AWS Prototyping

4-6 weeks

Business Challenge?

Prototyping workshop

Scope

Build

Transition & Scale to Production

Showcasing the Art of the Possible on AWS

Prototyping

Audio and video data are growing exponentially

Agenda

- Introduction to media intelligence

- Media trends

- AI/ML-enabled media analysis use cases

- Benefits of leveraging AI/ML for media analysis

- AWS machine learning solutions and key AI services for content analysis

- AWS AI-enabled media analysis solutions

- Resources to get started

Media trends

Enhanced audience experiences

Media trends

Enhanced audience experiences

Monetization innovation

Media trends

Enhanced audience experiences

Monetization innovation

Explosion of direct-to-consumer and user-generated content

Viewers expect more

Media customers need to accelerate innovation to differentiate themselves and maintain profitability
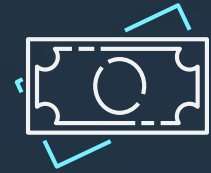
Media needs AI because current processes are . . .

Manual and
time-consuming

Subjective and
error-prone

Missed
opportunities

Expensive

Not scalable

Key Benefits for AI in media

Lower costs

Constant pressure to reduce content production costs and ensure compliance

Improve the customer experience

Expand audience reach and improve user experience to boost stickiness and reduce churn

Drive revenues

Identify new innovations to monetize content

Media use cases

Media use cases

Search and discovery

Create a rich metadata search index

Offer content-based recommendations

Generate highlights and promos

Media use cases

Search and discovery

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Offer content-based recommendations

Generate highlights and promos

Subtitling & localization

Boost user engagement

Reach a wider audience faster

Address subtitling and accessibility requirements

Media use cases

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Compliance & moderation

Automate quality control

Detect inappropriate content

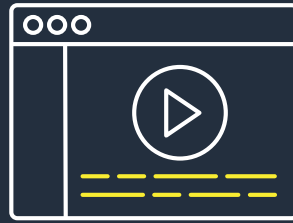Adhere to compliance standards

Media use cases

Search and discovery

Create a rich metadata search index

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Generate highlights and promos
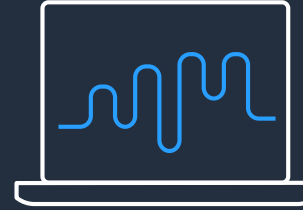
Subtitling & localization

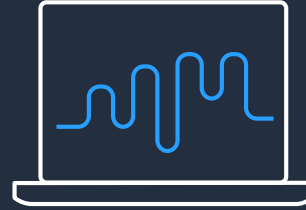Boost user engagement

Reach a wider audience faster

Address subtitling and accessibility requirements

Compliance & moderation

Automate quality control

Detect inappropriate content

Adhere to compliance standards

Content monetization

Increase revenues with metadata

Optimize native and contextual advertising
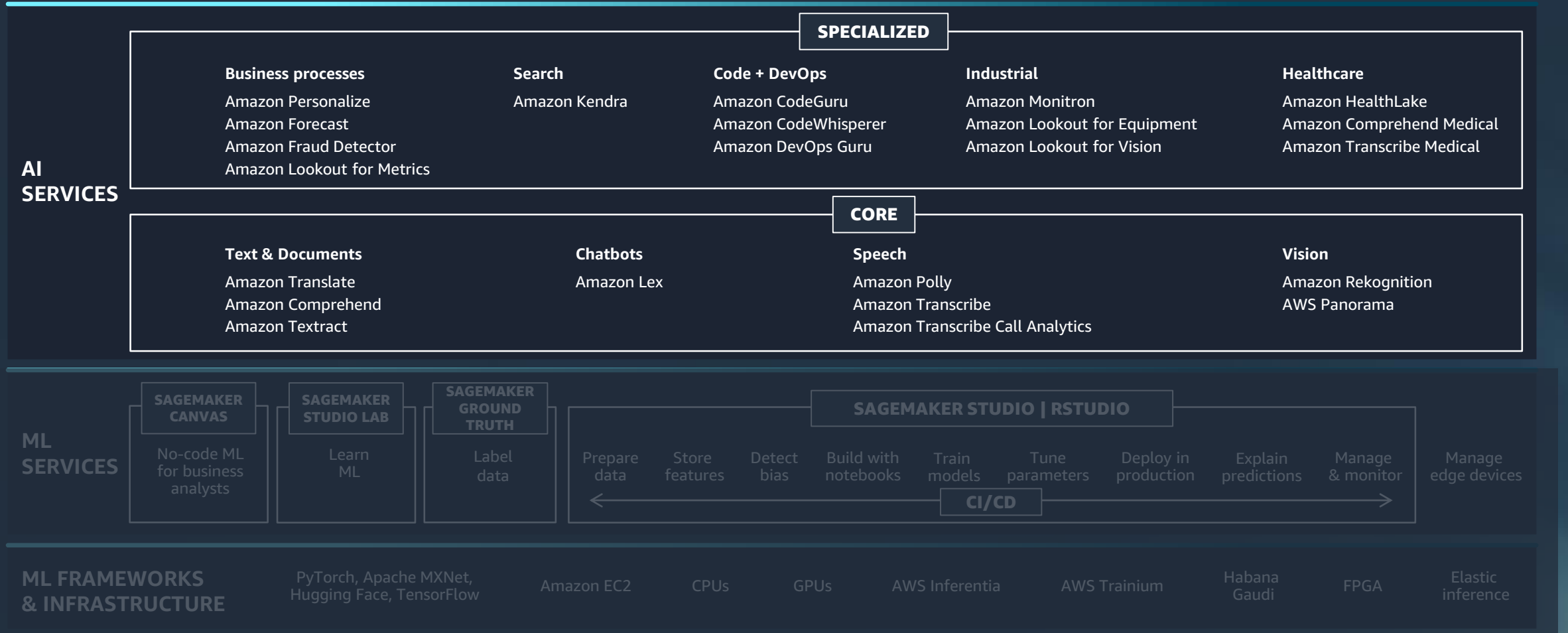
Provide reporting and analytics

