Contents

What is the Text Analytics API?

7/8/2021 • 5 minutes to read • Edit Online

The Text Analytics API is a cloud-based service that provides Natural Language Processing (NLP) features for text mining and text analysis, including: sentiment analysis, opinion mining, key phrase extraction, language detection, and named entity recognition.

The API is a part of Azure Cognitive Services, a collection of machine learning and AI algorithms in the cloud for your development projects. You can use these features with the REST API version 3.0 or version 3.1, or the client library.

This documentation contains the following types of articles:

- Quickstarts are step-by-step instructions that let you make calls to the service and get results in a short period of time.
- How-to guides contain instructions for using the service in more specific or customized ways.
- Concepts provide in-depth explanations of the service's functionality and features.
- Tutorials are longer guides that show you how to use this service as a component in broader business solutions.

Sentiment analysis

Use sentiment analysis (SA) and find out what people think of your brand or topic by mining the text for clues about positive or negative sentiment.

The feature provides sentiment labels (such as "negative", "neutral" and "positive") based on the highest confidence score found by the service at a sentence and document-level. This feature also returns confidence scores between 0 and 1 for each document & sentences within it for positive, neutral and negative sentiment. You can also be run the service on premises using a container.

Starting in the v3.1, opinion mining (OM) is a feature of Sentiment Analysis. Also known as Aspect-based Sentiment Analysis in Natural Language Processing (NLP), this feature provides more granular information about the opinions related to words (such as the attributes of products or services) in text.

Key phrase extraction

Use key phrase extraction (KPE) to quickly identify the main concepts in text. For example, in the text "The food was delicious and there were wonderful staff", Key Phrase Extraction will return the main talking points: "food" and "wonderful staff".

Language detection

Language detection can detect the language an input text is written in and report a single language code for every document submitted on the request in a wide range of languages, variants, dialects, and some regional/cultural languages. The language code is paired with a confidence score.

Named entity recognition

Named Entity Recognition (NER) can Identify and categorize entities in your text as people, places, organizations, quantities, Well-known entities are also recognized and linked to more information on the web.

Text Analytics for health

Text Analytics for health is a feature of the Text Analytics API service that extracts and labels relevant medical information from unstructured texts such as doctor's notes, discharge summaries, clinical documents, and electronic health records.

Deploy on premises using Docker containers

Use Text Analytics containers to deploy API features on-premises. These docker containers enable you to bring the service closer to your data for compliance, security or other operational reasons. Text Analytics offers the following containers:

- sentiment analysis
- key phrase extraction (preview)
- language detection (preview)
- Text Analytics for health

Asynchronous operations

The `/analyze` endpoint enables you to use many features of the Text Analytics API asynchronously. Named Entity Recognition (NER), Key phrase extraction (KPE), Sentiment Analysis (SA), Opinion Mining (OM) are available as part of `/analyze` endpoint. It allows clubbing of these features in a single call. It allows sending up to 125,000 characters per document. Pricing is same as regular Text Analytics.

Typical workflow

The workflow is simple: you submit data for analysis and handle outputs in your code. Analyzers are consumed as-is, with no additional configuration or customization.

1. Create an Azure resource for Text Analytics. Afterwards, get the key generated for you to authenticate your requests.
2. Formulate a request containing your data as raw unstructured text, in JSON.
3. Post the request to the endpoint established during sign-up, appending the desired resource: sentiment analysis, key phrase extraction, language detection, or named entity recognition.
4. Stream or store the response locally. Depending on the request, results are either a sentiment score, a collection of extracted key phrases, or a language code.

Output is returned as a single JSON document, with results for each text document you posted, based on ID. You can subsequently analyze, visualize, or categorize the results into actionable insights.

Data is not stored in your account. Operations performed by the Text Analytics API are stateless, which means the text you provide is processed and results are returned immediately.

Text Analytics for multiple programming experience levels

You can start using the Text Analytics API in your processes, even if you don't have much experience in programming. Use these tutorials to learn how you can use the API to analyze text in different ways to fit your experience level.

- Minimal programming required:
  - Extract information in Excel using Text Analytics and Power Automate

    - Use the Text Analytics API and MS Flow to identify the sentiment of comments in a Yammer group
    - Integrate Power BI with the Text Analytics API to analyze customer feedback
- Programming experience recommended:
    - Sentiment analysis on streaming data using Azure Databricks
    - Build a Flask app to translate text, analyze sentiment, and synthesize speech

Supported languages

This section has been moved to a separate article for better discoverability. Refer to Supported languages in the Text Analytics API for this content.

Data limits

All of the Text Analytics API endpoints accept raw text data. See the Data limits article for more information.

Unicode encoding

The Text Analytics API uses Unicode encoding for text representation and character count calculations. Requests can be submitted in both UTF-8 and UTF-16 with no measurable differences in the character count. Unicode codepoints are used as the heuristic for character length and are considered equivalent for the purposes of text analytics data limits. If you use `StringInfo.LengthInTextElements` to get the character count, you are using the same method we use to measure data size.

Next steps

- Create an Azure resource for Text Analytics to get a key and endpoint for your applications.
- Use the quickstart to start sending API calls. Learn how to submit text, choose an analysis, and view results with minimal code.
- See what's new in the Text Analytics API for information on new releases and features.
- Dig in a little deeper with this sentiment analysis tutorial using Azure Databricks.
- Check out our list of blog posts and more videos on how to use the Text Analytics API with other tools and technologies in our External & Community Content page.

Text Analytics API v3 language support

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- Sentiment Analysis
- Named Entity Recognition (NER)
- Key Phrase Extraction
- Entity Linking
- Text Analytics for health
- Personally Identifiable Information (PII)
- Language Detection

NOTE

Languages are added as new model versions are released for specific Text Analytics features. The current model version for Sentiment Analysis is `2020-04-01`.

LANGUAGE	LANGUAGE CODE	V3 SUPPORT	STARTING V3 MODEL VERSION:	NOTES
Chinese-Simplified	`zh-hans`	✓	2019-10-01	`zh` also accepted
Chinese-Traditional	`zh-hant`	✓	2019-10-01	
Dutch	`nl`	✓	2019-10-01	
English	`en`	✓	2019-10-01	
French	`fr`	✓	2019-10-01	
German	`de`	✓	2019-10-01	
Hindi	`hi`	✓	2020-04-01	
Italian	`it`	✓	2019-10-01	
Japanese	`ja`	✓	2019-10-01	
Korean	`ko`	✓	2019-10-01	
Norwegian (Bokmål)	`no`	✓	2020-04-01	
Portuguese (Brazil)	`pt-BR`	✓	2020-04-01	
Portuguese (Portugal)	`pt-PT`	✓	2019-10-01	`pt` also accepted

LANGUAGE	LANGUAGE CODE	V3 SUPPORT	STARTING V3 MODEL VERSION:	NOTES
Spanish	`es`	✓	2019-10-01	
Turkish	`tr`	✓	2020-04-01	

Opinion mining (v3.1 only)

LANGUAGE	LANGUAGE CODE	STARTING WITH V3 MODEL VERSION:	NOTES
English	`en`	2020-04-01	

See also

- What is the Text Analytics API?
- Model versions

What's new in the Text Analytics API?

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The Text Analytics API is updated on an ongoing basis. To stay up-to-date with recent developments, this article provides you with information about new releases and features.

July 2021

GA release updates

- General availability for Text Analytics for health for both containers and hosted API (/health).
- General availability for Opinion Mining.
- General availability for PII extraction and redaction.
- General availability for Asynchronous (`/analyze`) endpoint.
- Updated quickstart examples with new SDK.

June 2021

General API updates

- New model-version `2021-06-01` for key phrase extraction based on transformers. It provides:
  - Support for 10 languages (Latin and CJK).
  - Improved key phrase extraction.
- The `2021-06-01` model version for Named Entity Recognition v3.x, which provides
  - Improved AI quality and expanded language support for the *Skill* entity category.
  - Added Spanish, French, German, Italian and Portuguese language support for the *Skill* entity category
- Asynchronous (/analyze) operation and Text Analytics for health (ungated preview) is available in all regions.

Text Analytics for health updates

- You no longer need to apply for access to preview Text Analytics for health.
- A new model version `2021-05-15` for the `/health` endpoint and on-premise container which provides
  - 5 new entity types: `ALLERGEN`, `CONDITION_SCALE`, `COURSE`, `EXPRESSION` and `MUTATION_TYPE`,
  - 14 new relation types,
  - Assertion detection expanded for new entity types and
  - Linking support for ALLERGEN entity type
- A new image for the Text Analytics for health container with tag `3.0.016230002-onprem-amd64` and model version `2021-05-15`. This container is available for download from Microsoft Container Registry.

May 2021

- Custom question answering (previously QnA maker) can now be accessed using a Text Analytics resource.

General API updates

- Release of the new API v3.1-preview.5 which includes
  - Asynchronous Analyze API now supports Sentiment Analysis (SA) and Opinion Mining (OM).
  - A new query parameter, `LoggingOptOut`, is now available for customers who wish to opt out of logging input text for incident reports. Learn more about this parameter in the data privacy article.
- Text Analytics for health and the Analyze asynchronous operations are now available in all regions

March 2021

General API updates

- Release of the new API v3.1-preview.4 which includes
  - Changes in the Opinion Mining JSON response body:
    - `aspects` is now `targets` and `opinions` is now `assessments`.
  - Changes in the JSON response body of the hosted web API of Text Analytics for health:
    - The `isNegated` boolean name of a detected entity object for Negation is deprecated and replaced by Assertion Detection.
    - A new property called `role` is now part of the extracted relation between an attribute and an entity as well as the relation between entities. This adds specificity to the detected relation type.
  - Entity linking is now available as an asynchronous task in the `/analyze` endpoint.
  - A new `pii-categories` parameter is now available in the `/pii` endpoint.
    - This parameter lets you specify select PII entities as well as those not supported by default for the input language.
- Updated client libraries, which include asynchronous Analyze, and Text Analytics for health operations. You can find examples on GitHub:
  - C#
  - Python
  - Java
  - JavaScript

Learn more about Text Analytics API v3.1-Preview.4

Text Analytics for health updates

- A new model version `2021-03-01` for the `/health` endpoint and on-premise container which provides
  - A rename of the `Gene` entity type to `GeneOrProtein`.
  - A new `Date` entity type.
  - Assertion detection which replaces negation detection (only available in API v3.1-preview.4).
  - A new preferred `name` property for linked entities that is normalized from various ontologies and coding systems (only available in API v3.1-preview.4).
- A new container image with tag `3.0.015490002-onprem-amd64` and the new model-version `2021-03-01` has been released to the container preview repository.
  - This container image will no longer be available for download from `containerpreview.azurecr.io` after April 26th, 2021.
- A new Text Analytics for health container image with this same model-version is now available at `mcr.microsoft.com/azure-cognitive-services/textanalytics/healthcare`. Starting April 26th, you will only be able to download the container from this repository.

Learn more about Text Analytics for health

Text Analytics resource portal update

- **Processed Text Records** is now available as a metric in the **Monitoring** section for your Text Analytics resource in the Azure portal.

February 2021

- The `2021-01-15` model version for the PII endpoint in Named Entity Recognition v3.1-preview.x, which provides

  - Expanded support for 9 new languages
  - Improved AI quality of named entity categories for supported languages.
- The S0 through S4 pricing tiers are being retired on March 8th, 2021. If you have an existing Text Analytics resource using the S0 through S4 pricing tier, you should update it to use the Standard (S) pricing tier.
- The language detection container is now generally available.
- v2.1 of the API is being retired.

January 2021

- The `2021-01-15` model version for Named Entity Recognition v3.x, which provides
  - Expanded language support for several general entity categories.
  - Improved AI quality of general entity categories for all supported v3 languages.
- The `2021-01-05` model version for language detection, which provides additional language support.

These model versions are currently unavailable in the East US region.

Learn more about about the new NER model

December 2020

- Updated pricing details for the Text Analytics API.

November 2020

- A new endpoint with Text Analytics API v3.1-preview.3 for the new asynchronous Analyze API, which supports batch processing for NER, PII, and key phrase extraction operations.

- A new endpoint with Text Analytics API v3.1-preview.3 for the new asynchronous Text Analytics for health hosted API with support for batch processing.

- Both new features listed above are only available in the following regions: `West US 2`, `East US 2`, `Central US`, `North Europe` and `West Europe` regions.

- Portuguese (Brazil) `pt-BR` is now supported in Sentiment Analysis v3.x, starting with model version `2020-04-01`. It adds to the existing `pt-PT` support for Portuguese.

- Updated client libraries, which include asynchronous Analyze, and Text Analytics for health operations. You can find examples on GitHub:

  - C#
  - Python
  - Java
  -

Learn more about Text Analytics API v3.1-Preview.3

October 2020

- Hindi support for Sentiment Analysis v3.x, starting with model version `2020-04-01`.
- Model version `2020-09-01` for the v3 /languages endpoint, which adds increased language detection and accuracy improvements.
- v3 availability in Central India and UAE North.

September 2020

General API updates

- Release of a new URL for the Text Analytics v3.1 public preview to support updates to the following Named Entity Recognition v3 endpoints:
  - `/pii` endpoint now includes the new `redactedText` property in the response JSON where detected PII entities in the input text are replaced by an `*` for each character of those entities.
  - `/linking` endpoint now includes the `bingID` property in the response JSON for linked entities.
- The following Text Analytics preview API endpoints were retired on September 4th, 2020:
  - v2.1-preview
  - v3.0-preview
  - v3.0-preview.1

Learn more about Text Analytics API v3.1-Preview.2

Text Analytics for health container updates

The following updates are specific to the September release of the Text Analytics for health container only.

- A new container image with tag `1.1.013530001-amd64-preview` with the new model-version `2020-09-03` has been released to the container preview repository.
- This model version provides improvements in entity recognition, abbreviation detection, and latency enhancements.

Learn more about Text Analytics for health

August 2020

General API updates

- Model version `2020-07-01` for the v3 `/keyphrases`, `/pii` and `/languages` endpoints, which adds:
  - Additional government and country specific entity categories for Named Entity Recognition.
  - Norwegian and Turkish support in Sentiment Analysis v3.
- An HTTP 400 error will now be returned for v3 API requests that exceed the published data limits.
- Endpoints that return an offset now support the optional `stringIndexType` parameter, which adjusts the returned `offset` and `length` values to match a supported string index scheme.

Text Analytics for health container updates

The following updates are specific to the August release of the Text Analytics for health container only.

- New model-version for Text Analytics for health: `2020-07-24`
- New URL for sending Text Analytics for health requests: `http://<serverURL>:5000/text/analytics/v3.2-preview.1/entities/health` (Please note that a browser cache clearing will be needed in order to use the demo web app included in this new container image)

The following properties in the JSON response have changed:

- `type` has been renamed to `category`
- `score` has been renamed to `confidenceScore`
- Entities in the `category` field of the JSON output are now in pascal case. The following entities have been renamed:
  - `EXAMINATION_RELATION` has been renamed to `RelationalOperator`.
  - `EXAMINATION_UNIT` has been renamed to `MeasurementUnit`.
  - `EXAMINATION_VALUE` has been renamed to `MeasurementValue`.

- `ROUTE_OR_MODE` has been renamed `MedicationRoute`.
- The relational entity `ROUTE_OR_MODE_OF_MEDICATION` has been renamed to `RouteOfMedication`.

The following entities have been added:

- NER
  - `AdministrativeEvent`
  - `CareEnvironment`
  - `HealthcareProfession`
  - `MedicationForm`
- Relation extraction
  - `DirectionOfCondition`
  - `DirectionOfExamination`
  - `DirectionOfTreatment`

Learn more about Text Analytics for health container

July 2020

Text Analytics for health container - Public gated preview

The Text Analytics for health container is now in public gated preview, which lets you extract information from unstructured English-language text in clinical documents such as: patient intake forms, doctor's notes, research papers and discharge summaries. Currently, you will not be billed for Text Analytics for health container usage.

The container offers the following features:

- Named Entity Recognition
- Relation extraction
- Entity linking
- Negation

May 2020

Text Analytics API v3 General Availability

Text Analysis API v3 is now generally available with the following updates:

- Model version `2020-04-01`
- New data limits for each feature
- Updated language support for Sentiment Analysis (SA) v3
- Separate endpoint for Entity Linking
- New "Address" entity category in Named Entity Recognition (NER) v3.
- New subcategories in NER v3:
  - Location - Geographical
  - Location - Structural
  - Organization - Stock Exchange
  - Organization - Medical
  - Organization - Sports
  - Event - Cultural
  - Event - Natural
  - Event - Sports

The following properties in the JSON response have been added:

- `SentenceText` in Sentiment Analysis
- `Warnings` for each document

The names of the following properties in the JSON response have been changed, where applicable:

- `score` has been renamed to `confidenceScore`
  - `confidenceScore` has two decimal points of precision.
- `type` has been renamed to `category`
- `subtype` has been renamed to `subcategory`

Learn more about Text Analytics API v3

Text Analytics API v3.1 Public Preview

- New Sentiment Analysis feature - Opinion Mining
- New Personal (`PII`) domain filter for protected health information (`PHI`).

Learn more about Text Analytics API v3.1 Preview

February 2020

SDK support for Text Analytics API v3 Public Preview

As part of the unified Azure SDK release, the Text Analytics API v3 SDK is now available as a public preview for the following programming languages:

- C#
- Python
- JavaScript (Node.js)
- Java

Learn more about Text Analytics API v3 SDK

Named Entity Recognition v3 public preview

Additional entity types are now available in the Named Entity Recognition (NER) v3 public preview service as we expand the detection of general and personal information entities found in text. This update introduces model version `2020-02-01`, which includes:

- Recognition of the following general entity types (English only):
  - PersonType
  - Product
  - Event
  - Geopolitical Entity (GPE) as a subtype under Location
  - Skill
- Recognition of the following personal information entity types (English only):
  - Person
  - Organization
  - Age as a subtype under Quantity
  - Date as a subtype under DateTime
  - Email
  - Phone Number (US only)
  - URL

- IP Address

October 2019

Named Entity Recognition (NER)

- A new endpoint for recognizing personal information entity types (English only)
- Separate endpoints for entity recognition and entity linking.
- Model version `2019-10-01`, which includes:
  - Expanded detection and categorization of entities found in text.
  - Recognition of the following new entity types:
    - Phone number
    - IP address

Entity linking supports English and Spanish. NER language support varies by the entity type.

Sentiment Analysis v3 public preview

- A new endpoint for analyzing sentiment.
- Model version `2019-10-01`, which includes:
  - Significant improvements in the accuracy and detail of the API's text categorization and scoring.
  - Automatic labeling for different sentiments in text.
  - Sentiment analysis and output on a document and sentence level.

It supports English (`en`), Japanese (`ja`), Chinese Simplified (`zh-Hans`), Chinese Traditional (`zh-Hant`), French (`fr`), Italian (`it`), Spanish (`es`), Dutch (`nl`), Portuguese (`pt`), and German (`de`), and is available in the following regions: `Australia East`, `Central Canada`, `Central US`, `East Asia`, `East US`, `East US 2`, `North Europe`, `Southeast Asia`, `South Central US`, `UK South`, `West Europe`, and `West US 2`.

Learn more about Sentiment Analysis v3

Next steps

- What is the Text Analytics API?
- Example user scenarios
- Sentiment analysis
- Language detection
- Entity recognition
- Key phrase extraction

Quickstart: Use the Text Analytics client library and REST API

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Use this article to get started with the Text Analytics client library and REST API. Follow these steps to try out examples code for mining text:

- Sentiment analysis
- Opinion mining
- Language detection
- Entity recognition
- Personal Identifying Information recognition
- Key phrase extraction

IMPORTANT

- The latest stable version of the Text Analytics API is `3.1`.
  - Be sure to only follow the instructions for the version you are using.
- The code in this article uses synchronous methods and un-secured credentials storage for simplicity reasons. For production scenarios, we recommend using the batched asynchronous methods for performance and scalability. See the reference documentation below.
- If you want to use Text Analytics for health or Asynchronous operations, see the examples on Github for C#, Python or Java

- Version 3.1
- Version 3.0

v3.1 Reference documentation | v3.1 Library source code | v3.1 Package (NuGet) | v3.1 Samples

Prerequisites

- Azure subscription - Create one for free
- The Visual Studio IDE
- Once you have your Azure subscription, create a Text Analytics resource in the Azure portal to get your key and endpoint. After it deploys, click **Go to resource**.
  - You will need the key and endpoint from the resource you create to connect your application to the Text Analytics API. You'll paste your key and endpoint into the code below later in the quickstart.
  - You can use the free pricing tier (`F0`) to try the service, and upgrade later to a paid tier for production.
- To use the Analyze feature, you will need a Text Analytics resource with the standard (S) pricing tier.

Setting up

Create a new .NET Core application

Using the Visual Studio IDE, create a new .NET Core console app. This will create a "Hello World" project with a single C# source file: *program.cs*.

- Version 3.1

- Version 3.0

Install the client library by right-clicking on the solution in the **Solution Explorer** and selecting **Manage NuGet Packages**. In the package manager that opens select **Browse** and search for `Azure.AI.TextAnalytics`. Select version `5.1.0`, and then **Install**. You can also use the Package Manager Console.

- Version 3.1
- Version 3.0

Open the *program.cs* file and add the following `using` directives:

```
using Azure;
using System;
using System.Globalization;
using Azure.AI.TextAnalytics;
```

In the application's `Program` class, create variables for your resource's key and endpoint.

> **IMPORTANT**
>
> Go to the Azure portal. If the Text Analytics resource you created in the **Prerequisites** section deployed successfully, click the **Go to Resource** button under **Next Steps**. You can find your key and endpoint in the resource's **key and endpoint** page, under **resource management**.
>
> Remember to remove the key from your code when you're done, and never post it publicly. For production, consider using a secure way of storing and accessing your credentials. For example, Azure key vault.

```
private static readonly AzureKeyCredential credentials = new AzureKeyCredential("<replace-with-your-text-
analytics-key-here>");
private static readonly Uri endpoint = new Uri("<replace-with-your-text-analytics-endpoint-here>");
```

Replace the application's `Main` method. You will define the methods called here later.

```
static void Main(string[] args)
{
    var client = new TextAnalyticsClient(endpoint, credentials);
    // You will implement these methods later in the quickstart.
    SentimentAnalysisExample(client);
    SentimentAnalysisWithOpinionMiningExample(client);
    LanguageDetectionExample(client);
    EntityRecognitionExample(client);
    EntityLinkingExample(client);
    RecognizePIIExample(client);
    KeyPhraseExtractionExample(client);

    Console.Write("Press any key to exit.");
    Console.ReadKey();
}
```

Object model

The Text Analytics client is a `TextAnalyticsClient` object that authenticates to Azure using your key, and provides functions to accept text as single strings or as a batch. You can send text to the API synchronously, or asynchronously. The response object will contain the analysis information for each document you send.

If you're using version `3.x` of the service, you can use an optional `TextAnalyticsClientOptions` instance to initialize the client with various default settings (for example default language or country/region hint). You can also authenticate using an Azure Active Directory token.

Code examples

- Sentiment analysis
- Opinion mining
- Language detection
- Named Entity Recognition
- Entity linking
- Key phrase extraction

Authenticate the client

- Version 3.1
- Version 3.0

Make sure your main method from earlier creates a new client object with your endpoint and credentials.

```
var client = new TextAnalyticsClient(endpoint, credentials);
```

Sentiment analysis

- Version 3.1
- Version 3.0

Create a new function called `SentimentAnalysisExample()` that takes the client that you created earlier, and call its `AnalyzeSentiment()` function. The returned `Response<DocumentSentiment>` object will contain the sentiment label and score of the entire input document, as well as a sentiment analysis for each sentence if successful. If there was an error, it will throw a `RequestFailedException`.

```
static void SentimentAnalysisExample(TextAnalyticsClient client)
{
    string inputText = "I had the best day of my life. I wish you were there with me.";
    DocumentSentiment documentSentiment = client.AnalyzeSentiment(inputText);
    Console.WriteLine($"Document sentiment: {documentSentiment.Sentiment}\n");

    foreach (var sentence in documentSentiment.Sentences)
    {
        Console.WriteLine($"\tText: \"{sentence.Text}\"");
        Console.WriteLine($"\tSentence sentiment: {sentence.Sentiment}");
        Console.WriteLine($"\tPositive score: {sentence.ConfidenceScores.Positive:0.00}");
        Console.WriteLine($"\tNegative score: {sentence.ConfidenceScores.Negative:0.00}");
        Console.WriteLine($"\tNeutral score: {sentence.ConfidenceScores.Neutral:0.00}\n");
    }
}
```

Output

```
Document sentiment: Positive

        Text: "I had the best day of my life."
        Sentence sentiment: Positive
        Positive score: 1.00
        Negative score: 0.00
        Neutral score: 0.00

        Text: "I wish you were there with me."
        Sentence sentiment: Neutral
        Positive score: 0.21
        Negative score: 0.02
        Neutral score: 0.77
```

Opinion mining

Create a new function called `SentimentAnalysisWithOpinionMiningExample()` that takes the client that you created earlier, and call its `AnalyzeSentimentBatch()` function with `IncludeOpinionMining` option in the `AnalyzeSentimentOptions` bag. The returned `AnalyzeSentimentResultCollection` object will contain the collection of `AnalyzeSentimentResult` in which represents `Response<DocumentSentiment>`. The difference between `SentimentAnalysis()` and `SentimentAnalysisWithOpinionMiningExample()` is that the latter will contain `SentenceOpinion` in each sentence, which shows an analyzed target and the related assessment(s). If there was an error, it will throw a `RequestFailedException`.

```
static void SentimentAnalysisWithOpinionMiningExample(TextAnalyticsClient client)
{
    var documents = new List<string>
    {
        "The food and service were unacceptable, but the concierge were nice."
    };

    AnalyzeSentimentResultCollection reviews = client.AnalyzeSentimentBatch(documents, options: new
AnalyzeSentimentOptions()
    {
        IncludeOpinionMining = true
    });

    foreach (AnalyzeSentimentResult review in reviews)
    {
        Console.WriteLine($"Document sentiment: {review.DocumentSentiment.Sentiment}\n");
        Console.WriteLine($"\tPositive score: {review.DocumentSentiment.ConfidenceScores.Positive:0.00}");
        Console.WriteLine($"\tNegative score: {review.DocumentSentiment.ConfidenceScores.Negative:0.00}");
        Console.WriteLine($"\tNeutral score: {review.DocumentSentiment.ConfidenceScores.Neutral:0.00}\n");
        foreach (SentenceSentiment sentence in review.DocumentSentiment.Sentences)
        {
            Console.WriteLine($"\tText: \"{sentence.Text}\"");
            Console.WriteLine($"\tSentence sentiment: {sentence.Sentiment}");
            Console.WriteLine($"\tSentence positive score: {sentence.ConfidenceScores.Positive:0.00}");
            Console.WriteLine($"\tSentence negative score: {sentence.ConfidenceScores.Negative:0.00}");
            Console.WriteLine($"\tSentence neutral score: {sentence.ConfidenceScores.Neutral:0.00}\n");

            foreach (SentenceOpinion sentenceOpinion in sentence.Opinions)
            {
                Console.WriteLine($"\tTarget: {sentenceOpinion.Target.Text}, Value:
{sentenceOpinion.Target.Sentiment}");
                Console.WriteLine($"\tTarget positive score:
{sentenceOpinion.Target.ConfidenceScores.Positive:0.00}");
                Console.WriteLine($"\tTarget negative score:
{sentenceOpinion.Target.ConfidenceScores.Negative:0.00}");
                foreach (AssessmentSentiment assessment in sentenceOpinion.Assessments)
                {
                    Console.WriteLine($"\t\tRelated Assessment: {assessment.Text}, Value:
{assessment.Sentiment}");
                    Console.WriteLine($"\t\tRelated Assessment positive score:
{assessment.ConfidenceScores.Positive:0.00}");
                    Console.WriteLine($"\t\tRelated Assessment negative score:
{assessment.ConfidenceScores.Negative:0.00}");
                }
            }
        }
        Console.WriteLine($"\n");
    }
}
```

Output

```
Document sentiment: Positive

        Positive score: 0.84
        Negative score: 0.16
        Neutral score: 0.00

        Text: "The food and service were unacceptable, but the concierge were nice."
        Sentence sentiment: Positive
        Sentence positive score: 0.84
        Sentence negative score: 0.16
        Sentence neutral score: 0.00

        Target: food, Value: Negative
        Target positive score: 0.01
        Target negative score: 0.99
                Related Assessment: unacceptable, Value: Negative
                Related Assessment positive score: 0.01
                Related Assessment negative score: 0.99
        Target: service, Value: Negative
        Target positive score: 0.01
        Target negative score: 0.99
                Related Assessment: unacceptable, Value: Negative
                Related Assessment positive score: 0.01
                Related Assessment negative score: 0.99
        Target: concierge, Value: Positive
        Target positive score: 1.00
        Target negative score: 0.00
                Related Assessment: nice, Value: Positive
                Related Assessment positive score: 1.00
                Related Assessment negative score: 0.00

Press any key to exit.
```

Language detection

- Version 3.1
- Version 3.0

Create a new function called `LanguageDetectionExample()` that takes the client that you created earlier, and call its `DetectLanguage()` function. The returned `Response<DetectedLanguage>` object will contain the detected language along with its name and ISO-6391 code. If there was an error, it will throw a `RequestFailedException`.

