#### **Mobile Apps Development Using AWS Cloud Services**

16 July 2018, elCC2018

## Amazon LEX

Amazon Lex is a service for building conversational interfaces into any application using voice and text. Amazon Lex provides the advanced deep learning functionalities of automatic speech recognition (ASR) for converting speech to text, and natural language understanding (NLU) to recognize the intent of the text, to enable users to build applications with highly engaging user experiences and lifelike conversational interactions. With Amazon Lex, the same deep learning technologies that power Amazon Alexa are now available to any developer, enabling users to quickly and easily build sophisticated, natural language, conversational bots ("<u>chatbots</u>").

Speech recognition and natural language understanding are some of the most challenging problems to solve in computer science, requiring sophisticated deep learning algorithms to be trained on massive amounts of data and infrastructure. Amazon Lex democratizes these deep learning technologies by putting the power of Amazon Alexa within reach of all developers. Harnessing these technologies, Amazon Lex enables users to define entirely new categories of products made possible through conversational interfaces.

#### How Amazon LEX Work

Powered by the same technology as Alexa, Amazon Lex provides users with the tools to tackle challenging deep learning problems, such as speech recognition and language understanding, through an easy-to-use fully managed service. Amazon Lex integrates with AWS Lambda which users can use to easily trigger functions for execution of users back-end business logic for data retrieval and updates. Once built, users bot can be deployed directly to chat platforms, mobile clients, and IoT devices. Users can also use the reports provided to track metrics for users bot. Amazon Lex provides a scalable, secure, easy to use, end-to-end solution to build, publish and monitor user's bots.

### **Android Studio**

Android studio is used as a tool to help developers in building an android application on any devices fasters. It also helps developer test their application before deploying into Google Play Store as it offers a build in the emulator with the latest SDK from Google and variations of devices to act as an emulator. The developer also can use their own devices to test the application in the android studio by using the USB debugging feature.

# Lesson 2: Preparing Android Studio and Mobile Chatbot Interface

1. First, go to this GitHub link (<u>https://github.com/syahmiestormz/PizzaDelivery</u>) and download the android app example.

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← → ♂ ● GitHub, Inc. [U5]   https://github.com/syshmiestormz/PizzaDelivery			x 🚯 😇 👻 🗢 🛤	🗢 🙃 💌 👷 🗧 🖬 🕷 🕫 💁 i
- HL A005 🚱 🖉 📑 🗢 😰 🖘 Μ 🔹 📥 🖺 🦮 🗑 🗡 🔢 🗡 🔢 🔿	🙉 🐵 🔤 🍙 🗿 📣 Sinar (M.) Radio Mo 🔂 tehi	WADOX.COM 🗧 🔜 Leico Le 2 🚟 Memory an	d Storag 📕 tutorial zbig premiu: 🐵 BICProMiner - B	itco 🔳 researti paper 🐘 📄 Other bookmarks
Scarch or	ump to	issues Marketplace Explore	▲ ++ 13+	
🖟 syahmiestor	mz / PizzaDelivery	O Unwatch -	• 1 ★ Stor 0 ¥Feek 0	
<> Code ①	Issues (0) [1] Pull requests (0) [1] Projects (0)	🗄 Wiki 🔝 Insights 🔘 Settings		
Android app ex- Add topics	imple for LEX chatbot		Edit	
@1	commit 1/21 branch	© 0 releases	11 contributor	
Eranch: master ▼	New pull request	Create new file Upload fi	Iles Find file Clone or download *	
wyshmiestorm	at Initial commit		Latest commit +rzacias 4 minutes ago	
idea 🗎		Initial commit	4 minutes ago	
in app		Initial commit	4 minutes ago	
gradie/wrapp	er	Initial commit	4 minutes ago	
(a) .gitignore		Initial commit	4 minutes ago	
ia) README.md		Initial commit	4 minutes ago	
(a) build.gradle		Initial commit	4 minutes ago	
(a) gradle.proper	ties	Initial commit	4 minutes ago	
(5) gradlew		Initial commit	4 minutes ago	
gradlew.bat		Initial commit	4 minutes ago	
(ii) settings.grad	le	Initial commit	4 minutes ago	
IE README.md				
This sam authentic	ation with Amazon Lex.	ion client library on Android. This applica	ition uses AWS Cognito for	
👳 Welcome to Android Studio				– 🗆 ×
	ļ	2		
	Androi <sub>Vers</sub>	d Studie ion 3.1.2	0	
	늘 Open an existin	g Android Studio proj		
	👎 Check out proj			
	🚰 Profile or debu	g APK		
	💕 Import project	- (Gradle, Eclipse ADT, e		
	🛃 Import an Andr	oid code sample		
			-* 0	onfigure 🛪 Get Helm 🛪
			<del>,</del> , c	

