

Building a Serverless Customer Service Chatbot

Who am I?

Tommy Englert

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- *Senior Data Analyst at ASRC Federal*
- *BS Decision Sciences at ODU*
- *Graduate Candidate (April 2018) MS in Decision Analytics at VCU*

Let's take a brief look at some key data science concepts/tools involved with this project!

Let's take a brief look at some key data science concepts/tools



DynamoDB



SQL

- `SELECT * FROM customer_tbl WHERE last_name = 'Smith';`

custID	last_name	first_name
101	Smith	Deb
102	Smith	Chris
203	Smith	Steve
204	Smith	Josiah

NoSQL

- `GET customer.first_name, customer.last_name, customer.productid. * where last_name = 'Burbank'`

Key	Value
7461117	First_Name: Allen Last_Name: Burbank Productid: 2010:8
1245568	First_Name: Glenda Last_Name: Burbank Productid: 2917:8 1094: 9
8675309	First_Name: Jacob Last_Name: Burbank Productid: 2099:8

Let's take a brief look at some key data science concepts/tools

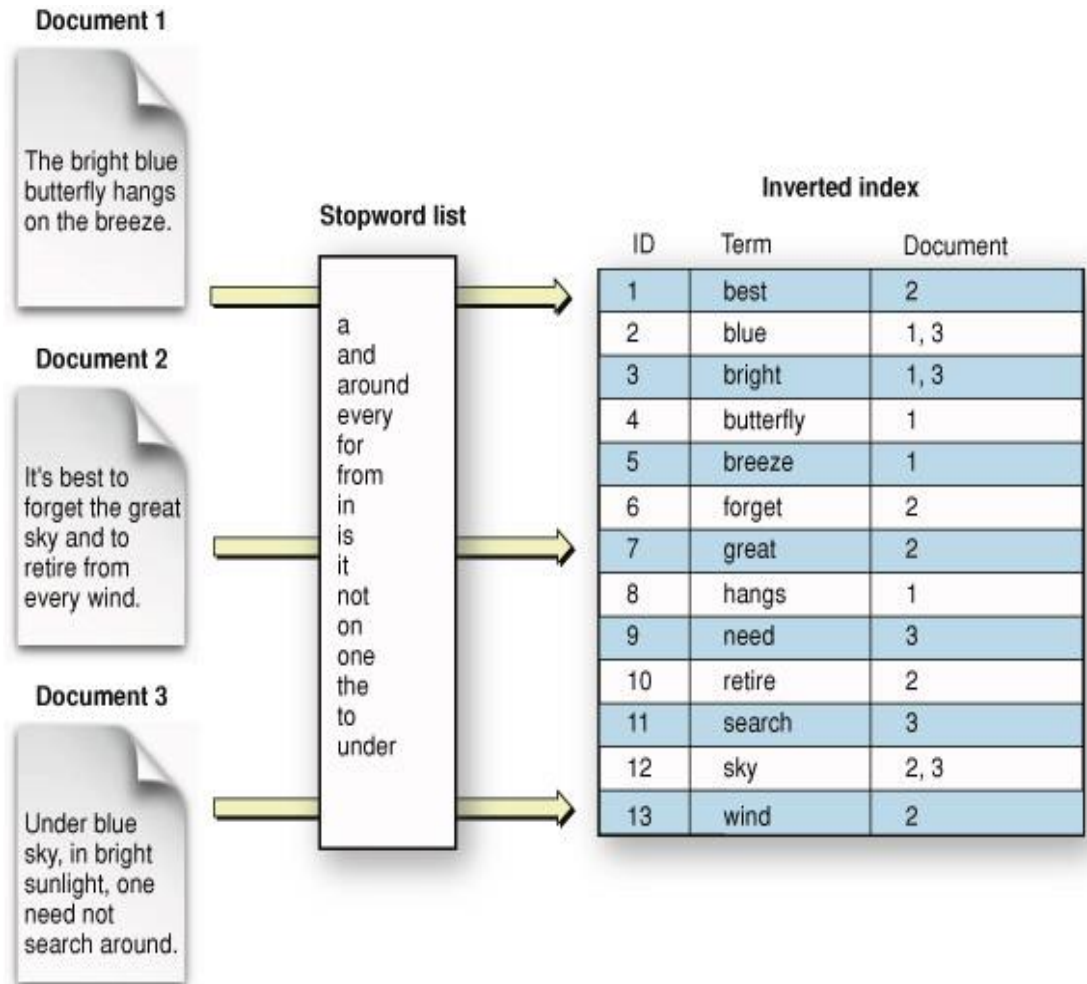


- Elasticsearch is a search engine based on Lucene. It provides a distributed, multitenant-capable full-text search engine with an HTTP web interface and schema-free JSON documents
- <https://www.elastic.co/products/elasticsearch>
- Fast, Scalable and Flexible
- Client Libraries include: Java, C#, Python, JavaScript, PHP, Perl and Ruby

Let's take a brief look at some key data science concepts/tools



- Apache Lucene is a high-performance, full-featured text search engine library written entirely in Java.
- Suitable for nearly any application that requires full-text search, especially cross-platform.
- <https://lucene.apache.org/>



Great overview at
<http://karthikkumar.me/intro-to-lucene>

Let's take a brief look at some key data science concepts/tools

- **Kibana** is an open source analytics and visualization platform designed to work with Elasticsearch
- **Kibana** makes it easy to understand large volumes of data.
- Its simple, browser-based interface enables you to quickly create and share dynamic dashboards that display changes to Elasticsearch queries in real time.



Let's take a brief look at some key data science concepts/tools

NLP

- **Natural Language Processing**, or **NLP** for short, is broadly defined as the automatic manipulation of natural language, like speech and text, by software.

NLTK

- **Natural Language Toolkit** - NLTK is a leading platform for building Python programs to work with human language data.
- It provides easy-to-use interfaces to [over 50 corpora and lexical resources](#) such as WordNet, along with a suite of text processing libraries for classification, tokenization, stemming, tagging, parsing, and semantic reasoning, wrappers for industrial-strength NLP libraries

Let's take a brief look at some key data science concepts/tools

English Snowball Stemmer

- Stemming is used as an approximate method for grouping words with a similar basic meaning together.
- Fish <- fishing, fished, fisher
- Demo can be found here <http://snowballstem.org/demo.html>

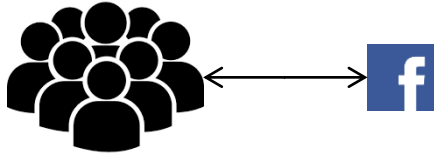
Let's take a brief look at some key data science concepts/tools

