AWS re:Invent

AIM240-P

What can you build with AI? No ML experience required

Nicholas Walsh
Technical Evangelist
Amazon Web Services

AWS re:Invent

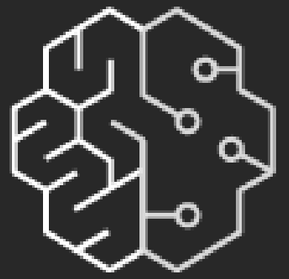
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aws

Our mission at AWS

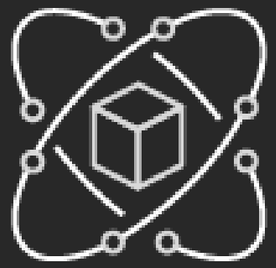
Put machine learning in the hands
of every developer

Why AWS for AI?



Broadest and deepest set of AI and ML services for your business

200+ new features and services since Jan 2018



Solving the toughest problems holding back ML - cost, ease of use, and data

75% lower inference cost

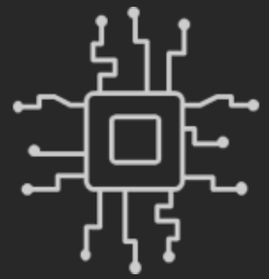
70% cost reduction in data-labeling

“No ML experience required”



Unmatched support for the most popular frameworks

85% of TensorFlow projects in the cloud happen on AWS



Built on the most comprehensive cloud platform optimized for machine learning

AWS **holds the top spots** on Stanford’s benchmark, for fastest training time, lowest cost, lowest inference latency

Deepest set of security and encryption features, with robust analytics capabilities

More machine learning happens on AWS than anywhere else



The Amazon ML stack: Broadest & deepest set of capabilities

APPLICATION SERVICES
ML for everyone

Vision
- AMAZON REKOGNITION IMAGE & VIDEO
- AMAZON TEXTRACT

Speech
- AMAZON POLLY
- AMAZON TRANSCRIBE

Language
- AMAZON TRANSLATE
- AMAZON COMPREHEND

Chatbots
- AMAZON LEX

Forecasting
- AMAZON FORECAST

Recommendations
- AMAZON PERSONALIZE

PLATFORM SERVICES
ML for engineers

AMAZON SAGEMAKER

BUILD
Pre-built Algorithms and Notebooks
Data Labeling (Ground Truth)
Machine Learning Marketplace

TRAIN
One-click model training and tuning
Optimization (NEO)
Reinforcement Learning
Hyperparameter Optimization

DEPLOY
One-click deployment and hosting
Automatic scaling
Elastic Inference Integration
VPC and AWS PrivateLink

FRAMEWORKS AND INTERFACES
ML for data scientists

Frameworks: Caffe2, Microsoft CNTK, mxnet, PYTORCH, TensorFlow, torch

Interfaces: KERAS, GLUON

INFRASTRUCTURE
Powering the ML

Compute
- Nvidia Tesla V100 GPUs (P3)
- EC2 C5 (C5, C5n)
- FPGAs
- ELASTIC INFERENCE

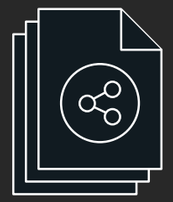
Machine Learning AMIs

AWS IoT GREENGRASS ML

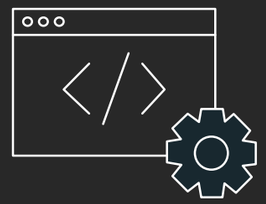
APPLICATION SERVICES

ML for everyone

Vision		Speech		Language		Chatbots	Forecasting	Recommendations
								
AMAZON REKOGNITION IMAGE & VIDEO	AMAZON TEXTRACT	AMAZON POLLY	AMAZON TRANSCRIBE	AMAZON TRANSLATE	AMAZON COMPREHEND	AMAZON LEX	AMAZON FORECAST	AMAZON PERSONALIZE



Pre-trained AI services that require no ML skills or training



Easily add intelligence to your existing apps and workflows



Quality and accuracy from continuously learning APIs

Common misconception:

“My AI Problem is unique to my business. “

(Hint: It probably isn’t)

Use Case: Physical Documents

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Documents are important

Primary tool of record keeping, communicating, collaborating, and transacting


Finance


Insurance


Real estate


Accounting


Tax management


Medical

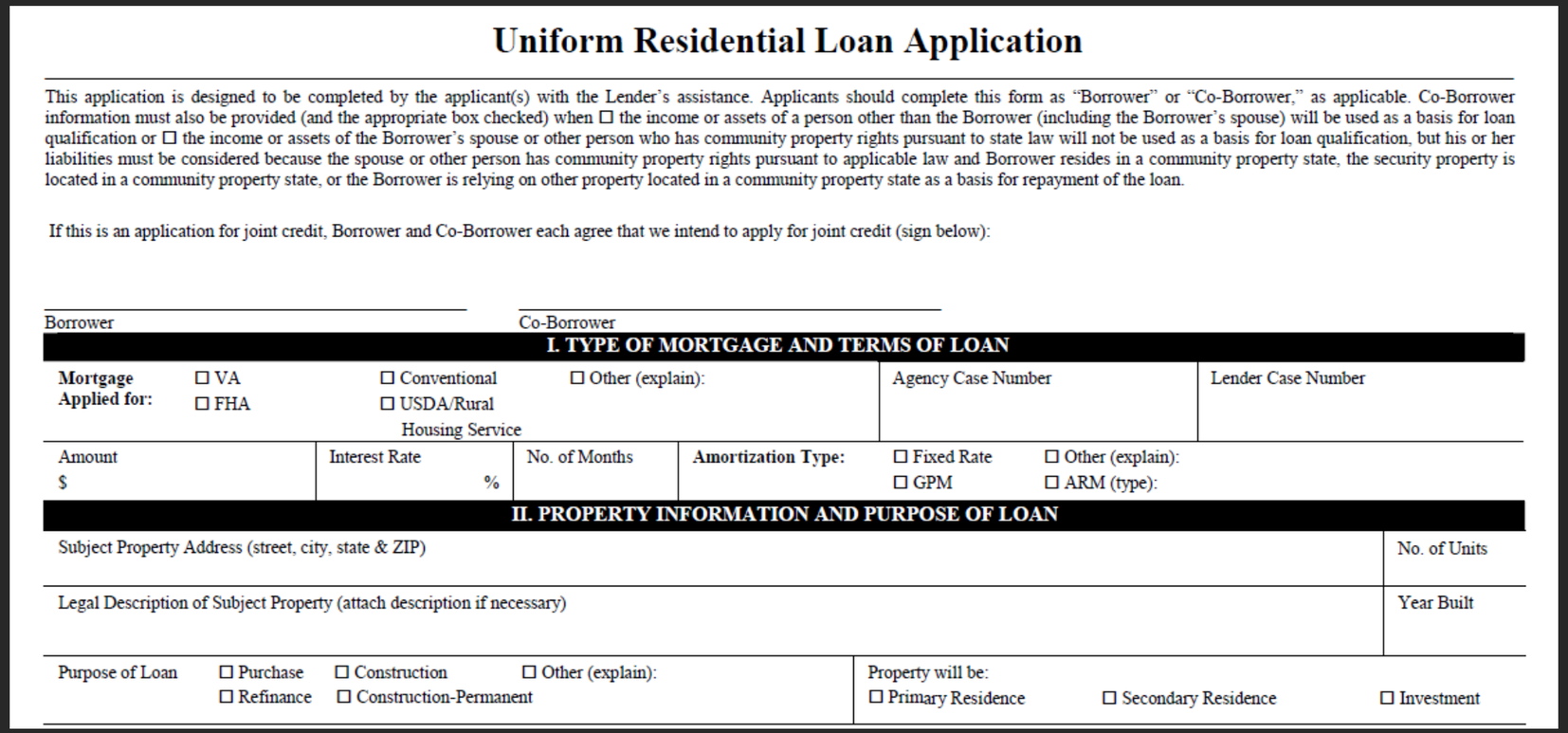

Legal


Business management


Education


And many more…

16.3M US mortgage applications ($2.1T) in 2016



Uniform Residential Loan Application

This application is designed to be completed by the applicant(s) with the Lender's assistance. Applicants should complete this form as "Borrower" or "Co-Borrower," as applicable. Co-Borrower information must also be provided (and the appropriate box checked) when ☐ the income or assets of a person other than the Borrower (including the Borrower's spouse) will be used as a basis for loan qualification or ☐ the income or assets of the Borrower's spouse or other person who has community property rights pursuant to state law will not be used as a basis for loan qualification, but his or her liabilities must be considered because the spouse or other person has community property rights pursuant to applicable law and Borrower resides in a community property state, the security property is located in a community property state, or the Borrower is relying on other property located in a community property state as a basis for repayment of the loan.

If this is an application for joint credit, Borrower and Co-Borrower each agree that we intend to apply for joint credit (sign below):

Borrower _____ Co-Borrower _____

I. TYPE OF MORTGAGE AND TERMS OF LOAN

Mortgage Applied for:	☐ VA ☐ FHA	☐ Conventional ☐ USDA/Rural Housing Service	☐ Other (explain):	Agency Case Number	Lender Case Number

Amount $	Interest Rate %	No. of Months	**Amortization Type:**	☐ Fixed Rate ☐ GPM	☐ Other (explain): ☐ ARM (type):

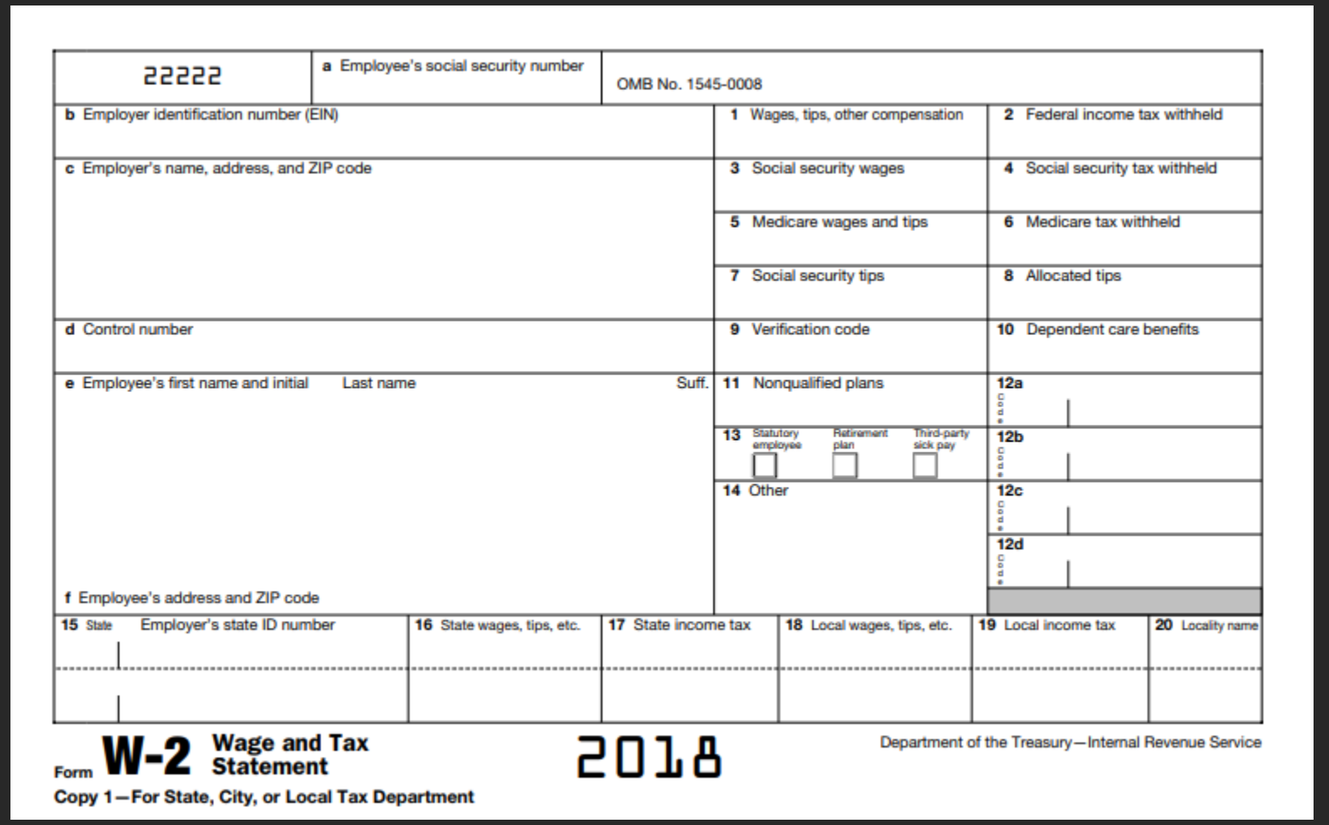
II. PROPERTY INFORMATION AND PURPOSE OF LOAN

Subject Property Address (street, city, state & ZIP)	No. of Units
Legal Description of Subject Property (attach description if necessary)	Year Built

Purpose of Loan	☐ Purchase ☐ Refinance	☐ Construction ☐ Construction-Permanent	☐ Other (explain):	Property will be: ☐ Primary Residence	☐ Secondary Residence	☐ Investment

*Mortgage Bankers Association 2016 HMDA

About 240M W2 tax forms processed for FY2018 in the US



22222

a Employee's social security number

OMB No. 1545-0008

b Employer identification number (EIN)

1 Wages, tips, other compensation

2 Federal income tax withheld

c Employer's name, address, and ZIP code

3 Social security wages

4 Social security tax withheld

5 Medicare wages and tips

6 Medicare tax withheld

7 Social security tips

8 Allocated tips

d Control number

9 Verification code

10 Dependent care benefits

e Employee's first name and initial Last name Suff.

