

Let's Take a Look Around Us

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The need for **Natural Language Processing (NLP)** is gaining more importance as the amount of unstructured text data doubles every 18 months and customers are looking to extend their existing analytics workloads to include natural language capabilities. Historically, this data had been prohibitively expensive to store and early manual processing evolved into rule-based systems, which were expensive to operate and inflexible. In this session we will show you how you can address this problem using **DeepInsight**.

Growth of Natural Language Experiences

- Public Content is Relevant
 - Social Media
 - News
- Natural Language Customer Engagement
 - Reviews/Comment
 - Support (call, email feedback)

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Text Analytics at Scale

- AWS Platform value
- Amazon S3 Data Lakes
- Scalable, pay for what you use, analytics

Training NLP is Hard and Expensive



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This is what the AWS Comprehend team does for you instead of you having to build a team for doing the same things.

Amazon Comprehend: Natural Language Processing



Sentiment



Entities



Languages



Key phrases



Topic modeling

POWERED BY DEEP
LEARNING



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It is a fully managed service that is constantly being trained for you. There are 5 main parts to this service as listed above. It uses up to 100 languages and exposed with easy to use APIs.

Text Analysis

Amazon.com, Inc. is located in Seattle, WA and was founded July 5th, 1994 by Jeff Bezos. Our customers love buying everything from books to blenders at great prices

Named Entities

- Amazon.com: Organization
- Seattle, WA : Location
- July 5th, 1994: Date
- Jeff Bezos : Person

Keyphrases

- Our customers
- books
- blenders
- great prices

Sentiment

- Positive

Language

- English

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These APIs are separated into 4 parts, **Text Analytics**, **Key Phrases**, **Sentiments** and **Language**.

Topic Modeling

Keywords Topic Groups

Topic	Term	Weight
0	Washington	.89
1	Silicon Valley	.67
2	Roasting	.91

Document Relationship to Topics

Document	Topic	Proportion
Doc.txt	0	.89
Doc.txt	1	.67
Doc.txt	2	.91

This can be used by pointing to a S3 bucket as the document source and give it a job name before clicking 'Run'. AWS Comprehend will make 2 views when running the job, the first is the **Keywords Topics** groups (the topics are buckets of words with terms and their weights), and the **Document Relationship to Topics**.

Developer Experience

The screenshot displays the AWS Comprehend API explorer interface. The main area shows a text input field with a sample paragraph about Amazon.com, Inc. The text is highlighted with colored boxes indicating detected entities: "Amazon.com, Inc." (blue), "Seattle, WA" (orange), "July 5th, 1994" (red), "Jeff Bezos" (purple), "books to blenders" (orange), "Seattle" (orange), "Portland" (orange), "Vancouver, BC" (orange), "Starbucks" (blue), and "Boeing" (blue). To the right of the text input, there is a list of analysis options: Entity, Key phrases, Language, and Sentiment. Below the text input, there is a "Language" dropdown menu set to "Auto-Detect" and an "Analyze" button. The interface also shows a character count: "270 of 1000 characters used". The footer of the interface includes a "Feedback" link, the language "English (US)", and copyright information: "© 2008 - 2017, Amazon Web Services, Inc. or its affiliates. All rights reserved.".

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Comprehend QuickSight Demo

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Amazon Comprehend

- API explorer
- Topic modeling
- Additional resources
- Documentation

API explorer

Paste the text that you would like to analyze with natural language processing.

Clear text

Amazon.com, Inc. is located in Seattle, WA and was founded July 5th, 1994 by Jeff Bezos, allowing customers to buy everything from books to blenders. Seattle is north of Portland and south of Vancouver, BC. Other notable Seattle-based companies are Starbucks and Boeing.

270 of 1000 characters used

Language Auto-Detect Analyze

Detected language: English

Entity

This API returns the named entities ("Person", "Organization", "Locations", etc.) within the text you analyzed.

List Tiles JSON

Filter Show all categories

Entity	Category	Count	Confidence
Amazon.com, Inc.	Organization	1	0.96
Seattle, WA	Location	1	0.96
July 5th, 1994	Date	1	0.99+
Jeff Bezos	Person	1	0.99+
Seattle	Location	2	0.98
Portland	Location	1	0.99
Vancouver, BC	Location	1	0.97
Starbucks	Organization	1	0.91
Boeing	Organization	1	0.99+

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List Tiles JSON

Request

```
{
  "Text": "Amazon.com, Inc. is located in Seattle, WA and was founded July 5th, 1994 by Jeff Bezos, allowing customers to buy everything from books to blenders. Seattle is north of Portland and south of Vancouver, BC. Other notable Seattle-based companies are Starbucks and Boeing.",
  "LanguageCode": "en"
}
```

Copy to clipboard

Response

```
{
  "Entities": [
```

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270 of 1000 characters used

Language Auto-Detect Analyze

Detected language: English

Entity

Key phrases

This API returns key phrases and a confidence score to support that this is a key phrase.

List JSON

Key phrase	Count	Confidence
Amazon.com	1	0.86
Seattle, WA	1	0.97
July 5th, 1994	1	0.93
Jeff Bezos	1	0.99+
customers	1	0.98
books	1	0.99+
blenders	1	0.98
Seattle	1	0.99+