Vader

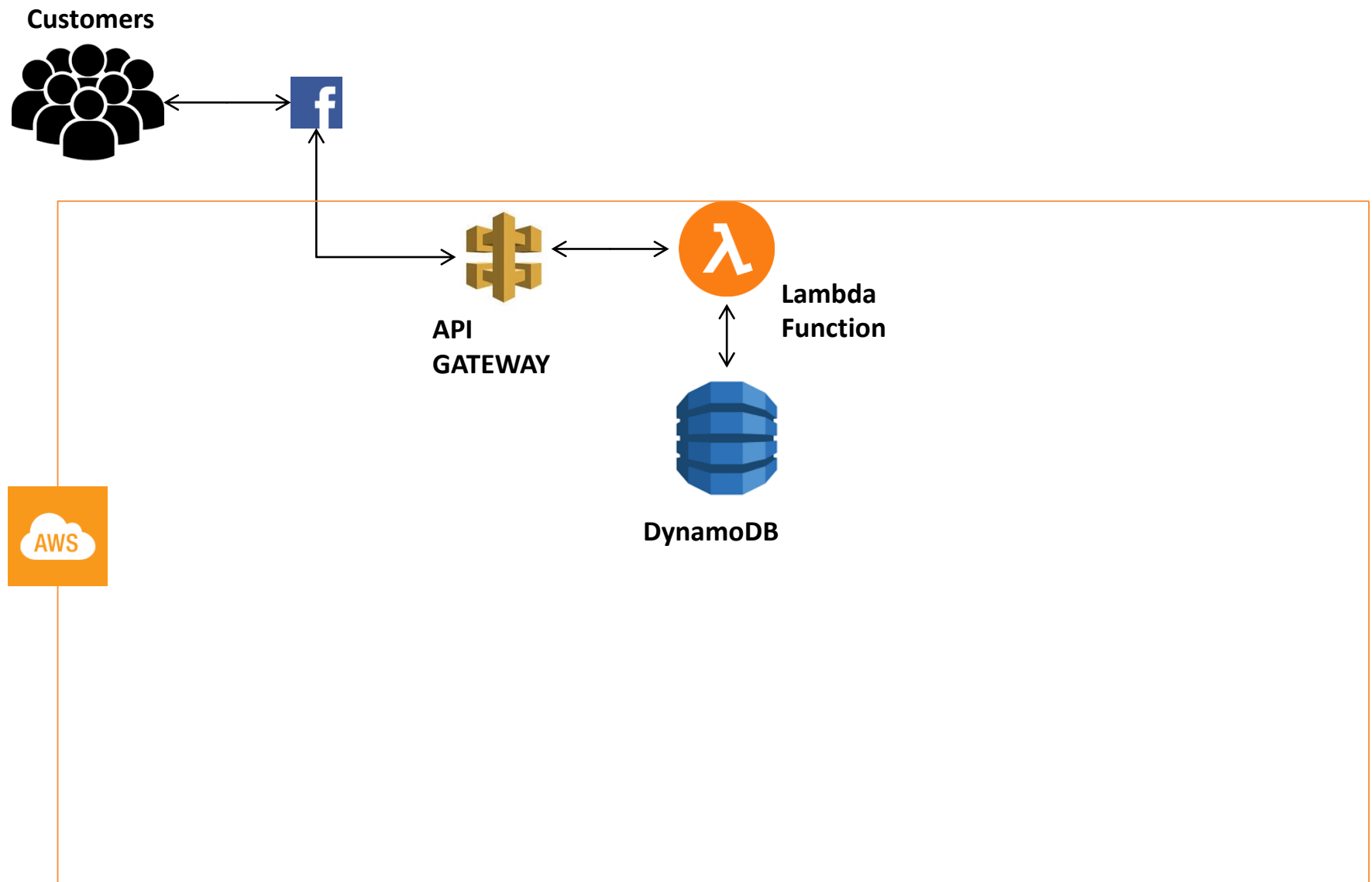
- Included in NLTK
- Used to perform Sentiment Analysis (*neg, positive, neutral*)
- Better equipped than other analyzers to handle social media data
 - This movie was the SHIT!
 - My burrito was the bomb
 - WHY AM I SO BAD AT FANTASY FOOTBALL!!!!
 - 😊 :D

