

# Improve CX with Amazon Lex

Introducing Amazon Lex Automated Chatbot Designer

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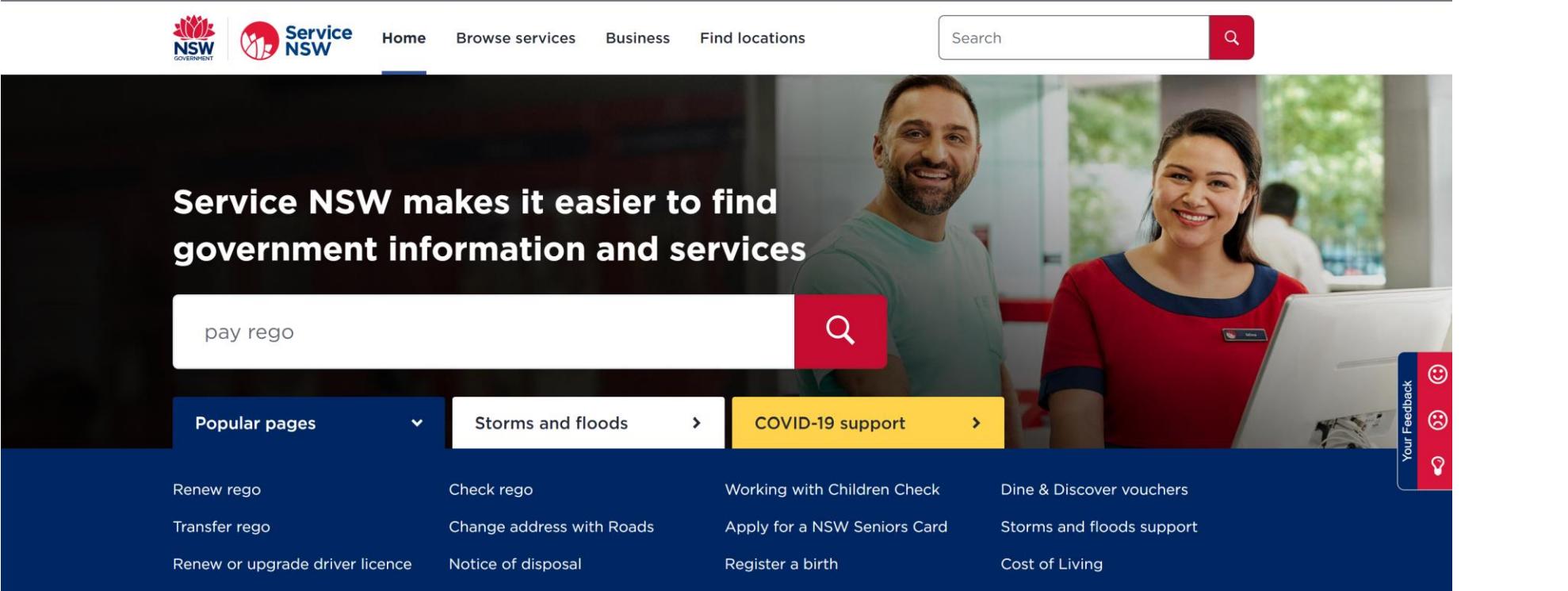


# Quick Intro

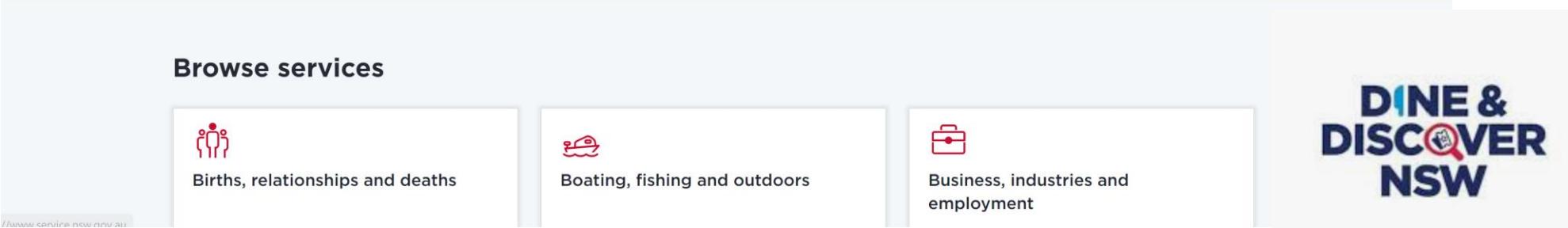


# Quick Intro

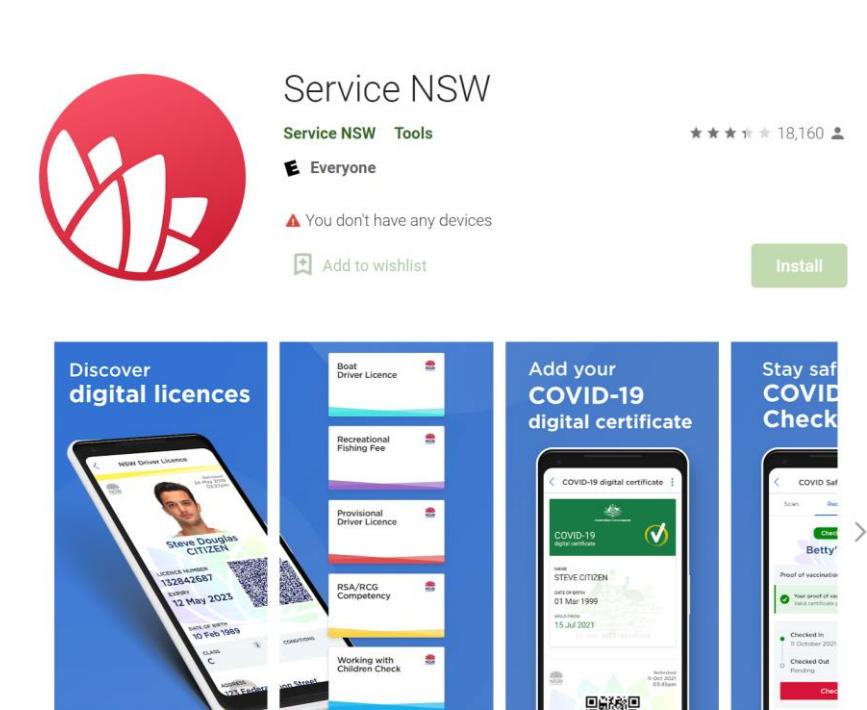
- Service NSW is part of Department of Customer Service
- One stop shop NSW government agency
- Our vision to become the world's most customer-centric government agency



