

MCL301 AWS re:INVENT

Building a Voice-Enabled Customer Service Chatbot Using
Amazon Lex and Amazon Polly

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We are ...

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They are from the Cognitive Technologies Team using Amazon Lex and other language technologies

HIGHLY PERSONALIZED
CUSTOMER SERVICE EXPERIENCES
AT SCALE

Building blocks

Amazon Polly



Converts text to life-like speech



Fully managed



52 voices



25 languages



Low latency, real time

Voice quality and pronunciation

1. Automatic, accurate text processing
2. Intelligible and easy to understand
3. Add semantic meaning to text
4. Customized pronunciation



Character voices

Articles and blogs
Training material
Chatbots (Amazon Lex)
Public announcements

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Amazon Lex



Voice and text "chatbots"



Powers Alexa



Voice interactions on mobile, web, and devices



Text interaction with Slack, Twilio SMS, and Facebook Messenger



Enterprise connectors

Improving human interactions...

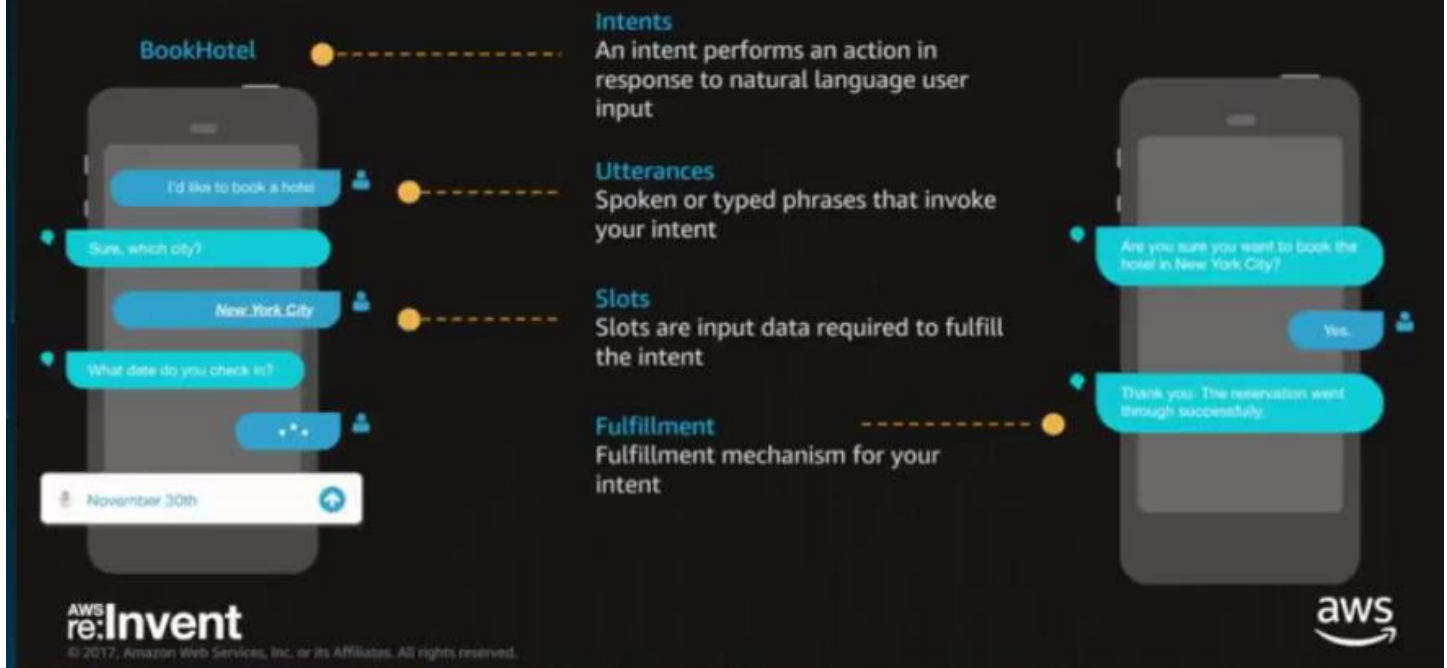
- Contact, service, and support center interfaces (text + voice)
- Employee productivity and collaboration (minutes into seconds)

