Assignment 2

Part B

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Dalhousie University

Subject

CSCI 5410 (Serverless Data Processing)

Professor

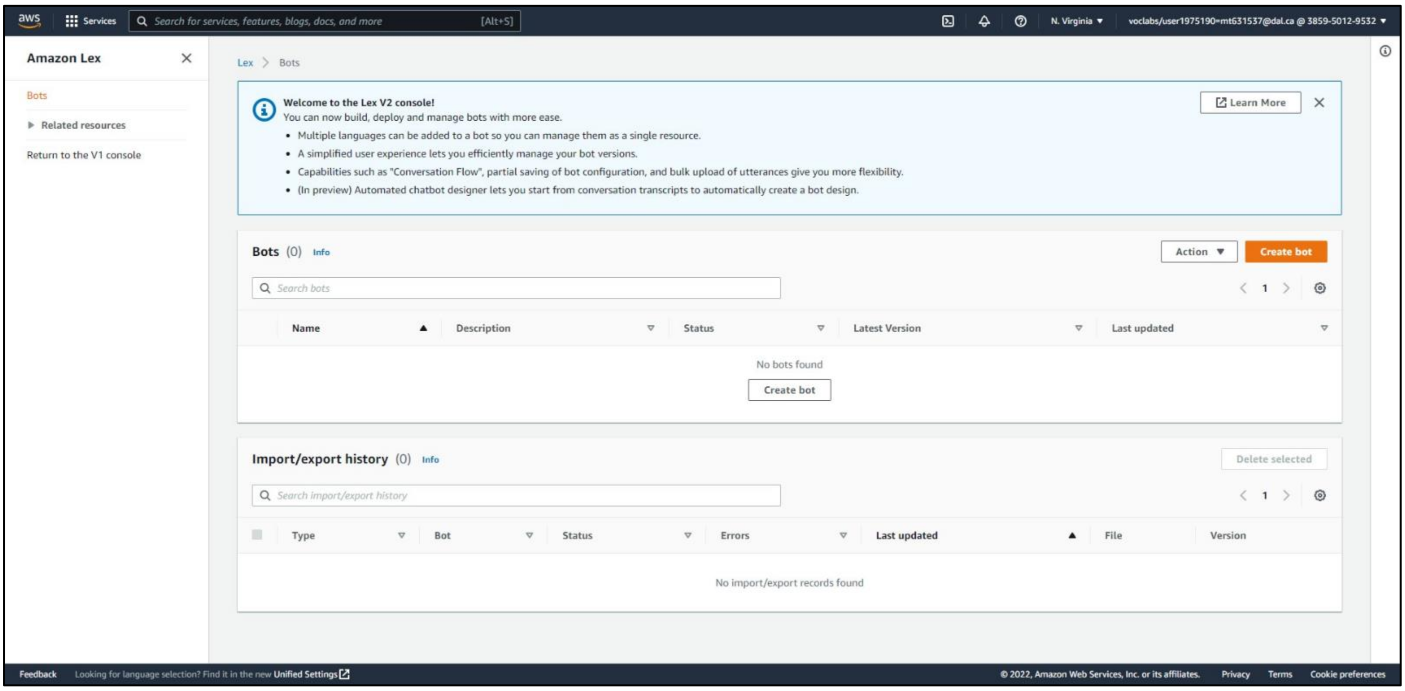
Dr. Saurabh Dey

Amazon Lex

Amazon Lex is a service for integrating speech and text-based chatbots into any application. It is the brains behind Amazon's virtual assistant Alexa. To understand Amazon lex, in this assignment we build a **QuickRide** chatbot. QuickRide chatbot is rental places that helps users to book/rent a taxi or a self-drive car.

Steps of creating a chatbot QuickRide

Figures 1, 2, 3, 4 and 5 are responsible for representing the steps for creating **QuickRide** chatbot. These figures also show the **configuration setting** required for creating the chat bot



aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
N. Virginia
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532
Amazon Lex
Bots
Related resources
Return to the V1 console
Lex > Bots
Learn More

Welcome to the Lex V2 console!
You can now build, deploy and manage bots with more ease.

- Multiple languages can be added to a bot so you can manage them as a single resource.
- A simplified user experience lets you efficiently manage your bot versions.
- Capabilities such as "Conversation Flow", partial saving of bot configuration, and bulk upload of utterances give you more flexibility.
- (In preview) Automated chatbot designer lets you start from conversation transcripts to automatically create a bot design.

Bots (0) Info

Name	Description	Status	Latest Version	Last updated

No bots found

Import/export history (0) Info

Type	Bot	Status	Errors	Last updated	File	Version

No import/export records found

Feedback
Looking for language selection? Find it in the new Unified Settings
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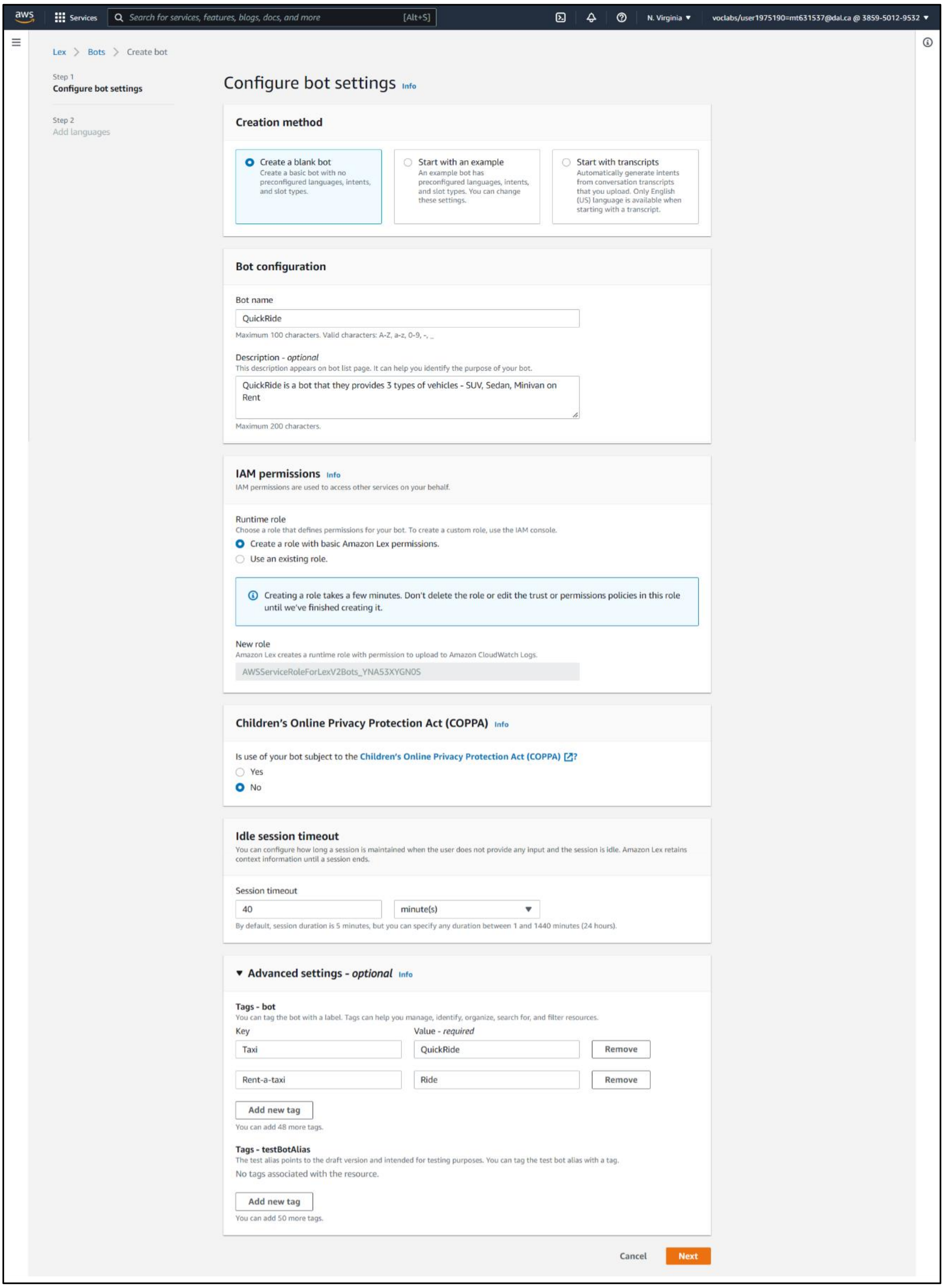
Cookie preferences

Figure 1: Dashboard of the Amazon Lex without any chatbot


aws
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N. Virginia ▼
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532 ▼
Lex > Bots > Create bot
Step 1
Configure bot settings
Step 2
Add languages

Configure bot settings Info

Creation method

● Create a blank bot
Create a basic bot with no preconfigured languages, intents, and slot types.

○ Start with an example
An example bot has preconfigured languages, intents, and slot types. You can change these settings.

○ Start with transcripts
Automatically generate intents from conversation transcripts that you upload. Only English (US) language is available when starting with a transcript.

Bot configuration

Bot name
QuickRide
Maximum 100 characters. Valid characters: A-Z, a-z, 0-9, -, _

Description - *optional*
This description appears on bot list page. It can help you identify the purpose of your bot.
QuickRide is a bot that they provides 3 types of vehicles - SUV, Sedan, Minivan on Rent
Maximum 200 characters.

IAM permissions Info
IAM permissions are used to access other services on your behalf.

Runtime role
Choose a role that defines permissions for your bot. To create a custom role, use the IAM console.
● Create a role with basic Amazon Lex permissions.
○ Use an existing role.

Creating a role takes a few minutes. Don't delete the role or edit the trust or permissions policies in this role until we've finished creating it.

New role
Amazon Lex creates a runtime role with permission to upload to Amazon CloudWatch Logs.
AWSServiceRoleForLexV2Bots_YNA53XYGN0S

Children's Online Privacy Protection Act (COPPA) Info

Is use of your bot subject to the Children's Online Privacy Protection Act (COPPA)?
○ Yes
● No

Idle session timeout
You can configure how long a session is maintained when the user does not provide any input and the session is idle. Amazon Lex retains context information until a session ends.

Session timeout
40 minute(s) ▼
By default, session duration is 5 minutes, but you can specify any duration between 1 and 1440 minutes (24 hours).

▼ **Advanced settings - *optional*** Info

Tags - bot
You can tag the bot with a label. Tags can help you manage, identify, organize, search for, and filter resources.

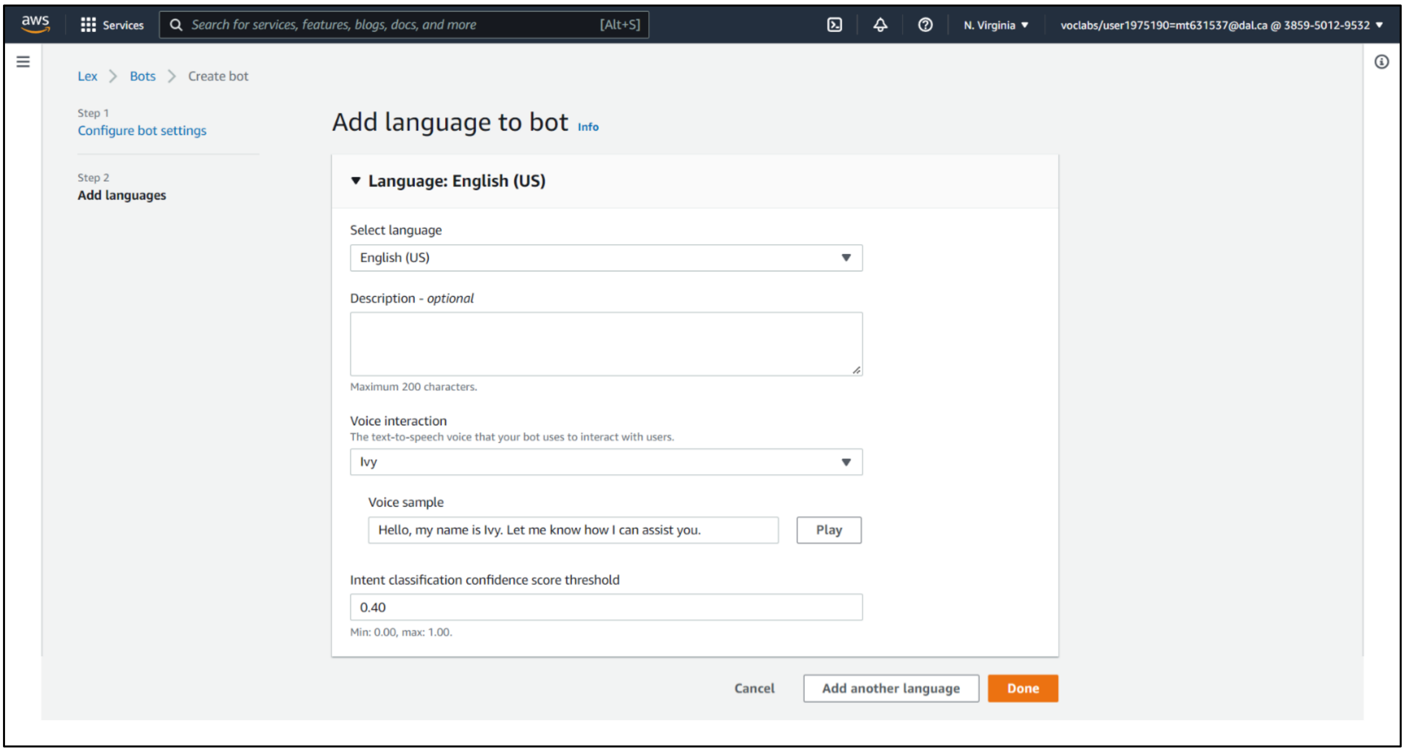
Key	Value - *required*	
Taxi	QuickRide	Remove
Rent-a-taxi	Ride	Remove

Add new tag
You can add 48 more tags.