The Service NSW website homepage features the NSW Government logo and the Service NSW logo. It includes a search bar and navigation links for Home, Browse services, Business, and Find locations. A large banner image shows a smiling man and woman. The main headline reads "Service NSW makes it easier to find government information and services". Below the banner are sections for Popular pages, Popular services, and a feedback button. The footer contains links for various government services like pay rego, renew rego, transfer rego, and COVID-19 support.



The "Browse services" page shows three categories: Births, relationships and deaths (with a person icon), Boating, fishing and outdoors (with a boat icon), and Business, industries and employment (with a briefcase icon). Each category has a link to its respective service page.



The Service NSW mobile application interface is shown on a smartphone. The top bar includes the NSW Government and Service NSW logos, a star rating of 4.5 stars (18,160 reviews), and an "Install" button. The main screen displays four cards: "Discover digital licences" showing a driver's license, "Add your COVID-19 digital certificate" showing a green pass, "Stay safe COVID Check" showing a QR code, and "Boat Driver Licence" showing a boat driver's license.



# What is Conversational AI?

According to Deloitte, conversational AI is:

*A programmatic and intelligent way of offering a conversational experience to mimic conversations with real people through digital and telecommunication technologies.*



# Conversational AI

## 8 components within Conversational AI:

- Natural Language Processing: NLP is used to read text and provide interactive conversations
- Intent: **Ability to understand what the user needs**
- Entity recognition: Text
- Fulfilment: Pull data from web services using APIs or databases
- Voice optimized responses: Engage in conversations in human-like manner with emotions
- Text to speech: Converts text to natural language
- Machine Learning: Understand the customer by analyzing Agent responses
- Contextual awareness: Ability to follow conversation history, recall, memorise info



# What is Amazon Lex?



Amazon Lex

Amazon Lex is an AWS service part of the machine learning stack that builds conversational interfaces with voice and text.

## What's New?

- **Amazon Lex V2** – i.e. Amazon Lex Automated Chatbot Designer (Preview)
- December 2021
- Developers can build bots within minutes
- You can analyze thousands of lines of audio transcripts to find the **intent** (i.e. identify what the customer wants) with ML



# Amazon Lex V2 Terminology

- **Intent:** An action the user wants to perform
- **Utterance:** How a user conveys the intent e.g. ‘Pay bill’, ‘I would like to make a payment’
- **Fulfill intent:** How to fulfill the intent after the user provides some information
- **Slot:** An intent can require zero or more slot values



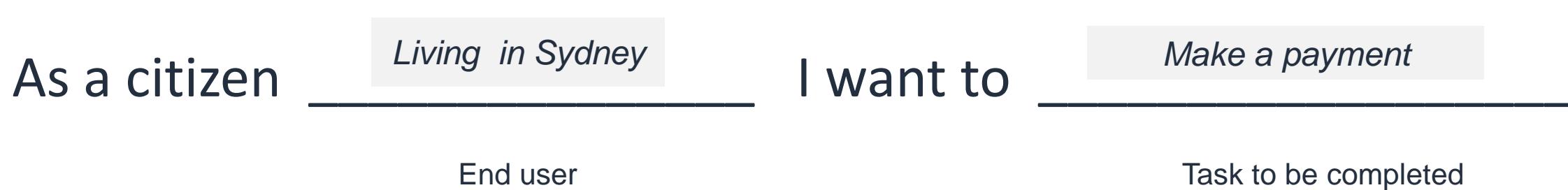
# Use Cases

- Deploy chatbot to contact centres
- Encourage self-service to make a regular payment
- Reduce phone calls in contact centre
- Routing **complex transactions** to an agent
- Deploy on a website or mobile app



# Use Case 1

- Identify the use case
- What does the user need?



- Renew a licence
- Pay a penalty
- Pay for licence plates

Simple or complex transaction?



## Use Case 2

- Identify the use case
  - What does the user need?



- Book a covid 19 vaccination
  - Book a driving test
  - Book an appointment for stimulus grant e.g. rebate

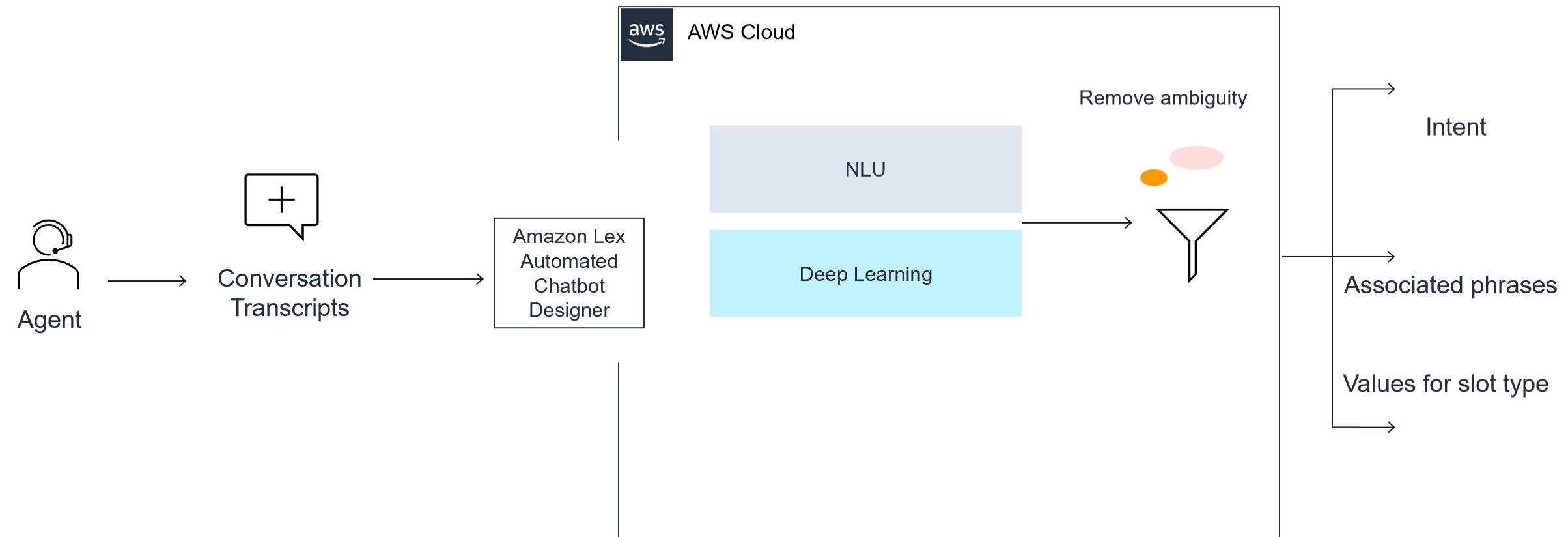
# Simple or complex transaction?



