aws
SUMMIT
LONDON | 27TH APRIL 2022

ML-04

Why are you waiting to add AI capabilities to your applications?

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Amazon Web Services

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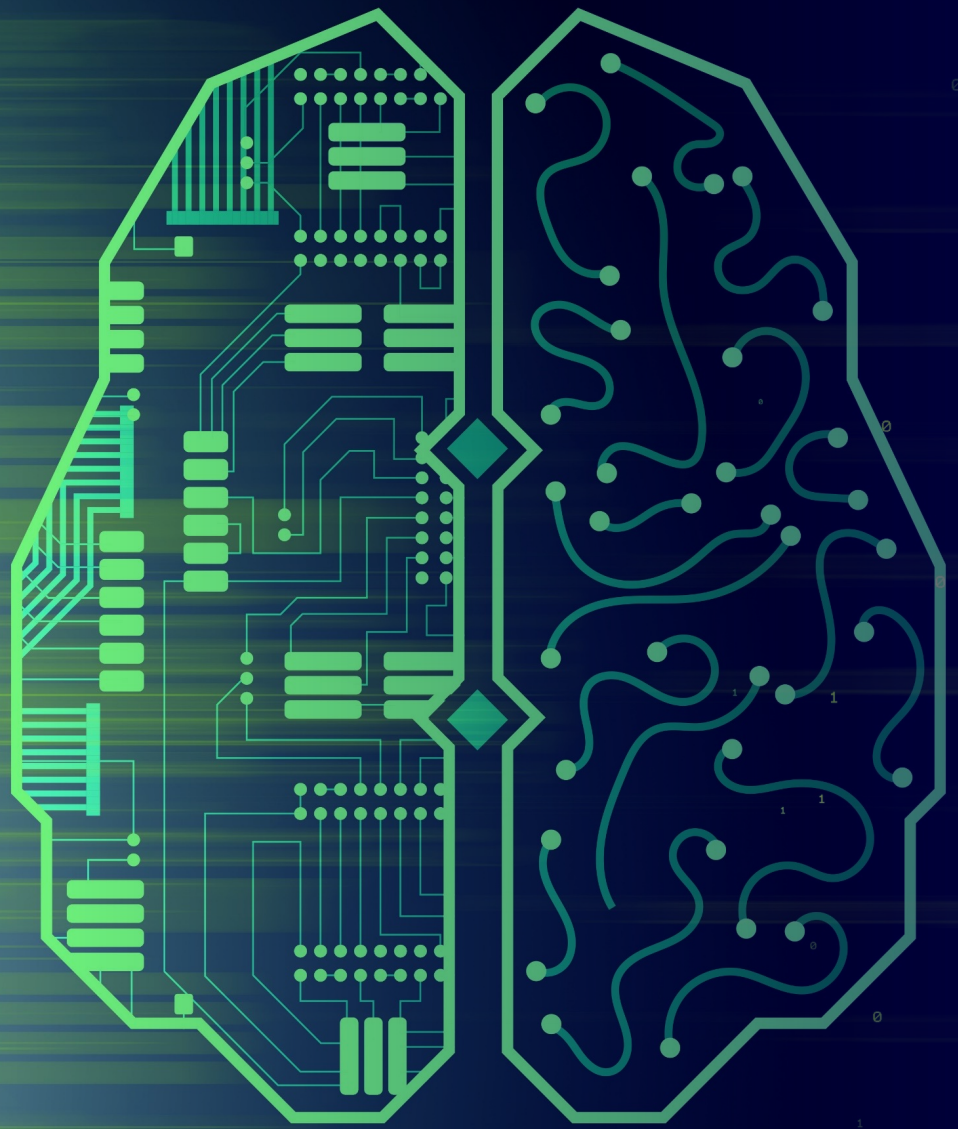

Most companies, around the world and across all industries, want to add AI capabilities to their applications and processes

But they don’t always have the skill or time to develop their own ML models

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Easily add intelligence to your business application or workflow with AWS

AWS offers the broadest and most complete set of AI services . . .

A series of pretrained ML models that you can use to implement common business use cases

