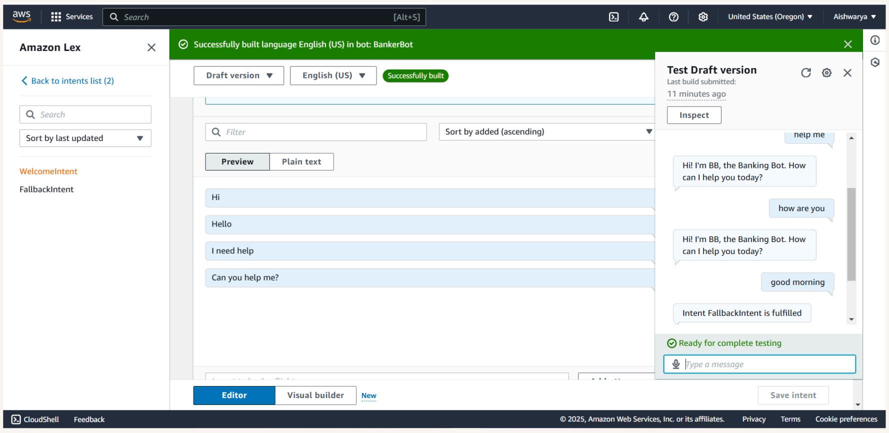
Build a Chatbot with Amazon Lex

AI aishuchoudhari16@gmail.com



Successfully built language English (US) in bot: BankerBot

Hi

Hello

I need help

Can you help me?

help me

Hi! I'm BB, the Banking Bot. How can I help you today?

how are you

Hi! I'm BB, the Banking Bot. How can I help you today?

good morning

Intent FallbackIntent is fulfilled

Ready for complete testing

Introducing Today's Project!

What is Amazon Lex?

Amazon Lex is a fully managed AI service for building conversational interfaces using voice and text. It's useful for creating chatbots, virtual assistants, and automated customer service solutions.

How I used Amazon Lex in this project

Create a practical chatbot, BankerBot, that can help your imaginary bank's customers check their account balance and transfer money between accounts.

One thing I didn't expect in this project was...

It support different accents and language.

This project took me...

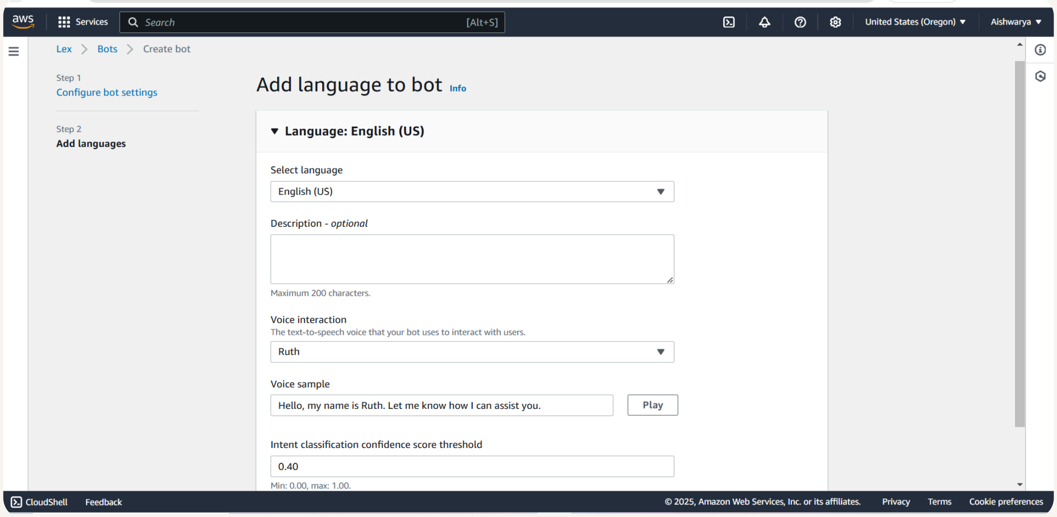
It took 30min.

Setting up a Lex chatbot

I created my chatbot from scratch with Amazon Lex. Setting it up took me 2 min.

While creating my chatbot, I also created a role with basic permission because Amazon Lex needs the permission to call other AWS services on your behalf, later in this project series I'll be integrating Lex with another service called Lambda.

In terms of the intent classification confidence score, I kept the default vlaue of 0.40. This means that your chatbot needs to be at least 40% confident that it understands what the user is asking to be able to give a response.



Add language to bot

▼ Language: English (US)

Select language
English (US)

Description - *optional*

Maximum 200 characters.

Voice interaction
The text-to-speech voice that your bot uses to interact with users.
Ruth

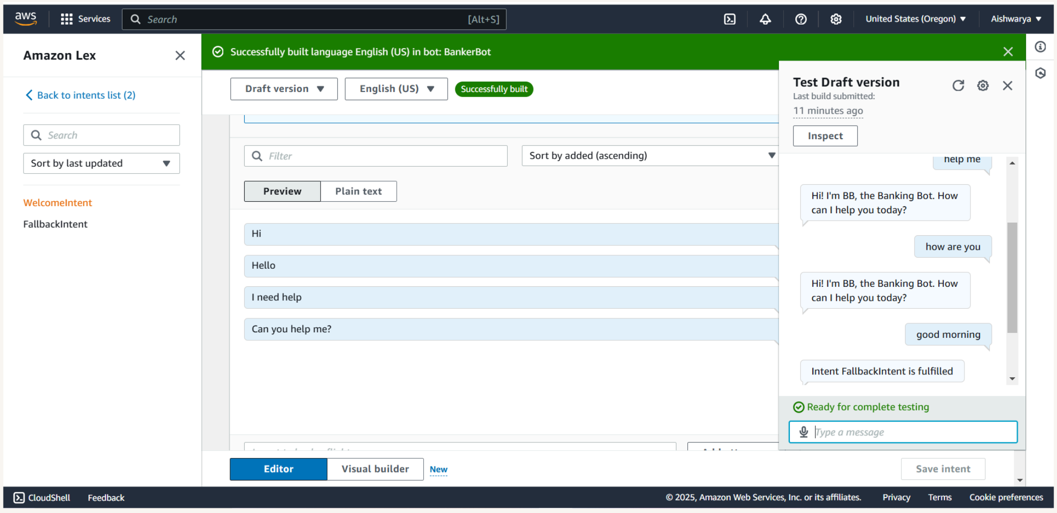
Voice sample
Hello, my name is Ruth. Let me know how I can assist you.

Intent classification confidence score threshold
0.40
Min: 0.00, max: 1.00.

Intents

Intents are what the user is trying to achieve in their conversation with the chatbot. For example, checking a bank account balance; booking a flight; ordering food.

I created my first intent WelcomeIntent, to welcoming a user when they say hello.



Successfully built language English (US) in bot: BankerBot

Hi

Hello

I need help

Can you help me?