AWS machine learning and media solutions

The AWS ML stack

Broadest and most complete set of machine learning capabilities

AI SERVICES

SPECIALIZED

Business processes	Search	Code + DevOps	Industrial	Healthcare
Amazon Personalize	Amazon Kendra	Amazon CodeGuru	Amazon Monitron	Amazon HealthLake
Amazon Forecast		Amazon CodeWhisperer	Amazon Lookout for Equipment	Amazon Comprehend Medical
Amazon Fraud Detector		Amazon DevOps Guru	Amazon Lookout for Vision	Amazon Transcribe Medical
Amazon Lookout for Metrics				

CORE

Text & Documents	Chatbots	Speech	Vision
Amazon Translate	Amazon Lex	Amazon Polly	Amazon Rekognition
Amazon Comprehend		Amazon Transcribe	AWS Panorama
Amazon Textract		Amazon Transcribe Call Analytics	

ML SERVICES

SAGEMAKER CANVAS	SAGEMAKER STUDIO LAB	SAGEMAKER GROUND TRUTH	SAGEMAKER STUDIO	RSTUDIO
No-code ML for business analysts	Learn ML	Label data	Prepare data · Store features · Detect bias · Build with notebooks · Train models · Tune parameters · Deploy in production · Explain predictions · Manage & monitor · Manage edge devices

CI/CD

ML FRAMEWORKS & INFRASTRUCTURE

PyTorch, Apache MXNet, Hugging Face, TensorFlow · Amazon EC2 · CPUs · GPUs · AWS Inferentia · AWS Trainium · Habana Gaudi · FPGA · Elastic inference

5 AWS AI core services for content moderation

Amazon Rekognition

Image and video analysis

Amazon Transcribe

Speech to text

Amazon Comprehend

Natural language processing

Amazon Translate

Translation

Amazon Augmented AI

Human reviews

Amazon Rekognition

Builders innovate faster with fully managed moderation, image, and video APIs

Content

Amazon
Rekognition

OBJECT, SCENE, AND ACTIVITY

TEXT DETECTION

VIDEO SEGMENTS & SHOTS

FACE DETECTION AND ANALYSIS

CELEBRITY RECOGNITION
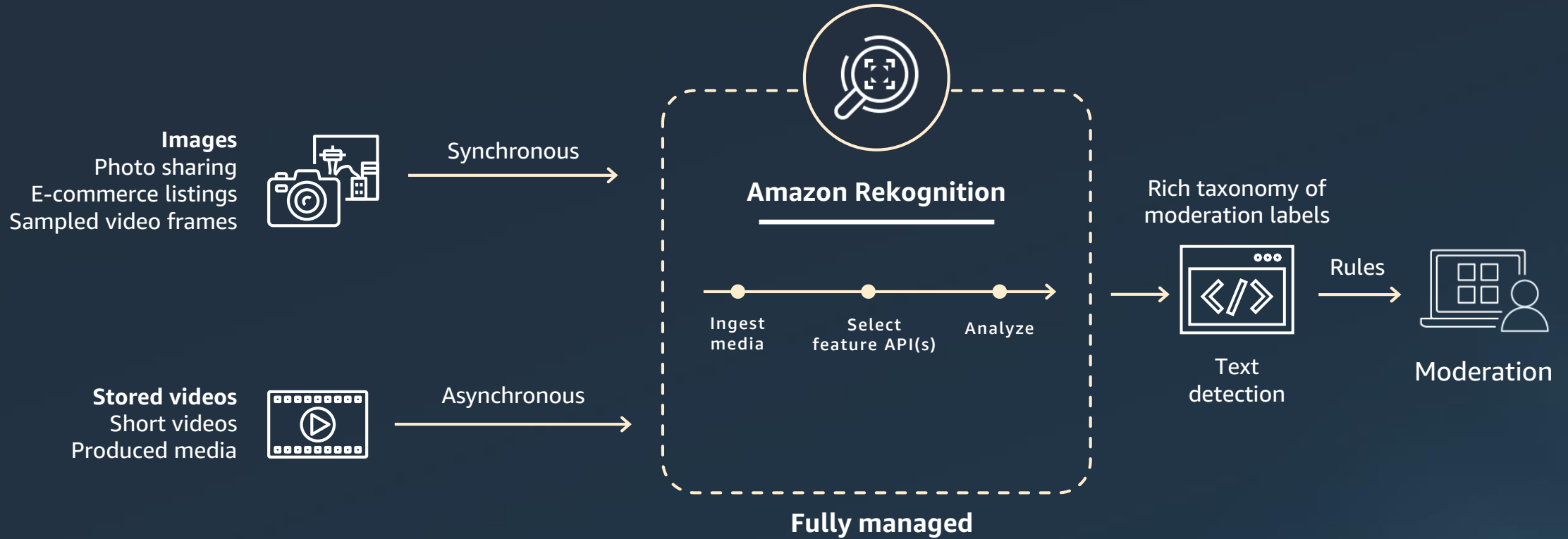
LIVE STREAM VIDEO & PATHING