Speech

Text and documents

Vision

Search

Business processes

Industrial AI

Healthcare

Chatbots

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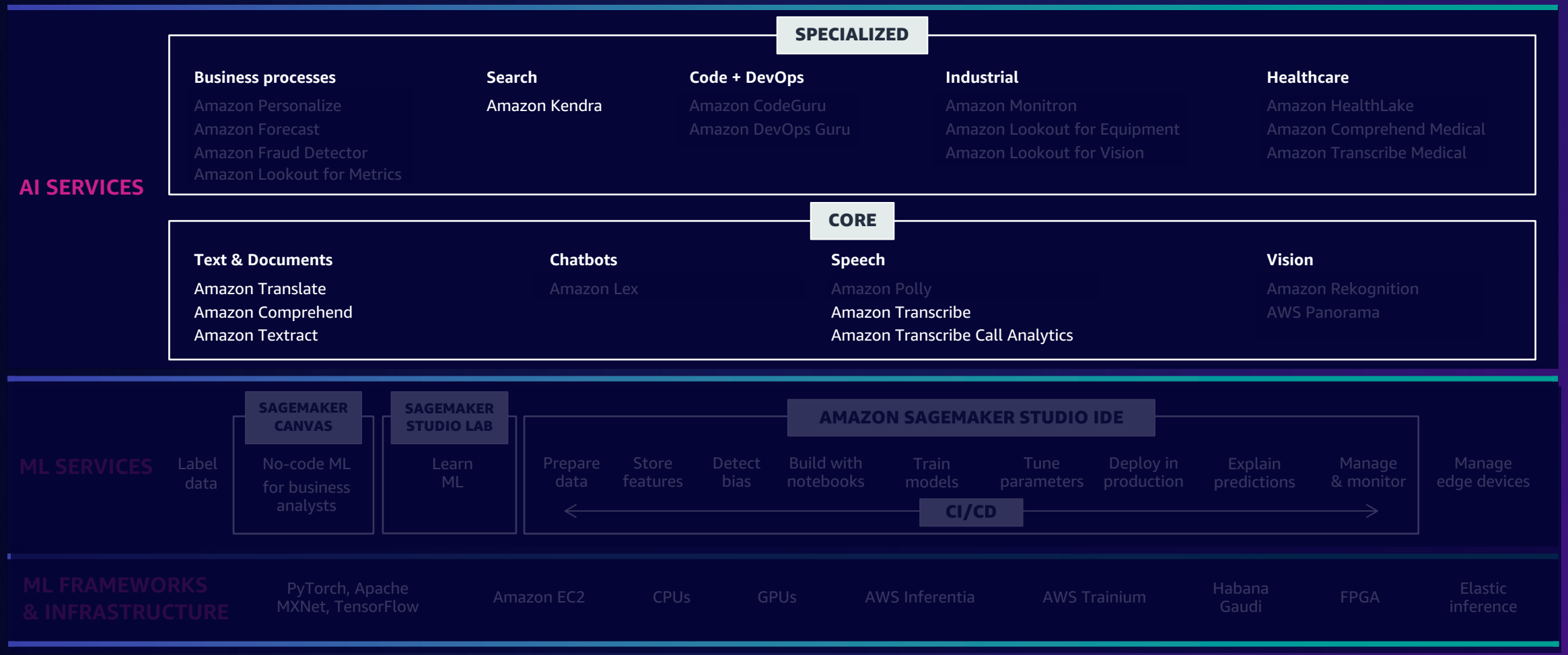
The AWS ML stack

Broadest and most complete set of machine learning capabilities



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Use case agenda

Contact center intelligence

Amazon Transcribe

Amazon Translate

Amazon Comprehend

Amazon Lex

Amazon Kendra

Intelligent document processing

Amazon Textract

Amazon Translate

Amazon Comprehend

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Use-case #1
Contact center intelligence (CCI)

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You can unlock the value with transcription, but traditional methods are...

Manual

Slow

Expensive

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Amazon Transcribe

A fully-managed and continuously trained automatic speech recognition (ASR) service

Highly accurate, efficient, and scalable

Easy to use speech-to-text capabilities and APIs to build voice-enabled applications

Fully customizable for domain-specific language terms and turns of phrase

No prior machine learning experience required

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Create easy to read and review transcripts

Punctuation, capitalization

Speaker labelling/channel identification

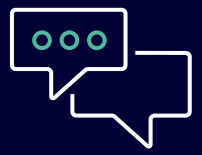
Word-level time stamps

Word-level confidence scores

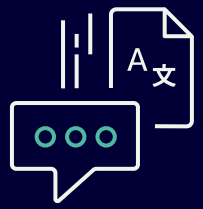
Alternative Transcriptions

Custom vocabulary

Vocabulary Filtering



Custom Language Models (CLM)



Language ID

PCI/PII content redaction

aws machine learning

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Amazon Transcribe Call Analytics API

Easy to use, call analytics API that can enable you to extract and add actionable insights from your customer interactions into your applications.