Tags - testBotAlias
The test alias points to the draft version and intended for testing purposes. You can tag the test bot alias with a tag.
No tags associated with the resource.

Add new tag
You can add 50 more tags.

*Figure 2: Configuration settings for **QuickRide** chatbot*



Add language to bot

▼ Language: English (US)

Select language: English (US)

Description - *optional*

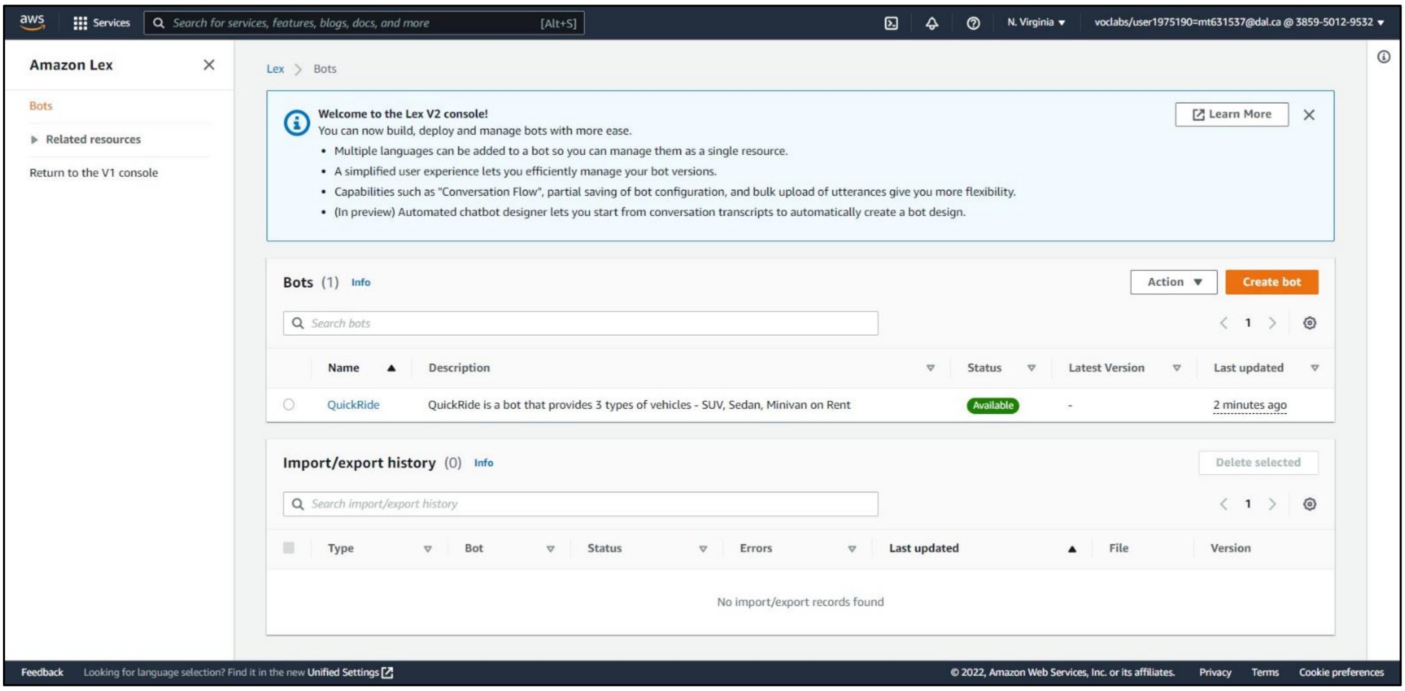
Maximum 200 characters.

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

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

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

*Figure 3: Add language to the **QuickRide** chatbot (i.e., English US)*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Search for services, features, blogs, docs, and more [Alt+S]
N. Virginia ▾
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532 ▾
Amazon Lex
Bots
Related resources
Return to the V1 console
Lex > Bots
Learn More
Info
Action ▾
Create bot
Search bots
Delete selected
Search import/export history
Feedback
Looking for language selection? Find it in the new Unified Settings
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Terms
Cookie preferences

Welcome to the Lex V2 console!
You can now build, deploy and manage bots with more ease.
- Multiple languages can be added to a bot so you can manage them as a single resource.
- A simplified user experience lets you efficiently manage your bot versions.
- Capabilities such as "Conversation Flow", partial saving of bot configuration, and bulk upload of utterances give you more flexibility.
- (In preview) Automated chatbot designer lets you start from conversation transcripts to automatically create a bot design.

Bots (1)

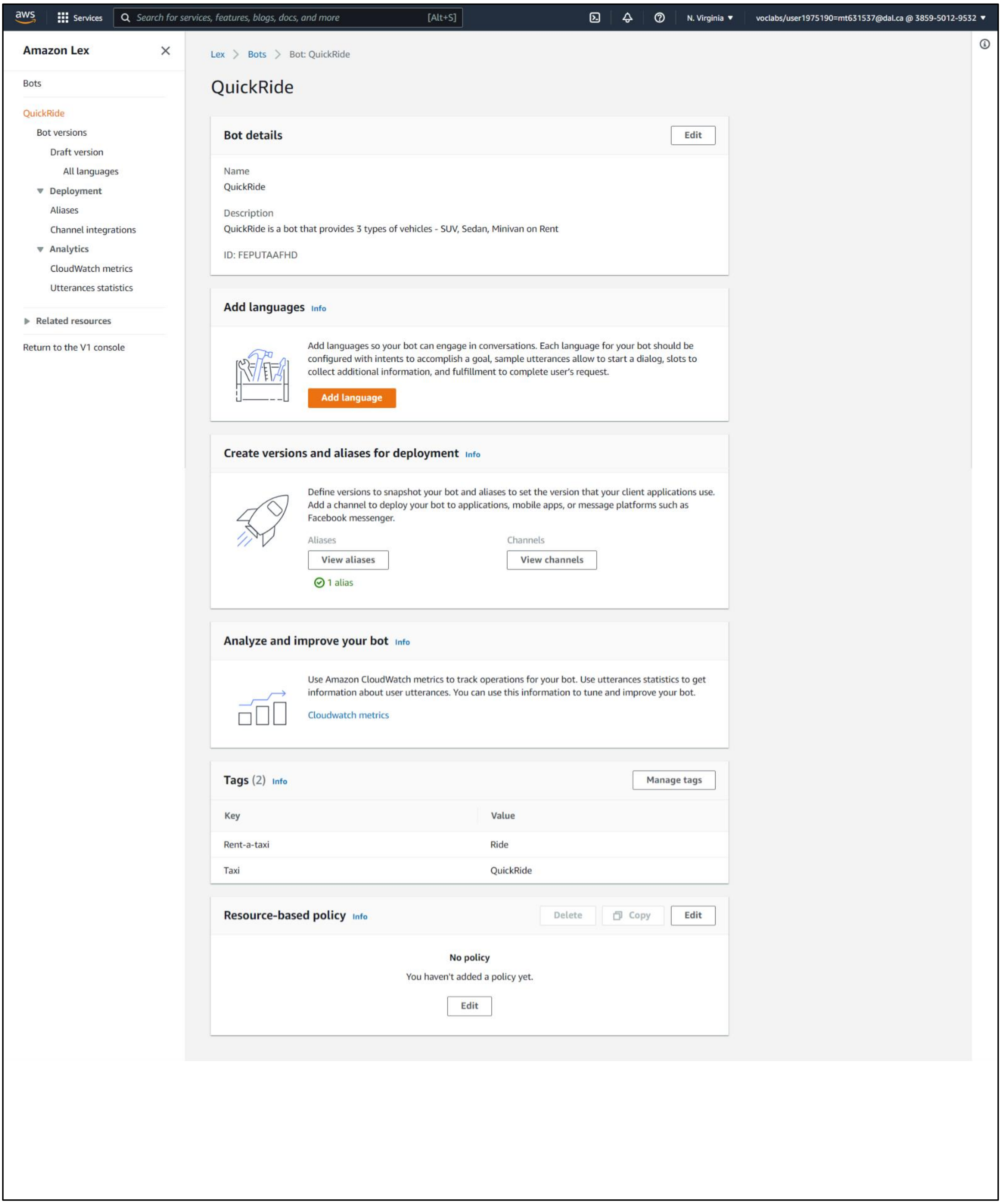
	Name	Description	Status	Latest Version	Last updated
○	QuickRide	QuickRide is a bot that provides 3 types of vehicles - SUV, Sedan, Minivan on Rent	Available	-	2 minutes ago

Import/export history (0)

Type	Bot	Status	Errors	Last updated	File	Version

No import/export records found

*Figure 4: Successfully created **QuickRide** chatbot*



QuickRide

Bot details

Name
QuickRide

Description
QuickRide is a bot that provides 3 types of vehicles - SUV, Sedan, Minivan on Rent

ID: FEPUTAAFHD

Add languages Info

Add languages so your bot can engage in conversations. Each language for your bot should be configured with intents to accomplish a goal, sample utterances allow to start a dialog, slots to collect additional information, and fulfillment to complete user's request.

Create versions and aliases for deployment Info

Define versions to snapshot your bot and aliases to set the version that your client applications use. Add a channel to deploy your bot to applications, mobile apps, or message platforms such as Facebook messenger.

Aliases: ✓ 1 alias

Channels

Analyze and improve your bot Info

Use Amazon CloudWatch metrics to track operations for your bot. Use utterances statistics to get information about user utterances. You can use this information to tune and improve your bot.

Tags (2) Info

Key	Value
Rent-a-taxi	Ride
Taxi	QuickRide

Resource-based policy Info

No policy
You haven't added a policy yet.