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Conversation flow



Every bot has a purpose and that is called an Intent, the intent is ultimately fulfilled by code written by the developer. A bot is thus a collection of intents and each intent is expressed as a set of sample utterances. If I want a coffee, I might start off by saying 'give me a coffee' instead of saying 'I want to buy a coffee'.

Those sample utterances also have additional information, if I am booking a flight, I might say something like 'I am going to New York', the name of the city 'New York' is now a slot. But for flights, you need an origin, destination, dates, airline which is optional, etc. but I need to know where you are starting from (your phone might tell me that!), I need to know where you are going, but I should be able to decipher whether or not you prefer a particular airline as part of that conversation. This is a difference between a required slot and an optional slot.

What Amazon Lex would do is to manage the dialog so that if you say something without the required slot, it would prompt the user if those slots have not been provided. If you provide those slots as part of your normal sentences, then Lex will fill those slots and continue to the next one in the list.

Popular Bots

Employee support (help desk)

DevOps admin (deployment)

Customer service (contact center)

Executive assistant (business intelligence)



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The fine print

- Bots rely on APIs
- Bots are not human—they struggle to adapt beyond their design
- Bots don't get subtlety



We <3 bots

- Bots don't sleep
- Bots are fast (I don't like to wait)
- Bots don't get frustrated with me
- Bots "like" getting to know me
- Bots don't judge me for my requests and preferences



Let's go! I want one!

Where to start?

What do customers ask about?

How do they contact us?

What's a script? Who writes it?

When?

What if it fails?

How can customers "exit" and talk to an agent?

Where will customer information come from?

Can this be updated?

What about the fulfillment API?

Will it scale?

How will we handle errors?

How will we know if we're successful?

How will it improve?

Who will monitor this stuff?

What will we monitor?

Which languages do we need to support?

What about accents?

Who will record the audio?

Will the text-to-speech work?

How will we test?

What does the CI/CD pipeline look like?

Is it secure?

What about compliance?

Can we use the brand voice?

How can we integrate it into the experience?

What if you have an outage?

What if fulfillment takes too long?

This could be a PR nightmare!

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You need to start small, think about what people want, how do we know if the bot is successful?

Start with "Why?"

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Why are we building a business bot for our business?

Why are we doing this?

- To offer a better customer experience
- To connect with customers where they are
- To save time and money
- To offer new products



... as measured
by ... ?

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Why are we doing this?

- Restaurant overflow
 - Customers calling the restaurant at peak times consume the host's time with questions like: "How long is the wait?" Could a chatbot answer the questions and direct overflow to nearby locations?
 - Measure automated interactions, calls reduced, and lift in other locations
- FAQ
 - Half of the questions answered by our social media team on Facebook are in our FAQs. Our queue times get beyond 5 minutes! Can we automate that?
 - Measure automated interactions, contact throughput, queue depth, and queue time
 - What about interactions beyond office hours?

Why are we doing this?

- Self-service
 - The number one question on the claims line is: "What's the status of my claim?" We're spending hours just scheduling these reviews. Can we automate these (so we can spend the time processing claims)?
 - Measure automated interactions, calls reduced, reviews scheduled, claims throughput
- Office productivity
 - Where does Sofia Martinez work, and what's her number? Is there a cafeteria in this building? Where is the "Inspiration" room?
 - Who broke the build?
 - Measure successful lookups, feedback on more things to do

Focus

So wait—we're not going to handle, "Tell me a joke"?

What about the weather? That's trivial!

And traffic—we definitely need traffic!

How hard could it be to get stock quotes?!