High-quality ASR and NLP models **specifically trained for call analytics**

Easy to use—fully managed AI service

Automated call **categorization**

Detailed **analytics** and sentiment analysis

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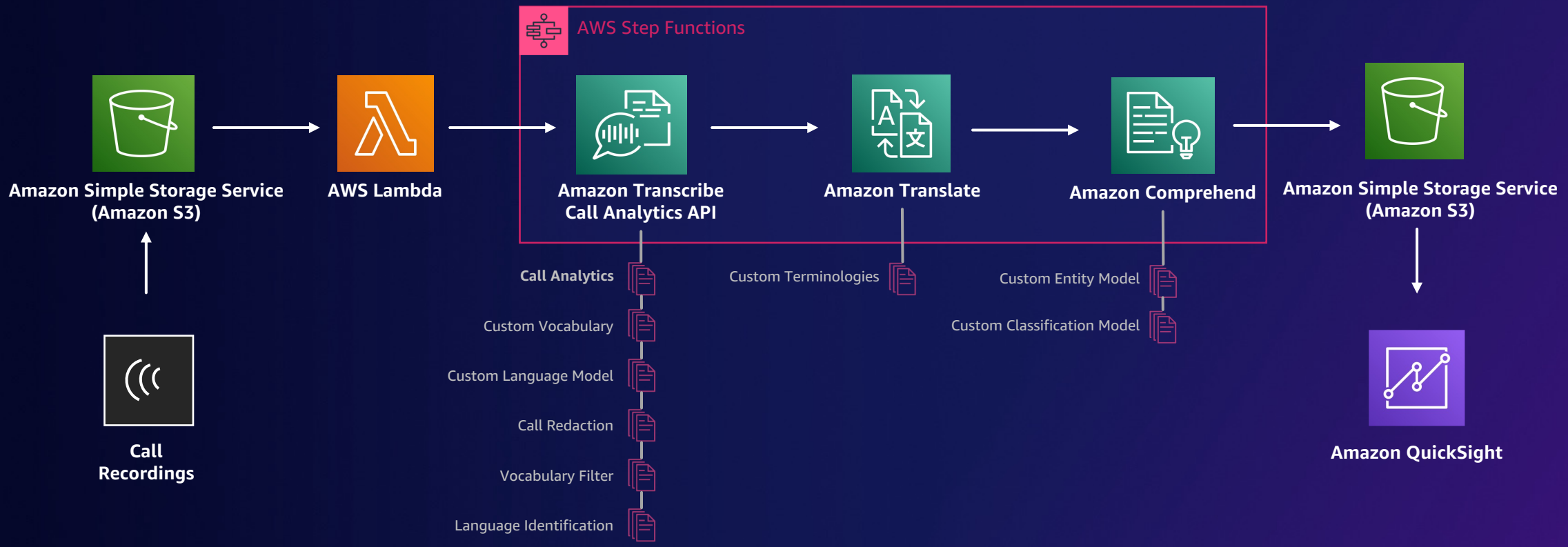
Post-call analytics – how is it implemented?



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CCI coding example [1/4]

Step 1
Start execution of workflow

1. Get a reference to boto3
2. Build up AWS Step Functions parameters for our API call used in the next step
3. Instantiate a new state machine execution

```
import boto3

sfn_client = boto3.client('stepfunctions')

parameters = {
  'bucket': 'my-audio-input-bucket',
  'key': 'inputAudio/audio-file.wav'
}

sfn_client.start_execution(
  stateMachineArn='CCIStepFunction',
  input=parameters
)
```

Note, `parameters` needs to be a string-escaped JSON structure, which is not shown here for the sake of clarity

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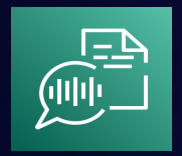
CCI coding example [2/4]



Step 2
Start Amazon Transcribe job

1. Get a reference to our audio file
2. Configure PII redaction
3. Setup other options such as Vocabulary Filtering
4. Initiate a new transcription job

```
media = { 'MediaFileUri': uri }

redaction = {
  'RedactionType': 'PII',
  'RedactionOutput': 'redacted'
}

job_settings = {
  'VocabularyFilterName': 'profanity',
  'VocabularyFilterMethod': 'mask',
  'LanguageOptions': ['en-GB'],
  'ContentRedaction': redaction
}

tscribe_client.start_call_analytics_job(
  CallAnalyticsJobName='my-job-name',
  Media=media,
  Settings=job_settings,
  DataAccessRoleArn='arn:aws:iam...'
  ChannelDefinitions=[...]
)
```

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CCI coding example [3/4]

Step 3
Translate conversation turn

1. Loop through each transcript line
2. Extract each turn of text
3. Translate it from English into French
4. Add the translation to our transcript line

```
for turn in asr_output['Transcript']

  turn_text = turn['Content']

  response = translate_client.translate_text(
    Text=turn_text,
    TerminologyNames=['domain-terms'],
    SourceLanguageCode='en',
    TargetLanguageCode='fr'
  )

  turn['Translation'] =
            response['TranslatedText']
```

```
response = {
    'TranslatedText': '<translation>',
    'SourceLanguageCode': 'en',
    'TargetLanguageCode': 'fr',
    'AppliedTerminologies': [
        'Name': 'domain-terms',
        'Terms': [...]
    ]
}
```

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CCI coding example [4/4]

Amazon Comprehend

Step 4
Extract NLP insights

1. Define the list of entity types of interest in Amazon Comprehend
2. Extract all standard entities from each turn of text
3. Filter out that list to just the types we're interested in
4. Add the remaining entities to our transcript line

```
types = ['LOCATION', 'ORGANIZATION', 'DATE']

for turn in asr_output['Transcript']

  turn_text = turn['Content']

  response = comp_client.detect_entities(
    Text=turn_text,
    LanguageCode='en'
  )

  entities = list(filter(lambda entity:
entity['Type'] in types, response['Entities']))

  turn['Entities'] = entities
```

```
response = {
    'Entities': [ {
            'Text': 'London',
            'Score': 0.98,
            'Type': 'LOCATION',
            'BeginOffset': 23,
            'EndOffset': 28
        } ] }
```