2. Open the Android Studio application and click on **Import Project** to import the downloaded sample project.

3. Navigate to the folder where downloaded sample app is stored and click **OK** button.

Select Eclipse or Gradle Project to Import Select your Eclipse project folder, build.gradle or se	× ettings.gradle				Y
Image: Constraint of the sector of the se	Hide path	Exercite Contract Contrac	-		×
Drag and drop a file into the space above to quickly lo	cate it in the tree		🔅 Configu	re 👻 Get I	Help 👻

4. Wait for the Gradle to finish building.

👳 Welcome to Ai	ndroid Studio		_		$\times$
		Android Studio			
		🗰 Start a new Android Studio project			
		늘 Open an existing Android Studio project			
		Building 'PizzaDelivery' Gradle project info			
	Gradle: Configure build		Cancel		
		🗹 Import an Android code sample			
			🛱 Configure	← Get He	elp <del>↓</del>

## Lesson 3.1: Create an Amazon LEX Chatbot in AWS Mobile Hub

In this lesson, we will learn how to create an Amazon LEX Chatbot in the AWS Mobile Hub.

1. Log in to your AWS Educate account.



2. After login, you will be directed to the AWS Mobile Hub main page. Here, you can choose to either create a new project or import an existing project. You also can manage existing project in this page. For this tutorial, we will be creating a new app. To get started, simply click *Create* button to create your first app.

, Mobile Hub			
AWS Mobile Hu Tools that enable you to quickly config Documentation V Support	<b>b</b> pure AWS services and integrate them in	tto your mobile app	
Your Projects Have your own app? Create a project Create Import	t to cloud enable your app with AWS	services.	
android-notes-app	PizzaOrder	webby	prototype2
REGION CREATED US East (Virginia) April 17, 2018	REGION CREATED US East (Virginia) May 21, 2018	REGION CREATED US East (Virginia) April 15, 2018	REGION CREATED US East (Virginia) April 19, 2018
arter Kits and Tutorials app? Kick the tires with one of or Pet Tracker Surfer Ki	ur cloud enabled starter kits. Of follo Restaurant Ordering Sauter kit	w a step-by-step tutorial to cloud enable	e a sample app yourself.
Use React Native to build an IOS and Android app where users can upload pictures of their pet.	Use React.js to build an app where users can view different restaurant menus, select items and place orders.	A Notes App for Android demonstrating analytics, user sign-in and storing notes in the cloud.	A Notes App for iOS demonstrating analytics, user sign-h and storing notes in the cloud.

3. After clicking the *Create* button the following pop-up window will be displayed. You can name your project anything you want but for this tutorial, we will name it *ChatBot*.

	Create a project for free
loud enable your app	
Create a project	A project is a single place for you to manage your app's cloud resources.
Select app platform	ChatBot
Set up your backend	Whenever possible project resources will be created in US East (Virginia) region.* Edit
Connect to your backend	Cancel Next

4. Next, pick your target platform. For this tutorial, we will choose Android as our platform.

Cloud enable your app	Select ap	p platform				
1) Create a project	Add AWS cl	loud services to	your app. Select a	platform:		
2 Select app platform		N				
3) Set up your backend				12	$\boxtimes$	
4 Connect to your backend		iOS	Android	Web	React Native	
					Cancel	Add

	Set up your backend
Cloud enable your app	
<ol> <li>Create a project</li> <li>Select app platform</li> <li>Set up your backend</li> </ol>	Add the cloud configuration file to your app Mobile Hub generates a cloud configuration file that connects your app to your AWS backend. Download the cloud configuration file and place it in <i><my-awesome-app>/app/src/main/res/raw/</my-awesome-app></i>
4 Connect to your backend	Cancel Next

5. Next is backend. You can just click Next in this window as we will not be using backend in our app instead we will be using Amazon Cognito to connect our chatbot with the Android app.