TIP

In some cases it may be hard to disambiguate languages based on the input. You can use the `countryHint` parameter to specify a 2-letter country/region code. By default the API is using the "US" as the default countryHint, to remove this behavior you can reset this parameter by setting this value to empty string `countryHint = ""`. To set a different default, set the `TextAnalyticsClientOptions.DefaultCountryHint` property and pass it during the client's initialization.

```
static void LanguageDetectionExample(TextAnalyticsClient client)
{
    DetectedLanguage detectedLanguage = client.DetectLanguage("Ce document est rédigé en Français.");
    Console.WriteLine("Language:");
    Console.WriteLine($"\t{detectedLanguage.Name},\tISO-6391: {detectedLanguage.Iso6391Name}\n");
}
```

Output

```
Language:
        French, ISO-6391: fr
```

Named Entity Recognition (NER)

- Version 3.1
- Version 3.0

Create a new function called `EntityRecognitionExample()` that takes the client that you created earlier, call its `RecognizeEntities()` function and iterate through the results. The returned `Response<CategorizedEntityCollection>` object will contain the collection of detected entities `CategorizedEntity`. If there was an error, it will throw a `RequestFailedException`.

```
static void EntityRecognitionExample(TextAnalyticsClient client)
{
    var response = client.RecognizeEntities("I had a wonderful trip to Seattle last week.");
    Console.WriteLine("Named Entities:");
    foreach (var entity in response.Value)
    {
        Console.WriteLine($"\tText: {entity.Text},\tCategory: {entity.Category},\tSub-Category:
{entity.SubCategory}");
        Console.WriteLine($"\t\tScore: {entity.ConfidenceScore:F2},\tLength: {entity.Length},\tOffset:
{entity.Offset}\n");
    }
}
```

Output

```
Named Entities:
        Text: trip,     Category: Event,        Sub-Category:
                Score: 0.61,    Length: 4,      Offset: 18

        Text: Seattle,  Category: Location,     Sub-Category: GPE
                Score: 0.82,    Length: 7,      Offset: 26

        Text: last week,        Category: DateTime,     Sub-Category: DateRange
                Score: 0.80,    Length: 9,      Offset: 34
```

Personally Identifiable Information (PII) recognition

Create a new function called `RecognizePIIExample()` that takes the client that you created earlier, call its `RecognizePiiEntities()` function and iterate through the results. The returned `PiiEntityCollection` represents the list of detected PII entities. If there was an error, it will throw a `RequestFailedException`.

```
static void RecognizePIIExample(TextAnalyticsClient client)
{
    string document = "A developer with SSN 859-98-0987 whose phone number is 800-102-1100 is building tools
with our APIs.";

    PiiEntityCollection entities = client.RecognizePiiEntities(document).Value;

    Console.WriteLine($"Redacted Text: {entities.RedactedText}");
    if (entities.Count > 0)
    {
        Console.WriteLine($"Recognized {entities.Count} PII entit{(entities.Count > 1 ? "ies" : "y")}:");
        foreach (PiiEntity entity in entities)
        {
            Console.WriteLine($"Text: {entity.Text}, Category: {entity.Category}, SubCategory:
{entity.SubCategory}, Confidence score: {entity.ConfidenceScore}");
        }
    }
    else
    {
        Console.WriteLine("No entities were found.");
    }
}
```

Output

```
Redacted Text: A developer with SSN *********** whose phone number is ************ is building tools with
our APIs.
Recognized 2 PII entities:
Text: 859-98-0987, Category: U.S. Social Security Number (SSN), SubCategory: , Confidence score: 0.65
Text: 800-102-1100, Category: Phone Number, SubCategory: , Confidence score: 0.8
```

Entity linking

- Version 3.1
- Version 3.0

Create a new function called `EntityLinkingExample()` that takes the client that you created earlier, call its `RecognizeLinkedEntities()` function and iterate through the results. The returned `Response<LinkedEntityCollection>` object will contain the collection of detected entities `LinkedEntity`. If there was an error, it will throw a `RequestFailedException`. Since linked entities are uniquely identified, occurrences of the same entity are grouped under a `LinkedEntity` object as a list of `LinkedEntityMatch` objects.

```
static void EntityLinkingExample(TextAnalyticsClient client)
{
    var response = client.RecognizeLinkedEntities(
        "Microsoft was founded by Bill Gates and Paul Allen on April 4, 1975, " +
        "to develop and sell BASIC interpreters for the Altair 8800. " +
        "During his career at Microsoft, Gates held the positions of chairman, " +
        "chief executive officer, president and chief software architect, " +
        "while also being the largest individual shareholder until May 2014.");
    Console.WriteLine("Linked Entities:");
    foreach (var entity in response.Value)
    {
        Console.WriteLine($"\tName: {entity.Name},\tID: {entity.DataSourceEntityId},\tURL:
{entity.Url}\tData Source: {entity.DataSource}");
        Console.WriteLine("\tMatches:");
        foreach (var match in entity.Matches)
        {
            Console.WriteLine($"\t\tText: {match.Text}");
            Console.WriteLine($"\t\tScore: {match.ConfidenceScore:F2}");
            Console.WriteLine($"\t\tLength: {match.Length}");
            Console.WriteLine($"\t\tOffset: {match.Offset}\n");
        }
    }
}
```

Output

```
Linked Entities:
        Name: Microsoft,        ID: Microsoft,  URL: https://en.wikipedia.org/wiki/Microsoft    Data Source:
Wikipedia
        Matches:
                Text: Microsoft
                Score: 0.55
                Length: 9
                Offset: 0

                Text: Microsoft
                Score: 0.55
                Length: 9
                Offset: 150

        Name: Bill Gates,       ID: Bill Gates, URL: https://en.wikipedia.org/wiki/Bill_Gates   Data Source:
Wikipedia
        Matches:
                Text: Bill Gates
                Score: 0.63
                Length: 10
                Offset: 25

                Text: Gates
                Score: 0.63
                Length: 5
                Offset: 161

        Name: Paul Allen,       ID: Paul Allen, URL: https://en.wikipedia.org/wiki/Paul_Allen   Data Source:
Wikipedia
        Matches:
                Text: Paul Allen
                Score: 0.60
                Length: 10
                Offset: 40

        Name: April 4,  ID: April 4,    URL: https://en.wikipedia.org/wiki/April_4      Data Source:
Wikipedia
        Matches:
                Text: April 4
                Score: 0.32
                Length: 7
                Offset: 54

        Name: BASIC,    ID: BASIC,      URL: https://en.wikipedia.org/wiki/BASIC        Data Source:
Wikipedia
        Matches:
                Text: BASIC
                Score: 0.33
                Length: 5
                Offset: 89

        Name: Altair 8800,      ID: Altair 8800,        URL: https://en.wikipedia.org/wiki/Altair_8800  Data
Source: Wikipedia
        Matches:
                Text: Altair 8800
                Score: 0.88
                Length: 11
                Offset: 116
```

Key phrase extraction

- Version 3.1
- Version 3.0

Create a new function called `KeyPhraseExtractionExample()` that takes the client that you created earlier, and call its `ExtractKeyPhrases()` function. The returned `<Response<KeyPhraseCollection>` object will contain the list of detected key phrases. If there was an error, it will throw a `RequestFailedException`.

```
static void KeyPhraseExtractionExample(TextAnalyticsClient client)
{
    var response = client.ExtractKeyPhrases("My cat might need to see a veterinarian.");

    // Printing key phrases
    Console.WriteLine("Key phrases:");

    foreach (string keyphrase in response.Value)
    {
        Console.WriteLine($"\t{keyphrase}");
    }
}
```

Output

```
Key phrases:
    cat
    veterinarian
```

Extract health entities

Caution

- To use the health operation, make sure your Azure resource is using the S standard pricing tier.

You can use Text Analytics to perform an asynchronous request to extract healthcare entities from text. The below sample shows a basic example. You can find a more advanced sample on GitHub.

- Version 3.1
- Version 3.0

```
static async Task healthExample(TextAnalyticsClient client)
{
    string document = "Prescribed 100mg ibuprofen, taken twice daily.";

    List<string> batchInput = new List<string>()
    {
        document
    };
    AnalyzeHealthcareEntitiesOperation healthOperation = await
client.StartAnalyzeHealthcareEntitiesAsync(batchInput);
    await healthOperation.WaitForCompletionAsync();

    await foreach (AnalyzeHealthcareEntitiesResultCollection documentsInPage in healthOperation.Value)
    {
        Console.WriteLine($"Results of Azure Text Analytics \"Healthcare Async\" Model, version: \"
{documentsInPage.ModelVersion}\"");
        Console.WriteLine("");

        foreach (AnalyzeHealthcareEntitiesResult entitiesInDoc in documentsInPage)
        {
            if (!entitiesInDoc.HasError)
            {
                foreach (var entity in entitiesInDoc.Entities)
                {
                    // view recognized healthcare entities
                    Console.WriteLine($"  Entity: {entity.Text}");
                    Console.WriteLine($"  Category: {entity.Category}");
                    Console.WriteLine($"  Offset: {entity.Offset}");
                    Console.WriteLine($"  Length: {entity.Length}");
                    Console.WriteLine($"  NormalizedText: {entity.NormalizedText}");
                }
                Console.WriteLine($"  Found {entitiesInDoc.EntityRelations.Count} relations in the current
document:");
                Console.WriteLine("");

                // view recognized healthcare relations
                foreach (HealthcareEntityRelation relations in entitiesInDoc.EntityRelations)
                {
                    Console.WriteLine($"    Relation: {relations.RelationType}");
                    Console.WriteLine($"    For this relation there are {relations.Roles.Count} roles");

                    // view relation roles
                    foreach (HealthcareEntityRelationRole role in relations.Roles)
                    {
                        Console.WriteLine($"      Role Name: {role.Name}");

                        Console.WriteLine($"      Associated Entity Text: {role.Entity.Text}");
                        Console.WriteLine($"      Associated Entity Category: {role.Entity.Category}");
                        Console.WriteLine("");
                    }
                    Console.WriteLine("");
                }
            }
            else
            {
                Console.WriteLine("  Error!");
                Console.WriteLine($"  Document error code: {entitiesInDoc.Error.ErrorCode}.");
                Console.WriteLine($"  Message: {entitiesInDoc.Error.Message}");
            }
            Console.WriteLine("");
        }
    }
}
```

```
Results of Azure Text Analytics "Healthcare Async" Model, version: "2021-05-15"

  Entity: 100mg
  Category: Dosage
  Offset: 11
  Length: 5
  NormalizedText:
  Entity: ibuprofen
  Category: MedicationName
  Offset: 17
  Length: 9
  NormalizedText: ibuprofen
  Entity: twice daily
  Category: Frequency
  Offset: 34
  Length: 11
  NormalizedText:
  Found 2 relations in the current document:

    Relation: DosageOfMedication
    For this relation there are 2 roles
      Role Name: Dosage
      Associated Entity Text: 100mg
      Associated Entity Category: Dosage

      Role Name: Medication
      Associated Entity Text: ibuprofen
      Associated Entity Category: MedicationName


    Relation: FrequencyOfMedication
    For this relation there are 2 roles
      Role Name: Medication
      Associated Entity Text: ibuprofen
      Associated Entity Category: MedicationName

      Role Name: Frequency
      Associated Entity Text: twice daily
      Associated Entity Category: Frequency
```

Use the API asynchronously with the Analyze operation

- Version 3.1
- Version 3.0

You can use the Analyze operation to perform asynchronous batch requests for: NER, key phrase extraction, sentiment analysis, and PII detection. The below sample shows a basic example on one operation. You can find a more advanced sample on GitHub.

Caution

- To use the Analyze operation, make sure your Azure resource is using the S standard pricing tier.

Add the following using statements to your C# file.

```
using System.Threading.Tasks;
using System.Collections.Generic;
using System.Linq;
```

Create a new function called `AnalyzeOperationExample()` that takes the client that you created earlier, and call its `StartAnalyzeBatchActionsAsync()` function. The returned operation will contain an `AnalyzeBatchActionsResult` object. As it is a Long Running Operation, `await` on the `operation.WaitForCompletionAsync()` for the value to be updated. Once the `WaitForCompletionAsync()` finishes, the collection should be updated in the `operation.Value`. If there was an error, it will throw a `RequestFailedException`.

```
static async Task AnalyzeOperationExample(TextAnalyticsClient client)
    {
        string inputText = "Microsoft was founded by Bill Gates and Paul Allen.";

        var batchDocuments = new List<string> { inputText };


        TextAnalyticsActions actions = new TextAnalyticsActions()
        {
            RecognizeEntitiesActions = new List<RecognizeEntitiesAction>() { new RecognizeEntitiesAction() 
},
            ExtractKeyPhrasesActions = new List<ExtractKeyPhrasesAction>() { new ExtractKeyPhrasesAction() 
},
            DisplayName = "Analyze Operation Quick Start Example"
        };

        AnalyzeActionsOperation operation = await client.StartAnalyzeActionsAsync(batchDocuments, actions);

        await operation.WaitForCompletionAsync();

        Console.WriteLine($"Status: {operation.Status}");
        Console.WriteLine($"Created On: {operation.CreatedOn}");
        Console.WriteLine($"Expires On: {operation.ExpiresOn}");
        Console.WriteLine($"Last modified: {operation.LastModified}");
        if (!string.IsNullOrEmpty(operation.DisplayName))
            Console.WriteLine($"Display name: {operation.DisplayName}");
        //Console.WriteLine($"Total actions: {operation.TotalActions}");
        Console.WriteLine($"  Succeeded actions: {operation.ActionsSucceeded}");
        Console.WriteLine($"  Failed actions: {operation.ActionsFailed}");
        Console.WriteLine($"  In progress actions: {operation.ActionsInProgress}");

        await foreach (AnalyzeActionsResult documentsInPage in operation.Value)
        {
            RecognizeEntitiesResultCollection entitiesResult = 
documentsInPage.RecognizeEntitiesResults.FirstOrDefault().DocumentsResults;
            ExtractKeyPhrasesResultCollection keyPhrasesResults = 
documentsInPage.ExtractKeyPhrasesResults.FirstOrDefault().DocumentsResults;

            Console.WriteLine("Recognized Entities");

            foreach (RecognizeEntitiesResult result in entitiesResult)
            {
                Console.WriteLine($"  Recognized the following {result.Entities.Count} entities:");

                foreach (CategorizedEntity entity in result.Entities)
                {
                    Console.WriteLine($"  Entity: {entity.Text}");
                    Console.WriteLine($"  Category: {entity.Category}");
                    Console.WriteLine($"  Offset: {entity.Offset}");
                    Console.WriteLine($"  Length: {entity.Length}");
                    Console.WriteLine($"  ConfidenceScore: {entity.ConfidenceScore}");
                    Console.WriteLine($"  SubCategory: {entity.SubCategory}");
                }
                Console.WriteLine("");
            }

            Console.WriteLine("Key Phrases");

            foreach (ExtractKeyPhrasesResult documentResults in keyPhrasesResults)
            {
                Console.WriteLine($"  Recognized the following {documentResults.KeyPhrases.Count} 
Keyphrases:");

                foreach (string keyphrase in documentResults.KeyPhrases)
                {
                    Console.WriteLine($"  {keyphrase}");
                }
                Console.WriteLine("");
            }

        }
    }
```

After you add this example to your application, call in your `main()` method using `await`. Because the Analyze operation is asynchronous, you will need to update your `Main()` method to the `async Task` type.

```
static async Task Main(string[] args)
{
    var client = new TextAnalyticsClient(endpoint, credentials);
    await AnalyzeOperationExample(client).ConfigureAwait(false);
}
```

Output

```
Status: succeeded
Created On: 3/10/2021 2:25:01 AM +00:00
Expires On: 3/11/2021 2:25:01 AM +00:00
Last modified: 3/10/2021 2:25:05 AM +00:00
Display name: Analyze Operation Quick Start Example
Total actions: 1
  Succeeded actions: 1
  Failed actions: 0
  In progress actions: 0
Recognized Entities
    Recognized the following 3 entities:
    Entity: Microsoft
    Category: Organization
    Offset: 0
    ConfidenceScore: 0.83
    SubCategory:
    Entity: Bill Gates
    Category: Person
    Offset: 25
    ConfidenceScore: 0.85
    SubCategory:
    Entity: Paul Allen
    Category: Person
    Offset: 40
    ConfidenceScore: 0.9
    SubCategory:
```

IMPORTANT

- The latest stable version of the Text Analytics API is `3.1`.
- The code in this article uses synchronous methods and un-secured credentials storage for simplicity reasons. For production scenarios, we recommend using the batched asynchronous methods for performance and scalability. See the reference documentation below. If you want to use Text Analytics for health or Asynchronous operations, see the examples on Github for C#, Python or Java

- Version 3.1
- Version 3.0

Reference documentation | Library source code | Package | Samples

Prerequisites

- Azure subscription - Create one for free
- Java Development Kit (JDK) with version 8 or above
- Once you have your Azure subscription, create a Text Analytics resource in the Azure portal to get your key and endpoint. After it deploys, click **Go to resource**.
  - You will need the key and endpoint from the resource you create to connect your application to the Text Analytics API. You'll paste your key and endpoint into the code below later in the quickstart.
  - You can use the free pricing tier (`F0`) to try the service, and upgrade later to a paid tier for production.
- To use the Analyze feature, you will need a Text Analytics resource with the standard (S) pricing tier.

Setting up

Add the client library

- Version 3.1
- Version 3.0

Create a Maven project in your preferred IDE or development environment. Then add the following dependency to your project's *pom.xml* file. You can find the implementation syntax for other build tools online.

```
<dependencies>
     <dependency>
        <groupId>com.azure</groupId>
        <artifactId>azure-ai-textanalytics</artifactId>
        <version>5.1.0</version>
    </dependency>
</dependencies>
```

Create a Java file named `TextAnalyticsSamples.java`. Open the file and add the following `import` statements:

- Version 3.1 preview
- Version 3.0

```

import com.azure.ai.textanalytics.TextAnalyticsAsyncClient;
import com.azure.core.credential.AzureKeyCredential;
import com.azure.ai.textanalytics.models.*;
import com.azure.ai.textanalytics.TextAnalyticsClientBuilder;
import com.azure.ai.textanalytics.TextAnalyticsClient;

import java.util.ArrayList;
import java.util.List;
import java.util.concurrent.TimeUnit;

import java.util.Arrays;
import com.azure.core.util.Context;
import com.azure.core.util.polling.SyncPoller;
import com.azure.ai.textanalytics.util.AnalyzeHealthcareEntitiesResultCollection;
import com.azure.ai.textanalytics.util.AnalyzeHealthcareEntitiesPagedIterable;
```

In the java file, add a new class and add your Azure resource's key and endpoint as shown below.

IMPORTANT

Go to the Azure portal. If the Text Analytics resource you created in the **Prerequisites** section deployed successfully, click the **Go to Resource** button under **Next Steps**. You can find your key and endpoint in the resource's **key and endpoint** page, under **resource management**.

Remember to remove the key from your code when you're done, and never post it publicly. For production, consider using a secure way of storing and accessing your credentials. For example, Azure key vault.

```
public class TextAnalyticsSamples {
    private static String KEY = "<replace-with-your-text-analytics-key-here>";
    private static String ENDPOINT = "<replace-with-your-text-analytics-endpoint-here>";
}
```

Add the following main method to the class. You will define the methods called here later.

- Version 3.1
- Version 3.0

```
public static void main(String[] args) {
    //You will create these methods later in the quickstart.
    TextAnalyticsClient client = authenticateClient(KEY, ENDPOINT);

    sentimentAnalysisWithOpinionMiningExample(client)
    detectLanguageExample(client);
    recognizeEntitiesExample(client);
    recognizeLinkedEntitiesExample(client);
    recognizePiiEntitiesExample(client);
    extractKeyPhrasesExample(client);
}
```

Object model

The Text Analytics client is a `TextAnalyticsClient` object that authenticates to Azure using your key, and provides functions to accept text as single strings or as a batch. You can send text to the API synchronously, or asynchronously. The response object will contain the analysis information for each document you send.

Code examples

- Authenticate the client
- Sentiment Analysis
- Opinion mining
- Language detection
- Named Entity recognition
- Entity linking
- Key phrase extraction

Authenticate the client

Create a method to instantiate the `TextAnalyticsClient` object with the key and endpoint for your Text Analytics resource. This example is the same for versions 3.0 and 3.1 of the API.

```
static TextAnalyticsClient authenticateClient(String key, String endpoint) {
    return new TextAnalyticsClientBuilder()
        .credential(new AzureKeyCredential(key))
        .endpoint(endpoint)
        .buildClient();
}
```

In your program's `main()` method, call the authentication method to instantiate the client.

Sentiment analysis

- Version 3.1
- Version 3.0

NOTE

In version `3.1`:

- Sentiment Analysis includes Opinion Mining analysis which is optional flag.
- Opinion Mining contains aspect and opinion level sentiment.

Create a new function called `sentimentAnalysisExample()` that takes the client that you created earlier, and call its `analyzeSentiment()` function. The returned `AnalyzeSentimentResult` object will contain `documentSentiment` and `sentenceSentiments` if successful, or an `errorMessage` if not.

```
static void sentimentAnalysisExample(TextAnalyticsClient client)
{
    // The text that need be analyzed.
    String text = "I had the best day of my life. I wish you were there with me.";

    DocumentSentiment documentSentiment = client.analyzeSentiment(text);
    System.out.printf(
        "Recognized document sentiment: %s, positive score: %s, neutral score: %s, negative score: %s.%n",
        documentSentiment.getSentiment(),
        documentSentiment.getConfidenceScores().getPositive(),
        documentSentiment.getConfidenceScores().getNeutral(),
        documentSentiment.getConfidenceScores().getNegative());

    for (SentenceSentiment sentenceSentiment : documentSentiment.getSentences()) {
        System.out.printf(
            "Recognized sentence sentiment: %s, positive score: %s, neutral score: %s, negative score: 
%s.%n",
            sentenceSentiment.getSentiment(),
            sentenceSentiment.getConfidenceScores().getPositive(),
            sentenceSentiment.getConfidenceScores().getNeutral(),
            sentenceSentiment.getConfidenceScores().getNegative());
        }
    }
}
```

Output

```
Recognized document sentiment: positive, positive score: 1.0, neutral score: 0.0, negative score: 0.0.
Recognized sentence sentiment: positive, positive score: 1.0, neutral score: 0.0, negative score: 0.0.
Recognized sentence sentiment: neutral, positive score: 0.21, neutral score: 0.77, negative score: 0.02.
```

Opinion mining

To perform sentiment analysis with opinion mining, create a new function called `sentimentAnalysisWithOpinionMiningExample()` that takes the client that you created earlier, and call its `analyzeSentiment()` function with setting option object `AnalyzeSentimentOptions`. The returned `AnalyzeSentimentResult` object will contain `documentSentiment` and `sentenceSentiments` if successful, or an `errorMessage` if not.

```
 static void sentimentAnalysisWithOpinionMiningExample(TextAnalyticsClient client)
 {
     // The document that needs be analyzed.
     String document = "Bad atmosphere. Not close to plenty of restaurants, hotels, and transit! Staff are
not friendly and helpful.";

     System.out.printf("Document = %s%n", document);

     AnalyzeSentimentOptions options = new AnalyzeSentimentOptions().setIncludeOpinionMining(true);
     final DocumentSentiment documentSentiment = client.analyzeSentiment(document, "en", options);
     SentimentConfidenceScores scores = documentSentiment.getConfidenceScores();
     System.out.printf(
             "Recognized document sentiment: %s, positive score: %f, neutral score: %f, negative score:
%f.%n",
             documentSentiment.getSentiment(), scores.getPositive(), scores.getNeutral(),
scores.getNegative());


     documentSentiment.getSentences().forEach(sentenceSentiment -> {
         SentimentConfidenceScores sentenceScores = sentenceSentiment.getConfidenceScores();
         System.out.printf("\tSentence sentiment: %s, positive score: %f, neutral score: %f, negative score:
%f.%n",
                 sentenceSentiment.getSentiment(), sentenceScores.getPositive(),
sentenceScores.getNeutral(), sentenceScores.getNegative());
         sentenceSentiment.getOpinions().forEach(opinion -> {
             TargetSentiment targetSentiment = opinion.getTarget();
             System.out.printf("\t\tTarget sentiment: %s, target text: %s%n",
targetSentiment.getSentiment(),
                     targetSentiment.getText());
             for (AssessmentSentiment assessmentSentiment : opinion.getAssessments()) {
                 System.out.printf("\t\t\t'%s' assessment sentiment because of \"%s\". Is the assessment
negated: %s.%n",
                         assessmentSentiment.getSentiment(), assessmentSentiment.getText(),
assessmentSentiment.isNegated());
             }
         });
     });
 }
```

Output

```
Document = Bad atmosphere. Not close to plenty of restaurants, hotels, and transit! Staff are not friendly
and helpful.
Recognized document sentiment: negative, positive score: 0.010000, neutral score: 0.140000, negative score:
0.850000.
 Sentence sentiment: negative, positive score: 0.000000, neutral score: 0.000000, negative score: 1.000000.
  Target sentiment: negative, target text: atmosphere
   'negative' assessment sentiment because of "bad". Is the assessment negated: false.
 Sentence sentiment: negative, positive score: 0.020000, neutral score: 0.440000, negative score: 0.540000.
 Sentence sentiment: negative, positive score: 0.000000, neutral score: 0.000000, negative score: 1.000000.
  Target sentiment: negative, target text: Staff
   'negative' assessment sentiment because of "friendly". Is the assessment negated: true.
   'negative' assessment sentiment because of "helpful". Is the assessment negated: true.
```

Language detection

Create a new function called `detectLanguageExample()` that takes the client that you created earlier, and call its `detectLanguage()` function. The returned `DetectLanguageResult` object will contain a primary language detected, a list of other languages detected if successful, or an `errorMessage` if not. This example is the same for versions 3.0 and 3.1 of the API.