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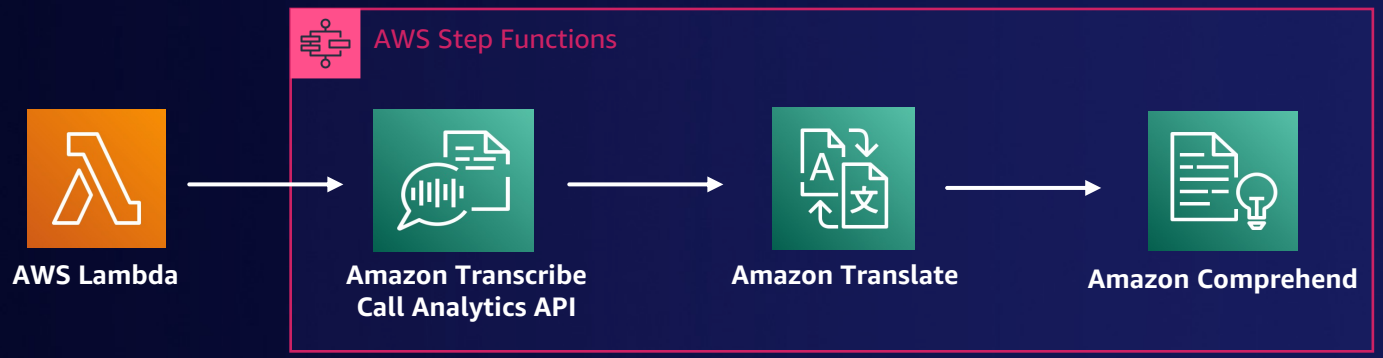
Contact center intelligence – sample solution



https://amazon.com/post-call-analytics

AWS blogs
GitHub code repositories
1-Click installers

https://amazon.com/live-call-analytics

Post-Call Analytics

Live-Call Analytics

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Use-case #2
Intelligent document processing (IDP)

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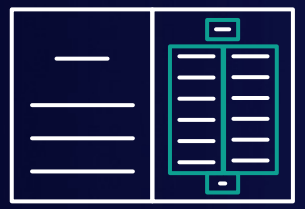
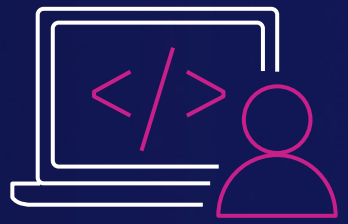
Legacy document processes do not meet today's needs



Legacy OCR and manual processes are time-consuming, error-prone, and expensive



Manual processes do not scale easily with document volume

Difficult to find useful information needed for business decisions

Faster document processing shortens decision cycles.
This enables you to serve more customers and have people do higher value tasks.

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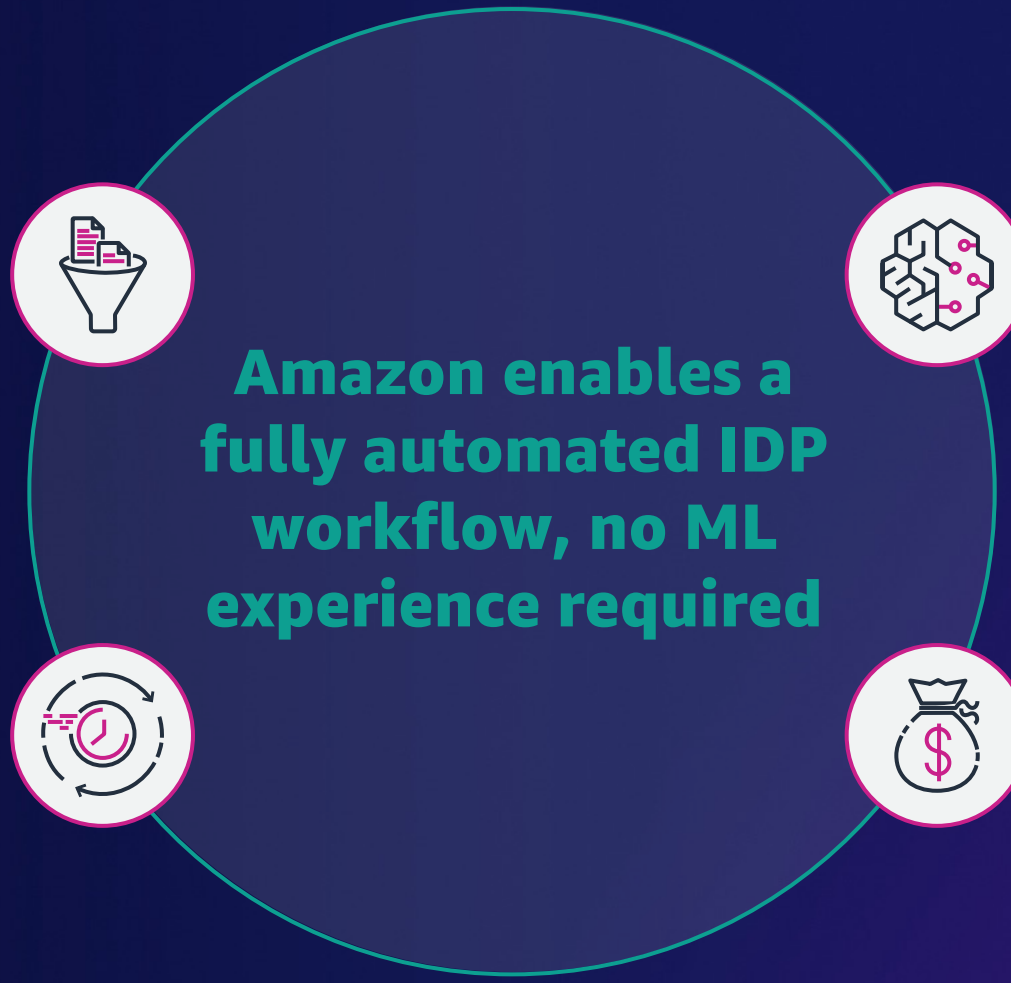
Benefits of Amazon's Intelligent Document Processing