# High Level Architecture



# High Level Architecture



## **How to create a bot with Amazon Lex V2**

Step 1: Create a bot and add one or more languages

### **Configure the bot to:**

- a) Understand the user goal
- b) Engages conversation with the user to obtain information and
- c) Fulfils the user's intent

# **Demo**

**Create a bot with existing data**

Step 2: Test the bot.

Step 3: Publish the a version of the bot and create an alias.

Step 4: Deploy the bot. E.g.Facebook Messenger and Slack.



# Demo: Book a flight

- Step 1: Click on URL for Chatbot Designer:

<https://aws.amazon.com/lex/chatbot-designer/>

The screenshot shows the AWS website with the navigation bar at the top. The 'Amazon Lex' section is selected, and the 'Automated Chatbot Designer' tab is highlighted. The main heading is 'Amazon Lex Automated Chatbot Designer (preview)'. Below it is the subtext 'Accelerate conversation design'. A prominent orange button says 'Get started with automated chatbot designer'. At the bottom of the main content area, there's a blue banner with the text 'Free AWS Training | Advance your career with AWS Cloud Practitioner Essentials—a free, six-hour, foundational course »'.

Amazon Lex automated chatbot designer helps you design chatbots using existing conversation transcripts in hours rather than weeks. Using machine learning (ML), it can analyze thousands of lines of transcripts in a couple of hours and provide an initial bot design that includes common intents and the information needed to fulfill them. You can iterate on the bot design to deliver effective conversational experiences.

Designing conversational interfaces or chatbots is manual, time consuming, and prone to human errors. Developers often spend hundreds of hours analyzing transcripts and gathering the key information needed to design chatbots. With the automated chatbot designer, you can offload the analysis of conversation transcripts to Amazon Lex and accelerate the design of your chatbots, reduce errors, and improve your customer experience.

You can try the automated chatbot designer in preview for free.

## Benefits

### Reduce manual effort

Analyze thousands of lines of transcripts to discover

### Expedite conversation design

Automatically surface an initial bot design that you can

### Improve customer experience

Help your bot understand customers better by minimizing



# Demo: Book a flight



Sign in

Root user  
Account owner that performs tasks requiring unrestricted access. [Learn more](#)

IAM user  
User within an account that performs daily tasks. [Learn more](#)

Account ID (12 digits) or account alias

Next

By continuing, you agree to the AWS Customer Agreement or other agreement for AWS services, and the Privacy Notice. This site uses essential cookies. See our Cookie Notice for more information.

New to AWS?

[Create a new AWS account](#)



- Step 2: Create a bot to book a flight

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.

Name	Description	Status	Latest Version
No bots found			

[Create bot](#)

Type	Bot	Status	Errors	Last updated	File	Version
No import/export records found						

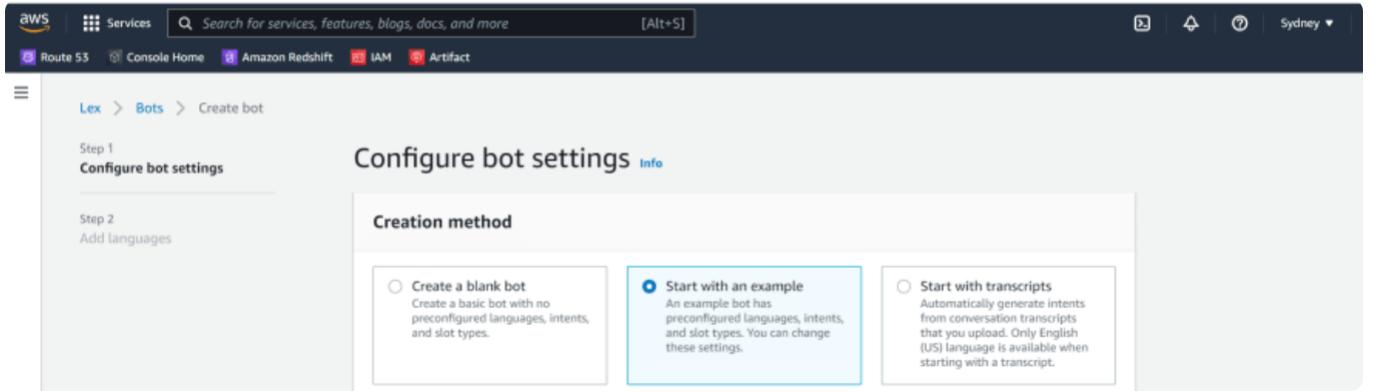
- Step 3: Sign into Amazon Lex V2 console with IAM user