Last build submitted:
11 minutes ago

help me

Hi! I'm BB, the Banking Bot. How can I help you today?

how are you

Hi! I'm BB, the Banking Bot. How can I help you today?

good morning

Intent FallbackIntent is fulfilled

Ready for complete testing

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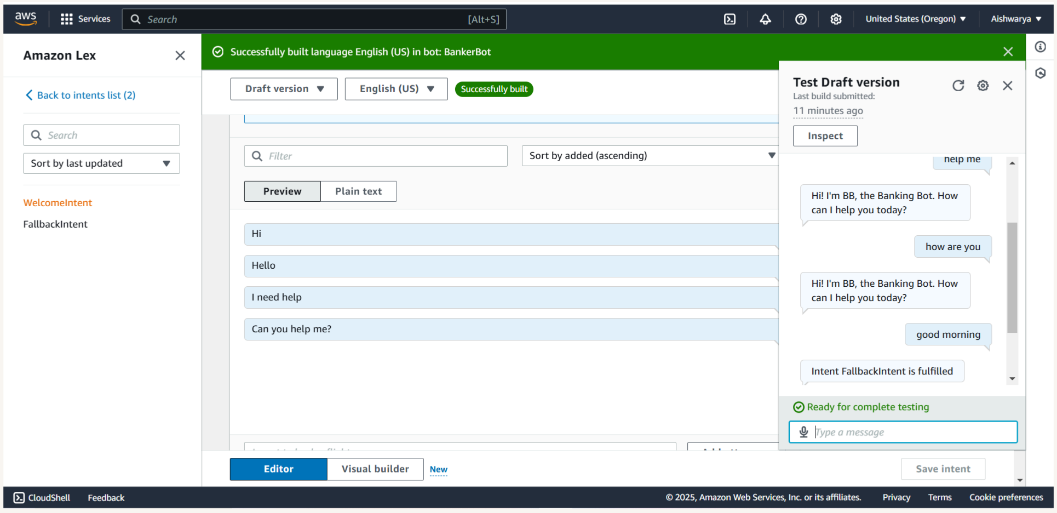
FallbackIntent

I launched and tested my chatbot, which could respond successfully if i enter utterances which represent the user inputs that will trigger this intent.

My chatbot returned the error message 'Intent FallbackIntent is fulfilled' when I entered 'Good Morning'. This error message occured because Amazon Lex doesn't quite recognize your utterance.



Successfully built language English (US) in bot: BankerBot

Draft version · English (US) · Successfully built

Hi
Hello
I need help
Can you help me?

Test Draft version
Last build submitted:
11 minutes ago

help me

Hi! I'm BB, the Banking Bot. How can I help you today?

how are you

Hi! I'm BB, the Banking Bot. How can I help you today?

good morning

Intent FallbackIntent is fulfilled

Ready for complete testing

Configuring FallbackIntent

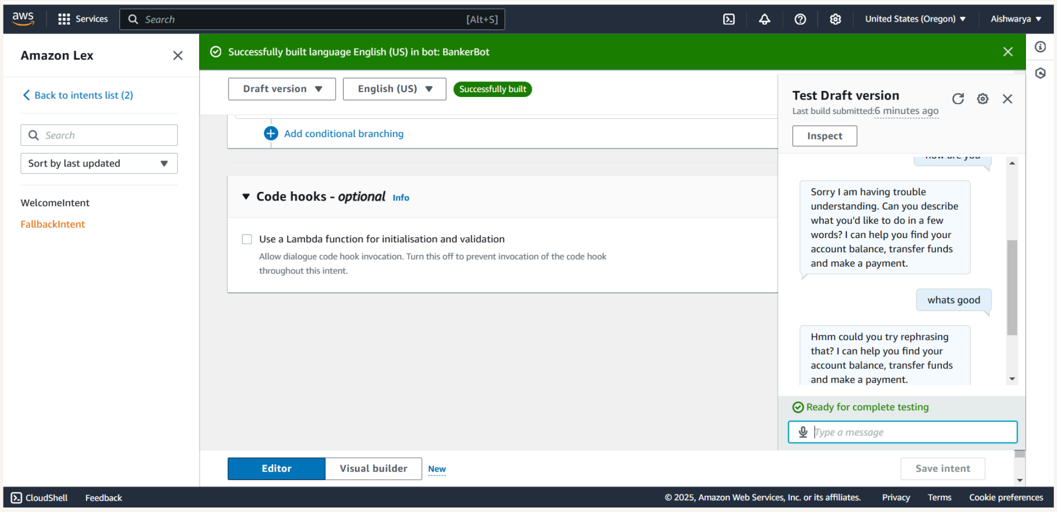
FallbackIntent is a default intent in every chatbot that gets triggered when If your chatbot has a confidence score below 40% for all the intents you've defined (in our case, it's just the WelcomeIntent for now), the FallbackIntent is triggered.

I wanted to configure FallbackIntent because the default FallbackIntent message you saw just now can be a little confusing. Re-phrase that message so it's clearer to the user that your chatbot doesn't understand the user's request.

Variations

To configure FallbackIntent, I had changed the response messge and also and variation message.

I also added variations! What this means for an end user is will give your users a dynamic range of responses, making them sound more conversational.



Successfully built language English (US) in bot: BankerBot

□ Use a Lambda function for initialisation and validation
Allow dialogue code hook invocation. Turn this off to prevent invocation of the code hook throughout this intent.

Last build submitted:6 minutes ago

how are you

Sorry I am having trouble understanding. Can you describe what you'd like to do in a few words? I can help you find your account balance, transfer funds and make a payment.

whats good

Hmm could you try rephrasing that? I can help you find your account balance, transfer funds and make a payment.

Ready for complete testing

Type a message

nextwork.org

Add Custom Slots to a Lex Chatbot

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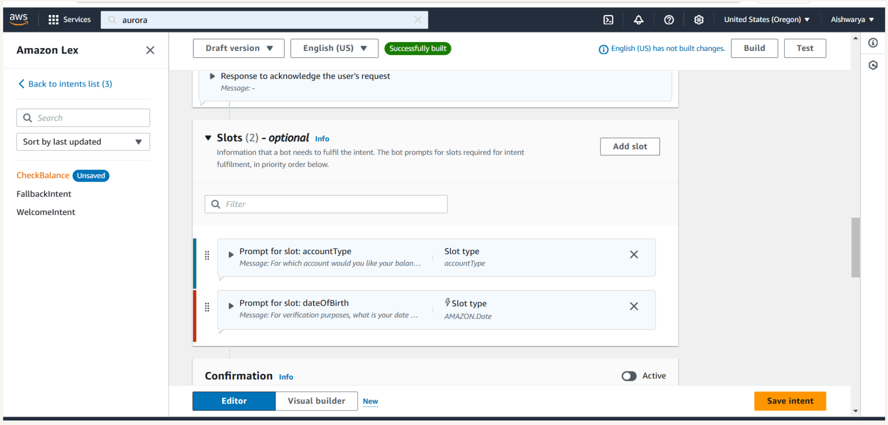


Response to acknowledge the user's request
Message: -

Slots (2) - *optional* Info

Information that a bot needs to fulfil the intent. The bot prompts for slots required for intent fulfilment, in priority order below.

Prompt for slot: accountType *Message: For which account would you like your balan…*	Slot type *accountType*
Prompt for slot: dateOfBirth *Message: For verification purposes, what is your date …*	Slot type *AMAZON.Date*

Introducing Today's Project!

P2 - Add Custom Slots to a Lex Chatbot.

What is Amazon Lex?

Amazon Lex is an AI service for building conversational interfaces using voice and text. It provides automatic speech recognition (ASR) and natural language understanding (NLU) to create chatbots, virtual assistants, and automated support, improving

One thing I didn't expect in this project was...