11 Nonqualified plans

12a

13 Statutory employee Retirement plan Third-party sick pay

12b

14 Other

12c

12d

f Employee's address and ZIP code

15 State Employer's state ID number

16 State wages, tips, etc.

17 State income tax

18 Local wages, tips, etc.

19 Local income tax

20 Locality name

Form **W-2** Wage and Tax Statement

2018

Department of the Treasury—Internal Revenue Service

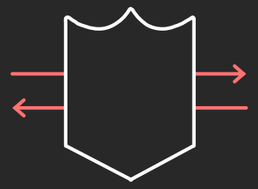
Copy 1—For State, City, or Local Tax Department

*IRS—https://www.irs.gov/individuals/w-2-verification-code

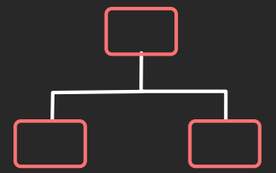
Need for processing documents



Search
and discovery

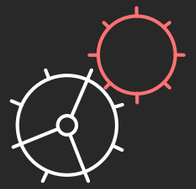


Compliance
and control



Business
process automation

How documents are processed today



Manual processing



Optical Character Recognition (OCR)



Rules and template-based extraction

Challenges for processing documents
Manual processing





Expensive

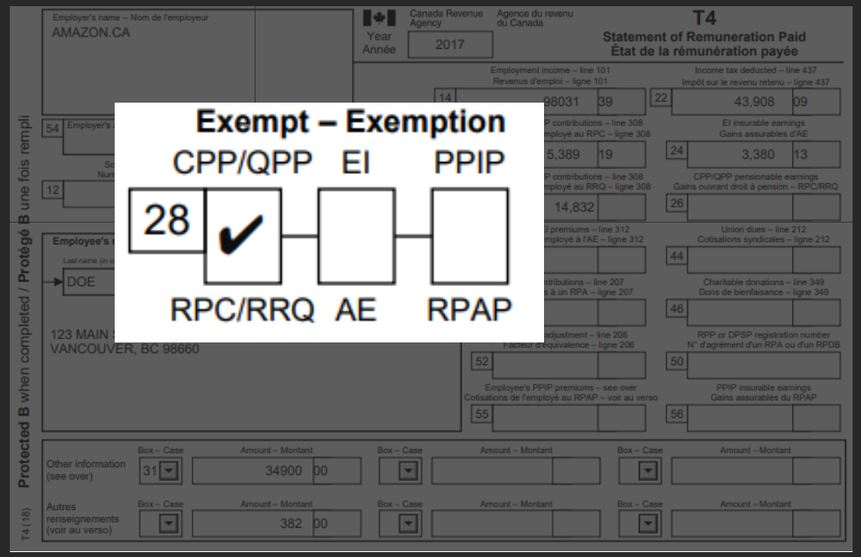


Error-prone



Time-consuming

Challenges for processing documents
Manual processing



Output

1. Exempt is true
2. 28 is true
3. CPP/QPP is true
4. RPC/RRQ is true

- Variable output
- Inconsistent results
- Needs multiple human reviews for consensus

Challenges for processing documents
Optical Character Recognition (OCR)



Simple documents only

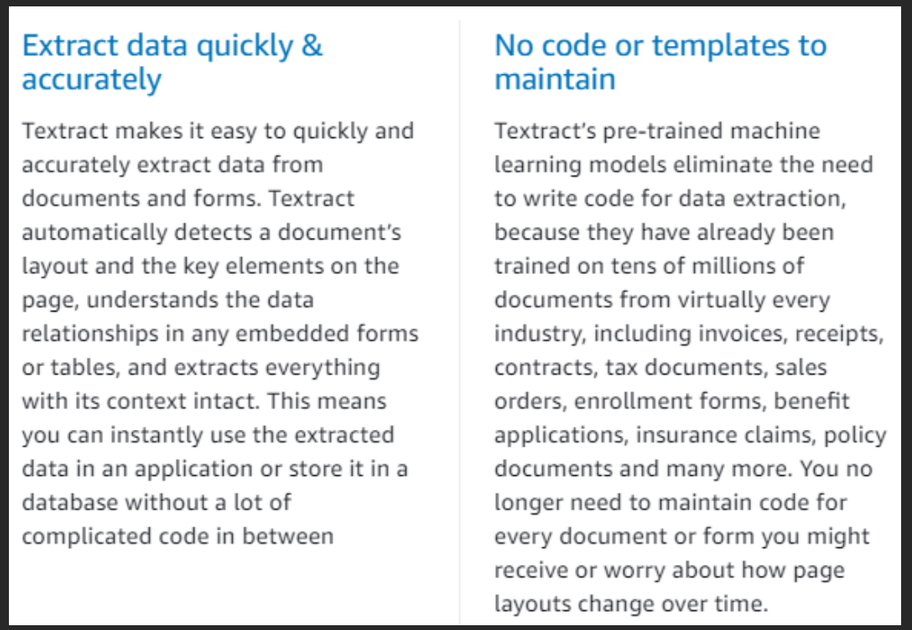


Error-prone



Flat bag of words

Challenges for processing documents
Optical Character Recognition (OCR)



Extract data quickly & accurately

Textract makes it easy to quickly and accurately extract data from documents and forms. Textract automatically detects a document's layout and the key elements on the page, understands the data relationships in any embedded forms or tables, and extracts everything with its context intact. This means you can instantly use the extracted data in an application or store it in a database without a lot of complicated code in between

No code or templates to maintain

Textract's pre-trained machine learning models eliminate the need to write code for data extraction, because they have already been trained on tens of millions of documents from virtually every industry, including invoices, receipts, contracts, tax documents, sales orders, enrollment forms, benefit applications, insurance claims, policy documents and many more. You no longer need to maintain code for every document or form you might receive or worry about how page layouts change over time.

- No multi-column detection
- No rotated text detection (not shown)
- No stylized font detection (not shown)

Output

Extract data quickly & No code templates to accurately maintain

Challenges for processing documents
Optical Character Recognition (OCR)

Previous Employment History				
Start Date	**End Date**	**Employer Name**	**Position Held**	**Reason for leaving**
1/15/2009	6/30/2013	Any Company	Head Baker	Family relocated
8/15/2013	present	Example Corp.	Baker	N/A, current employer

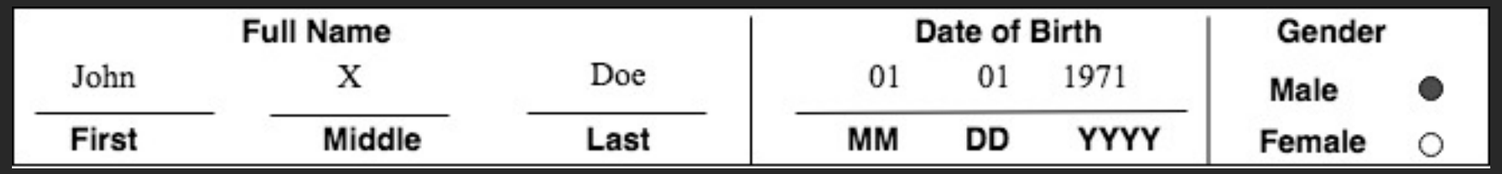


OCR reads left to right, ignoring table structure

Output

Start Date End Date Employer Name Position Held Reason for leaving
1/15/2009 6/30/2013 Any Company Head Baker Family Relocated

Challenges for processing documents



Output

Full Name Date of Birth Gender
John X Doe 01 01 1971
Male
First Middle Last MM DD YYYY
Female

- Logical groupings missed
- Relationships missed
- Glyphs missed

Challenges for processing documents

Rules- and template-based extraction





Limited by
accuracy of OCR



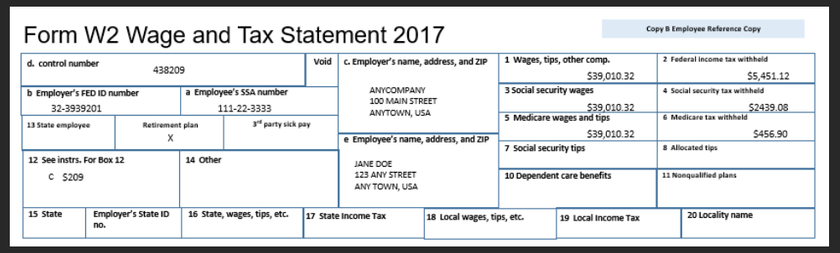
Significant development
and management overhead



Templates
are brittle

Challenges for processing documents
Rules- and template-based extraction

The well-known W2 US tax form has 100s of variants each year

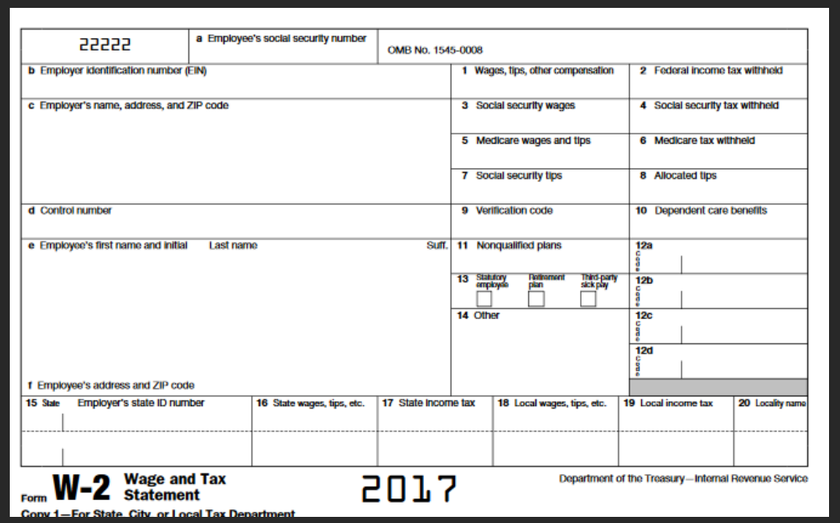


Form W2 Wage and Tax Statement 2017

Copy B Employee Reference Copy

d. control number		Void	c. Employer's name, address, and ZIP	1 Wages, tips, other comp.	2 Federal income tax withheld
	438209		ANYCOMPANY 100 MAIN STREET ANYTOWN, USA	$39,010.32	$5,451.12
b Employer's FED ID number	a Employee's SSA number			3 Social security wages	4 Social security tax withheld
32-3939201	111-22-3333			$39,010.32	$2439.08
13 State employee	Retirement plan	3rd party sick pay	e Employee's name, address, and ZIP	5 Medicare wages and tips	6 Medicare tax withheld
	X		JANE DOE 123 ANY STREET ANY TOWN, USA	$39,010.32	$456.90
12 See instrs. For Box 12	14 Other			7 Social security tips	8 Allocated tips
C $209				10 Dependent care benefits	11 Nonqualified plans