Go beyond OCR with accurate, versatile information extraction

Analyze documents and send key insights to downstream systems and workflows

Serve end customers faster

Reduce the total cost of document processing

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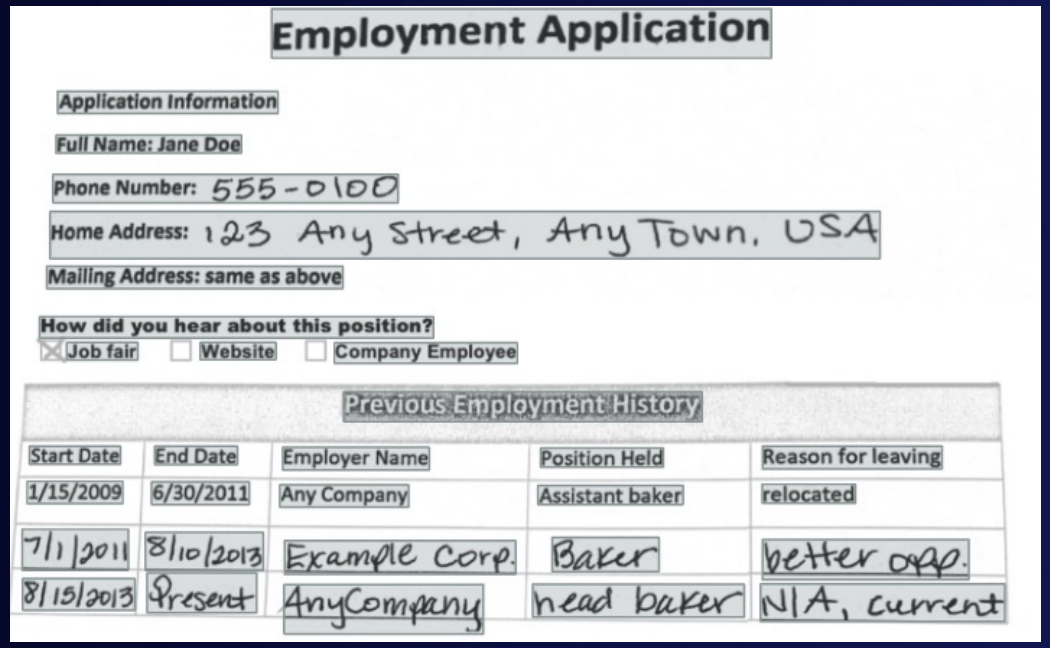
Go beyond OCR with accurate, versatile information extraction

Accuracy of forms and tables allows customers to reach **80–90% automation levels** on documents that previously needed manual processing.

INPUT → **OUTPUT**



Employment Application

Application Information

Full Name: Jane Doe

Phone Number: 555-0100

Home Address: 123 Any Street, Any Town, USA

Mailing Address: same as above

How did you hear about this position?

☒ Job fair ☐ Website ☐ Company Employee

Previous Employment History

Start Date	End Date	Employer Name	Position Held	Reason for leaving
1/15/2009	6/30/2011	Any Company	Assistant baker	relocated
7/1/2011	8/10/2013	Example Corp.	Baker	better opp.
8/15/2013	Present	AnyCompany	head baker	N/A, current

Raw Text

Employment Application	Application Information	Full Name: Jane Doe
Phone Number: 555-0100	Home Address: 123 Any street, Any Town. USA	

Forms

Job fair	Website
SELECTED	NOT_SELECTED

Table Recognition

7/1/2011	8/10/2013	Example Corp.	Baker	better opp.

