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# **SERVERLESS CHATBOTS**

# WHAT TO EXPECT

- ▶ What is serverless?
- ▶ Serverless Challenges
- ▶ AWS Lambda functions in Java
- ▶ Chatbots?
- ▶ Chatbot challenges
- ▶ Amazon LEX
- ▶ Putting it all together - Demo

# WHAT IS SERVERLESS

- ▶ a cloud computing execution model
- ▶ The cloud platform manages the allocation of machines
- ▶ Characteristics
  - ▶ No Ops - resources are managed by the platform
  - ▶ Never pay for idle
  - ▶ Reduced development costs - (built into existing architecture)
  - ▶ Continuous scaling
  - ▶ Next evolution in cloud systems

## SERVERLESS EXAMPLES

- ▶ function as a service (aws lambda) - FAAS
  - ▶ a serverless compute service that runs your code in response to events
  - ▶ http driven using api gateway
  - ▶ event driven
  - ▶ created in its own container
  - ▶ focus only on your code - high productivity
  - ▶ cold starts on inactivity, function updates or scaling
  - ▶ Sensitive to class loading check your dependency tree

## SERVERLESS EXAMPLES

- ▶ not just lambda
  - ▶ S3
  - ▶ SNS
  - ▶ Kinesis, firebase
  - ▶ Api-Gateway
  - ▶ Cognito
  - ▶ Dynamo DB ?
- ▶ Not serverless (when you have to manage server types and instances)
  - ▶ RDS, Ec2, Elasticache...

# FAAS – AWS LAMBDA

- ▶ run code in response to events in java, c#, python, node.js
- ▶ you configure the memory size: 128mb 1.5gb and CPU/IO allocated in proportion
- ▶ runs on Java 1.8 with 2 virtual CPU's and 500MB /tmp
- ▶ MAX heap size 85% of the lambda memory
- ▶ STDOUT / STDERR and Basic Metrics are sent to cloud watch logs
- ▶ Runtime includes aws-lambda-java-core (other java aws SDK's are not included)
- ▶ JVM parameters cannot be altered (but can be viewed)
- ▶ Cold Starts

# AWS LAMBDA EVENTS

## DATA STORES



Amazon S3



Amazon  
DynamoDB



Amazon  
Kinesis



Amazon  
Cognito

## ENDPOINTS



Amazon  
API Gateway



AWS IoT



AWS Step  
Functions



Amazon  
Alexa

## DEVELOPMENT AND MANAGEMENT TOOLS



AWS  
CloudFormation



AWS CloudTrail



AWS  
CodeCommit



Amazon  
CloudWatch

## EVENT/MESSAGE SERVICES



Amazon  
SES



Amazon SNS



Cron events

# LAMBDA CHALLENGES

- ▶ loss of control, configuration, performance, issue resolution, security
- ▶ care is needed with none serverless services that would need to scale automatically
- ▶ benchmarking inconsistent performance
- ▶ testing, simulation of the system as a whole
- ▶ lack of maturity features (e.g api-gw doesn't support web-sockets yet),
- ▶ not a smooth sailing require shift in paradigm and thinking
- ▶ latency (services are not necessarily co-located)
- ▶ debugging
- ▶ vendor lock-in



# CREATE LAMBDA

- ▶ Demo with aws console
- ▶ Demo with aws cli

# CHATBOTS

- ▶ a service designed to **simulate** conversation with human users accessible from a messaging / voice interface
- ▶ Artificial Intelligence or a Script
  - ▶ Natural language processing
  - ▶ Machine Learning
- ▶ Not Just text:
  - ▶ <http://tinyurl.com/ycphvzgo>
  - ▶ Voice chat with Alexa
- ▶ What could go wrong? (Microsoft Tay posting racist, sexually charged tweets)

# CHATBOTS

- ▶ Conversational UI (Chatbots) are the new and smart human to machine interface
- ▶ Types of Bots:
  - ▶ **Weather bot:** Get the weather whenever you ask.
  - ▶ **Shopping bot:** Help me with my retail tasks.
  - ▶ **News bot:** Ask it to tell you when ever something interesting happens.
  - ▶ **Life advice bot:** I'll tell it my problems and it helps me think of solutions.
  - ▶ **Banking, Personal finance bot:** helps me manage my money better.
  - ▶ **Scheduling bot:** Get me a meeting with someone and reminds me about it
  - ▶ **A bot that's your friend:** In China there is a bot called **Xiaoice**, built by Microsoft, that over 20 million people talk to.
- ▶ **Demo - slackbot**