15 State	Employer's State ID no.	16 State, wages, tips, etc.	17 State Income Tax	18 Local wages, tips, etc.	19 Local Income Tax	20 Locality name

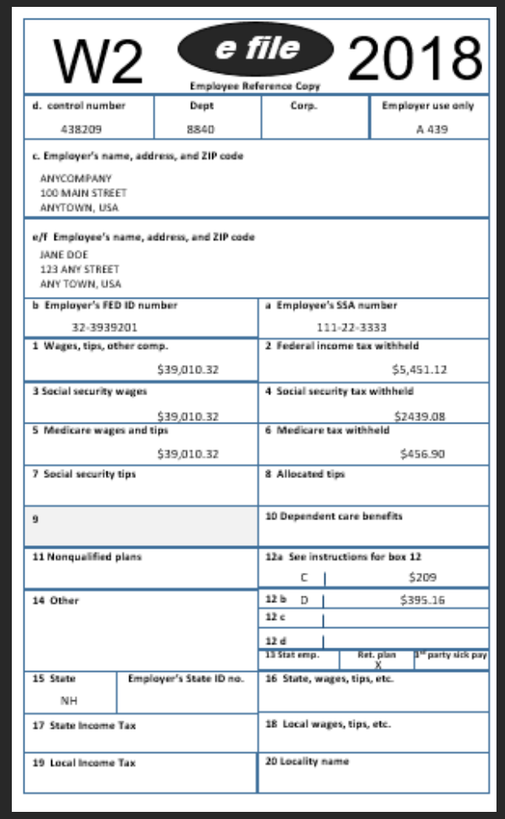


22222	a Employee's social security number	OMB No. 1545-0008	
b Employer identification number (EIN)		1 Wages, tips, other compensation	2 Federal income tax withheld
c Employer's name, address, and ZIP code		3 Social security wages	4 Social security tax withheld
		5 Medicare wages and tips	6 Medicare tax withheld
		7 Social security tips	8 Allocated tips
d Control number		9 Verification code	10 Dependent care benefits
e Employee's first name and initial Last name Suff.		11 Nonqualified plans	12a
		13 Statutory employee / Retirement plan / Third-party sick pay	12b
		14 Other	12c
			12d
f Employee's address and ZIP code			

15 State Employer's state ID number	16 State wages, tips, etc.	17 State income tax	18 Local wages, tips, etc.	19 Local income tax	20 Locality name

Form **W-2** Wage and Tax Statement 2017 — Department of the Treasury—Internal Revenue Service

Copy 1—For State, City, or Local Tax Department



W2 e file 2018

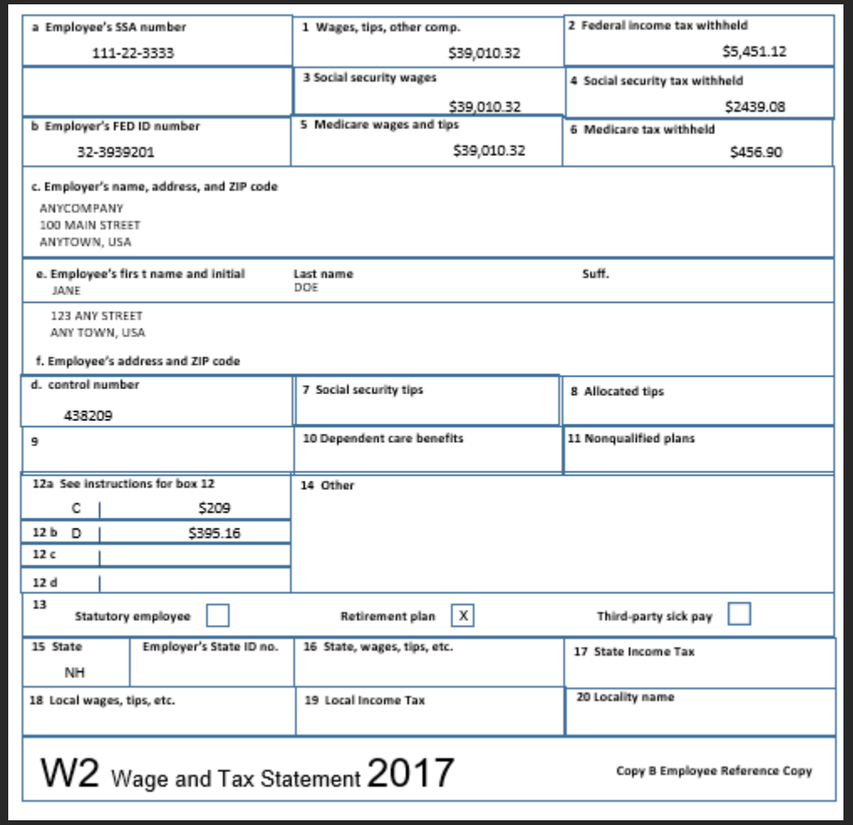
Employee Reference Copy

d. control number	Dept	Corp.	Employer use only
438209	8840		A 439

c. Employer's name, address, and ZIP code
ANYCOMPANY
100 MAIN STREET
ANYTOWN, USA

e/f Employee's name, address, and ZIP code
JANE DOE
123 ANY STREET
ANY TOWN, USA

b Employer's FED ID number	a Employee's SSA number
32-3939201	111-22-3333
1 Wages, tips, other comp.	2 Federal income tax withheld
$39,010.32	$5,451.12
3 Social security wages	4 Social security tax withheld
$39,010.32	$2439.08
5 Medicare wages and tips	6 Medicare tax withheld
$39,010.32	$456.90
7 Social security tips	8 Allocated tips
9	10 Dependent care benefits
11 Nonqualified plans	12a See instructions for box 12
	C $209
14 Other	12 b D $395.16
	12 c
	12 d
	13 Stat emp. / Ret. plan X / 3rd party sick pay
15 State NH / Employer's State ID no.	16 State, wages, tips, etc.
17 State Income Tax	18 Local wages, tips, etc.
19 Local Income Tax	20 Locality name



a Employee's SSA number	1 Wages, tips, other comp.	2 Federal income tax withheld
111-22-3333	$39,010.32	$5,451.12
	3 Social security wages	4 Social security tax withheld
	$39,010.32	$2439.08
b Employer's FED ID number	5 Medicare wages and tips	6 Medicare tax withheld
32-3939201	$39,010.32	$456.90

c. Employer's name, address, and ZIP code
ANYCOMPANY
100 MAIN STREET
ANYTOWN, USA

e. Employee's firs t name and initial	Last name	Suff.
JANE	DOE	

123 ANY STREET
ANY TOWN, USA
f. Employee's address and ZIP code

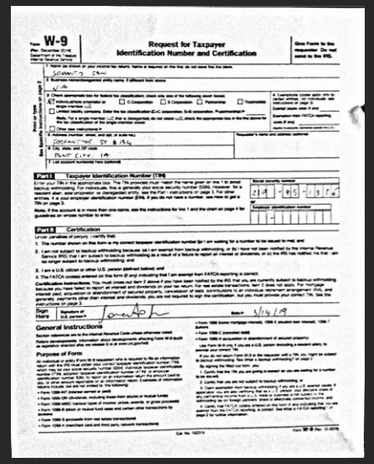
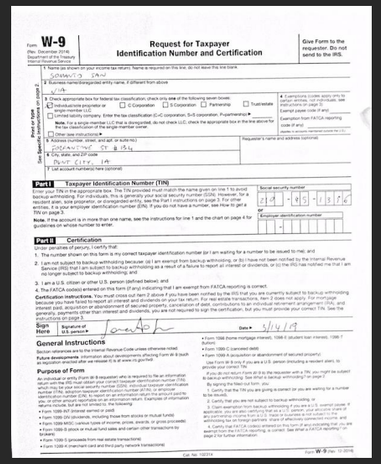
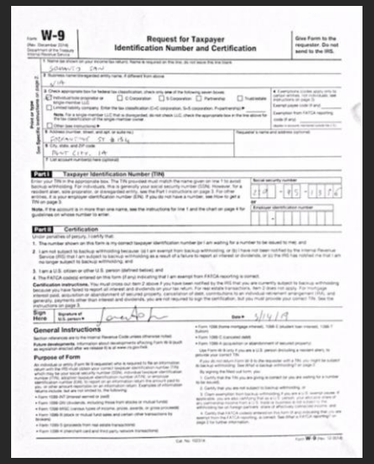
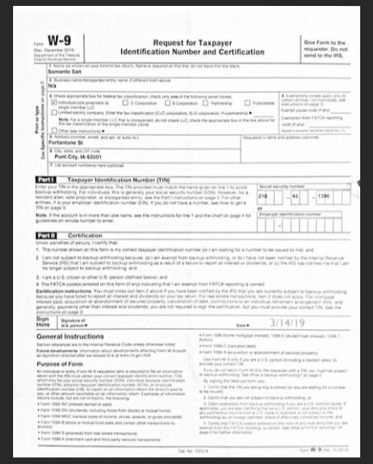
d. control number	7 Social security tips	8 Allocated tips
438209		
9	10 Dependent care benefits	11 Nonqualified plans
12a See instructions for box 12	14 Other	
C $209		
12 b D $395.16		
12 c		
12 d		

13 Statutory employee ☐ Retirement plan ☒ Third-party sick pay ☐

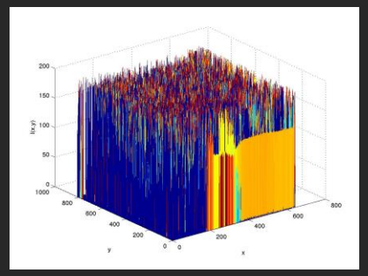
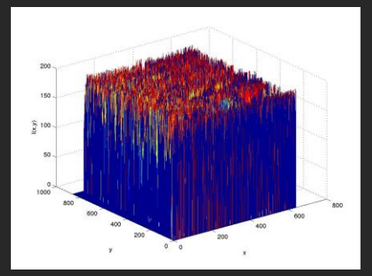
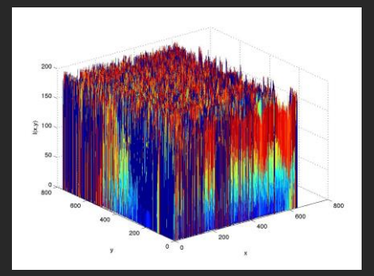
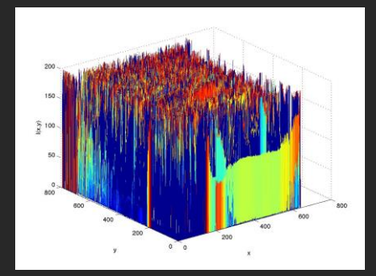
15 State	Employer's State ID no.	16 State, wages, tips, etc.	17 State Income Tax
NH			
18 Local wages, tips, etc.	19 Local Income Tax	20 Locality name	

W2 Wage and Tax Statement 2017 — Copy B Employee Reference Copy

It looks easy, but …

…not a single corresponding pixel value in common

RECENT MODEL UPDATE

Amazon Textract

OCR++ service to easily extract text and data from virtually any document. No ML experience required.

https://aws.amazon.com/about-aws/whats-new/2019/10/amazon-textract-now-extracts-text-even-more-accurately-from-even-more-types-of-documents/

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Put AI to work, no ML experience required

Increase efficiency with automated document analysis

optical character recognition (OCR) | automatic data extraction | natural language processing
intelligent search | text analytics