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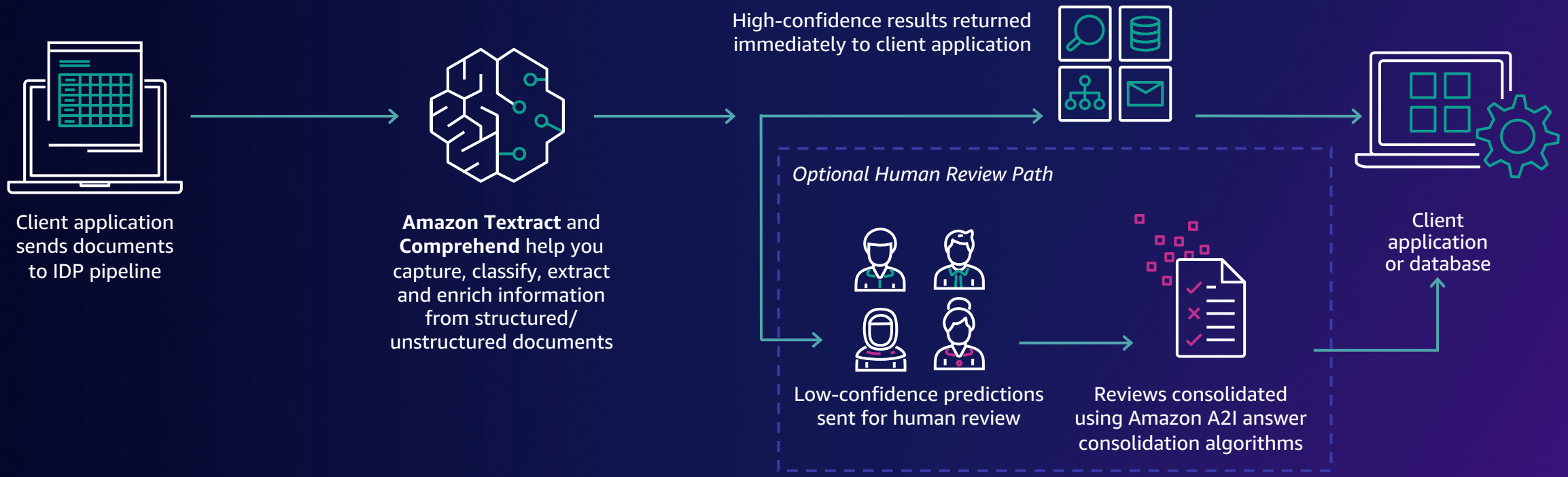
Typical IDP workflow



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IDP coding example [1/2]

Step 1
Extract text from document

1. Get a reference to boto3
2. Create an S3 reference to our source document
3. Call the synchronous API `analyze_document()` to extract text, forms and tables from our purchase invoice

```
import boto3

textract = boto3.client('textract')

doc_parameter = {
  'S3Object' : {
    'Bucket': 'my-document-input-bucket',
    'Name': 'invoices/PI-1125VF.pdf'
  }
}

response = textract.analyze_document(
  Document=doc_parameter,
  FeatureTypes=['FORMS', 'TABLES']
)
```

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IDP coding example [2/2]

Step 2
Redact text from the document

1. Use the Amazon Comprehend API call `DetectPiiEntities()` to detect bank account numbers

```
import boto3

comprehend = boto3.client('textract')

response = comprehend.detect_pii_entities(
  Text=textract_text,
  LanguageCode='en'
)
```

```
response = {
    'Entities': [
        {
            'Score': 0.9997,
            'Type': 'BANK_ACCOUNT_NUMBER',
            'BeginOffset': 11,
            'EndOffset': 18
        }
    ]
}
```

