Amazon Lex and Robo Advisors

FinTech

Lesson 13.3

Conversational User Interfaces (CUIs) and Robo Advisors

Conversational User Interfaces (CUIs) and Robo Advisors

In the early years of computing, interfaces were text-based and people used commands to interact with computers.

```
Welcome to FreeDOS


CuteMouse v1.9.1 alpha 1 [FreeDOS]
Installed at PS/2 port
C:\>ver

FreeCom version 0.82 pl 3 XMS_Swap [Dec 10 2003 06:49:21]

C:\>dir
 Volume in drive C is FREEDOS_C95
 Volume Serial Number is 0E4F-19EB
 Directory of C:\

FDOS                    <DIR>   08-26-04   6:23p
AUTOEXEC BAT              435   08-26-04   6:24p
BOOTSECT BIN              512   08-26-04   6:23p
COMMAND   COM          93,963   08-26-04   6:24p
CONFIG    SYS             801   08-26-04   6:24p
FDOSBOOT  BIN             512   08-26-04   6:24p
KERNEL    SYS          45,815   04-17-04   9:19p
          6 file(s)       142,038 bytes
          1 dir(s)    1,064,517,632 bytes free

C:\>_
```

Conversational User Interfaces (CUIs) and Robo Advisors

Thanks to natural language processing (NLP), we can create conversational user interfaces (CUIs) that allow computers to understand, analyze, and have meaningful conversations using human language.
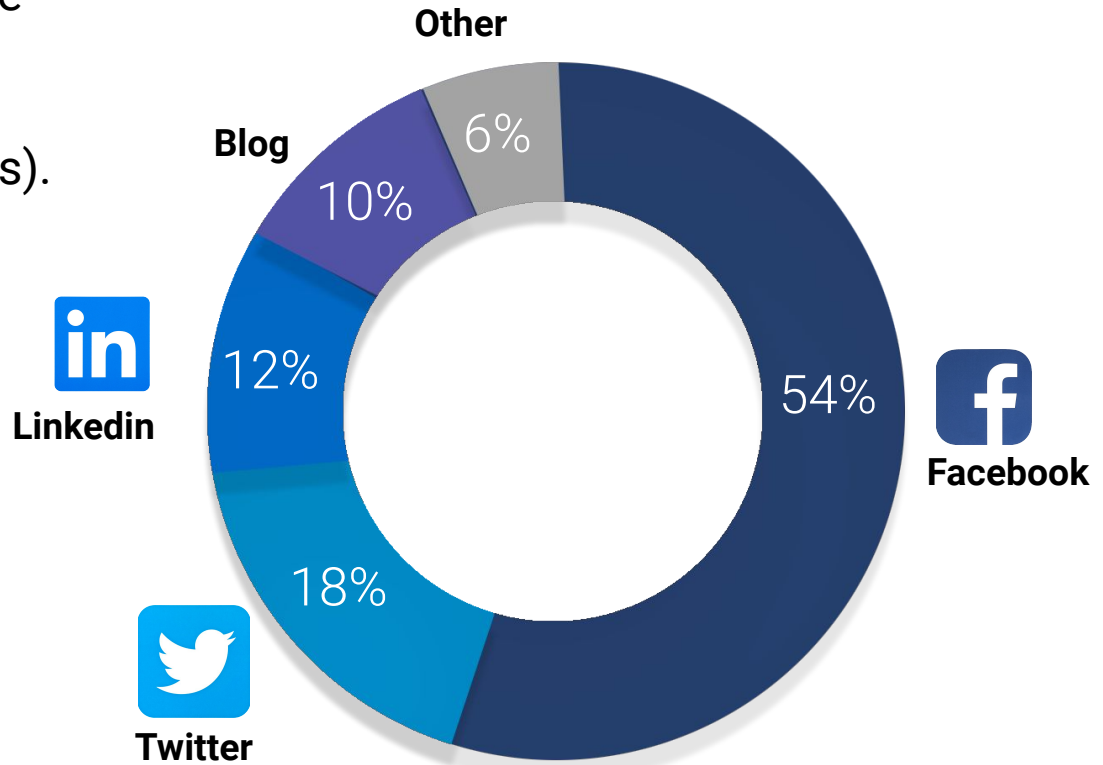
Chatbots are the most common application of CUIs.

CUIs and Robo Advisors

CUIs and Robo Advisors enhance customer engagement by using digital communication channels (social media or messaging apps).

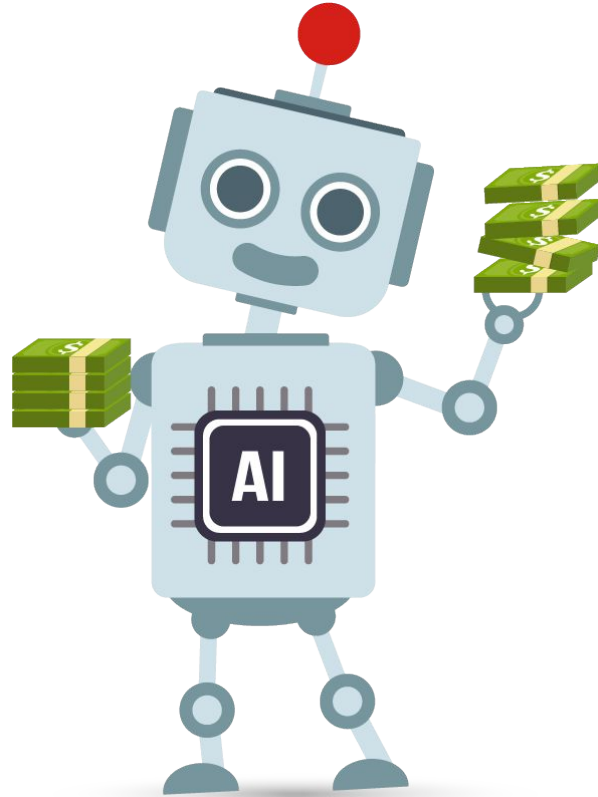Social media channels consumers are using to contact their banking providers