- Step 4: In Amazon Lex V2 console
  - Click create bot



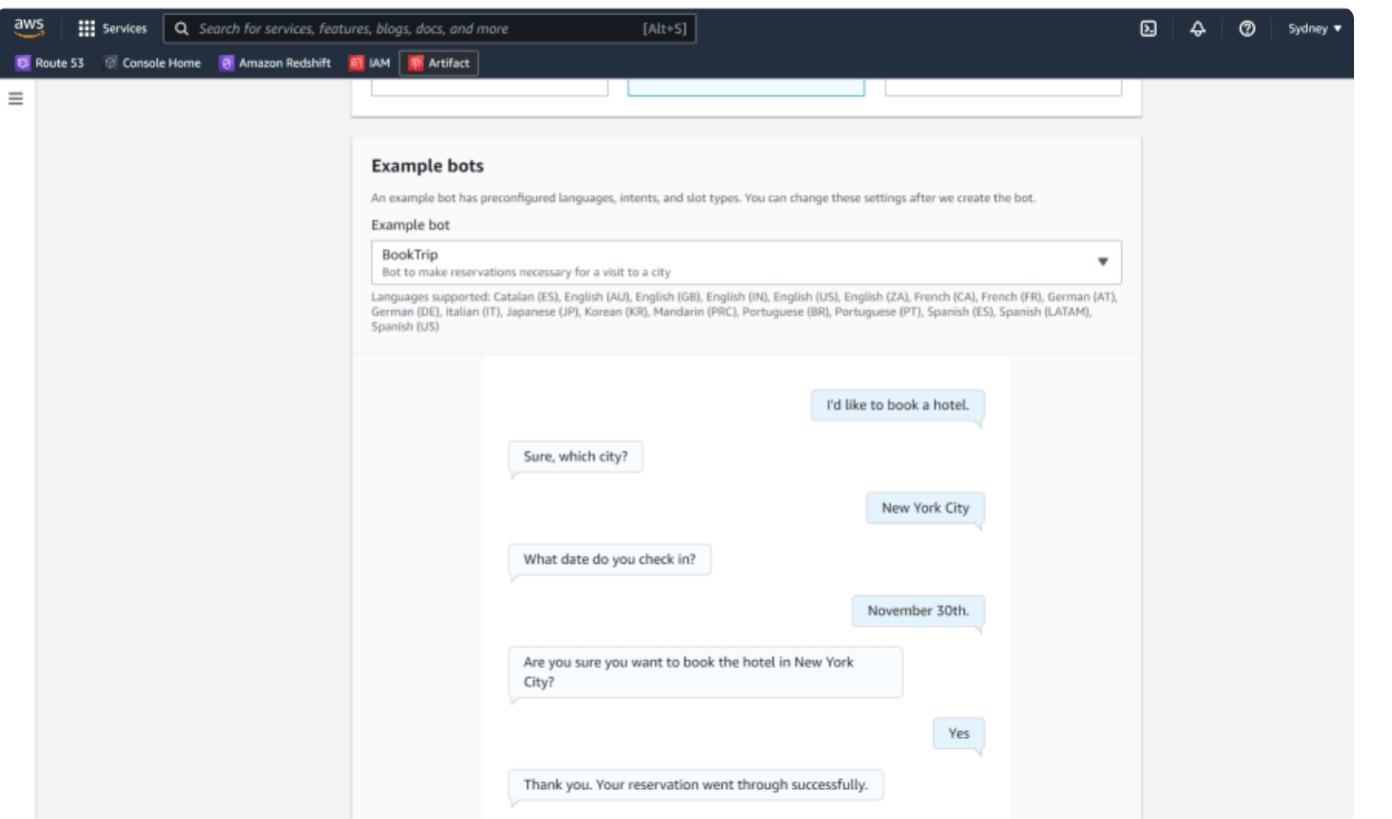
# Demo: Book a flight

Step 5: For the **Creation method**, choose **Start with an example**



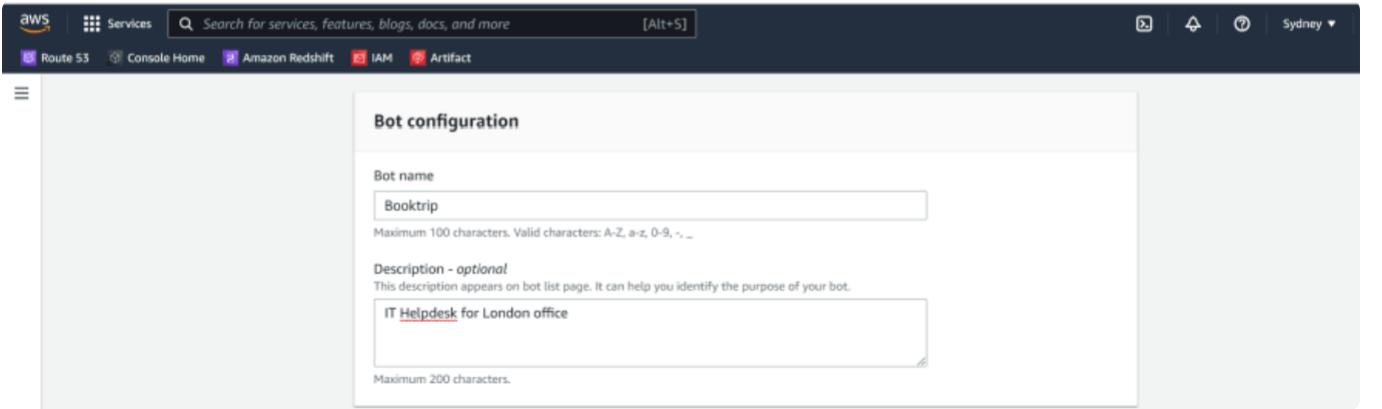
Step 6: In the **Example bots** section, select from the drop-down menu