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270 of 1000 characters used

Language Auto-Detect Analyze

Detected language: English

Entity

Key phrases

Language

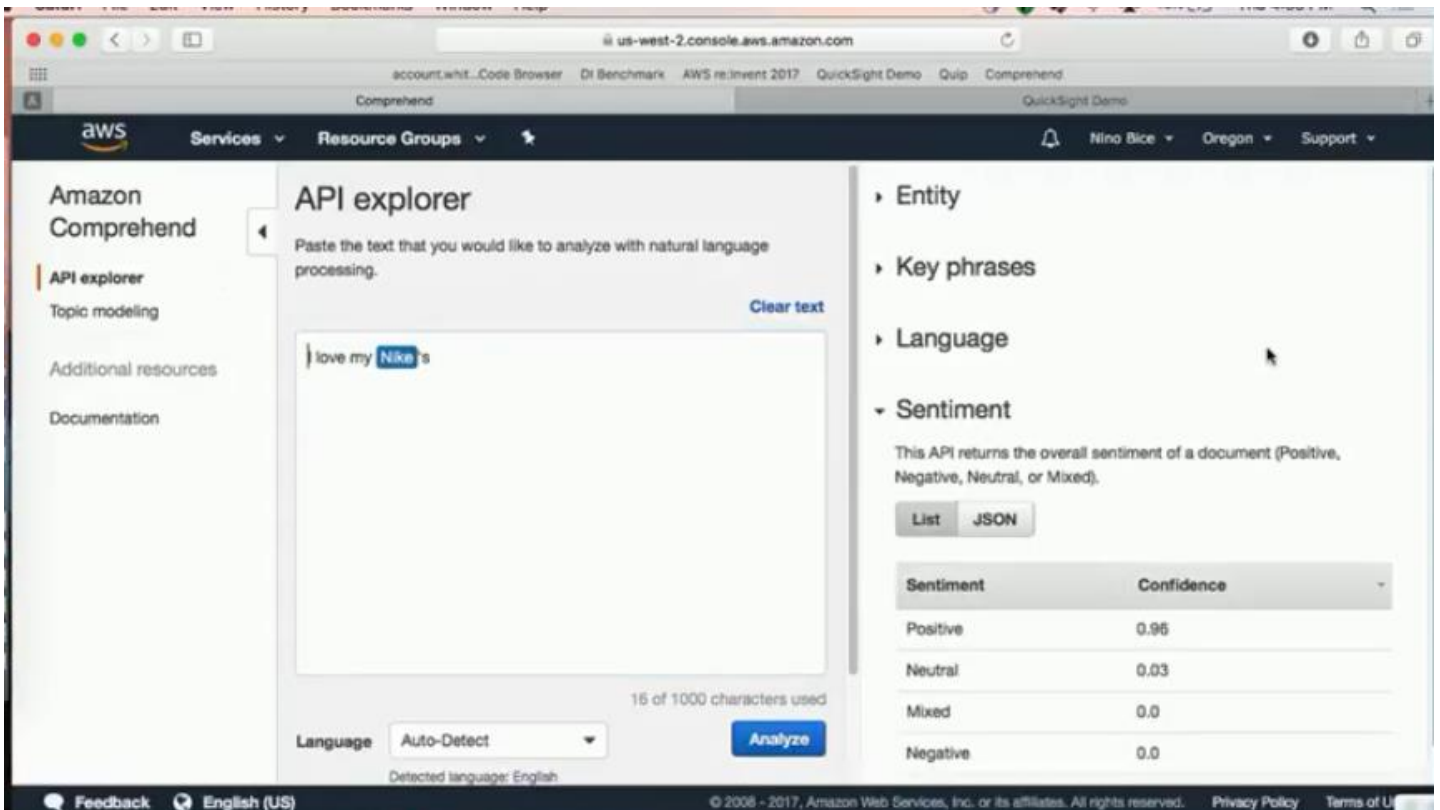
Sentiment

This API returns the overall sentiment of a document (Positive, Negative, Neutral, or Mixed).

List JSON

Sentiment	Confidence
Neutral	0.95
Positive	0.03
Negative	0.02
Mixed	0.0

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It does sentiment analysis on text as seen above

Developer Experience

API Summary

Synchronous

- `DetectDominantLanguage` and `BatchDetectDominantLanguage` – to detect the dominant language in a document. We can detect up to 100 languages.
- `DetectEntities` and `BatchDetectEntities` – to detect the entities, such as persons or places, in the document.
- `DetectKeyPhrases` and `BatchDetectKeyPhrases` – to detect key noun phrases that are most indicative of the content.
- `DetectSentiment` and `BatchDetectSentiment` – to detect the emotional sentiment, positive, negative, mixed, or neutral, of a document.

Asynchronous

- `StartTopicDetection` – to start a topic modeling job
- `ListTopicDetection` – to list all your submitted jobs
- `DescribeTopicDetection` – to get progress status and information about each submitted job

The AWS Comprehend SDK is now available and the CLI also works. The APIs are grouped into Synchronous and Asynchronous (for batch jobs) APIs.

Synchronous APIs

```
{
  "Languages": [
    {
      "LanguageCode": "string",
      "Score": number
    }
  ],
  "Entities": [
    {
      "BeginOffset": number,
      "EndOffset": number,
      "Score": number,
      "Text": "string",
      "Type": "string"
    }
  ]
}
```

This is a typical response of the Language and Entities APIs.

Synchronous APIs

```
import boto3
import json
comprehend = boto3.client(service_name='comprehend', region_name='region')
text = "It is raining today in Seattle"
print('Calling DetectEntities')
print(
    • json.dumps(
      • comprehend.detect_entities(Text=text, LanguageCode='en'),
      • sort_keys=True, indent=4)
    • )
print('End of DetectEntities\n')
```


Batch APIs

```
{
  "ErrorList": [
    {
      "ErrorCode": "string",
      "ErrorMessage": "string",
      "Index": number
    }
  ],
  "ResultList": [
    {
      "Entities": [
        {
          "BeginOffset": number,
          "EndOffset": number,
          "Score": number,
          "Text": "string",
          "Type": "string"
        }
      ],
      "Index": number
    }
  ]
}
```

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The Batch APIs gives the option to provide multiple requests synchronously and get back response with the results for all the individual requests, you can then iterate through the result list to get individual results. You can also get partial results via polling.