Other
6%

Blog
10%

Linkedin
12%

54%
Facebook

18%

Twitter

Robo Advisors:
Chatbots disrupting finance and banking

Chatbots Disrupting Finance and Banking

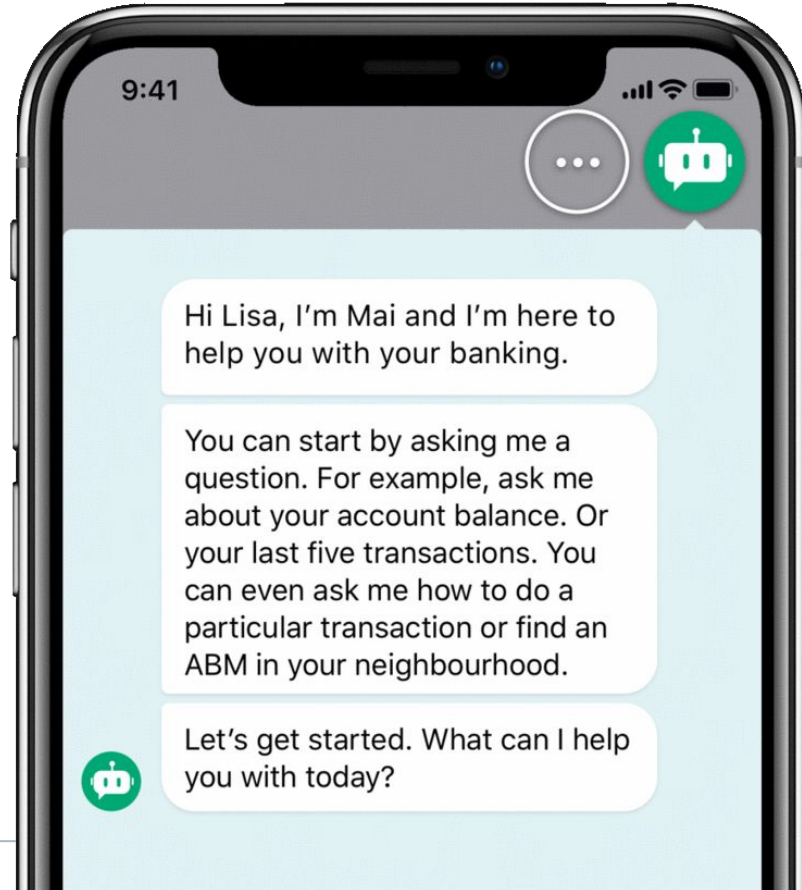According to Juniper Research, banks will save about

8 billion USD

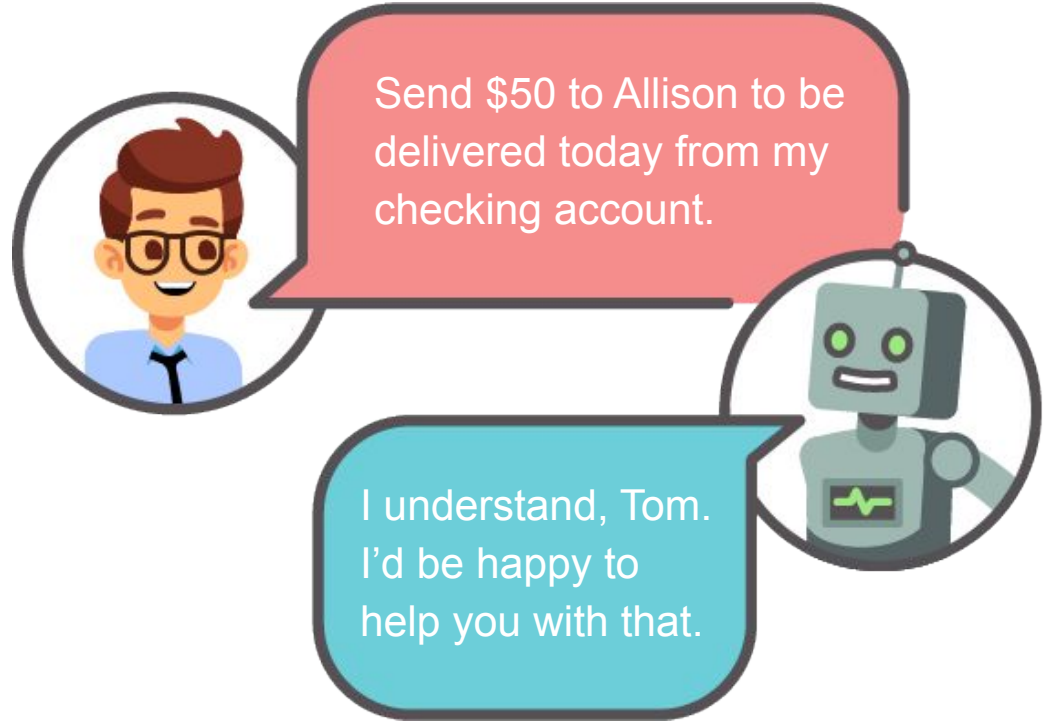annually by 2020 thanks to chatbot use.