Brief overview of the project

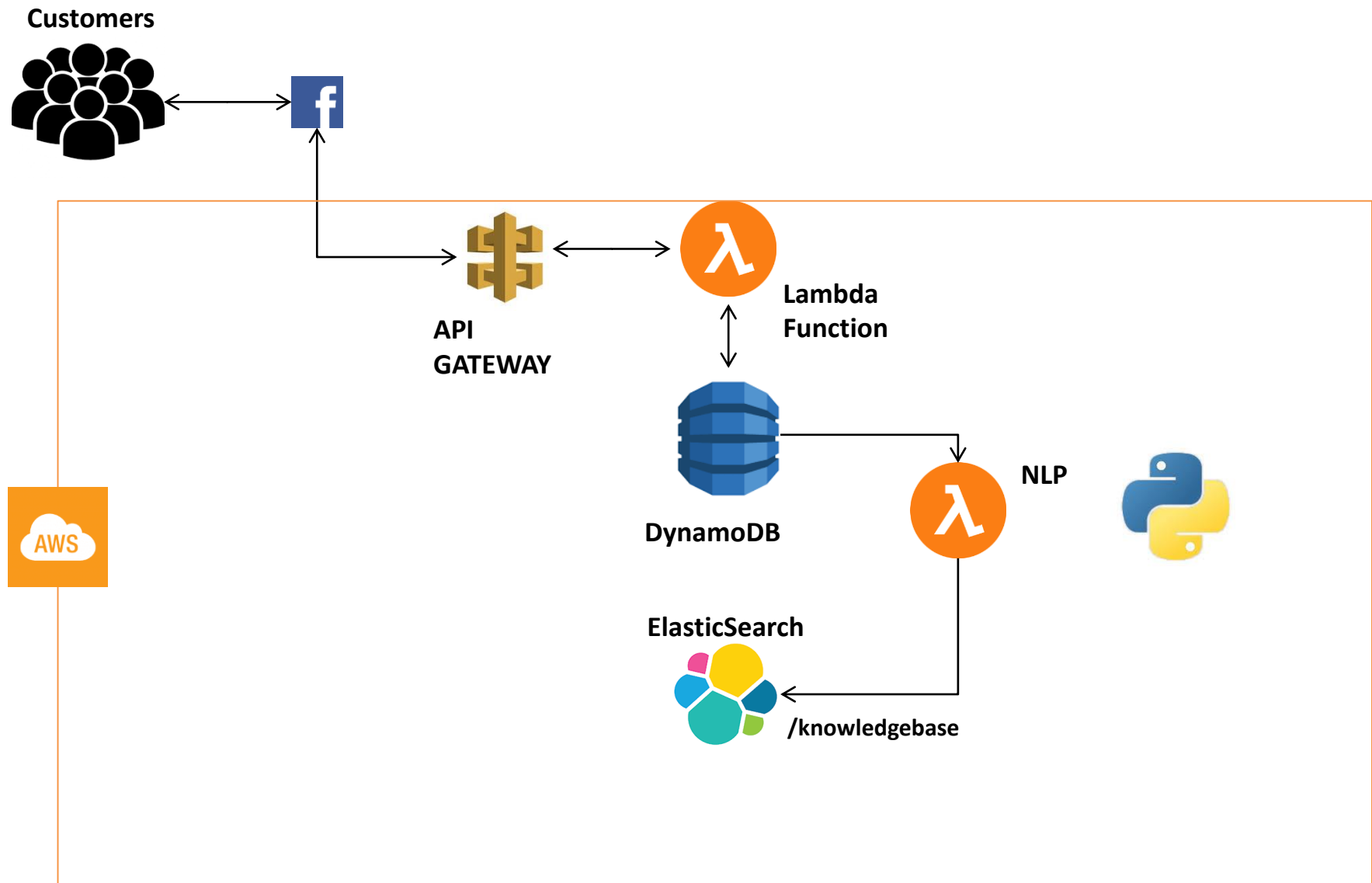
Customers



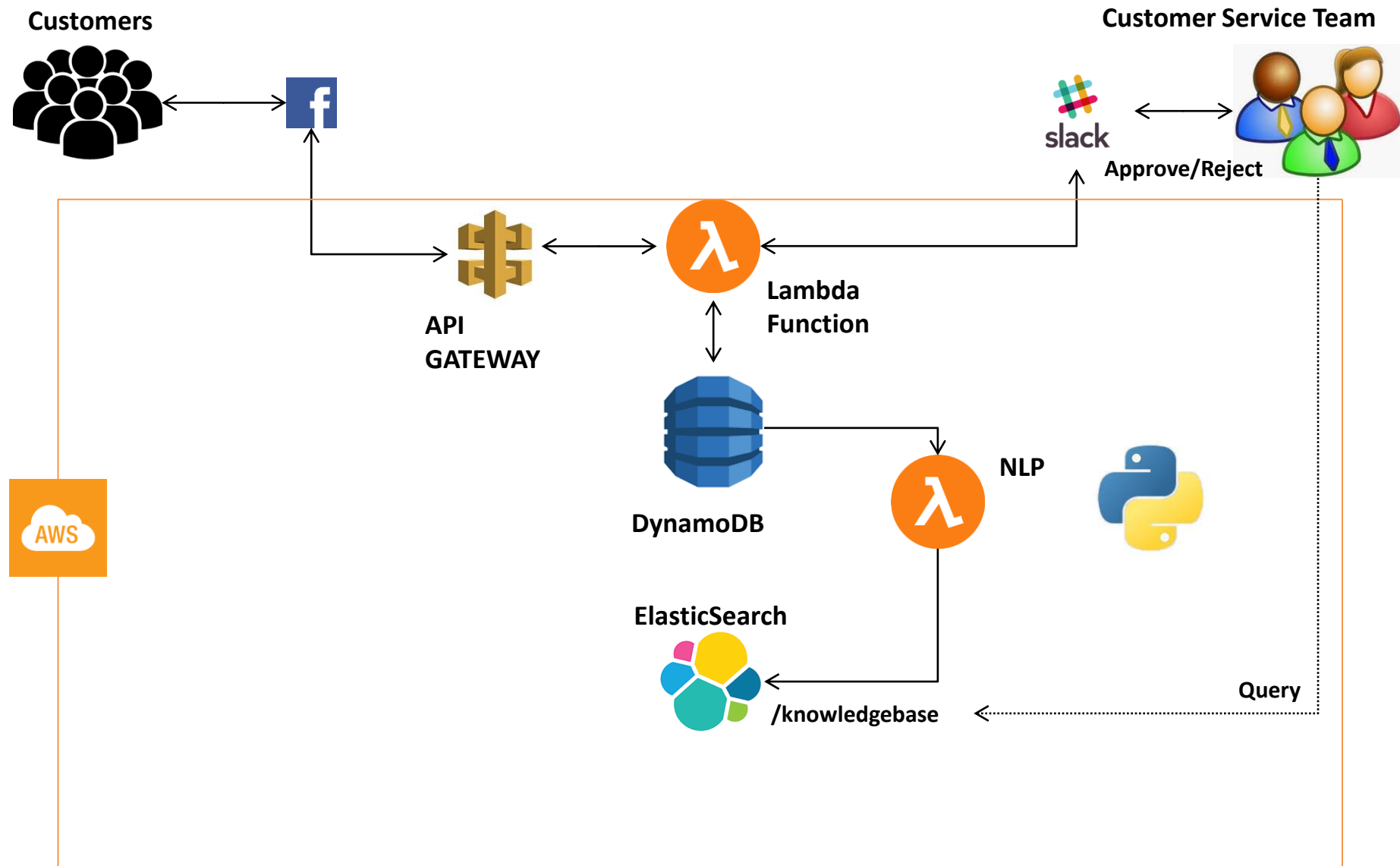