FACE COMPARE & SEARCH

PPE DETECTION

CUSTOM LABELS

How Amazon Rekognition works

Images
Photo sharing
E-commerce listings
Sampled video frames

Synchronous →

Amazon Rekognition

Ingest media → Select feature API(s) → Analyze

Stored videos
Short videos
Produced media

Asynchronous →

Fully managed

Rich taxonomy of moderation labels

→

Text detection

Rules →

Moderation

Amazon Transcribe
Automatically convert speech to text

Content

Amazon Transcribe

AUDIO INPUTS

READABLE TRANSCRIPTS

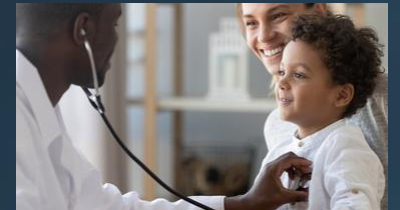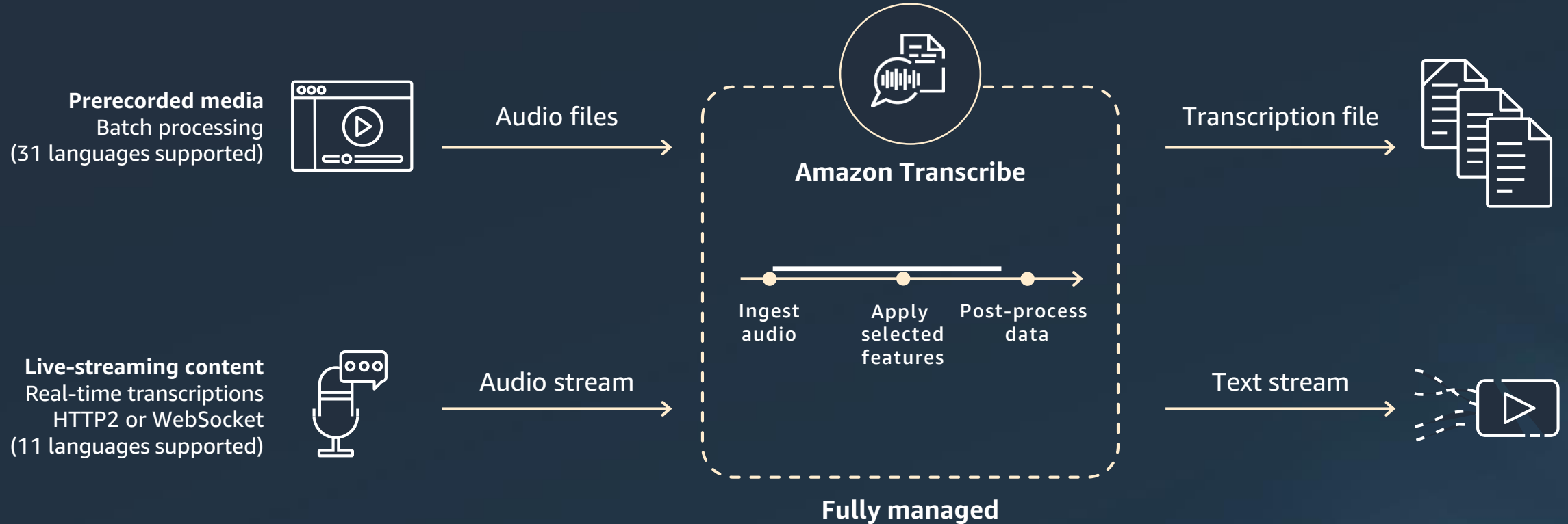OUTPUT CUSTOMIZATION

SAFETY AND PRIVACY

CALL ANALYTICS

TRANSCRIBE MEDICAL

How Amazon Transcribe works

Prerecorded media
Batch processing
(31 languages supported)

Audio files →

Amazon Transcribe

Ingest audio → Apply selected features → Post-process data

Transcription file →

Live-streaming content
Real-time transcriptions
HTTP2 or WebSocket
(11 languages supported)
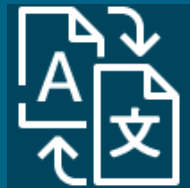
Audio stream →

Text stream →

Fully managed

Amazon Translate

Lower costs and differentiate with moderation based on accurate and natural sounding translation

Content

Amazon Translate

MULTI-LINGUAL SUPPORT

DEEP LEARNING NEURAL NETWORK BASED
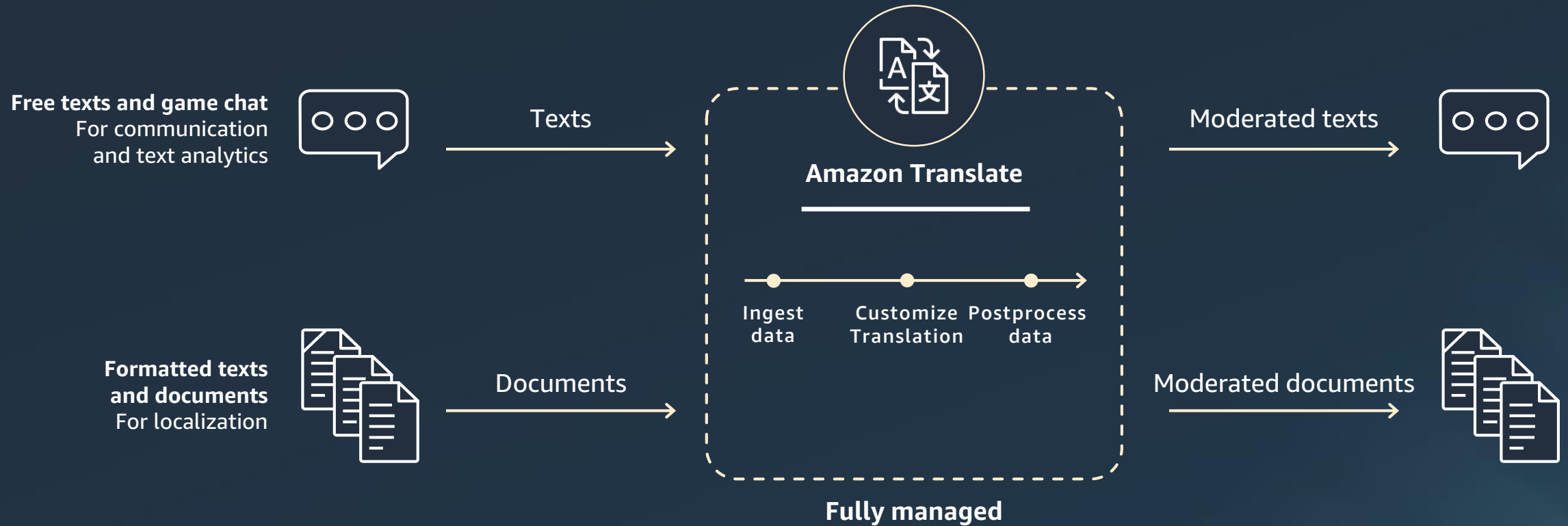
CUSTOMIZABLE TRANSLATION