TIP

In some cases it may be hard to disambiguate languages based on the input. You can use the `countryHint` parameter to specify a 2-letter country code. By default the API is using the "US" as the default countryHint, to remove this behavior you can reset this parameter by setting this value to empty string `countryHint = ""`. To set a different default, set the `TextAnalyticsClientOptions.DefaultCountryHint` property and pass it during the client's initialization.

```
static void detectLanguageExample(TextAnalyticsClient client)
{
    // The text that need be analyzed.
    String text = "Ce document est rédigé en Français.";

    DetectedLanguage detectedLanguage = client.detectLanguage(text);
    System.out.printf("Detected primary language: %s, ISO 6391 name: %s, score: %.2f.%n",
        detectedLanguage.getName(),
        detectedLanguage.getIso6391Name(),
        detectedLanguage.getConfidenceScore());
}
```

Output

```
Detected primary language: French, ISO 6391 name: fr, score: 1.00.
```

Named Entity Recognition (NER)

- Version 3.1
- Version 3.0

NOTE

In version `3.1`:

- NER includes separate methods for detecting personal information.
- Entity linking is a separate request than NER.

Create a new function called `recognizeEntitiesExample()` that takes the client that you created earlier, and call its `recognizeEntities()` function. The returned `CategorizedEntityCollection` object will contain a list of `CategorizedEntity` if successful, or an `errorMessage` if not.

```
static void recognizeEntitiesExample(TextAnalyticsClient client)
{
    // The text that need be analyzed.
    String text = "I had a wonderful trip to Seattle last week.";

    for (CategorizedEntity entity : client.recognizeEntities(text)) {
        System.out.printf(
            "Recognized entity: %s, entity category: %s, entity sub-category: %s, score: %s, offset: %s,
length: %s.%n",
            entity.getText(),
            entity.getCategory(),
            entity.getSubcategory(),
            entity.getConfidenceScore(),
            entity.getOffset(),
            entity.getLength());
    }
}
```

Output

```
Recognized entity: trip, entity category: Event, entity sub-category: null, score: 0.61, offset: 8, length:
4.
Recognized entity: Seattle, entity category: Location, entity sub-category: GPE, score: 0.82, offset: 16,
length: 7.
Recognized entity: last week, entity category: DateTime, entity sub-category: DateRange, score: 0.8, offset:
24, length: 9.
```

Personally Identifiable Information (PII) recognition

Create a new function called `recognizePiiEntitiesExample()` that takes the client that you created earlier, and call its `recognizePiiEntities()` function. The returned `PiiEntityCollection` object will contain a list of `PiiEntity` if successful, or an `errorMessage` if not. It will also contain the redacted text, which consists of the input text with all identifiable entities replaced with `*****`.

```
static void recognizePiiEntitiesExample(TextAnalyticsClient client)
{
    // The text that need be analyzed.
    String document = "My SSN is 859-98-0987";
    PiiEntityCollection piiEntityCollection = client.recognizePiiEntities(document);
    System.out.printf("Redacted Text: %s%n", piiEntityCollection.getRedactedText());
    piiEntityCollection.forEach(entity -> System.out.printf(
        "Recognized Personally Identifiable Information entity: %s, entity category: %s, entity subcategory:
%s,"
            + " confidence score: %f.%n",
        entity.getText(), entity.getCategory(), entity.getSubcategory(), entity.getConfidenceScore()));
}
```

Output

```
Redacted Text: My SSN is ***********
Recognized Personally Identifiable Information entity: 859-98-0987, entity category: U.S. Social Security
Number (SSN), entity subcategory: null, confidence score: 0.650000.
```

Entity linking

- Version 3.1
- Version 3.0

Create a new function called `recognizeLinkedEntitiesExample()` that takes the client that you created earlier, and call its `recognizeLinkedEntities()` function. The returned `LinkedEntityCollection` object will contain a list of `LinkedEntity` if successful, or an `errorMessage` if not. Since linked entities are uniquely identified, occurrences of the same entity are grouped under a `LinkedEntity` object as a list of `LinkedEntityMatch` objects.

```
static void recognizeLinkedEntitiesExample(TextAnalyticsClient client)
{
    // The text that need be analyzed.
    String text = "Microsoft was founded by Bill Gates and Paul Allen on April 4, 1975, " +
        "to develop and sell BASIC interpreters for the Altair 8800. " +
        "During his career at Microsoft, Gates held the positions of chairman, " +
        "chief executive officer, president and chief software architect, " +
        "while also being the largest individual shareholder until May 2014.";

    System.out.printf("Linked Entities:%n");
    for (LinkedEntity linkedEntity : client.recognizeLinkedEntities(text)) {
        System.out.printf("Name: %s, ID: %s, URL: %s, Data Source: %s.%n",
            linkedEntity.getName(),
            linkedEntity.getDataSourceEntityId(),
            linkedEntity.getUrl(),
            linkedEntity.getDataSource());
        System.out.printf("Matches:%n");
        for (LinkedEntityMatch linkedEntityMatch : linkedEntity.getMatches()) {
            System.out.printf("Text: %s, Score: %.2f, Offset: %s, Length: %s%n",
            linkedEntityMatch.getText(),
            linkedEntityMatch.getConfidenceScore(),
            linkedEntityMatch.getOffset(),
            linkedEntityMatch.getLength());
        }
    }
}
```

Output

```
Linked Entities:
Name: Microsoft, ID: Microsoft, URL: https://en.wikipedia.org/wiki/Microsoft, Data Source: Wikipedia.
Matches:
Text: Microsoft, Score: 0.55, Offset: 9, Length: 0
Text: Microsoft, Score: 0.55, Offset: 9, Length: 150
Name: Bill Gates, ID: Bill Gates, URL: https://en.wikipedia.org/wiki/Bill_Gates, Data Source: Wikipedia.
Matches:
Text: Bill Gates, Score: 0.63, Offset: 10, Length: 25
Text: Gates, Score: 0.63, Offset: 5, Length: 161
Name: Paul Allen, ID: Paul Allen, URL: https://en.wikipedia.org/wiki/Paul_Allen, Data Source: Wikipedia.
Matches:
Text: Paul Allen, Score: 0.60, Offset: 10, Length: 40
Name: April 4, ID: April 4, URL: https://en.wikipedia.org/wiki/April_4, Data Source: Wikipedia.
Matches:
Text: April 4, Score: 0.32, Offset: 7, Length: 54
Name: BASIC, ID: BASIC, URL: https://en.wikipedia.org/wiki/BASIC, Data Source: Wikipedia.
Matches:
Text: BASIC, Score: 0.33, Offset: 5, Length: 89
Name: Altair 8800, ID: Altair 8800, URL: https://en.wikipedia.org/wiki/Altair_8800, Data Source: Wikipedia.
Matches:
Text: Altair 8800, Score: 0.88, Offset: 11, Length: 116
```

Key phrase extraction

Create a new function called `extractKeyPhrasesExample()` that takes the client that you created earlier, and call its `extractKeyPhrases()` function. The returned `ExtractKeyPhraseResult` object will contain a list of key phrases if successful, or an `errorMessage` if not. This example is the same for version 3.0 and 3.1 of the API.

```
static void extractKeyPhrasesExample(TextAnalyticsClient client)
{
    // The text that need be analyzed.
    String text = "My cat might need to see a veterinarian.";

    System.out.printf("Recognized phrases: %n");
    for (String keyPhrase : client.extractKeyPhrases(text)) {
        System.out.printf("%s%n", keyPhrase);
    }
}
```

Output

```
Recognized phrases:
cat
veterinarian
```

Extract health entities

- Version 3.1
- Version 3.0

You can use Text Analytics to perform an asynchronous request to extract healthcare entities from text. The below sample shows a basic example. You can find a more advanced sample on GitHub.

```java
static void healthExample(TextAnalyticsClient client){
    List<TextDocumentInput> documents = Arrays.asList(
            new TextDocumentInput("0",
                    "Prescribed 100mg ibuprofen, taken twice daily."));

    AnalyzeHealthcareEntitiesOptions options = new
AnalyzeHealthcareEntitiesOptions().setIncludeStatistics(true);

    SyncPoller<AnalyzeHealthcareEntitiesOperationDetail, AnalyzeHealthcareEntitiesPagedIterable>
            syncPoller = client.beginAnalyzeHealthcareEntities(documents, options, Context.NONE);

    System.out.printf("Poller status: %s.%n", syncPoller.poll().getStatus());
    syncPoller.waitForCompletion();

    // Task operation statistics
    AnalyzeHealthcareEntitiesOperationDetail operationResult = syncPoller.poll().getValue();
    System.out.printf("Operation created time: %s, expiration time: %s.%n",
            operationResult.getCreatedAt(), operationResult.getExpiresAt());
    System.out.printf("Poller status: %s.%n", syncPoller.poll().getStatus());

    for (AnalyzeHealthcareEntitiesResultCollection resultCollection : syncPoller.getFinalResult()) {
        // Model version
        System.out.printf(
                "Results of Azure Text Analytics \"Analyze Healthcare Entities\" Model, version: %s%n",
                resultCollection.getModelVersion());

        for (AnalyzeHealthcareEntitiesResult healthcareEntitiesResult : resultCollection) {
            System.out.println("Document ID = " + healthcareEntitiesResult.getId());
            System.out.println("Document entities: ");
            // Recognized healthcare entities
            for (HealthcareEntity entity : healthcareEntitiesResult.getEntities()) {
                System.out.printf(
                        "\tText: %s, normalized name: %s, category: %s, subcategory: %s, confidence score:
%f.%n",
                        entity.getText(), entity.getNormalizedText(), entity.getCategory(),
                        entity.getSubcategory(), entity.getConfidenceScore());
            }
            // Recognized healthcare entity relation groups
            for (HealthcareEntityRelation entityRelation : healthcareEntitiesResult.getEntityRelations()) {
                System.out.printf("Relation type: %s.%n", entityRelation.getRelationType());
                for (HealthcareEntityRelationRole role : entityRelation.getRoles()) {
                    HealthcareEntity entity = role.getEntity();
                    System.out.printf("\tEntity text: %s, category: %s, role: %s.%n",
                            entity.getText(), entity.getCategory(), role.getName());
                }
            }
        }
    }
}
```

output

```
Poller status: IN_PROGRESS.
Operation created time: 2021-07-20T19:45:50Z, expiration time: 2021-07-21T19:45:50Z.
Poller status: SUCCESSFULLY_COMPLETED.
Results of Azure Text Analytics "Analyze Healthcare Entities" Model, version: 2021-05-15
Document ID = 0
Document entities:
 Text: 100mg, normalized name: null, category: Dosage, subcategory: null, confidence score: 1.000000.
 Text: ibuprofen, normalized name: ibuprofen, category: MedicationName, subcategory: null, confidence score:
1.000000.
 Text: twice daily, normalized name: null, category: Frequency, subcategory: null, confidence score:
1.000000.
Relation type: DosageOfMedication.
 Entity text: 100mg, category: Dosage, role: Dosage.
 Entity text: ibuprofen, category: MedicationName, role: Medication.
Relation type: FrequencyOfMedication.
 Entity text: ibuprofen, category: MedicationName, role: Medication.
 Entity text: twice daily, category: Frequency, role: Frequency.
```

Use the API asynchronously with the Analyze operation

- Version 3.1
- Version 3.0

You can use the Analyze operation to perform asynchronous batch requests for: NER, key phrase extraction, sentiment analysis, and PII detection. The below sample shows a basic example on one operation. You can find a more advanced sample on GitHub

Caution

- To use the Analyze operation, make sure your Azure resource is using the S standard pricing tier.

Create a new function called `analyzeBatchActionsExample()`, which calls the `beginAnalyzeBatchActions()` function. The result will be a long running operation which will be polled for results.

```
static void analyzeActionsExample(TextAnalyticsClient client){
        List<TextDocumentInput> documents = new ArrayList<>();
        documents.add(new TextDocumentInput("0", "Microsoft was founded by Bill Gates and Paul Allen."));


        SyncPoller<AnalyzeActionsOperationDetail, AnalyzeActionsResultPagedIterable> syncPoller =
                client.beginAnalyzeActions(documents,
                        new TextAnalyticsActions().setDisplayName("Example analyze task")
                                .setRecognizeEntitiesActions(new RecognizeEntitiesAction())
                                .setExtractKeyPhrasesActions(
                                        new ExtractKeyPhrasesAction().setModelVersion("latest")),
                        new AnalyzeActionsOptions().setIncludeStatistics(false),
                        Context.NONE);

        // Task operation statistics details
        while (syncPoller.poll().getStatus() == LongRunningOperationStatus.IN_PROGRESS) {
            final AnalyzeActionsOperationDetail operationDetail = syncPoller.poll().getValue();
            System.out.printf("Action display name: %s, Successfully completed actions: %d, in-process
actions: %d,"
                            + " failed actions: %d, total actions: %d%n",
                    operationDetail.getDisplayName(), operationDetail.getSucceededCount(),
                    operationDetail.getInProgressCount(), operationDetail.getFailedCount(),
                    operationDetail.getTotalCount());
        }

        syncPoller.waitForCompletion();

        Iterable<PagedResponse<AnalyzeActionsResult>> pagedResults =
syncPoller.getFinalResult().iterableByPage();
        for (PagedResponse<AnalyzeActionsResult> perPage : pagedResults) {
            System.out.printf("Response code: %d, Continuation Token: %s.%n", perPage.getStatusCode(),
                    perPage.getContinuationToken());
            for (AnalyzeActionsResult actionsResult : perPage.getElements()) {
                System.out.println("Entities recognition action results:");
                for (RecognizeEntitiesActionResult actionResult :
actionsResult.getRecognizeEntitiesResults()) {
                    if (!actionResult.isError()) {
                        for (RecognizeEntitiesResult documentResult : actionResult.getDocumentsResults()) {
                            if (!documentResult.isError()) {
                                for (CategorizedEntity entity : documentResult.getEntities()) {
                                    System.out.printf(
                                            "\tText: %s, category: %s, confidence score: %f.%n",
                                            entity.getText(), entity.getCategory(),
entity.getConfidenceScore());
                                }
                            } else {
                                System.out.printf("\tCannot recognize entities. Error: %s%n",
                                        documentResult.getError().getMessage());
                            }
                        }
                    } else {
                        System.out.printf("\tCannot execute Entities Recognition action. Error: %s%n",
                                actionResult.getError().getMessage());
                    }
                }

                System.out.println("Key phrases extraction action results:");
                for (ExtractKeyPhrasesActionResult actionResult :
actionsResult.getExtractKeyPhrasesResults()) {
                    if (!actionResult.isError()) {
                        for (ExtractKeyPhraseResult documentResult : actionResult.getDocumentsResults()) {
                            if (!documentResult.isError()) {
                                System.out.println("\tExtracted phrases:");
                                for (String keyPhrases : documentResult.getKeyPhrases()) {
                                    System.out.printf("\t\t%s.%n", keyPhrases);
                                }
                            } else {
                                System.out.printf("\tCannot extract key phrases. Error: %s%n",
                                        documentResult.getError().getMessage());
                            }
                        }
                    } else {
                        System.out.printf("\tCannot execute Key Phrases Extraction action. Error: %s%n",
                                actionResult.getError().getMessage());
                    }
                }
            }
        }
    }
```

After you add this example to your application, call it in your `main()` method.

```
analyzeBatchActionsExample(client);
```

Output

```
Action display name: Example analyze task, Successfully completed actions: 1, in-process actions: 1, failed
actions: 0, total actions: 2
Response code: 200, Continuation Token: null.
Entities recognition action results:
 Text: Microsoft, category: Organization, confidence score: 1.000000.
 Text: Bill Gates, category: Person, confidence score: 1.000000.
 Text: Paul Allen, category: Person, confidence score: 1.000000.
Key phrases extraction action results:
 Extracted phrases:
  Bill Gates.
  Paul Allen.
  Microsoft.
```

You can also use the Analyze operation to perform NER, key phrase extraction, sentiment analysis and detect PII. See the Analyze sample on GitHub.

IMPORTANT

- The latest stable version of the Text Analytics API is `3.1`.
  - Be sure to only follow the instructions for the version you are using.
- The code in this article uses synchronous methods and un-secured credentials storage for simplicity reasons. For production scenarios, we recommend using the batched asynchronous methods for performance and scalability. See the reference documentation below.
- You can also run this version of the Text Analytics client library in your browser.

- Version 3.1
- Version 3.0

v3 Reference documentation | v3 Library source code | v3 Package (NPM) | v3 Samples

Prerequisites

- Azure subscription - Create one for free
- The current version of Node.js.
- Once you have your Azure subscription, create a Text Analytics resource in the Azure portal to get your key and endpoint. After it deploys, click **Go to resource**.
  - You will need the key and endpoint from the resource you create to connect your application to the Text Analytics API. You'll paste your key and endpoint into the code below later in the quickstart.
  - You can use the free pricing tier (`F0`) to try the service, and upgrade later to a paid tier for production.
- To use the Analyze feature, you will need a Text Analytics resource with the standard (S) pricing tier.

Setting up

Create a new Node.js application

In a console window (such as cmd, PowerShell, or Bash), create a new directory for your app, and navigate to it.

```
mkdir myapp

cd myapp
```

Run the `npm init` command to create a node application with a `package.json` file.

```
npm init
```

Install the client library

- Version 3.1
- Version 3.0

Install the `@azure/ai-text-analytics` NPM packages:

```
npm install --save @azure/ai-text-analytics@5.1.0
```

TIP

Want to view the whole quickstart code file at once? You can find it on GitHub, which contains the code examples in this quickstart.

Your app's `package.json` file will be updated with the dependencies. Create a file named `index.js` and add the following:

- Version 3.1
- Version 3.0

```
"use strict";

const { TextAnalyticsClient, AzureKeyCredential } = require("@azure/ai-text-analytics");
```

Create variables for your resource's Azure endpoint and key.

IMPORTANT

Go to the Azure portal. If the Text Analytics resource you created in the **Prerequisites** section deployed successfully, click the **Go to Resource** button under **Next Steps**. You can find your key and endpoint in the resource's **key and endpoint** page, under **resource management**.

Remember to remove the key from your code when you're done, and never post it publicly. For production, consider using a secure way of storing and accessing your credentials. For example, Azure key vault.

```
const key = '<paste-your-text-analytics-key-here>';
const endpoint = '<paste-your-text-analytics-endpoint-here>';
```

Object model

The Text Analytics client is a `TextAnalyticsClient` object that authenticates to Azure using your key. The client provides several methods for analyzing text, as a single string, or a batch.

Text is sent to the API as a list of `documents`, which are `dictionary` objects containing a combination of `id`, `text`, and `language` attributes depending on the method used. The `text` attribute stores the text to be analyzed in the origin `language`, and the `id` can be any value.

The response object is a list containing the analysis information for each document.

Code examples

- Client Authentication
- Sentiment Analysis
- Opinion mining
- Language detection
- Named Entity recognition
- Entity linking
- Personally Identifiable Information
- Key phrase extraction

Authenticate the client

- Version 3.1
- Version 3.0

Create a new `TextAnalyticsClient` object with your key and endpoint as parameters.

```
const textAnalyticsClient = new TextAnalyticsClient(endpoint,  new AzureKeyCredential(key));
```

Sentiment analysis

- Version 3.1
- Version 3.0

Create an array of strings containing the document you want to analyze. Call the client's `analyzeSentiment()` method and get the returned `SentimentBatchResult` object. Iterate through the list of results, and print each document's ID, document level sentiment with confidence scores. For each document, result contains sentence level sentiment along with offsets, length, and confidence scores.

```
async function sentimentAnalysis(client){

    const sentimentInput = [
        "I had the best day of my life. I wish you were there with me."
    ];
    const sentimentResult = await client.analyzeSentiment(sentimentInput);

    sentimentResult.forEach(document => {
        console.log(`ID: ${document.id}`);
        console.log(`\tDocument Sentiment: ${document.sentiment}`);
        console.log(`\tDocument Scores:`);
        console.log(`\t\tPositive: ${document.confidenceScores.positive.toFixed(2)} \tNegative: 
${document.confidenceScores.negative.toFixed(2)} \tNeutral: 
${document.confidenceScores.neutral.toFixed(2)}`);
        console.log(`\tSentences Sentiment(${document.sentences.length}):`);
        document.sentences.forEach(sentence => {
            console.log(`\t\tSentence sentiment: ${sentence.sentiment}`)
            console.log(`\t\tSentences Scores:`);
            console.log(`\t\tPositive: ${sentence.confidenceScores.positive.toFixed(2)} \tNegative: 
${sentence.confidenceScores.negative.toFixed(2)} \tNeutral: 
${sentence.confidenceScores.neutral.toFixed(2)}`);
        });
    });
}
sentimentAnalysis(textAnalyticsClient)
```

Run your code with `node index.js` in your console window.

Output

```
ID: 0
        Document Sentiment: positive
        Document Scores:
                Positive: 1.00  Negative: 0.00  Neutral: 0.00
        Sentences Sentiment(2):
                Sentence sentiment: positive
                Sentences Scores:
                Positive: 1.00  Negative: 0.00  Neutral: 0.00
                Sentence sentiment: neutral
                Sentences Scores:
                Positive: 0.21  Negative: 0.02  Neutral: 0.77
```

Opinion mining

- Version 3.1
- Version 3.0

In order to do sentiment analysis with opinion mining, create an array of strings containing the document you want to analyze. Call the client's `analyzeSentiment()` method with adding option flag `includeOpinionMining: true` and get the returned `SentimentBatchResult` object. Iterate through the list of results, and print each document's ID, document level sentiment with confidence scores. For each document, result contains not only sentence level sentiment as above, but also aspect and opinion level sentiment.

```
async function sentimentAnalysisWithOpinionMining(client){

  const sentimentInput = [
    {
      text: "The food and service were unacceptable, but the concierge were nice",
      id: "0",
      language: "en"
    }
  ];
  const results = await client.analyzeSentiment(sentimentInput, { includeOpinionMining: true });

  for (let i = 0; i < results.length; i++) {
    const result = results[i];
    console.log(`- Document ${result.id}`);
    if (!result.error) {
      console.log(`\tDocument text: ${sentimentInput[i].text}`);
      console.log(`\tOverall Sentiment: ${result.sentiment}`);
      console.log("\tSentiment confidence scores:", result.confidenceScores);
      console.log("\tSentences");
      for (const { sentiment, confidenceScores, opinions } of result.sentences) {
        console.log(`\t- Sentence sentiment: ${sentiment}`);
        console.log("\t  Confidence scores:", confidenceScores);
        console.log("\t  Mined opinions");
        for (const { target, assessments } of opinions) {
          console.log(`\t\t- Target text: ${target.text}`);
          console.log(`\t\t  Target sentiment: ${target.sentiment}`);
          console.log("\t\t  Target confidence scores:", target.confidenceScores);
          console.log("\t\t  Target assessments");
          for (const { text, sentiment } of assessments) {
            console.log(`\t\t\t- Text: ${text}`);
            console.log(`\t\t\t  Sentiment: ${sentiment}`);
          }
        }
      }
    } else {
      console.error(`\tError: ${result.error}`);
    }
  }
}
sentimentAnalysisWithOpinionMining(textAnalyticsClient)
```

Run your code with `node index.js` in your console window.

Output

```
- Document 0
        Document text: The food and service were unacceptable, but the concierge were nice
        Overall Sentiment: positive
        Sentiment confidence scores: { positive: 0.84, neutral: 0, negative: 0.16 }
        Sentences
        - Sentence sentiment: positive
          Confidence scores: { positive: 0.84, neutral: 0, negative: 0.16 }
          Mined opinions
                - Target text: food
                  Target sentiment: negative
                  Target confidence scores: { positive: 0.01, negative: 0.99 }
                  Target assessments
                        - Text: unacceptable
                          Sentiment: negative
                - Target text: service
                  Target sentiment: negative
                  Target confidence scores: { positive: 0.01, negative: 0.99 }
                  Target assessments
                        - Text: unacceptable
                          Sentiment: negative
                - Target text: concierge
                  Target sentiment: positive
                  Target confidence scores: { positive: 1, negative: 0 }
                  Target assessments
                        - Text: nice
                          Sentiment: positive
```

Language detection

- Version 3.1
- Version 3.0

Create an array of strings containing the document you want to analyze. Call the client's `detectLanguage()` method and get the returned `DetectLanguageResultCollection`. Then iterate through the results, and print each document's ID with respective primary language.

```
async function languageDetection(client) {

    const languageInputArray = [
        "Ce document est rédigé en Français."
    ];
    const languageResult = await client.detectLanguage(languageInputArray);

    languageResult.forEach(document => {
        console.log(`ID: ${document.id}`);
        console.log(`\tPrimary Language ${document.primaryLanguage.name}`)
    });
}
languageDetection(textAnalyticsClient);
```

Run your code with `node index.js` in your console window.

