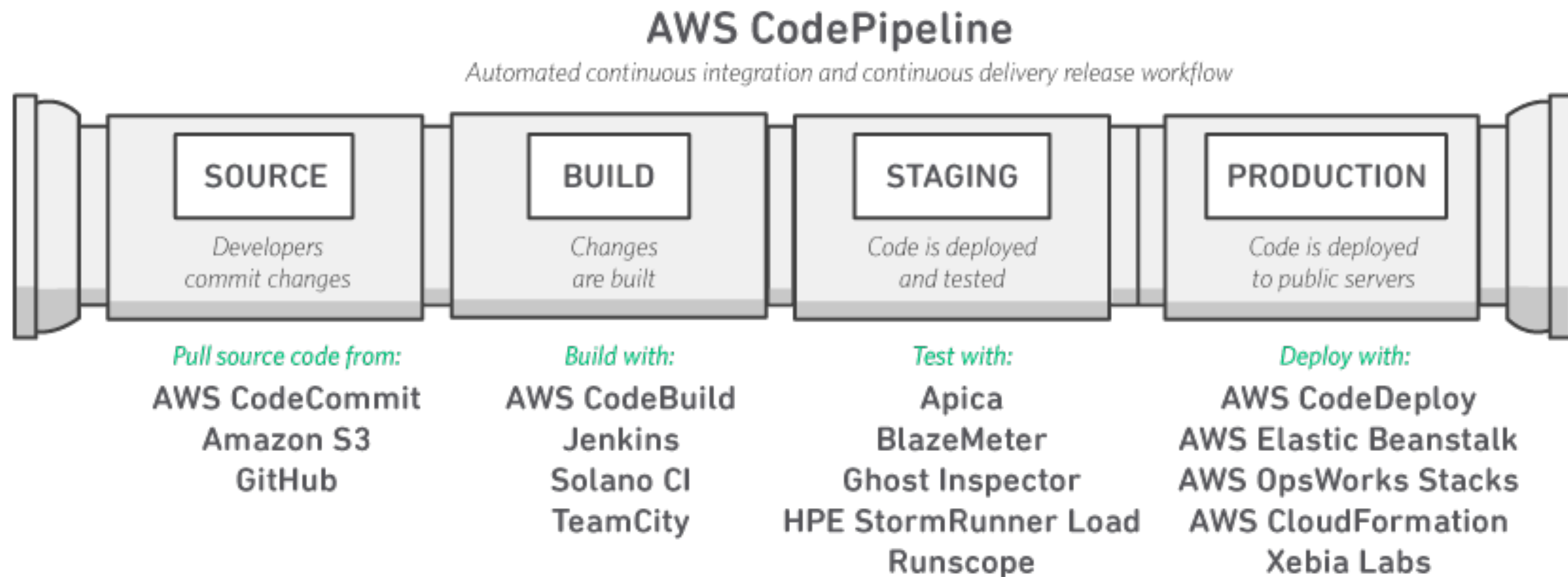


Add a snapshot of X-Ray dump

Deployment Pipeline

- AWS CodeBuild: Managed build service that compiles source code, runs tests and create packages 
- AWS CodeDeploy: Automates deployment of packages to EC2 instances, rolling updates and health checks 
- AWS CodePipeline: CI/CD service that builds, tests and deploy applications, visual workflow, integrate using custom plugins 

Deployment Pipeline on AWS



References

- Amazon Lex: aws.amazon.com/lex
- Developer Portal: developer.amazon.com
- Slides & code: github.com/arun-gupta/chatbot