Chatbots Disrupting Finance and Banking

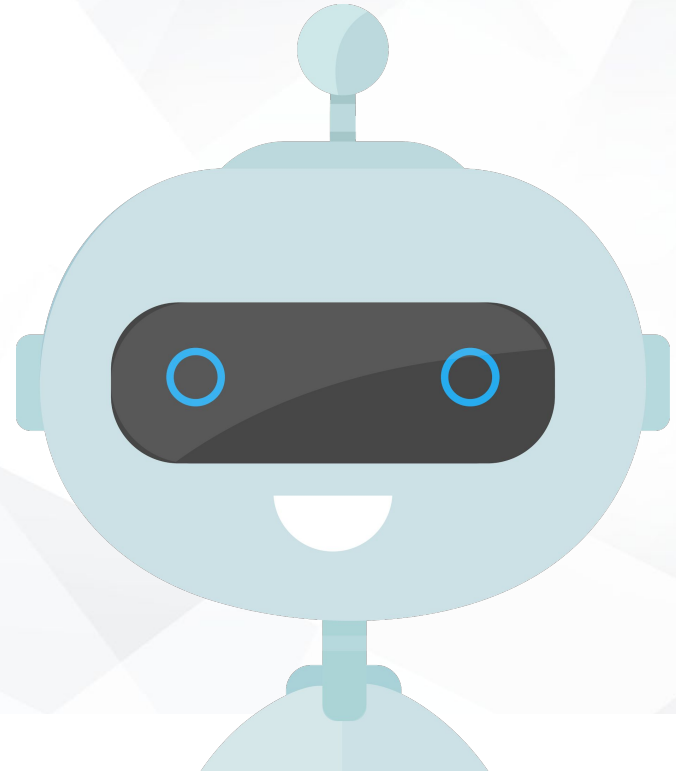Chatbots can perform tasks 24/7. Customers don't need to wait for replies.

Chatbots Disrupting Finance and Banking

Chatbots understand how customers speak.
You can respond more adequately to customer needs.
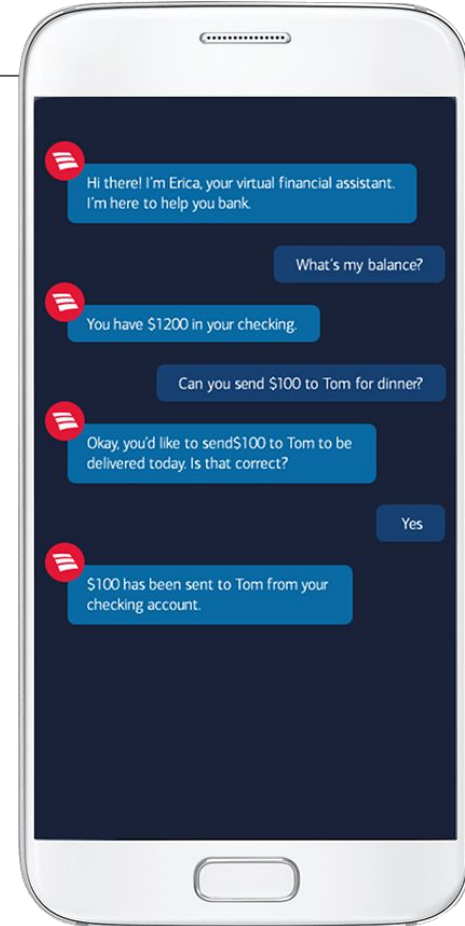
> Send $50 to Allison to be delivered today from my checking account.

> I understand, Tom. I'd be happy to help you with that.
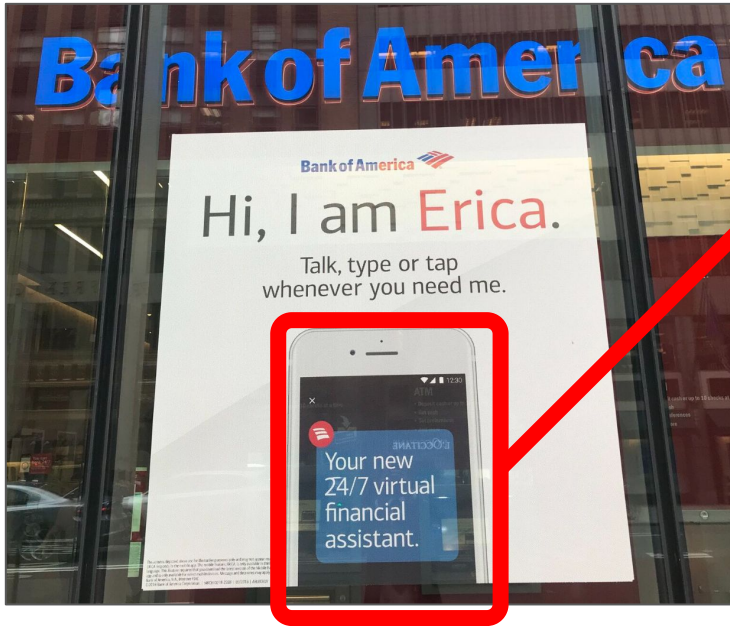
Chatbot Use Cases