If a word fits what's expected for the accountType slot, Lex will automatically fill in that information and won't need to prompt the user for their accountType anymore (saving time for the user).

This project took me...

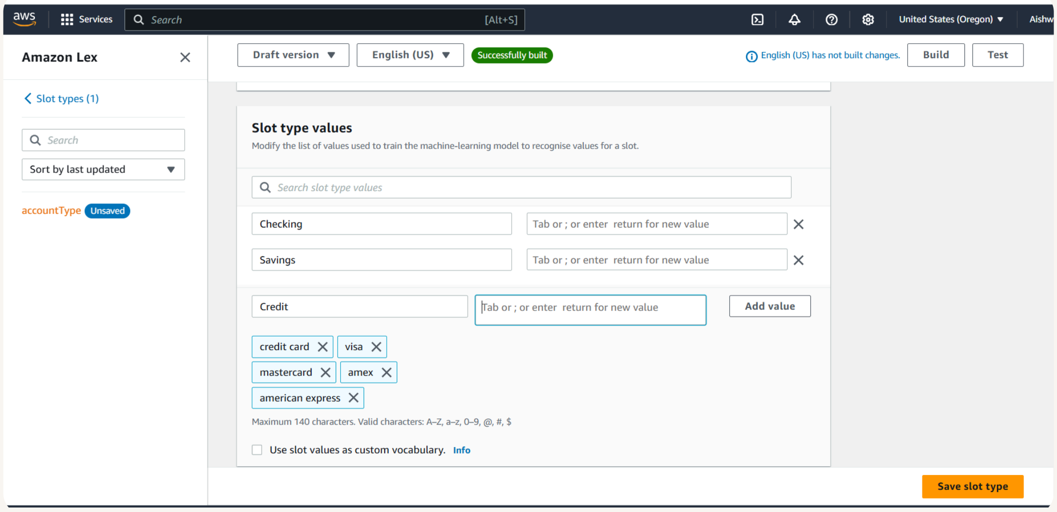
It took 45 min.

Slots

Slots are pieces of information that a chatbot needs to complete a user's request. Think of them as blanks that need to be filled in a form.

By adding custom slots in utterances, my chatbot's users for their bank account type and birthday for verification too.

In this project, I created a custom slot type to make that happen, BankerBot will need to ask users for their bank account type and birthday for verification too.



Slot type values

Modify the list of values used to train the machine-learning model to recognise values for a slot.

Checking — Tab or ; or enter return for new value

Savings — Tab or ; or enter return for new value

Credit — Tab or ; or enter return for new value

credit card, visa, mastercard, amex, american express

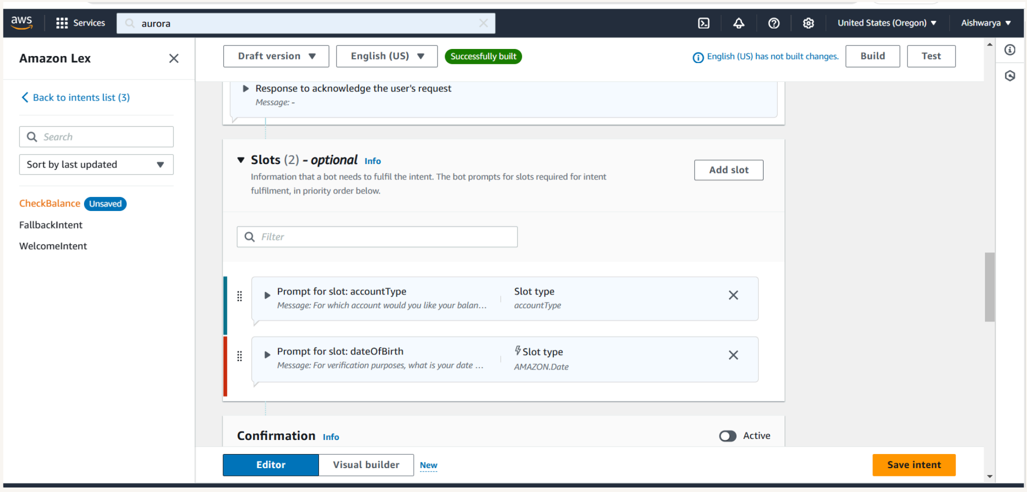
Maximum 140 characters. Valid characters: A–Z, a–z, 0–9, @, #, $

□ Use slot values as custom vocabulary. Info

Connecting slots with intents

This slot type has restricted slot values, which means selecting Restrict to slot values makes sure that only the values that you specify will count as a valid accountType.

I associated my custom slot with CheckBalance, which is Intent to check the balance in the specified account type. BankerBot knows about different bank account types, it's ready to take on users' requests to check their account balance.



English (US) has not built changes.

Response to acknowledge the user's request
Message: -

Slots (2) - ***optional*** Info

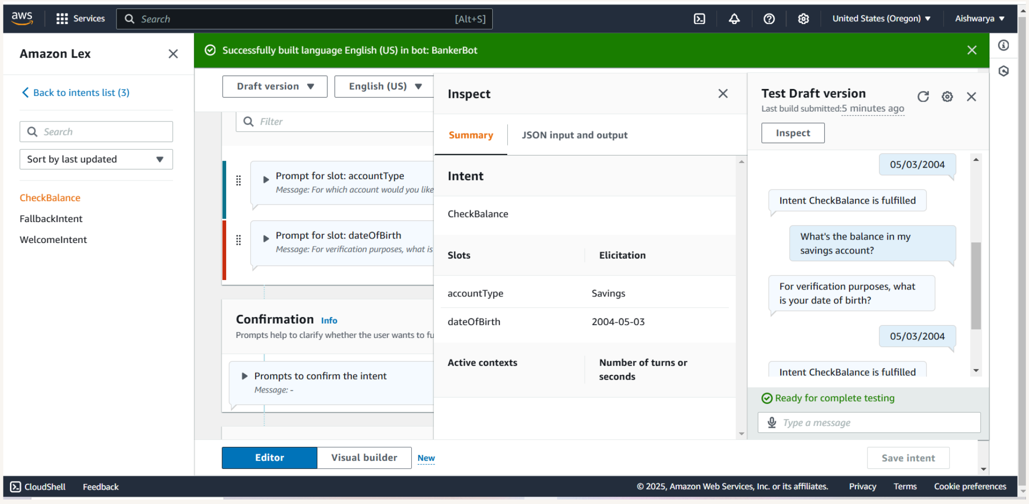
Information that a bot needs to fulfil the intent. The bot prompts for slots required for intent fulfilment, in priority order below.

Prompt for slot: accountType Message: For which account would you like your balan…	Slot type accountType
Prompt for slot: dateOfBirth Message: For verification purposes, what is your date …	Slot type AMAZON.Date

Confirmation Info

Slot values in utterances

I included slot values in some of the utterances (i.e. user inputs) by What's the balance in my account? Check my account balance ?What's the balance in my {accountType} account?



Successfully built language English (US) in bot: BankerBot

Prompt for slot: accountType
Message: For which account would you like

Prompt for slot: dateOfBirth
Message: For verification purposes, what is

Confirmation
Prompts help to clarify whether the user wants to fu

Prompts to confirm the intent
Message: -

Inspect

Intent

CheckBalance

Slots	Elicitation
accountType	Savings
dateOfBirth	2004-05-03

Active contexts	Number of turns or seconds

Test Draft version
Last build submitted: 5 minutes ago

05/03/2004

Intent CheckBalance is fulfilled

What's the balance in my savings account?