AUTOMATED LANGUAGE ID

BATCH AND REAL-TIME TRANSLATION

SECURE MACHINE TRANSLATION

How Amazon Translate works

Free texts and game chat
For communication and text analytics

Texts →

Amazon Translate

Ingest data — Customize Translation — Postprocess data

Fully managed

Moderated texts →

Formatted texts and documents
For localization

Documents →

Moderated documents →

Amazon Comprehend

Differentiate your business with valuable insights from text within documents

Content Moderation

Amazon
Comprehend

PRE-TRAINED AND CUSTOM ENTITY RECOGNITION

CUSTOM CLASSIFICATION

EVENTS DETECTION

PII IDENTIFICATION AND REDACTION

KEYPHRASE EXTRACTION

MULTI-LINGUAL SUPPORT
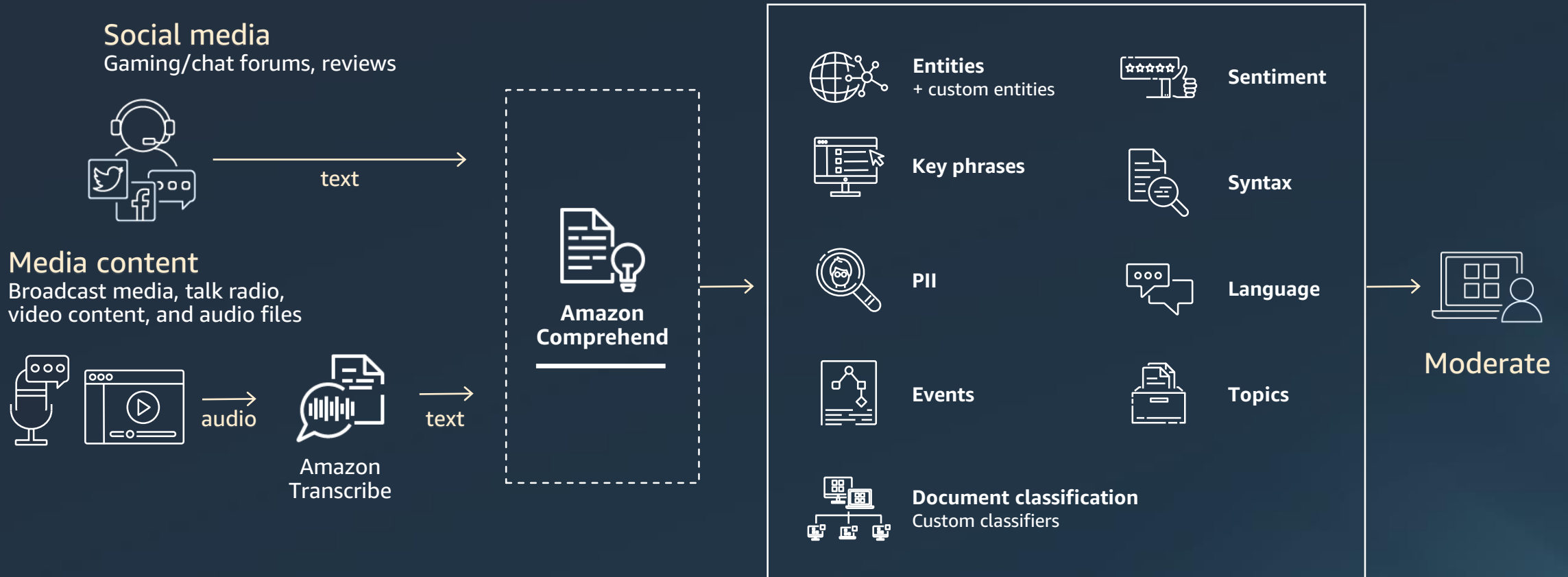
LANGUAGE DETECTION

SYNTAX ANALYSIS

SENTIMENT ANALYSIS

TOPIC MODELING

How Amazon Comprehend works

Social media
Gaming/chat forums, reviews

text →

Media content
Broadcast media, talk radio,
video content, and audio files

audio →

Amazon
Transcribe

text →

**Amazon
Comprehend**

Entities
+ custom entities

Key phrases

PII

Events

Document classification
Custom classifiers

Sentiment

Syntax

Language

Topics

Moderate

Bringing it all together

Bringing all AWS AI services together

TEXT

AMAZON TRANSLATE

AMAZON TRANSCRIBE

AUDIO

AMAZON AUGMENTED AI

TEXT

AMAZON COMPREHEND

AMAZON REKOGNITION

IMAGE/VIDEO

USERS

Bringing all AWS AI services together
Content analysis

AWS Cloud

Ingestion
- AWS Amplify
- Amazon API Gateway
- AWS Panorama
- Amazon Kinesis Video Streams

Content staging
- Amazon S3 (image, video, audio, text and document)