Figure 5: ***OrderFood*** *chatbot dashboard along with its description*

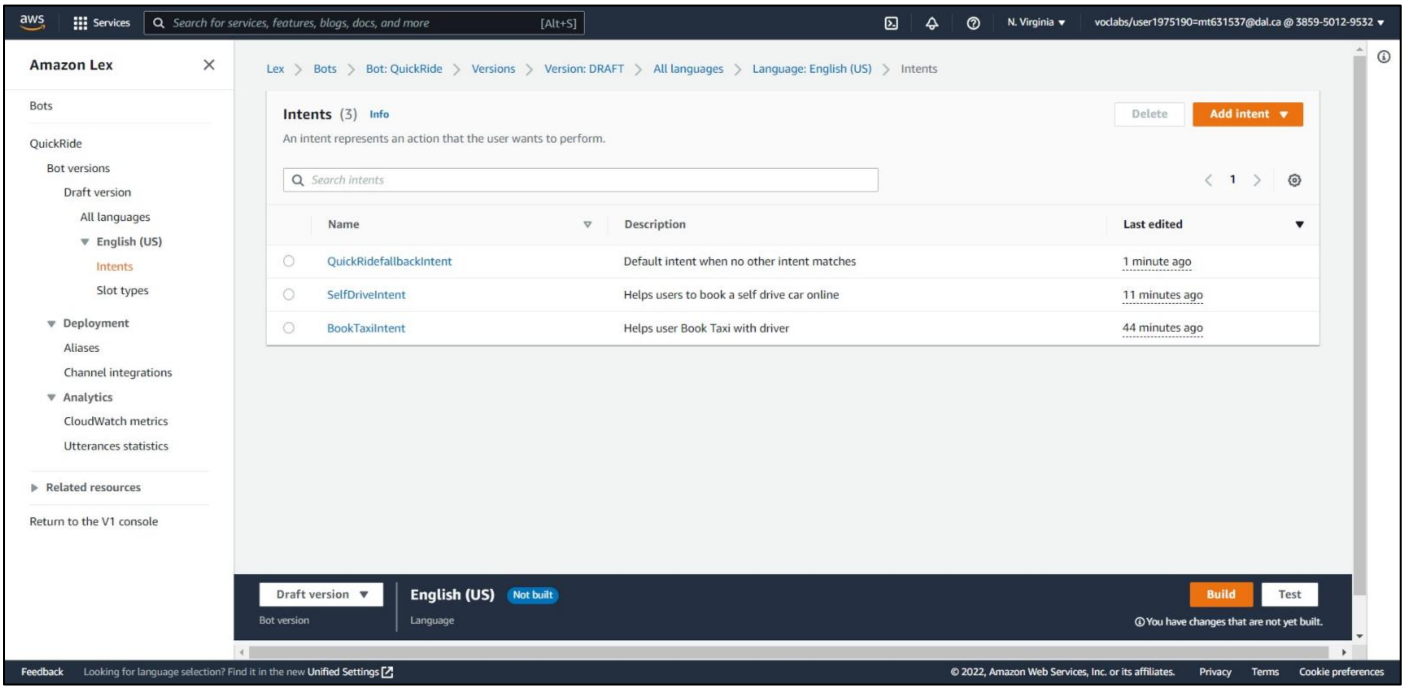
Figure 6 is responsible for displaying the three intents that are created for **QuickRide** chatbot.

1. SelfDriveIntent
2. BookTaxiIntent
3. FallbackIntent

BookTaxiIntent is created for handling the request regarding booking a taxi. For BookTaxiIntent typeofTaxi, pickupAddress, pickUpTime, pickupDate and numberOfTaxi are the important information.

SelfDriveIntent is created for handling the request regarding booking the self-drive car. For SelfDriveIntent vehicleType, numberOfVehicle and arrivalTime are the important information.

FallbackIntent is configured to handle any false requests placed by the users.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N. Virginia
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532
Amazon Lex
Bots
QuickRide
Bot versions
Draft version
All languages
English (US)
Intents
Slot types
Deployment
Aliases
Channel integrations
Analytics
CloudWatch metrics
Utterances statistics
Related resources
Return to the V1 console
Lex > Bots > Bot: QuickRide > Versions > Version: DRAFT > All languages > Language: English (US) > Intents
Delete
Add intent
Search intents
1
Draft version
Bot version
English (US)
Not built
Language
Build
Test
You have changes that are not yet built.
Feedback
Looking for language selection? Find it in the new Unified Settings
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Intents (3) Info

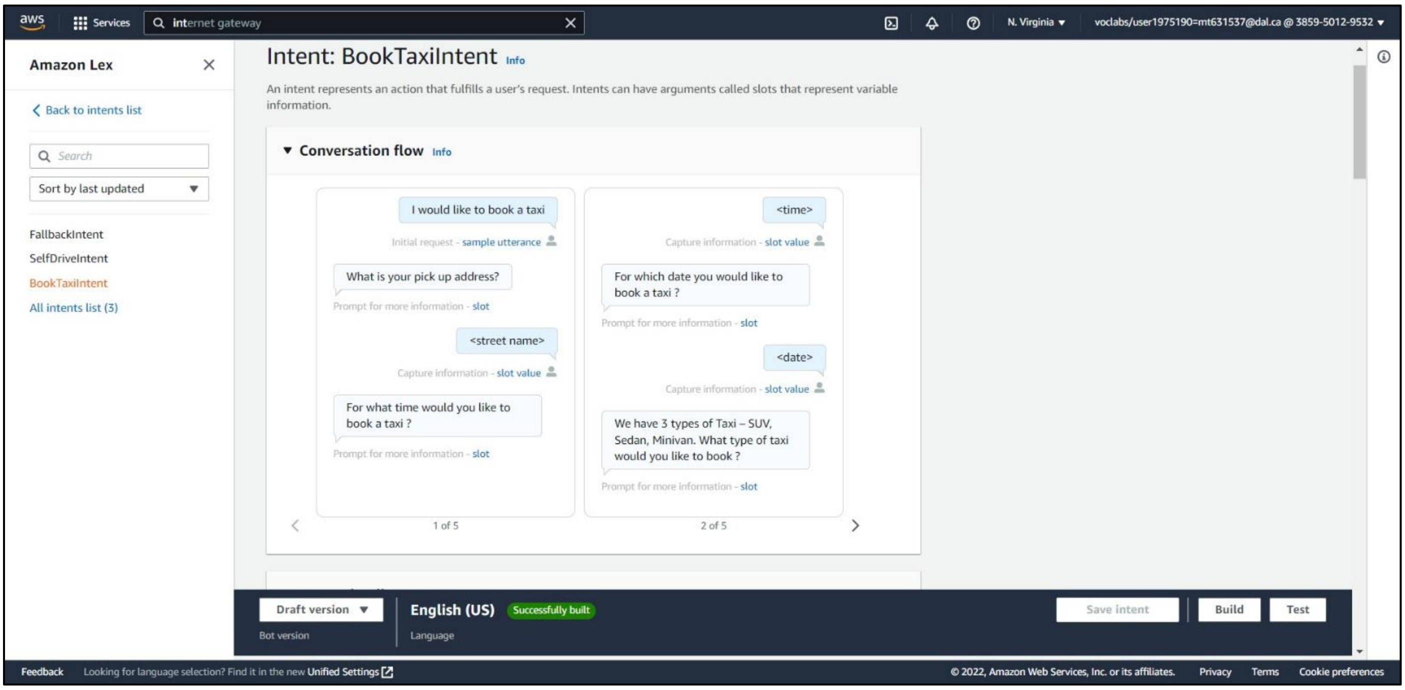
An intent represents an action that the user wants to perform.

	Name	Description	Last edited
○	QuickRidefallbackIntent	Default intent when no other intent matches	1 minute ago
○	SelfDriveIntent	Helps users to book a self drive car online	11 minutes ago
○	BookTaxiIntent	Helps user Book Taxi with driver	44 minutes ago

Figure 6: Three Intents created for ***QuickRide*** *chatbot*

BookTaxiIntent – Booking Taxi (QuickRide chatbot)

Figures 7,8, 9, 10, 11 and 12 are responsible for representing the configuration setting required for setting up the BookTaxiIntent.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internet gateway
N. Virginia
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532
Amazon Lex
Back to intents list
Search
Sort by last updated
FallbackIntent
SelfDriveIntent
BookTaxiIntent
All intents list (3)
Info
Conversation flow
Info
Initial request - sample utterance
Prompt for more information - slot
Capture information - slot value
Prompt for more information - slot
Capture information - slot value
Prompt for more information - slot
1 of 5
2 of 5
Draft version
Bot version
English (US)
Successfully built
Language
Save intent
Build
Test
Feedback
Looking for language selection? Find it in the new Unified Settings
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Intent: BookTaxiIntent

An intent represents an action that fulfills a user's request. Intents can have arguments called slots that represent variable information.

I would like to book a taxi

What is your pick up address?

<street name>

For what time would you like to book a taxi ?

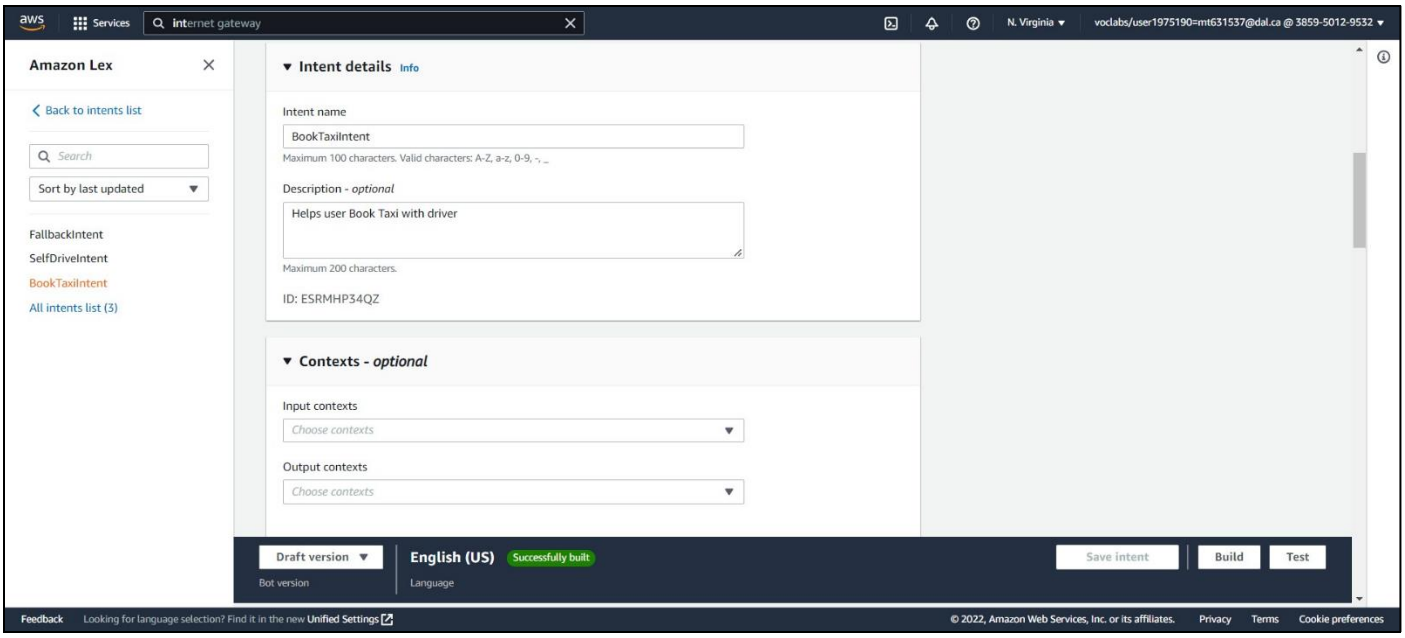
<time>

For which date you would like to book a taxi ?

<date>

We have 3 types of Taxi – SUV, Sedan, Minivan. What type of taxi would you like to book ?

*Figure 7: Conversation Flow for QuickRide Chatbot (**BookTaxiIntent**)*



Intent name: BookTaxiIntent

Maximum 100 characters. Valid characters: A-Z, a-z, 0-9, -, _

Description - *optional*: Helps user Book Taxi with driver

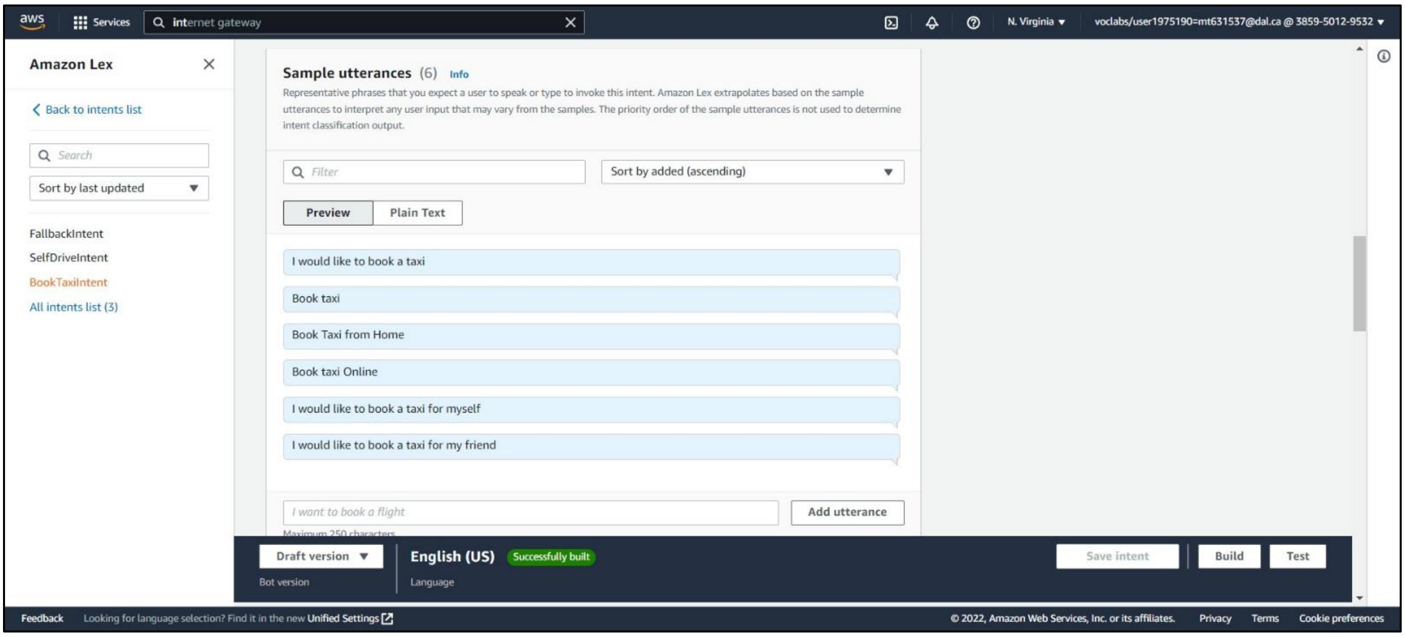
Maximum 200 characters.