	Connect to your backend	
Cloud enable your app		
1 Create a project	Add the AWS Mobile SDK to your app to start calling your AWS backend.	
2 Select app platform		
3 Set up your backend		Done
A Connect to your backend		

6. Click done and your app will be created.

aws Mobile Hub → ChatBot		Syahmie 🗸	Support 🗸
ChatRat			
ChatBot		Anaty	ics   Resources
	Apps A list of apps you can cloud enable with the AWS features you have configured in your backend.		
	Backend features Integrate		
	Backend A list of backend features you have enabled in your project.		
C Feedback C English (US)	© 2008 - 2018, Amazon Web Services, Inc. on ha affiliates. All rights n	served. Privacy Policy	Terms of Use

ChatBot				Analytics   Resources
	Engage users with mobile push, emails, or SMS messages and analyze app usage.			
	Powered by Amazon Piepoint			
	0			
	Add More Backend Features			
	ß			
	User Sign-in	NoSQL Database	Cloud Logic	
	Let your users sign in with public identity providers or your own identity system.	Store data in a fully managed cloud database.	Run your business logic in the cloud.	
	Powered by Amazon Cognito	Powared by Amazon DynamoDB	Powared by Amazon API Gateway and AWS Lambda	
	+	+	+	
			(Pros	
	User File Storage	Conversational Bots	Hosting and Streaming	
	Store files in the cloud.	Add voice and chat bots to your mobile app.	Host web apps, deliver files, and stream media from our global network of edge servers	
	Powered by Amazon S3	Powered by Amazon Lex	Powered by Amazon S3 and Amazon CloudFront	
	+	+	+	
4			·	v Þ
🗨 Feedback 🛛 🥝 English (US)			© 2008 - 2018, Amazon Web Services, Inc. or	its affiliates. All rights reserved. Privacy Policy Terms of Use

7. After clicking done you will be directed to the app main page. In this page, there will be seven services that can be integrated into our app. For this tutorial, we will choose conversational bots to be integrated into our app.

ChatBot			Analytics   Resources
Get started with a Amazon Lex is a service for building conversational interface that powers Amazon Alexa, enabling you to build sophisticat example phrases and Lex builds a complete natural language and complete sophisticated tasks. Learn more	bot, and integrate it into your mobile app s into any applications using voice or text. With Lex, yo a natural language chatbols into your and existin model through which bot can interact using voice and	D. u get the same deep learning engine ig mobile apps. You supply just a few text, to ask questions, get answers.	ĺ
TRI A SAM	PLE	CUSTOM	
Book a trip	lowers 😥 Make appointment	Import a bot	
•	Choose which Amazon Lex bot you want to imp Amazon Lex C Bots	X ort, or create a new bot in	
Import a bot	botBot		
You can easily integrate existing bots created on Amazon Lex with your Androld and IOS apps using this feature. Simply choose which bot you would like to import from the adjoining list. Mobile Hib then simplifies integrating your bot with your mobile app including setting up security policies in Amazon Identity and Access management, and generating boiler plate UX crede for wire and chai integrations with your bot	MakeAppointmentMOBILEHUB OrderFlowersMOBILEHUB OrderFlozzaMOBILEHUB PizzaMAin	-	
After you have imported a bot, click on the integrate tab in the left hand menu.		Cancel	

8. After choosing conversational bot you will be directed to the chatbot main page. AWS already gave three fully functioning bot, to begin with. For this tutorial, we will create a new bot so select *Import a bot* and then select *create a new bot in Amazon LEX* to create your own bot.

CREATE YOUR OWN				TRY A S	AMPLE	
Custom bot		BookTrip		OrderF	lowers	ScheduleAppointment
	Bot name	PizzaOrder				
	Language	English (US)				
	Output voice	Matthew			•	
		Type text here to I	hear a sample		€	
s	ession timeout	5	min	• 0		
	IAM role	AWSServiceRoleFo Automatically created of	or LexBots 🚯			
	COPPA	Please indicate if y Online Privacy Pro	our use of this b tection Act (COF	ot is subject to the Child PA). Learn more	iren's 🚯	
						Cancel Create

9. After selecting the *select to create a new bot in Amazon LEX* you will be transferred to bot page. Here, select custom bot and fill in the details as shown and click the *Create* button.

AWS Services v Resource Groups v 🖈	<b>∆</b> ® Syahmie →	N. Virginia 👻 Su	ipport 👻	
< PizzaOrder Latest +		Build Public	sh 🕜	<
Intents of Getting started with your bot No intents created Slot types •				Test Chatb
bo sobservated components of your boots.				
Feedback Peedback English (US) 0 2008 - 2018, Amazon Web Services, Inc. or	ts affiliates. All rights reser	ved. Privacy Policy	Terms of Us	8

10. You will then be directed to the chatbot main page. Here, you can edit your bot, build and publish it. You also can test your chatbot here by using the online test chatbot tab. In this main page, you will find several tabs to help you build the chatbot. The tabs are:

- Intents- A particular goal that the user wants to achieve.
- Utterances-Spoken or typed phrases that invoke your intent.
- Slots-Data the user must provide to fulfill the intent.
- Prompts-Question that ask the user to input data.
- Fulfillment- The business logic required to fulfill the user's intent.