Output

```
ID: 0
        Primary Language French
```

Named Entity Recognition (NER)

- Version 3.1
- Version 3.0

Create an array of strings containing the document you want to analyze. Call the client's `recognizeEntities()` method and get the `RecognizeEntitiesResult` object. Iterate through the list of results, and print the entity name, type, subtype, offset, length, and score.

```
async function entityRecognition(client){

    const entityInputs = [
        "Microsoft was founded by Bill Gates and Paul Allen on April 4, 1975, to develop and sell BASIC
interpreters for the Altair 8800",
        "La sede principal de Microsoft se encuentra en la ciudad de Redmond, a 21 kilómetros de Seattle."
    ];
    const entityResults = await client.recognizeEntities(entityInputs);

    entityResults.forEach(document => {
        console.log(`Document ID: ${document.id}`);
        document.entities.forEach(entity => {
            console.log(`\tName: ${entity.text} \tCategory: ${entity.category} \tSubcategory:
${entity.subCategory ? entity.subCategory : "N/A"}`);
            console.log(`\tScore: ${entity.confidenceScore}`);
        });
    });
}
entityRecognition(textAnalyticsClient);
```

Run your code with `node index.js` in your console window.

Output

```
Document ID: 0
        Name: Microsoft        Category: Organization  Subcategory: N/A
        Score: 0.29
        Name: Bill Gates       Category: Person        Subcategory: N/A
        Score: 0.78
        Name: Paul Allen       Category: Person        Subcategory: N/A
        Score: 0.82
        Name: April 4, 1975    Category: DateTime      Subcategory: Date
        Score: 0.8
        Name: 8800      Category: Quantity      Subcategory: Number
        Score: 0.8
Document ID: 1
        Name: 21        Category: Quantity      Subcategory: Number
        Score: 0.8
        Name: Seattle   Category: Location      Subcategory: GPE
        Score: 0.25
```

Personally Identifying Information (PII) recognition

Create an array of strings containing the document you want to analyze. Call the client's `recognizePiiEntities()` method and get the `RecognizePIIEntitiesResult` object. Iterate through the list of results, and print the entity name, type, and score.

```
async function piiRecognition(client) {

    const documents = [
        "The employee's phone number is (555) 555-5555."
    ];

    const results = await client.recognizePiiEntities(documents, "en");
    for (const result of results) {
        if (result.error === undefined) {
            console.log("Redacted Text: ", result.redactedText);
            console.log(" -- Recognized PII entities for input", result.id, "--");
            for (const entity of result.entities) {
                console.log(entity.text, ":", entity.category, "(Score:", entity.confidenceScore, ")");
            }
        } else {
            console.error("Encountered an error:", result.error);
        }
    }
}
piiRecognition(textAnalyticsClient)
```

Run your code with `node index.js` in your console window.

Output

```
Redacted Text:  The employee's phone number is **************.
 -- Recognized PII entities for input 0 --
(555) 555-5555 : Phone Number (Score: 0.8 )
```

Entity linking

- Version 3.1
- Version 3.0

Create an array of strings containing the document you want to analyze. Call the client's `recognizeLinkedEntities()` method and get the `RecognizeLinkedEntitiesResult` object. Iterate through the list of results, and print the entity name, ID, data source, url, and matches. Every object in `matches` array will contain offset, length, and score for that match.

```
async function linkedEntityRecognition(client){

    const linkedEntityInput = [
        "Microsoft was founded by Bill Gates and Paul Allen on April 4, 1975, to develop and sell BASIC
interpreters for the Altair 8800. During his career at Microsoft, Gates held the positions of chairman,
chief executive officer, president and chief software architect, while also being the largest individual
shareholder until May 2014."
    ];
    const entityResults = await client.recognizeLinkedEntities(linkedEntityInput);

    entityResults.forEach(document => {
        console.log(`Document ID: ${document.id}`);
        document.entities.forEach(entity => {
            console.log(`\tName: ${entity.name} \tID: ${entity.dataSourceEntityId} \tURL: ${entity.url}
\tData Source: ${entity.dataSource}`);
            console.log(`\tMatches:`)
            entity.matches.forEach(match => {
                console.log(`\t\tText: ${match.text} \tScore: ${match.confidenceScore.toFixed(2)}`);
        })
        });
    });
}
linkedEntityRecognition(textAnalyticsClient);
```

Run your code with `node index.js` in your console window.

Output

```
Document ID: 0
        Name: Altair 8800       ID: Altair 8800         URL: https://en.wikipedia.org/wiki/Altair_8800  Data
Source: Wikipedia
        Matches:
                Text: Altair 8800       Score: 0.88
        Name: Bill Gates        ID: Bill Gates  URL: https://en.wikipedia.org/wiki/Bill_Gates   Data Source:
Wikipedia
        Matches:
                Text: Bill Gates        Score: 0.63
                Text: Gates     Score: 0.63
        Name: Paul Allen        ID: Paul Allen  URL: https://en.wikipedia.org/wiki/Paul_Allen   Data Source:
Wikipedia
        Matches:
                Text: Paul Allen        Score: 0.60
        Name: Microsoft         ID: Microsoft   URL: https://en.wikipedia.org/wiki/Microsoft    Data Source:
Wikipedia
        Matches:
                Text: Microsoft         Score: 0.55
                Text: Microsoft         Score: 0.55
        Name: April 4   ID: April 4     URL: https://en.wikipedia.org/wiki/April_4      Data Source:
Wikipedia
        Matches:
                Text: April 4   Score: 0.32
        Name: BASIC     ID: BASIC       URL: https://en.wikipedia.org/wiki/BASIC        Data Source:
Wikipedia
        Matches:
                Text: BASIC     Score: 0.33
```

Key phrase extraction

- Version 3.1
- Version 3.0

Create an array of strings containing the document you want to analyze. Call the client's `extractKeyPhrases()`

method and get the returned `ExtractKeyPhrasesResult` object. Iterate through the results and print each document's ID, and any detected key phrases.

```
async function keyPhraseExtraction(client){

    const keyPhrasesInput = [
        "My cat might need to see a veterinarian.",
    ];
    const keyPhraseResult = await client.extractKeyPhrases(keyPhrasesInput);

    keyPhraseResult.forEach(document => {
        console.log(`ID: ${document.id}`);
        console.log(`\tDocument Key Phrases: ${document.keyPhrases}`);
    });
}
keyPhraseExtraction(textAnalyticsClient);
```

Run your code with `node index.js` in your console window.

Output

```
ID: 0
        Document Key Phrases: cat,veterinarian
```

Extract health entities

Caution

- To use the health operation, make sure your Azure resource is using the S standard pricing tier.

You can use Text Analytics to perform an asynchronous request to extract healthcare entities from text. The below sample shows a basic example. You can find a more advanced sample on GitHub.

- Version 3.1
- Version 3.0

```
async function healthExample(client) {
    console.log("== Recognize Healthcare Entities Sample ==");

    const documents = [
        "Prescribed 100mg ibuprofen, taken twice daily."
      ];
    const poller = await client.beginAnalyzeHealthcareEntities(documents, "en", {
      includeStatistics: true
    });

    poller.onProgress(() => {
      console.log(
        `Last time the operation was updated was on: ${poller.getOperationState().lastModifiedOn}`
      );
    });
    console.log(
      `The analyze healthcare entities operation was created on ${
        poller.getOperationState().createdOn
      }`
    );
    console.log(
      `The analyze healthcare entities operation results will expire on ${
        poller.getOperationState().expiresOn
      }`
    );

    const results = await poller.pollUntilDone();

    for await (const result of results) {
      console.log(`- Document ${result.id}`);
      if (!result.error) {
        console.log("\tRecognized Entities:");
        for (const entity of result.entities) {
          console.log(`\t- Entity "${entity.text}" of type ${entity.category}`);
        }
        if (result.entityRelations && (result.entityRelations.length > 0)) {
          console.log(`\tRecognized relations between entities:`);
          for (const relation of result.entityRelations) {
            console.log(
              `\t\t- Relation of type ${relation.relationType} found between the following entities:`
            );
            for (const role of relation.roles) {
              console.log(`\t\t\t- "${role.entity.text}" with the role ${role.name}`);
            }
          }
        }
      } else console.error("\tError:", result.error);
    }
  }

  healthExample(textAnalyticsClient).catch((err) => {
    console.error("The sample encountered an error:", err);
  });
```

Output

```
- Document 0
    Recognized Entities:
    - Entity "100mg" of type Dosage
    - Entity "ibuprofen" of type MedicationName
    - Entity "twice daily" of type Frequency
    Recognized relations between entities:
        - Relation of type DosageOfMedication found between the following entities:
                - "100mg" with the role Dosage
                - "ibuprofen" with the role Medication
        - Relation of type FrequencyOfMedication found between the following entities:
                - "ibuprofen" with the role Medication
                - "twice daily" with the role Frequency
```

Use the API asynchronously with the Analyze operation

- Version 3.1
- Version 3.0

You can use the Analyze operation to perform asynchronous batch requests for: NER, key phrase extraction, sentiment analysis, and PII detection. The below sample shows a basic example on one operation. You can find more advanced samples for JavaScript and TypeScript on GitHub.

Caution

- To use the Analyze operation, make sure your Azure resource is using the S standard pricing tier.

Create a new function called `analyze_example()`, which calls the `beginAnalyze()` function. The result will be a long running operation which will be polled for results.

```
async function analyze_example(client) {
    const documents = [
        "Microsoft was founded by Bill Gates and Paul Allen.",
    ];

    const actions = {
        recognizeEntitiesActions: [{ modelVersion: "latest" }],
        extractKeyPhrasesActions: [{ modelVersion: "latest" }]
    };
    const poller = await client.beginAnalyzeActions(documents, actions, "en");

    console.log(
        `The analyze batch actions operation was created on ${poller.getOperationState().createdOn}`
    );
    console.log(
        `The analyze batch actions operation results will expire on ${poller.getOperationState().expiresOn
        }`
    );
    const resultPages = await poller.pollUntilDone();
    for await (const page of resultPages) {
        const entitiesAction = page.recognizeEntitiesResults[0];
        if (!entitiesAction.error) {
            for (const doc of entitiesAction.results) {
                console.log(`- Document ${doc.id}`);
                if (!doc.error) {
                    console.log("\tEntities:");
                    for (const entity of doc.entities) {
                        console.log(`\t- Entity ${entity.text} of type ${entity.category}`);
                    }
                } else {
                    console.error("\tError:", doc.error);
                }
            }
        }
    }
    for await (const page of resultPages) {
        const keyPhrasesAction = page.extractKeyPhrasesResults[0];
        if (!keyPhrasesAction.error) {
            for (const doc of keyPhrasesAction.results) {
                console.log(`- Document ${doc.id}`);
                if (!doc.error) {
                    console.log("\tKey phrases:");
                    for (const phrase of doc.keyPhrases) {
                        console.log(`\t- ${phrase}`);
                    }
                } else {
                    console.error("\tError:", doc.error);
                }
            }
        }
    }
}
analyze_example(textAnalyticsClient)
```

Output

```
The analyze batch actions operation was created on Fri Jun 18 2021 12:34:52 GMT-0700 (Pacific Daylight Time)
The analyze batch actions operation results will expire on Sat Jun 19 2021 12:34:52 GMT-0700 (Pacific
Daylight Time)
- Document 0
        Entities:
        - Entity Microsoft of type Organization
        - Entity Bill Gates of type Person
        - Entity Paul Allen of type Person
- Document 0
        Key phrases:
        - Bill Gates
        - Paul Allen
        - Microsoft
```

You can also use the Analyze operation to perform NER, key phrase extraction, sentiment analysis and detect PII. See the Analyze samples for JavaScript and TypeScript on GitHub.

Run the application with the `node` command on your quickstart file.

```
node index.js
```

IMPORTANT

- The latest stable version of the Text Analytics API is `3.1`.
  - Be sure to only follow the instructions for the version you are using.
- The code in this article uses synchronous methods and un-secured credentials storage for simplicity reasons. For production scenarios, we recommend using the batched asynchronous methods for performance and scalability. See the reference documentation below. If you want to use Text Analytics for health or Asynchronous operations, see the examples on Github for C#, Python or Java

- Version 3.1
- Version 3.0

v3.1 Reference documentation | v3.1 Library source code | v3.1 Package (PiPy) | v3.1 Samples

Prerequisites

- Azure subscription - Create one for free
- Python 3.x
- Once you have your Azure subscription, create a Text Analytics resource in the Azure portal to get your key and endpoint. After it deploys, click **Go to resource**.
  - You will need the key and endpoint from the resource you create to connect your application to the Text Analytics API. You'll paste your key and endpoint into the code below later in the quickstart.
  - You can use the free pricing tier (`F0`) to try the service, and upgrade later to a paid tier for production.
- To use the Analyze feature, you will need a Text Analytics resource with the standard (S) pricing tier.

Setting up

Install the client library

After installing Python, you can install the client library with:

- Version 3.1
- Version 3.0

```
pip install azure-ai-textanalytics==5.1.0
```

TIP

Want to view the whole quickstart code file at once? You can find it on GitHub, which contains the code examples in this quickstart.

Create a new python application

Create a new Python file and create variables for your resource's Azure endpoint and subscription key.

IMPORTANT

Go to the Azure portal. If the Text Analytics resource you created in the **Prerequisites** section deployed successfully, click the **Go to Resource** button under **Next Steps**. You can find your key and endpoint in the resource's **key and endpoint** page, under **resource management**.

Remember to remove the key from your code when you're done, and never post it publicly. For production, consider using a secure way of storing and accessing your credentials. For example, Azure key vault.

```
key = "<paste-your-text-analytics-key-here>"
endpoint = "<paste-your-text-analytics-endpoint-here>"
```

Object model

- Version 3.1
- Version 3.0

The Text Analytics client is a `TextAnalyticsClient` object that authenticates to Azure. The client provides several methods for analyzing text.

When processing text is sent to the API as a list of `documents`, which is either as a list of string, a list of dict-like representation, or as a list of `TextDocumentInput/DetectLanguageInput`. A `dict-like` object contains a combination of `id`, `text`, and `language/country_hint`. The `text` attribute stores the text to be analyzed in the origin `country_hint`, and the `id` can be any value.

The response object is a list containing the analysis information for each document.

Code examples

These code snippets show you how to do the following tasks with the Text Analytics client library for Python:

- Version 3.1
- Version 3.0

- Authenticate the client
- Sentiment Analysis
- Opinion mining
- Language detection
- Named Entity recognition
- Personally Identifiable Information recognition

- Entity linking
- Key phrase extraction

Authenticate the client

- Version 3.1
- Version 3.0

Create a function to instantiate the `TextAnalyticsClient` object with your `key` AND `endpoint` created above. Then create a new client.

```
from azure.ai.textanalytics import TextAnalyticsClient
from azure.core.credentials import AzureKeyCredential

def authenticate_client():
    ta_credential = AzureKeyCredential(key)
    text_analytics_client = TextAnalyticsClient(
            endpoint=endpoint,
            credential=ta_credential)
    return text_analytics_client

client = authenticate_client()
```

Sentiment analysis

- Version 3.1
- Version 3.0

Create a new function called `sentiment_analysis_example()` that takes the client as an argument, then calls the `analyze_sentiment()` function. The returned response object will contain the sentiment label and score of the entire input document, as well as a sentiment analysis for each sentence.

```
def sentiment_analysis_example(client):

    documents = ["I had the best day of my life. I wish you were there with me."]
    response = client.analyze_sentiment(documents=documents)[0]
    print("Document Sentiment: {}".format(response.sentiment))
    print("Overall scores: positive={0:.2f}; neutral={1:.2f}; negative={2:.2f} \n".format(
        response.confidence_scores.positive,
        response.confidence_scores.neutral,
        response.confidence_scores.negative,
    ))
    for idx, sentence in enumerate(response.sentences):
        print("Sentence: {}".format(sentence.text))
        print("Sentence {} sentiment: {}".format(idx+1, sentence.sentiment))
        print("Sentence score:\nPositive={0:.2f}\nNeutral={1:.2f}\nNegative={2:.2f}\n".format(
            sentence.confidence_scores.positive,
            sentence.confidence_scores.neutral,
            sentence.confidence_scores.negative,
        ))

sentiment_analysis_example(client)
```

Output

```
Document Sentiment: positive
Overall scores: positive=1.00; neutral=0.00; negative=0.00

Sentence: I had the best day of my life.
Sentence 1 sentiment: positive
Sentence score:
Positive=1.00
Neutral=0.00
Negative=0.00

Sentence: I wish you were there with me.
Sentence 2 sentiment: neutral
Sentence score:
Positive=0.21
Neutral=0.77
Negative=0.02
```

Opinion mining

- Version 3.1
- Version 3.0

In order to do sentiment analysis with opinion mining, create a new function called `sentiment_analysis_with_opinion_mining_example()` that takes the client as an argument, then calls the `analyze_sentiment()` function with option flag `show_opinion_mining=True`. The returned response object will contain not only the sentiment label and score of the entire input document with sentiment analysis for each sentence, but also aspect and opinion level sentiment analysis.

```
def sentiment_analysis_with_opinion_mining_example(client):

    documents = [
        "The food and service were unacceptable, but the concierge were nice"
    ]

    result = client.analyze_sentiment(documents, show_opinion_mining=True)
    doc_result = [doc for doc in result if not doc.is_error]

    positive_reviews = [doc for doc in doc_result if doc.sentiment == "positive"]
    negative_reviews = [doc for doc in doc_result if doc.sentiment == "negative"]

    positive_mined_opinions = []
    mixed_mined_opinions = []
    negative_mined_opinions = []

    for document in doc_result:
        print("Document Sentiment: {}".format(document.sentiment))
        print("Overall scores: positive={0:.2f}; neutral={1:.2f}; negative={2:.2f} \n".format(
            document.confidence_scores.positive,
            document.confidence_scores.neutral,
            document.confidence_scores.negative,
        ))
        for sentence in document.sentences:
            print("Sentence: {}".format(sentence.text))
            print("Sentence sentiment: {}".format(sentence.sentiment))
            print("Sentence score:\nPositive={0:.2f}\nNeutral={1:.2f}\nNegative={2:.2f}\n".format(
                sentence.confidence_scores.positive,
                sentence.confidence_scores.neutral,
                sentence.confidence_scores.negative,
            ))
            for mined_opinion in sentence.mined_opinions:
                target = mined_opinion.target
                print("......'{}' target '{}'".format(target.sentiment, target.text))
                print("......Target score:\n......Positive={0:.2f}\n......Negative={1:.2f}\n".format(
                    target.confidence_scores.positive,
                    target.confidence_scores.negative,
                ))
                for assessment in mined_opinion.assessments:
                    print("......'{}' assessment '{}'".format(assessment.sentiment, assessment.text))
                    print("......Assessment score:\n......Positive={0:.2f}\n......Negative=
{1:.2f}\n".format(
                        assessment.confidence_scores.positive,
                        assessment.confidence_scores.negative,
                    ))
            print("\n")
        print("\n")

sentiment_analysis_with_opinion_mining_example(client)
```

Output

```
Document Sentiment: positive
Overall scores: positive=0.84; neutral=0.00; negative=0.16

Sentence: The food and service were unacceptable, but the concierge were nice
Sentence sentiment: positive
Sentence score:
Positive=0.84
Neutral=0.00
Negative=0.16

......'negative' target 'food'
......Target score:
......Positive=0.01
......Negative=0.99

......'negative' assessment 'unacceptable'
......Assessment score:
......Positive=0.01
......Negative=0.99

......'negative' target 'service'
......Target score:
......Positive=0.01
......Negative=0.99

......'negative' assessment 'unacceptable'
......Assessment score:
......Positive=0.01
......Negative=0.99

......'positive' target 'concierge'
......Target score:
......Positive=1.00
......Negative=0.00

......'positive' assessment 'nice'
......Assessment score:
......Positive=1.00
......Negative=0.00




Press any key to continue . . .
```

Language detection

- Version 3.1
- Version 3.0

Create a new function called `language_detection_example()` that takes the client as an argument, then calls the `detect_language()` function. The returned response object will contain the detected language in `primary_language` if successful, and an `error` if not.

TIP

In some cases it may be hard to disambiguate languages based on the input. You can use the `country_hint` parameter to specify a 2-letter country code. By default the API is using the "US" as the default countryHint, to remove this behavior you can reset this parameter by setting this value to empty string `country_hint : ""`.

```
def language_detection_example(client):
    try:
        documents = ["Ce document est rédigé en Français."]
        response = client.detect_language(documents = documents, country_hint = 'us')[0]
        print("Language: ", response.primary_language.name)

    except Exception as err:
        print("Encountered exception. {}".format(err))
language_detection_example(client)
```

Output

```
Language:  French
```

Named Entity Recognition (NER)

- Version 3.1
- Version 3.0

NOTE

In version `3.1`:

- Entity linking is a separate request than NER.

Create a new function called `entity_recognition_example` that takes the client as an argument, then calls the `recognize_entities()` function and iterates through the results. The returned response object will contain the list of detected entities in `entity` if successful, and an `error` if not. For each detected entity, print its Category and Sub-Category if exists.

```
def entity_recognition_example(client):

    try:
        documents = ["I had a wonderful trip to Seattle last week."]
        result = client.recognize_entities(documents = documents)[0]

        print("Named Entities:\n")
        for entity in result.entities:
            print("\tText: \t", entity.text, "\tCategory: \t", entity.category, "\tSubCategory: \t",
entity.subcategory,
                    "\n\tConfidence Score: \t", round(entity.confidence_score, 2), "\tLength: \t",
entity.length, "\tOffset: \t", entity.offset, "\n")

    except Exception as err:
        print("Encountered exception. {}".format(err))
entity_recognition_example(client)
```

Output

```
Named Entities:

        Text:    trip   Category:        Event  SubCategory:     None
        Confidence Score:       0.61   Length:          4      Offset:          18

        Text:    Seattle        Category:        Location       SubCategory:     GPE
        Confidence Score:       0.82   Length:          7      Offset:          26

        Text:    last week      Category:        DateTime       SubCategory:     DateRange
        Confidence Score:       0.8    Length:          9      Offset:          34
```

Personally Identifiable Information (PII) recognition

Create a new function called `pii_recognition_example` that takes the client as an argument, then calls the `recognize_pii_entities()` function and iterates through the results. The returned response object will contain the list of detected entities in `entity` if successful, and an `error` if not. For each detected entity, print its Category and Sub-Category if exists.

```
def pii_recognition_example(client):
    documents = [
        "The employee's SSN is 859-98-0987.",
        "The employee's phone number is 555-555-5555."
    ]
    response = client.recognize_pii_entities(documents, language="en")
    result = [doc for doc in response if not doc.is_error]
    for doc in result:
        print("Redacted Text: {}".format(doc.redacted_text))
        for entity in doc.entities:
            print("Entity: {}".format(entity.text))
            print("\tCategory: {}".format(entity.category))
            print("\tConfidence Score: {}".format(entity.confidence_score))
            print("\tOffset: {}".format(entity.offset))
            print("\tLength: {}".format(entity.length))
pii_recognition_example(client)
```

Output

```
Redacted Text: The employee's SSN is ***********.
Entity: 859-98-0987
        Category: U.S. Social Security Number (SSN)
        Confidence Score: 0.65
        Offset: 22
        Length: 11
Redacted Text: The employee's phone number is ************.
Entity: 555-555-5555
        Category: Phone Number
        Confidence Score: 0.8
        Offset: 31
        Length: 12
```

Entity linking

- Version 3.1
- Version 3.0

Create a new function called `entity_linking_example()` that takes the client as an argument, then calls the `recognize_linked_entities()` function and iterates through the results. The returned response object will contain the list of detected entities in `entities` if successful, and an `error` if not. Since linked entities are uniquely identified, occurrences of the same entity are grouped under a `entity` object as a list of `match` objects.

```
def entity_linking_example(client):

    try:
        documents = ["""Microsoft was founded by Bill Gates and Paul Allen on April 4, 1975,
        to develop and sell BASIC interpreters for the Altair 8800.
        During his career at Microsoft, Gates held the positions of chairman,
        chief executive officer, president and chief software architect,
        while also being the largest individual shareholder until May 2014."""]
        result = client.recognize_linked_entities(documents = documents)[0]

        print("Linked Entities:\n")
        for entity in result.entities:
            print("\tName: ", entity.name, "\tId: ", entity.data_source_entity_id, "\tUrl: ", entity.url,
            "\n\tData Source: ", entity.data_source)
            print("\tMatches:")
            for match in entity.matches:
                print("\t\tText:", match.text)
                print("\t\tConfidence Score: {0:.2f}".format(match.confidence_score))
                print("\t\tOffset: {}".format(match.offset))
                print("\t\tLength: {}".format(match.length))

    except Exception as err:
        print("Encountered exception. {}".format(err))
entity_linking_example(client)
```

Output

```
Linked Entities:

        Name:  Microsoft        Id:  Microsoft  Url:  https://en.wikipedia.org/wiki/Microsoft
        Data Source:  Wikipedia
        Matches:
                Text: Microsoft
                Confidence Score: 0.55
                Offset: 0
                Length: 9
                Text: Microsoft
                Confidence Score: 0.55
                Offset: 168
                Length: 9
        Name:  Bill Gates       Id:  Bill Gates         Url:  https://en.wikipedia.org/wiki/Bill_Gates
        Data Source:  Wikipedia
        Matches:
                Text: Bill Gates
                Confidence Score: 0.63
                Offset: 25
                Length: 10
                Text: Gates
                Confidence Score: 0.63
                Offset: 179
                Length: 5
        Name:  Paul Allen       Id:  Paul Allen         Url:  https://en.wikipedia.org/wiki/Paul_Allen
        Data Source:  Wikipedia
        Matches:
                Text: Paul Allen
                Confidence Score: 0.60
                Offset: 40
                Length: 10
        Name:  April 4  Id:  April 4    Url:  https://en.wikipedia.org/wiki/April_4
        Data Source:  Wikipedia
        Matches:
                Text: April 4
                Confidence Score: 0.32
                Offset: 54
                Length: 7
        Name:  BASIC    Id:  BASIC      Url:  https://en.wikipedia.org/wiki/BASIC
        Data Source:  Wikipedia
        Matches:
                Text: BASIC
                Confidence Score: 0.33
                Offset: 98
                Length: 5
        Name:  Altair 8800      Id:  Altair 8800        Url:  https://en.wikipedia.org/wiki/Altair_8800
        Data Source:  Wikipedia
        Matches:
                Text: Altair 8800
                Confidence Score: 0.88
                Offset: 125
                Length: 11
```

Key phrase extraction

- Version 3.1
- Version 3.0

Create a new function called `key_phrase_extraction_example()` that takes the client as an argument, then calls the `extract_key_phrases()` function. The result will contain the list of detected key phrases in `key_phrases` if successful, and an `error` if not. Print any detected key phrases.

```
def key_phrase_extraction_example(client):

    try:
        documents = ["My cat might need to see a veterinarian."]

        response = client.extract_key_phrases(documents = documents)[0]

        if not response.is_error:
            print("\tKey Phrases:")
            for phrase in response.key_phrases:
                print("\t\t", phrase)
        else:
            print(response.id, response.error)

    except Exception as err:
        print("Encountered exception. {}".format(err))

key_phrase_extraction_example(client)
```

Output

```
    Key Phrases:
         cat
         veterinarian
```

Extract health entities

You can use Text Analytics to perform an asynchronous request to extract healthcare entities from text. The below sample shows a basic example. You can find a more advanced sample on GitHub.