Batch APIs

```
AmazonComprehend client = AmazonComprehendClientBuilder.standard()
    .withCredentials(new AWSSStaticCredentialsProvider(awsCreds))
    .withRegion("region")
    .build();

String[] textList = {"I love Seattle", "Today is Sunday", "Tomorrow is Monday"};

// Call detectEntities API
System.out.println("Calling BatchDetectEntities");
BatchDetectEntitiesRequest batchDetectEntitiesRequest = new BatchDetectEntitiesRequest()
    .withTextList(textList)
    .withLanguageCode("en");

BatchDetectEntitiesResult batchDetectEntitiesResult = client.batchDetectEntities(batchDetectEntitiesRequest);

for(BatchDetectEntitiesItemResult item : batchDetectEntitiesResult.getResultList())
{
    System.out.println(item);
}
```

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Topic Modeling APIs

```
aws comprehend start-topics-detection-job
```

```
--number-of-topics topics to return
```

```
--job-name "job name"
```

```
--region region
```

```
--cli-input-json file:
```

```
{
  "InputDataConfig": {
    "S3Uri": "s3://input bucket/input path",
    "InputFormat": "ONE_DOC_PER_FILE"
  },
  "OutputDataConfig": {
    "S3Uri": "s3://output bucket/output path"
  },
  "DataAccessRoleArn": "arn:aws:iam::account ID:role/data access role"
}
```

```
aws comprehend describe-topics-detection-job --region region --job-id job ID
```

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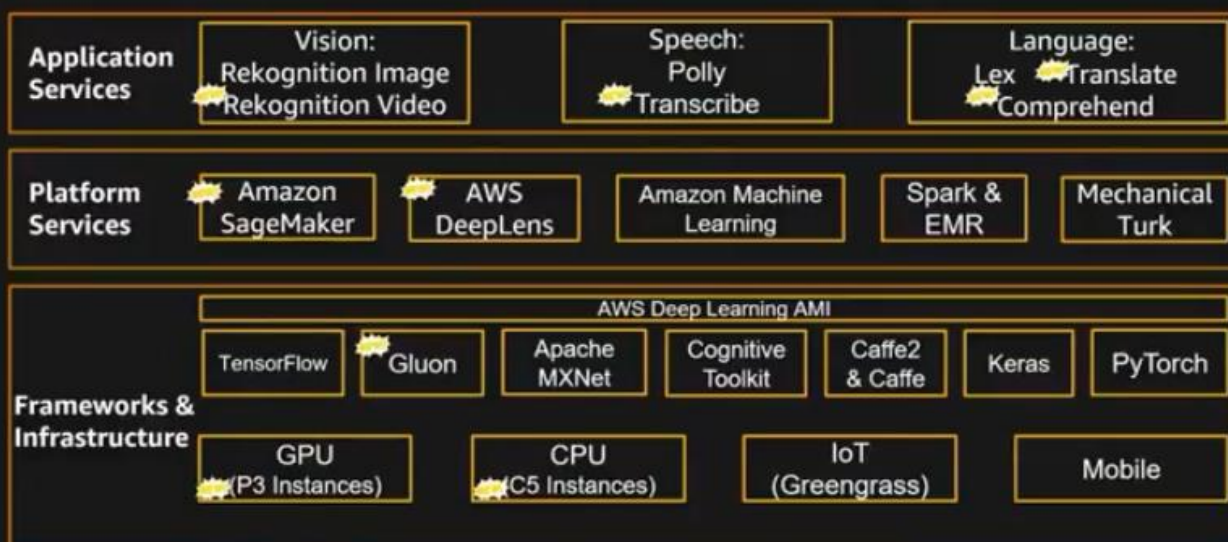
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This is a CLI example for the topic modelling API in a synchronous manner, you can specify a job name, S3 URI for your bucket so that you can refer to the job later using the job-id handler.

Comprehend AWS Text Analytics

AWS ML Stack



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These are continuously trained ML models made available for you.

Common Use Cases



Voice of Customer Analytics

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



Semantic Search

Making search smarter by searching on keyphrase, sentiment and topic



Knowledge Management/Discovery

Organizing documents, categorizing by topic and personalizing experiences

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The screenshot shows the AWS console interface for the Amazon Comprehend service. The left sidebar contains navigation links for 'API explorer', 'Topic modeling' (which is selected), 'Additional resources', and 'Documentation'. The main content area is titled 'Topic modeling' and includes a 'Create' button. Below this is a table showing a single completed job. The table has columns for 'Job name', 'Job ID', 'Start time', 'End time', and 'Status'. The job listed is 'job1' with a long alphanumeric ID, completed on 11/26/2017 at 8:37:04 PM.

Job name	Job ID	Start time	End time	Status
job1	d6e5de5d51d13715d3db406ee9a0608e	11/26/2017, 8:12:49 PM	11/26/2017, 8:37:04 PM	Completed

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Amazon Comprehend

API explorerTopic modelingAdditional resourcesDocumentation

Create topic modeling job

Starts an asynchronous topic modeling job. The topic modeling job will find the most common topics in the collection and organize them in phrase groups, per topic. In addition, the service will map which documents belong to which topic. For example, you can see all documents that map to a topic group that has a high weight to words like "Holiday", "Sales", and "Discounts".

Select input data

Please select the topic modeling data you would like to analyze. Our text analytics services work best when there are at least 1,000 documents of at least 100 words each, but can be applied to documents of any size up to 1MB, and from 10's to millions of documents.

☐ Topic modeling sample data (1000 documents)☒ My data (S3)

S3 data location

e.g.: s3://MyBucketName

Input format

Select an input format

Number of topics

Max of 100

Job Name

e.g.: MyTopicModelingJob

Any characters; length between 1-256

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Topic modeling sample data (1000 documents)☐ My data (S3)☒

S3 data location

e.g.: s3://MyBucketName

Input format

Select an input format

Number of topics

Max of 100

Job Name

e.g.: MyTopicModelingJob

Any characters; length between 1-256

Select output location

Select the preferred output format for your analysis. S3 data output location, and the format of data as CSV.