Interaction design



Transcripts and
analysis



Whiteboard

How do you build the chat bot? if you have data about what people are talking about, start there. Or you can simulate the scenarios you are trying to solve with the particular chatbot.

Interaction design

Hi there! I am a chatbot and can help you do stuff (what?). How can I help you today?

> I want to come in for a well-baby visit.

schedule well-baby visit appointment intent

get child's name? (or do we already know this?)

(do we need the parent's name?)

lookups and schedule access here

Sure, Joe. I can help you with that. Does Thursday at 10 a.m. work?

do we need to reserve that slot tentatively?

> Anything sooner?

We can also do Tuesday at 2 p.m. and 4 p.m. if one of those will be better. You can always call the nurse's hotline (hotline #) for something urgent.

> 4 p.m.—let's do 4 p.m.

reserve slot and return

Great! We have you scheduled to come in on ...

want a reminder?

You can do a script like this on the whiteboard and write what people are saying. There are 3 participants here, the user, the bot, and the system. The system is what needs to keep track of the conversation and know the different variations and detects points/questions where an API is needed to get the answers.

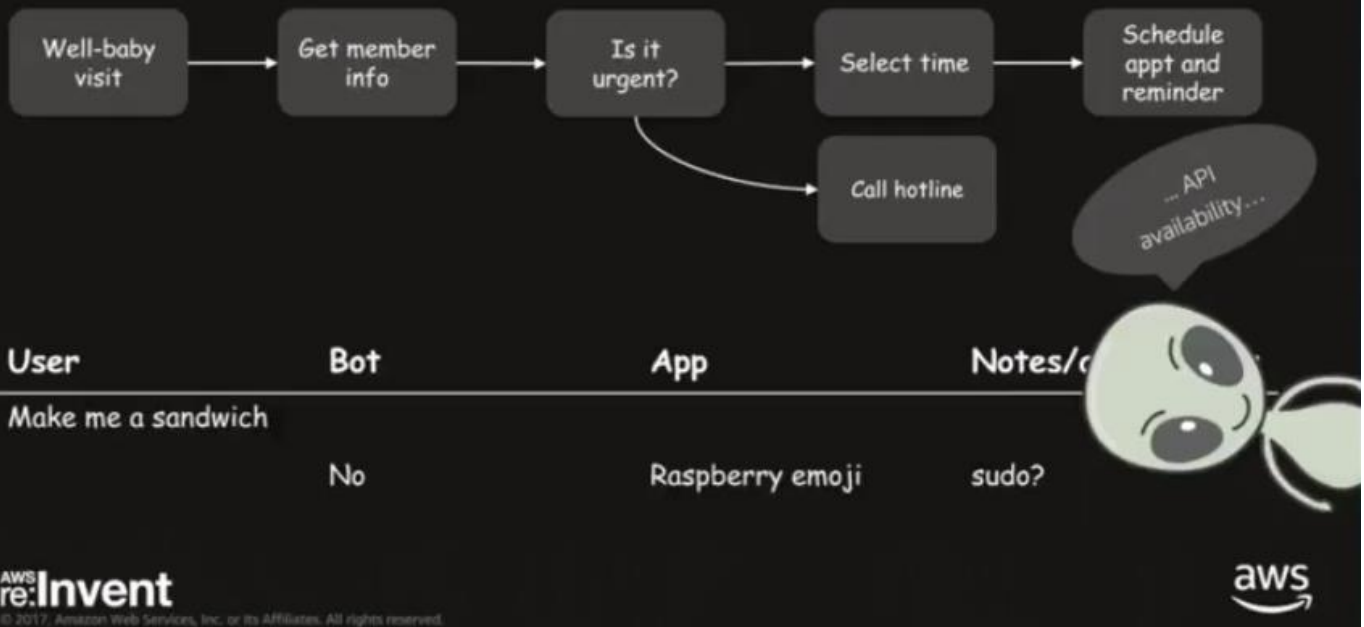
Interaction design



User	Bot	App	Notes/alternatives
Make me a sandwich	No	Raspberry emoji	sudo?