For verification purposes, what is your date of birth?

05/03/2004

Intent CheckBalance is fulfilled

Ready for complete testing

nextwork.org

Connect Amazon Lex with Lambda

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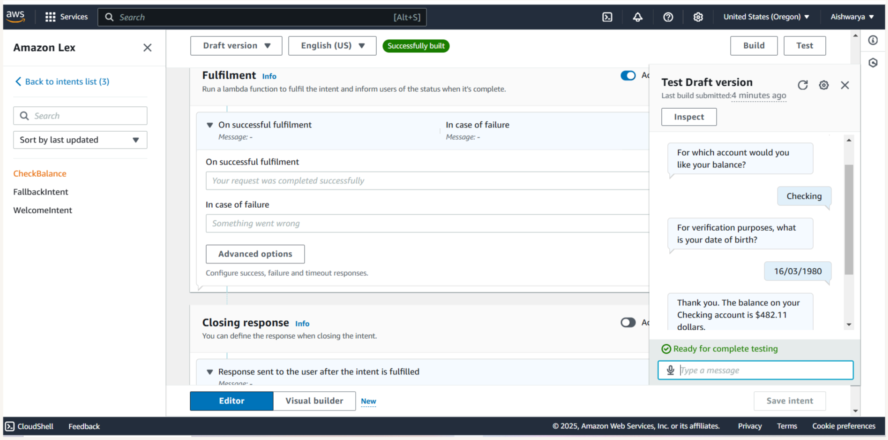


Fulfilment

Run a lambda function to fulfil the intent and inform users of the status when it's complete.

On successful fulfilment
Message: -

In case of failure
Message: -

On successful fulfilment

Your request was completed successfully

In case of failure

Something went wrong

Configure success, failure and timeout responses.

Closing response

You can define the response when closing the intent.

Response sent to the user after the intent is fulfilled
Message: -

Test Draft version

Last build submitted:4 minutes ago

For which account would you like your balance?

Checking

For verification purposes, what is your date of birth?

16/03/1980

Thank you. The balance on your Checking account is $482.11 dollars.

Ready for complete testing

Type a message

Introducing Today's Project!

What is Amazon Lex?

AWS Lambda is a serverless computing service that runs code in response to events. This enables scalable, automated conversational AI solutions without managing servers.

How I used Amazon Lex in this project

P3 - Connect Amazon Lex with Lambda

One thing I didn't expect in this project was...

Work of fulfilment.

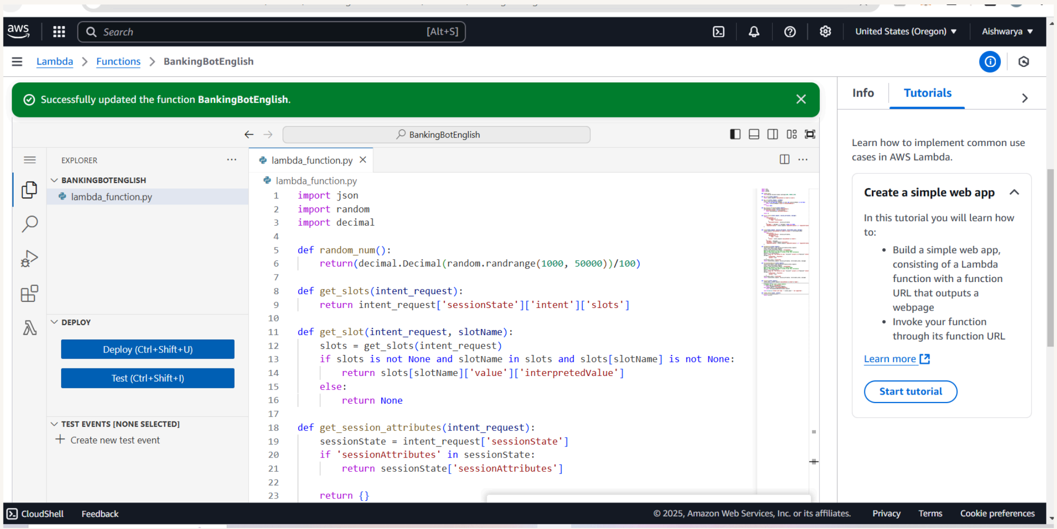
This project took me...

It took 60min.

AWS Lambda Functions

AWS Lambda is a serverless computing service that runs code in response to events. This enables scalable, automated conversational AI solutions without managing servers.

In this project, I created a Lambda function to generate a random number on the fly (whenever a user asks for their balance). You can think of Lex as the interface that the user sees and chats with, while Lambda is the calculator.



Successfully updated the function **BankingBotEnglish**.

lambda_function.py

```python
import json
import random
import decimal

def random_num():
    return(decimal.Decimal(random.randrange(1000, 50000))/100)

def get_slots(intent_request):
    return intent_request['sessionState']['intent']['slots']

def get_slot(intent_request, slotName):
    slots = get_slots(intent_request)
    if slots is not None and slotName in slots and slots[slotName] is not None:
        return slots[slotName]['value']['interpretedValue']
    else:
        return None

def get_session_attributes(intent_request):
    sessionState = intent_request['sessionState']
    if 'sessionAttributes' in sessionState:
        return sessionState['sessionAttributes']

    return {}
```

Learn how to implement common use cases in AWS Lambda.

Create a simple web app

In this tutorial you will learn how to:

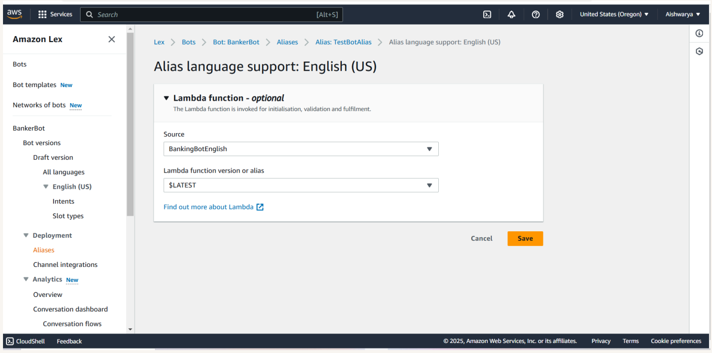
- Build a simple web app, consisting of a Lambda function with a function URL that outputs a webpage
- Invoke your function through its function URL

Chatbot Alias

An alias in Amazon Lex as a pointer for a specific version of your bot.

TestBotAlias is a default version of your bot that's made for testing or development.

To connect Lambda with my BankerBot, I visited my bot's TestBotAlias and select the language and source of lambda function.



Lex > Bots > Bot: BankerBot > Aliases > Alias: TestBotAlias > Alias language support: English (US)

Alias language support: English (US)

▼ Lambda function - *optional*

The Lambda function is invoked for initialisation, validation and fulfilment.