ID: ESRMHP34QZ

Input contexts

Output contexts

*Figure 8: Intent details for QuickRide Chatbot (**BookTaxiIntent**)*



Sample utterances (6) Info

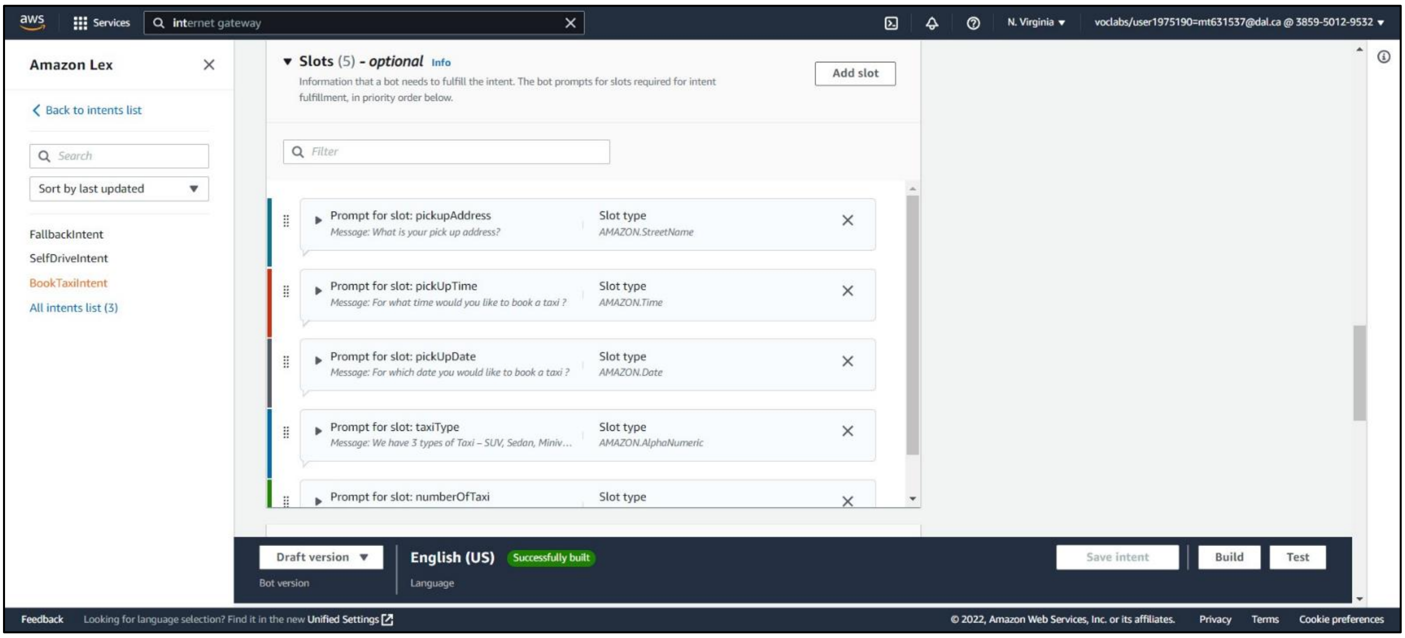
Representative phrases that you expect a user to speak or type to invoke this intent. Amazon Lex extrapolates based on the sample utterances to interpret any user input that may vary from the samples. The priority order of the sample utterances is not used to determine intent classification output.

- I would like to book a taxi
- Book taxi
- Book Taxi from Home
- Book taxi Online
- I would like to book a taxi for myself
- I would like to book a taxi for my friend

I want to book a flight

Maximum 250 characters

*Figure 9: Sample Utterances that user enters to book a taxi from QuickRide Chatbot (**BookTaxiIntent**)*

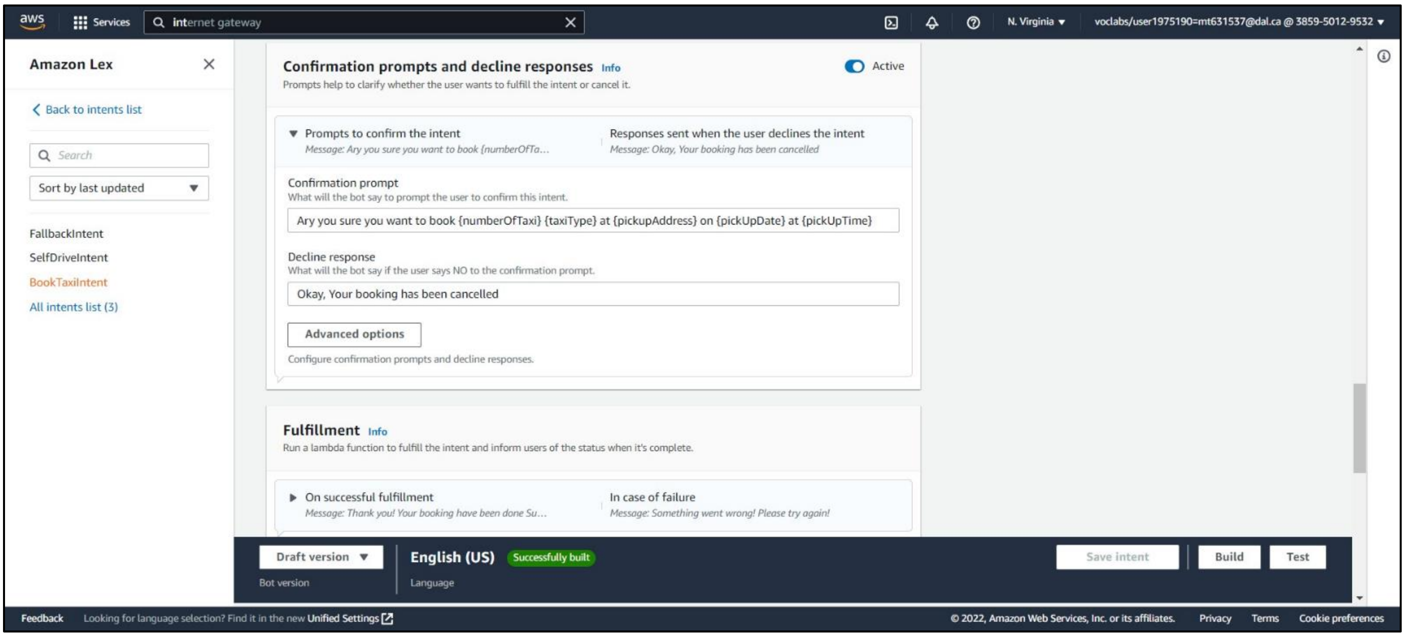


Slots (5) - *optional* Info

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

Prompt for slot: pickupAddress *Message: What is your pick up address?*	Slot type *AMAZON.StreetName*
Prompt for slot: pickUpTime *Message: For what time would you like to book a taxi ?*	Slot type *AMAZON.Time*
Prompt for slot: pickUpDate *Message: For which date you would like to book a taxi ?*	Slot type *AMAZON.Date*
Prompt for slot: taxiType *Message: We have 3 types of Taxi – SUV, Sedan, Miniv…*	Slot type *AMAZON.AlphaNumeric*
Prompt for slot: numberOfTaxi	Slot type

*Figure 10: Slots to accepts address, time, date, type and vehicles from the user (**BookTaxiIntent**)*



Confirmation prompts and decline responses

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

▼ Prompts to confirm the intent

Message: Ary you sure you want to book {numberOfTa...

Responses sent when the user declines the intent

Message: Okay, Your booking has been cancelled

Confirmation prompt

What will the bot say to prompt the user to confirm this intent.

Ary you sure you want to book {numberOfTaxi} {taxiType} at {pickupAddress} on {pickUpDate} at {pickUpTime}

Decline response

What will the bot say if the user says NO to the confirmation prompt.

Okay, Your booking has been cancelled

Configure confirmation prompts and decline responses.

Fulfillment

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

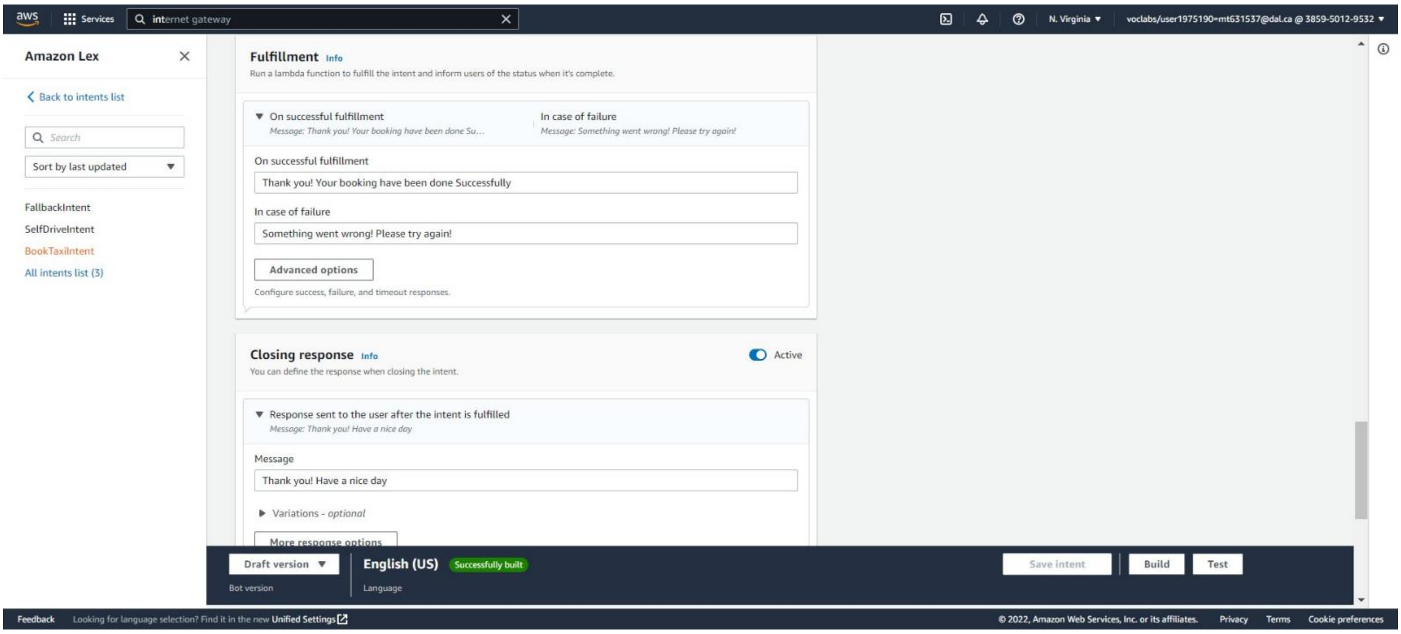
▶ On successful fulfillment

Message: Thank you! Your booking have been done Su...

In case of failure

Message: Something went wrong! Please try again!

*Figure 11: Configuration prompts for QuickRide Chatbot (**BookTaxiIntent**)*



Fulfillment

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

▼ On successful fulfillment

Message: Thank you! Your booking have been done Su...

In case of failure

Message: Something went wrong! Please try again!

On successful fulfillment

Thank you! Your booking have been done Successfully

In case of failure

Something went wrong! Please try again!