AMAZON TEXTRACT

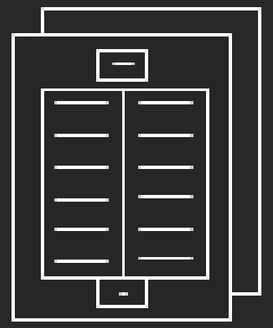


AMAZON COMPREHEND & COMPREHEND MEDICAL

Cox Automotive™

Alfresco™

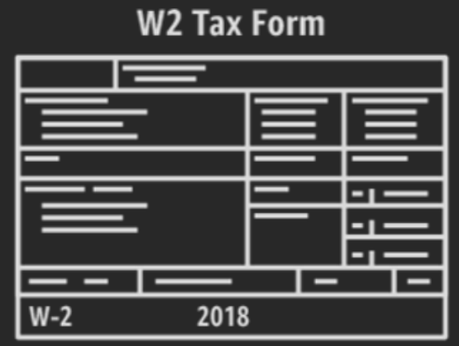
Amazon Textract features



Text extraction



Table extraction



Form extraction

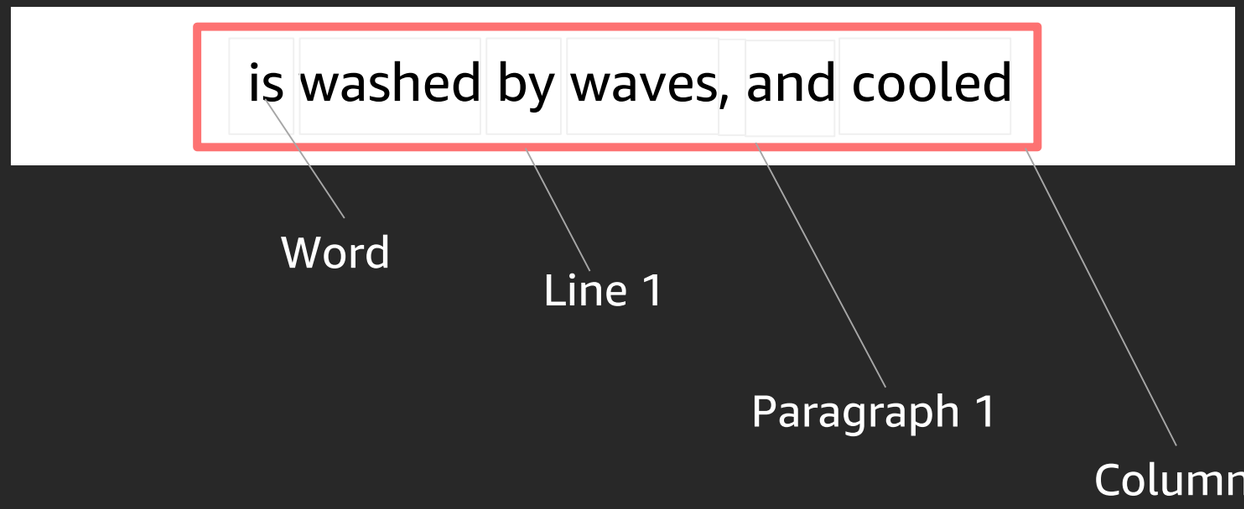
Amazon Textract—Text extraction

Document



Output

Blocks: PAGE, PARAGRAPH, LINE, WORD



Amazon Textract—Text extraction API
DetectDocumentText

Request

Name	Description
Document	Blob or Amazon S3 object

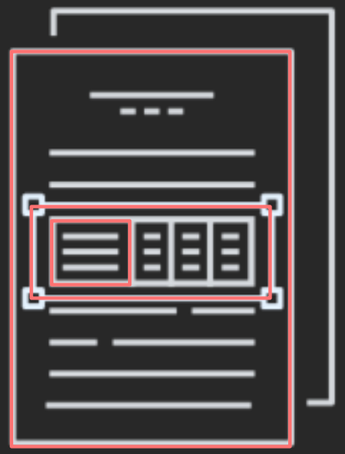
Response

Name	Description
Blocks	List of blocks identified from the document
ID	Unique ID of the unit
Relationships	CHILD
Block type	PAGE, PARAGRAPH, LINE, WORD
Pages	Contains number of pages in the document

Amazon Textract—Table extraction API

AnalyzeDocument with “table” as FeatureTypes parameter

Document



Output

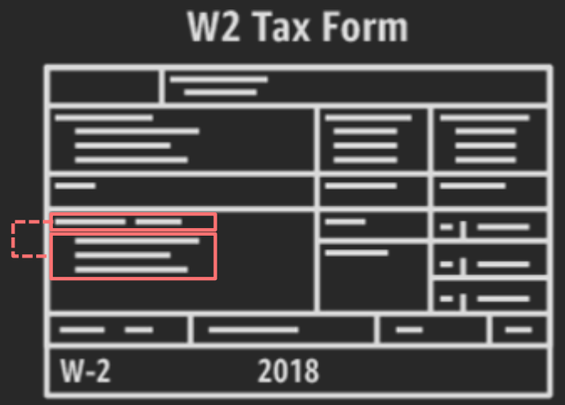
Blocks: PAGE, TABLE, CELL

For each ’block’ you get:

- Text
- Confidence score
- Block relationships (e.g., cells within a table)

Amazon Textract—Form extraction
AnalyzeDocument with “form” as FeatureTypes parameter

Document



Output

Blocks: PAGE, KEY_VALUE_SET

For each ’block’ of your document:

- Form field name (key) and field value (value) association
- Confidence score
- Page number
- Block relationships

Amazon Textract
Sync and async

Synchronous



Supports single-page documents such as images (e.g., mobile capture)

Asynchronous



For multipage documents, up to 3,000 pages

Amazon Textract

Text extraction simplified

Extract data quickly & accurately

Textract makes it easy to quickly and accurately extract data from documents and forms. Textract automatically detects a document's layout and the key elements on the page, understands the data relationships in any embedded forms or tables, and extracts everything with its context intact. This means you can instantly use the extracted data in an application or store it in a database without a lot of complicated code in between

No code or templates to maintain

Textract's pre-trained machine learning models eliminate the need to write code for data extraction, because they have already been trained on tens of millions of documents from virtually every industry, including invoices, receipts, contracts, tax documents, sales orders, enrollment forms, benefit applications, insurance claims, policy documents and many more. You no longer need to maintain code for every document or form you might receive or worry about how page layouts change over time.

Output

Extract data quickly & accurately

No code or templates to maintain

- Multi-column detection

Amazon Textract

Table extraction simplified

Previous Employment History				
Start Date	**End Date**	**Employer Name**	**Position Held**	**Reason for leaving**
1/15/2009	6/30/2013	Any Company	Head Baker	Family relocated
8/15/2013	present	Example Corp.	Baker	N/A, current employer

- Table recognized
- Words grouped by cell

Output

{

Start Date: 1/15/2009

End Date: 6/30/2013

Employer Name: Any Company

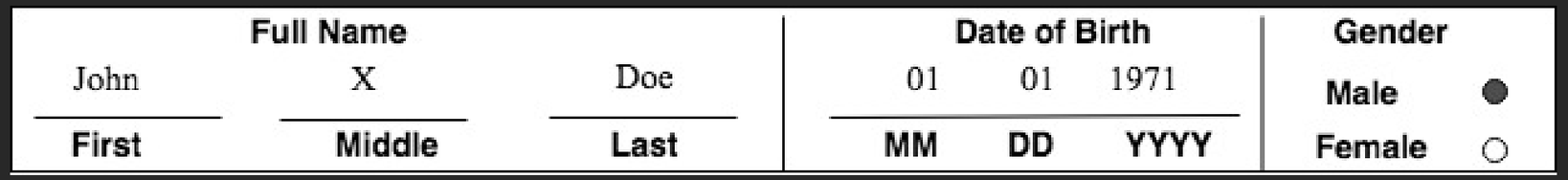
Position Held: Head Baker

Reason for leaving: Family relocated

}

Amazon Textract

Form extraction simplified



- Logical groupings captured
- Relationships captured
- Glyphs captured

Output

Full Name:
- First: John
- Middle: X
- Last: Doe

Date of Birth:
- MM: 01
- DD: 01
- YYYY: 1971

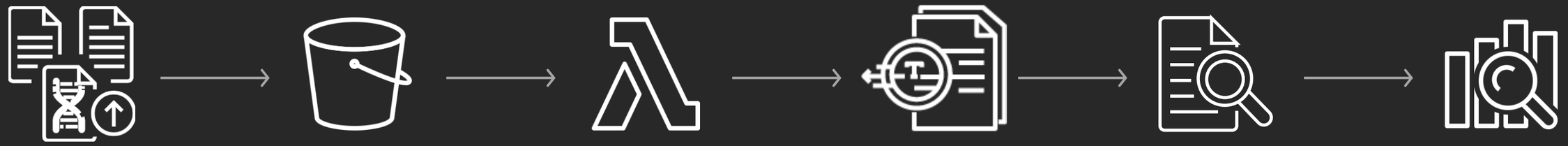
Gender:
- Male: True
- Female: False



Processing documents at scale

Cox Automotive uses **Amazon Textract** to process millions of document pages including vehicle titles, loan applications, and car registrations.

Reference architecture—Index and search documents



Input
Uploaded document images such as tax forms, credit applications, or medical notes

Amazon S3
Uploaded documents are stored in data lake

AWS Lambda
A Lambda function is triggered to initiate document analysis using the Hieroglyph API

Amazon Textract
Automatically extract text, including key-value pairs and tables

Output
Perform contextual search on millions of documents or integrate data into your document management system

Amazon Elasticsearch Service
Extracted data and confidence scores are indexed to enable document search

Reference architecture—Form capture



Input

Customer uses mobile app to capture a photo of a W2 form



Amazon Textract

The Amazon Textract API is integrated into the end-user application to automatically extract text from the W2 form and auto-populate the form fields



Customer Application

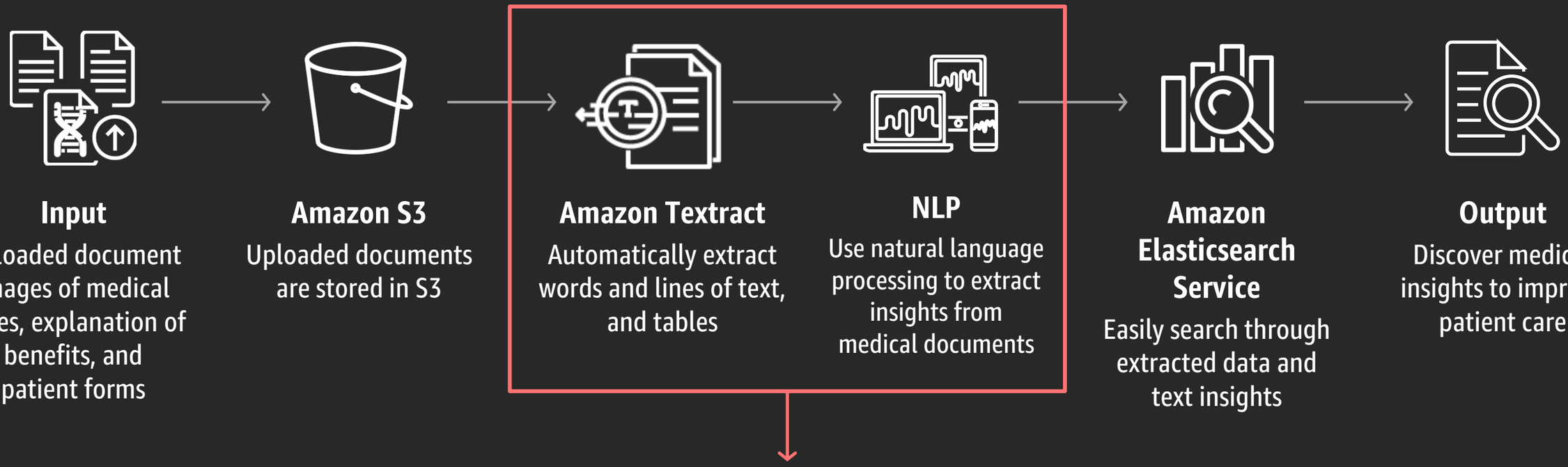
Customers experience real-time capture of their tax information by taking a photo instead of manual data entry



Database

User submitted data is loaded into a database for use in tax preparation

Reference architecture—Extract for NLP



Input
Uploaded document images of medical notes, explanation of benefits, and patient forms

Amazon S3
Uploaded documents are stored in S3

Amazon Textract
Automatically extract words and lines of text, and tables

NLP
Use natural language processing to extract insights from medical documents

Amazon Elasticsearch Service
Easily search through extracted data and text insights

Output
Discover medical insights to improve patient care

Quickly turn extracted text/data into actionable insights

Amazon Rekognition

Deep-learning-based image & video analysis





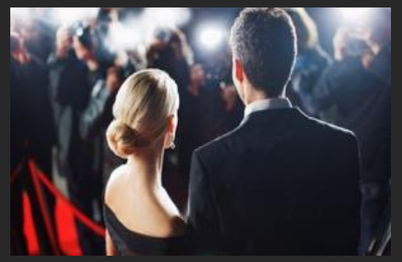
Amazon Rekognition

Features

Faces



Celebrities



Labels



Text



Moderation



Activities



Paths



Scenes



Amazon Rekognition

Face – common use cases



Recognize Your Customer

Verify the identities of customers who opt-in



Customer Analysis

Analyze trends, not individuals

Amazon Rekognition

Face – common use cases

Recognize your customer

Verify the identities of customers who opt-in

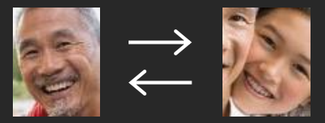




Similarity 93%



Similarity 0%





Real-time identity verification

Aella Credit uses **Amazon Rekognition** to analyze images to verify an individual's identity in real-time without human intervention, allowing it to provide instant loans to eligible customers through its mobile app.