Monitoring	9	Add intent	ж
0	Getting started with your bot Welcome to your bot editor. You can start	• Create intent	
-	+ Create Intent	1 Import intent	
0		<b>Q</b> Search existing intents	
	BookHotel		Cancel Add
		to achieve	
	I'd like to book a hotel.	<ul> <li>Utterances</li> <li>Spoken or typed phrases that invoke your intent</li> </ul>	Are you sure you want to book the

11. Click the *Create Intent* button to create your intent. A pop-up window will be displayed, and you can choose between creating a new intent, import intent from other sources or you can search for existing intent that you already created. Choose *Create Intent* and click add.

	Create intent	×	
vith your bot editor. You can start	Give a unique name for the new intent OrderPizza		
	Previous	Add	
(Hotel •	A particular goal that the user wants		

12. Give your intent a name and for example, this one is *OrderPizza* but you can name your intent anything you like.

< PizzaOrd	ler Latest 👻									Ľ		uild Publish	0
Editor Intents Pizza Slot type	Settings	Channels	0 0	Pizza Lat Sample u e.g. I would	est ♥ Itterances € like to book a flight.	K <sup>2</sup>		C	•	J		Î G	
Error Hand		1		Lambda     Slots	nitialization and	i validation  and	Slot type e.g. AMAZON US_CITY	•	Version	Prompt e.g. What city?	٥	0	
		~		Fulfilmer     AwsL     Respons     A	ambda function	Return parameters to client							
				<b>E</b>	nable response car	d							
				U V	Vait for user reply the user says "no," the	following message will be presented.							

13. After you created intent you will be greeted with the intent page. Here, you can see few tabs that can help you in creating the chatbot. In this tutorial, we will focus on five main tabs to help you create your first chatbot.

• Number one is *Slot Types*. Slot types function as a class for your chatbot data. Here, you can fill in the information of what you want your chatbot to call when you ask the question. It may be confusing at this time, but we will tackle this issue in the next step.

- Number two is *Sample Utterances*. Sample utterances are used to invoke the question to our chatbot.
- Number three is *Slots*. Slots are the storage where you put all the data to fulfill the intent.
- Number four is *Conformation Prompt*. This function is to make your chatbot to be more like a human by asking the confirmation about their action.
- Number five is Build. This button is used to build your chatbot before you can publish it.
- Number six is Publish. You can publish your chatbot after satisfying with your chatbot. You also can publish multiple time.

Pizza Latest -

-	Sampl	eι	ittera	nces	0

e.g. I would like to book a flight.	0
hey pizza	0
i would like a pizza	0
order	0
pizza	0
order me a pizza	0

14. To start building our bot first create sample utterances. For example, the above figure shows the utterance tab with a few utterances that can jump-start the bot conversation about ordering a pizza.

Slot types	0
No slots created	

15. Next step is to create a slot for our data. Simply go to slot type tab and click the plus button.

	Add slot type		×	
	Create slot type			
nt	1 Import slot type			
п.		Cancel	Add	
			0	
			0	

16. Click on *Create Slot Type* to create a new slot and click add.

,	Add slot type	×	
	Slot type name		
	PizzaMenu		
	Description		
	Type of pizza available		
	Slot Resolution		
	Expand Values (1)		
	Restrict to Slot values and Synonyms		
	Value 🚯		
alidat	Meats Lover		
Na	Beef Pepperoni 8		rsion
	Veggie Fiesta		
	Cancel Save slot type Add slot to int	ent	
Return par	ameters to client		

17. Fill the empty box in the slots as follows and click *the Add Slot to Intent* button when you are done.

- Slots 0						
Priority	Required	Name	Slot type	Version	Prompt	
		e.g. Location	e.g. AMAZON.US_CITY	-	e.g. What city?	۵ و
1.		PizzaMenu	PizzaMenu	▼ 1 ▼	e.g. What city?	¢ ©

18. After clicking *the Add Slot to the Intent* button, your slot type will appear in the slot tabs.

-	Slots @								
	Priority		Required	Name	Slot type	Version	Prompt	1	
				Address	AMAZON.StreetAddress		Where should I deliver the pizza?	C	
	1.	~		PizzaMenu	PizzaMenu 💌	1 💌	e.g. What city?	0	
	2.	^		Payment	Payment	1 💌	e.g. What city?	0	

19. You also can add the class directly from the slot tab, provided that you already have slot type made. Here *Address* class is created directly in the slot tab but we are using slot type that is already pre-made by Amazon. You can find many pre-made slot type by Amazon by simply click the arrow down. To edit bot prompt simply click the gear button.