# CHALLENGES IN BUILDING CHATBOTS

Security

Speech  
Recognition

Authentication

Language  
Understanding

**Disparate  
Systems**

Messaging  
platforms

Availability

Business Logic

Scale

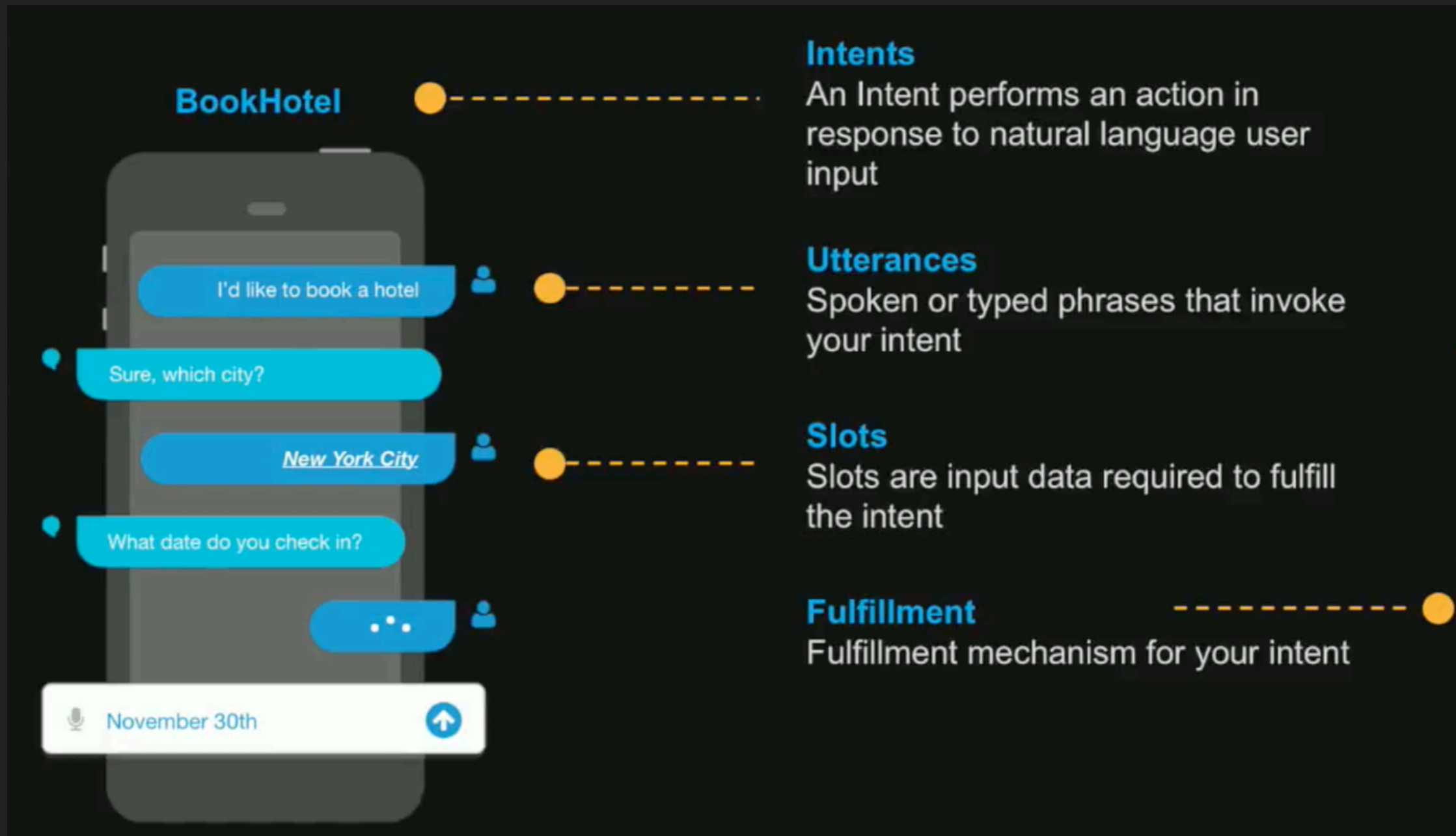
Mobile

Testing

# AMAZON LEX

- ▶ a fully managed service for building conversational interfaces into any application using voice and text
- ▶ powered by the same deep learning technologies that power Amazon Alexa
  - ▶ automatic speech recognition (ASR) for converting speech to text
  - ▶ natural language understanding (NLU)
- ▶ intent chaining
- ▶ telephony audio support
- ▶ Life cycle management, versioning and aliases
- ▶ One click deployment to messenger, slack, twilio SMS ...
- ▶ Marketing video: <https://aws.amazon.com/lex>

# AMAZON LEX – BUILDING BLOCKS



# AMAZON LEX

## Monitoring – Track your bot



Missed Utterance Count



Request Latency



Traffic by Channel

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# LAMBDA + LEX

- ▶ Reduced operation costs both are completely managed
- ▶ scales on demand
- ▶ Pay as much as you use
- ▶ Built in:
  - ▶ authentication, authorization
  - ▶ Logging, Monitoring
  - ▶ versioning, aliases



## DEMO

- ▶ LEX + Lambda Demo - order pizza chatbot

## THANK YOU – SD CONSULTING GROUP

- ▶ David Shemer, Siavash Shaghafi - SD Consulting Group
- ▶ Founded in 2015 by former Pikel employees and located in San Diego
- ▶ Agile, experienced, curious, innovative, hands-on team
- ▶ Technology Stack:
  - ▶ web-services, micro-services, web-applications
  - ▶ Search engines (Solr and Elastic)
  - ▶ Databases - RDBMS and NoSQL
  - ▶ Spring Boot, Netflix OSS, Spring Cloud
  - ▶ AWS and Cloud Technologies
  - ▶ More ...
- ▶ we are helping companies solve their BIG problems, innovate and win