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aws

Speech and language services

Discover insights and relationships in text

AWS re:Invent

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aws

Amazon Polly



Use Cases

Content Creation

Mobile & Desktop Applications

Internet of Things (IoT)

Education & E-Learning

Telephony

Game Development

Key Features

61 Unique Voices across 25 languages

Lip-Syncing & Text Highlighting

Fine-grained Voice Control

Custom Vocabularies

Available in 14 AWS regions

Amazon Transcribe

Automatic Speech Recognition

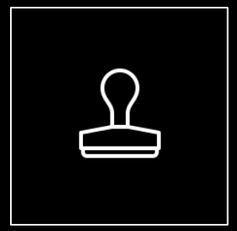




Support for both regular & telephony audio



Amazon S3 integration



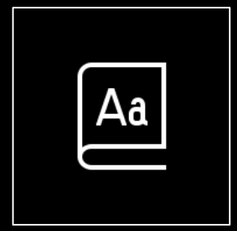
Timestamps



Punctuation & formatting



Recognize multiple speakers



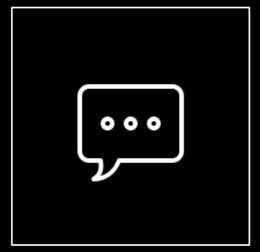
Custom dictionaries

Amazon Transcribe

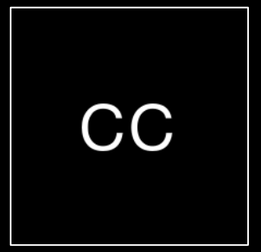
Use Cases



Call centers



Subtitles for VOD



Broadcast closed captions



Transcribe meetings

Amazon Translate

Neural Machine Translation

Key Features

21 Languages
417 Combinations

$15/1M Characters
Or $0.000075 per word;
Pay as you go, 2M characters monthly free tier

Real Time
< 500ms / sentence on average
< 150ms / conversational / short form

Tag Handling
XML tags placement maintains styling and formatting through translation

Data Security
Data ownership
Encryption
Access Management

Ease of Use
Simple API calls and partner solutions

HIPAA **Eligible**

Amazon Comprehend

Natural Language Processing



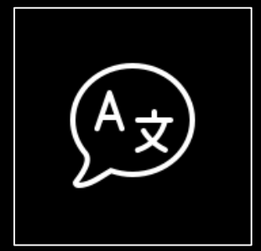
Sentiment



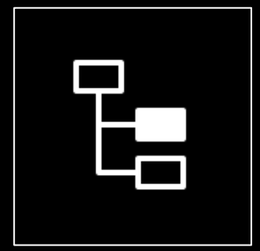
Entities



Key phrases



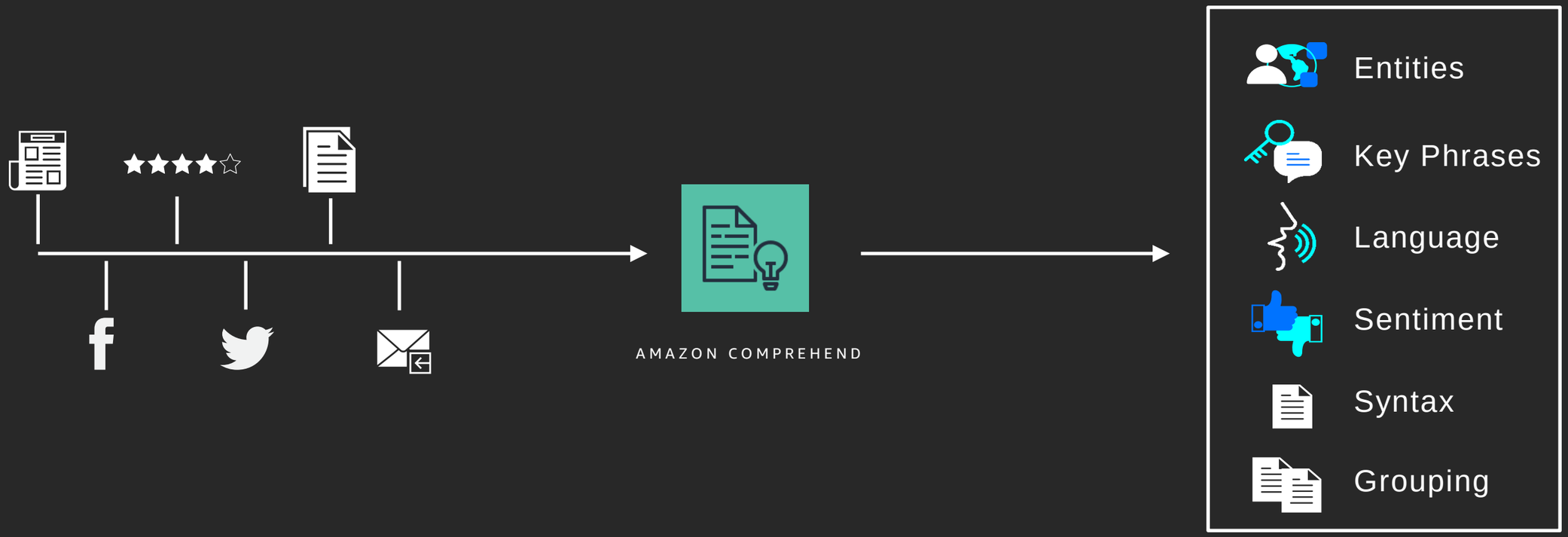
Languages



Topic modeling

Amazon Comprehend

Discover insights and relationships in text



English, Spanish, German, French, Italian, Portuguese

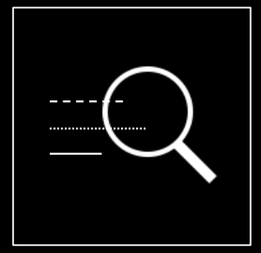
Amazon Comprehend

Use cases



Voice of Customer Analytics

Analyzing what customers are saying about your brand, products and services



Semantic Search

Making search smarter by searching on key phrase, sentiment and topic



Knowledge Management/Discovery

Organizing documents, categorizing by topic, and personalizing experiences

Put AI to work, no ML experience required

Understand the voice of your customer

sentiment analysis | app localization | translation services | transcription services | cataloging media | accessibility



AMAZON REKOGNITION IMAGE



AMAZON REKOGNITION VIDEO



AMAZON TRANSCRIBE



AMAZON TRANSLATE



AMAZON COMPREHEND

Chick-fil-A

vidmob

Tint

VideoPeel

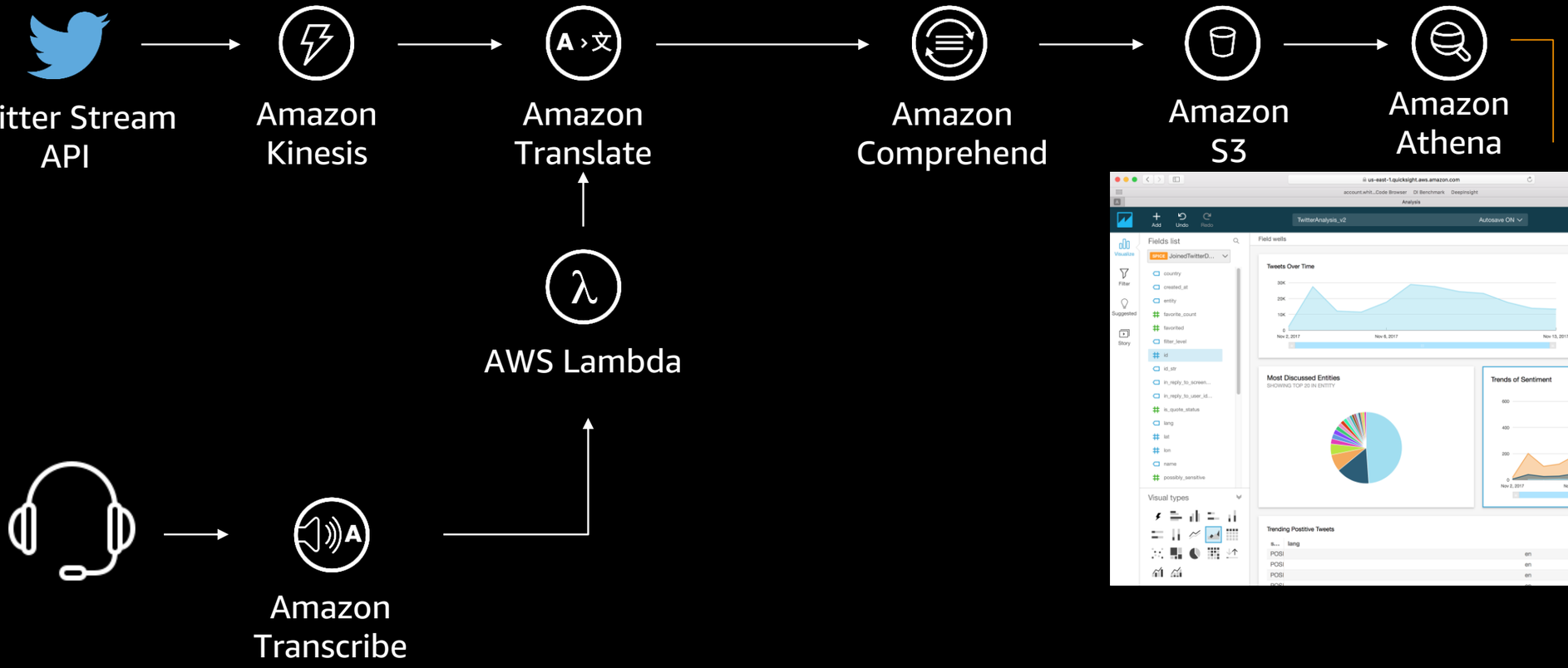


Targeted customer acquisition

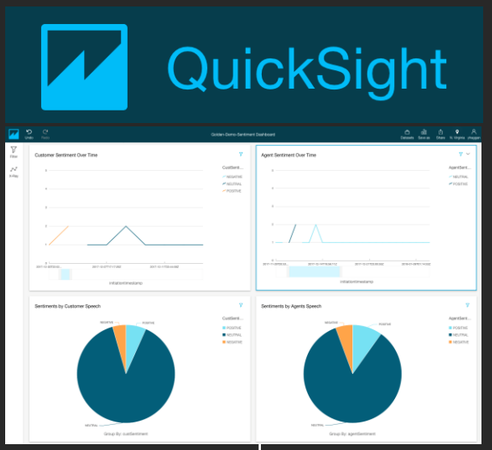
VidMob uses **Amazon Rekognition** and **Amazon Transcribe** for metadata extraction and sentiment analysis, to help marketers understand which videos resonate with audiences. This allows marketers to promote targeted content to acquire new customers.