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: Thank you! Have a nice day

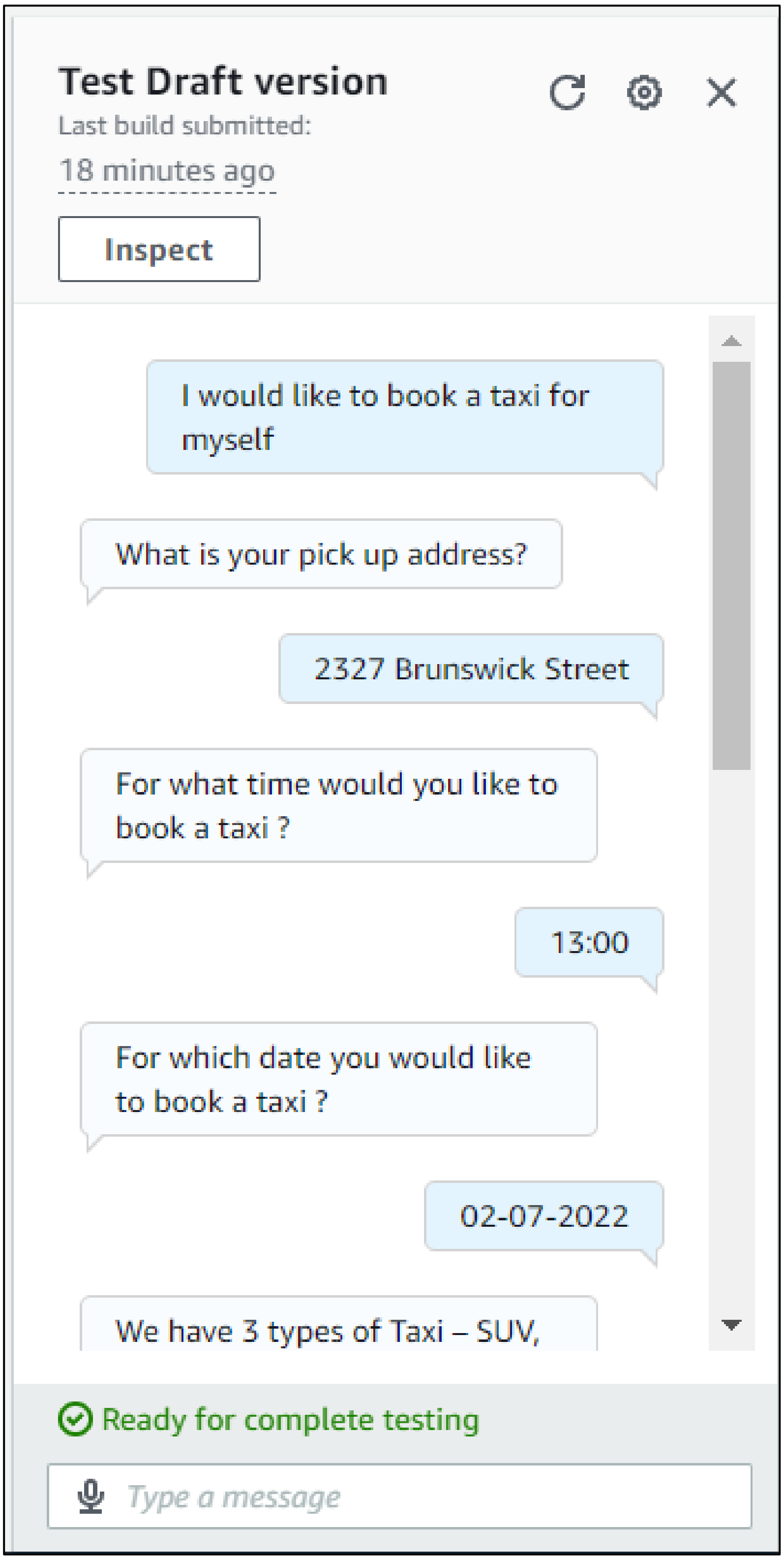
Message

Thank you! Have a nice day

▶ Variations - *optional*

*Figure 12: Fulfillment and closing response for QuickRide Chatbot (**BookTaxiIntent**)*

BookTaxiIntent – Conversation Flow in working



Test Draft version

Last build submitted:

18 minutes ago

I would like to book a taxi for myself

What is your pick up address?

2327 Brunswick Street

For what time would you like to book a taxi ?

13:00

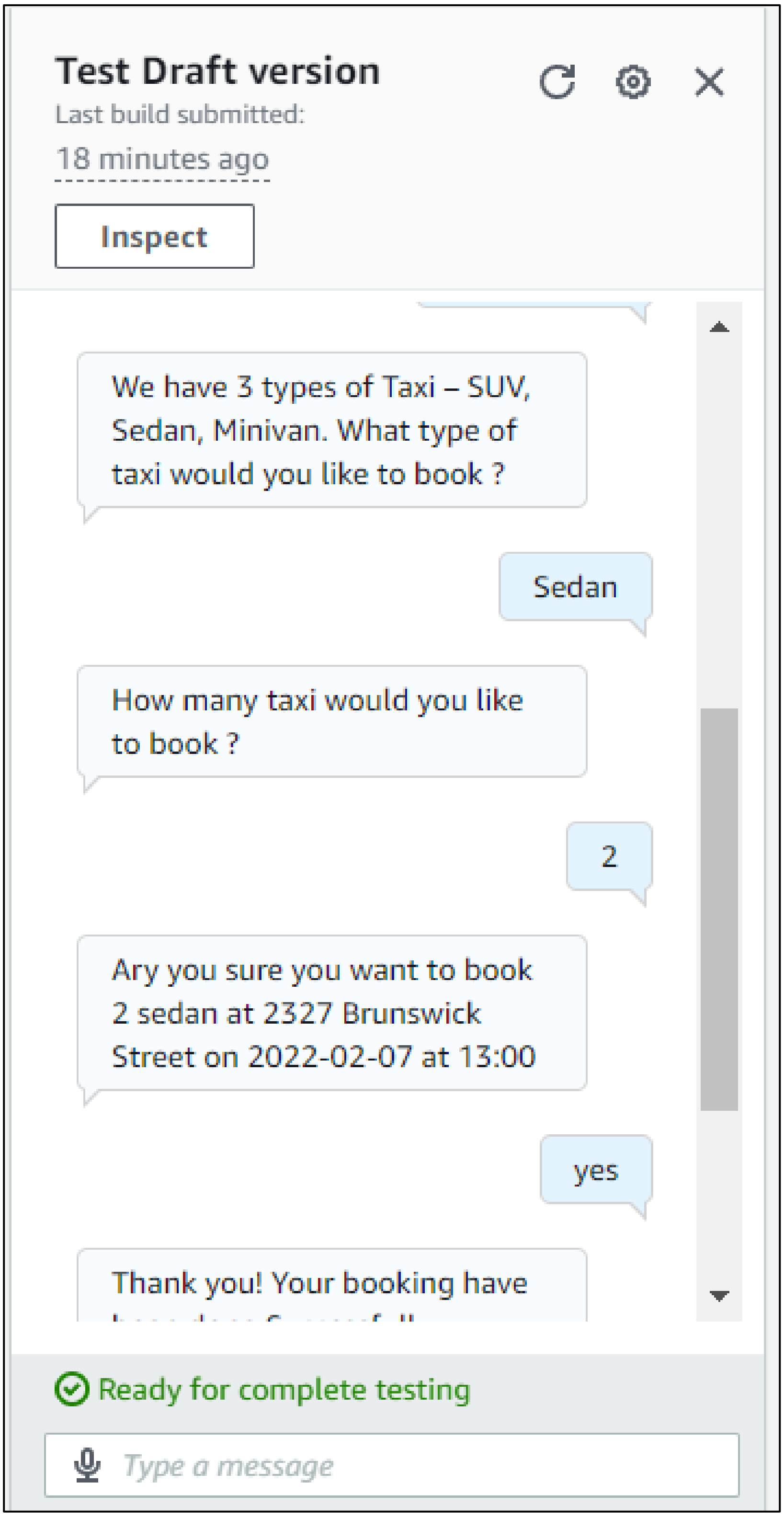
For which date you would like to book a taxi ?

02-07-2022

We have 3 types of Taxi – SUV,

Ready for complete testing

*Figure 13: Testing conversation in working for QuickRide Chatbot (**BookTaxiIntent**)*



Test Draft version

Last build submitted:

18 minutes ago

We have 3 types of Taxi – SUV, Sedan, Minivan. What type of taxi would you like to book ?

Sedan

How many taxi would you like to book ?

2

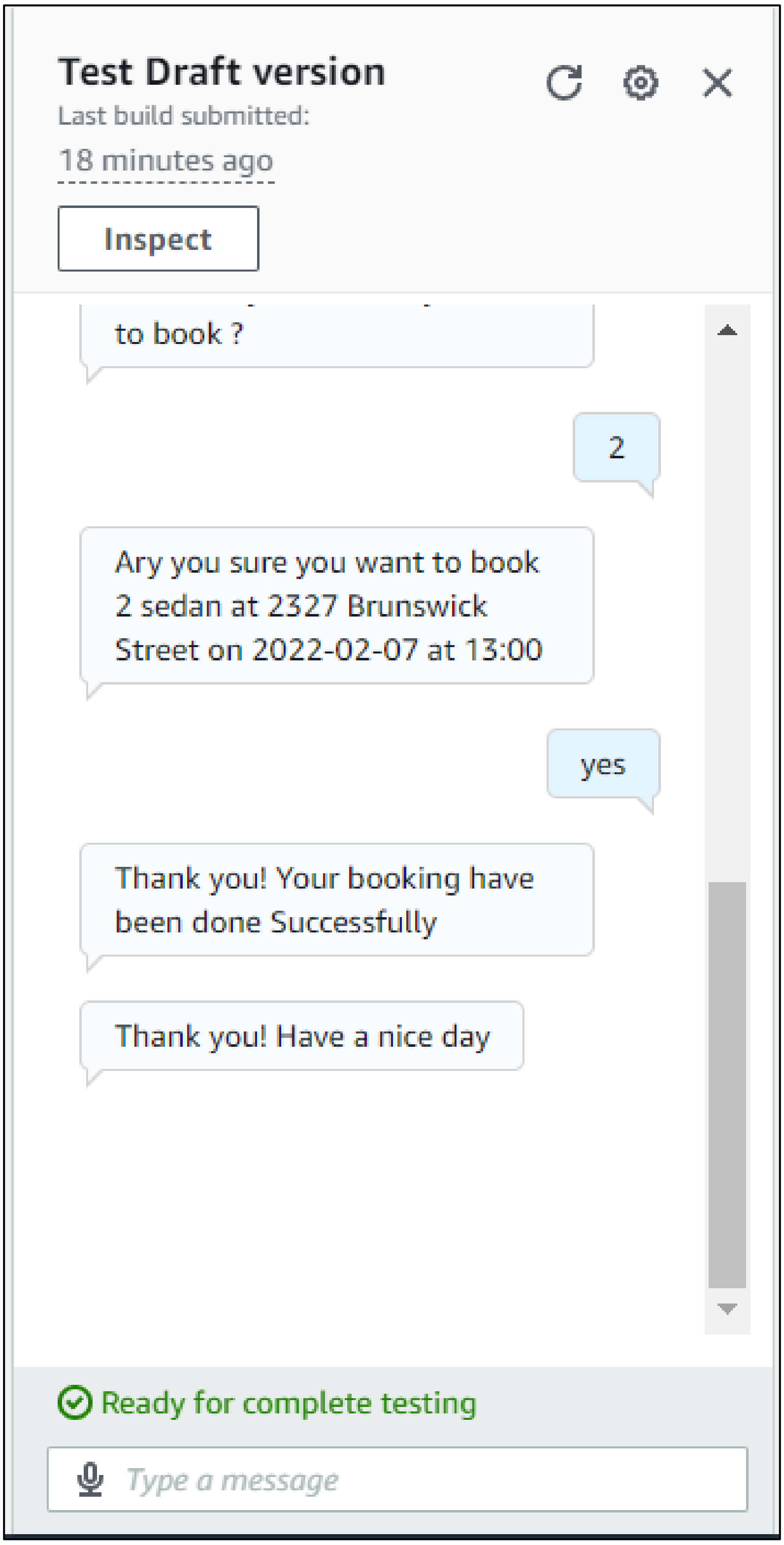
Ary you sure you want to book 2 sedan at 2327 Brunswick Street on 2022-02-07 at 13:00

yes

Thank you! Your booking have

Ready for complete testing

*Figure 14: Testing conversation in working for QuickRide Chatbot (**BookTaxiIntent**)*



to book ?