Chatbot Use Cases

Erica from **Bank of America**

Chatbot Use Cases

BMO Bolt™ from
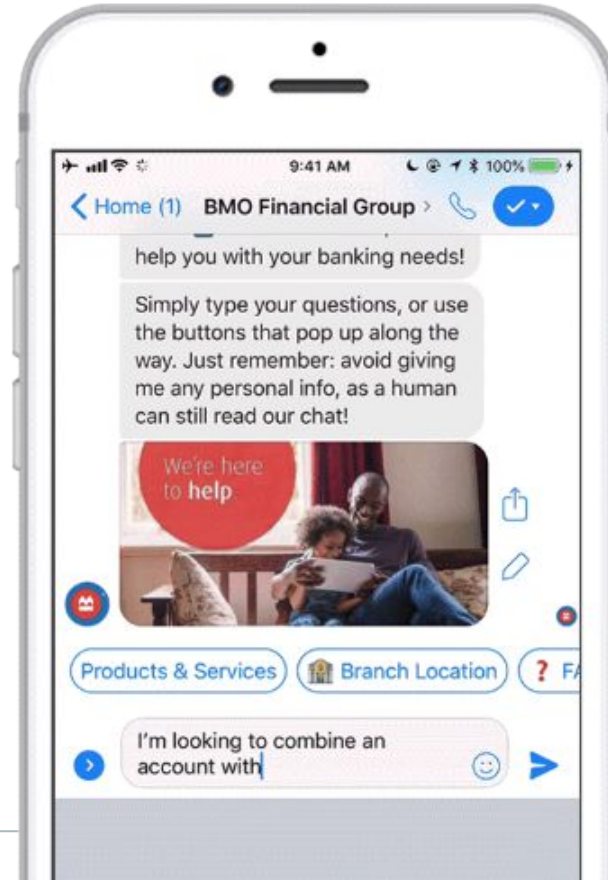
Chatbot Use Cases

NOVA from

Nordea

Nova - Nordeas Chatbot ⑦ ✕

Hi how can I help you today?

My credit card is about to expire and I would like to update my payment information.

Chatbot Use Cases

Olivia
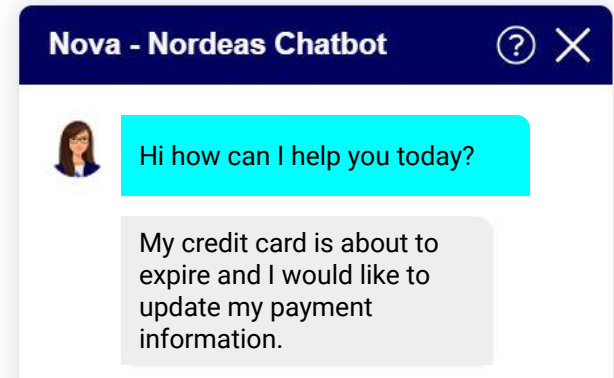
AI-powered financial assistant

Let's Create a Robo Advisor!

Amazon
Lex

Amazon
Lambda

Intro to Amazon Lex

What Is Amazon Lex?

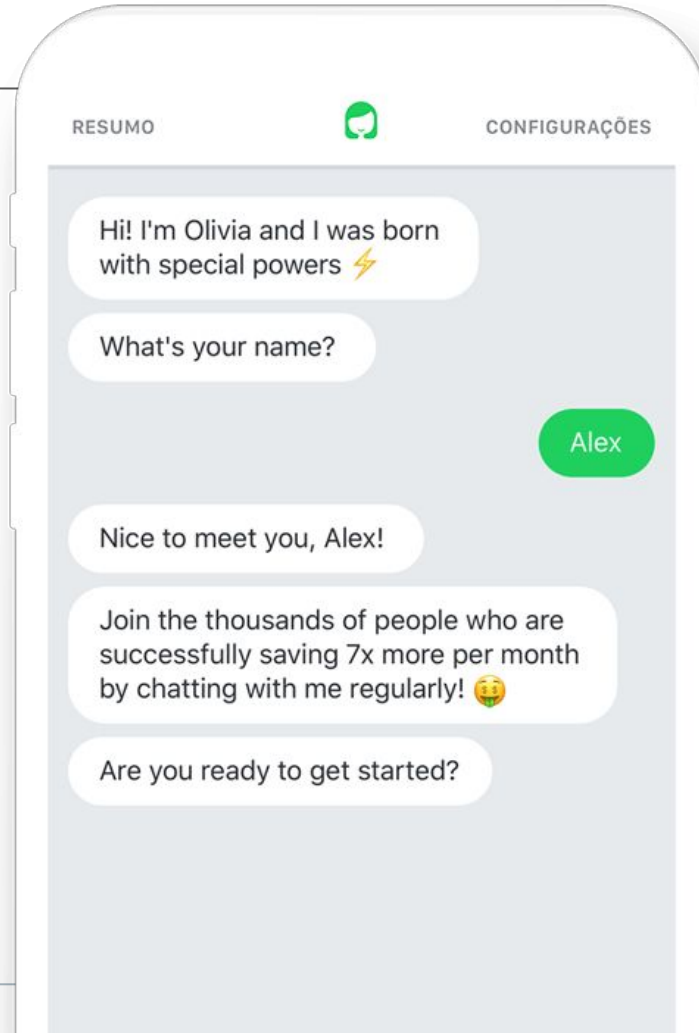Amazon Lex is an AWS service for building CUIs into any application using voice and text.