**BookTrip**

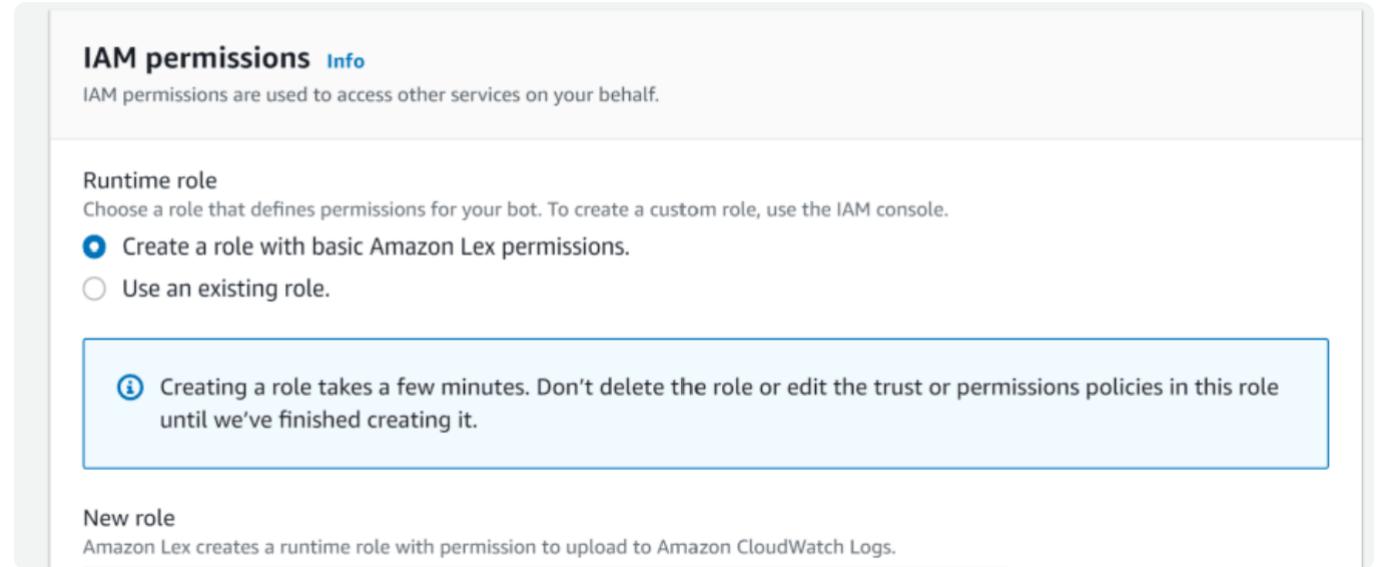


# Demo: Book a flight

Step 7: In the **Bot configuration** give the bot a name and a description for the purpose of creating a bot



Step 8: In the **Permissions** section, choose **Create a role with basic Lex permissions**



IAM permissions are required to run the bot.

# Demo: Book a flight

Step 9: In the **Children's Online Privacy Protection Act(COPPA)** section  
read the terms and conditions and make the right choice.

**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

Step 10: In the **Session timeout** and **Advanced settings** retain the default settings and click **Next**. Amazon Lex 2 will create the bot.

**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**  
 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.  
No tags associated with the resource.

[Add new tag](#)

You can add 50 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.

[Cancel](#) [Next](#)



# Demo: Book a flight

## Add language to a Bot

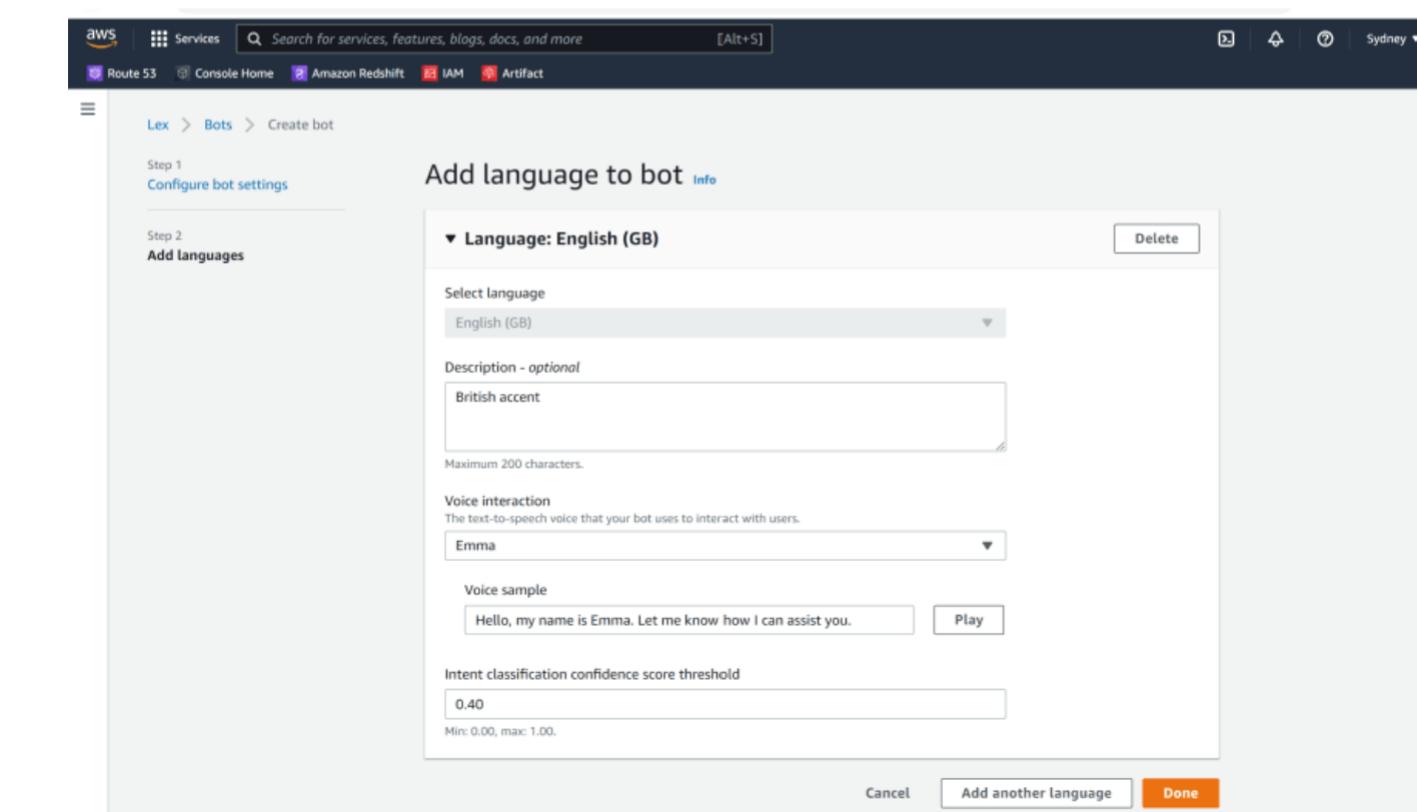
Step 1: In the **Language** section, choose a language and provide a description. Select from the drop-down menu **English(GB)** and in the description type **British accent**

Step 2: Leave **Voice interaction** and **Intent classification confidence score threshold** with default settings.