When you have done and written down questions and answers for several natural conversation scenarios, then you can boil them down into some kind of conversation flow as above. The important thing is to record what the bot will do.

Interaction design



Make sure the APIs are available or developed

Operations & monitoring

- Will you know if it fails? Will you know if it works? Will you know if no one uses it?
 - Who gets notified? How will this person react?
- How will it scale? Is it elastic? Is it secure?
 - Test it; run a "game day"
- What if it messes up? What if someone posts a threat this way? What if the region goes down?
 - Do you have filters in place? How would you find out?
 - Can you deploy a fix quickly?
 - Have a procedure in place and rehearse it

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The chatbot in production is composed of several parts that need to work.

Consider

- Amazon Lex makes it easy to build, deploy, and monitor a bot, but conversational experiences do require thoughtful design
- At the end of the day, the user is expecting the bot to perform tasks for her with minimal delay; the fulfillment architecture is critical to a competent bot
- Metrics are certainly essential for operations, but that feedback loop is also necessary for continuous improvement and to demonstrate progress toward business goals



Liberty Mutual
INSURANCE

Our Digital Assistant

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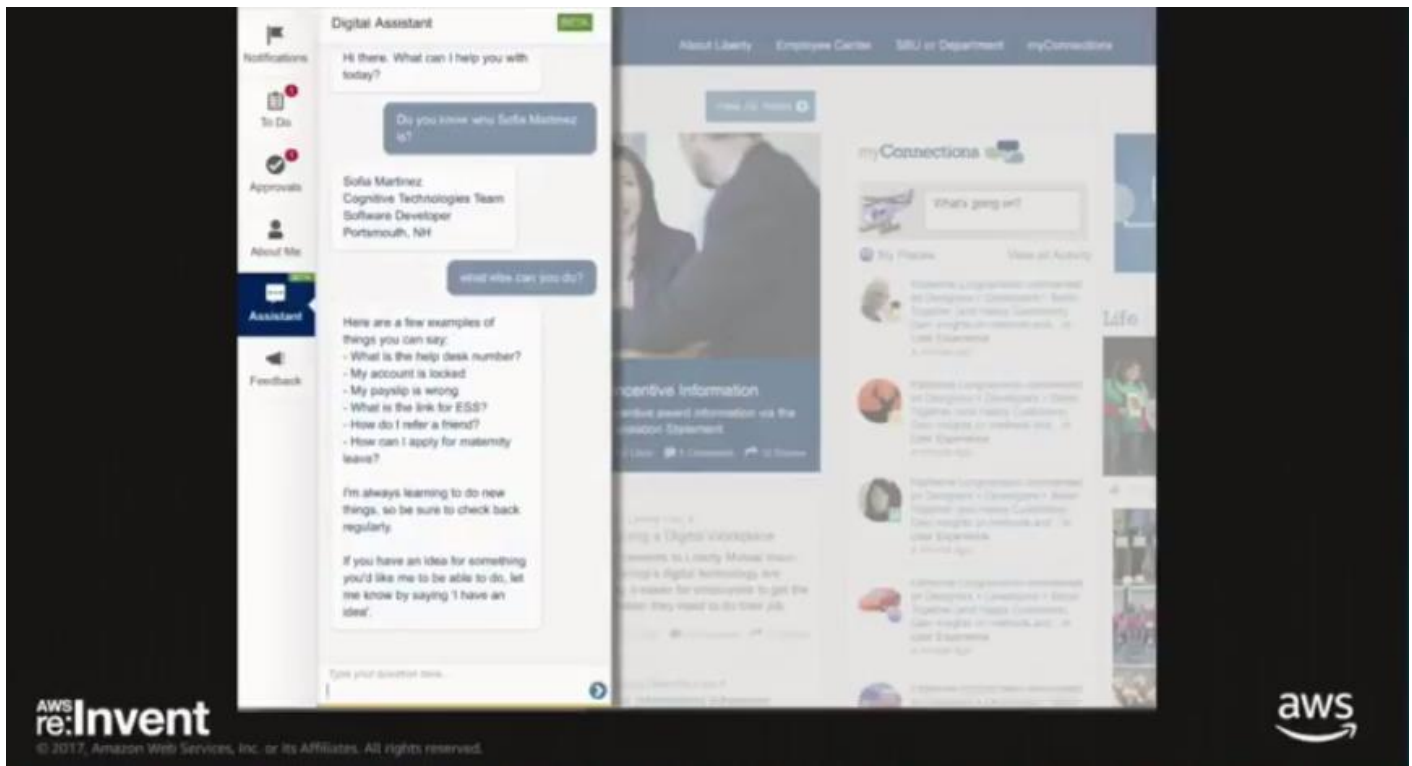
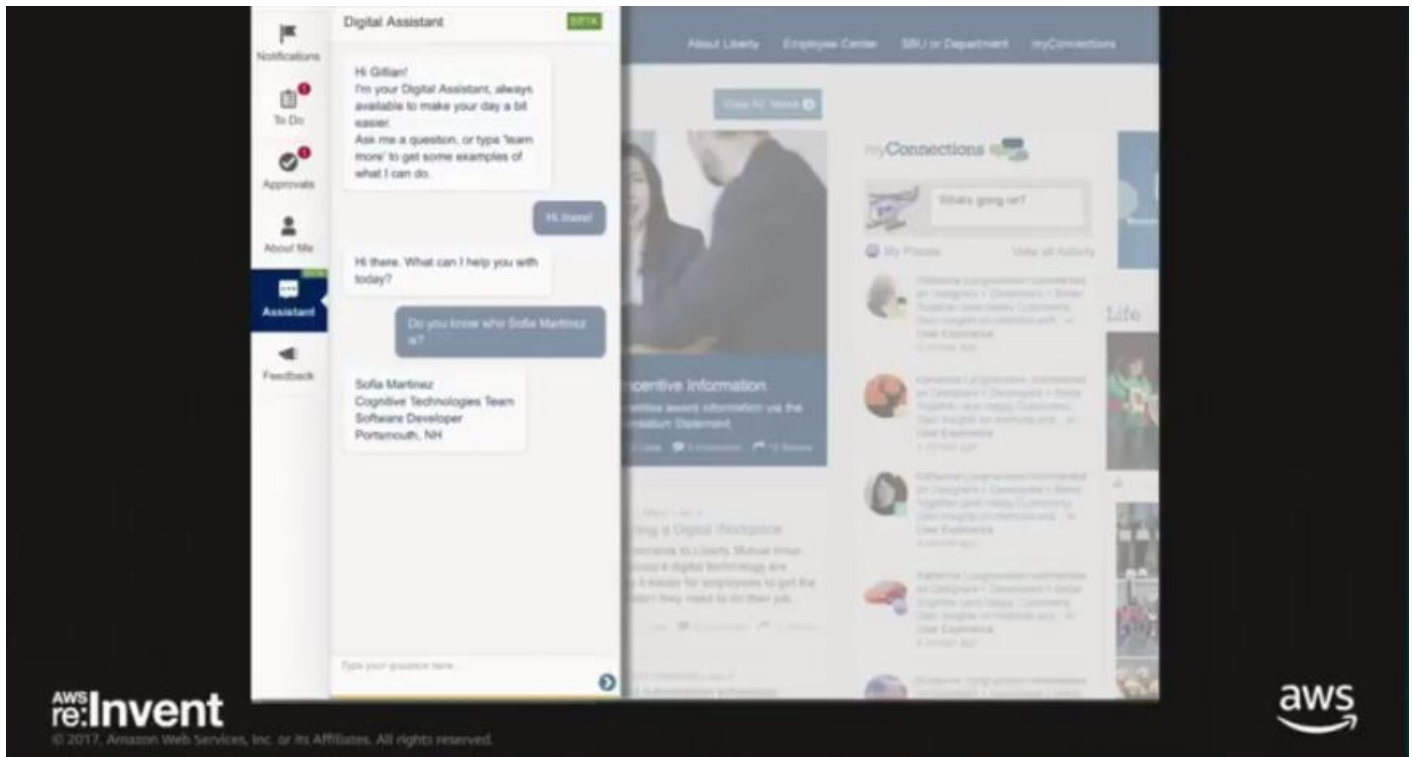
Chatbots for the Enterprise