Provides the same deep learning technologies that power Amazon Alexa.

Uses automatic speech recognition to convert speech to text and natural language understanding to recognize the intent of the text.

Lets you build applications with engaging user experiences and human-like conversations.

Allows integration with third-party applications, AWS services, and your own code via Amazon Lambda.

How to Use Amazon Lex

Follow these steps to build an application:

01 Create a bot and configure it so it can understand user's goals/intent.

02 Test the bot on the Amazon Lex console. Make sure it engages in conversation with the user.

03 Publish the bot and create an alias.

04 Deploy the bot on a mobile application or a messaging platform such as Slack, Kik, or Facebook Messenger.

Amazon Lex

Amazon Lex Jargon

Bot

It's the core component of Amazon Lex. A bot performs automated tasks such as booking a hotel, making a wire transfer, or suggesting an investment portfolio.

Intent

Represents an action that the user wants to perform such as BookHotel, TransferMoney, or SuggestPortfolio. A bot can have more than one intent.

Utterances

Speech or text phrases that trigger the intent.

Slots

A piece of data that is necessary for the chatbot to fulfill the user's intent. Think of it as required user input.

Fulfillment

When the chatbot has collected all the slot values, then it proceeds with the logic in the fulfillment section. This is where an AWS lambda function can be used if you need some business logic.

AWS Supported Regions

You can only use Amazon Lex from these regions:

Asia Pacific (Sydney)

EU (Ireland)

US East (N. Virginia)

US West (Oregon)

Instructor Demonstration
Intro to Amazon Lex

Activity:
Simple Crypto Conversation

In this activity, you will create a bot that converts US Dollars to bitcoin BTC, ethereum ETH, or ripple XRP.

Suggested Time:
15 Minutes

**Time's Up!** Let's Review.

Intro to AWS Lambda

Intro to AWS Lambda

What's AWS Lambda?

It's a technology that executes code remotely without provisioning or managing servers.

Just upload your code and Lambda takes care of everything, you can have your code automatically trigger from other AWS services
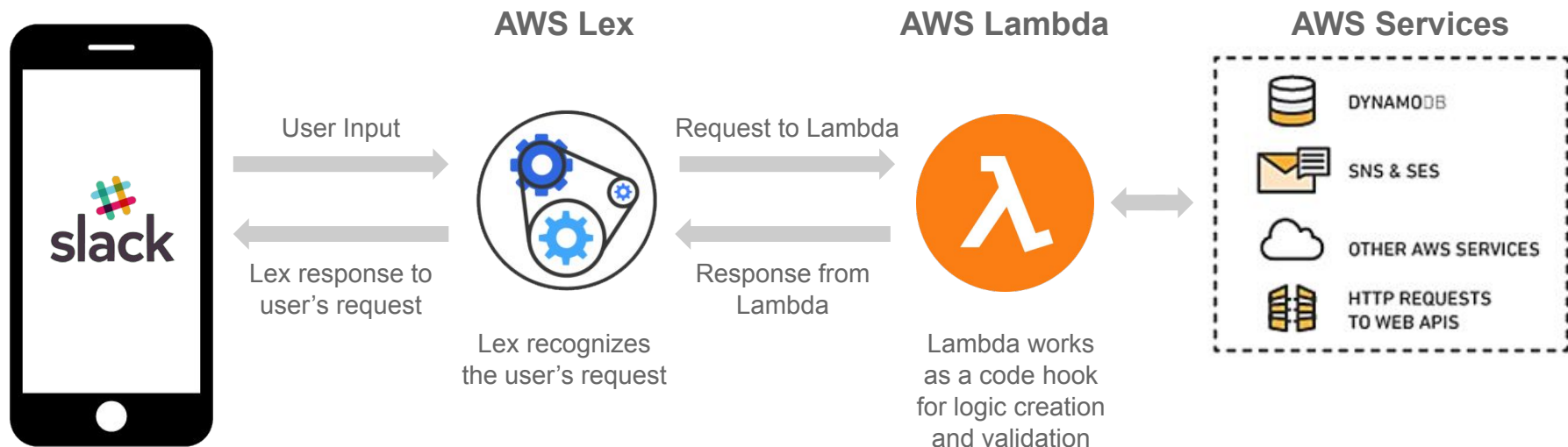or call it directly from any web or mobile app.