Step 3: Select **Add language** to add a language to the bot.

Select **Emma** from the drop-down menu and use Standard speech-to-text.

Step 4: After the language is added, choose **Done** to continue.

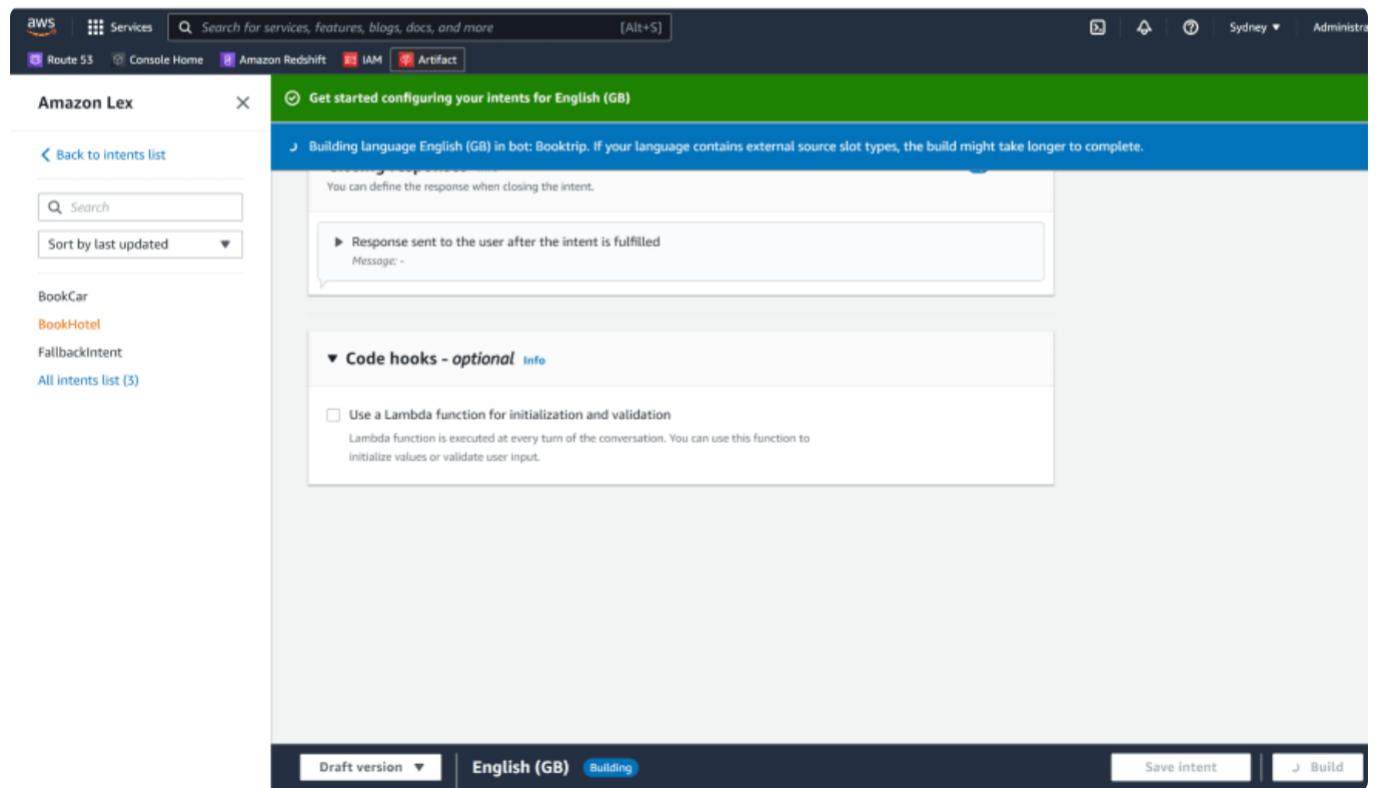


# Demo: Book a flight

Use the intent editor to inspect the intents used by the bot and once you are satisfied you can test the bot.

## To test the BookFlight bot

Step 1: From the bottom of the menu, click **Build**. Wait a few seconds for the bot to be created.



Step 2: After the bot has been created, click **Test** to open the test window.