Detecting Customer Sentiment

Bringing it together: Multilanguage product analytics



Improving contact centers with AI



Contact Trace Record (CTR)

Amazon Kinesis Data Firehose

Amazon Connect

AWS Step Functions

Call Recordings

Amazon S3

Amazon Transcribe

Amazon Comprehend

Entity

Key Phrase

Sentiment

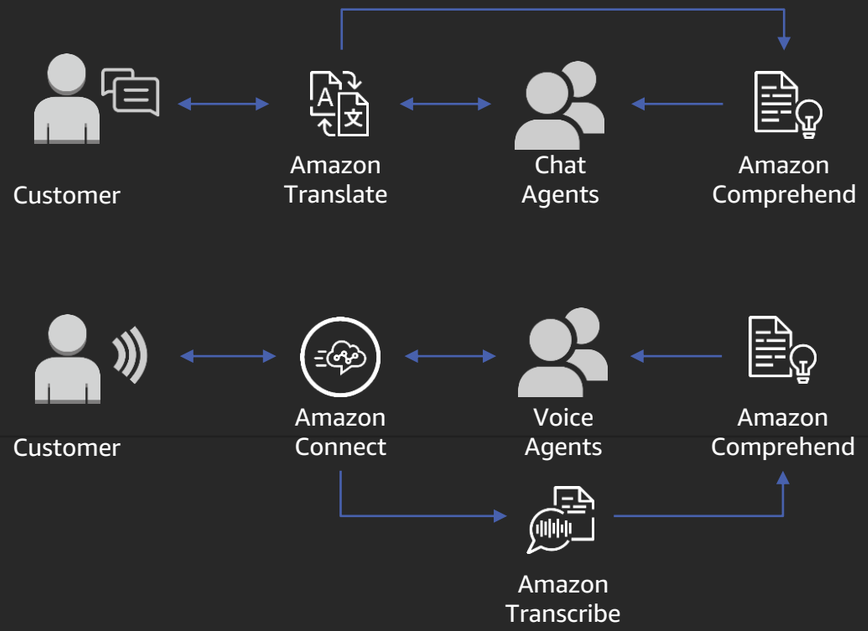
Amazon S3

Amazon Athena

Insights and Dashboards

Modernize your contact center to improve customer service

Live agent optimization with AI

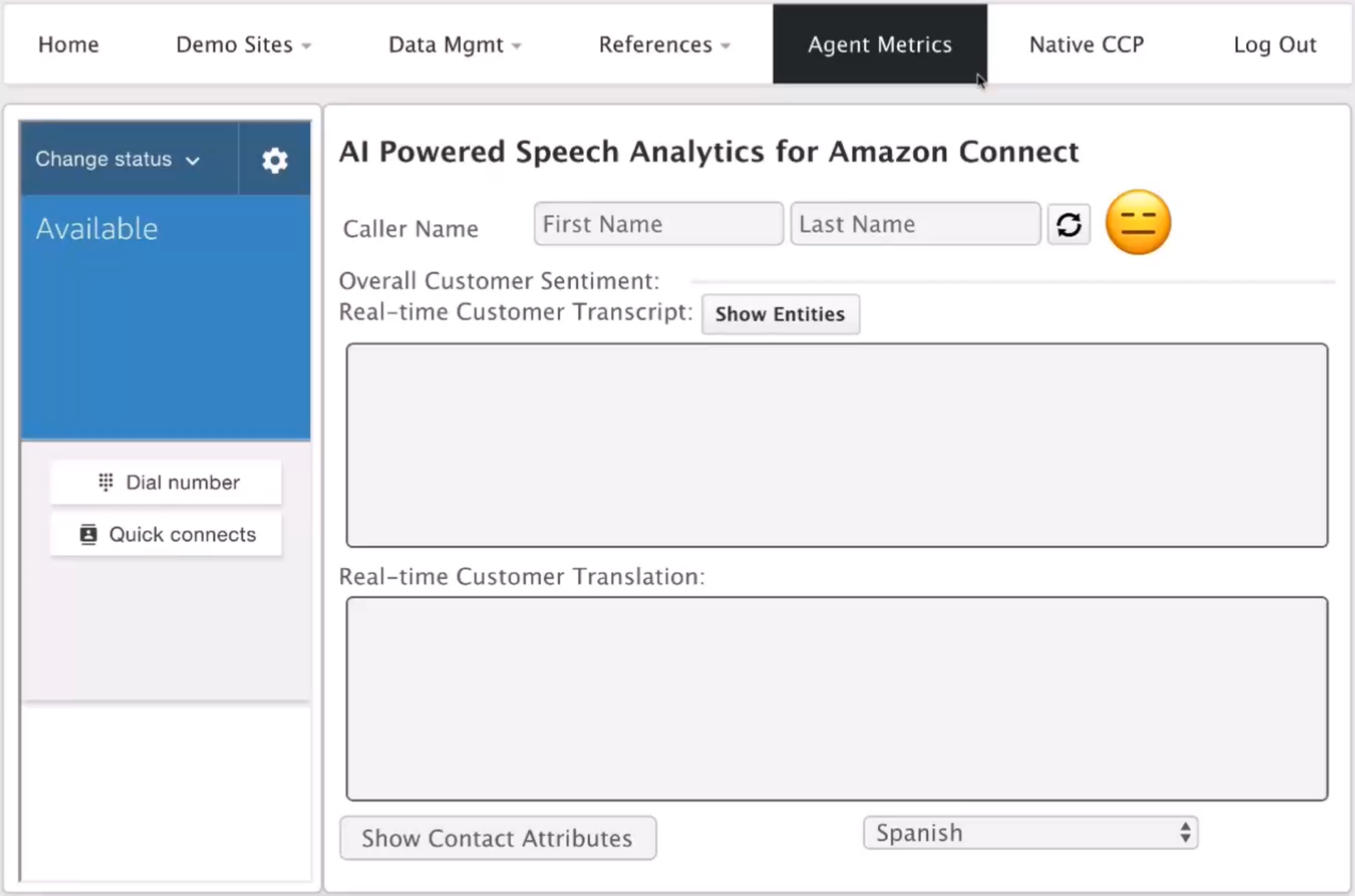


live translation enables global, multi-lingual chat

real time analysis provides next best action guidance

live transcription extends guidance for voice calls

Video: Live call analysis with next best action and translation



Amazon Lex

Conversational interfaces for your applications powered by the same deep learning technologies as Alexa