Mobile / IoT backends

Streaming analytics

Data processing

11:18:33 AM: "Hello world!"
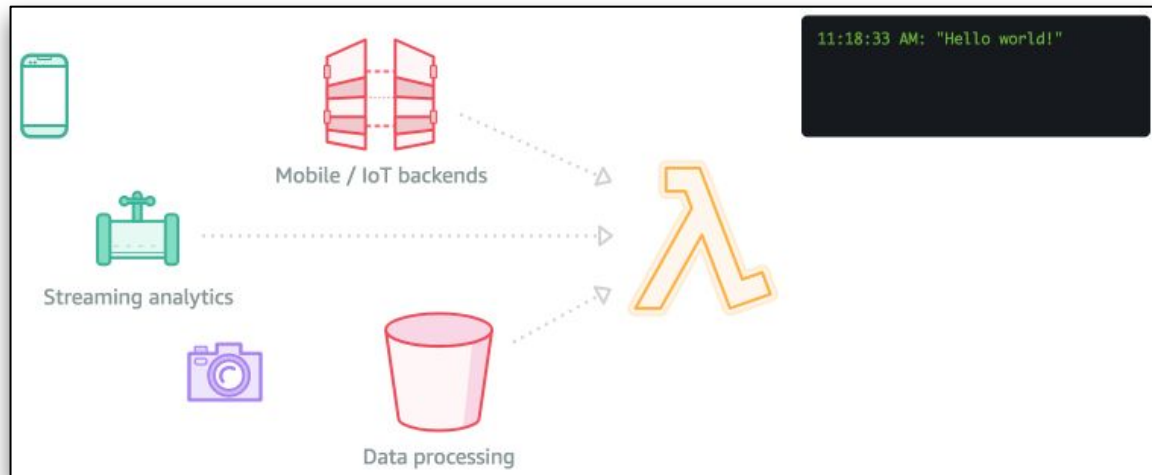
Time For a Quick Video

[Intro to AWS Lambda](Intro%20to%20AWS%20Lambda)

Intro to AWS Lambda

How AWS Lambda boosts chatbots

AWS Lambda enhances chatbots by combining the NLP capabilities of Amazon Lex with the possibility of running code to fulfill user's requests. For example, booking a hotel room, making a wire transfer, or providing financial advice about an investment portfolio.

AWS Lex

AWS Lambda

AWS Services

User Input

Request to Lambda

Lex response to user's request

Response from Lambda

Lex recognizes the user's request

Lambda works as a code hook for logic creation and validation

DYNAMODB

SNS & SES

OTHER AWS SERVICES

HTTP REQUESTS TO WEB APIS
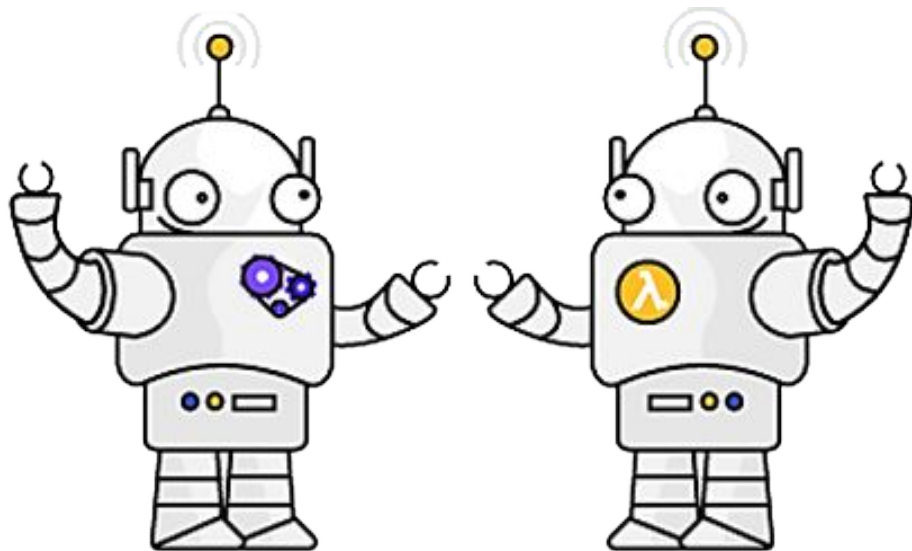
How Lex and Lambda talk

ElicitSlot

Informs Amazon Lex that the user
is expected to provide a
slot value in the response.

Delegate

Directs Amazon Lex to choose
the next course of action based
on the bot configuration.

Close

Informs Amazon Lex not to
expect a response from the user.

Instructor Demonstration
Intro to AWS Lambda

Anatomy of a Lambda Function for Amazon Lex

```python
lambda_function.py  Activities/05-Ins_Intro_Lambda/Solved/lambda_function.py/ lambda_handler

### Required Libraries ###
from datetime import datetime
from dateutil.relativedelta import relativedelta
from botocore.vendored import requests          ← This is how the requests library is imported into AWS Lambda

### Functionality Helper Functions ###
> def parse_float(n): …

> def get_btcprice(): …

> def build_validation_result(is_valid, violated_slot, message_content): …   ← Helper functions implement data validation
                                                                                and business logic support

> def validate_data(birthday, usd_amount, intent_request): …

### Dialog Actions Helper Functions ###
> def get_slots(intent_request): …

> def elicit_slot(session_attributes, intent_name, slots, slot_to_elicit, message)

> def delegate(session_attributes, slots): …        ← Dialog actions helper functions control conversation
                                                        response events

> def close(session_attributes, fulfillment_state, message): …

### Intents Handlers ###
> def convert_usd(intent_request): …               ← Intents handlers use helper functions and dialog
                                                      helper functions to fulfill users's intents

### Intents Dispatcher ###                          ← Intents dispatcher validates that the current intent
> def dispatch(intent_request): …                      is valid and dispatch the intent to the corresponding
                                                       intent handler

### Main Handler ###
def lambda_handler(event, context):
    """
    Route the incoming request based on intent.
    The JSON body of the request is provided in the event slot.
    """

    return dispatch(event)
```