# Demo: Book a flight

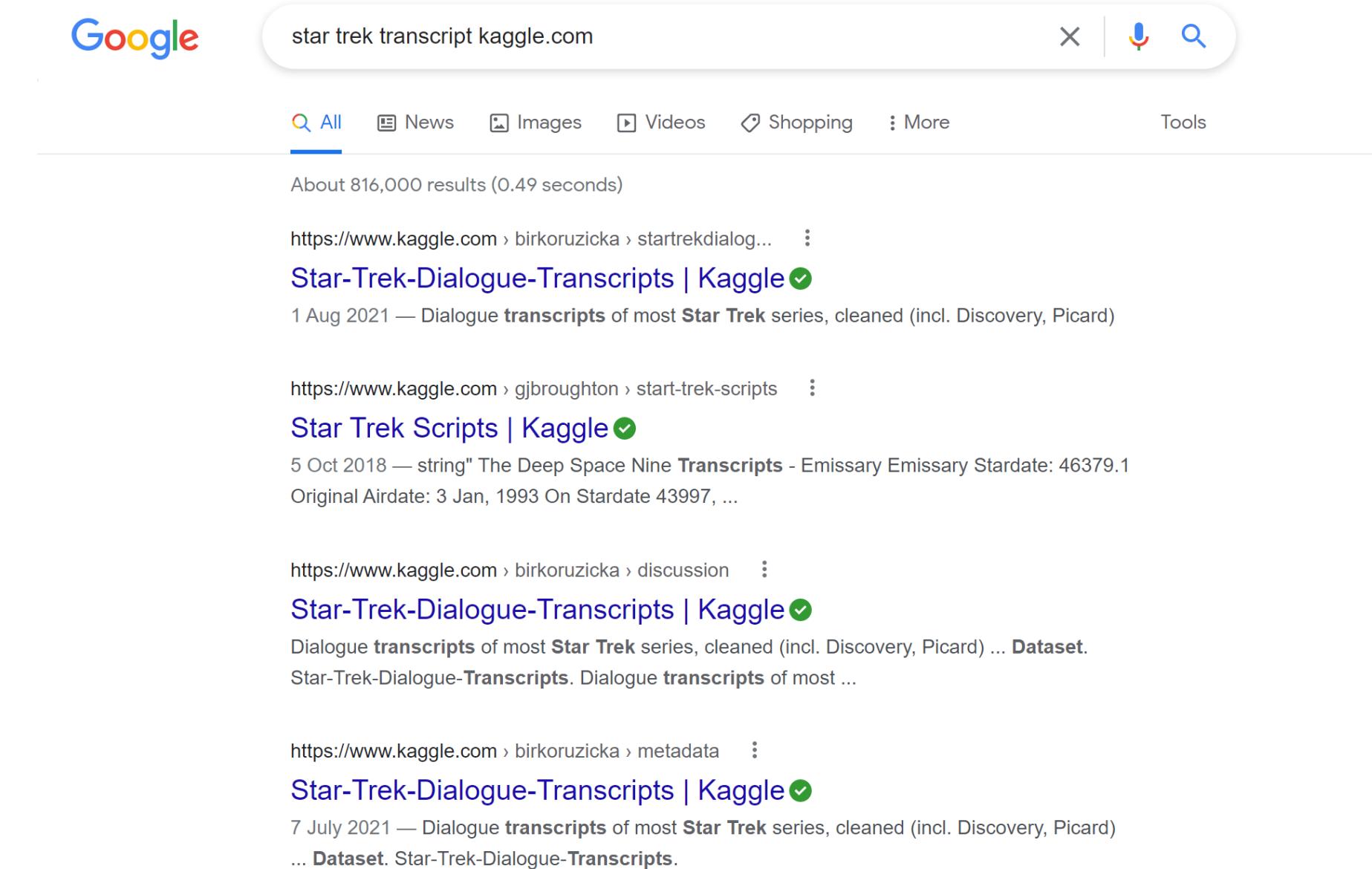
Step 3: Test the bot. Start the conversation with a sample utterance or type your own e.g. "I would like to book a flight to London"

The screenshot shows the Amazon Lex console interface. On the left, there's a sidebar with a search bar, a 'Sort by last updated' dropdown, and a list of intents: BookCar, BookHotel, FallbackIntent, and All intents list (3). The main area displays the configuration for the 'Booktrip' bot. It includes sections for 'Fulfillment' (with 'On successful fulfillment' and 'In case of failure' message fields), 'Closing responses' (with an 'Active' toggle and a message field), and 'Code hooks - optional' (with a checkbox for using Lambda functions). On the right, a 'Test Draft version' window is open, showing a conversation transcript. The user messages are in blue, and the bot responses are in grey. The transcript starts with 'I would like to visit london', followed by 'What day do you want to check in?', 'monday', 'How many nights will you be staying?', '3', 'What type of room would you like, queen, king or deluxe?', 'queen', and ends with 'OK, I have you down for a 3'. Below the transcript, there's a green 'Ready for complete testing' button and a text input field labeled 'Type a message'. At the bottom of the main screen, there are buttons for 'Draft version', 'Bot version', 'English (GB)', 'Successfully built', 'Save intent', 'Build', and 'Test'.



# Data Sources - Audio Transcripts

- Google Data Search
- Kaggle.com
- Github
- Google.com



Google search results for "star trek transcript kaggle.com". The search bar shows the query. The results page has a header with "All", "News", "Images", "Videos", "Shopping", "More", and "Tools" buttons. It displays the number of results (816,000) and the time taken (0.49 seconds). The first result is a link to "Star-Trek-Dialogue-Transcripts | Kaggle" with a green checkmark, dated 1 Aug 2021, describing dialogue transcripts of Star Trek series. The second result is a link to "Star Trek Scripts | Kaggle" with a green checkmark, dated 5 Oct 2018, describing dialogue transcripts of Deep Space Nine. The third result is a link to "Star-Trek-Dialogue-Transcripts | Kaggle" with a green checkmark, dated 7 July 2021, describing dialogue transcripts of Star Trek series. All results include a snippet of text and a "more" button.

star trek transcript kaggle.com

All News Images Videos Shopping More Tools

About 816,000 results (0.49 seconds)

<https://www.kaggle.com/birkoruzicka/startrekdialog...> ::

**Star-Trek-Dialogue-Transcripts | Kaggle** ✓

1 Aug 2021 — Dialogue **transcripts** of most **Star Trek** series, cleaned (incl. Discovery, Picard)

<https://www.kaggle.com/gjbroughton/start-trek-scripts...> ::

**Star Trek Scripts | Kaggle** ✓

5 Oct 2018 — string" The Deep Space Nine **Transcripts** - Emissary Emissary Stardate: 46379.1  
Original Airdate: 3 Jan, 1993 On Stardate 43997, ...

<https://www.kaggle.com/birkoruzicka/discussion...> ::

**Star-Trek-Dialogue-Transcripts | Kaggle** ✓

Dialogue **transcripts** of most **Star Trek** series, cleaned (incl. Discovery, Picard) ... **Dataset**.  
Star-Trek-Dialogue-**Transcripts**. Dialogue **transcripts** of most ...