S3 data location

e.g.: s3://MyBucketName

Select an IAM role

The topic modeling job will use the IAM role to access your Amazon S3 input and output buckets.

☒ Select an existing IAM role

FeedbackEnglish (US)

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API explorer

Topic modeling

Additional resources

Documentation

Number of topics Max of 100

Job Name e.g.: MyTopicModelingJob

Any characters; length between 1-256

Select output location

Select the preferred output format for your analysis. S3 data output location, and the format of data as CSV.

S3 data location e.g.: s3://MyBucketName

Select an IAM role

The topic modeling job will use the IAM role to access your Amazon S3 input and output buckets.

☒ Select an existing IAM role

☐ Create a new IAM role

IAM role Select a role

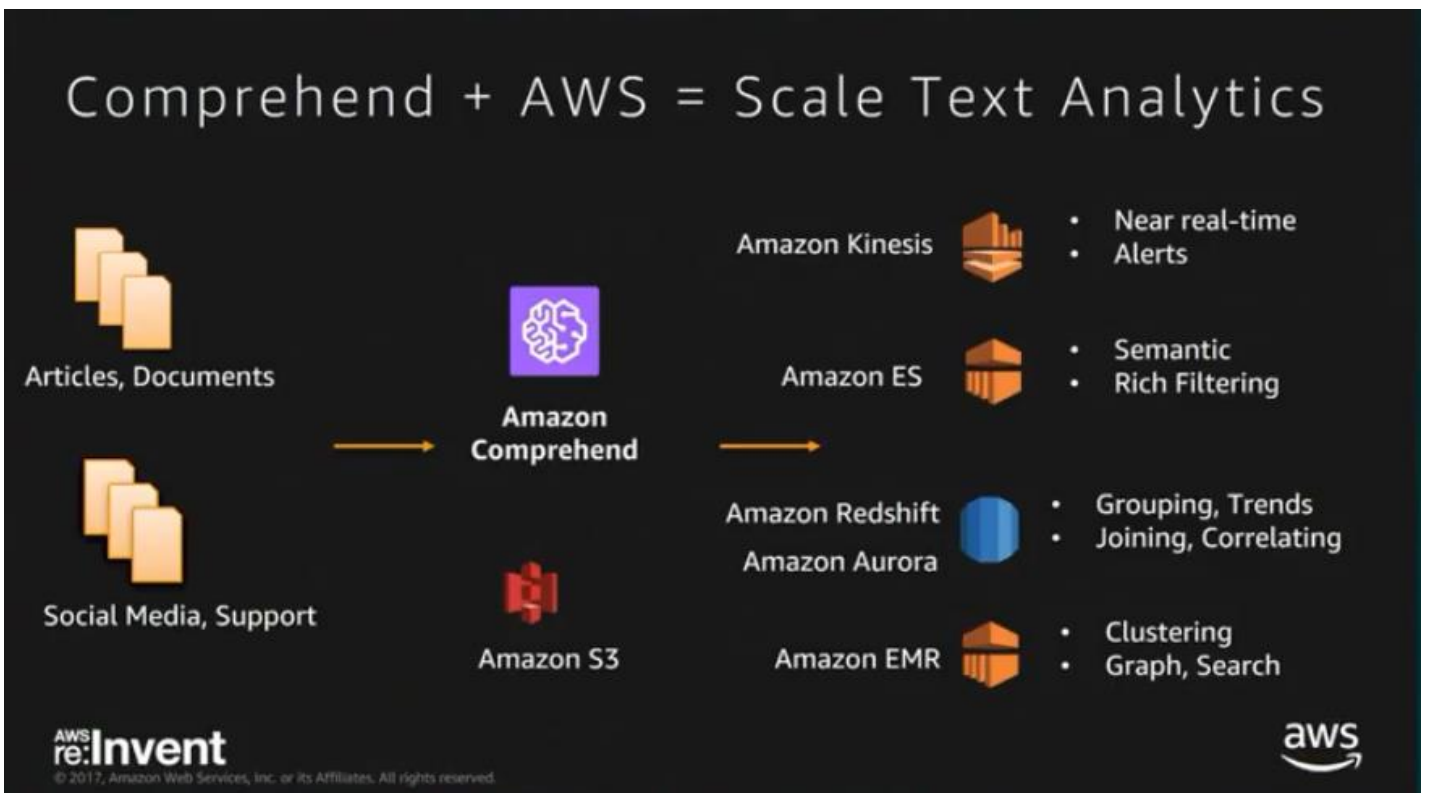
Filtered by trust policy: comprehend.amazonaws.com

Cancel Create job

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This is all you need for doing topic modelling on a corpus in a S3 bucket.



Launch Customer: Elementum

Elementum: Make.Things.Better.

Supply Chain Management

- Fortune 100 clients
- Provide a real-time-end-to-end platform that unifies procurement, logistics, manufacturing, and inventory operations.
- Our Product Graph digitally maps the \$25T global product economy.
- Enable manufacturers to make smarter decisions, anticipate disruptions, and quickly rally your teams to take corrective action, converting volatility into opportunity.