2

Ary you sure you want to book 2 sedan at 2327 Brunswick Street on 2022-02-07 at 13:00

yes

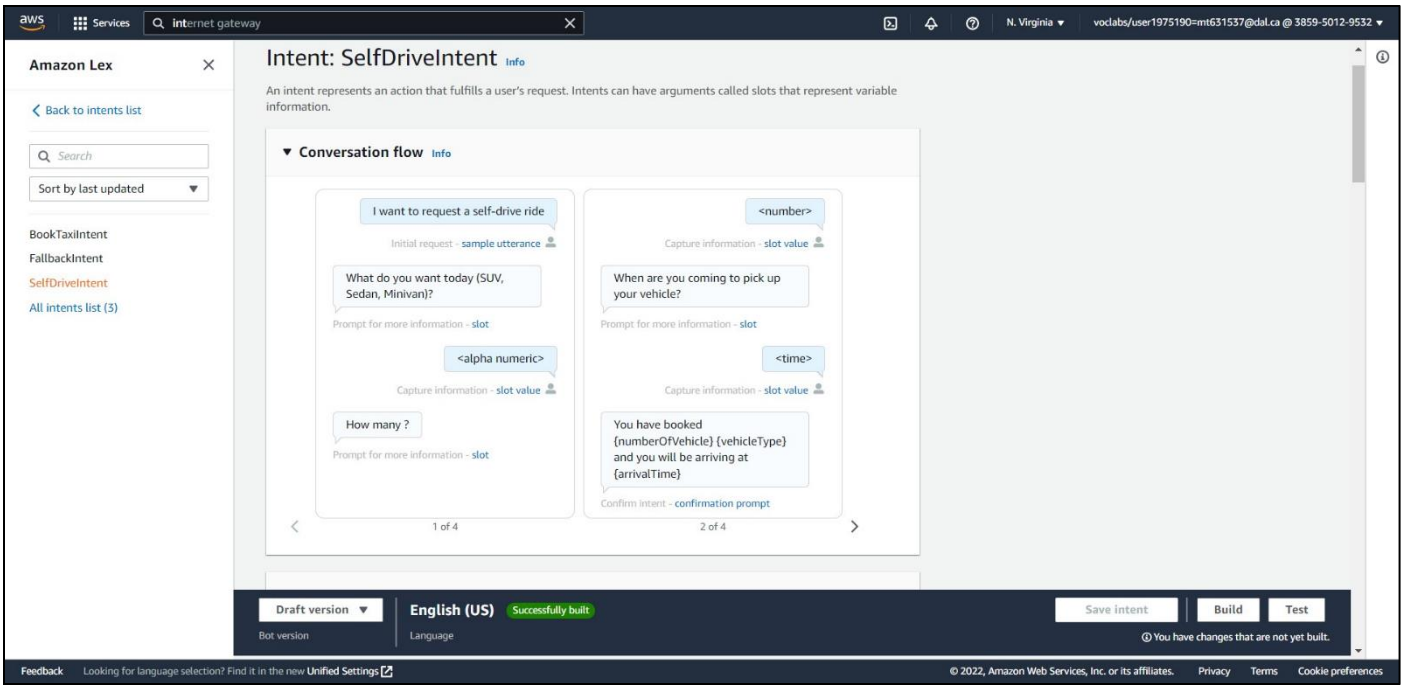
Thank you! Your booking have been done Successfully

Thank you! Have a nice day

*Figure 15; Testing conversation in working for QuickRide Chatbot (**BookTaxiIntent**)*

SelfDriveIntent– Renting Self-drive Taxi (QuickRide chatbot)

Figures 16,17, 18, 19, 20 and 21 are responsible for representing the configuration setting required for setting up the BookTaxiIntent.


aws
Services
internet gateway
N. Virginia ▾
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532 ▾
Amazon Lex
Back to intents list
Search
Sort by last updated
BookTaxiIntent
FallbackIntent
SelfDriveIntent
All intents list (3)
Info
Conversation flow
Info
Initial request - sample utterance
Prompt for more information - slot
Capture information - slot value
Prompt for more information - slot
Capture information - slot value
Prompt for more information - slot
Capture information - slot value
Confirm intent - confirmation prompt
1 of 4
2 of 4
Draft version
Bot version
English (US)
Successfully built
Language
Save intent
Build
Test
You have changes that are not yet built.
Feedback
Looking for language selection? Find it in the new Unified Settings
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Intent: SelfDriveIntent

An intent represents an action that fulfills a user's request. Intents can have arguments called slots that represent variable information.

I want to request a self-drive ride

What do you want today (SUV, Sedan, Minivan)?

<alpha numeric>

How many ?

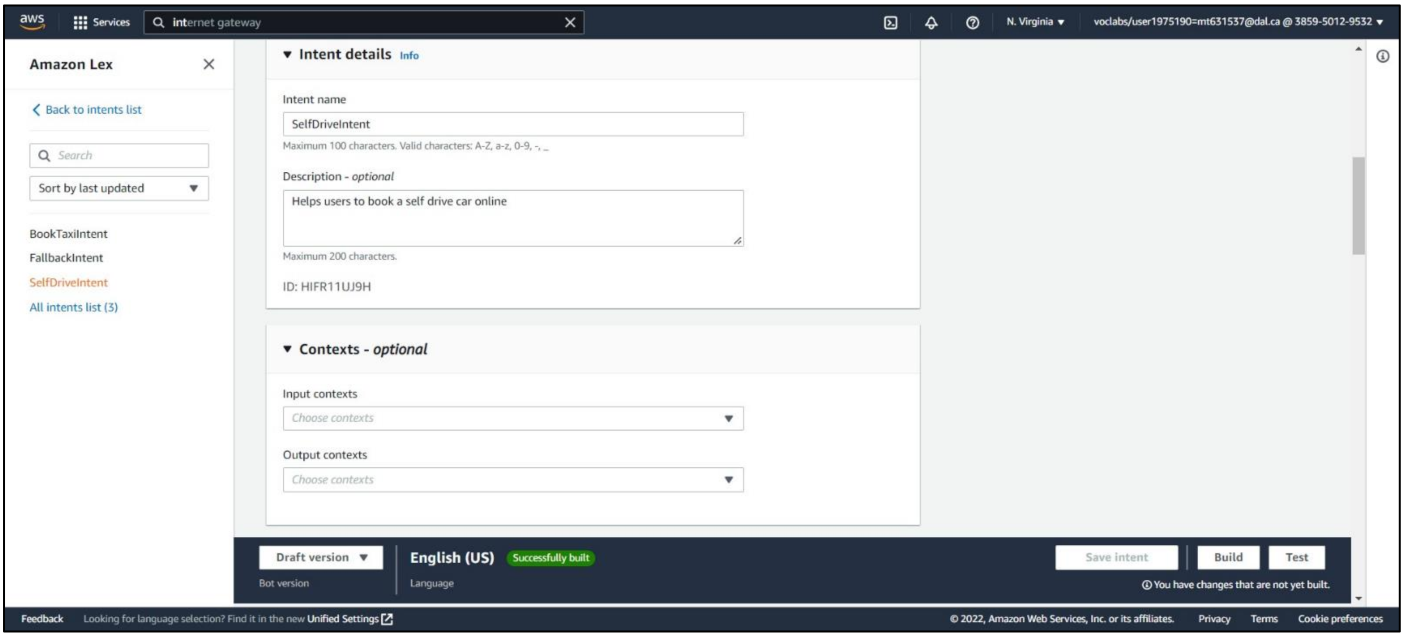
<number>

When are you coming to pick up your vehicle?

<time>

You have booked {numberOfVehicle} {vehicleType} and you will be arriving at {arrivalTime}

*Figure 16: Conversation Flow for QuickRide Chatbot (**SelfDriveIntent**)*



Intent name: SelfDriveIntent

Maximum 100 characters. Valid characters: A-Z, a-z, 0-9, -, _

Description - *optional*: Helps users to book a self drive car online

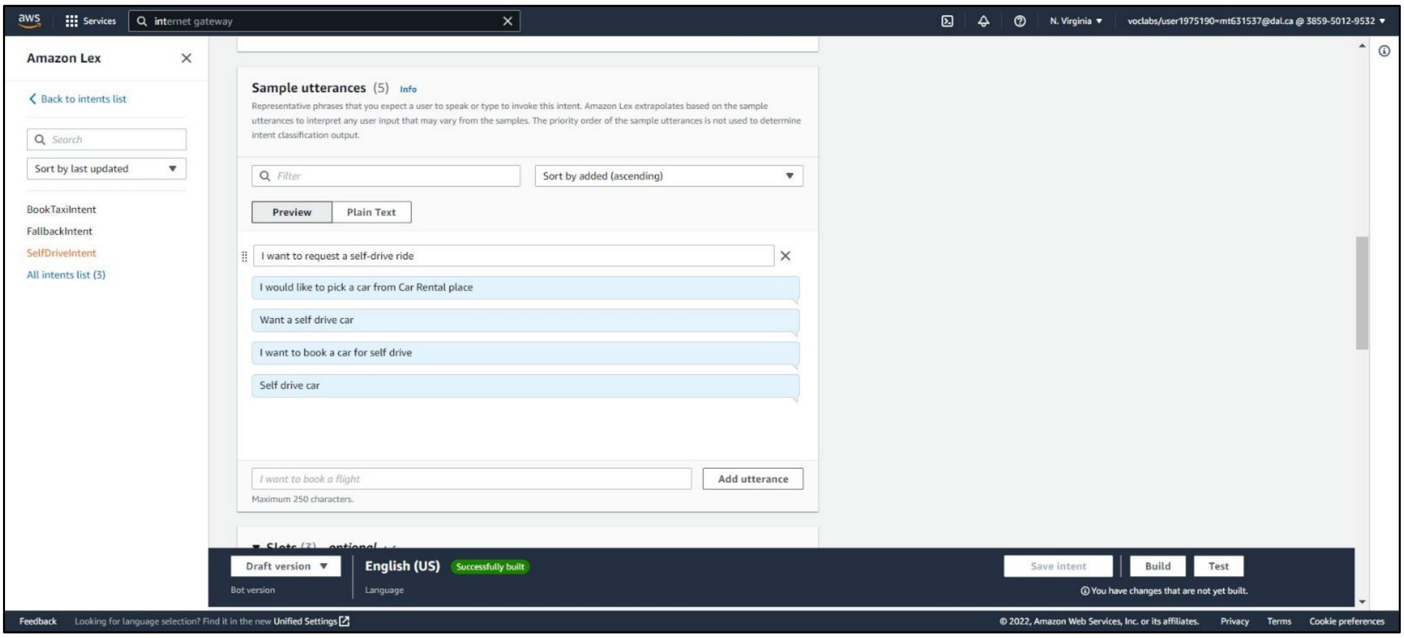
Maximum 200 characters.

ID: HIFR11UJ9H

Input contexts: Choose contexts

Output contexts: Choose contexts

*Figure 17: Intent details for QuickRide Chatbot (**SelfDriveIntent**)*



Sample utterances (5)

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 determine intent classification output.

- I want to request a self-drive ride
- I would like to pick a car from Car Rental place
- Want a self drive car
- I want to book a car for self drive
- Self drive car

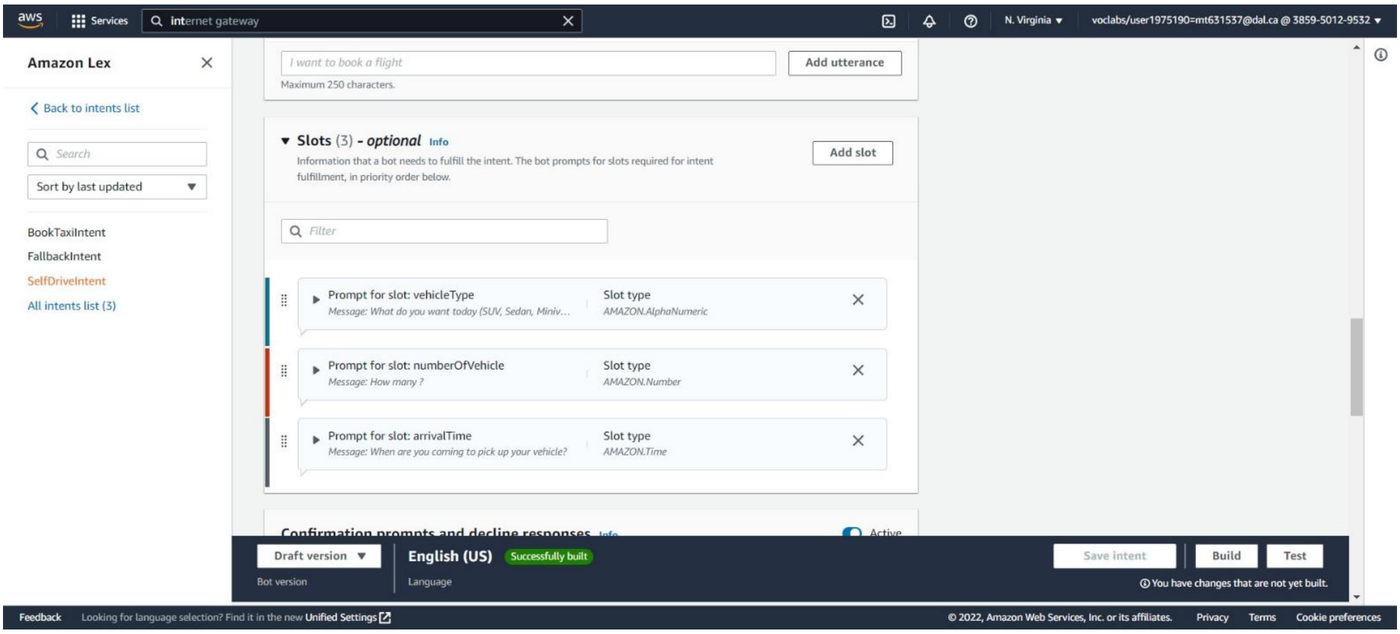
I want to book a flight

Maximum 250 characters.