Caution

- To use the health operation, make sure your Azure resource is using the S standard pricing tier.

- Version 3.1
- Version 3.0

```
def health_example(client):
    documents = [
        """
        Patient needs to take 50 mg of ibuprofen.
        """
    ]

    poller = client.begin_analyze_healthcare_entities(documents)
    result = poller.result()

    docs = [doc for doc in result if not doc.is_error]

    for idx, doc in enumerate(docs):
        for entity in doc.entities:
            print("Entity: {}".format(entity.text))
            print("...Normalized Text: {}".format(entity.normalized_text))
            print("...Category: {}".format(entity.category))
            print("...Subcategory: {}".format(entity.subcategory))
            print("...Offset: {}".format(entity.offset))
            print("...Confidence score: {}".format(entity.confidence_score))
        for relation in doc.entity_relations:
            print("Relation of type: {} has the following roles".format(relation.relation_type))
            for role in relation.roles:
                print("...Role '{}' with entity '{}'".format(role.name, role.entity.text))
        print("------------------------------------------")
health_example(client)
```

Output

```
Entity: 50 mg
...Normalized Text: None
...Category: Dosage
...Subcategory: None
...Offset: 31
...Confidence score: 1.0
Entity: ibuprofen
...Normalized Text: ibuprofen
...Category: MedicationName
...Subcategory: None
...Offset: 40
...Confidence score: 1.0
Relation of type: DosageOfMedication has the following roles
...Role 'Dosage' with entity '50 mg'
...Role 'Medication' with entity 'ibuprofen'
```

Use the API asynchronously with the Analyze operation

- Version 3.1
- Version 3.0

You can use the Analyze operation to perform asynchronous batch requests for: NER, key phrase extraction, sentiment analysis, and PII detection. The below sample shows a basic example on one operation. You can find a more advanced sample on GitHub.

Caution

- To use the Analyze operation, make sure your Azure resource is using the S standard pricing tier.

Create a new function called `analyze_batch_example()` that takes the client as an argument, then calls the `begin_analyze_actions()` function. The result will be a long running operation which will be polled for results.

```python
from azure.ai.textanalytics import (
    RecognizeEntitiesAction,
    ExtractKeyPhrasesAction
)

def analyze_batch_example(client):
        documents = [
            "Microsoft was founded by Bill Gates and Paul Allen."
        ]

        poller = client.begin_analyze_actions(
            documents,
            display_name="Sample Text Analysis",
            actions=[RecognizeEntitiesAction(), ExtractKeyPhrasesAction()]
        )

        result = poller.result()
        action_results = [action_result for action_result in list(result)]
        first_action_result = action_results[0][0]
        print("Results of Entities Recognition action:")

        for entity in first_action_result.entities:
            print("Entity: {}".format(entity.text))
            print("...Category: {}".format(entity.category))
            print("...Confidence Score: {}".format(entity.confidence_score))
            print("...Offset: {}".format(entity.offset))
            print("...Length: {}".format(entity.length))
        print("------------------------------------------")

        second_action_result = action_results[0][1]
        print("Results of Key Phrase Extraction action:")

        for key_phrase in second_action_result.key_phrases:
            print("Key Phrase: {}\n".format(key_phrase))
        print("------------------------------------------")

analyze_batch_example(client)
```

Output

```
Results of Entities Recognition action:
Entity: Microsoft
...Category: Organization
...Confidence Score: 1.0
...Offset: 0
...Length: 9
Entity: Bill Gates
...Category: Person
...Confidence Score: 1.0
...Offset: 25
...Length: 10
Entity: Paul Allen
...Category: Person
...Confidence Score: 1.0
...Offset: 40
...Length: 10
------------------------------------------
Results of Key Phrase Extraction action:
Key Phrase: Bill Gates

Key Phrase: Paul Allen

Key Phrase: Microsoft

------------------------------------------
```

IMPORTANT

- The latest stable version of the Text Analytics API is `3.1`.
  - Be sure to only follow the instructions for the version you are using.

- Version 3.1
- Version 3.0

v3.1 Reference documentation

Prerequisites

- The current version of cURL.
- Once you have your Azure subscription, create a Text Analytics resource in the Azure portal to get your key and endpoint. After it deploys, click **Go to resource**.
  - You will need the key and endpoint from the resource you create to connect your application to the Text Analytics API. You'll paste your key and endpoint into the code below later in the quickstart.
  - You can use the free pricing tier (`F0`) to try the service, and upgrade later to a paid tier for production.

NOTE

- The following BASH examples use the `\` line continuation character. If your console or terminal uses a different line continuation character, use that character.
- You can find language specific samples on GitHub.
- Go to the Azure portal and find the key and endpoint for the Text Analytics resource you created in the prerequisites. They will be located on the resource's **key and endpoint** page, under **resource management**. Then replace the strings in the code below with your key and endpoint. To call the Text Analytics API, you need the following information:

PARAMETER	DESCRIPTION
`-X POST <endpoint>`	Specifies your endpoint for accessing the API.
`-H Content-Type: application/json`	The content type for sending JSON data.
`-H "Ocp-Apim-Subscription-Key:<key>`	Specifies the key for accessing the API.
`-d <documents>`	The JSON containing the documents you want to send.

The following cURL commands are executed from a BASH shell. Edit these commands with your own resource name, resource key, and JSON values.

Sentiment Analysis

1. Copy the command into a text editor.
2. Make the following changes in the command where needed:
   a. Replace the value `<your-text-analytics-key-here>` with your key.
   b. Replace the first part of the request URL `<your-text-analytics-endpoint-here>` with the your own endpoint URL.
3. Open a command prompt window.

4. Paste the command from the text editor into the command prompt window, and then run the command.

- version 3.1
- version 3.0

> **NOTE**
>
> The below example includes a request for the Opinion Mining feature of Sentiment Analysis using the `opinionMining=true` parameter, which provides granular information about assessments (adjectives) related to targets (nouns) in the text.

```
curl -X POST https://<your-text-analytics-endpoint-here>/text/analytics/v3.1/sentiment?opinionMining=true \
-H "Content-Type: application/json" \
-H "Ocp-Apim-Subscription-Key: <your-text-analytics-key-here>" \
-d '{ documents: [{ id: "1", text: "The customer service here is really good."}]}'
```

JSON response

```json
{
   "documents":[
      {
         "id":"1",
         "sentiment":"positive",
         "confidenceScores":{
            "positive":1.0,
            "neutral":0.0,
            "negative":0.0
         },
         "sentences":[
            {
               "sentiment":"positive",
               "confidenceScores":{
                  "positive":1.0,
                  "neutral":0.0,
                  "negative":0.0
               },
               "offset":0,
               "length":41,
               "text":"The customer service here is really good.",
               "targets":[
                  {
                     "sentiment":"positive",
                     "confidenceScores":{
                        "positive":1.0,
                        "negative":0.0
                     },
                     "offset":4,
                     "length":16,
                     "text":"customer service",
                     "relations":[
                        {
                           "relationType":"assessment",
                           "ref":"#/documents/0/sentences/0/assessments/0"
                        }
                     ]
                  }
               ],
               "assessments":[
                  {
                     "sentiment":"positive",
                     "confidenceScores":{
                        "positive":1.0,
                        "negative":0.0
                     },
                     "offset":36,
                     "length":4,
                     "text":"good",
                     "isNegated":false
                  }
               ]
            }
         ],
         "warnings":[

         ]
      }
   ],
   "errors":[

   ],
   "modelVersion":"2020-04-01"
}
```

Language detection

1. Copy the command into a text editor.
2. Make the following changes in the command where needed:
   a. Replace the value `<your-text-analytics-key-here>` with your key.
   b. Replace the first part of the request URL `<your-text-analytics-endpoint-here>` with the your own endpoint URL.
3. Open a command prompt window.
4. Paste the command from the text editor into the command prompt window, and then run the command.

- version 3.1
- version 3.0

```
curl -X POST https://<your-text-analytics-endpoint-here>/text/analytics/v3.1/languages/ \
-H "Content-Type: application/json" \
-H "Ocp-Apim-Subscription-Key: <your-text-analytics-key-here>" \
-d '{ documents: [{ id: "1", text: "This is a document written in English."}]}'
```

JSON response

```
{
   "documents":[
      {
         "id":"1",
         "detectedLanguage":{
            "name":"English",
            "iso6391Name":"en",
            "confidenceScore":1.0
         },
         "warnings":[

         ]
      }
   ],
   "errors":[

   ],
   "modelVersion":"2021-01-05"
}
```

Named Entity Recognition (NER)

1. Copy the command into a text editor.
2. Make the following changes in the command where needed:
   a. Replace the value `<your-text-analytics-key-here>` with your key.
   b. Replace the first part of the request URL `<your-text-analytics-endpoint-here>` with the your own endpoint URL.
3. Open a command prompt window.
4. Paste the command from the text editor into the command prompt window, and then run the command.

- version 3.1
- version 3.0

```
curl -X POST https://<your-text-analytics-endpoint-here>/text/analytics/v3.1/entities/recognition/general \
-H "Content-Type: application/json" \
-H "Ocp-Apim-Subscription-Key: <your-text-analytics-key-here>" \
-d '{ documents: [{ id: "1", language:"en", text: "I had a wonderful trip to Seattle last week."}]}'
```

JSON response

```
{
   "documents":[
      {
         "id":"1",
         "entities":[
            {
               "text":"Seattle",
               "category":"Location",
               "subcategory":"GPE",
               "offset":26,
               "length":7,
               "confidenceScore":0.99
            },
            {
               "text":"last week",
               "category":"DateTime",
               "subcategory":"DateRange",
               "offset":34,
               "length":9,
               "confidenceScore":0.8
            }
         ],
         "warnings":[

         ]
      }
   ],
   "errors":[

   ],
   "modelVersion":"2021-01-15"
}
```

Detecting personally identifying information

1. Copy the command into a text editor.
2. Make the following changes in the command where needed:
   a. Replace the value `<your-text-analytics-key-here>` with your key.
   b. Replace the first part of the request URL `<your-text-analytics-endpoint-here>` with the your own endpoint URL.
3. Open a command prompt window.
4. Paste the command from the text editor into the command prompt window, and then run the command.

```
curl -X POST https://your-text-analytics-endpoint-here>/text/analytics/v3.1/entities/recognition/pii \
-H "Content-Type: application/json" \
-H "Ocp-Apim-Subscription-Key: <your-text-analytics-key-here>" \
-d '{ documents: [{ id: "1", language:"en", text: "Call our office at 312-555-1234, or send an email to
support@contoso.com"}]}'
```

JSON response

```
{
   "documents":[
      {
         "redactedText":"Call our office at ************, or send an email to *******************",
         "id":"1",
         "entities":[
            {
               "text":"312-555-1234",
               "category":"PhoneNumber",
               "offset":19,
               "length":12,
               "confidenceScore":0.8
            },
            {
               "text":"support@contoso.com",
               "category":"Email",
               "offset":53,
               "length":19,
               "confidenceScore":0.8
            }
         ],
         "warnings":[

         ]
      }
   ],
   "errors":[

   ],
   "modelVersion":"2021-01-15"
}
```

Entity linking

1. Copy the command into a text editor.
2. Make the following changes in the command where needed:
   a. Replace the value `<your-text-analytics-key-here>` with your key.
   b. Replace the first part of the request URL `<your-text-analytics-endpoint-here>` with the your own endpoint URL.
3. Open a command prompt window.
4. Paste the command from the text editor into the command prompt window, and then run the command.

- version 3.1
- version 3.0

```
curl -X POST https://<your-text-analytics-endpoint-here>/text/analytics/v3.1/entities/linking \
-H "Content-Type: application/json" \
-H "Ocp-Apim-Subscription-Key: <your-text-analytics-key-here>" \
-d '{ documents: [{ id: "1", language:"en", text: "Microsoft was founded by Bill Gates and Paul Allen on
April 4, 1975."}]}'
```

JSON response

```
{
   "documents":[
      {
         "id":"1",
         "entities":[
            {
               "bingId":"a093e9b9-90f5-a3d5-c4b8-5855e1b01f85",
               "name":"Microsoft",
               "matches":[
                  {
                     "text":"Microsoft",
                     "offset":0,
                     "length":9,
                     "confidenceScore":0.48
                  }
               ],
               "language":"en",
               "id":"Microsoft",
               "url":"https://en.wikipedia.org/wiki/Microsoft",
               "dataSource":"Wikipedia"
            },
            {
               "bingId":"0d47c987-0042-5576-15e8-97af601614fa",
               "name":"Bill Gates",
               "matches":[
                  {
                     "text":"Bill Gates",
                     "offset":25,
                     "length":10,
                     "confidenceScore":0.52
                  }
               ],
               "language":"en",
               "id":"Bill Gates",
               "url":"https://en.wikipedia.org/wiki/Bill_Gates",
               "dataSource":"Wikipedia"
            },
            {
               "bingId":"df2c4376-9923-6a54-893f-2ee5a5badbc7",
               "name":"Paul Allen",
               "matches":[
                  {
                     "text":"Paul Allen",
                     "offset":40,
                     "length":10,
                     "confidenceScore":0.54
                  }
               ],
               "language":"en",
               "id":"Paul Allen",
               "url":"https://en.wikipedia.org/wiki/Paul_Allen",
               "dataSource":"Wikipedia"
            },
            {
               "bingId":"52535f87-235e-b513-54fe-c03e4233ac6e",
               "name":"April 4",
               "matches":[
                  {
                     "text":"April 4",
                     "offset":54,
                     "length":7,
                     "confidenceScore":0.38
                  }
               ],
               "language":"en",
               "id":"April 4",
               "url":"https://en.wikipedia.org/wiki/April_4",
               "dataSource":"Wikipedia"
            }
         ],
         "warnings":[

         ]
      }
   ],
   "errors":[

   ],
   "modelVersion":"2020-02-01"
}
```

Key phrase extraction

1. Copy the command into a text editor.
2. Make the following changes in the command where needed:
   a. Replace the value `<your-text-analytics-key-here>` with your key.
   b. Replace the first part of the request URL `<your-text-analytics-endpoint-here>` with the your own endpoint URL.
3. Open a command prompt window.
4. Paste the command from the text editor into the command prompt window, and then run the command.

- version 3.1
- version 3.0

```
curl -X POST https://<your-text-analytics-endpoint-here>/text/analytics/v3.1/keyPhrases \
-H "Content-Type: application/json" \
-H "Ocp-Apim-Subscription-Key: <your-text-analytics-key-here>" \
-d '{ documents: [{ id: "1", language:"en", text: "I had a wonderful trip to Seattle last week."}]}'
```

```
{
    "documents":[
        {
            "id":"1",
            "keyPhrases":[
                "wonderful trip",
                "Seattle"
            ],
            "warnings":[

            ]
        }
    ],
    "errors":[

    ],
    "modelVersion":"2021-06-01"
}
```

Clean up resources

If you want to clean up and remove a Cognitive Services subscription, you can delete the resource or resource group. Deleting the resource group also deletes any other resources associated with it.

- Portal
- Azure CLI

Next steps

Explore a solution

- Text Analytics overview
- Sentiment analysis
- Entity recognition
- Detect language
- Language recognition

How to call the Text Analytics REST API

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In this article, we use the Text Analytics REST API and Postman to demonstrate key concepts. The API provides several synchronous and asynchronous endpoints for using the features of the service.

Create a Text Analytics resource

NOTE

- You will need a Text Analytics resource using a Standard (S) pricing tier if you want to use the `/analyze` or `/health` endpoints. The `/analyze` endpoint is included in your pricing tier.

Before you use the Text Analytics API, you will need to create a Azure resource with a key and endpoint for your applications.

1. First, go to the Azure portal and create a new Text Analytics resource, if you don't have one already. Choose a pricing tier.
2. Select the region you want to use for your endpoint.
3. Create the Text Analytics resource and go to the “Keys and Endpoint” section under Resource Management in the left of the page. Copy the key to be used later when you call the APIs. You'll add this later as a value for the `Ocp-Apim-Subscription-Key` header.
4. To check the number of text records that have been sent using your Text Analytics resource:
   a. Navigate to your Text Analytics resource in the Azure portal.
   b. Click **Metrics**, located under **Monitoring** in the left navigation menu.
   c. Select *Processed text records* in the dropdown box for **Metric**.

A text record is a unit of input text up to 1000 characters. For example, 1500 characters submitted as input text will count as 2 text records.

Change your pricing tier

If you have an existing Text Analytics resource using the S0 through S4 pricing tier, you should update it to use the Standard (S) pricing tier. The S0 through S4 pricing tiers will be retired. To update your resource's pricing:

1. Navigate to your Text Analytics resource in the Azure portal.
2. Select **Pricing tier** in the left navigation menu. It will be below **RESOURCE MANAGEMENT**.
3. Choose the Standard (S) pricing tier. Then click **Select**.

You can also create a new Text Analytics resource with the Standard (S) pricing tier, and migrate your applications to use the credentials for the new resource.

Using the API synchronously

You can call Text Analytics synchronously (for low latency scenarios). You have to call each API (feature) separately when using synchronous API. If you need to call multiple features then check out below section on how to call Text Analytics asynchronously.

Using the API asynchronously

The Text Analytics v3.1 API provides two asynchronous endpoints:

- The `/analyze` endpoint for Text Analytics allows you to analyze the same set of text documents with multiple text analytics features in one API call. Previously, to use multiple features you would need to make separate API calls for each operation. Consider this capability when you need to analyze large sets of documents with more than one Text Analytics feature.

- The `/health` endpoint for Text Analytics for health, which can extract and label relevant medical information from clinical documents.

See the table below to see which features can be used asynchronously. Note that only a few features can be called from the `/analyze` endpoint.

FEATURE	SYNCHRONOUS	ASYNCHRONOUS
Language detection	✓	
Sentiment analysis	✓	✓*
Opinion mining	✓	✓*
Key phrase extraction	✓	✓*
Named Entity Recognition (including PII and PHI)	✓	✓*
Entity linking	✓	✓*
Text Analytics for health (container)	✓	
Text Analytics for health (API)		✓

`*` - Called asynchronously through the `/analyze` endpoint.

TIP

For detailed API technical documentation and to see it in action, use the following links. You can also send POST requests from the built-in API test console. No setup is required, simply paste your resource key and JSON documents into the request:

- Latest stable API - v3.1
- Previous stable API - v3.0

API request formats

You can send both synchronous and asynchronous calls to the Text Analytics API.

- Synchronous
- Asynchronous

Synchronous requests

The format for API requests is the same for all synchronous operations. Documents are submitted in a JSON object as raw unstructured text. XML is not supported. The JSON schema consists of the elements described below.

ELEMENT	VALID VALUES	REQUIRED?	USAGE
`id`	The data type is string, but in practice document IDs tend to be integers.	Required	The system uses the IDs you provide to structure the output. Language codes, key phrases, and sentiment scores are generated for each ID in the request.

ELEMENT	VALID VALUES	REQUIRED?	USAGE
`text`	Unstructured raw text, up to 5,120 characters.	Required	For language detection, text can be expressed in any language. For sentiment analysis, key phrase extraction and entity identification, the text must be in a supported language.
`language`	2-character ISO 639-1 code for a supported language	Varies	Required for sentiment analysis, key phrase extraction, and entity linking; optional for language detection. There is no error if you exclude it, but the analysis is weakened without it. The language code should correspond to the `text` you provide.

The following is an example of an API request for the synchronous Text Analytics endpoints.

```
{
  "documents": [
    {
      "language": "en",
      "id": "1",
      "text": "Sample text to be sent to the text analytics api."
    }
  ]
}
```

TIP

See the Data and rate limits article for information on the rates and size limits for sending data to the Text Analytics API.

Set up a request

In Postman (or another web API test tool), add the endpoint for the feature you want to use. Use the table below to find the appropriate endpoint format, and replace `<your-text-analytics-resource>` with your resource endpoint. For example:

TIP

You can call v3.0 of the below synchronous endpoints by replacing `/v3.1` with `/v3.0/`.

`https://my-resource.cognitiveservices.azure.com/text/analytics/v3.1/languages`

- Synchronous
- Asynchronous

Endpoints for sending synchronous requests

FEATURE	REQUEST TYPE	RESOURCE ENDPOINTS
Language Detection	POST	`<your-text-analytics-resource>/text/analytics/v3.1/languages`
Sentiment Analysis	POST	`<your-text-analytics-resource>/text/analytics/v3.1/sentiment`

FEATURE	REQUEST TYPE	RESOURCE ENDPOINTS
Opinion Mining	POST	`<your-text-analytics-resource>/text/analytics/v3.1/sentiment?opinionMining=true`
Key Phrase Extraction	POST	`<your-text-analytics-resource>/text/analytics/v3.1/keyPhrases`
Named Entity Recognition - General	POST	`<your-text-analytics-resource>/text/analytics/v3.1/entities/recognition/`
Named Entity Recognition - PII	POST	`<your-text-analytics-resource>/text/analytics/v3.1/entities/recognition/`
Named Entity Recognition - PHI	POST	`<your-text-analytics-resource>/text/analytics/v3.1/entities/recognition/domain=phi`
Entity Linking	POST	`<your-text-analytics-resource>/text/analytics/v3.1/entities/linking`

After you have your endpoint, in Postman (or another web API test tool):

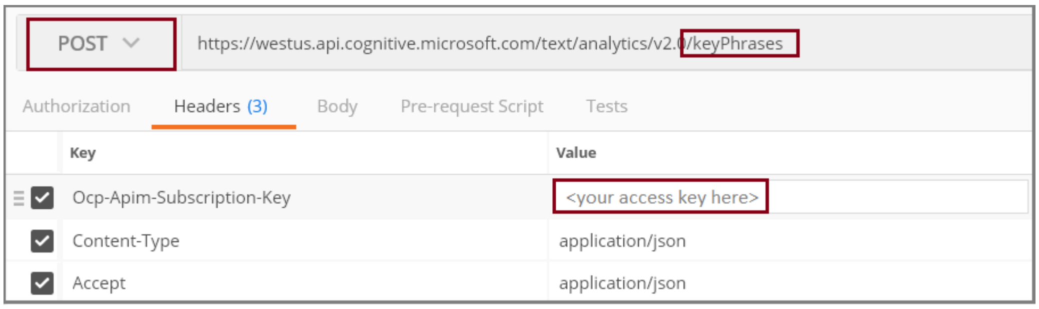
1. Choose the request type for the feature you want to use.

2. Paste in the endpoint of the proper operation you want from the above table.

3. Set the three request headers:

   - `Ocp-Apim-Subscription-Key` : your access key, obtained from Azure portal
   - `Content-Type` : application/json
   - `Accept` : application/json

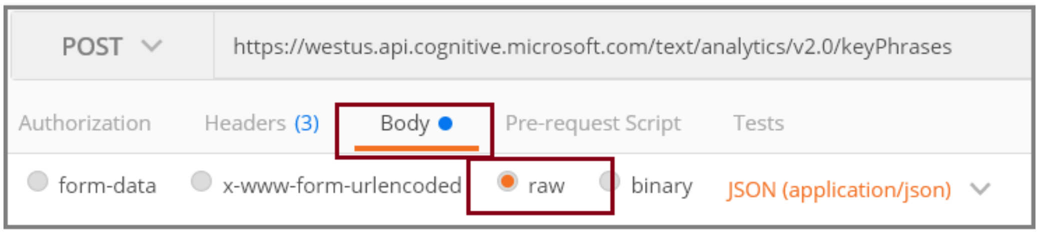
   If you're using Postman, your request should look similar to the following screenshot, assuming a `/keyPhrases` endpoint.


POST https://westus.api.cognitive.microsoft.com/text/analytics/v2.0/keyPhrases

Authorization | Headers (3) | Body | Pre-request Script | Tests

Key	Value
Ocp-Apim-Subscription-Key	<your access key here>
Content-Type	application/json
Accept	application/json

4. Choose **raw** for the format of the **Body**


POST https://westus.api.cognitive.microsoft.com/text/analytics/v2.0/keyPhrases

Authorization | Headers (3) | Body | Pre-request Script | Tests

form-data | x-www-form-urlencoded | [✓ raw] | binary | JSON (application/json)

5. Paste in some JSON documents in a valid format. Use the examples in the **API request format** section above, and for more information and examples, see the topics below:

   - Language detection
   - Key phrase extraction
   - Sentiment analysis
   - Entity recognition

Send the request

Submit the API request. If you made the call to a synchronous endpoint, the response will be displayed immediately, as a single JSON document, with an item for each document ID provided in the request.

If you made the call to the asynchronous `/analyze` or `/health` endpoints, check that you received a 202 response code. you will need to get the response to view the results:

1. In the API response, find the `Operation-Location` from the header, which identifies the job you sent to the API.
2. Create a GET request for the endpoint you used. refer to the table above for the endpoint format, and review the API reference documentation. For example:

   ```
   https://my-resource.cognitiveservices.azure.com/text/analytics/v3.1/analyze/jobs/<Operation-Location>
   ```

3. Add the `Operation-Location` to the request.
4. The response will be a single JSON document, with an item for each document ID provided in the request.

Please note that for both asynchronous `/analyze` or `/health` operations, the results from the GET request in step 2 above are available for 24 hours from the time the job was created. This time is indicated by the `expirationDateTime` value in the GET response. After this time period, the results are purged and are no longer available for retrieval.

Example API responses

- Synchronous
- Asynchronous

Example responses for synchronous operation

The synchronous endpoint responses will vary depending on the endpoint you use. See the following articles for example responses.