Operational Excellence

- Drive revenue growth
 - Deliver the right products on-time
 - Proactively recommend alternative when needed (natural disasters, strikes, etc)
- Increase free cash
 - Reduce Time to Market
 - Monitor actual performance vs SLAs



News Feed Analysis & Requirements

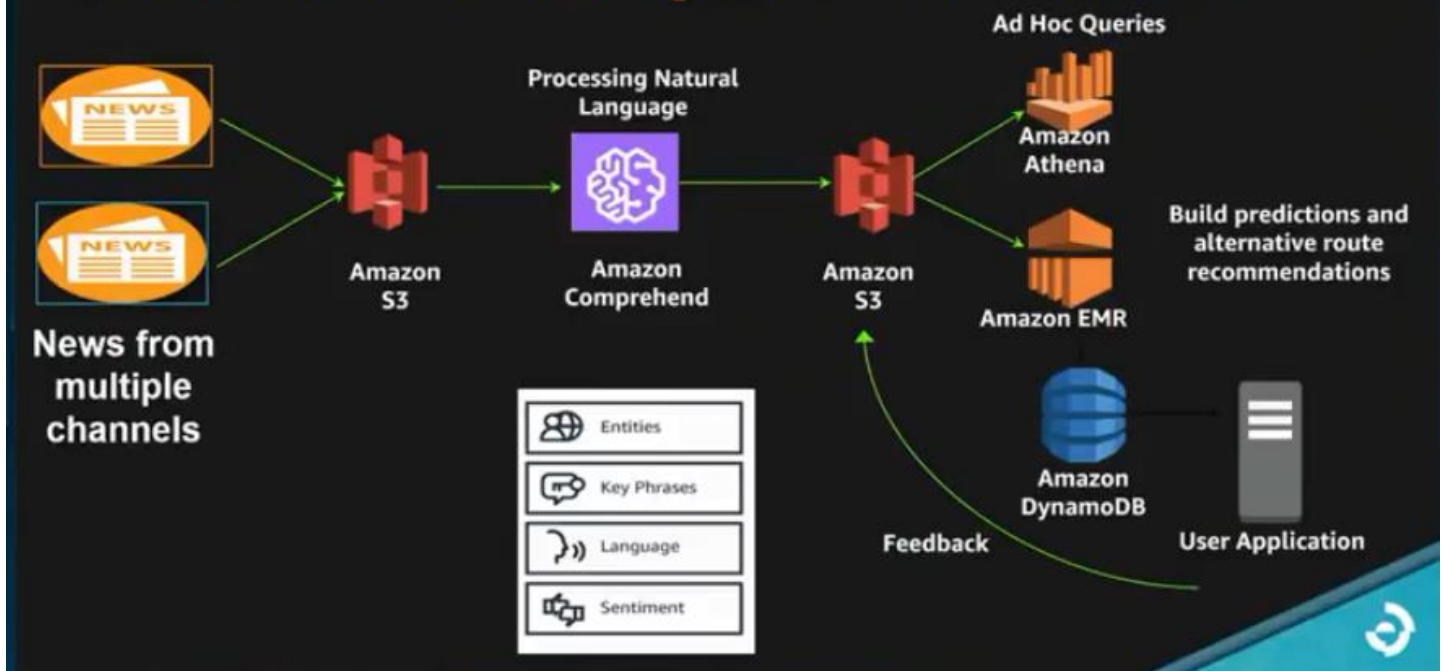
- Global Supply Chain requires local language translation
- Disaster Aware System – Build proactive recommendation alternatives when needed (I.E. natural disasters, strikes, geopolitical, etc)
- Operational Excellence
- Business Continuity
- Build continuous supply-chain workflow



Amazon Comprehend

- Discover meaning and relationships in text from numerous sources
- Identify topics in a collection of text
- Continually learning, always improving
- Easy organization and categorization of documents by topic for easier discovery, ability to personalize content recommendations for readers by recommending other articles related to the same topic.
- Fully managed and continuously trained service

News Feed Analysis - Workflow



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Our software is purpose-built for specific industries, providing complete suites that are designed to support progress – for individuals, businesses, and the world.

Customers and innovation at the core



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Infor OS

UX

Portal
In-context
Homepages
Search
Chat
Documents (IDM)

IPAAS

Process integration
Activity Monitoring
Workflow
API gateway
Orchestration
Mapping
Mediation

SECURITY

Single Sign On
Users / Roles
Groups
Auditing / Monitoring
Risk & Compliance
Insights

DATA MGMT

Data Lake
Graph
Data Catalogue
Data Services APIs
Data Pipelines
Archiving

PAAS

Dev Framework
Composite Apps
Soho UX Library
Reports
Extensibility

COLEMAN A.I.

Digital Assistant
Automated Skills
Contextual A.I.
Image recognition
A.I. PaaS

IOT

IoT Portal
Connectors
Embedded EAM
Analytics

LOCALIZATIONS

Electronic Messages
Reports
Tax Engine
eAccounting
Financial Controller
Submission Portal

infor

AMAZON COMPREHEND + INFOR TECHNOLOGY

Infor OS



Unstructured
Documents

*Ability to extract sentiment and entity relationships
in documents to automatically create actions and
provide refined search capabilities*