AWS re:Invent

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aws

Amazon Lex





Dialog Management

Native support & maintains context

Deployment

One-click deployment



Speech to Intent

ASR + NLU integrated into one API

End to End

Scale

Completely managed service





Text to Speech

Amazon Polly integrated into API

Business Logic

Native integration with AWS Lambda





Analytics

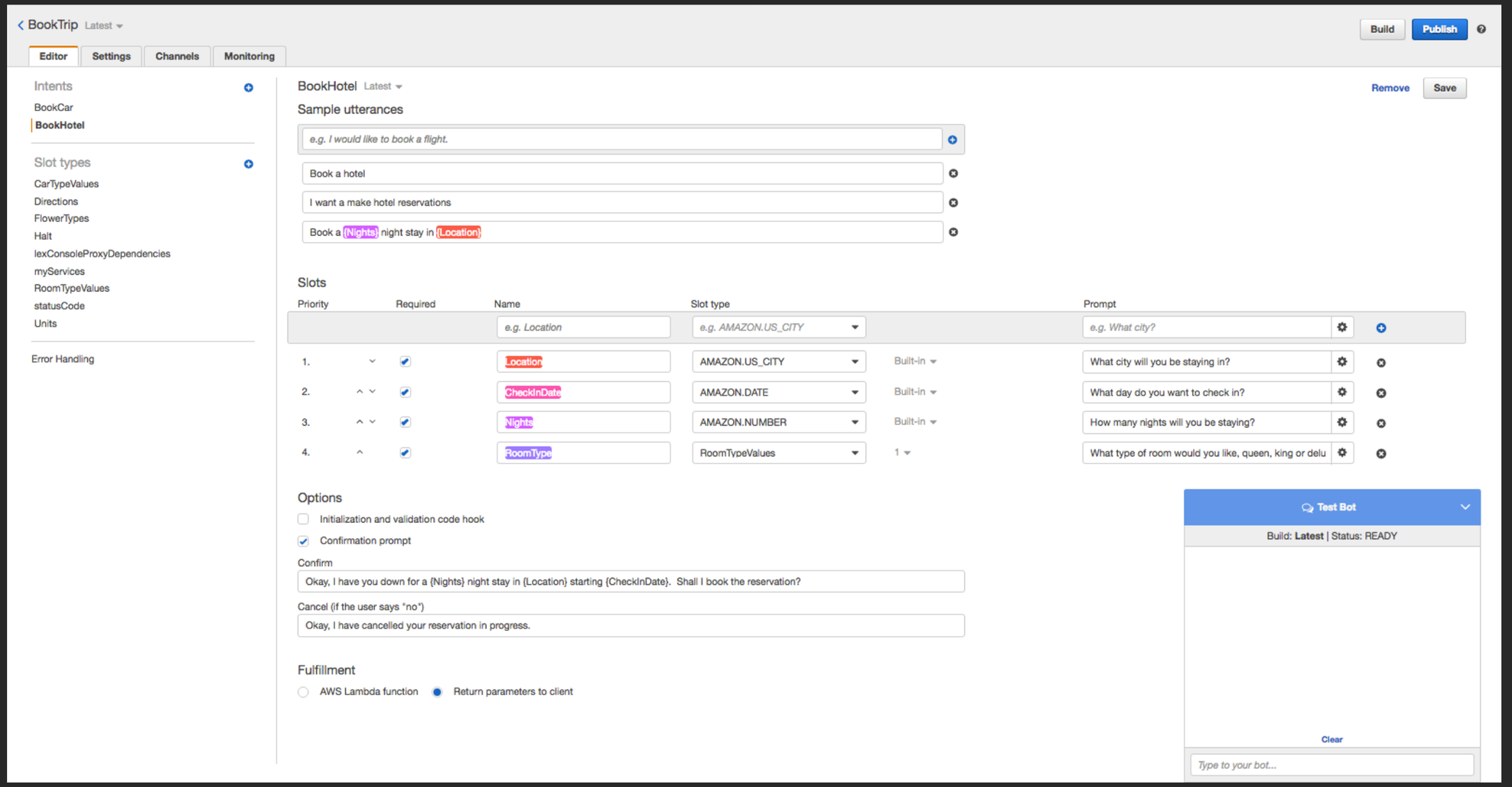
Monitor and improve

Security

Encrypted data in transit & at rest



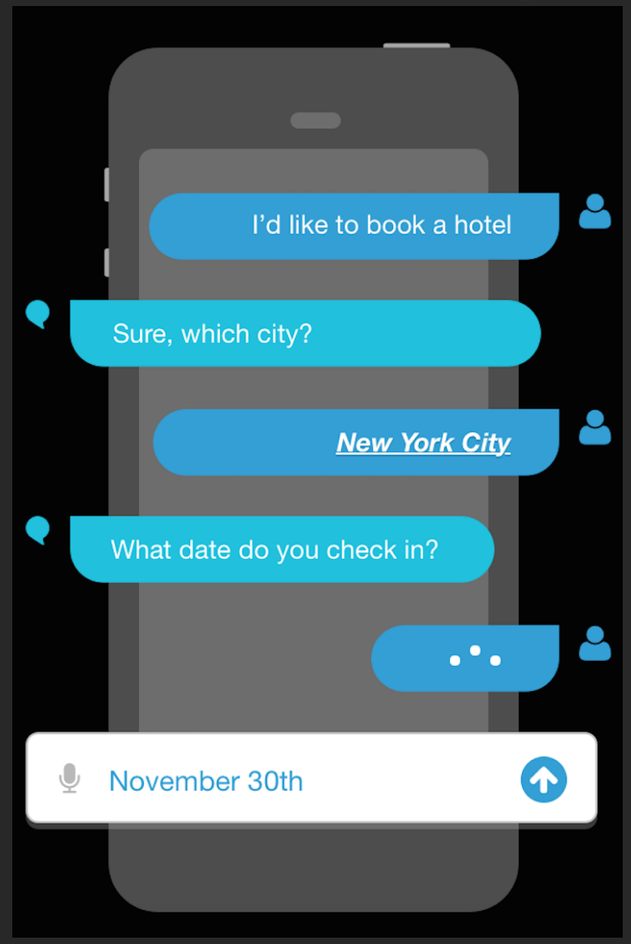
Designed for builders



Efficient and intuitive tools to build conversations

Amazon Lex

BookHotel

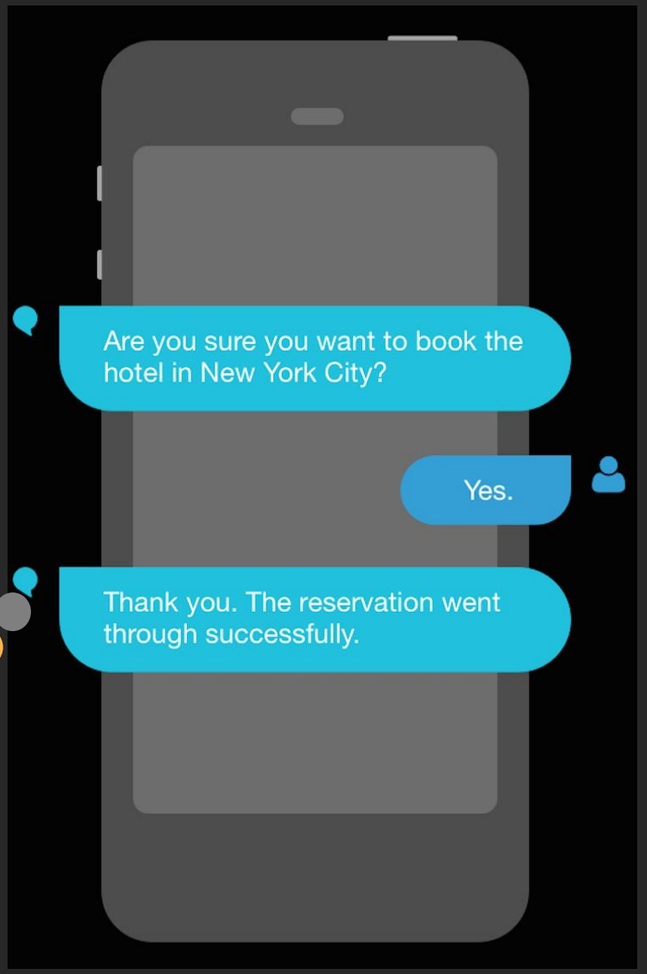


Intents
An intent performs an action in response to natural language user input

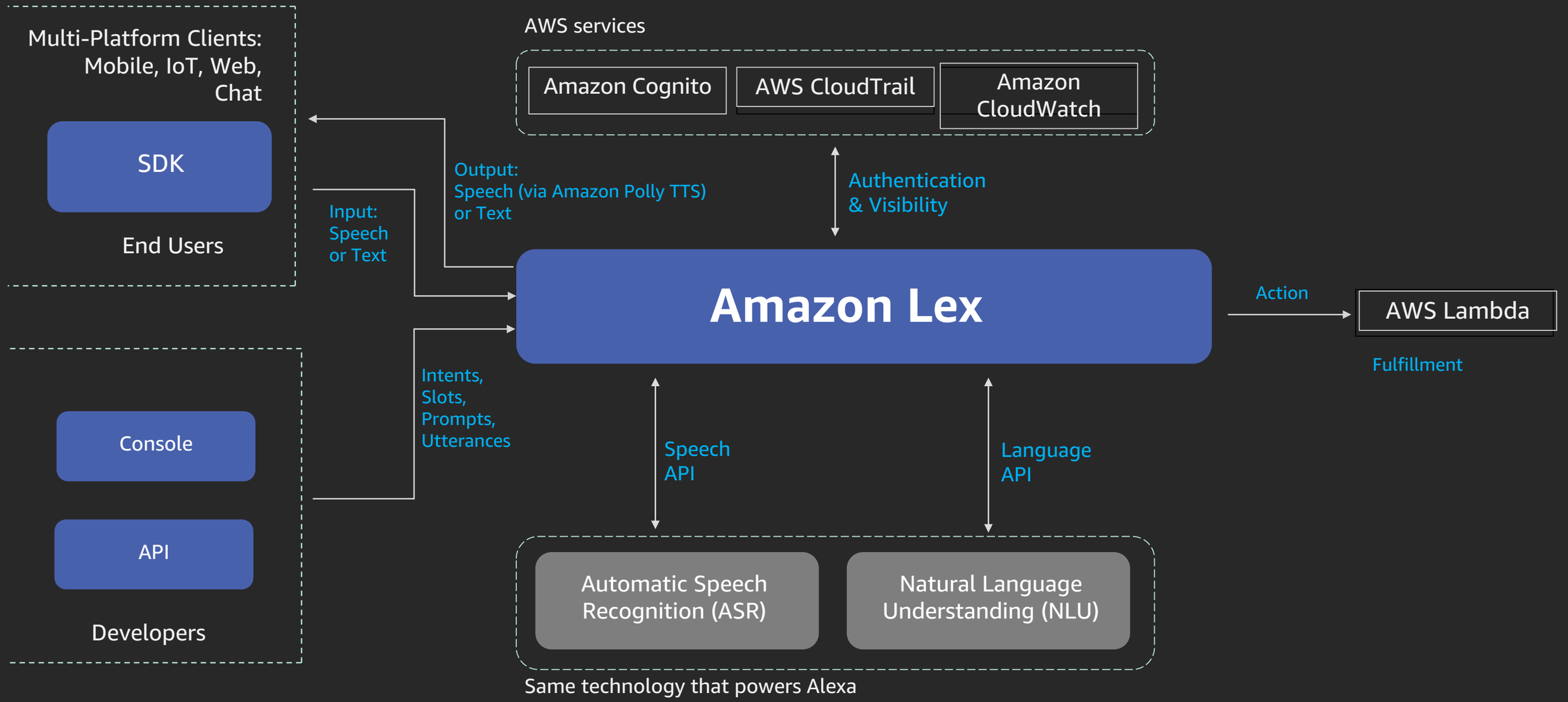
Utterances
Spoken or typed phrases that invoke your intent

Slots
Slots are input data required to fulfill the intent

Fulfillment
Fulfillment mechanism for your intent



Amazon Lex—Technology



Amazon Lex

Use Cases

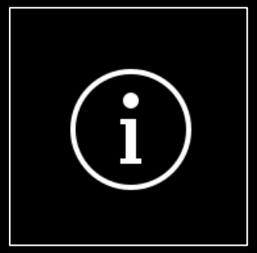




Contact Center Bots

Chatbots for customer service IVR

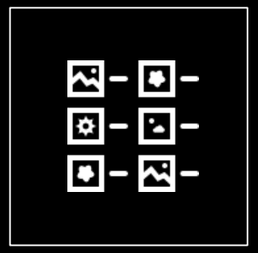
- Account inquiries
- Bill payment
- Service update ….



Informational Bots

Chatbots for everyday consumer requests

- News updates
- Weather information
- Game scores ….



Application Bots

Build powerful interfaces to mobile applications

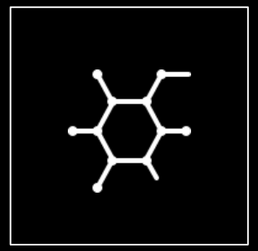
- Book tickets
- Order food
- Manage bank accounts ….



Enterprise Productivity Bots

Streamline enterprise work activities and improve efficiencies

- Check sales numbers
- Marketing performance
- Inventory status ….



Internet of Things (IoT) Bots

Enable conversational interfaces for device interactions

- Wearables
- Appliances
- Auto ….

Put AI to work, no ML experience required

Modernize your contact center to improve customer service

conversational chat bots | call transcription | intelligent routing | sentiment analysis | VoC analytics
text-to speech | multilingual omni-channel communication



AMAZON POLLY



AMAZON TRANSCRIBE



AMAZON TRANSLATE



AMAZON COMPREHEND



AMAZON LEX

Vonage

RedAwning

Liberty Mutual INSURANCE

American Heart Association.



Meaningful customer interactions

Liberty Mutual uses **Amazon Lex** and AI Services to develop natural language-driven conversational apps to enable customer service agents to respond to customer requests with real-time and contextual intelligence, improving response time, and quality of service.

Put AI to work for your business

Personalize customer experiences with targeted recommendations

recommendation technology used by Amazon.com | context-aware recommendations
sentiment analysis | VoC analytics



AMAZON PERSONALIZE



AMAZON REKOGNITION IMAGE



AMAZON REKOGNITION VIDEO



AMAZON COMPREHEND

Domino's Zola RBmedia Spuul NAVITIME



Amazon Personalize

Real-time personalization and recommendation



Custom models

Personalization models must accurately reflect business context and user behavior



Real-Time

Personalization must be responsive to the changing user intent



Cold Starts

New users should get relevant recommendations, new items should show in recommendations



Popularity Trap

Naïve models give recommendations similar to popular items



Scale

Recommendations should scale across millions of users and items

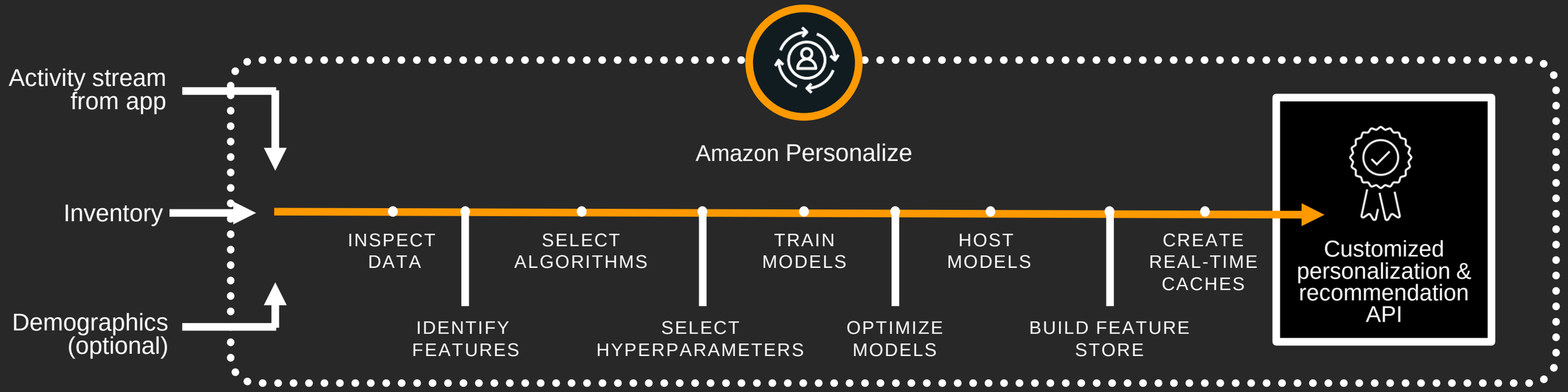
Amazon Personalize

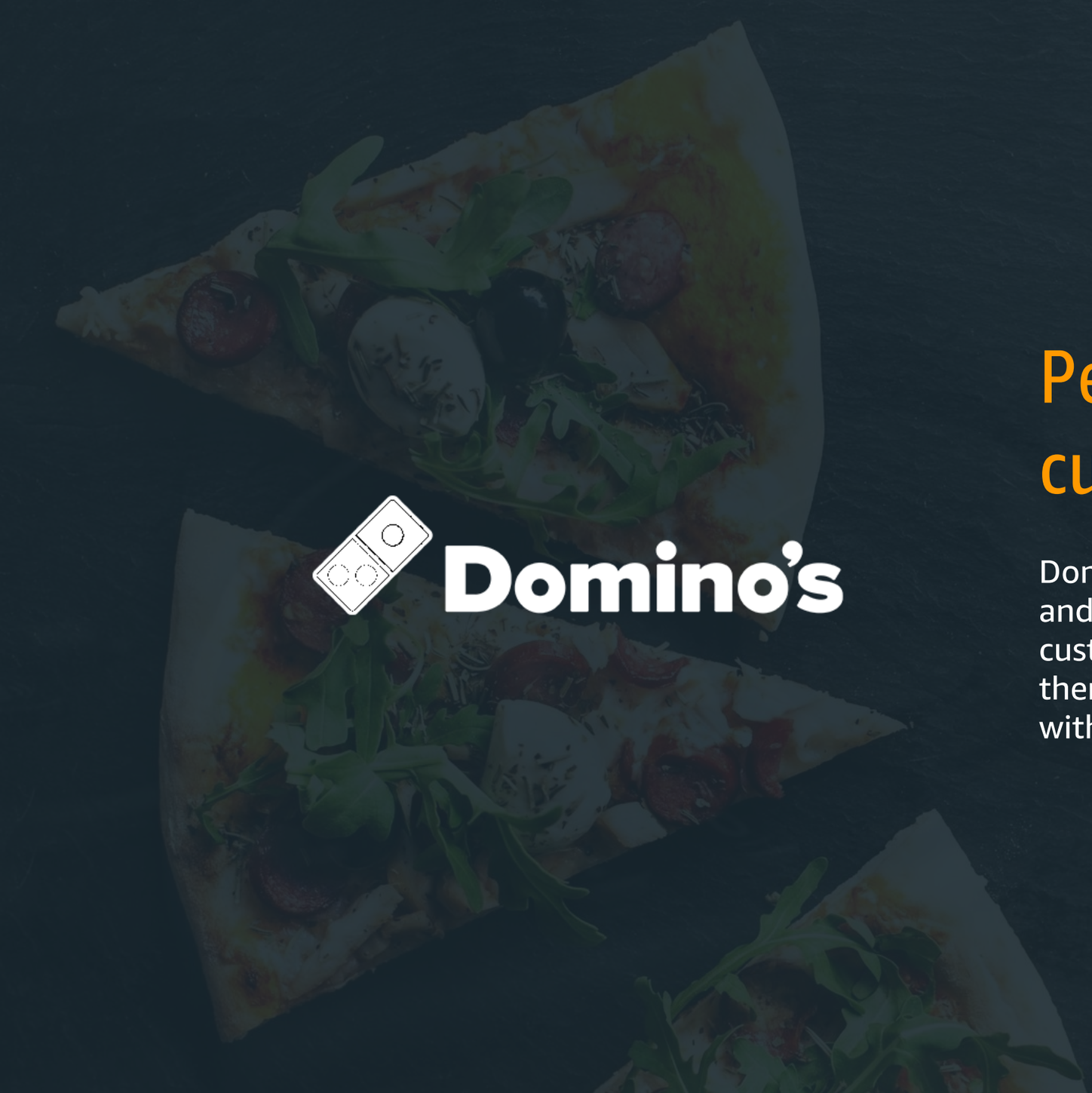
Real-time personalization and recommendation