Integration
- AWS Step Functions
- Amazon EventBridge
- Amazon SQS
- AWS Lambda

4 Moderate image and video streams
- Amazon Transcribe
- Amazon Translate
- Amazon Comprehend
- Amazon Rekognition

5 Moderate audio
- Amazon Transcribe
- Amazon Translate
- Amazon Comprehend

6 Moderate text and document
- Amazon Textract
- Amazon Translate
- Amazon Comprehend

Data labeling
- Amazon SageMaker Ground Truth
- 7 Human workforce

Human in the loop
- 8 Amazon A2I
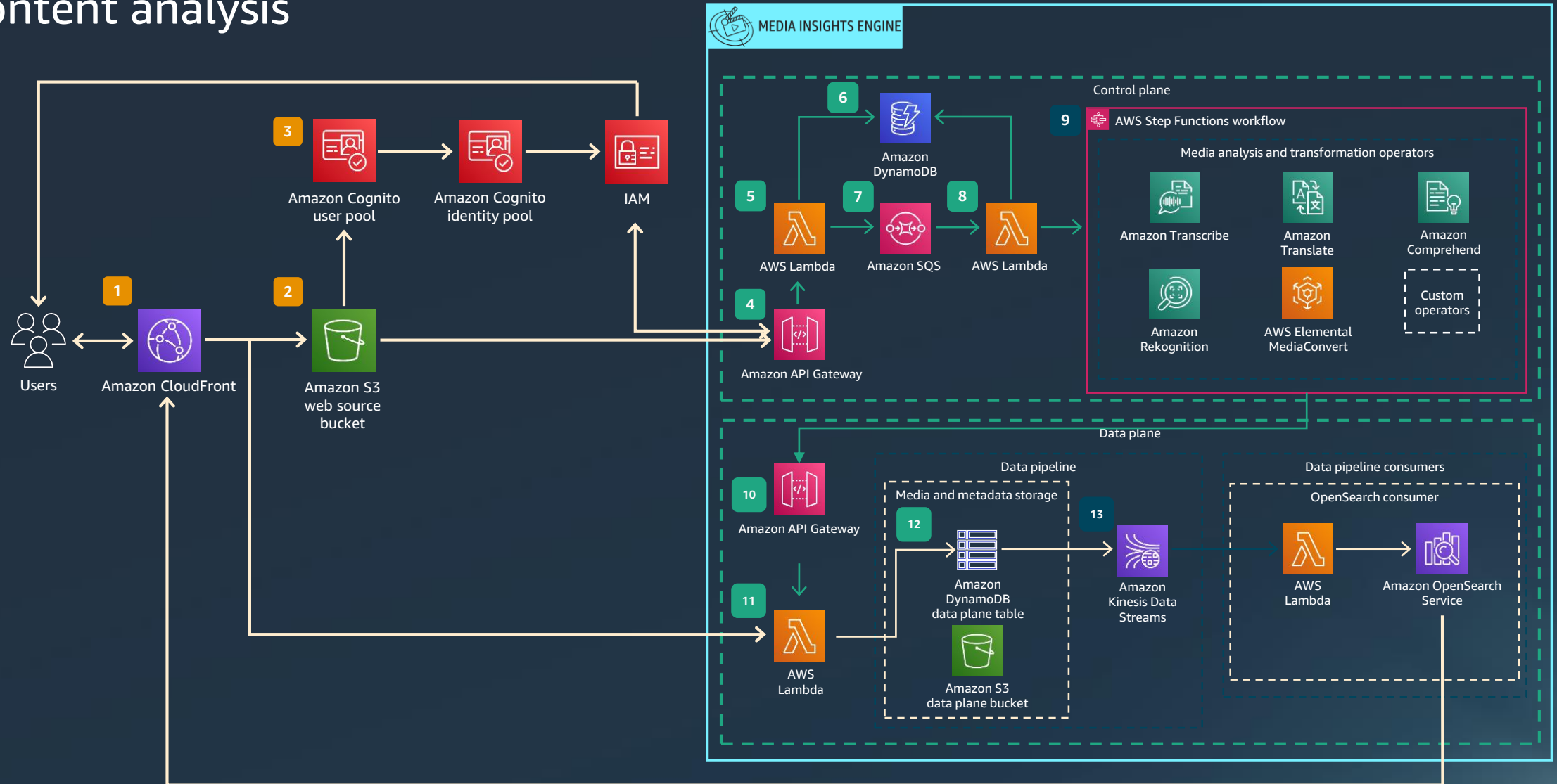
End users

1. Customers upload content to AWS
2. Content securely persists into an Amazon S3 bucket or another data store
3. Activate workflows, publisher/ subscription patterns, and custom code to moderate content
4. Process audio streams within video streams, and extract content moderation categories using simple APIs
5. Transcribe audio and translate languages for text for NLP
6. Use NLP to moderate Microsoft Word and Adobe PDF documents
7. Integrate human workforces to customize model vocabularies and image labels
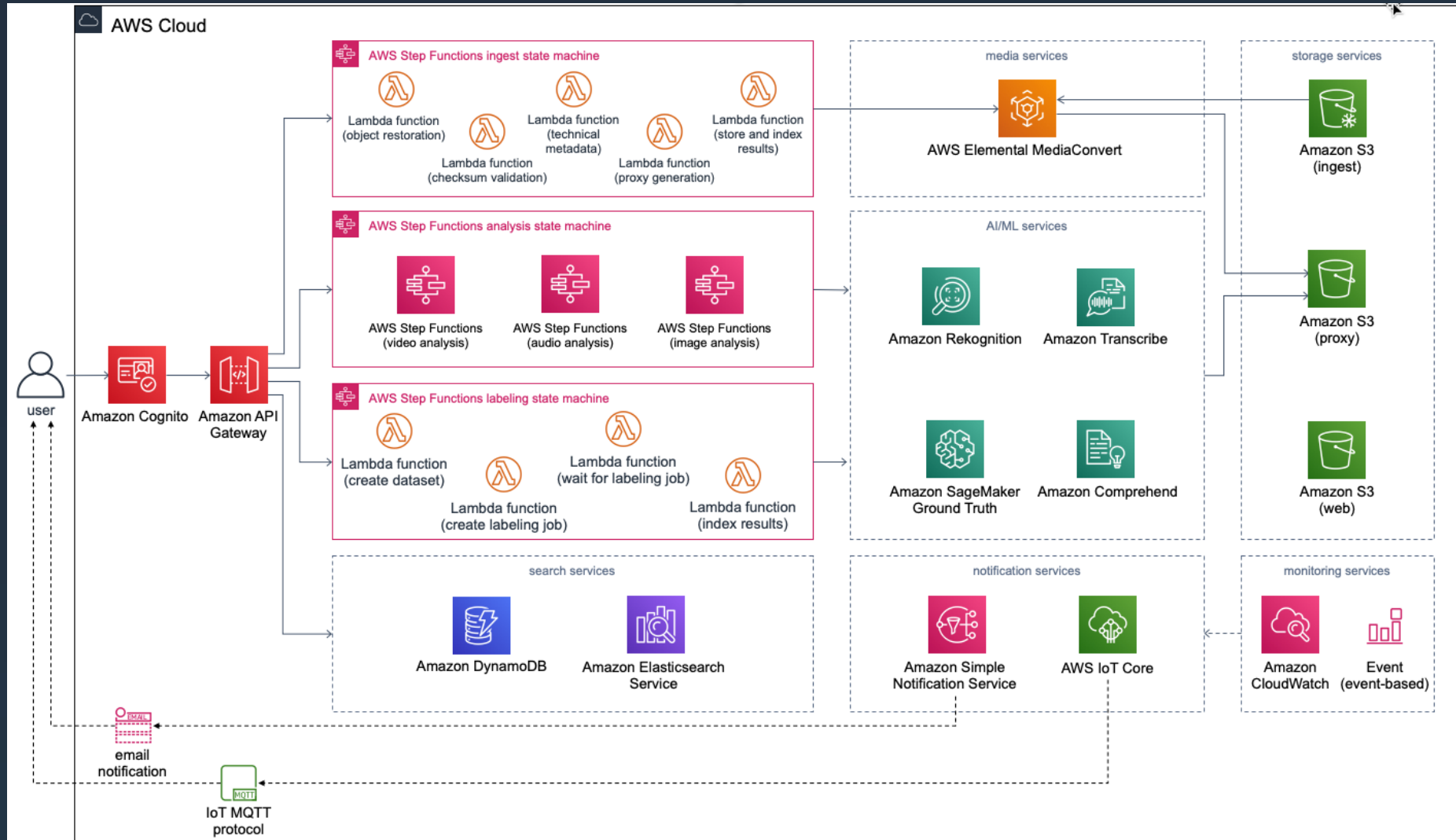8. Bring humans into the loop for scenarios that are not fully automatable