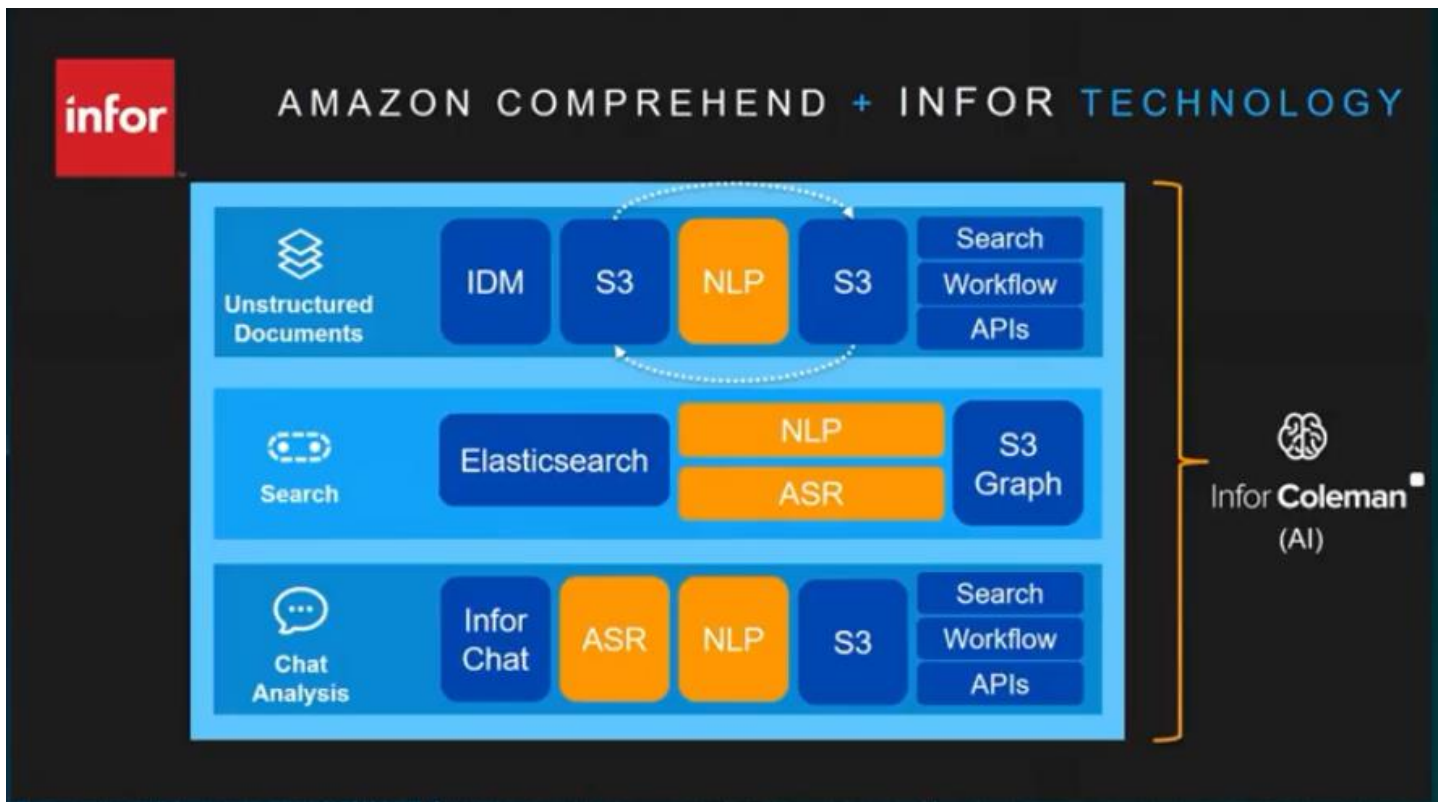
Search

*Ability to accept search requests in natural language and create
relationships to entities in order to generate more accurate
search queries and to automatically link to Digital Assistant skills*