Source: BankingBotEnglish

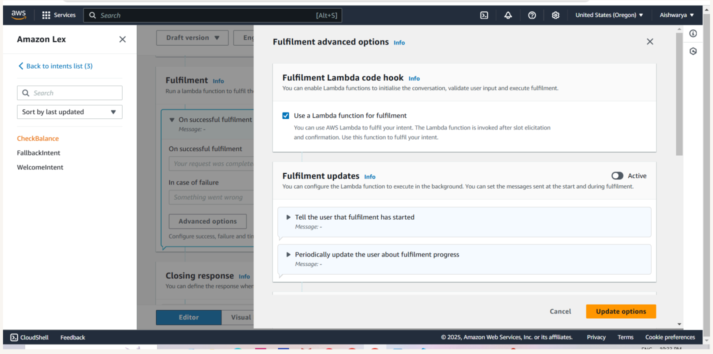
Lambda function version or alias: $LATEST

Code Hooks

Code hooks help you connect your chatbot to custom Lambda functions for doing specific tasks during a conversation.

Even though I already connected my Lambda function with my chatbot's alias, I had to use code hooks because code hooks make your chatbot smarter and more useful by allowing it to perform these extra steps seamlessly during chats.

I could find code hooks at intent there is fulfilment option.



Fulfilment Info

Run a lambda function to fulfil th

▼ On successful fulfilment
Message: -

On successful fulfilment
Your request was complete

In case of failure
Something went wrong

Configure success, failure and tir

Closing response Info

You can define the response wher

Fulfilment advanced options Info

Fulfilment Lambda code hook Info

You can enable Lambda functions to initialise the conversation, validate user input and execute fulfilment.

☑ Use a Lambda function for fulfilment

You can use AWS Lambda to fulfil your intent. The Lambda function is invoked after slot elicitation and confirmation. Use this function to fulfil your intent.

Fulfilment updates Info ○ Active

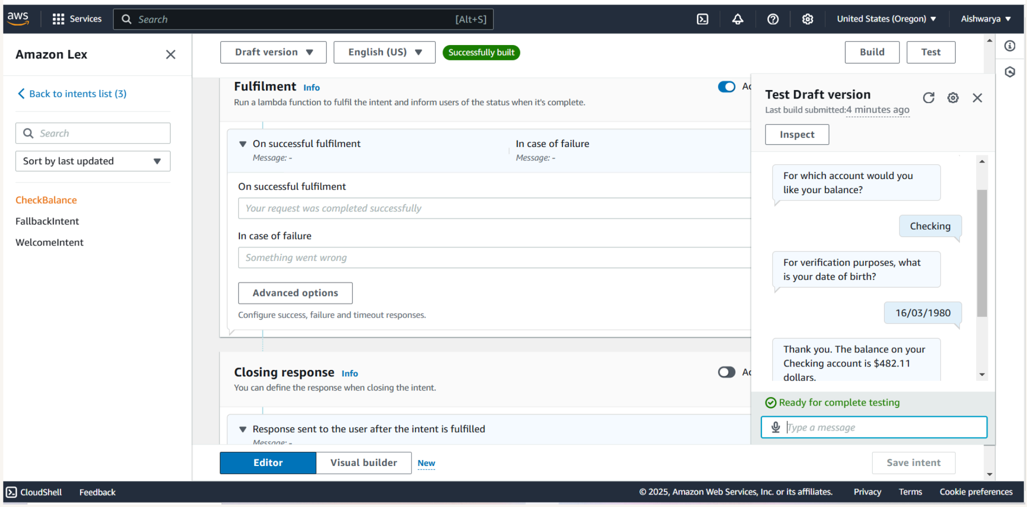
You can configure the Lambda function to execute in the background. You can set the messages sent at the start and during fulfilment.

▶ Tell the user that fulfilment has started
Message: -

▶ Periodically update the user about fulfilment progress
Message: -

The final result!

I've set up my chatbot to trigger Lambda and return a random dollar figure when we ask for bank balance.



Fulfilment Info

Run a lambda function to fulfil the intent and inform users of the status when it's complete.

▼ On successful fulfilment
Message: -

In case of failure
Message: -

On successful fulfilment
Your request was completed successfully

In case of failure
Something went wrong

Configure success, failure and timeout responses.

Closing response Info

You can define the response when closing the intent.

▼ Response sent to the user after the intent is fulfilled
Message: -

Test Draft version

Last build submitted:4 minutes ago

For which account would you like your balance?

Checking

For verification purposes, what is your date of birth?

16/03/1980

Thank you. The balance on your Checking account is $482.11 dollars.

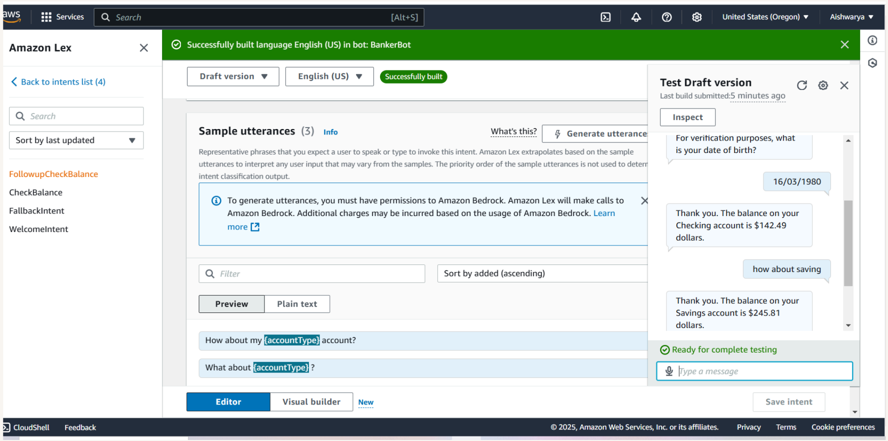
Ready for complete testing

Type a message

nextwork.org

Save User Info with a Lex Chatbot

AI aishuchoudhari16@gmail.com



Successfully built language English (US) in bot: BankerBot

Amazon Lex

Back to intents list (4)

Sort by last updated

- FollowupCheckBalance
- CheckBalance
- FallbackIntent
- WelcomeIntent

Draft version | English (US) | Successfully built

Sample utterances (3) Info

Representative phrases that you expect a user to speak or type to invoke this intent. Amazon Lex extrapolates based on the sample utterances to interpret any user input that may vary from the samples. The priority order of the sample utterances is not used to determ intent classification output.

To generate utterances, you must have permissions to Amazon Bedrock. Amazon Lex will make calls to Amazon Bedrock. Additional charges may be incurred based on the usage of Amazon Bedrock. Learn more

Sort by added (ascending)

How about my {accountType} account?

What about {accountType} ?

Test Draft version

Last build submitted:5 minutes ago

For verification purposes, what is your date of birth?

16/03/1980

Thank you. The balance on your Checking account is $142.49 dollars.

how about saving

Thank you. The balance on your Savings account is $245.81 dollars.

Ready for complete testing

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Introducing Today's Project!

What is Amazon Lex?

AWS Lambda is a serverless computing service that runs code in response to events.This enables scalable, automated conversational AI solutions without managing servers.

How I used Amazon Lex in this project

P4 - Save User Info with a Lex Chatbot

One thing I didn't expect in this project was...

Nothing

This project took me...