	PizzaMenu Prompts	×	
	Prompts		<b>^</b>
	e.g. What is your destination?	•	
	What type of pizza would you like to order? We offer meats lover, beef pepperon	0	
	Maximum number of retries 2 Corresponding utterances I would like to order {PizzaMenu} Prompt response cards	0	
uat	Card 1 🚯 Preview as: Facebook 👻 🛍		
			viilt-in
L	Cancel	Save	

20. Here, we will focus on two things in prompts menu. First one is *Prompts*. Prompts are used to enter the question that will be asked by the bot. Here is an example of a question that bot asked when you want to order a pizza." What type of pizza would you like to order? We offer meats lover, beef pepperoni, and veggie fiesta.". *Corresponding Utterances* is what is the utterance that a user answers which is based on the bot question.

AMAZON, StreetAddress 🔻 Duitein V Vitiere Stroutu Lidenver die pizza?

21. Next step we need to tackle is *Confirmation Prompt*. A confirmation prompt is a way to make the bot more humane. A confirmation prompt can be any text that asks the user to confirm their action. For this bot, we will use the confirmation

prompt as shown in the figure below.

Address

Confirmation prompt ①

Confirmation prompt
 Confirmation prompt

Confirmation prompt	
Confirm	
Great you're all set! Your {PizzaMenu} will be delivered in approximately 30 minutes at this address {Address}. You choose {P	٥
Cancel (if the user says "no")	
Okay, I will not place the order.	ф
✓ Response ●	
Add Message	
Enable response card	
Wait for user repty If the user says "no," the following message will be presented.	
* Required Field	

22. Next step is putting a bot response at the end of the chat. To do that simply go to **Response** and click the **Add Message** button. Here is the example of what response you can put in your chatbot.



aws Services - Resource	Groups 🗸 🕇	🛕 🔍 Syahmie 👻 N. Virginia 👻 Support 🗸
C PizzaOrder Latest + Editor Settings Channels Mon	nong	Build Publish 9
Intents O Paza Silot types O Payment PizzeMenu Error Handing	Ptzza Lateri + Sample ulterances 0 Lambda Initialization and validation 0 Stots 0 Confirmation prompt 0 Confirmatio	• •

23. Next is to save and build your chatbot.



24. Wait for a build success window to pop-up and then you can test the chatbot.

> Test Bot (Latest)	⊘ READY			
			Where should I deliver the pizza?	
i would like a pizza	Î	0000	tmont A	
What type of pizza would you like order? We offer meats lover, beef pepperoni, and veggie fiesta. meats lover How do you plan on paying for the We offer cash and credit card.	to e pizza?	apar	Great you're all set! Your meats lover will be delivered in approximately 30 minutes at this address apartment A. You choose cash as your payment method. Does this sound okay?	
Clear chat history	• •	yes		-
Chat to your bot			Clear chat history	
Great you're all set! Your meats I be delivered in approximately 30 at this address apartment A. You cash as your payment method. D sound okay?	lover will minutes choose Does this			
yes				
Thank You, your meats lover has ordered. Have a nice day.	s been			
Clear chat history				
Chat to your bot				