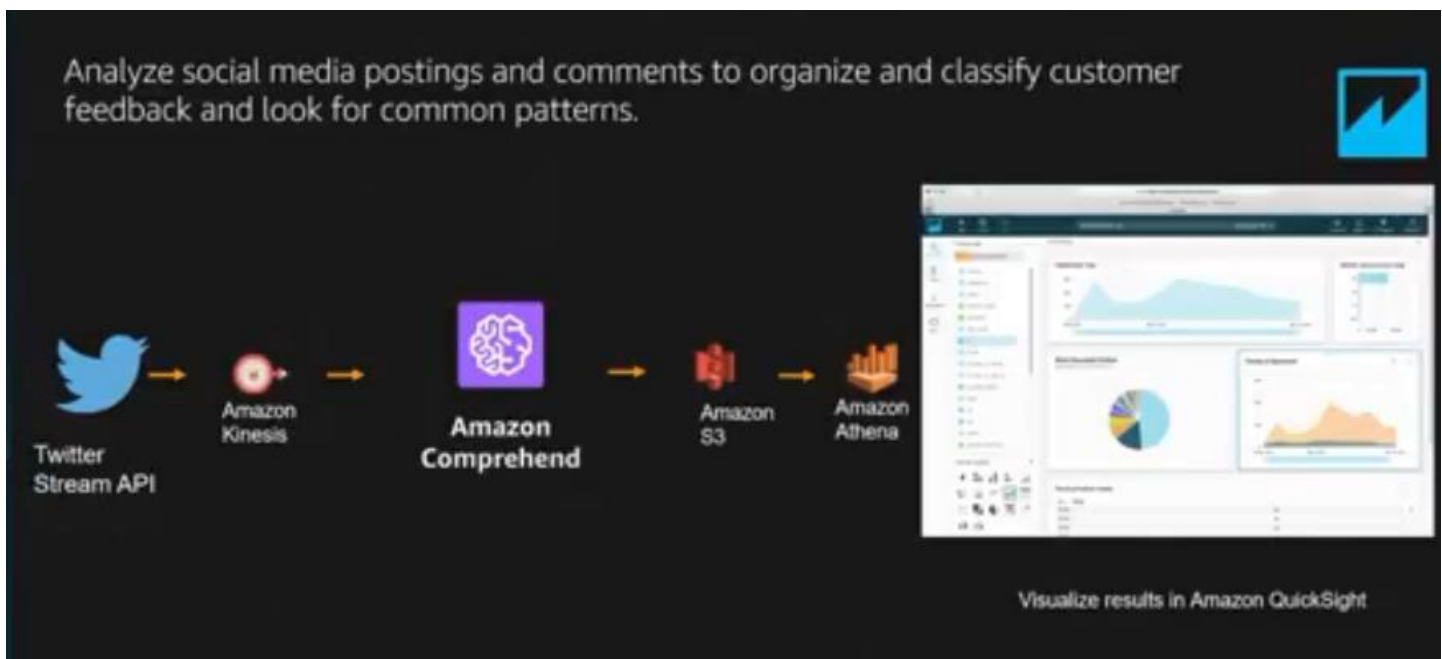
Chat
Analysis

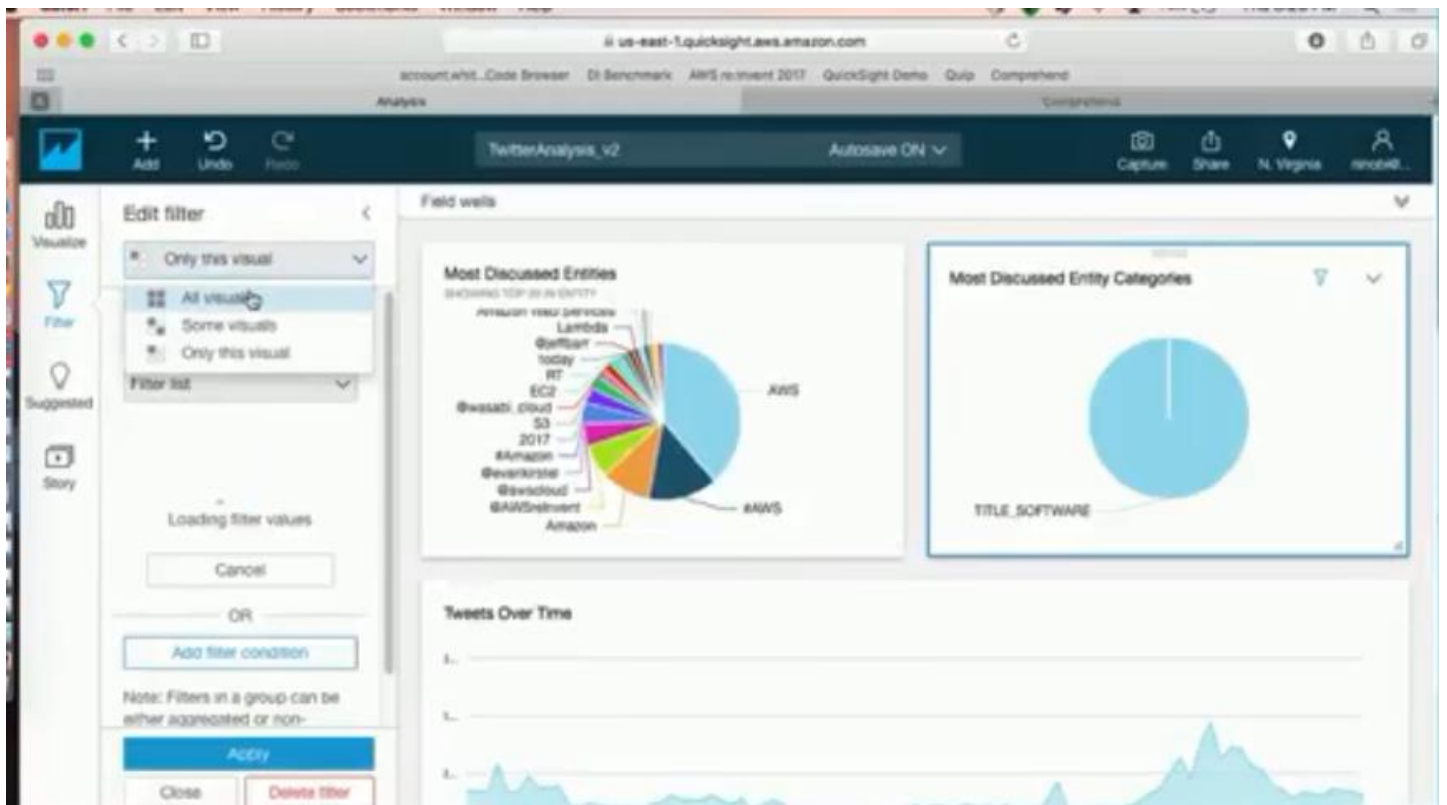
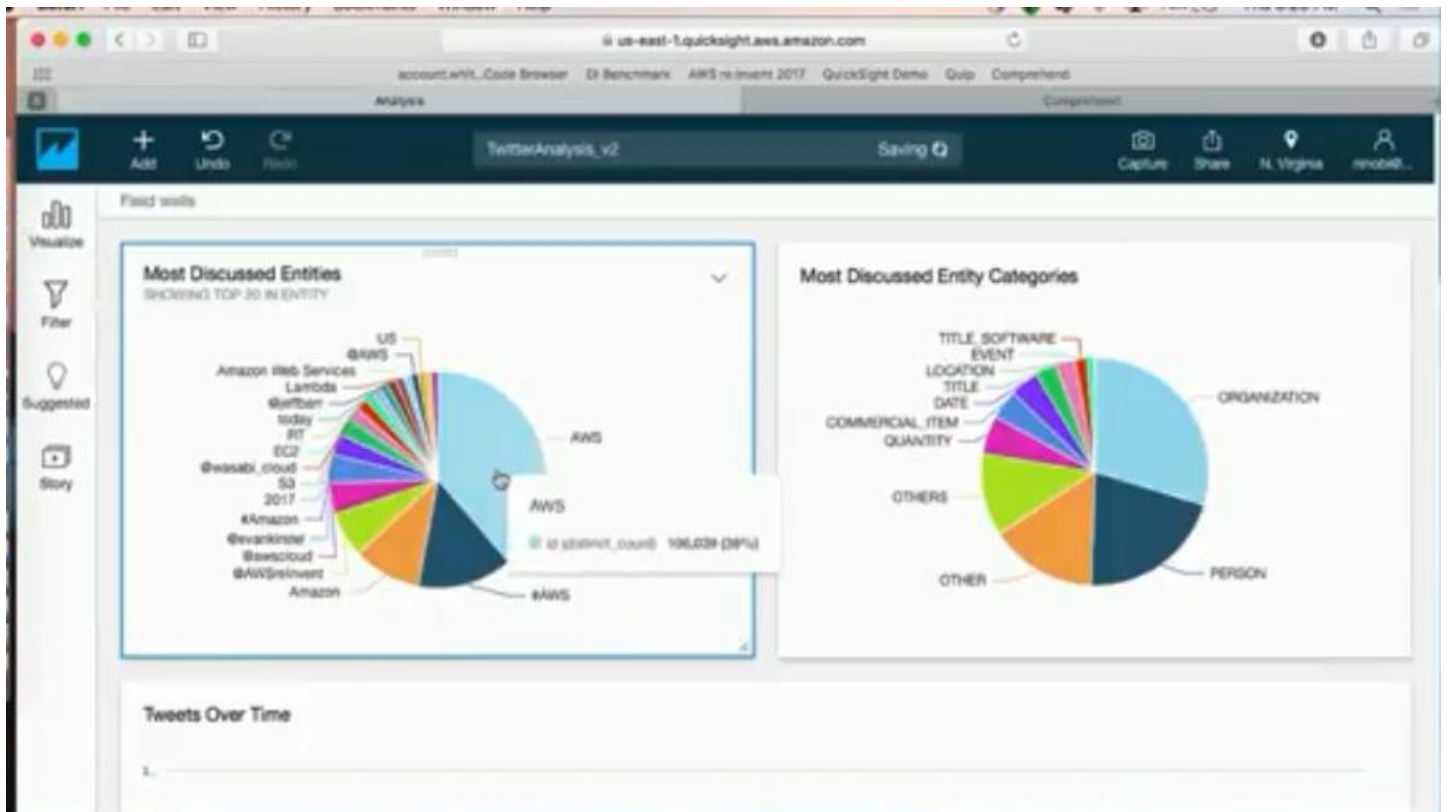
*Ability to transcribe and analyze text and voice conversations
to create contextual minutes and tasks, while capturing
unstructured knowledge*