English (US) Successfully built

You have changes that are not yet built.

*Figure 18: Sample Utterances that user enters to book a self-drive from QuickRide Chatbot (**SelfDriveIntent**)*



I want to book a flight

Maximum 250 characters.

Slots (3) - *optional*

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

Prompt for slot: vehicleType
Message: What do you want today (SUV, Sedan, Miniv...
Slot type
AMAZON.AlphaNumeric

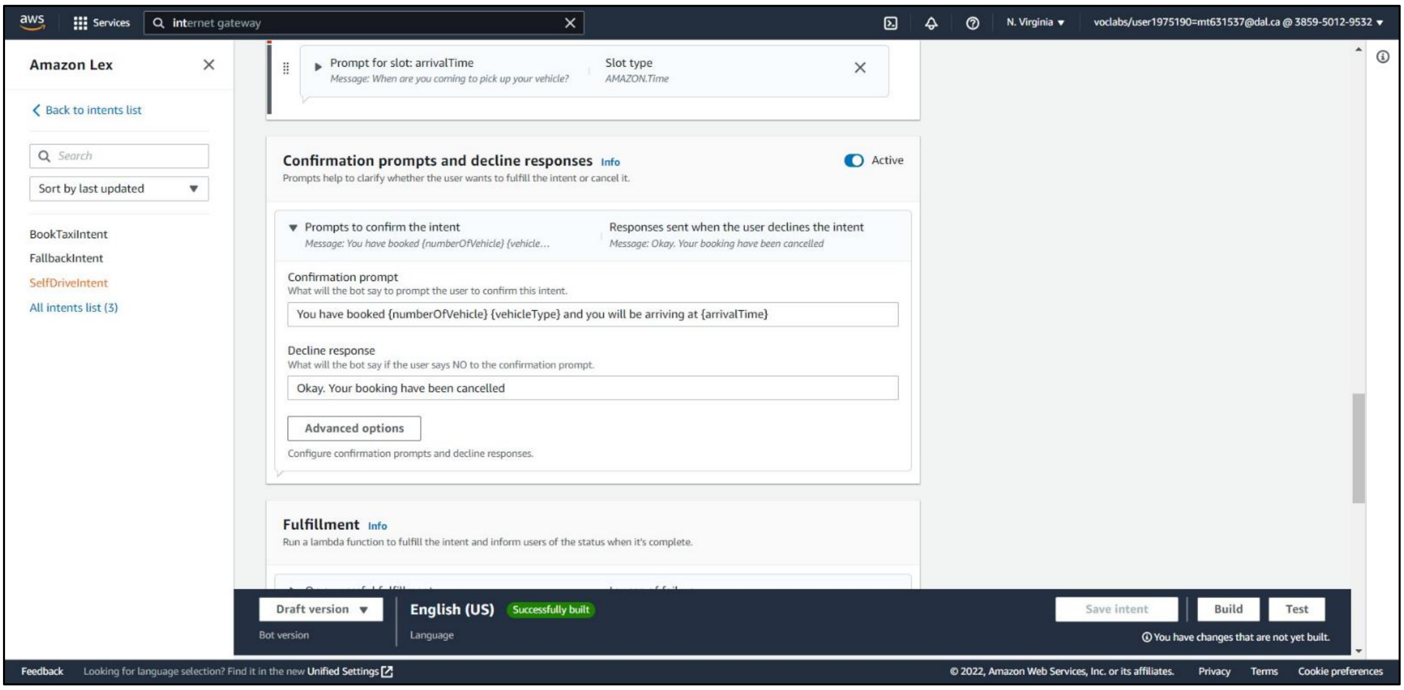
Prompt for slot: numberOfVehicle
Message: How many ?
Slot type
AMAZON.Number

Prompt for slot: arrivalTime
Message: When are you coming to pick up your vehicle?
Slot type
AMAZON.Time

English (US) Successfully built

You have changes that are not yet built.

*Figure 19:Slots to accepts time, type and vehicles from the user (**SelfDriveIntent**)*



Prompt for slot: arrivalTime
Message: When are you coming to pick up your vehicle?
Slot type
AMAZON.Time

Confirmation prompts and decline responses
Prompts help to clarify whether the user wants to fulfill the intent or cancel it.

Prompts to confirm the intent
Message: You have booked {numberOfVehicle} {vehicle...
Responses sent when the user declines the intent
Message: Okay. Your booking have been cancelled

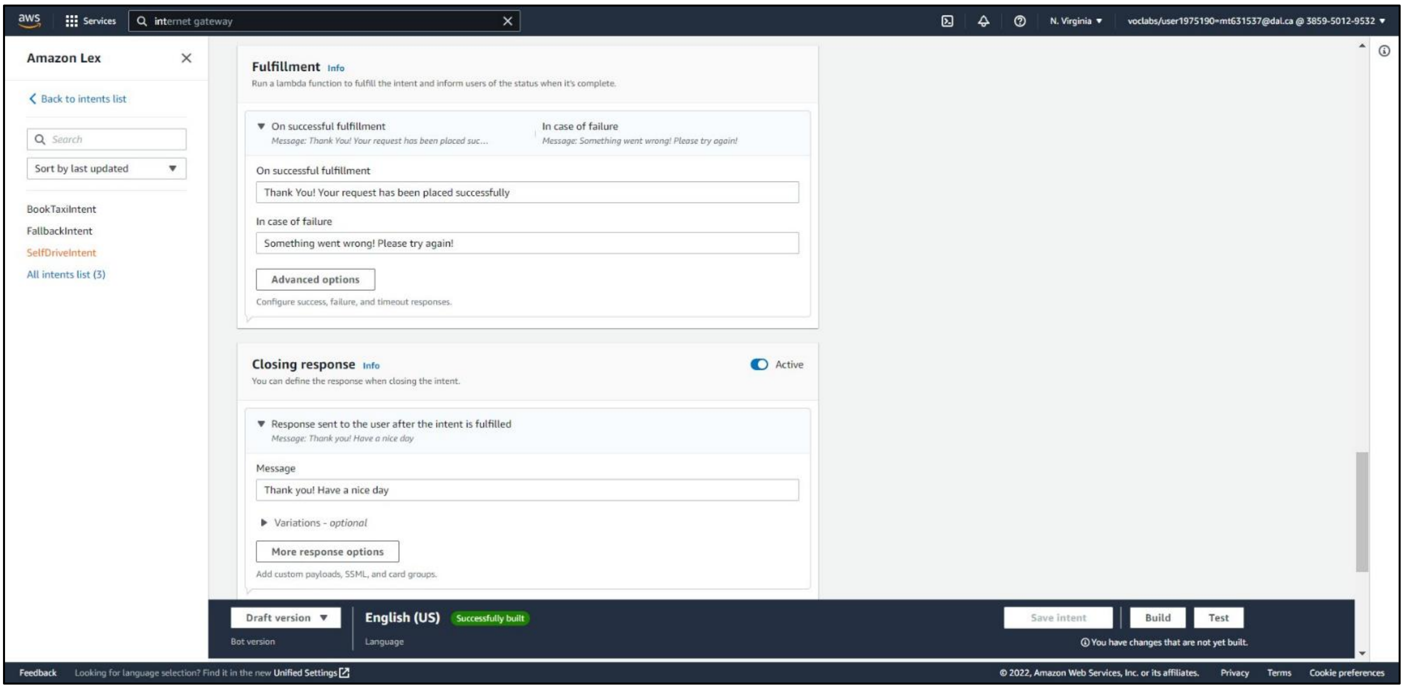
Confirmation prompt
What will the bot say to prompt the user to confirm this intent.
You have booked {numberOfVehicle} {vehicleType} and you will be arriving at {arrivalTime}

Decline response
What will the bot say if the user says NO to the confirmation prompt.
Okay. Your booking have been cancelled

Configure confirmation prompts and decline responses.

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

*Figure 20: Configuration prompts for QuickRide Chatbot (**SelfDriveIntent**)*



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

On successful fulfillment
Message: Thank You! Your request has been placed suc...
In case of failure
Message: Something went wrong! Please try again!

On successful fulfillment
Thank You! Your request has been placed successfully

In case of failure
Something went wrong! Please try again!

Configure success, failure, and timeout responses.

Closing response
You can define the response when closing the intent.

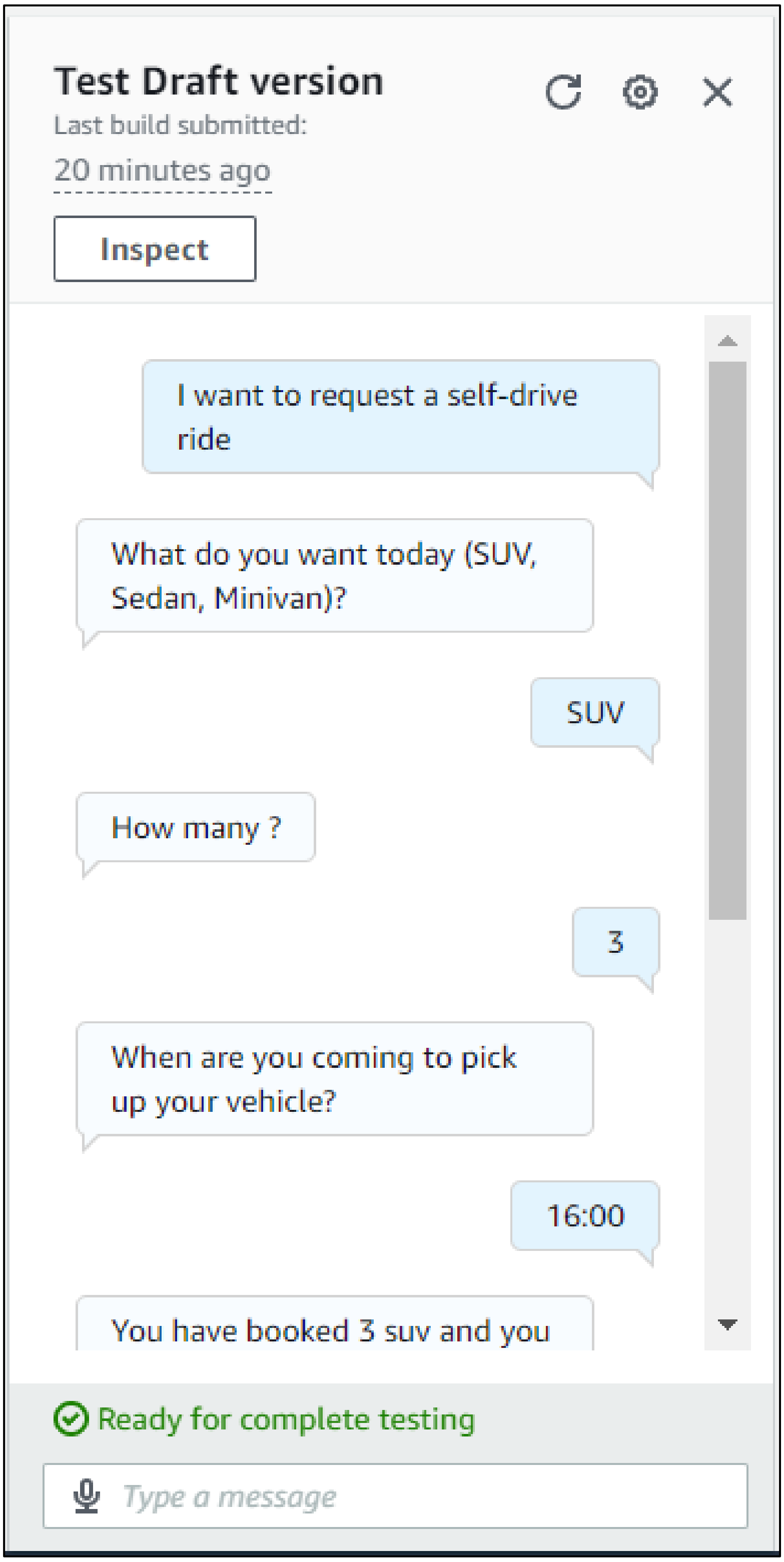
Response sent to the user after the intent is fulfilled
Message: Thank you! Have a nice day

Message
Thank you! Have a nice day

Add custom payloads, SSML, and card groups.