25. Here is how the conversation with the chatbot should look like after you insert all the data.

< PizzaOrde	er Latest 👻								Build Pub	> Test Bot (Latest) @ READY
Editor Intents Pizza Slot type: Payment PizzaMenu Error Handi	S	Channels O	Monitoring Pizza La - Sample (e.g. 1 wou hey pizza 1 would like order pizza order me a	atest + utterances • d like to book a fii a pizza pizza	pnt.		0 0 0 0		7	Additional and a soft Yoar meaks lower will be delivered in approximately 30 minutes and the delivered in approximately 30 minutes and the delivery minute indefoid Juses that a soveral delay?     yes     Trans You, your meaks lower has been ordered Jave a minute lower delivery.     Crant by our Dot.     Inspect Response
			<ul> <li>Lambda</li> <li>Slots •</li> <li>Priority</li> <li>1. ~</li> <li>2. ~</li> <li>3. ~</li> <li>Confirm</li> <li>Futfilline</li> </ul>	Initialization a Required	Name e g. Location (Pozzakłenu) (Address)	Slot type a g_AMAZON US_CITY PIZZMenu Payment AMAZON StreetAddress se_dead	Version • 1 • • 1 • • Built-in •	Prompt e g What oby? What type of pizza woodd you How do you palan on paying fo Where should I deliver the pizz	0         0           like         0           r th         0           zari         0	Balge State: Fulfile Summary  Etails Summary  Etails RequestD: SobBio14-6183-1100-8022-052005c1101c (file)optimizers file)optimizers filessage(file)optimizers filessage(file)optimizers file)optimizers

	Publish PizzaOrder				Build	
ight.	Publishing is the last step befor Create an alias	pizza	0			
		Update an existing alias		Cancel	Publish	

26. The final step is to publish and give your bot an alias before integrating it with an android app and Amazon Cognito.

# Lesson 3.2: Integrating Chat Bot with Amazon Cognito

Before we can integrate our chatbot with android we need to first create an identity for our bot in Amazon Cognito. To do that just follow this step.

1. In AWS go to **Cognito**:

AWS services			
Cognito			
Cognito User Identity and App Data Synch	ironization		
Cognito		Lambda	
API Gateway		CloudWatch	
> All convince			

2. Then go to Manage Federated Identities.



3. Then Create new Identity pool.

4. Give it an Identity pool name and tick Enable access to unauthenticated

Getting started wiz	zard				
Step 1: Create identity pool	Create new identity pool				
Step 2: Set permissions	Identity pools are used to store end user identities. To declare a new identity pool, enter a unique name.				
	Identity pool name* PizzaBot				
	✓ Unauthenticated identities o				
	Amazon Cognito can support unauthenticated identities by providing a unique identifier and AWS credentials for users who do not authenticate with an identity provider. If your application allows customers to use the application without logging in, you can enable access for unauthenticated identities. Learn more about unauthenticated identities.				
	Enable access to unauthenticated identities				
	Authentication providers				
	*Required Cancel Create Pool				

#### identities.

5. When you hit **Create Pool** you'll be asked to allow the creation of new roles, hit **Allow**.

Cancel	Allow

6. You'll now be taken to a "Getting started with Amazon Cognito" page. In the code samples, you'll see a code. The code id the Identity Pool ID that you need to use when you are integrating your chatbot with the android app. Noted that there is code that is red in color. That is your **Identity Pool ID**. You will need this later.

```
// Initialize the Amazon Cognito credentials provider
CognitoCachingCredentialsProvider credentialsProvider = new CognitoCachingCredentialsProvider(
    getApplicationContext(),
    "us-east-1:f64f37a9-afb2-438f-ab6e-aa4aa66e05ec", // Identity pool ID
    Regions.US_EAST_1 // Region
);
```

7. Before we use that ID, we need to give the roles created by Cognito, access to LEX. Go IAM in AWS, click on Roles, then search for your Cognito role. It'll be called something like Cognito\_LEX\_ID\_POOLUnauth\_... depending on what you called your federated identity.