Activity:

Intro to AWS Lambda

In this activity, you will learn how to integrate Lambda functions into an Amazon Lex bot.

Time's Up! Let's Review.

Instructor Demonstration
Understanding Lambdas

Activity:
Understanding Lambdas

Time's Up! Let's Review.

Instructor Demonstration
Testing AWS Lambda Functions

Activity:

Testing AWS Lambda Functions

In this activity, you will test AWS Lambda functions that validate Amazon Lex intents.

Time's Up! Let's Review.

Instructor Demonstration
Review Buggy Lambdas

Activity:
Review Buggy Lambdas

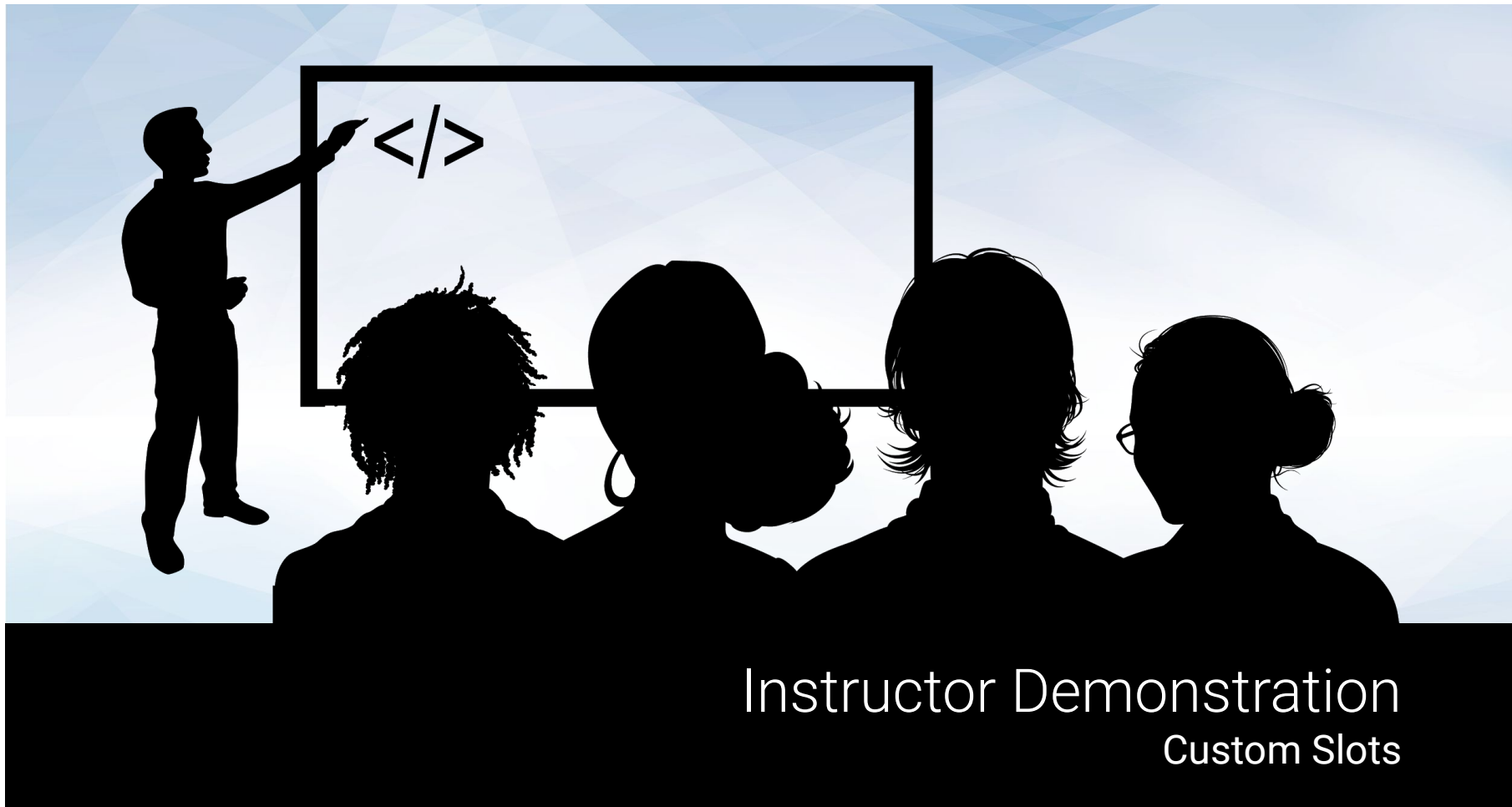In this activity, you will test Lambdas and find runtime errors.