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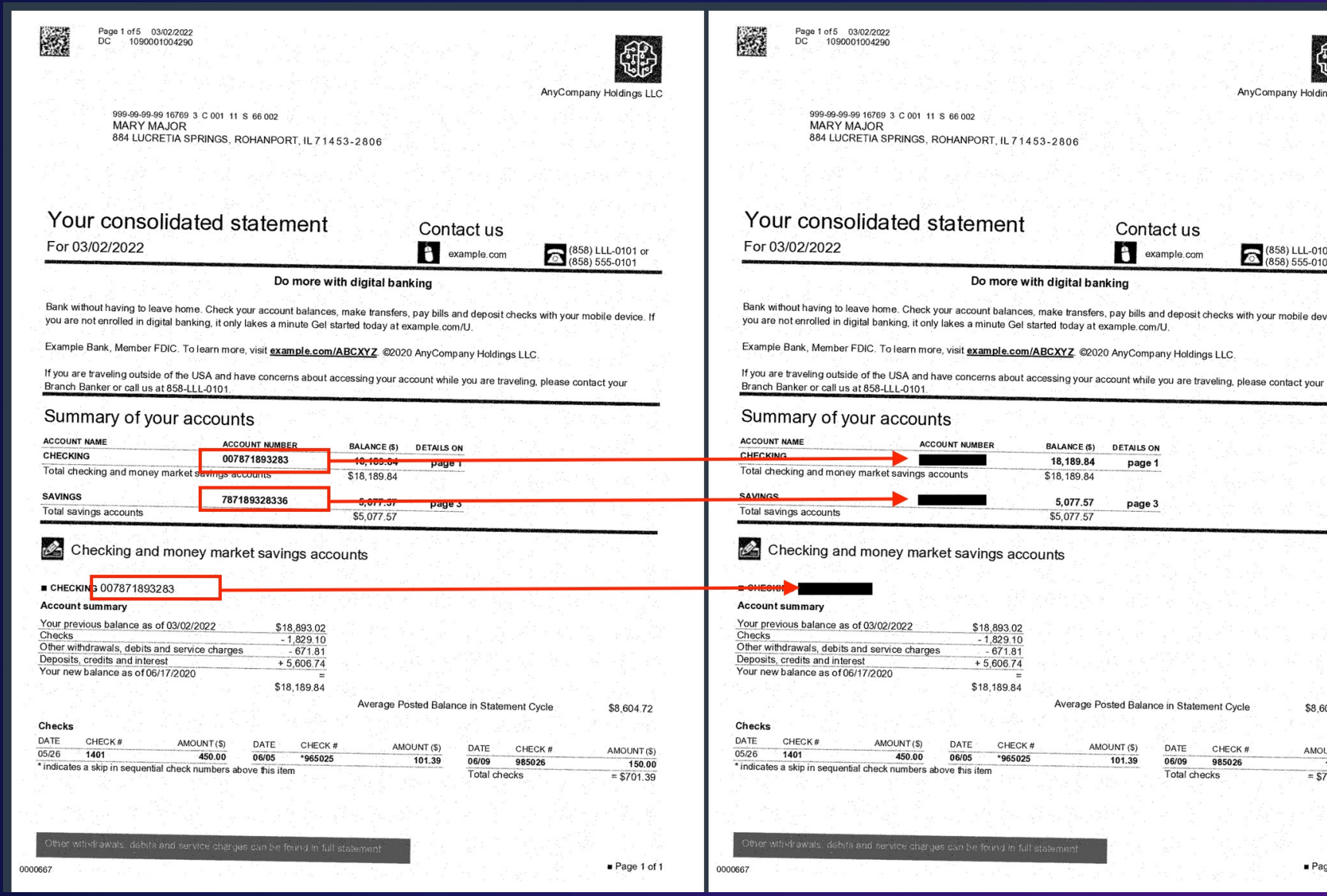
IDP coding example [2/2]

Amazon Comprehend

Step 2
Redact text from the document

1. Use the Amazon Comprehend API call `DetectPiiEntities()` to detect bank account numbers

2. Use the Amazon Textract geometries to redact the source image



Page 1 of 5 03/02/2022
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Your consolidated statement
For 03/02/2022

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Summary of your accounts

ACCOUNT NAME	ACCOUNT NUMBER	BALANCE ($)	DETAILS ON
CHECKING	007871893283	18,189.84	page 1
Total checking and money market savings accounts		$18,189.84	
SAVINGS	787189328336	5,077.57	page 3
Total savings accounts		$5,077.57	

Checking and money market savings accounts

■ CHECKING 007871893283

Account summary

Your previous balance as of 03/02/2022	$18,893.02
Checks	- 1,829.10
Other withdrawals, debits and service charges	- 671.81
Deposits, credits and interest	+ 5,606.74
Your new balance as of 06/17/2020 =	$18,189.84

Average Posted Balance in Statement Cycle $8,604.72

Checks

DATE	CHECK #	AMOUNT ($)	DATE	CHECK #	AMOUNT ($)	DATE	CHECK #	AMOUNT ($)
05/26	1401	450.00	06/05	*965025	101.39	06/09	985026	150.00

* indicates a skip in sequential check numbers above this item

Total checks = $701.39

Other withdrawals, debits and service charges can be found in full statement

0000667

■ Page 1 of 1

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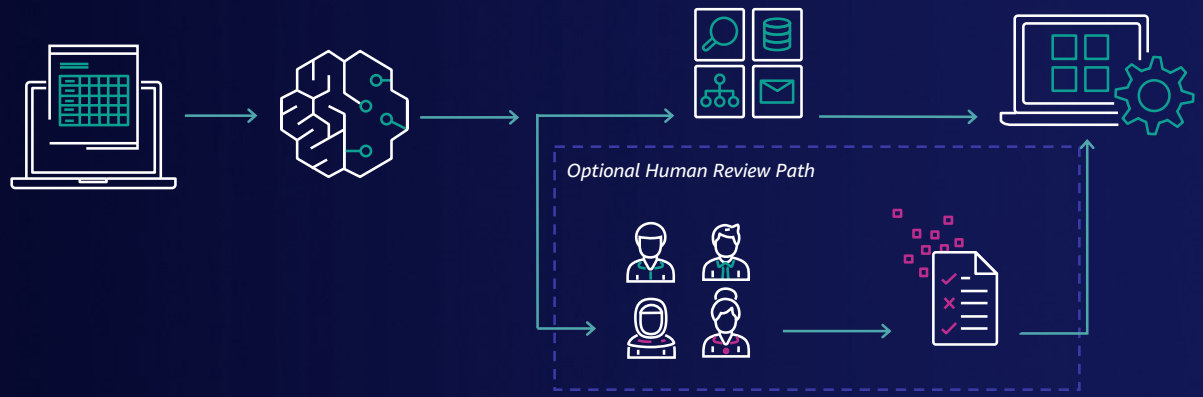
Intelligent document processing – workshop