14	AM		Q
1	IAM Manage User Access and Er	ncryption Keys	
$\forall$	Cognito	MAI W	See Amazon Lex
	Mobile Hub		
aws ser	ervices 🗸 Resource Groups 🗸 🏌		<b>∆</b> ® Syahmie + Global + Sup
arch IAM Ishboard roups Jes Jilcies entity providers count settings redential report	UAN roles are a secure way to grant permissions t     IAM user in another account     Application code numming on an EC2 Instance th     An AWS service that needs to act on resources     Users from a corporate directory who use ident     IAM roles issue keys that are valid for short durate     Additional resources:     IAM Roles FAQ     IAM Roles FAQ     IAM Roles FAQ     Constrained to the constraints     Common Scenarios for Roles	o entines timat you trust. Examples of entities include the following: at needs to perform actions on AWS resources in your account to provide its features by federation with SAML ons, making them a more secure way to grant access.	
cryption keys			
	Create role Delete role		
	Create role Delete role Q cognito		ی ا Showing 8
	Create role Q cognito Role name •	Description	ہ ہے۔ Showing 8 Trusted entities
	Create role Q cognito Role name  Cognito_cnatBolAuth_Role	Description	Showing 8 Trusted entities Identity Provider cognito-identity amazonaw
	Create role  C cognito Cognito_chatBolAuth_Role Cognito_chatBolAuth_Role Cognito_chatBolAuth_Role	Description	Showing 8 Trusted entities Identity Provider: cognito-identity amazonaw Identity Provider: cognito-identity amazonaw
	Create role  C cognto  C cognito_chatBolAuth_Role  C cognito_thatBolAuth_Role  C cognito_thatBolUnauth_Role  C cognito_thatBol	Description	Showing 8 Trusted entities Identity Provider: cognito-identity amazonaw Identity Provider: cognito-identity amazonaw Identity Provider: cognito-identity amazonaw
	Create role  Ccognio  Cognito_chatBolAuth_Role  Cognito_thatBolAuth_Role  Cognito_thatBolAuth_Role  Cognito_texampleAuth_Role  Co	Description	Showing 8 Trusted entities Identity Provider: cognito-identity amazonaw
	Create role  Ccognito  Role name  Cognito_chatBolAuth_Role  Cognito_chatBolAuth_Role  Cognito_lexsampleAuth_Role	Description	Showing 8     Showing 8     Trusted entities     Identity Provider: cognito-identity amazonaw
	Create role  Cognito  Cognito _chatBoAuth_Role  Cognito _chatBoAuth_Role  Cognito _lexampleAuth_Role  Cognito _lexampleAuth_Role  Cognito _lexampleAuth_Role  Cognito _FizzaBoIAuth_Role  Cognito _Fiz	Description	Showing is     Showing is     Showing is     Identity Provider: cognito-identity amazonaw     Identity Provider: cognito-identity amazonaw

8. If you are following the chatbot tutorial above your Cognito role will be something like this.

	Cognito_PizzaBotAuth_Role	
	Cognito_PizzaBotUnauth_Role	
	Cognito_PizzaOrderAuth_Role	

9. Click on it, then hit Attach policy.



Pilter: Policy type × Q lox         Showing 7 res           Policy name +         Type         Attachments -         Description           Image: Imag	Attach	1 policy			
Policy name -         Type         Attachments -         Description           • If AlexaForBusinessDeviceSetup         AWS managed         0         Provide device setup access to AlexaForBusiness services           • If AlexaForBusinessTuffAccess         AWS managed         0         Grants full access to AlexaForBusiness tersources and access to related AWS Services           • If AlexaForBusinessTuffAccess         AWS managed         0         Grants full access to AlexaForBusiness resources and access to related AWS Services           • If AlexaForBusinessCatewayExecution         AWS managed         0         Provide galeway execution access to AlexaForBusiness services           • If AlexaForBusinessCatewayExecution         AWS managed         0         Provide galeway execution access to AlexaForBusiness services           • If AlexaForBusinessReadOntyAccess         AWS managed         0         Provide galeway execution access to AlexaForBusiness services           • If AlexaForBusinessReadOntyAccess         AWS managed         0         Provide galeway execution access to AlexaForBusiness services	Filter: P	Policy type ~ Q lex			Showing 7 results
ANS managed     ANS managed     Provide device setup access to AlexaForBusiness services     ANS managed     Provide device setup access to AlexaForBusiness services     ANS managed     Grants full access to AlexaForBusiness resources and access to related AWS Services     ANS managed     O Grants full access to AlexaForBusiness services     ANS managed     O Provide galeway execution access to AlexaForBusiness services     ANS managed     O Provide galeway execution access to AlexaForBusiness services     ANS managed     O Provide galeway execution access to AlexaForBusiness services     O Provide galeway execution access to AlexaForBusiness     O Provide galeway execution access to AlexaForBusiness     O Provide galeway execution access to AlexaForBusiness     O Provide galeway execution access to AlexaF		Policy name 👻	Туре	Attachments 👻	Description
AVIS managed     Grants full access to AlexaForBusiness resources and access to related AVIS Services     AVIS managed     Grants full access to AlexaForBusiness resources and access to related AVIS Services     AVIS managed     O Provide gateway execution access to AlexaForBusiness services     of AlexaForBusinessReadOntyAccess     AVIS managed     O Provide gateway execution access to AlexaForBusiness services     of AlexaForBusinessReadOntyAccess     AVIS managed     O Provide gateway execution access to AlexaForBusiness services     of AlexaForBusinessReadOntyAccess     AVIS managed     O Provide gateway execution access to AlexaForBusiness services     of Provide gateway execution access to AlexaForBusiness services     of Provide gateway execution access to AlexaForBusiness services	$\Box \rightarrow$	AlexaForBusinessDeviceSetup	AWS managed	0	Provide device setup access to AlexaForBusiness services
> 10 AlexaForBusinessGatewayExecution     AVIS managed     0     Provide gateway execution access to AlexaForBusiness services       > 10 AlexaForBusinessReadOnlyAccess     AVIS managed     0     Provide read only access to AlexaForBusiness services       ? > 10 AlexaForBusinessReadOnlyAccess     AVIS managed     0     Provide read only access to AlexaForBusiness services       ? > 10 AlexaForBusiness     AVIS managed     3     Provides full access to Amazon Lex via the AVIS Management Console. Also provides access to create Lex Service Linked Roles and grant Lex cess	$\square \rightarrow$	AlexaForBusinessFullAccess	AWS managed	0	Grants full access to AlexaForBusiness resources and access to related AWS Services
AWS managed     Provide read only access to AlexaForBusiness services     AWS managed     Provide read only access to AlexaForBusiness services     AWS management Console. Also provides access to create Lex Service Linked Roles and grant Lex De     Service Service Linked Roles and grant Lex De	$\Box \rightarrow$	AlexaForBusinessGatewayExecution	AWS managed	0	Provide gateway execution access to AlexaForBusiness services
Provides full access to Amazon Lex via the AWS Management Console. Also provides access to create Lex Service Linked Roles and grant Lex ver		AlexaForBusinessReadOnlyAccess	AWS managed	0	Provide read only access to AlexaForBusiness services
		AmazonLexFullAccess	AWS managed	3	Provides full access to Amazon Lex via the AWS Management Console. Also provides access to create Lex Service Linked Roles and grant Lex per
	$\Box \rightarrow$	AmazonLexReadOnly	AWS managed	0	Provides read-only access to Amazon Lex.
• • • AmazonLexRunBotsOnly AVIS managed 0 Provides access to Amazon Lex conversational APIs.		i AmazonLexRunBotsOnly	AWS managed	0	Provides access to Amazon Lex conversational APIs.