- Language detection
- Key phrase extraction
- Sentiment analysis
- Entity recognition

See also

- Text Analytics overview
- Model versions
- Frequently asked questions (FAQ)
- Text Analytics product page
- Using the Text Analytics client library
- What's new

Example: Detect language with Text Analytics

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The Language Detection feature of the Azure Text Analytics REST API evaluates text input for each document and returns language identifiers with a score that indicates the strength of the analysis.

This capability is useful for content stores that collect arbitrary text, where language is unknown. You can parse the results of this analysis to determine which language is used in the input document. The response also returns a score that reflects the confidence of the model. The score value is between 0 and 1.

The Language Detection feature can detect a wide range of languages, variants, dialects, and some regional or cultural languages. The exact list of languages for this feature isn't published.

If you have content expressed in a less frequently used language, you can try the Language Detection feature to see if it returns a code. The response for languages that can't be detected is `unknown`.

TIP

Text Analytics also provides a Linux-based Docker container image for language detection, so you can install and run the Text Analytics container close to your data.

Preparation

You must have JSON documents in this format: ID and text.

The document size must be under 5,120 characters per document. You can have up to 1,000 items (IDs) per collection. The collection is submitted in the body of the request. The following sample is an example of content you might submit for language detection:

```
{
    "documents": [
        {
            "id": "1",
            "text": "This document is in English."
        },
        {
            "id": "2",
            "text": "Este documento está en inglés."
        },
        {
            "id": "3",
            "text": "Ce document est en anglais."
        },
        {
            "id": "4",
            "text": "本文件为英文"
        },
        {
            "id": "5",
            "text": "Этот документ на английском языке."
        }
    ]
}
```

Step 1: Structure the request

For more information on request definition, see Call the Text Analytics API. The following points are restated for convenience:

- Create a POST request. To review the API documentation for this request, see the Language Detection API.
- Set the HTTP endpoint for language detection. Use either a Text Analytics resource on Azure or an instantiated Text Analytics container. You must include `/text/analytics/v3.1/languages` in the URL. For example: `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/languages`.
- Set a request header to include the access key for Text Analytics operations.
- In the request body, provide the JSON documents collection you prepared for this analysis.

TIP

Use Postman or open the **API testing console** in the documentation to structure a request and POST it to the service.

Step 2: POST the request

Analysis is performed upon receipt of the request. For information on the size and number of requests you can send per minute and second, see the data limits article.

Recall that the service is stateless. No data is stored in your account. Results are returned immediately in the response.

Step 3: View the results

All POST requests return a JSON-formatted response with the IDs and detected properties.

Output is returned immediately. You can stream the results to an application that accepts JSON or save the output to a file on the local system. Then, import the output into an application that you can use to sort, search, and manipulate the data.

Results for the example request should look like the following JSON document. Notice that it's one JSON document with multiple items with each item representing the detection result for every document you submit. Output is in English.

Language detection will return one predominant language for one document, along with it's ISO 639-1 name, friendly name and confidence score. A positive score of 1.0 expresses the highest possible confidence level of the analysis.

```json
{
    "documents": [
        {
            "id": "1",
            "detectedLanguage": {
                "name": "English",
                "iso6391Name": "en",
                "confidenceScore": 0.99
            },
            "warnings": []
        },
        {
            "id": "2",
            "detectedLanguage": {
                "name": "Spanish",
                "iso6391Name": "es",
                "confidenceScore": 0.91
            },
            "warnings": []
        },
        {
            "id": "3",
            "detectedLanguage": {
                "name": "French",
                "iso6391Name": "fr",
                "confidenceScore": 0.78
            },
            "warnings": []
        },
        {
            "id": "4",
            "detectedLanguage": {
                "name": "Chinese_Simplified",
                "iso6391Name": "zh_chs",
                "confidenceScore": 1.0
            },
            "warnings": []
        },
        {
            "id": "5",
            "detectedLanguage": {
                "name": "Russian",
                "iso6391Name": "ru",
                "confidenceScore": 1.0
            },
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-01-05"
}
```

Ambiguous content

In some cases it may be hard to disambiguate languages based on the input. You can use the `countryHint` parameter to specify an ISO 3166-1 alpha-2 country/region code. By default the API is using the "US" as the default countryHint, to remove this behavior you can reset this parameter by setting this value to empty string `countryHint = ""` .

For example, "Impossible" is common to both English and French and if given with limited context the response will be based on the "US" country/region hint. If the origin of the text is known to be coming from France that can be given as a hint.

Input

```
{
    "documents": [
        {
            "id": "1",
            "text": "impossible"
        },
        {
            "id": "2",
            "text": "impossible",
            "countryHint": "fr"
        }
    ]
}
```

The service now has additional context to make a better judgment:

Output

```
{
    "documents":[
        {
            "detectedLanguage":{
                "confidenceScore":0.62,
                "iso6391Name":"en",
                "name":"English"
            },
            "id":"1",
            "warnings":[

            ]
        },
        {
            "detectedLanguage":{
                "confidenceScore":1.0,
                "iso6391Name":"fr",
                "name":"French"
            },
            "id":"2",
            "warnings":[

            ]
        }
    ],
    "errors":[

    ],
    "modelVersion":"2020-09-01"
}
```

If the analyzer can't parse the input, it returns `(Unknown)`. An example is if you submit a text block that consists solely of Arabic numerals.

```
{
    "documents": [
        {
            "id": "1",
            "detectedLanguage": {
                "name": "(Unknown)",
                "iso6391Name": "(Unknown)",
                "confidenceScore": 0.0
            },
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-01-05"
}
```

Mixed-language content

Mixed-language content within the same document returns the language with the largest representation in the content, but with a lower positive rating. The rating reflects the marginal strength of the assessment. In the following example, input is a blend of English, Spanish, and French. The analyzer counts characters in each segment to determine the predominant language.

Input

```
{
    "documents": [
        {
            "id": "1",
            "text": "Hello, I would like to take a class at your University. ¿Se ofrecen clases en español?
Es mi primera lengua y más fácil para escribir. Que diriez-vous des cours en français?"
        }
    ]
}
```

Output

The resulting output consists of the predominant language, with a score of less than 1.0, which indicates a weaker level of confidence.

```
{
    "documents": [
        {
            "id": "1",
            "detectedLanguage": {
                "name": "Spanish",
                "iso6391Name": "es",
                "confidenceScore": 0.88
            },
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-01-05"
}
```

Summary

In this article, you learned concepts and workflow for language detection by using Text Analytics in Azure Cognitive Services. The following points were explained and demonstrated:

- Language detection is available for a wide range of languages, variants, dialects, and some regional or cultural languages.
- JSON documents in the request body include an ID and text.
- The POST request is to a `/languages` endpoint by using a personalized access key and an endpoint that's valid for your subscription.
- Response output consists of language identifiers for each document ID. The output can be streamed to any app that accepts JSON. Example apps include Excel and Power BI, to name a few.

See also

- Text Analytics overview
- Using the Text Analytics client library
- What's new
- Model versions

How to: Sentiment analysis and Opinion Mining

7/8/2021 • 7 minutes to read • Edit Online

The Text Analytics API's Sentiment Analysis feature provides two ways for detecting positive and negative sentiment. If you send a Sentiment Analysis request, the API will return sentiment labels (such as "negative", "neutral" and "positive") and confidence scores at the sentence and document-level. You can also send Opinion Mining requests using the Sentiment Analysis endpoint, which provides granular information about the opinions related to words (such as the attributes of products or services) in the text.

The AI models used by the API are provided by the service, you just have to send content for analysis.

Sentiment Analysis versions and features

FEATURE	SENTIMENT ANALYSIS V3.0	SENTIMENT ANALYSIS V3.1
Methods for single, and batch requests	X	X
Sentiment Analysis scores and labeling	X	X
Linux-based Docker container	X	
Opinion Mining		X

Sentiment Analysis

Sentiment Analysis in version 3.x applies sentiment labels to text, which are returned at a sentence and document level, with a confidence score for each.

The labels are *positive*, *negative*, and *neutral*. At the document level, the *mixed* sentiment label also can be returned. The sentiment of the document is determined below:

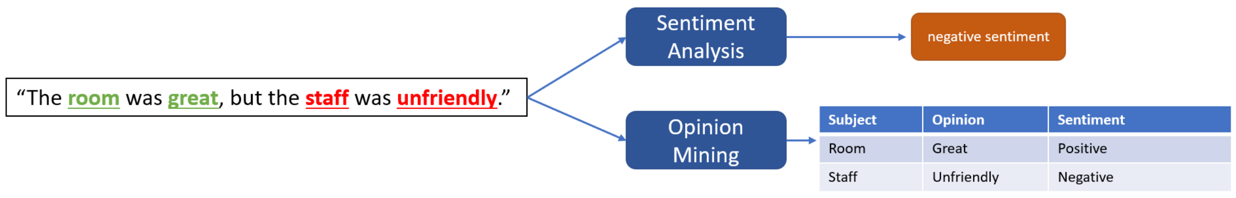
SENTENCE SENTIMENT	RETURNED DOCUMENT LABEL
At least one `positive` sentence is in the document. The rest of the sentences are `neutral`.	`positive`
At least one `negative` sentence is in the document. The rest of the sentences are `neutral`.	`negative`
At least one `negative` sentence and at least one `positive` sentence are in the document.	`mixed`
All sentences in the document are `neutral`.	`neutral`

Confidence scores range from 1 to 0. Scores closer to 1 indicate a higher confidence in the label's classification, while lower scores indicate lower confidence. For each document or each sentence, the predicted scores associated with the labels (positive, negative and neutral) add up to 1. For more information, see the Text Analytics transparency note.

Opinion Mining

Opinion Mining is a feature of Sentiment Analysis, starting in version 3.1. Also known as Aspect-based Sentiment Analysis in Natural Language Processing (NLP), this feature provides more granular information about the opinions related to attributes of products or services in text. The API surfaces opinions as a target (noun or verb) and an assessment (adjective).

For example, if a customer leaves feedback about a hotel such as "The room was great, but the staff was unfriendly.", Opinion Mining will locate targets (aspects) in the text, and their associated assessments (opinions) and sentiments. Sentiment Analysis might only report a negative sentiment.



Subject	Opinion	Sentiment
Room	Great	Positive
Staff	Unfriendly	Negative

To get Opinion Mining in your results, you must include the `opinionMining=true` flag in a request for sentiment analysis. The Opinion Mining results will be included in the sentiment analysis response. Opinion mining is an extension of Sentiment Analysis and is included in your current pricing tier.

Sending a REST API request

Preparation

Sentiment analysis produces a higher-quality result when you give it smaller amounts of text to work on. This is opposite from key phrase extraction, which performs better on larger blocks of text. To get the best results from both operations, consider restructuring the inputs accordingly.

You must have JSON documents in this format: ID, text, and language. Sentiment Analysis supports a wide range of languages. For more information, see Supported languages.

Document size must be under 5,120 characters per document. For the maximum number of documents permitted in a collection, see the data limits article under Concepts. The collection is submitted in the body of the request.

Structure the request

Create a POST request. You can use Postman or the **API testing console** in the following reference links to quickly structure and send one.

- Version 3.1
- Version 3.0

Sentiment Analysis v3.1 reference

Request endpoints

Set the HTTPS endpoint for sentiment analysis by using either a Text Analytics resource on Azure or an instantiated Text Analytics container. You must include the correct URL for the version you want to use. For example:

NOTE

You can find your key and endpoint for your Text Analytics resource on the Azure portal. They will be located on the resource's **Quick start** page, under **resource management**.

- Version 3.1
- Version 3.0

Sentiment Analysis

`https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/sentiment`

Opinion Mining

To get Opinion Mining results, you must include the `opinionMining=true` parameter. For example:

`https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/sentiment?opinionMining=true`

This parameter is set to `false` by default.

Set a request header to include your Text Analytics API key. In the request body, provide the JSON documents collection you prepared for this analysis.

Example request for Sentiment Analysis and Opinion Mining

The following is an example of content you might submit for sentiment analysis. The request format is the same for both `v3.0` and `v3.1`.

```
{
  "documents": [
    {
      "language": "en",
      "id": "1",
      "text": "The restaurant had great food and our waiter was friendly."
    }
  ]
}
```

Post the request

Analysis is performed upon receipt of the request. For information on the size and number of requests you can send per minute and second, see the data limits section in the overview.

The Text Analytics API is stateless. No data is stored in your account, and results are returned immediately in the response.

View the results

Output is returned immediately. You can stream the results to an application that accepts JSON or save the output to a file on the local system. Then, import the output into an application that you can use to sort, search, and manipulate the data. Due to multilingual and emoji support, the response may contain text offsets. See how to process offsets for more information.

- Version 3.1
- Version 3.0

Sentiment Analysis and Opinion Mining example response

> **IMPORTANT**
>
> The following is a JSON example for using Opinion Mining with Sentiment Analysis, offered in v3.1 of the API. If you don't request Opinion mining, the API response will be the same as the **Version 3.0** tab.

Sentiment Analysis v3.1 can return response objects for both Sentiment Analysis and Opinion Mining.

Sentiment analysis returns a sentiment label and confidence score for the entire document, and each sentence within it. Scores closer to 1 indicate a higher confidence in the label's classification, while lower scores indicate lower confidence. A document can have multiple sentences, and the confidence scores within each document or sentence add up to 1.

Opinion Mining will locate targets (nouns or verbs) in the text, and their associated assessment (adjective). In the below response, the sentence *The restaurant had great food and our waiter was friendly* has two targets: *food* and *waiter*. Each target's `relations` property contains a `ref` value with the URI-reference to the associated `documents`, `sentences`, and `assessments` objects.

The API returns opinions as a target (noun or verb) and an assessment (adjective).

```
{
  "documents": [
    {
      "id": "1",
      "sentiment": "positive",
      "confidenceScores": {
        "positive": 1,
        "neutral": 0,
        "negative": 0
      },
      "sentences": [
        {
          "sentiment": "positive",
          "confidenceScores": {
            "positive": 1,
            "neutral": 0,
            "negative": 0
          },
          "offset": 0,
          "length": 58,
          "text": "The restaurant had great food and our waiter was friendly.",
          "targets": [
            {
              "sentiment": "positive",
              "confidenceScores": {
                "positive": 1,
                "negative": 0
              },
              "offset": 25,
              "length": 4,
              "text": "food",
              "relations": [
                {
                  "relationType": "assessment",
                  "ref": "#/documents/0/sentences/0/assessments/0"
                }
              ]
            },
            {
              "sentiment": "positive",
              "confidenceScores": {
                "positive": 1,
                "negative": 0
              },
              "offset": 38,
              "length": 6,
              "text": "waiter",
              "relations": [
                {
                  "relationType": "assessment",
                  "ref": "#/documents/0/sentences/0/assessments/1"
                }
              ]
            }
            }
          ],
          "assessments": [
            {
              "sentiment": "positive",
              "confidenceScores": {
                "positive": 1,
                "negative": 0
              },
              "offset": 19,
              "length": 5,
              "text": "great",
              "isNegated": false
            },
            {
              "sentiment": "positive",
              "confidenceScores": {
                "positive": 1,
                "negative": 0
              },
              "offset": 49,
              "length": 8,
              "text": "friendly",
              "isNegated": false
            }
          ]
        }
      ],
      "warnings": []
    }
  ],
  "errors": [],
  "modelVersion": "2020-04-01"
}
```

Summary

In this article, you learned concepts and workflow for sentiment analysis using the Text Analytics API. In summary:

- Sentiment Analysis and Opinion Mining is available for select languages.
- JSON documents in the request body include an ID, text, and language code.
- The POST request is to a `/sentiment` endpoint by using a personalized access key and an endpoint that's valid for your subscription.
- Use `opinionMining=true` in Sentiment Analysis requests to get Opinion Mining results.
- Response output, which consists of a sentiment score for each document ID, can be streamed to any app that accepts JSON. For example, Excel and Power BI.

See also

- Text Analytics overview
- Using the Text Analytics client library
- What's new
- Model versions

Example: How to extract key phrases using Text Analytics

7/8/2021 • 4 minutes to read • Edit Online

The Key Phrase Extraction API evaluates unstructured text, and for each JSON document, returns a list of key phrases.

This capability is useful if you need to quickly identify the main points in a collection of documents. For example, given input text "The food was delicious and there were wonderful staff", the service returns the main talking points: "food" and "wonderful staff".

For more information, see Supported languages.

TIP

- Text Analytics also provides a Linux-based Docker container image for key phrase extraction, so you can install and run the Text Analytics container close to your data.
- You can also use this feature asynchronously using the `/analyze` endpoint.

Preparation

Key phrase extraction works best when you give it bigger amounts of text to work on. This is opposite from sentiment analysis, which performs better on smaller amounts of text. To get the best results from both operations, consider restructuring the inputs accordingly.

You must have JSON documents in this format: ID, text, language

Document size must be 5,120 or fewer characters per document, and you can have up to 1,000 items (IDs) per collection. The collection is submitted in the body of the request. The following example is an illustration of content you might submit for key phrase extraction.

See How to call the Text Analytics API for more information on request and response objects.

Example synchronous request object

```
    {
        "documents": [
            {
                "language": "en",
                "id": "1",
                "text": "We love this trail and make the trip every year. The views are breathtaking and
well worth the hike!"
            },
            {
                "language": "en",
                "id": "2",
                "text": "Poorly marked trails! I thought we were goners. Worst hike ever."
            },
            {
                "language": "en",
                "id": "3",
                "text": "Everyone in my family liked the trail but thought it was too challenging for the
less athletic among us. Not necessarily recommended for small children."
            },
            {
                "language": "en",
                "id": "4",
                "text": "It was foggy so we missed the spectacular views, but the trail was ok. Worth
checking out if you are in the area."
            },
            {
                "language": "en",
                "id": "5",
                "text": "This is my favorite trail. It has beautiful views and many places to stop and rest"
            }
        ]
    }
```

Example asynchronous request object

Starting in `v3.1`, You can send NER requests asynchronously using the `/analyze` endpoint.

```
{
"displayName":"MyJob",
"analysisInput":{
"documents":[
{
"id":"doc1",
"text":"It's incredibly sunny outside! I'm so happy"
},
{
"id":"doc2",
"text":"Pike place market is my favorite Seattle attraction."
}
]
},
    "tasks": {
        "keyPhraseExtractionTasks": [{
            "parameters": {
                "model-version": "latest"
            }
        }],
    }
}
```

Step 1: Structure the request

For information about request definition, see How to call the Text Analytics API. The following points are restated for convenience:

- Create a **POST** request. Review the API documentation for this request: Key Phrases API.
- Set the HTTP endpoint for key phrase extraction by using either a Text Analytics resource on Azure or an instantiated Text Analytics container. if you're using the API synchronously, you must include `/text/analytics/v3.1/keyPhrases` in the URL. For example: `https://<your-custom-subdomain>.api.cognitiveservices.azure.com/text/analytics/v3.1/keyPhrases`.
- Set a request header to include the access key for Text Analytics operations.
- In the request body, provide the JSON documents collection you prepared for this analysis.

TIP

Use Postman or open the **API testing console** in the documentation to structure a request and POST it to the service.

Step 2: Post the request

Analysis is performed upon receipt of the request. For information about the size and number of requests you can send per minute or per second, see the data limits article.

Recall that the service is stateless. No data is stored in your account. Results are returned immediately in the response.

Step 3: View results

All POST requests return a JSON formatted response with the IDs and detected properties. The order of the returned key phrases is determined internally, by the model.

Output is returned immediately. You can stream the results to an application that accepts JSON or save the output to a file on the local system, and then import it into an application that allows you to sort, search, and manipulate the data.

An example of the output for key phrase extraction from the v3.1 endpoint is shown here:

Synchronous result

```json
{
    "documents": [
        {
            "id": "1",
            "keyPhrases": [
                "trail",
                "trip",
                "views",
                "hike"
            ],
            "warnings": []
        },
        {
            "id": "2",
            "keyPhrases": [
                "Worst hike",
                "trails"
            ],
            "warnings": []
        },
        {
            "id": "3",
            "keyPhrases": [
                "less athletic",
                "small children",
                "Everyone",
                "family",
                "trail"
            ],
            "warnings": []
        },
        {
            "id": "4",
            "keyPhrases": [
                "spectacular views",
                "trail",
                "area"
            ],
            "warnings": []
        },
        {
            "id": "5",
            "keyPhrases": [
                "favorite trail",
                "beautiful views",
                "many places"
            ],
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-06-01"
}
```

As noted, the analyzer finds and discards non-essential words, and it keeps single terms or phrases that appear to be the subject or object of a sentence.

Asynchronous result

If you use the `/analyze` endpoint for asynchronous operation, you will get a response containing the tasks you sent to the API.

```
{
    "jobId": "fa813c9a-0d96-4a34-8e4f-a2a6824f9190",
    "lastUpdateDateTime": "2021-07-07T18:16:45Z",
    "createdDateTime": "2021-07-07T18:16:15Z",
    "expirationDateTime": "2021-07-08T18:16:15Z",
    "status": "succeeded",
    "errors": [],
    "displayName": "MyJob",
    "tasks": {
        "completed": 1,
        "failed": 0,
        "inProgress": 0,
        "total": 1,
        "keyPhraseExtractionTasks": [
            {
                "lastUpdateDateTime": "2021-07-07T18:16:45.0623454Z",
                "taskName": "KeyPhraseExtraction_latest",
                "state": "succeeded",
                "results": {
                    "documents": [
                        {
                            "id": "doc1",
                            "keyPhrases": [],
                            "warnings": []
                        },
                        {
                            "id": "doc2",
                            "keyPhrases": [
                                "Pike place market",
                                "Seattle attraction",
                                "favorite"
                            ],
                            "warnings": []
                        }
                    ],
                    "errors": [],
                    "modelVersion": "2021-06-01"
                }
            }
        ]
    }
}
```

Summary

In this article, you learned concepts and workflow for key phrase extraction by using Text Analytics in Cognitive Services. In summary:

- Key phrase extraction API is available for selected languages.
- JSON documents in the request body include an ID, text, and language code.
- POST request is to a `/keyphrases` or `/analyze` endpoint, using a personalized access key and an endpoint that is valid for your subscription.
- Response output, which consists of key words and phrases for each document ID, can be streamed to any app that accepts JSON, including Microsoft Office Excel and Power BI, to name a few.

See also

Text Analytics overview Frequently asked questions (FAQ)
Text Analytics product page

Next steps

- Text Analytics overview
- Using the Text Analytics client library
- What's new
- Model versions

How to use Named Entity Recognition in Text Analytics

7/8/2021 • 8 minutes to read • Edit Online

The Text Analytics API lets you takes unstructured text and returns a list of disambiguated entities, with links to more information on the web. The API supports both named entity recognition (NER) for several entity categories, and entity linking.

Entity Linking

Entity linking is the ability to identify and disambiguate the identity of an entity found in text (for example, determining whether an occurrence of the word "Mars" refers to the planet, or to the Roman god of war). This process requires the presence of a knowledge base in an appropriate language, to link recognized entities in text. Entity Linking uses Wikipedia as this knowledge base.

Named Entity Recognition (NER)

Named Entity Recognition (NER) is the ability to identify different entities in text and categorize them into pre-defined classes or types such as: person, location, event, product, and organization.

Personally Identifiable Information (PII)

The PII feature is part of NER and it can identify and redact sensitive entities in text that are associated with an individual person such as: phone number, email address, mailing address, passport number.

Named Entity Recognition features and versions

FEATURE	NER V3.0	NER V3.1
Methods for single, and batch requests	X	X
Expanded entity recognition across several categories	X	X
Separate endpoints for sending entity linking and NER requests.	X	X
Recognition of personal (`PII`) and health (`PHI`) information entities		X
Redaction of `PII`		X

See language support for information.

Named Entity Recognition v3 provides expanded detection across multiple types. Currently, NER v3.0 can recognize entities in the general entity category.

Named Entity Recognition v3.1 includes the detection capabilities of v3.0, and:

- The ability to detect personal information (`PII`) using the `v3.1/entities/recognition/pii` endpoint.
- An optional `domain=phi` parameter to detect confidential health information (`PHI`).
- Asynchronous operation using the `/analyze` endpoint.

For more information, see the entity categories article, and request endpoints section below. For more information on confidence scores, see the Text Analytics transparency note.

Sending a REST API request

Preparation

You must have JSON documents in this format: ID, text, language.

Each document must be under 5,120 characters, and you can have up to 1,000 items (IDs) per collection. The collection is submitted in the body of the request.

Structure the request

Create a POST request. You can use Postman or the **API testing console** in the following links to quickly structure and send one.

> **NOTE**
>
> You can find your key and endpoint for your Text Analytics resource on the azure portal. They will be located on the resource's **Quick start** page, under **resource management**.

Request endpoints

- Version 3.1
- Version 3.0

Named Entity Recognition `v3.1` uses separate endpoints for NER, PII, and entity linking requests. Use a URL format below based on your request.

Entity linking

- `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/linking`

Named Entity Recognition version 3.1 reference for `Linking`

Named Entity Recognition

- General entities -
  `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/recognition/general`

Named Entity Recognition version 3.1 reference for `General`

Personally Identifiable Information (PII)

- Personal (`PII`) information -
  `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/recognition/pii`

You can also use the optional `domain=phi` parameter to detect health (`PHI`) information in text.

```
https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/recognition/pii?
domain=phi
```

Starting in `v3.1`, The JSON response includes a `redactedText` property, which contains the modified input text where the detected PII entities are replaced by an `*` for each character in the entities.

Named Entity Recognition version 3.1 reference for `PII`

The API will attempt to detect the listed entity categories for a given document language. If you want to specify which entities will be detected and returned, use the optional `piiCategories` parameter with the appropriate entity categories. This parameter can also let you detect entities that aren't enabled by default for your document language. The following example would detect a French driver's license number that might occur in English text, along with the default English entities.

> **TIP**
> If you don't include `default` when specifying entity categories, The API will only return the entity categories you specify.

```
https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/recognition/pii?
piiCategories=default,FRDriversLicenseNumber
```

Asynchronous operation

Starting in `v3.1`, You can send NER and entity linking requests asynchronously using the `/analyze` endpoint.

- Asynchronous operation - `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/analyze`

See How to call the Text Analytics API for information on sending asynchronous requests.

Set a request header to include your Text Analytics API key. In the request body, provide the JSON documents you prepared.