Bringing all AWS AI services together
Content analysis

Users

1 Amazon CloudFront

2 Amazon S3 web source bucket

3 Amazon Cognito user pool → Amazon Cognito identity pool → IAM

MEDIA INSIGHTS ENGINE

Control plane

4 Amazon API Gateway

5 AWS Lambda

6 Amazon DynamoDB

7 Amazon SQS

8 AWS Lambda

9 AWS Step Functions workflow

Media analysis and transformation operators
- Amazon Transcribe
- Amazon Translate
- Amazon Comprehend
- Amazon Rekognition
- AWS Elemental MediaConvert
- Custom operators

Data plane

10 Amazon API Gateway

11 AWS Lambda

Data pipeline
Media and metadata storage
12 Amazon DynamoDB data plane table

Amazon S3 data plane bucket

13 Amazon Kinesis Data Streams

Data pipeline consumers
OpenSearch consumer
AWS Lambda → Amazon OpenSearch Service

Bringing all AWS AI services together
Media2Cloud

Better accuracy

Why Amazon Augmented AI

Human-powered ML

Sampled and efficient human reviews

Multiple workforce options

Best allocation of human value

Easy to implement

Simple integration

Fully managed API

No ML required

Go to market speed and cost

Pre-built tooling

Increased accuracy at a lower cost

Update and retain models

KEY FEATURES

Pre-integrated workflows for image, text and audio moderation use cases

Integrate human oversight with any application

Keep information safe with encrypted translation for batch and real-time sources

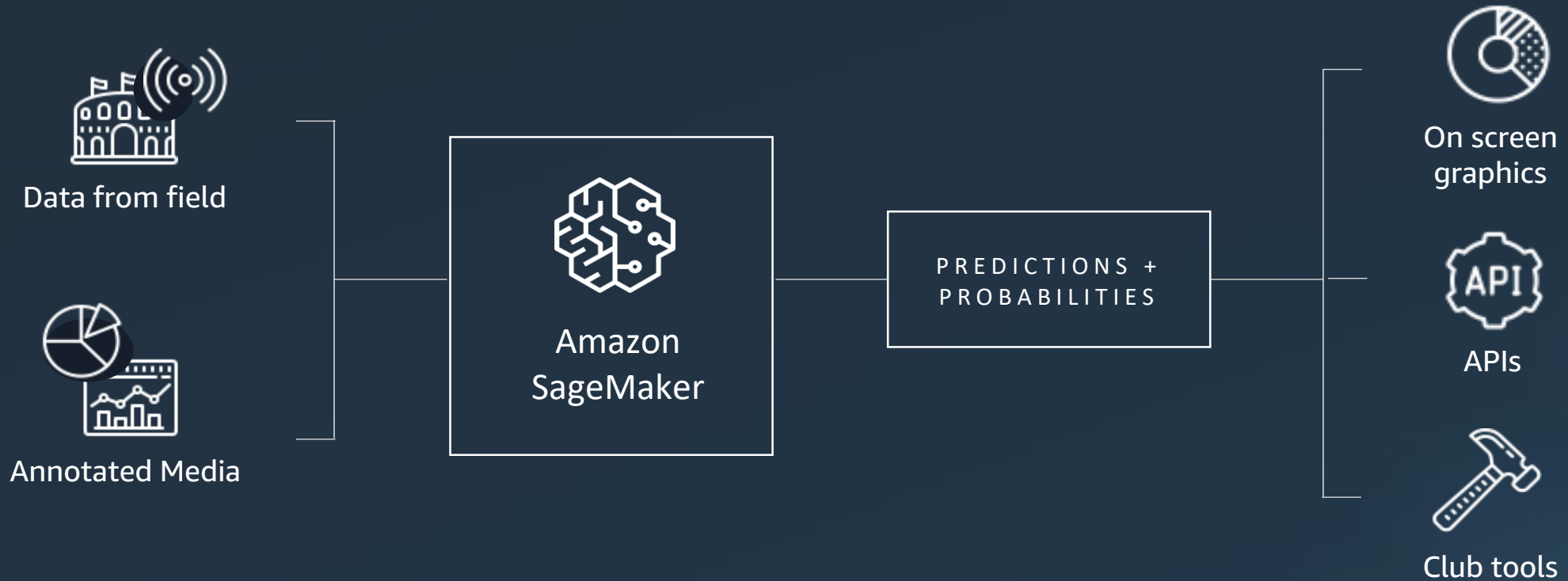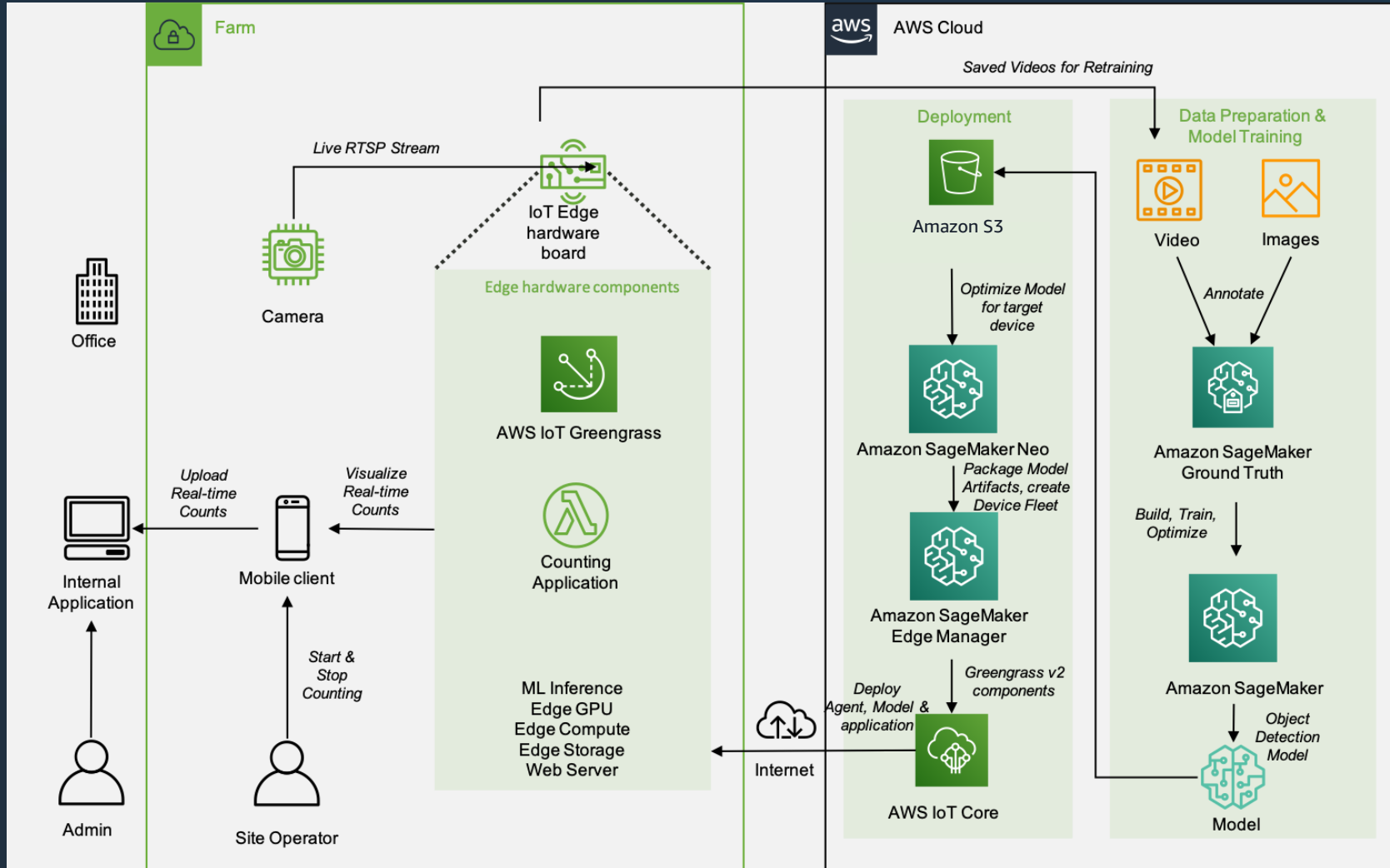| Easy to implement human review workflows | Pre-built workflows and UI | Multiple workforce options | Integrate with your custom ML models | Increased worker efficiency |

How Amazon A2I works

3 High-confidence predictions returned immediately to client application

1 Client application sends input data

2 AWS AI service or custom ML model makes predictions

4 Low-confidence predictions sent for human review

5 Reviews consolidated using Amazon A2I

6 Results stored to Amazon S3

Client application
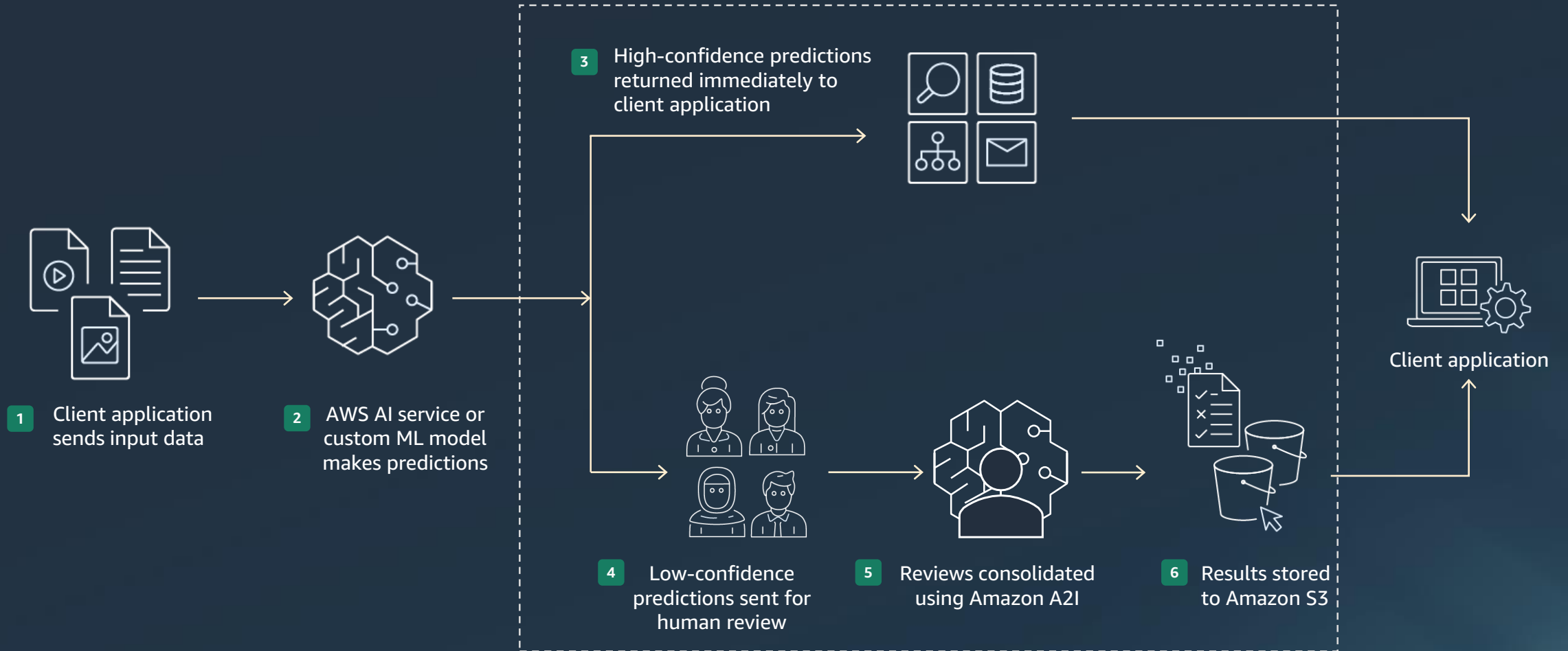
Custom models and edge