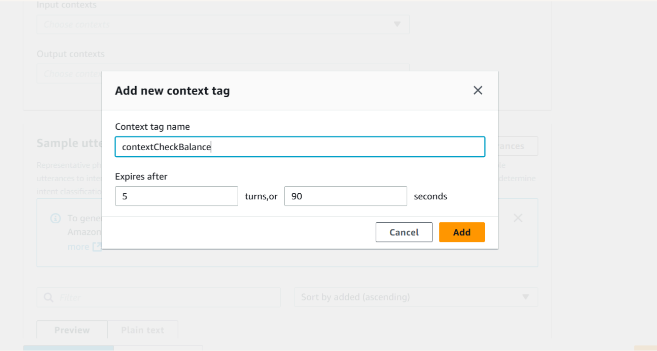
It took 60min.

Context Tags

Context tags in Amazon Lex are used to store and check for specific information across different parts of a conversation. They help save the user from having to repeat certain information.

There are two types of context tags: 1. Output context tag 2. Input context tag

I created a context tag called output context tag. This context tag was created in the intent checkbalnce.This tag stores information about certain details after an intent is finished,so other parts of the conversation can use this stored information



Add new context tag

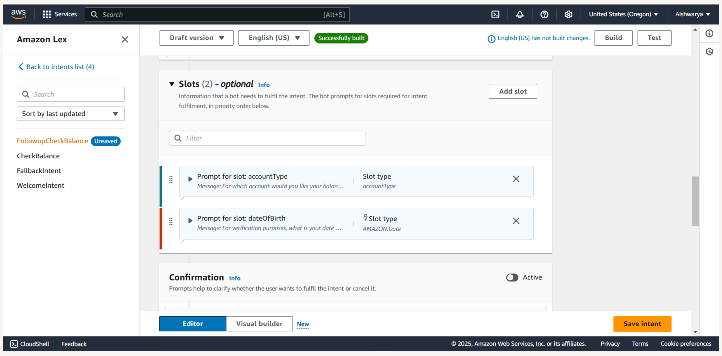
Context tag name
contextCheckBalance

Expires after
5 turns,or 90 seconds

FollowUpCheckBalance

I created a new intent called FollowupCheckBalance. The purpose of this intent is to handle follow up questions without asking for the user's birthday again.

This intent is connected to the previous intent I made, CheckBalance, because for not repeating the actions.



Slots (2) - *optional* Info

Information that a bot needs to fulfil the intent. The bot prompts for slots required for intent fulfilment, in priority order below.

Prompt for slot: accountType
Message: For which account would you like your balan…
Slot type
accountType

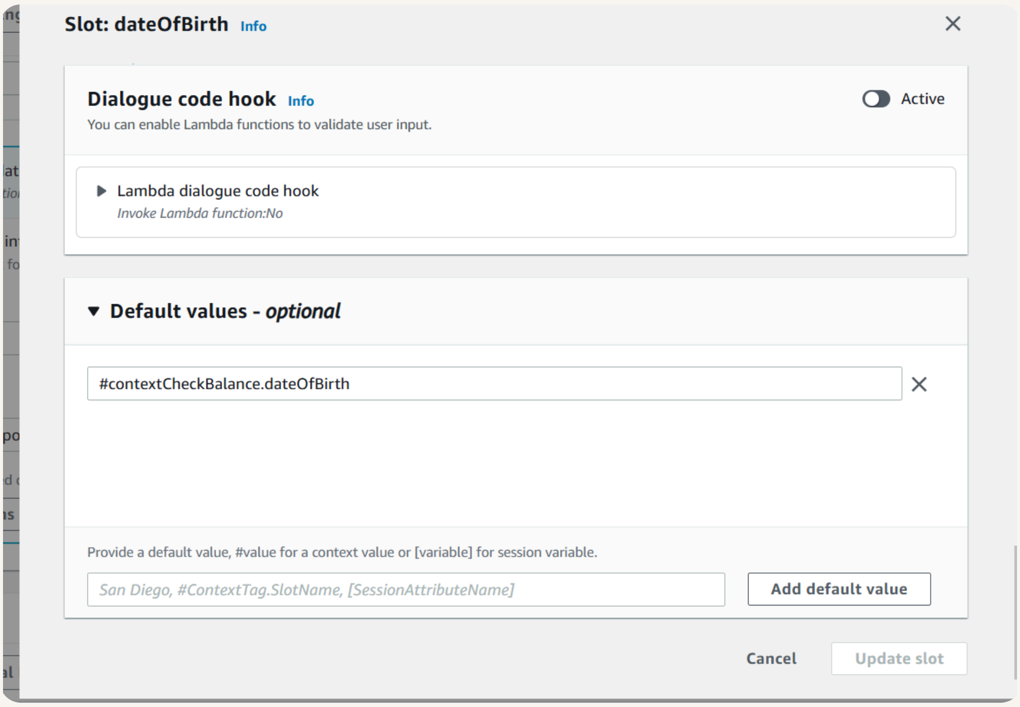
Prompt for slot: dateOfBirth
Message: For verification purposes, what is your date …
Slot type
AMAZON.Date

Confirmation Info
Active

Prompts help to clarify whether the user wants to fulfil the intent or cancel it.

Input Context Tag

I created an input context, contextCheckBalance, that Intent to allow a follow-up balance check request without authentication



Slot: dateOfBirth Info

Dialogue code hook Info

You can enable Lambda functions to validate user input.

Active

▶ Lambda dialogue code hook

Invoke Lambda function:No

▼ Default values - *optional*

#contextCheckBalance.dateOfBirth

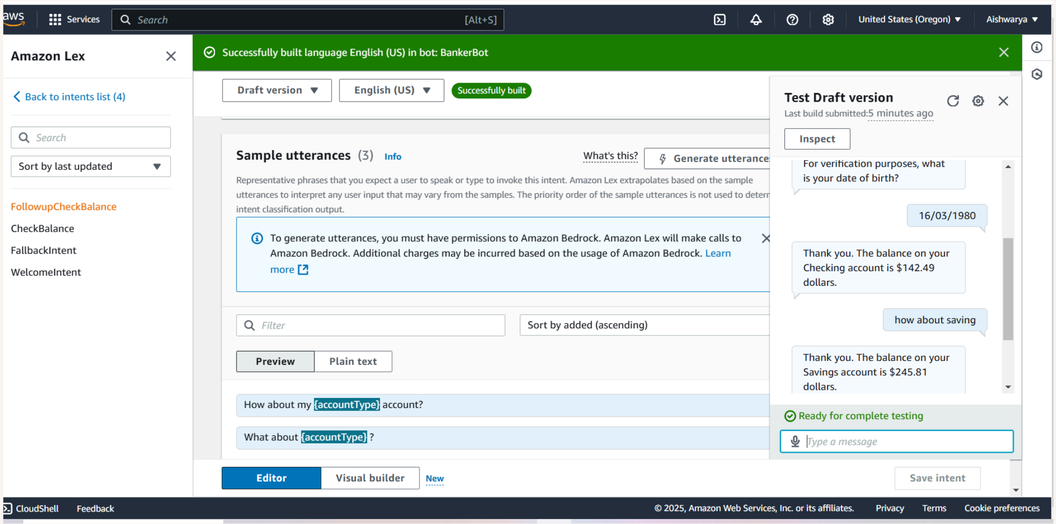
Provide a default value, #value for a context value or [variable] for session variable.

San Diego, #ContextTag.SlotName, [SessionAttributeName]

The final result!