Example requests

- Version 3.1
- Version 3.0

Example synchronous NER request

The following JSON is an example of content you might send to the API. The request format is the same for both versions of the API.

```
{
  "documents": [
    {
        "id": "1",
        "language": "en",
        "text": "Our tour guide took us up the Space Needle during our trip to Seattle last week."
    }
  ]
}
```

Example synchronous PII request

The following JSON is an example of content you might send to the API to detect PII in text.

```
{
  "documents": [
    {
        "id": "1",
        "language": "en",
        "text": "You can even pre-order from their online menu at www.contososteakhouse.com, call 312-555-
0176 or send email to order@contososteakhouse.com!"
    }
  ]
}
```

Example asynchronous NER request

If you use the `/analyze` endpoint for asynchronous operation, you will get a response containing the tasks you sent to the API.

```
{
"displayName":"MyJob",
"analysisInput":{
"documents":[
{
"id":"doc1",
"text":"It's incredibly sunny outside! I'm so happy"
},
{
"id":"doc2",
"text":"Pike place market is my favorite Seattle attraction."
}
]
},
    "tasks": {
        "entityRecognitionTasks": [
            {
                "parameters": {
                    "model-version": "latest"
                }
            }
        ],
        "entityRecognitionPiiTasks": [{
            "parameters": {
                "model-version": "latest"
            }
        }]
    }
}
```

Post the request

Analysis is performed upon receipt of the request. See the data limits article for information on the size and number of requests you can send per minute and second.

The Text Analytics API is stateless. No data is stored in your account, and results are returned immediately in the response.

View results

All POST requests return a JSON formatted response with the IDs and detected entity properties.

Output is returned immediately. You can stream the results to an application that accepts JSON or save the output to a file on the local system, and then import it into an application that allows you to sort, search, and manipulate the data. Due to multilingual and emoji support, the response may contain text offsets. For more information, see how to process text offsets.

Example responses

Version 3 provides separate endpoints for general NER, PII, and entity linking. Version 3.1-pareview includes an asynchronous Analyze mode. The responses for these operations are below.

- Version 3.1
- Version 3.0

Synchronous example results

Example of a general NER response:

```
{
    "documents": [
        {
            "id": "1",
            "entities": [
                {
                    "text": "tour guide",
                    "category": "PersonType",
                    "offset": 4,
                    "length": 10,
                    "confidenceScore": 0.94
                },
                {
                    "text": "Space Needle",
                    "category": "Location",
                    "offset": 30,
                    "length": 12,
                    "confidenceScore": 0.96
                },
                {
                    "text": "Seattle",
                    "category": "Location",
                    "subcategory": "GPE",
                    "offset": 62,
                    "length": 7,
                    "confidenceScore": 1.0
                },
                {
                    "text": "last week",
                    "category": "DateTime",
                    "subcategory": "DateRange",
                    "offset": 70,
                    "length": 9,
                    "confidenceScore": 0.8
                }
            ],
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-06-01"
}
```

Example of a PII response:

```
{
    "documents": [
        {
            "redactedText": "You can even pre-order from their online menu at www.contososteakhouse.com,
call ************ or send email to ***************************!",
            "id": "1",
            "entities": [
                {
                    "text": "312-555-0176",
                    "category": "PhoneNumber",
                    "offset": 81,
                    "length": 12,
                    "confidenceScore": 0.8
                },
                {
                    "text": "order@contososteakhouse.com",
                    "category": "Email",
                    "offset": 111,
                    "length": 27,
                    "confidenceScore": 0.8
                },
                {
                    "text": "contososteakhouse",
                    "category": "Organization",
                    "offset": 117,
                    "length": 17,
                    "confidenceScore": 0.45
                }
            ],
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-01-15"
}
```

Example of an Entity linking response:

```
{
    "documents": [
        {
            "id": "1",
            "entities": [
                {
                    "bingId": "f8dd5b08-206d-2554-6e4a-893f51f4de7e",
                    "name": "Space Needle",
                    "matches": [
                        {
                            "text": "Space Needle",
                            "offset": 30,
                            "length": 12,
                            "confidenceScore": 0.4
                        }
                    ],
                    "language": "en",
                    "id": "Space Needle",
                    "url": "https://en.wikipedia.org/wiki/Space_Needle",
                    "dataSource": "Wikipedia"
                },
                {
                    "bingId": "5fbba6b8-85e1-4d41-9444-d9055436e473",
                    "name": "Seattle",
                    "matches": [
                        {
                            "text": "Seattle",
                            "offset": 62,
                            "length": 7,
                            "confidenceScore": 0.25
                        }
                    ],
                    "language": "en",
                    "id": "Seattle",
                    "url": "https://en.wikipedia.org/wiki/Seattle",
                    "dataSource": "Wikipedia"
                }
            ],
            "warnings": []
        }
    ],
    "errors": [],
    "modelVersion": "2021-06-01"
}
```

Example asynchronous result

```
{
    "jobId": "f480e1f9-0b61-4d47-93da-240f084582cf",
    "lastUpdateDateTime": "2021-07-06T19:03:15Z",
    "createdDateTime": "2021-07-06T19:02:47Z",
    "expirationDateTime": "2021-07-07T19:02:47Z",
    "status": "succeeded",
    "errors": [],
    "displayName": "MyJob",
    "tasks": {
        "completed": 2,
        "failed": 0,
        "inProgress": 0,
        "total": 2,
        "entityRecognitionTasks": [
            {
                "lastUpdateDateTime": "2021-07-06T19:03:15.212633Z",
                "taskName": "NamedEntityRecognition_latest",
                "state": "succeeded",
                "results": {
                    "documents": [
                        {
                            "id": "doc1",
                            "entities": [],
                            "warnings": []
                        },
                        {
                            "id": "doc2",
                            "entities": [
                                {
                                    "text": "Pike place market",
                                    "category": "Location",
                                    "offset": 0,
                                    "length": 17,
                                    "confidenceScore": 0.95
                                },
                                {
                                    "text": "Seattle",
                                    "category": "Location",
                                    "subcategory": "GPE",
                                    "offset": 33,
                                    "length": 7,
                                    "confidenceScore": 0.99
                                }
                            ],
                            "warnings": []
                        }
                    ],
                    "errors": [],
                    "modelVersion": "2021-06-01"
                }
            }
        ],
        "entityRecognitionPiiTasks": [
            {
                "lastUpdateDateTime": "2021-07-06T19:03:03.2063832Z",
                "taskName": "PersonallyIdentifiableInformation_latest",
                "state": "succeeded",
                "results": {
                    "documents": [
                        {
                            "redactedText": "It's incredibly sunny outside! I'm so happy",
                            "id": "doc1",
                            "entities": [],
                            "warnings": []
                        },
                        {
                            "redactedText": "Pike place market is my favorite Seattle attraction.",
                            "id": "doc2",
                            "entities": [],
                            "warnings": []
                        }
                    ],
                    "errors": [],
                    "modelVersion": "2021-01-15"
                }
            }
        ]
    }
}
```

Summary

In this article, you learned concepts and workflow for entity linking using Text Analytics in Cognitive Services. In summary:

- JSON documents in the request body include an ID, text, and language code.
- POST requests are sent to one or more endpoints, using a personalized access key and an endpoint that is valid for your subscription.
- Response output, which consists of linked entities (including confidence scores, offsets, and web links, for each document ID) can be used in any application

Next steps

- Text Analytics overview
- Using the Text Analytics client library
- Model versions
- What's new

How to: Use Text Analytics for health

7/8/2021 • 9 minutes to read • Edit Online

IMPORTANT

Text Analytics for health is a capability provided "AS IS" and "WITH ALL FAULTS." Text Analytics for health is not intended or made available for use as a medical device, clinical support, diagnostic tool, or other technology intended to be used in the diagnosis, cure, mitigation, treatment, or prevention of disease or other conditions, and no license or right is granted by Microsoft to use this capability for such purposes. This capability is not designed or intended to be implemented or deployed as a substitute for professional medical advice or healthcare opinion, diagnosis, treatment, or the clinical judgment of a healthcare professional, and should not be used as such. The customer is solely responsible for any use of Text Analytics for health. The customer must separately license any and all source vocabularies it intends to use under the terms set for that UMLS Metathesaurus License Agreement Appendix or any future equivalent link. The customer is responsible for ensuring compliance with those license terms, including any geographic or other applicable restrictions.

Text Analytics for health is a feature of the Text Analytics API service that extracts and labels relevant medical information from unstructured texts such as doctor's notes, discharge summaries, clinical documents, and electronic health records. There are two ways to utilize this service:

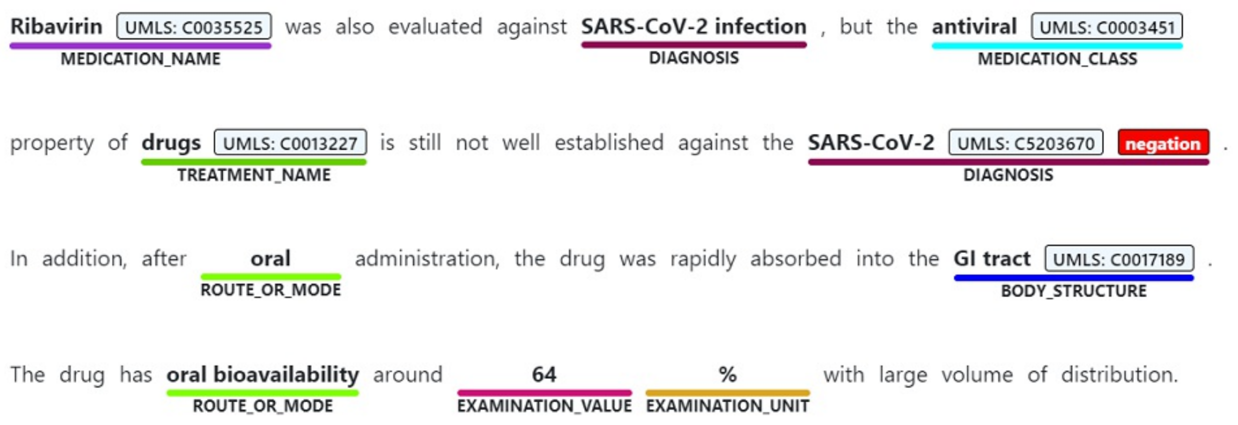
- The web-based API (asynchronous)
- A Docker container (synchronous)

Features

Text Analytics for health performs Named Entity Recognition (NER), relation extraction, entity negation and entity linking on English-language text to uncover insights in unstructured clinical and biomedical text.

- Named Entity Recognition
- Relation Extraction
- Entity Linking
- Assertion Detection

Named Entity Recognition detects words and phrases mentioned in unstructured text that can be associated with one or more semantic types, such as diagnosis, medication name, symptom/sign, or age.


Ribavirin UMLS: C0035525 was also evaluated against SARS-CoV-2 infection , but the antiviral UMLS: C0003451
MEDICATION_NAME
DIAGNOSIS
MEDICATION_CLASS
property of drugs UMLS: C0013227 is still not well established against the SARS-CoV-2 UMLS: C5203670 negation .
TREATMENT_NAME
DIAGNOSIS
In addition, after oral administration, the drug was rapidly absorbed into the GI tract UMLS: C0017189 .
ROUTE_OR_MODE
BODY_STRUCTURE
The drug has oral bioavailability around 64 % with large volume of distribution.
ROUTE_OR_MODE
EXAMINATION_VALUE
EXAMINATION_UNIT

See the entity categories returned by Text Analytics for health for a full list of supported entities. For information on confidence scores, see the Text Analytics transparency note.

Supported languages

Text Analytics for health only supports English language documents.

Using the Docker container

To run the Text Analytics for health container in your own environment, follow these instructions to download and install the container.

Using the client library

The latest prerelease of the Text Analytics client library enables you to call Text Analytics for health using a client object. Refer to the reference documentation, and see the examples on GitHub:

- C#
- Python
- Java

Sending a REST API request

Preparation

You must have JSON documents in this format: ID, text, and language.

Document size must be under 5,120 characters per document. For the maximum number of documents permitted in a collection, see the data limits article under Concepts. The collection is submitted in the body of the request. If your text exceeds this limit, consider splitting the text into separate requests. For best results, split text between sentences.

Structure the API request for the hosted asynchronous web API

For both the container and hosted web API, you must create a POST request. You can use Postman, a cURL command or the **API testing console** in the Text Analytics for health hosted API reference to quickly construct and send a POST request to the hosted web API in your desired region. In the API v3.1 endpoint, the `loggingOptOut` boolean query parameter can be used to enable logging for troubleshooting purposes. It's default is TRUE if not specified in the request query.

Send the POST request to `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/health/jobs` Below is an example of a JSON file attached to the Text Analytics for health API request's POST body:

```
example.json

{
  "documents": [
    {
      "language": "en",
      "id": "1",
      "text": "Subject was administered 100mg remdesivir intravenously over a period of 120 min"
    }
  ]
}
```

Hosted asynchronous web API response

Since this POST request is used to submit a job for the asynchronous operation, there is no text in the response object. However, you need the value of the operation-location KEY in the response headers to make a GET request to check the status of the job and the output. Below is an example of the value of the operation-location KEY in the response header of the POST request:

```
https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/entities/health/jobs/<jobID>
```

To check the job status, make a GET request to the URL in the value of the operation-location KEY header of the POST response. The following states are used to reflect the status of a job: `NotStarted`, `running`, `succeeded`, `failed`, `rejected`, `cancelling`, and `cancelled`.

You can cancel a job with a `NotStarted` or `running` status with a DELETE HTTP call to the same URL as the GET request. More information on the DELETE call is available in the Text Analytics for health hosted API reference.

The following is an example of the response of a GET request. The output is available for retrieval until the `expirationDateTime` (24 hours from the time the job was created) has passed after which the output is purged.

```
{
    "jobId": "69081148-055b-4f92-977d-115df343de69",
    "lastUpdateDateTime": "2021-07-06T19:06:03Z",
    "createdDateTime": "2021-07-06T19:05:41Z",
    "expirationDateTime": "2021-07-07T19:05:41Z",
    "status": "succeeded",
    "errors": [],
    "results": {
        "documents": [
            {
                "id": "1",
                "entities": [
                    {
                        "offset": 25,
                        "length": 5,
                        "text": "100mg",
                        "category": "Dosage",
                        "confidenceScore": 1.0
                    },
                    {
                        "offset": 31,
                        "length": 10,
                        "text": "remdesivir",
                        "category": "MedicationName",
                        "confidenceScore": 1.0,
                        "name": "remdesivir",
                        "links": [
                            {
                                "dataSource": "UMLS",
                                "id": "C4726677"
                            },
                            {
                                "dataSource": "DRUGBANK",
                                "id": "DB14761"
                            },
                            {
                                "dataSource": "GS",
                                "id": "6192"
                            },
                            {
                                "dataSource": "MEDCIN",
                                "id": "398132"
                            },
                            {
                                "dataSource": "MMSL",
                                "id": "d09540"
                            },
                            {
                                "dataSource": "MSH",
                                "id": "C000606551"
                                "id": "C000606551"
                            },
                            {
                                "dataSource": "MTHSPL",
                                "id": "3QKI37EEHE"
                            },
                            {
                                "dataSource": "NCI",
                                "id": "C152185"
                            },
                            {
                                "dataSource": "NCI_FDA",
                                "id": "3QKI37EEHE"
                            },
                            {
                                "dataSource": "NDDF",
                                "id": "018308"
                            },
                            {
                                "dataSource": "RXNORM",
                                "id": "2284718"
                            },
                            {
                                "dataSource": "SNOMEDCT_US",
                                "id": "870592005"
                            },
                            {
                                "dataSource": "VANDF",
                                "id": "4039395"
                            }
                        ]
                    },
                    {
                        "offset": 42,
                        "length": 13,
                        "text": "intravenously",
                        "category": "MedicationRoute",
                        "confidenceScore": 0.99
                    },
                    {
                        "offset": 73,
                        "length": 7,
                        "text": "120 min",
                        "category": "Time",
                        "confidenceScore": 0.98
                    }
                ],
                "relations": [
                    {
                        "relationType": "DosageOfMedication",
                        "entities": [
                            {
                                "ref": "#/results/documents/0/entities/0",
                                "role": "Dosage"
                            },
                            {
                                "ref": "#/results/documents/0/entities/1",
                                "role": "Medication"
                            }
                        ]
                    },
                    {
                        "relationType": "RouteOfMedication",
                        "entities": [
                            {
                                "ref": "#/results/documents/0/entities/1",
                                "role": "Medication"
                            },
                            {
                                "ref": "#/results/documents/0/entities/2",
                                    "ref": "#/results/documents/0/entities/2",
                                    "role": "Route"
                                }
                            ]
                        },
                        {
                            "relationType": "TimeOfMedication",
                            "entities": [
                                {
                                    "ref": "#/results/documents/0/entities/1",
                                    "role": "Medication"
                                },
                                {
                                    "ref": "#/results/documents/0/entities/3",
                                    "role": "Time"
                                }
                            ]
                        }
                    ],
                    "warnings": []
                }
            ],
            "errors": [],
            "modelVersion": "2021-05-15"
        }
    }
```

Structure the API request for the container

You can use Postman or the example cURL request below to submit a query to the container you deployed, replacing the `serverURL` variable with the appropriate value. Note the version of the API in the URL for the container is different than the hosted API.

```
curl -X POST 'http://<serverURL>:5000/text/analytics/v3.1/entities/health' --header 'Content-Type:
application/json' --header 'accept: application/json' --data-binary @example.json
```

The following JSON is an example of a JSON file attached to the Text Analytics for health API request's POST body:

```
example.json

{
  "documents": [
    {
      "language": "en",
      "id": "1",
      "text": "Patient reported itchy sores after swimming in the lake."
    },
    {
      "language": "en",
      "id": "2",
      "text": "Prescribed 50mg benadryl, taken twice daily."
    }
  ]
}
```

Container response body

The following JSON is an example of the Text Analytics for health API response body from the containerized synchronous call:

```
{
    "documents": [
        {
            "id": "1",
            "entities": [
                {
                    "offset": 25,
                    "length": 5,
                    "text": "100mg",
                    "category": "Dosage",
                    "confidenceScore": 1.0
                },
                {
                    "offset": 31,
                    "length": 10,
                    "text": "remdesivir",
                    "category": "MedicationName",
                    "confidenceScore": 1.0,
                    "name": "remdesivir",
                    "links": [
                        {
                            "dataSource": "UMLS",
                            "id": "C4726677"
                        },
                        {
                            "dataSource": "DRUGBANK",
                            "id": "DB14761"
                        },
                        {
                            "dataSource": "GS",
                            "id": "6192"
                        },
                        {
                            "dataSource": "MEDCIN",
                            "id": "398132"
                        },
                        {
                            "dataSource": "MMSL",
                            "id": "d09540"
                        },
                        {
                            "dataSource": "MSH",
                            "id": "C000606551"
                        },
                        {
                            "dataSource": "MTHSPL",
                            "id": "3QKI37EEHE"
                        },
                        {
                            "dataSource": "NCI",
                            "id": "C152185"
                        },
                        {
                            "dataSource": "NCI_FDA",
                            "id": "3QKI37EEHE"
                        },
                        {
                            "dataSource": "NDDF",
                            "id": "018308"
                        },
                        {
                            "dataSource": "RXNORM",
                            "id": "2284718"
                        },
                        {
                            "dataSource": "SNOMEDCT_US",
                            "id": "870592005"
                        },
                        {
                            "dataSource": "VANDF",
```

```json
                        "id": "4039395"
                    }
                ]
            },
            {
                "offset": 42,
                "length": 13,
                "text": "intravenously",
                "category": "MedicationRoute",
                "confidenceScore": 1.0
            },
            {
                "offset": 73,
                "length": 7,
                "text": "120 min",
                "category": "Time",
                "confidenceScore": 0.94
            }
        ],
        "relations": [
            {
                "relationType": "DosageOfMedication",
                "entities": [
                    {
                        "ref": "#/documents/0/entities/0",
                        "role": "Dosage"
                    },
                    {
                        "ref": "#/documents/0/entities/1",
                        "role": "Medication"
                    }
                ]
            },
            {
                "relationType": "RouteOfMedication",
                "entities": [
                    {
                        "ref": "#/documents/0/entities/1",
                        "role": "Medication"
                    },
                    {
                        "ref": "#/documents/0/entities/2",
                        "role": "Route"
                    }
                ]
            },
            {
                "relationType": "TimeOfMedication",
                "entities": [
                    {
                        "ref": "#/documents/0/entities/1",
                        "role": "Medication"
                    },
                    {
                        "ref": "#/documents/0/entities/3",
                        "role": "Time"
                    }
                ]
            }
        ],
        "warnings": []
    }
  ],
  "errors": [],
  "modelVersion": "2021-03-01"
}
```

Assertion output

Text Analytics for health returns assertion modifiers, which are informative attributes assigned to medical concepts that provide deeper understanding of the concepts' context within the text. These modifiers are divided into three categories, each focusing on a different aspect, and containing a set of mutually exclusive values. Only one value per category is assigned to each entity. The most common value for each category is the Default value. The service's output response contains only assertion modifiers that are different from the default value.

CERTAINTY – provides information regarding the presence (present vs. absent) of the concept and how certain the text is regarding its presence (definite vs. possible).

- **Positive** [Default]: the concept exists or happened.
- **Negative**: the concept does not exist now or never happened.
- **Positive_Possible**: the concept likely exists but there is some uncertainty.
- **Negative_Possible**: the concept's existence is unlikely but there is some uncertainty.
- **Neutral_Possible**: the concept may or may not exist without a tendency to either side.

CONDITIONALITY – provides information regarding whether the existence of a concept depends on certain conditions.

- **None** [Default]: the concept is a fact and not hypothetical and does not depend on certain conditions.
- **Hypothetical**: the concept may develop or occur in the future.
- **Conditional**: the concept exists or occurs only under certain conditions.

ASSOCIATION – describes whether the concept is associated with the subject of the text or someone else.

- **Subject** [Default]: the concept is associated with the subject of the text, usually the patient.
- **Someone_Else**: the concept is associated with someone who is not the subject of the text.

Assertion detection represents negated entities as a negative value for the certainty category, for example:

```
{
                        "offset": 381,
                        "length": 3,
                        "text": "SOB",
                        "category": "SymptomOrSign",
                        "confidenceScore": 0.98,
                        "assertion": {
                            "certainty": "negative"
                        },
                        "name": "Dyspnea",
                        "links": [
                            {
                                "dataSource": "UMLS",
                                "id": "C0013404"
                            },
                            {
                                "dataSource": "AOD",
                                "id": "0000005442"
                            },
    ...
```

Relation extraction output

Text Analytics for Health recognizes relations between different concepts, including relations between attribute and entity (for example, direction of body structure, dosage of medication) and between entities (for example, abbreviation detection).

ABBREVIATION

BODY_SITE_OF_CONDITION

BODY_SITE_OF_TREATMENT

COURSE_OF_CONDITION

COURSE_OF_EXAMINATION

COURSE_OF_MEDICATION

COURSE_OF_TREATMENT

DIRECTION_OF_BODY_STRUCTURE

DIRECTION_OF_CONDITION

DIRECTION_OF_EXAMINATION

DIRECTION_OF_TREATMENT

DOSAGE_OF_MEDICATION

EXAMINATION_FINDS_CONDITION

EXPRESSION_OF_GENE

EXPRESSION_OF_VARIANT

FORM_OF_MEDICATION

FREQUENCY_OF_CONDITION

FREQUENCY_OF_MEDICATION

FREQUENCY_OF_TREATMENT

MUTATION_TYPE_OF_GENE

MUTATION_TYPE_OF_VARIANT

QUALIFIER_OF_CONDITION

RELATION_OF_EXAMINATION

ROUTE_OF_MEDICATION

SCALE_OF_CONDITION

TIME_OF_CONDITION

TIME_OF_EVENT

TIME_OF_EXAMINATION

TIME_OF_MEDICATION

TIME_OF_TREATMENT

UNIT_OF_CONDITION

UNIT_OF_EXAMINATION

VALUE_OF_CONDITION

VALUE_OF_EXAMINATION

VARIANT_OF_GENE

NOTE

- Relations referring to CONDITION may refer to either the DIAGNOSIS entity type or the SYMPTOM_OR_SIGN entity type.
- Relations referring to MEDICATION may refer to either the MEDICATION_NAME entity type or the MEDICATION_CLASS entity type.
- Relations referring to TIME may refer to either the TIME entity type or the DATE entity type.

Relation extraction output contains URI references and assigned roles of the entities of the relation type. For example:

```
                "relations": [
                    {
                        "relationType": "DosageOfMedication",
                        "entities": [
                            {
                                "ref": "#/results/documents/0/entities/0",
                                "role": "Dosage"
                            },
                            {
                                "ref": "#/results/documents/0/entities/1",
                                "role": "Medication"
                            }
                        ]
                    },
                    {
                        "relationType": "RouteOfMedication",
                        "entities": [
                            {
                                "ref": "#/results/documents/0/entities/1",
                                "role": "Medication"
                            },
                            {
                                "ref": "#/results/documents/0/entities/2",
                                "role": "Route"
                            }
                        ]
...
]
```

See also

- Text Analytics overview
- Named Entity categories
- What's new

Install and run Text Analytics containers

7/22/2021 • 18 minutes to read • Edit Online

Containers enable you to run the Text Analytic APIs in your own environment and are great for your specific security and data governance requirements. The following Text Analytics containers are available:

- sentiment analysis
- language detection
- key phrase extraction (preview)
- Text Analytics for health

NOTE

- Entity linking and NER are not currently available as a container.
- The container image locations may have recently changed. Read this article to see the updated location for this container.
- The free account is limited to 5,000 text records per month and only the **Free** and **Standard** pricing tiers are valid for containers. For more information on transaction request rates, see Data Limits.

Containers enable you to run the Text Analytic APIs in your own environment and are great for your specific security and data governance requirements. The Text Analytics containers provide advanced natural language processing over raw text, and include three main functions: sentiment analysis, key phrase extraction, and language detection.

If you don't have an Azure subscription, create a free account before you begin.

Prerequisites

You must meet the following prerequisites before using Text Analytics containers. If you don't have an Azure subscription, create a free account before you begin.