Customers send our company a message via FB Messenger



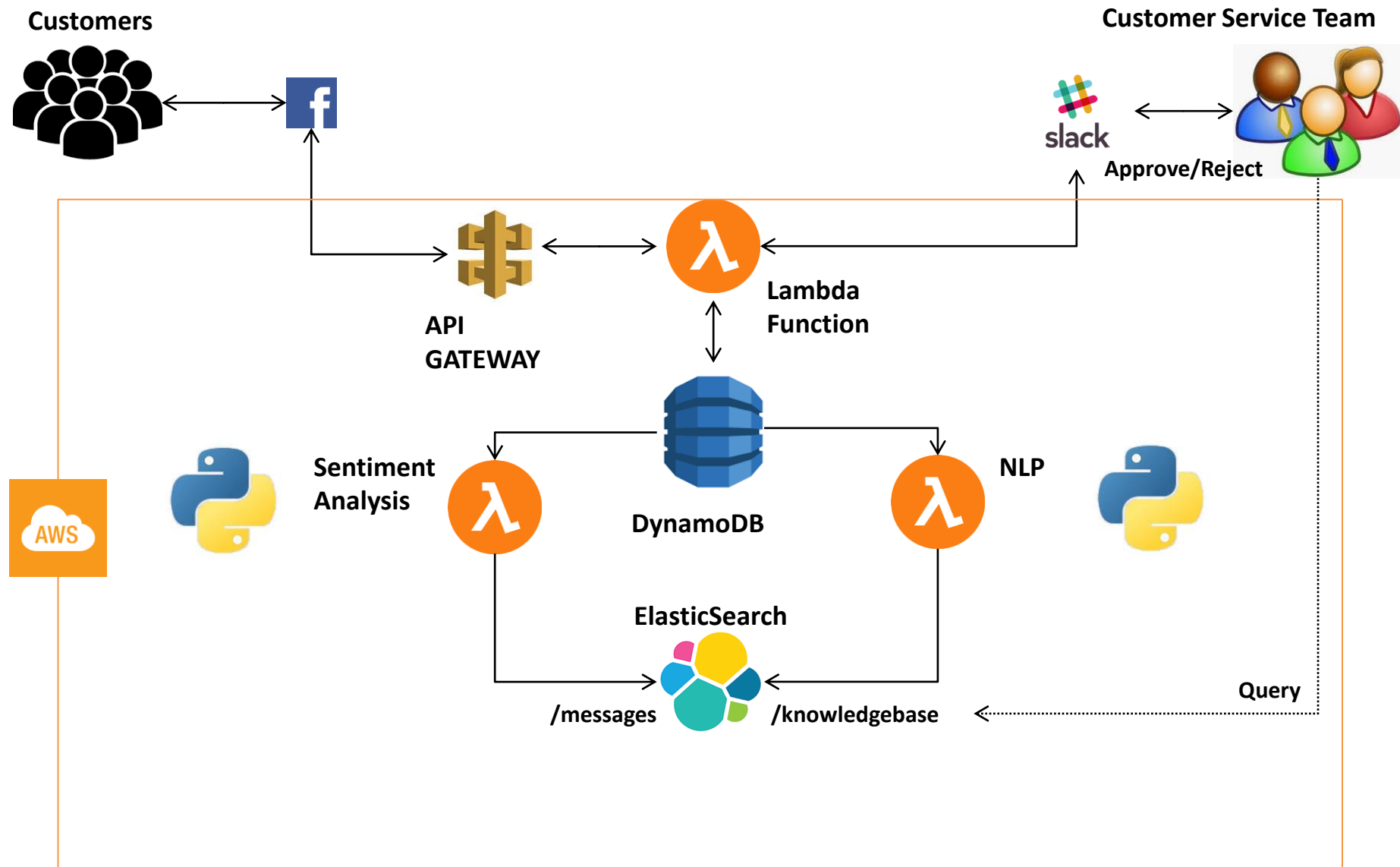
- The Lambda function is notified of an incoming message.
- A copy of the message is automatically stored into DynamoDB