Time's Up! Let's Review.

Instructor Demonstration
Custom Slots

Activity:
Custom Slots
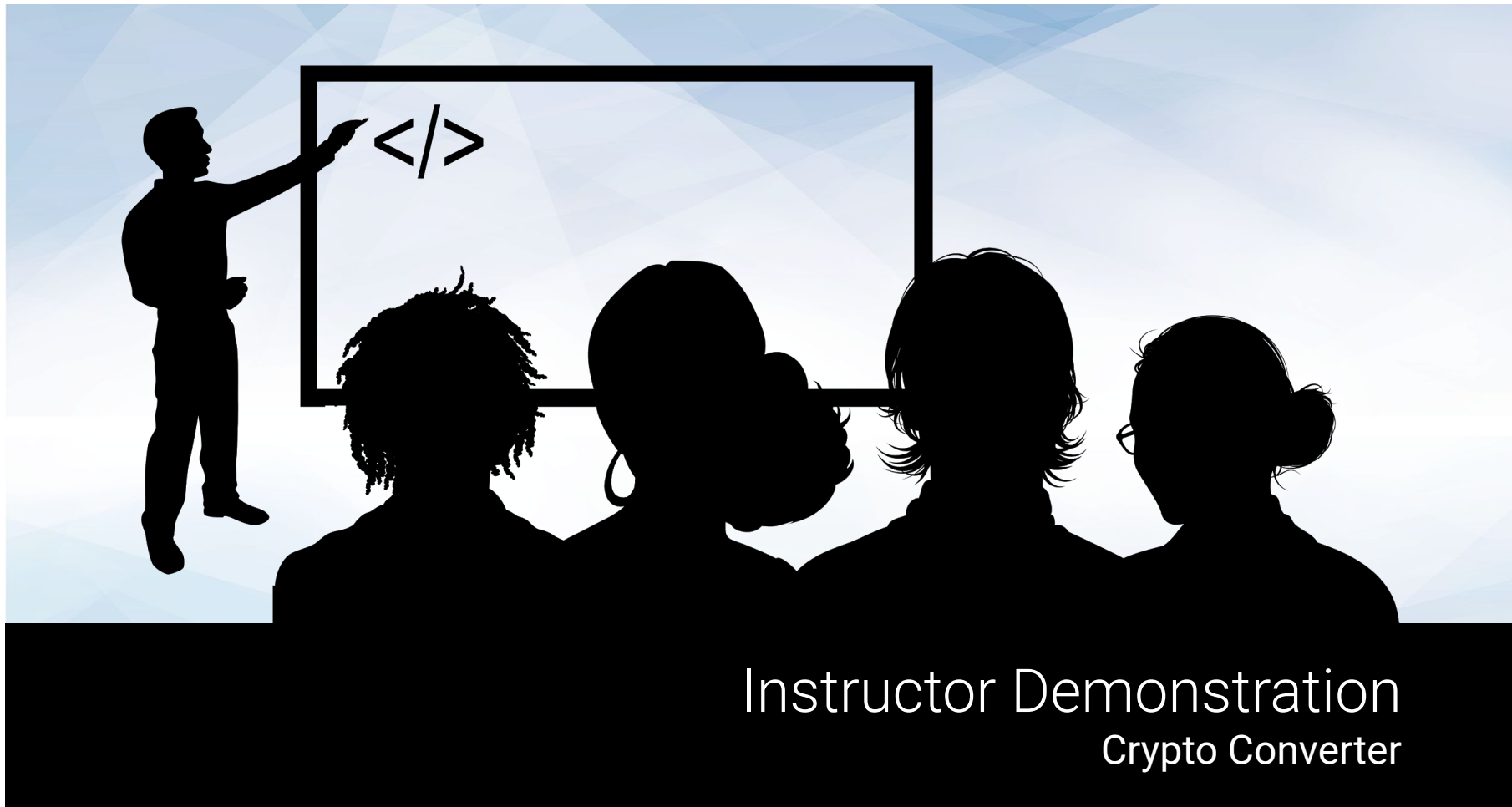
In this activity, you will create a custom slot and add it to an Amazon Lex bot intent.

Time's Up! Let's Review.

Instructor Demonstration
Crypto Converter

Activity:
Crypto Converter

In this activity, you will extend your cryptocurrency converter by adding a custom slot to allow users to convert US dollars to bitcoin, Ethereum, or Ripple.

Suggested Time:
20 Minutes

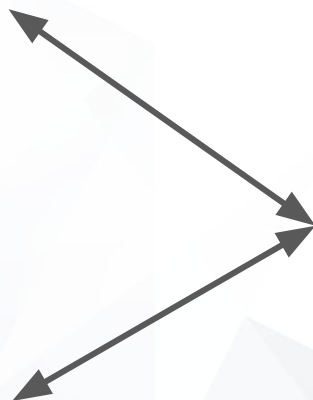**Time's Up!** Let's Review.

Deploying Amazon Lex Bots

Built-in integration
with messaging platforms

Mobile apps using AWS SDK
or AWS Mobile Hub

Amazon
Lex

Amazon
Lambda

Learn more at: Developing Amazon Lex Bots Guide