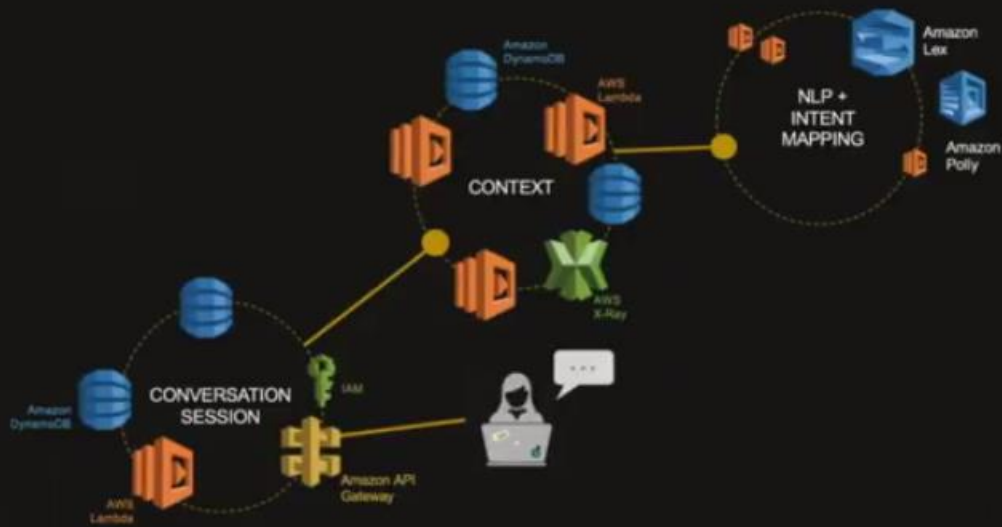
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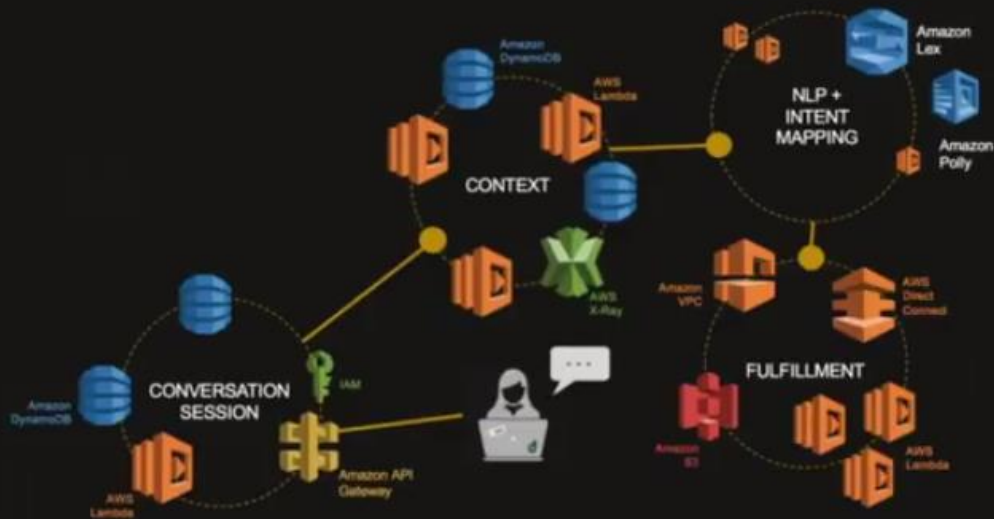
Our chat platform architecture