AWS Workshop Studio
Hands-On Workshop

1. Document classification
2. Document extraction
3. Document extraction and enrichment
4. Document review and verification

IDP Workshop

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Synamedia

Transforming the way the world is entertained and informed

The largest global provider of video solutions for pay TV operators

#1 Market share in client software*

Deployed in **220 million set top boxes**

Market leader in content security

Protecting **320 million** active devices and **$70B** in revenue annually

1000+

Customers are using our video network technology

Our technology is deployed in **1 out of 4 global pay TV households**

*Synergy research 2018

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Synamedia

From zero to POC in 3m

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Project statement

Build a new way to navigate content that delights the viewer

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Opening premise

Screens are getting larger!

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Prototype

Build a UX that’s fully contextual to the show in content & time

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Challenges

The nature of video

Creative editing

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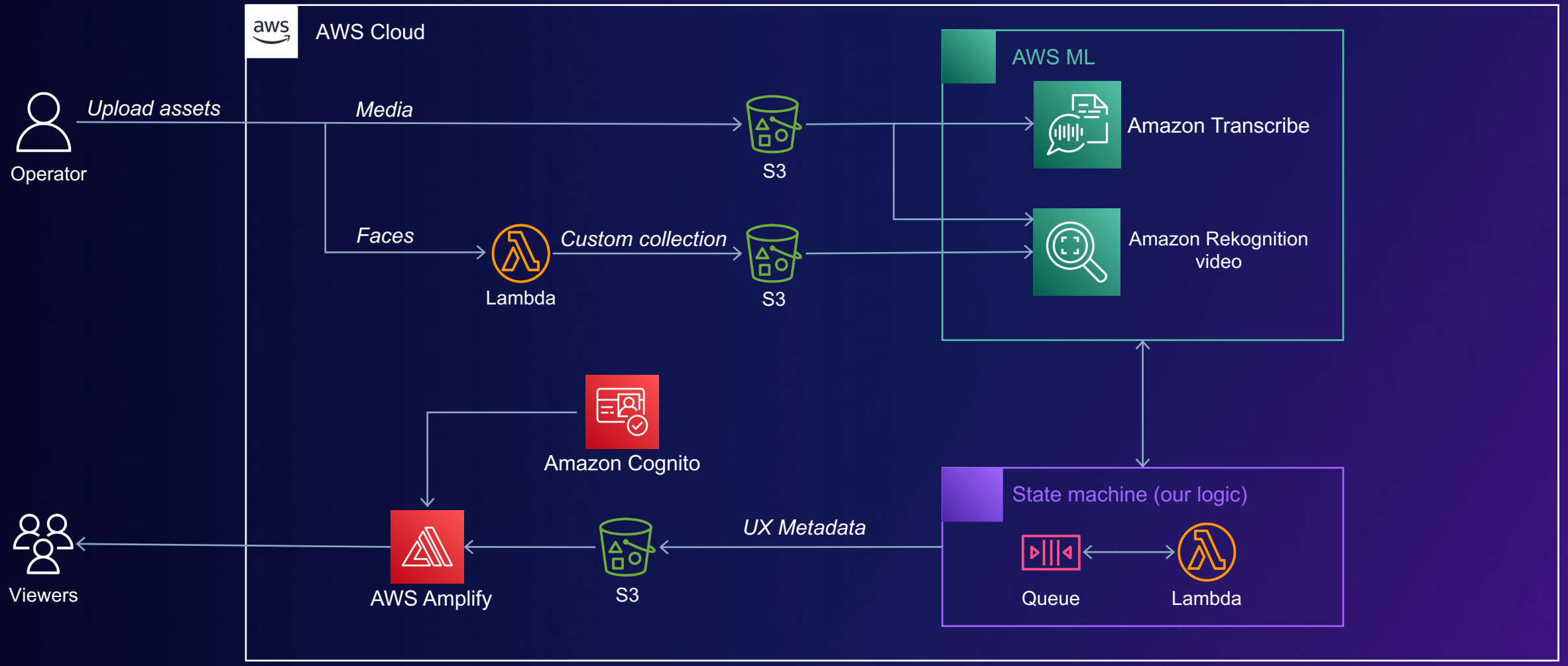
Architecture



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Xlabs use of AWS

- Rekognition (images, video, faces, labels)
- Transcribe
- Kendra
- Amplify (the “cookie cutter”)
- Polly
- Compute & serverless
- …

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Wrap-up

- We created a POC that proved the viability
- AWS ML, Serverless & Amplify were key to our agility
- AWS continues to be a valued partner of Xlabs

Thank you!

www.linkedin.com/company/synamedia

www.linkedin.com/in/jameswilson8

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AWS can add AI capabilities to your applications

Identify the use case that fits your needs

Investigate AWS AI services and reference architectures

Develop your solution

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Thank you!

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Amazon Web Services
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James Wilson *(he/him)*

Distinguished Engineer
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