To see the context tags and followup intent in action, It will not repeat questions.

'If I had gone straight to trying to trigger FollowUpCheckBalance without setting up any context it will give an error.



Successfully built language English (US) in bot: BankerBot

Sample utterances (3)

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To generate utterances, you must have permissions to Amazon Bedrock. Amazon Lex will make calls to Amazon Bedrock. Additional charges may be incurred based on the usage of Amazon Bedrock. Learn more

How about my {accountType} account?

What about {accountType} ?

Test Draft version

Last build submitted:5 minutes ago

For verification purposes, what is your date of birth?

16/03/1980

Thank you. The balance on your Checking account is $142.49 dollars.

how about saving

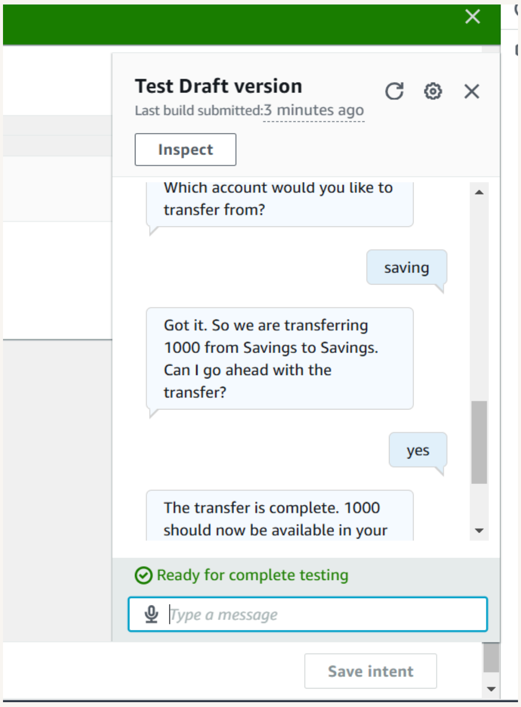
Thank you. The balance on your Savings account is $245.81 dollars.

Ready for complete testing

nextwork.org

Build a Chatbot with Multiple Slots

AI aishuchoudhari16@gmail.com



Test Draft version
Last build submitted:3 minutes ago
Inspect

Which account would you like to transfer from?

saving

Got it. So we are transferring 1000 from Savings to Savings. Can I go ahead with the transfer?

yes

The transfer is complete. 1000 should now be available in your

Ready for complete testing
Type a message
Save intent

Introducing Today's Project!

What is Amazon Lex?

AWS Lambda is a serverless computing service that runs code in response to events.

How I used Amazon Lex in this project

P5 - Set Up Multiple Slots in a Lex Chatbot

One thing I didn't expect in this project was...

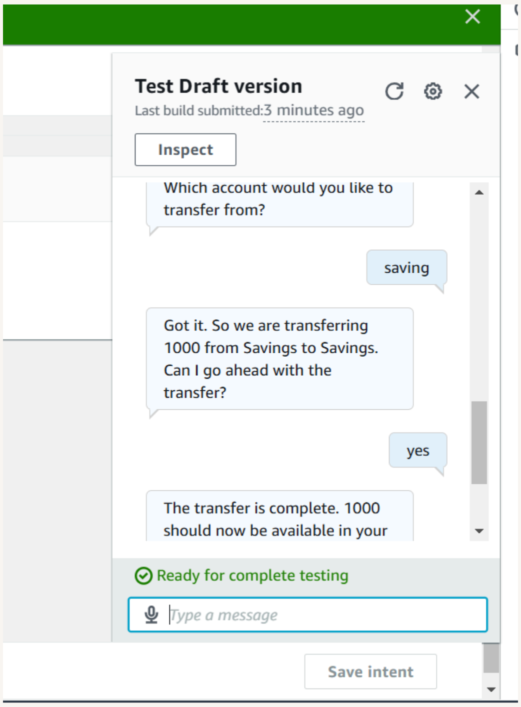
Cloudformation

This project took me...

It took 90min.

TransferFunds

An intent I created for my chatbot was TransferFunds, which about transferring money between accounts.



Test Draft version
Last build submitted:3 minutes ago
Inspect

Which account would you like to transfer from?

saving

Got it. So we are transferring 1000 from Savings to Savings. Can I go ahead with the transfer?

yes

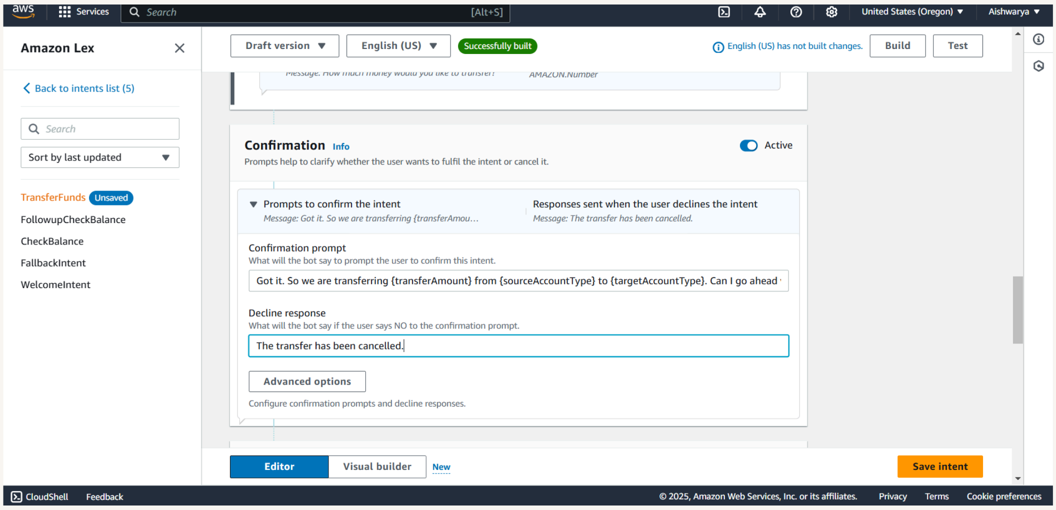
The transfer is complete. 1000 should now be available in your

Ready for complete testing
Type a message
Save intent

Using multiple slots

For this intent, I had to use the same slot type twice. This is because When two slots have the same slot type, it becomes important that you're using clear slot names, like sourceAccountType and targetAccountType, to make it easy to identify.

I also learnt how to create confirmation prompts, which are typically repeat back information for the user to confirm. e.g. "Are you sure you want to do x?"



Message: How much money would you like to transfer?

Confirmation

Prompts help to clarify whether the user wants to fulfil the intent or cancel it.

Prompts to confirm the intent
Message: Got it. So we are transferring {transferAmou…

Responses sent when the user declines the intent
Message: The transfer has been cancelled.