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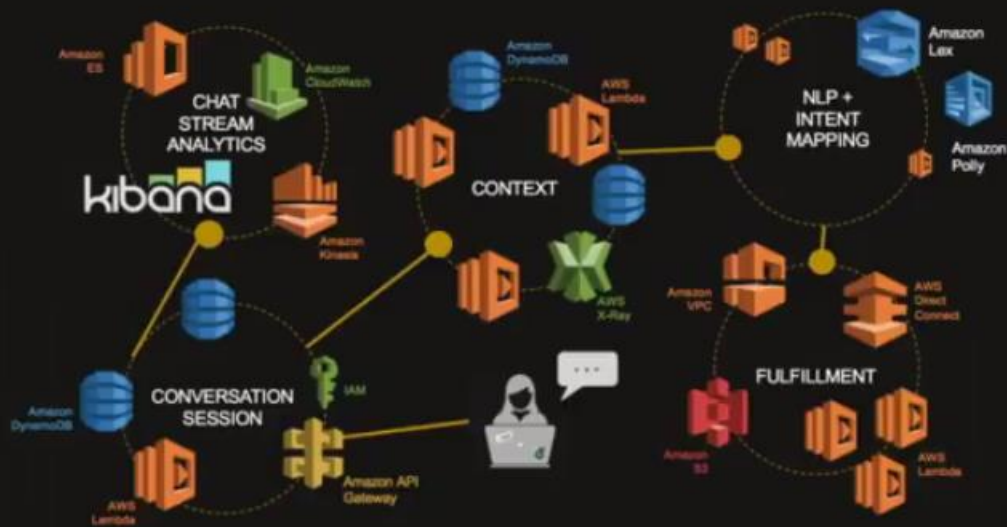
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Analytics



Examples of what we look at:

- number of users
- number of conversations
- length of conversations
- what functionality is being used
- where we are getting it right 👍
- what people want us to add 🤔
- where we are getting it wrong 🤯