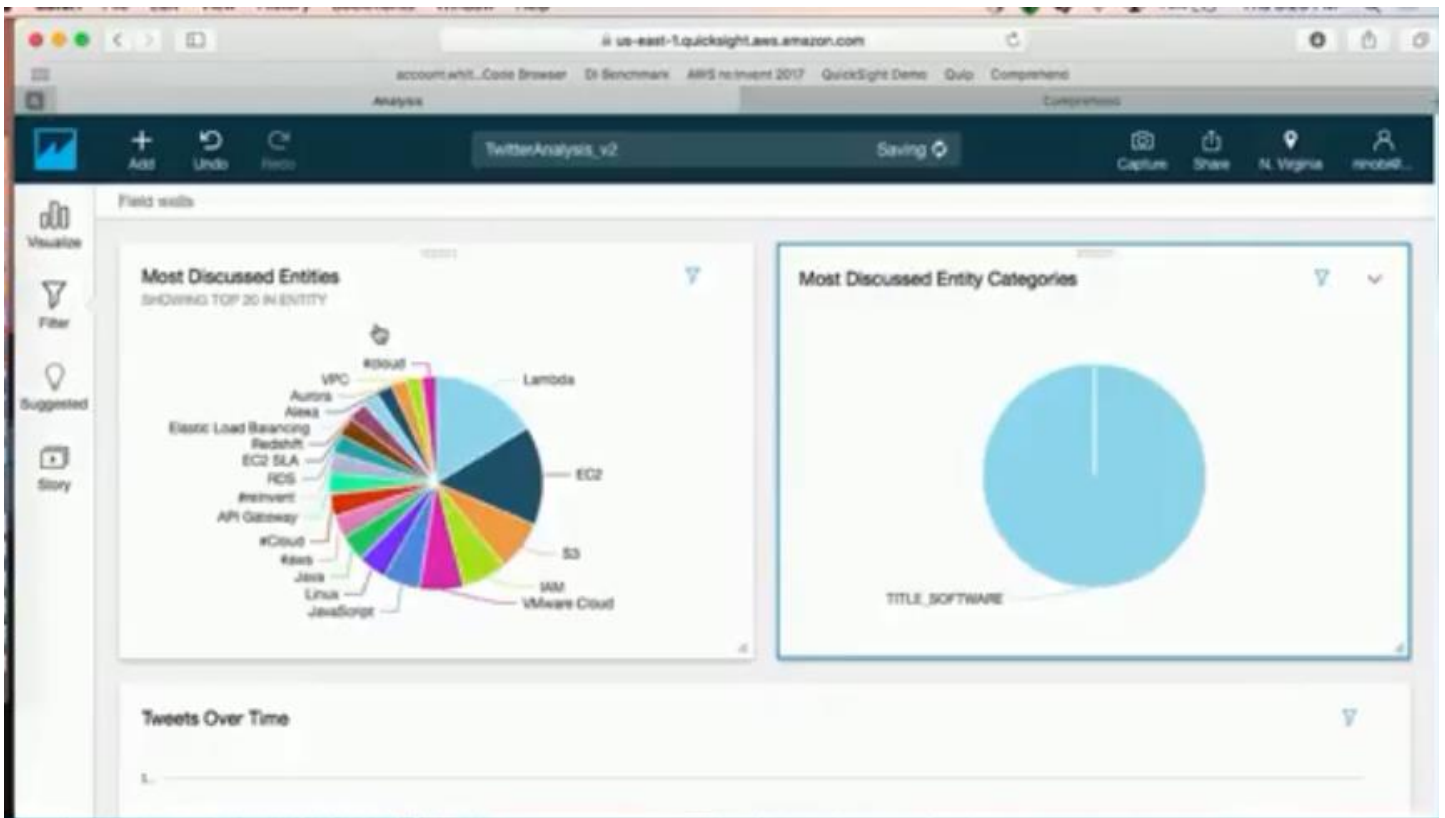


You can use AWS Comprehend search via spoken words by extracting keywords and meaning from written or spoken text so that you can use that to search your database or ElasticSearch instead of using keywords or Product ID as traditionally done.

Comprehend Demo: Social Analytics








We are using AWS Translate to pull in tweets from many languages and running analytics over all the results.


Amazon Comprehend: *Call to action*



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- Free to try!
- Pay for what you use
- AWS SDK, Code Samples
- Follow us!

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Thank you

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