Confirmation prompt
What will the bot say to prompt the user to confirm this intent.
Got it. So we are transferring {transferAmount} from {sourceAccountType} to {targetAccountType}. Can I go ahead

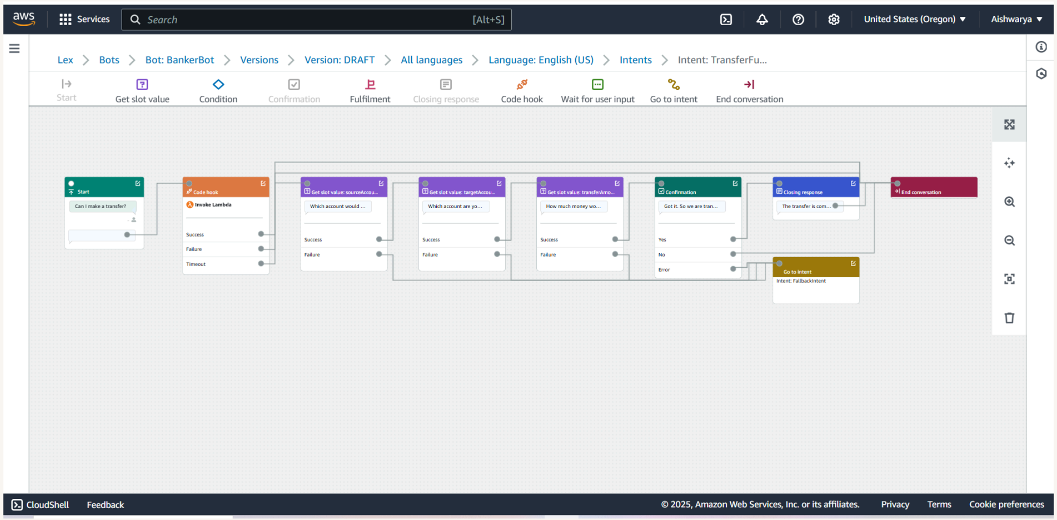
Decline response
What will the bot say if the user says NO to the confirmation prompt.
The transfer has been cancelled.

Configure confirmation prompts and decline responses.

Exploring Lex features

This flow will update as you continue editing this intent. It shows every step in a conversation in a logical, chronological order. If you click on the chat bubble, you'll get taken to an edit screen.

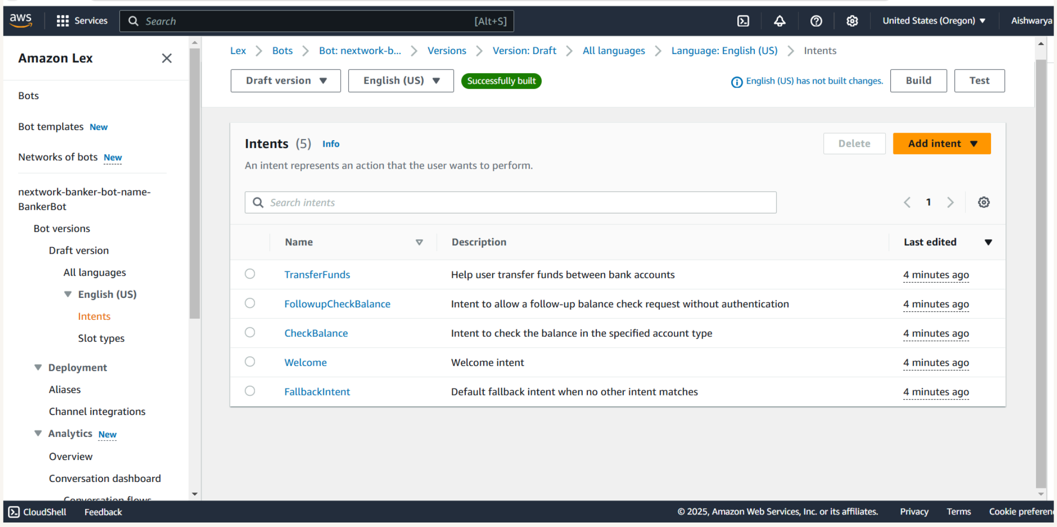
You could also set up your intent using a visual builder! A visual builder visual representation of the intent you have just built.



AWS CloudFormation

AWS CloudFormation is a service that gives you an easy way to create and set up AWS resources.

Use a file that describes all the resources you want to create and their dependencies as code. Then, you can use that template to create, update, and delete the entire stack of resources you described, instead of managing your resources individually.



English (US) has not built changes.

Intents (5) Info

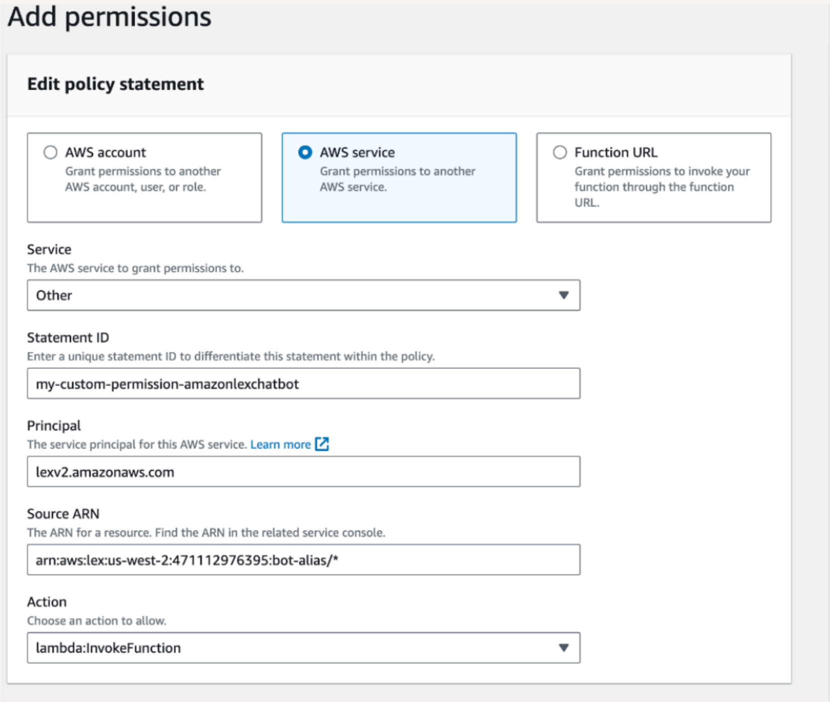
An intent represents an action that the user wants to perform.

	Name	Description	Last edited
○	TransferFunds	Help user transfer funds between bank accounts	4 minutes ago
○	FollowupCheckBalance	Intent to allow a follow-up balance check request without authentication	4 minutes ago
○	CheckBalance	Intent to check the balance in the specified account type	4 minutes ago
○	Welcome	Welcome intent	4 minutes ago
○	FallbackIntent	Default fallback intent when no other intent matches	4 minutes ago

The final result!

Re-building my bot with CloudFormation took me 5min.

There was an error after I deployed my bot! The error was Intent CheckBalance is fulfilled. fixed this by Create a new Resource-based policy statement that gives your chatbot aliases access to your new function.



Add permissions

Edit policy statement

○ AWS account
Grant permissions to another AWS account, user, or role.

● AWS service
Grant permissions to another AWS service.

○ Function URL
Grant permissions to invoke your function through the function URL.

Service
The AWS service to grant permissions to.
Other

Statement ID
Enter a unique statement ID to differentiate this statement within the policy.
my-custom-permission-amazonlexchatbot

Principal
The service principal for this AWS service. Learn more
lexv2.amazonaws.com

Source ARN
The ARN for a resource. Find the ARN in the related service console.
arn:aws:lex:us-west-2:471112976395:bot-alias/*

Action
Choose an action to allow.
lambda:InvokeFunction