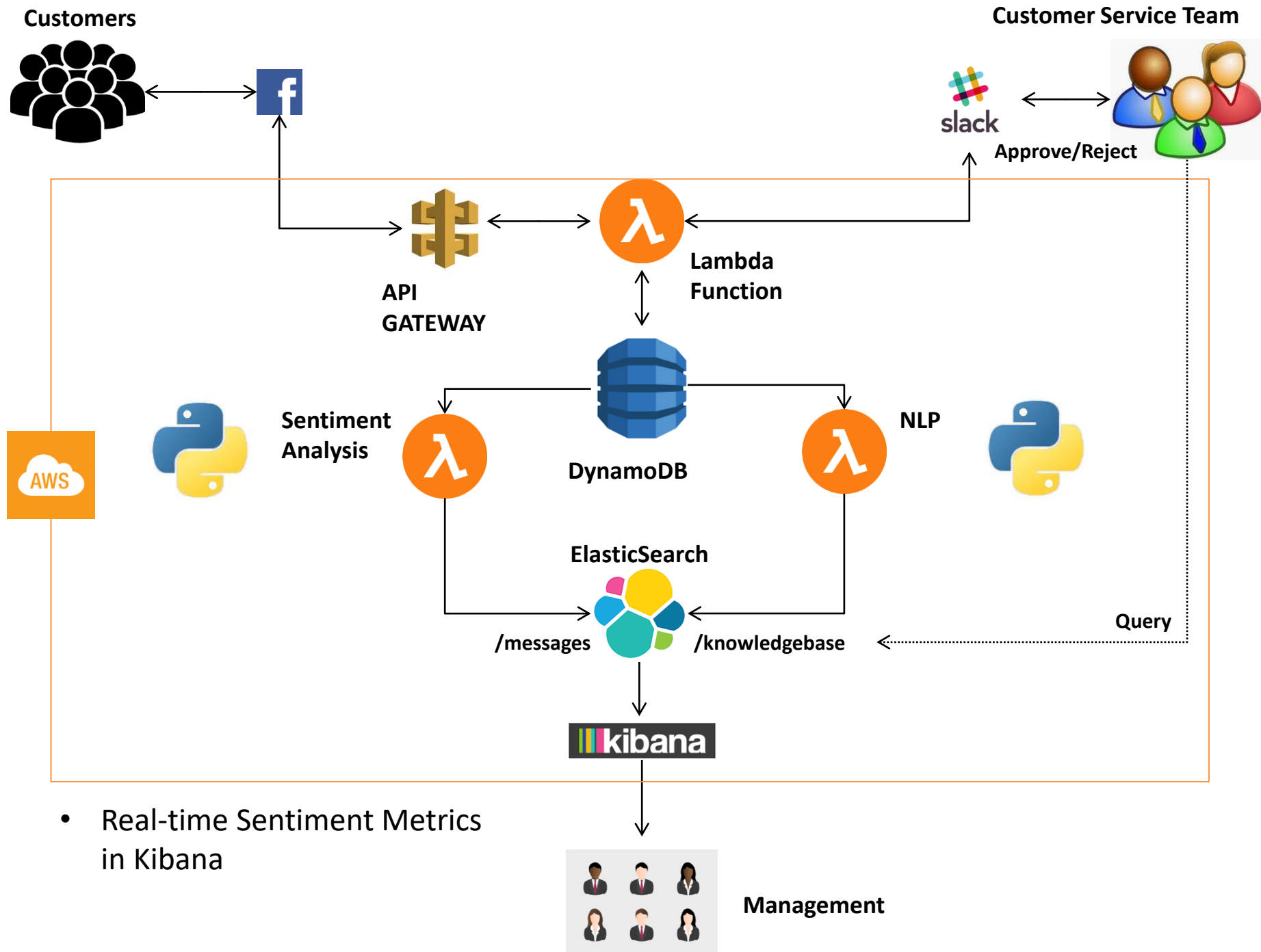
- Lambda function strips out stop words, stems words, and checks to see if the message approximately matches any of our previous messages (KnowledgeBase)
- If a message receives a high enough match score, a previous response is automatically returned to the customer