10. Then search for AmazonLexFullAccess, select it and hit Attach policy again.



After that, you can integrate the chatbot with the android app.

5. Go back to Android Studio. After gradle finish building the apps, you will be forwarded to Android studio main page. Go to **app** > **res** > **values** > **strings.xml**.



6. In strings.xml, you will find resources class. In this class, there are several things that you can replace to customize your bot but the main things that need to be changed in order for your bot to work are the Cognito ID. In the identity\_id\_test replace the existing Cognito ID with your own Identity Pool ID created on page 21 when you connect the chatbot with the Cognito. You also need to replace the bot\_name and bot\_alias with your bot name and alias respectively.



7. After finish editing the code, click **Run > Run App** to launch the Android emulator to test the app.



8. Choose your virtual device to test the app. If you don't have one just clicked on **Create New Virtual Device** the create one. After that click ok to launch it.

😨 Select Deployment Target	×
No USB devices or running emulators detected	Troubleshoot
Available Virtual Devices I Pixel 2 API 27	
	OK Cancel

9. Wait for the app to install and when finished an app screen will pop-up and click Allow.



10. Choose **Chat with Me** to test your bot.



11. Here is what your chatbot should look like in the final product.



## **Final App Build**

After a few tweaks and interface, the Android application is ready to be installed into a smartphone to test its functionality. Figures below are screenshots and explanation of a working application.



1. The above figure shows how the application looks when it has been installed on a smartphone.



2. This is the main menu of the Pizza Delivery application. Users can choose to chat or to talk with the chatbot by clicking either **Chat With Me** or **Talk With Me** button.



3. When the user clicks on the **Chat With Me** button, the following page will be displayed. In this page, the user can type the questions that they want to ask the bot.



4. The above figure shows an example of how users ask the questions to chatbot and how the chatbot answer the questions.

Response as text: Response Placeholder	Transcript Transcript Placeholde

5. The above figure shows what happens when users click on **Talk With Me** button. The above page will be displayed. When a user wants to ask questions to the chatbot they simply tap the Microphone button to talk. Their questions will appear in the Transcript tab while the chatbot answer will appear on Response as text tab.

## Conclusion

There is another way of building a conversational bot. For example, we can also use AWS Lambda to create the bot intents and prompts which require Javascript programming using Node.js code. By using AWS Lambda, the bot can be more humane and intelligent than using the slots and intents as this project is built in this tutorial.