Amazon Personalize

Real-time personalization and recommendation





Personalizing customer experiences

Domino's uses Amazon Personalize to customize and scale relevant marketing communications to customers based on time, context, and content, thereby improving and enhancing their experience with the Domino's brand.

Put AI to work for your business

Accurately forecast future business outcomes

forecasting technology used by Amazon.com | multiple time-series data
forecast scheduling & visualization | supply chain integration



AMAZON FORECAST

CJ Logistics

Mercado Libre

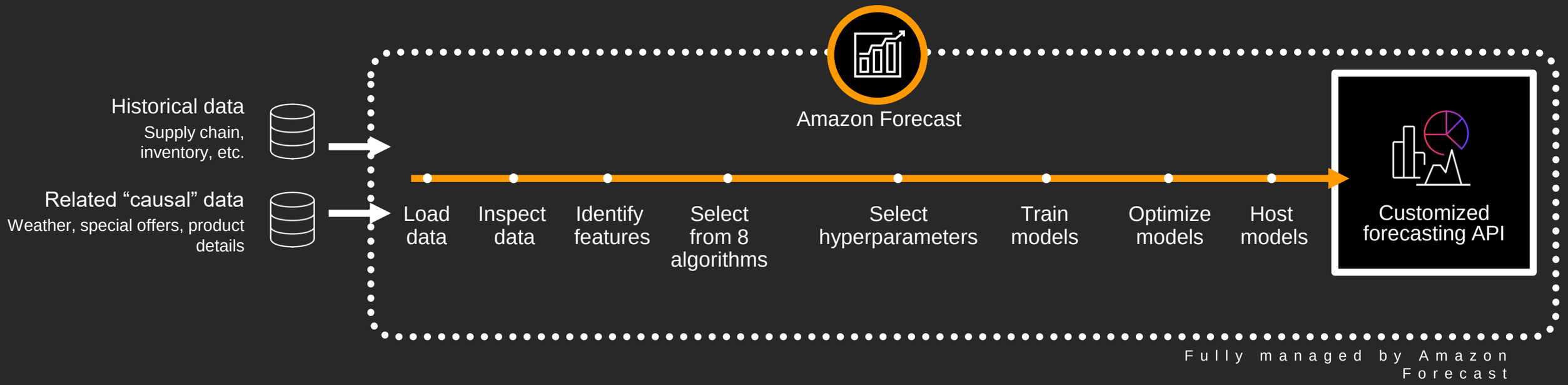
Amazon Forecast

Accurate time-series forecasting



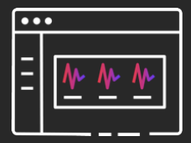
Amazon Forecast

Accurate time-series forecasting

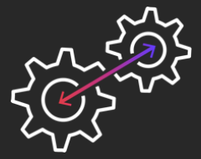


Amazon Forecast

Accurate time-series forecasting



Any historical time-series



Export to CSV to Integrate with SAP and Oracle Supply Chain



Custom forecasts with 3 clicks



Up to 50% more accurate



1/10th the cost

Generate forecasts for:

Retail demand	Travel demand	AWS usage
Revenue forecasts	Web traffic	Advertising demand

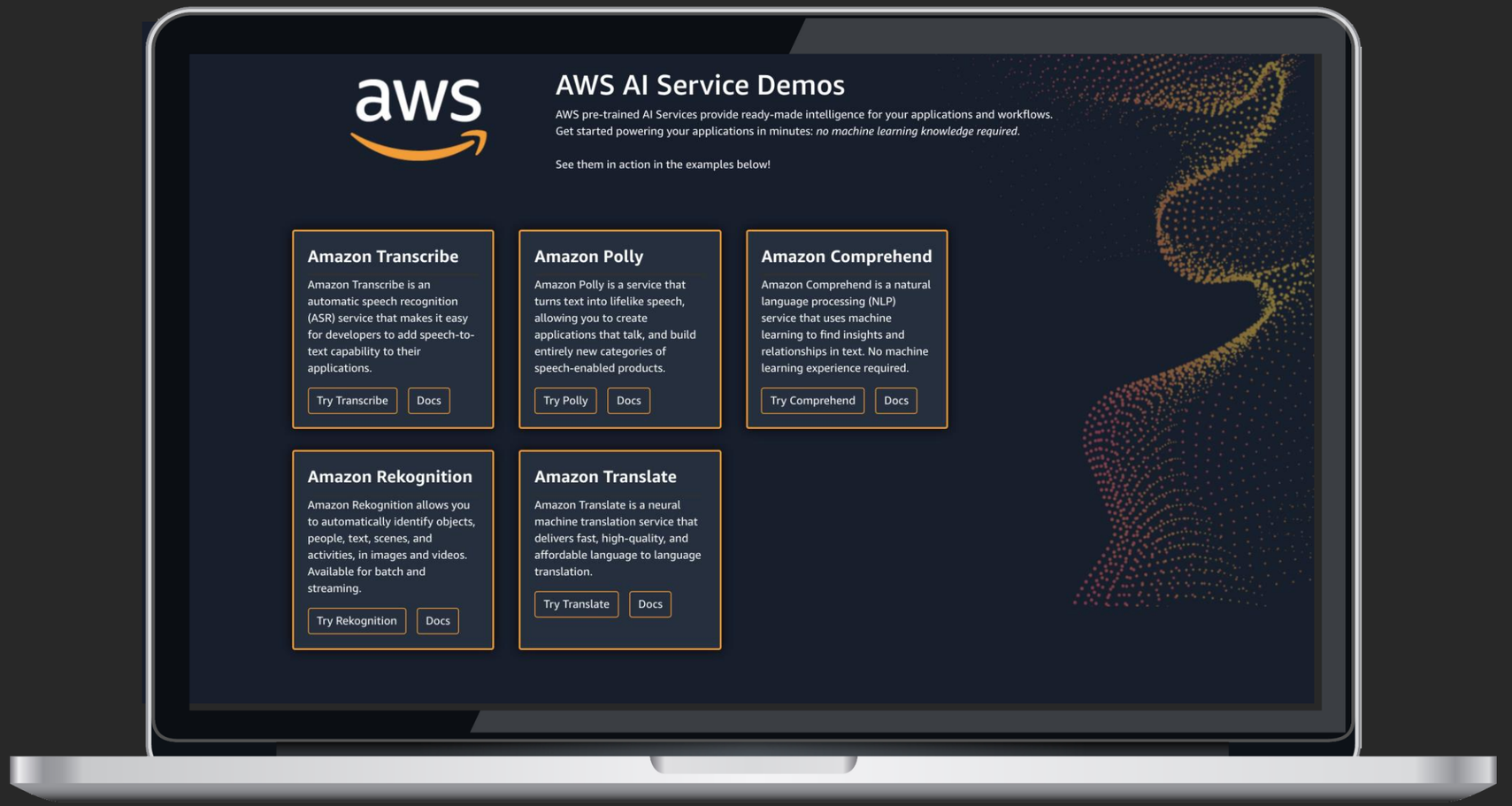
Demo

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AI Services In Action

Boilerplate React template for a simple client side application with components for:

1. Amazon Transcribe
2. Amazon Polly
3. Amazon Comprehend
4. Amazon Rekognition
5. Amazon Translate



Live examples:
https://ai-service-demos.go-aws.com

Ready to dive deeper into machine learning?

The Amazon ML stack: Broadest & deepest set of capabilities

APPLICATION SERVICES
ML for everyone

Vision
- AMAZON REKOGNITION IMAGE & VIDEO
- AMAZON TEXTRACT

Speech
- AMAZON POLLY
- AMAZON TRANSCRIBE

Language
- AMAZON TRANSLATE
- AMAZON COMPREHEND

Chatbots
- AMAZON LEX

Forecasting
- AMAZON FORECAST

Recommendations
- AMAZON PERSONALIZE

PLATFORM SERVICES
ML for engineers

AMAZON SAGEMAKER

BUILD
Pre-built Algorithms and Notebooks
Data Labeling (Ground Truth)
Machine Learning Marketplace

TRAIN
One-click model training and tuning
Optimization (NEO)
Reinforcement Learning
Hyperparameter Optimization

DEPLOY
One-click deployment and hosting
Automatic scaling
Elastic Inference Integration
VPC and AWS PrivateLink

FRAMEWORKS AND INTERFACES
ML for data scientists

Frameworks: Caffe2, Microsoft CNTK, mxnet, PYTORCH, TensorFlow, torch

Interfaces: KERAS, GLUON

INFRASTRUCTURE
Powering the ML

Compute
- Nvidia Tesla V100 GPUs (P3)
- EC2 C5 (C5, C5n)
- FPGAs
- ELASTIC INFERENCE

Machine Learning AMIs

AWS IoT GREENGRASS ML

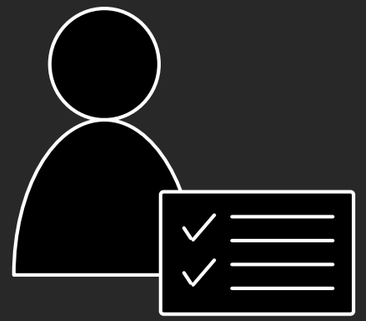
AWS Machine Learning Training & Certification



Uses the same materials used to train Amazon developers



Foundational knowledge with real-world application

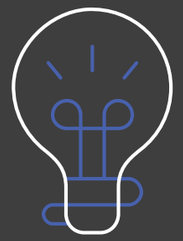


Structured courses



Specialist certification

RESOURCES



ML Solutions Lab

- Brainstorming
- Custom modeling
- Training
- Work side-by-side with Amazon experts

Communities

- Local meetups
- Blogs (Medium: Towards Data Science)
- Reddit (/r/MachineLearning, /r/AWS)
- Twitter! Lots of amazing folks.



Machine Learning Training and Certification

- Practical education on ML for new and experienced practitioners
- Based on the same material used to train Amazon developers

Online Courses

- [NEW] Coursera
- https://aws.training

GET STARTED TODAY:



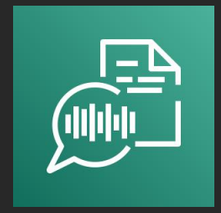
Amazon Comprehend



Amazon Forecast



Amazon Textract



Amazon Transcribe



Amazon Personalize



Amazon Polly



Amazon Lex



Amazon Rekognition



Amazon Translate

Demo

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Thank you!

Nicholas Walsh

twitter.com/thenickwalsh
nmwalsh@amazon.com

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aws



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