*Figure 21: Fulfillment and closing response for QuickRide Chatbot (**SelfDriveIntent**)*

SelfDriveIntent – Conversation Flow in working



Test Draft version

Last build submitted:

20 minutes ago

I want to request a self-drive ride

What do you want today (SUV, Sedan, Minivan)?

SUV

How many ?

3

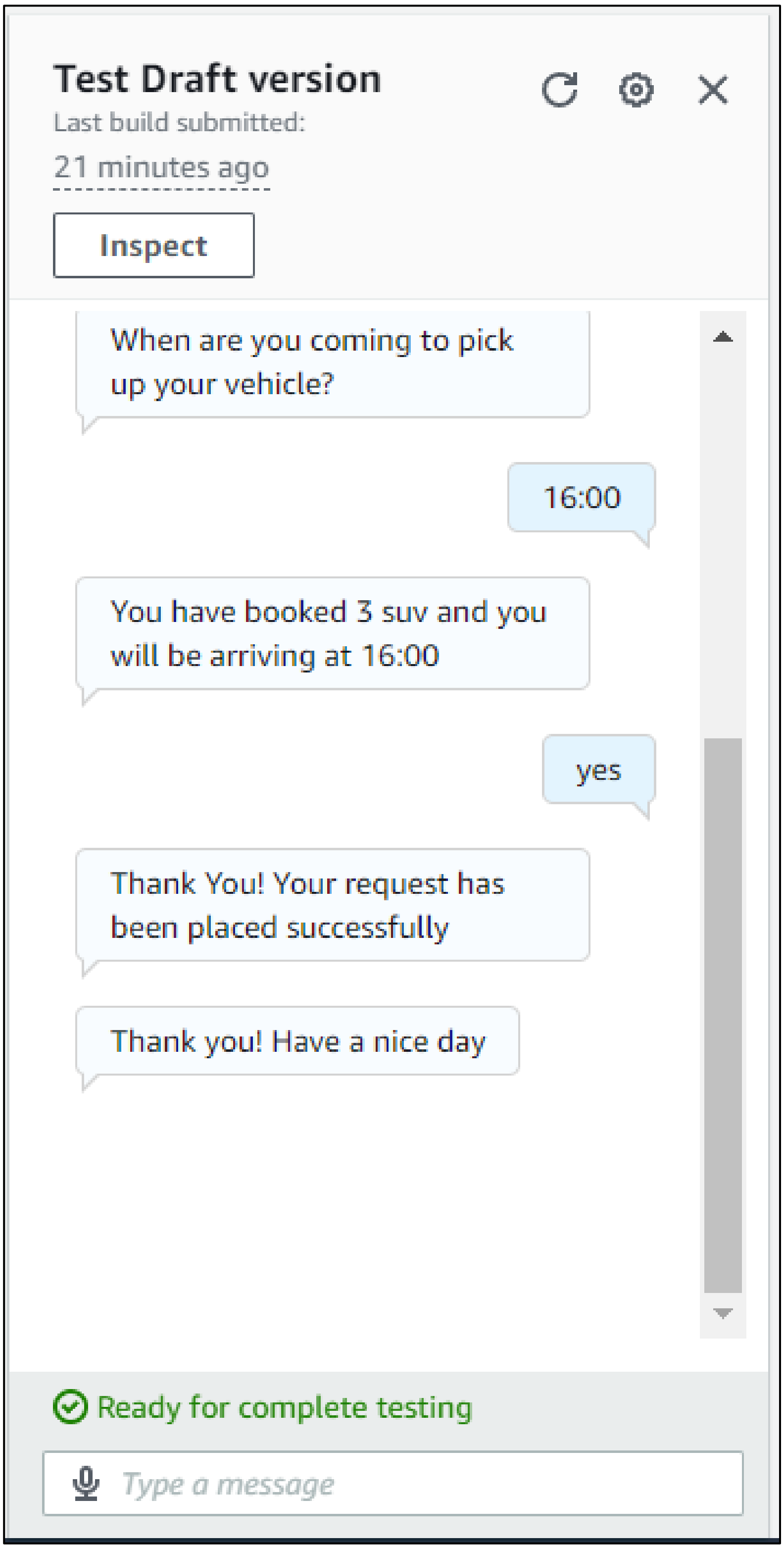
When are you coming to pick up your vehicle?

16:00

You have booked 3 suv and you

Ready for complete testing

*Figure 22: Testing conversation in working for QuickRide Chatbot (**SelfDriveIntent**)*



When are you coming to pick up your vehicle?

16:00

You have booked 3 suv and you will be arriving at 16:00

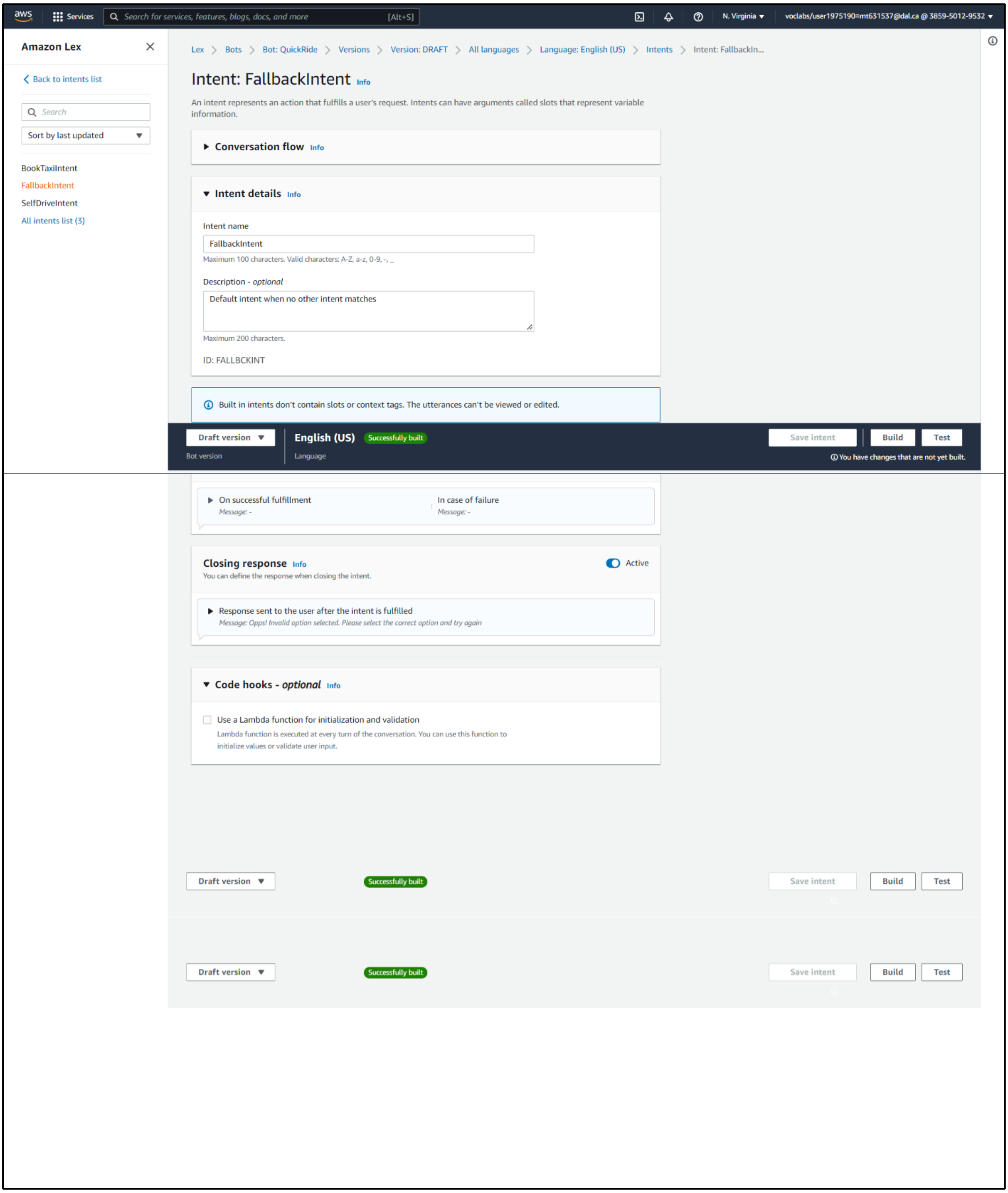
yes

Thank You! Your request has been placed successfully

Thank you! Have a nice day

*Figure 23: Testing conversation in working for QuickRide Chatbot (**SelfDriveIntent**)*

FallbackIntent



aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
N. Virginia ▾
voclabs/user1975190=mt631537@dal.ca @ 3859-5012-9532 ▾

Amazon Lex

Back to intents list

Search

Sort by last updated ▾

BookTaxiIntent
FallbackIntent
SelfDriveIntent
All intents list (3)

Lex > Bots > Bot: QuickRide > Versions > Version: DRAFT > All languages > Language: English (US) > Intents > Intent: FallbackIn...

Intent: FallbackIntent Info

An intent represents an action that fulfills a user's request. Intents can have arguments called slots that represent variable information.

▸ Conversation flow Info

▾ Intent details Info

Intent name
FallbackIntent
Maximum 100 characters. Valid characters: A-Z, a-z, 0-9, -, _

Description - *optional*
Default intent when no other intent matches
Maximum 200 characters.

ID: FALLBCKINT

Built in intents don't contain slots or context tags. The utterances can't be viewed or edited.

Draft version ▾ | English (US) Successfully built | Save intent | Build | Test
Bot version | Language | You have changes that are not yet built.

▸ On successful fulfillment
Message: -

In case of failure
Message: -

Closing response Info
You can define the response when closing the intent.
Active

▸ Response sent to the user after the intent is fulfilled
Message: Opps! Invalid option selected. Please select the correct option and try again

▾ Code hooks - *optional* Info

□ Use a Lambda function for initialization and validation
Lambda function is executed at every turn of the conversation. You can use this function to initialize values or validate user input.

Draft version ▾ | Successfully built | Save intent | Build | Test

Draft version ▾ | Successfully built | Save intent | Build | Test

Figure 24: Fallback intent configuration setup

Summary of Operations Performed

AWS's **Amazon Lex** service was used to create the **QuickRide** chatbot. With this service, you can create automated chatbots that work in a systematic way. Chatbots are created by assigning details to them, such as the name of the bot, its description, IAM permissions, and the bot's conversation language. The crucial step in development of chatbot using **Amazon Lex** is creating intents.

For creating **QuickRide** chatbot, I have created three intents namely **SelfDriveIntent, BookTaxiIntent**, and **FallbackIntent.** These intents are responsible for fulfilling the task such as booking the taxi for the user, setting the pickup time and location, and along with that it also fulfils the task such as booking the self-drive vehicles and setting the arrival time for the arrival time of the client. A chatbot's intent encompasses everything that is required to handle a conversation. It consists of following crucial components such as Utterances, Slots, Confirmation Prompts, Fulfillment messages and Closing Responses. An utterance is the initial statement in the process of a conversation with the chatbot. It is usually made by the initiating party. A chatbot has slots for answering questions or responding to user queries. It is not common to display fulfillment messages unless specified. After the intent is fulfilled, the closing message is displayed. This all component joined together and are set using a service provided by the AWS called **Amazon Lex.**

References

[1] Amazon, "Amazon Lex," Amazon, [Online]. Available: https://aws.amazon.com/lex/. [Accessed 10 June 2022]