- If a message receives a low match score, best guess is sent to Customer Service team for approval/rejection
- If Customer Service approves , the best guess response is sent to the customer
- Customer Service can reject and send a different response.



- Sentiment Analysis (with Vader) is performed on the message



Time Check!

Let's ask Chris, Dan, and/or Deb if we have enough time left for a live (albeit quick) demonstration of the project

Lessons Learned

- Difficult to navigate AWS Documentation for various services they provide
- AWS Documentation may be outdated/incorrect

To: [Thomas Englert](#) >

[Hide](#)

Amazon Lex documentation feedback

Today at 12:59 PM

Hi,

I'm the writer for the Amazon Lex documentation. Thanks for your feedback. You said:

service-role/pizzaOrderBotRole is not an available option

You're right. I was using a test account that already had a role defined. I've updated the documentation with the correct instructions. You can see them here:

<http://docs.aws.amazon.com/lex/latest/dg/gs2-prepare.html>

Thanks again,
Chuck Bigham
AWS Developer Documentation

Lessons Learned

- Must properly submit messenger application approvals to Facebook
- Web Browsers: Chrome vs Firefox vs Edge
- Snapshots of ElasticSearch clusters are a good idea
- Security in real life
- A more structured approach to collecting test data (see next slide for examples)

People are Unpredictable

- You are the supreme ruler of the black hole of suckyness that is your Company.
- w0w, 1'v3 n3v3r 533n 4ny7h1n6 45 4m4z1n6 45 y0ur pr0duc75. 7h3 1nf3c710n w3n7 4w4y 1mm3d1473ly, wh1ch w45 1mp0r74n7 b3c4u53 1 h4d 4 h07 d473!
- I purchased a shrink ray about a month ago and it isn't shrinking my student loans. When I point it at the studentloans.gov website, it just shrinks the computer. Can you please provide assistance?
- He's cuuuute!

Next Steps

- Visit AWS github page <https://github.com/awslabs>
- Try working your way through their more recent workshop <https://github.com/awslabs/aws-serverless-workshops>
- Looking for something harder???
<https://github.com/awslabs/aws-lambda-zombie-workshop>
 - requires you to spend some \$\$\$ for IoT equipment

Thank You!

Any (easy) Questions?

References:

AWS Labs

AWS Documentation and Tutorials

O'Reilly Online Training – Building Lex Bots