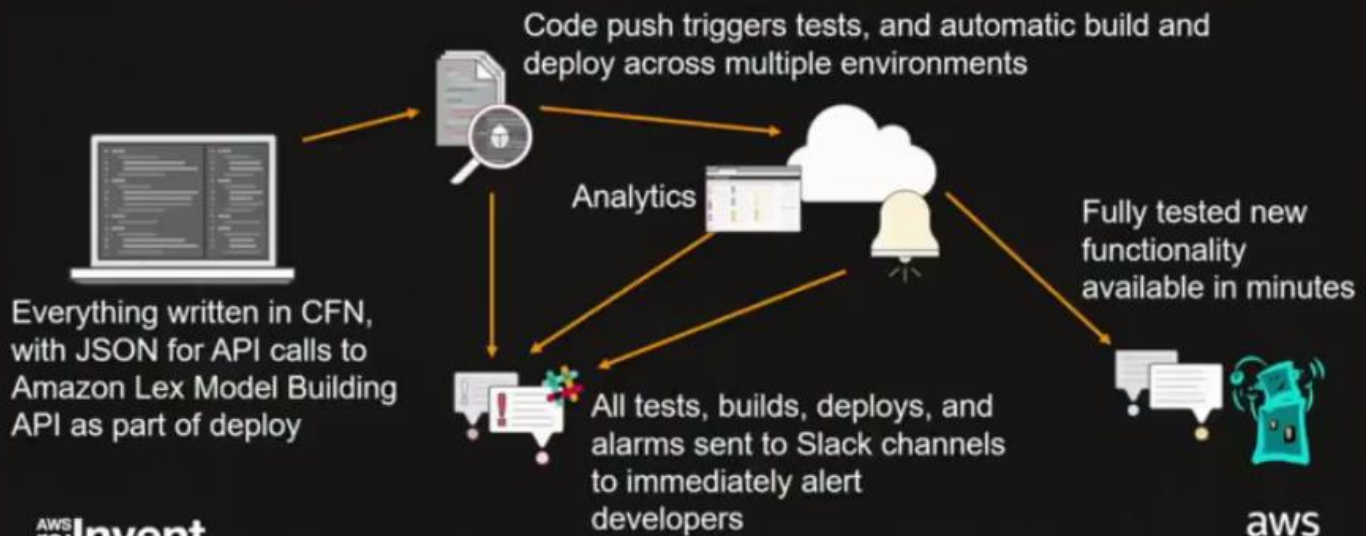
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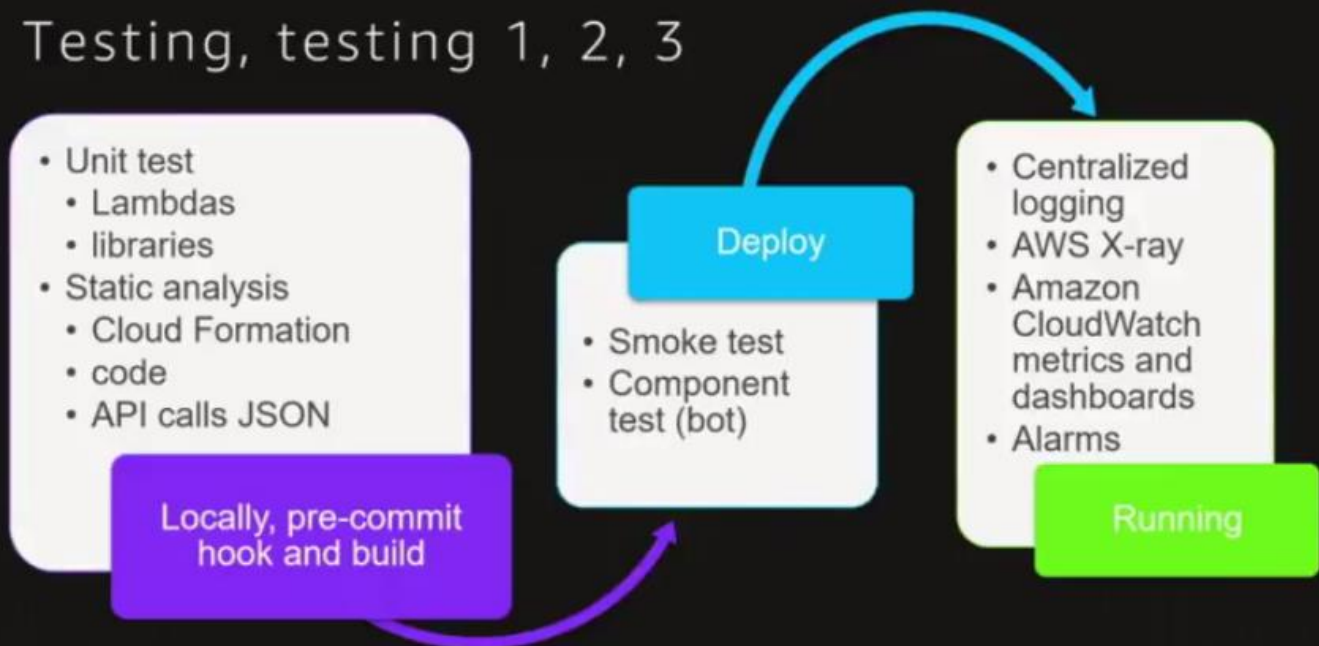


Conversation as code

Fully validated and repeatable bot build and deploy to any AWS account



Testing, testing 1, 2, 3



BUILDING A SIMPLE CHATBOT
IS SIMPLE...

BUILDING A GOOD CHATBOT
IS REALLY, REALLY HARD

Q&A

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