Custom models with Amazon Sagemaker

Data from field

Annotated Media

Amazon SageMaker

PREDICTIONS + PROBABILITIES

On screen graphics

APIs

Club tools

Cloud and edge in action

- Count wildlife with drone imagery
- Count and track farm animals
- Track and act on public safety situations
- Situational awareness
- Battlefield

Demo

Recap

- Add AI capabilities to your media workflows with AWS

- Learn how AWS AI services like Amazon Rekognition, Amazon Transcribe, Amazon Translate, and Amazon Comprehend enable you to derive meaning from the video frames and audio tracks

- Transform your media workloads with the most purpose-built capabilities

- Uncover approaches of building and running custom models with cloud/edge

AWS solutions

Find all AWS solutions here: **aws.amazon.com/media/solutions** and look at for the ML-specific solutions such as:

- **Media Insights Engine** – Gain deep insights into your content / build out rich media use cases

- **Media 2 Cloud –** Setup an ingest workflow to move media assets to the cloud

- **Live Subtitling and Translation -** Generate multi-language subtitles for live OTT streaming
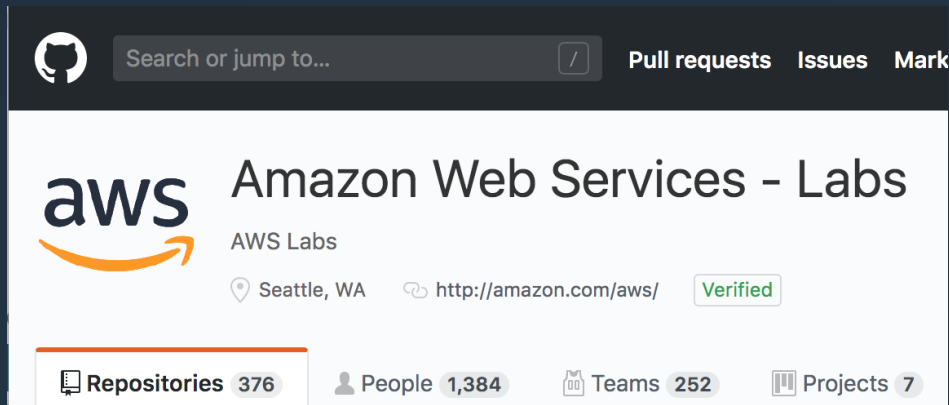
Note:
The Media Insights Engine is currently available on <u>GitHub only</u>.

<u>https://github.com/awslabs/aws-media-insights-engine</u>

Getting started

AWS Framework to accelerate development

AWS Media2Cloud solution
https://aws.amazon.com/solutions/implementations/media2cloud/

AWS Content Analysis Solution
https://aws.amazon.com/solutions/implementations/aws-content-analysis/

AWS Media Insights Engine
https://github.com/awslabs/aws-media-insights-engine/

Automating broadcast video monitoring
https://aws.amazon.com/blogs/media/automate-broadcast-video-monitoring-using-machine-learning-on-aws/

Inserting ad breaks into video content
https://aws.amazon.com/blogs/media/inserting-ad-breaks-into-video-content-using-amazon-rekognition-aws-elemental-mediaconvert-and-aws-elemental-mediatailor/

Custom Brand Detection Solution using Amazon Rekognition Custom Labels
https://github.com/aws-samples/amazon-rekognition-custom-brand-detection

AWS Training and Certification

Access the AI & ML learning plan courses built by AWS experts on AWS Skill Builder

- Get started with digital self-paced, on-demand training and ramp-up guides to help you grow your technical skills

- Learn how to apply machine learning, artificial intelligence, and deep learning to unlock new insights and value in your role

- Take the steps today, towards validating your expertise with an AWS Certified Machine Learning – Specialty Certification

https://bit.ly/3FnxDH7

Learn your way explore.skillbuilder.aws »

Visit the Data & AI/ML resource hub

Dive deeper into these resources, get inspired and learn how you can use AI and machine learning to accelerate your business outcomes.

- 6 steps to machine learning success e-book

- 7 leading machine learning use cases e-book

- Machine learning at scale e-book

- Achieving transformative business results with machine learning e-book

- Tackling our world's hardest problems with machine learning e-book

- Accelerating machine learning innovation through security e-book

- … and more!

https://bityl.co/FqdC

Visit resource hub

Thank you for attending AWS Innovate – Data & AI/ML Edition

We hope you found it interesting! A kind reminder to **complete the survey.**
Let us know what you thought of today's event and how we can improve the event experience for you in the future.

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Thank you!