<https://www.kaggle.com/birkoruzicka/metadata...> ::

**Star-Trek-Dialogue-Transcripts | Kaggle** ✓

7 July 2021 — Dialogue **transcripts** of most **Star Trek** series, cleaned (incl. Discovery, Picard)  
... **Dataset**. Star-Trek-Dialogue-**Transcripts**.



# Demo

Create a custom bot



Data Source: <https://github.com/BirkoRuzicka/Star-Trek-Transcripts>



# Demo: Build a StarTrek Bot

- Step 1: On Amazon Lex V2 console choose **Bots**
- Step 2: Click **Create bot**
- Step 3: Click on **Start with Transcripts**
- Step 4: Give the bot a name. e.g. StarTrekBot

Provide a description

Amazon Lex

Bots

Related resources

Return to the V1 console

Welcome to the Lex V2 console!

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- 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.

Action ▾ Create bot

Bots (1) Info

Search bots

Configure bot settings

Step 1 Configure bot settings

Step 2 Add languages

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: StarTrekBot  
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.  
Help desk to fly to moon  
Maximum 200 characters.



# Demo: Create a StarTrekBot

- Step 5: Create a role with basic Amazon Lex permissions and click **Next**

**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.

i 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.



# Demo: Create a StarTrekBot

Add language to bot [Info](#)

▼ 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.

Kimberly

Voice sample

Hello, my name is Kimberly. Let me know how I can assist you.

Play

Intent classification confidence score threshold

0.40

Min: 0.00, max: 1.00.

- Step 6: Add language to bot

At time of writing December 2021,  
Automated Chatbot designer is only  
available in **US English**.



# Demo: Create a StarTrekBot

- S3 bucket – US East (N.Virginia)

The screenshot shows the AWS S3 'Create bucket' wizard on the left and the 'Account snapshot' dashboard on the right.

**Create bucket Wizard:**

- General configuration:**
  - Bucket name:** startrekmovie
  - AWS Region:** US East (N. Virginia) us-east-1
  - Copy settings from existing bucket - optional:** Only the bucket settings in the following configuration are copied.  
Choose bucket
- Object Lambda Access Points**
- Multi-Region Access Points**
- Batch Operations**
- Access analyzer for S3**
- Block Public Access settings for this account**
- Storage Lens:**
  - Dashboards
  - AWS Organizations settings
- Feature spotlight**
- AWS Marketplace for S3**

**Account snapshot (Last updated: Mar 7, 2022 by Storage Lens. Metrics are generated every 24 hours. Learn more)**

Total storage	Object count	Avg. object size	You can enable advanced metrics in the "default-account-dashboard" configuration.
1.3 GB	109	12.2 MB	

**Buckets (2)**

Name	AWS Region	Access	Creation date
audio-transcripts-test	Asia Pacific (Sydney) ap-southeast-2	Bucket and objects not public	February 12, 2022, 01:09:20 (UTC+11:00)
startrekmovie	US East (N. Virginia) us-east-1	Bucket and objects not public	March 9, 2022, 01:51:33 (UTC+11:00)



# Demo: Create a StarTrekBot

- S3 bucket – US East (N.Virginia)

The screenshot shows the AWS S3 Upload interface. At the top, there's a navigation bar with the AWS logo, a search bar, and links for Route 53, Console Home, Amazon Redshift, IAM, and Artifact. Below the navigation bar, the breadcrumb path shows 'Amazon S3 > startrek-movie > Upload'. The main area is titled 'Upload' with an 'Info' link. It contains instructions to add files or folders by dragging and dropping them or choosing 'Add files' or 'Add folder'. A dashed blue box highlights this area. Below this, a table lists the file 'startrekdialogue\_v2.json' with details: Name (startrekdialogue\_v2.json), Type (application/json), and Size (9.0 MB). There are 'Remove', 'Add files', and 'Add folder' buttons above the table. A search bar labeled 'Find by name' is also present. The 'Destination' section shows the destination as 's3://startrek-movie'. Under 'Destination details', it says 'Bucket settings that impact new objects stored in the specified destination.'

aws | Services | Search for services, features, blogs, docs, and more [Alt+S]

Route 53 | Console Home | Amazon Redshift | IAM | Artifact

Amazon S3 > startrek-movie > Upload

## Upload [Info](#)

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose **Add files**, or **Add folders**.

Files and folders (1 Total, 9.0 MB)					
All files and folders in this table will be uploaded.					
<input type="text"/> Find by name					
<input type="checkbox"/>	Name	Folder	Type	Size	
<input type="checkbox"/>	startrekdialogue_v2.json	-	application/json	9.0 MB	

### Destination

Destination  
<s3://startrek-movie>

▶ **Destination details**  
Bucket settings that impact new objects stored in the specified destination.



# Demo: Create a StarTrekBot

## Transcript details for this language

Provide around 10,000 lines of transcripts or more for effective discovery of your intents and slot types. The transcripts can be in multiple files. Use the [specified JSON format](#). S3:bucketname://analysis/voice/mm/dd/yy/<timestamp>-<contact-id>.json

### S3 bucket

The S3 bucket should provide access to the individual JSON files.

startrek-movie

S3 bucket is encrypted

### Local path - *optional*

The location in the Amazon S3 bucket where the data resides.

To view existing paths within the S3 bucket, go to [Amazon S3](#).

Analysis/Voice

Analysis/Voice/Redacted

### KMS key to encrypt output transcripts - *optional*

Provide a KMS key to encrypt output data during processing. The service KMS key will be used to encrypt otherwise.

Select KMS key

### Access permissions

The bot's IAM role must have permission to read transcripts from the S3 bucket.

- We will update your service role with Amazon Lex permissions to access the S3 bucket. If you used your own role to create the bot, you need to update the role.

[Learn More](#)

### Transcript filtering - *optional*

- No filtering

Include all conversations in the transcript.

- Filter for specific conversations

Include only conversations based within a date range.

Cancel

Add another language

Done

**Step 7: Choose S3 bucket and the path where the transcripts re located in json format**

**Step 8: Choose Review to review intent and slots**

**Step 9: Trouble shooting:**

- S3 batch replication**
- English(US language)**



# Q&A

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- LinkedIn: <https://www.linkedin.com/in/wendywong7/>