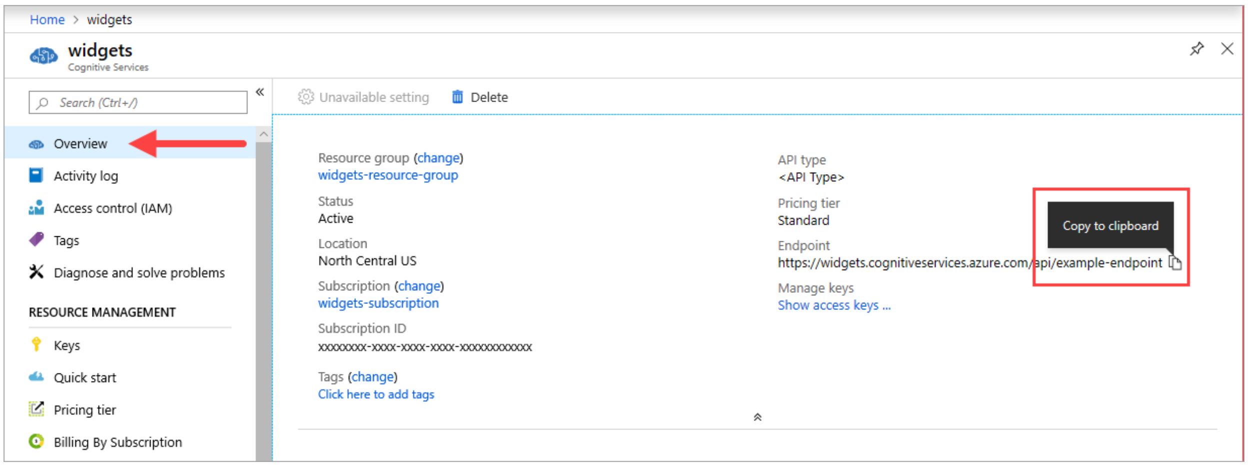
- Docker installed on a host computer. Docker must be configured to allow the containers to connect with and send billing data to Azure.
  - On Windows, Docker must also be configured to support Linux containers.
  - You should have a basic understanding of Docker concepts.
- A Text Analytics resource with the free (F0) or standard (S) pricing tier.

Gathering required parameters

There are three primary parameters for all Cognitive Services' containers that are required. The end-user license agreement (EULA) must be present with a value of `accept`. Additionally, both an Endpoint URL and API Key are needed.

Endpoint URI `{ENDPOINT_URI}`

The **Endpoint** URI value is available on the Azure portal *Overview* page of the corresponding Cognitive Service resource. Navigate to the *Overview* page, hover over the Endpoint, and a `Copy to clipboard` icon will appear. Copy and use where needed.

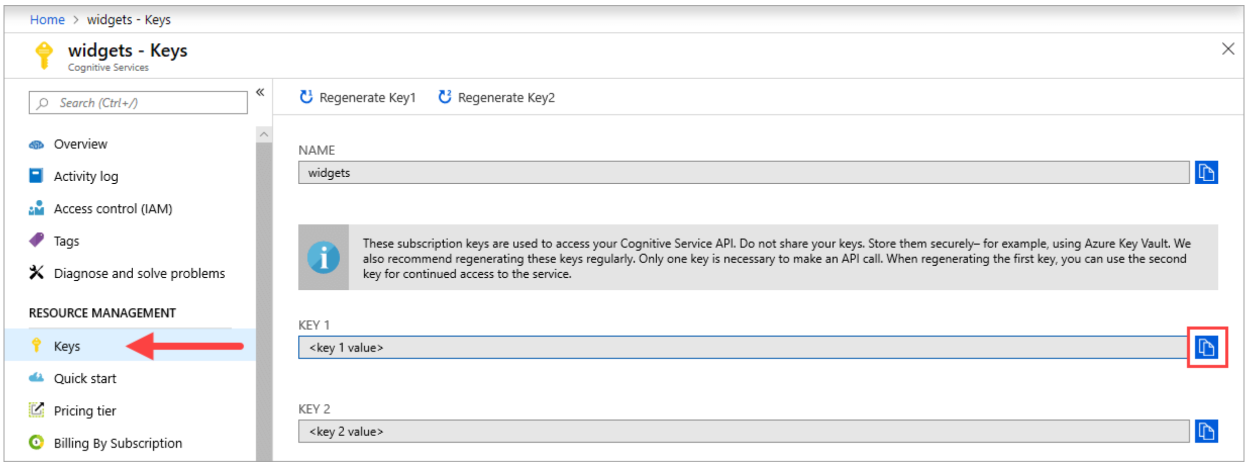


Resource group (change)
widgets-resource-group
Status
Active
Location
North Central US
Subscription (change)
widgets-subscription
Subscription ID
xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
Tags (change)
Click here to add tags

API type
<API Type>
Pricing tier
Standard
Endpoint
https://widgets.cognitiveservices.azure.com/api/example-endpoint
Manage keys
Show access keys ...

Keys `{API_KEY}`

This key is used to start the container, and is available on the Azure portal's Keys page of the corresponding Cognitive Service resource. Navigate to the *Keys* page, and click on the `Copy to clipboard` icon.



NAME
widgets

These subscription keys are used to access your Cognitive Service API. Do not share your keys. Store them securely– for example, using Azure Key Vault. We also recommend regenerating these keys regularly. Only one key is necessary to make an API call. When regenerating the first key, you can use the second key for continued access to the service.

KEY 1
<key 1 value>

KEY 2
<key 2 value>

IMPORTANT

These subscription keys are used to access your Cognitive Service API. Do not share your keys. Store them securely, for example, using Azure Key Vault. We also recommend regenerating these keys regularly. Only one key is necessary to make an API call. When regenerating the first key, you can use the second key for continued access to the service.

Host computer requirements and recommendations

The host is a x64-based computer that runs the Docker container. It can be a computer on your premises or a Docker hosting service in Azure, such as:

- Azure Kubernetes Service.
- Azure Container Instances.
- A Kubernetes cluster deployed to Azure Stack. For more information, see Deploy Kubernetes to Azure Stack.

The following table describes the minimum and recommended specifications for the available Text Analytics containers. Each CPU core must be at least 2.6 gigahertz (GHz) or faster. The allowable Transactions Per Second (TPS) are also listed.

	MINIMUM HOST SPECS	RECOMMENDED HOST SPECS	MINIMUM TPS	MAXIMUM TPS
Language detection	1 core, 2GB memory	1 core, 4GB memory	15	30

	MINIMUM HOST SPECS	RECOMMENDED HOST SPECS	MINIMUM TPS	MAXIMUM TPS
key phrase extraction (preview)	1 core, 2GB memory	1 core, 4GB memory	15	30
Sentiment Analysis	1 core, 2GB memory	4 cores, 8GB memory	15	30
Text Analytics for health - 1 document/request	4 core, 10GB memory	6 core, 12GB memory	15	30
Text Analytics for health - 10 documents/request	6 core, 16GB memory	8 core, 20GB memory	15	30

CPU core and memory correspond to the `--cpus` and `--memory` settings, which are used as part of the `docker run` command.

Get the container image with `docker pull`

- Sentiment Analysis
- Key Phrase Extraction (preview)
- Language Detection
- Text Analytics for health

Docker pull for the Sentiment Analysis v3 container

The sentiment analysis container v3 container is available in several languages. To download the container for the English container, use the command below.

```
docker pull mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment:3.0-en
```

To download the container for another language, replace `en` with one of the language codes below.

TEXT ANALYTICS CONTAINER	LANGUAGE CODE
Chinese-Simplified	`zh-hans`
Chinese-Traditional	`zh-hant`
Dutch	`nl`
English	`en`
French	`fr`
German	`de`
Hindi	`hi`

TEXT ANALYTICS CONTAINER	LANGUAGE CODE
Italian	`it`
Japanese	`ja`
Korean	`ko`
Norwegian (Bokmål)	`no`
Portuguese (Brazil)	`pt-BR`
Portuguese (Portugal)	`pt-PT`
Spanish	`es`
Turkish	`tr`

For a full description of available tags for the Text Analytics containers, see Docker Hub.

TIP

You can use the docker images command to list your downloaded container images. For example, the following command lists the ID, repository, and tag of each downloaded container image, formatted as a table:

```
docker images --format "table {{.ID}}\t{{.Repository}}\t{{.Tag}}"

IMAGE ID         REPOSITORY                TAG
<image-id>       <repository-path/name>    <tag-name>
```

Run the container with `docker run`

Once the container is on the host computer, use the docker run command to run the containers. The container will continue to run until you stop it.

IMPORTANT

- The docker commands in the following sections use the back slash, `\`, as a line continuation character. Replace or remove this based on your host operating system's requirements.
- The `Eula`, `Billing`, and `ApiKey` options must be specified to run the container; otherwise, the container won't start. For more information, see Billing.
  - If you're using the Text Analytics for health container, the responsible AI (RAI) acknowledgment must also be present with a value of `accept`.
- The sentiment analysis and language detection containers use v3 of the API, and are generally available. The key phrase extraction container uses v2 of the API, and is in preview.

- Sentiment Analysis
- Key Phrase Extraction (preview)
- Language Detection
- Text Analytics for health

To run the *Sentiment Analysis v3* container, execute the following `docker run` command. Replace the placeholders below with your own values:

PLACEHOLDER	VALUE	FORMAT OR EXAMPLE
{API_KEY}	The key for your Text Analytics resource. You can find it on your resource's **Key and endpoint** page, on the Azure portal.	`xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx`
{ENDPOINT_URI}	The endpoint for accessing the Text Analytics API. You can find it on your resource's **Key and endpoint** page, on the Azure portal.	`https://<your-custom-subdomain>.cognitiveservices.azure.com`

```
docker run --rm -it -p 5000:5000 --memory 8g --cpus 1 \
mcr.microsoft.com/azure-cognitive-services/textanalytics/sentiment \
Eula=accept \
Billing={ENDPOINT_URI} \
ApiKey={API_KEY}
```

This command:

- Runs a *Sentiment Analysis* container from the container image
- Allocates one CPU core and 8 gigabytes (GB) of memory
- Exposes TCP port 5000 and allocates a pseudo-TTY for the container
- Automatically removes the container after it exits. The container image is still available on the host computer.

Run multiple containers on the same host

If you intend to run multiple containers with exposed ports, make sure to run each container with a different exposed port. For example, run the first container on port 5000 and the second container on port 5001.

You can have this container and a different Azure Cognitive Services container running on the HOST together. You also can have multiple containers of the same Cognitive Services container running.

Query the container's prediction endpoint

The container provides REST-based query prediction endpoint APIs.

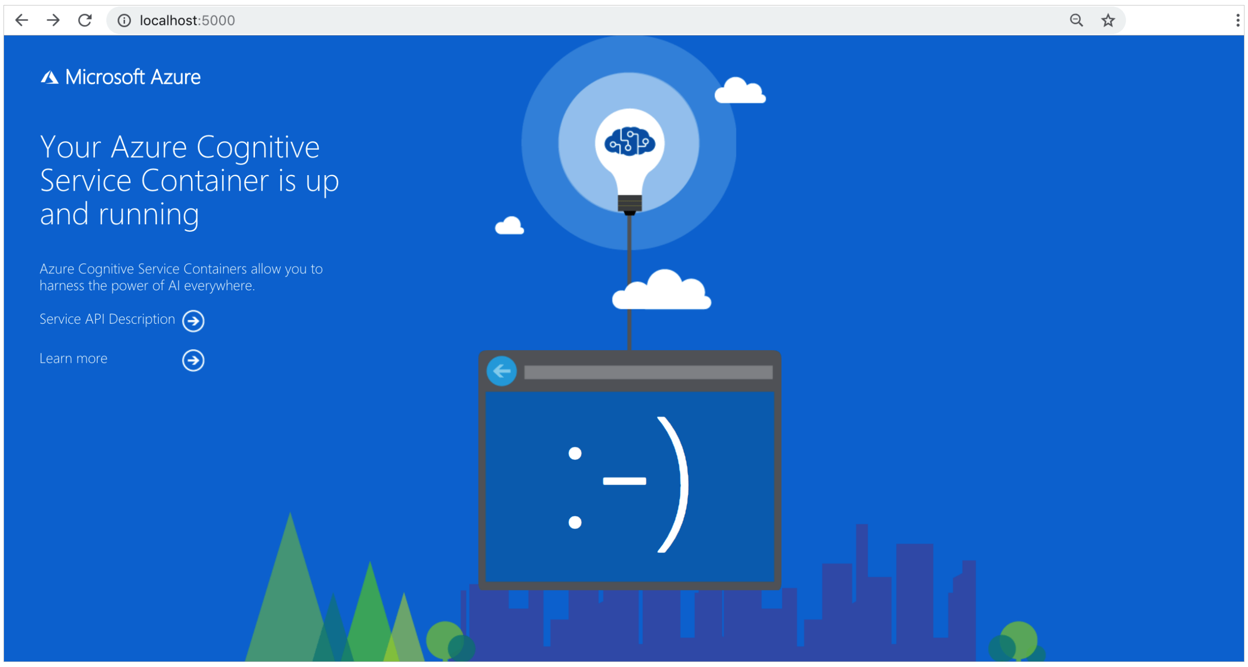
Use the host, `http://localhost:5000`, for container APIs.

Validate that a container is running

There are several ways to validate that the container is running. Locate the *External IP* address and exposed port of the container in question, and open your favorite web browser. Use the various request URLs below to validate the container is running. The example request URLs listed below are `http://localhost:5000`, but your specific container may vary. Keep in mind that you're to rely on your container's *External IP* address and exposed port.

REQUEST URL	PURPOSE
`http://localhost:5000/`	The container provides a home page.

REQUEST URL	PURPOSE
`http://localhost:5000/ready`	Requested with GET, this provides a verification that the container is ready to accept a query against the model. This request can be used for Kubernetes liveness and readiness probes.
`http://localhost:5000/status`	Also requested with GET, this verifies if the api-key used to start the container is valid without causing an endpoint query. This request can be used for Kubernetes liveness and readiness probes.
`http://localhost:5000/swagger`	The container provides a full set of documentation for the endpoints and a **Try it out** feature. With this feature, you can enter your settings into a web-based HTML form and make the query without having to write any code. After the query returns, an example CURL command is provided to demonstrate the HTTP headers and body format that's required.


localhost:5000
Microsoft Azure
Your Azure Cognitive Service Container is up and running
Azure Cognitive Service Containers allow you to harness the power of AI everywhere.
Service API Description
Learn more

Stop the container

To shut down the container, in the command-line environment where the container is running, select `Ctrl+C`.

Troubleshooting

If you run the container with an output mount and logging enabled, the container generates log files that are helpful to troubleshoot issues that happen while starting or running the container.

TIP

For more troubleshooting information and guidance, see Cognitive Services containers frequently asked questions (FAQ).

Billing

The Text Analytics containers send billing information to Azure, using a *Text Analytics* resource on your Azure account.

Queries to the container are billed at the pricing tier of the Azure resource that's used for the `ApiKey`.

Azure Cognitive Services containers aren't licensed to run without being connected to the metering / billing endpoint. You must enable the containers to communicate billing information with the billing endpoint at all times. Cognitive Services containers don't send customer data, such as the image or text that's being analyzed, to Microsoft.

Connect to Azure

The container needs the billing argument values to run. These values allow the container to connect to the billing endpoint. The container reports usage about every 10 to 15 minutes. If the container doesn't connect to Azure within the allowed time window, the container continues to run but doesn't serve queries until the billing endpoint is restored. The connection is attempted 10 times at the same time interval of 10 to 15 minutes. If it can't connect to the billing endpoint within the 10 tries, the container stops serving requests. See the Cognitive Services container FAQ for an example of the information sent to Microsoft for billing.

Billing arguments

The `docker run` command will start the container when all three of the following options are provided with valid values:

OPTION	DESCRIPTION
`ApiKey`	The API key of the Cognitive Services resource that's used to track billing information. The value of this option must be set to an API key for the provisioned resource that's specified in `Billing`.
`Billing`	The endpoint of the Cognitive Services resource that's used to track billing information. The value of this option must be set to the endpoint URI of a provisioned Azure resource.
`Eula`	Indicates that you accepted the license for the container. The value of this option must be set to **accept**.

For more information about these options, see Configure containers.

Summary

In this article, you learned concepts and workflow for downloading, installing, and running Text Analytics containers. In summary:

- Text Analytics provides three Linux containers for Docker, encapsulating various capabilities:
  - *Sentiment Analysis*
  - *Key Phrase Extraction (preview)*
  - *Language Detection*
  - *Text Analytics for health*
- Container images are downloaded from the Microsoft Container Registry (MCR).
- Container images run in Docker.
- You can use either the REST API or SDK to call operations in Text Analytics containers by specifying the host URI of the container.
- You must specify billing information when instantiating a container.

IMPORTANT

Cognitive Services containers are not licensed to run without being connected to Azure for metering. Customers need to enable the containers to communicate billing information with the metering service at all times. Cognitive Services containers do not send customer data (e.g. text that is being analyzed) to Microsoft.

Next steps

- See Configure containers for configuration settings.

Configure Text Analytics docker containers

7/22/2021 • 6 minutes to read • Edit Online

Text Analytics provides each container with a common configuration framework, so that you can easily configure and manage storage, logging and telemetry, and security settings for your containers. Several example docker run commands are also available.

Configuration settings

The container has the following configuration settings:

REQUIRED	SETTING	PURPOSE
Yes	ApiKey	Tracks billing information.
No	ApplicationInsights	Enables adding Azure Application Insights telemetry support to your container.
Yes	Billing	Specifies the endpoint URI of the service resource on Azure.
Yes	Eula	Indicates that you've accepted the license for the container.
No	Fluentd	Writes log and, optionally, metric data to a Fluentd server.
No	HTTP Proxy	Configures an HTTP proxy for making outbound requests.
No	Logging	Provides ASP.NET Core logging support for your container.
No	Mounts	Reads and writes data from the host computer to the container and from the container back to the host computer.

IMPORTANT

The `ApiKey`, `Billing`, and `Eula` settings are used together, and you must provide valid values for all three of them; otherwise your container won't start. For more information about using these configuration settings to instantiate a container, see Billing.

ApiKey configuration setting

The `ApiKey` setting specifies the Azure resource key used to track billing information for the container. You must specify a value for the ApiKey and the value must be a valid key for the *Text Analytics* resource specified for the `Billing` configuration setting.

This setting can be found in the following place:

- Azure portal: **Text Analytics** resource management, under **Keys**

ApplicationInsights setting

The `ApplicationInsights` setting allows you to add Azure Application Insights telemetry support to your container. Application Insights provides in-depth monitoring of your container. You can easily monitor your container for availability, performance, and usage. You can also quickly identify and diagnose errors in your container.

The following table describes the configuration settings supported under the `ApplicationInsights` section.

REQUIRED	NAME	DATA TYPE	DESCRIPTION
No	`InstrumentationKey`	String	The instrumentation key of the Application Insights instance to which telemetry data for the container is sent. For more information, see Application Insights for ASP.NET Core. Example: `InstrumentationKey=123456789`

Billing configuration setting

The `Billing` setting specifies the endpoint URI of the *Text Analytics* resource on Azure used to meter billing information for the container. You must specify a value for this configuration setting, and the value must be a valid endpoint URI for a _*Text Analytics* resource on Azure. The container reports usage about every 10 to 15 minutes.

This setting can be found in the following place:

- Azure portal: **Text Analytics** Overview, labeled `Endpoint`

REQUIRED	NAME	DATA TYPE	DESCRIPTION
Yes	`Billing`	String	Billing endpoint URI. For more information on obtaining the billing URI, see gathering required parameters. For more information and a complete list of regional endpoints, see Custom subdomain names for Cognitive Services.

Eula setting

The `Eula` setting indicates that you've accepted the license for the container. You must specify a value for this configuration setting, and the value must be set to `accept`.

REQUIRED	NAME	DATA TYPE	DESCRIPTION
Yes	`Eula`	String	License acceptance Example: `Eula=accept`

Cognitive Services containers are licensed under your agreement governing your use of Azure. If you do not have an existing agreement governing your use of Azure, you agree that your agreement governing use of

Azure is the Microsoft Online Subscription Agreement, which incorporates the Online Services Terms. For previews, you also agree to the Supplemental Terms of Use for Microsoft Azure Previews. By using the container you agree to these terms.

Fluentd settings

Fluentd is an open-source data collector for unified logging. The `Fluentd` settings manage the container's connection to a Fluentd server. The container includes a Fluentd logging provider, which allows your container to write logs and, optionally, metric data to a Fluentd server.

The following table describes the configuration settings supported under the `Fluentd` section.

NAME	DATA TYPE	DESCRIPTION
`Host`	String	The IP address or DNS host name of the Fluentd server.
`Port`	Integer	The port of the Fluentd server. The default value is 24224.
`HeartbeatMs`	Integer	The heartbeat interval, in milliseconds. If no event traffic has been sent before this interval expires, a heartbeat is sent to the Fluentd server. The default value is 60000 milliseconds (1 minute).
`SendBufferSize`	Integer	The network buffer space, in bytes, allocated for send operations. The default value is 32768 bytes (32 kilobytes).
`TlsConnectionEstablishmentTimeoutMs`	Integer	The timeout, in milliseconds, to establish a SSL/TLS connection with the Fluentd server. The default value is 10000 milliseconds (10 seconds). If `UseTLS` is set to false, this value is ignored.
`UseTLS`	Boolean	Indicates whether the container should use SSL/TLS for communicating with the Fluentd server. The default value is false.

Http proxy credentials settings

If you need to configure an HTTP proxy for making outbound requests, use these two arguments:

NAME	DATA TYPE	DESCRIPTION

HTTP_PROXY	string	The proxy to use, for example,
		`http://proxy:8888`
		`<proxy-url>`

HTTP_PROXY_CREDS	string	Any credentials needed to authenticate against the proxy, for example, `username:password`. This value **must be in lower-case**.
`<proxy-user>`	string	The user for the proxy.

NAME	DATA TYPE	DESCRIPTION
`<proxy-password>`	string	The password associated with `<proxy-user>` for the proxy.

```
docker run --rm -it -p 5000:5000 \
--memory 2g --cpus 1 \
--mount type=bind,src=/home/azureuser/output,target=/output \
<registry-location>/<image-name> \
Eula=accept \
Billing=<endpoint> \
ApiKey=<api-key> \
HTTP_PROXY=<proxy-url> \
HTTP_PROXY_CREDS=<proxy-user>:<proxy-password> \
```

Logging settings

The `Logging` settings manage ASP.NET Core logging support for your container. You can use the same configuration settings and values for your container that you use for an ASP.NET Core application.

The following logging providers are supported by the container:

PROVIDER	PURPOSE
Console	The ASP.NET Core `Console` logging provider. All of the ASP.NET Core configuration settings and default values for this logging provider are supported.
Debug	The ASP.NET Core `Debug` logging provider. All of the ASP.NET Core configuration settings and default values for this logging provider are supported.
Disk	The JSON logging provider. This logging provider writes log data to the output mount.

This container command stores logging information in the JSON format to the output mount:

```
docker run --rm -it -p 5000:5000 \
--memory 2g --cpus 1 \
--mount type=bind,src=/home/azureuser/output,target=/output \
<registry-location>/<image-name> \
Eula=accept \
Billing=<endpoint> \
ApiKey=<api-key> \
Logging:Disk:Format=json
```

This container command shows debugging information, prefixed with `dbug`, while the container is running:

```
docker run --rm -it -p 5000:5000 \
--memory 2g --cpus 1 \
<registry-location>/<image-name> \
Eula=accept \
Billing=<endpoint> \
ApiKey=<api-key> \
Logging:Console:LogLevel:Default=Debug
```

Disk logging

The `Disk` logging provider supports the following configuration settings:

NAME	DATA TYPE	DESCRIPTION
`Format`	String	The output format for log files. **Note:** This value must be set to `json` to enable the logging provider. If this value is specified without also specifying an output mount while instantiating a container, an error occurs.
`MaxFileSize`	Integer	The maximum size, in megabytes (MB), of a log file. When the size of the current log file meets or exceeds this value, a new log file is started by the logging provider. If -1 is specified, the size of the log file is limited only by the maximum file size, if any, for the output mount. The default value is 1.

For more information about configuring ASP.NET Core logging support, see Settings file configuration.

Mount settings

Use bind mounts to read and write data to and from the container. You can specify an input mount or output mount by specifying the `--mount` option in the docker run command.

The Text Analytics containers don't use input or output mounts to store training or service data.

The exact syntax of the host mount location varies depending on the host operating system. Additionally, the host computer's mount location may not be accessible due to a conflict between permissions used by the docker service account and the host mount location permissions.

OPTIONAL	NAME	DATA TYPE	DESCRIPTION
Not allowed	`Input`	String	Text Analytics containers do not use this.
Optional	`Output`	String	The target of the output mount. The default value is `/output`. This is the location of the logs. This includes container logs. Example: `--mount type=bind,src=c:\output,target=/outp`

Next steps

- Review How to install and run containers
- Use more Cognitive Services Containers

Deploy and run container on Azure Container Instance

4/29/2021 • 7 minutes to read • Edit Online

With the following steps, scale Azure Cognitive Services applications in the cloud easily with Azure Container Instances. Containerization helps you focus on building your applications instead of managing the infrastructure. For more information on using containers, see features and benefits.

Prerequisites

The recipe works with any Cognitive Services container. The Cognitive Service resource must be created before using the recipe. Each Cognitive Service that supports containers has a "How to install" article for installing and configuring the service for a container. Some services require a file or set of files as input for the container, it is important that you understand and have used the container successfully before using this solution.

- An Azure resource for the Azure Cognitive Service you're using.
- Cognitive Service **endpoint URL** - review your specific service's "How to install" for the container, to find where the endpoint URL is from within the Azure portal, and what a correct example of the URL looks like. The exact format can change from service to service.
- Cognitive Service **key** - the keys are on the **Keys** page for the Azure resource. You only need one of the two keys. The key is a string of 32 alpha-numeric characters.
- A single Cognitive Services Container on your local host (your computer). Make sure you can:
  - Pull down the image with a `docker pull` command.
  - Run the local container successfully with all required configuration settings with a `docker run` command.
  - Call the container's endpoint, getting a response of HTTP 2xx and a JSON response back.

All variables in angle brackets, `<>`, need to be replaced with your own values. This replacement includes the angle brackets.

IMPORTANT

The LUIS container requires a `.gz` model file that is pulled in at runtime. The container must be able to access this model file via a volume mount from the container instance. To upload a model file, follow these steps:

1. Create an Azure file share. Take note of the Azure Storage account name, key, and file share name as you'll need them later.
2. export your LUIS model (packaged app) from the LUIS portal.
3. In the Azure portal, navigate to the **Overview** page of your storage account resource, and select **File shares**.
4. Select the file share name that you recently created, then select **Upload**. Then upload your packaged app.

- Azure portal
- CLI

Create an Azure Container Instance resource using the Azure portal

1. Go to the Create page for Container Instances.
2. On the **Basics** tab, enter the following details:

SETTING	VALUE
Subscription	Select your subscription.
Resource group	Select the available resource group or create a new one such as `cognitive-services`.
Container name	Enter a name such as `cognitive-container-instance`. The name must be in lower caps.
Location	Select a region for deployment.
Image type	If your container image is stored in a container registry that doesn't require credentials, choose `Public`. If accessing your container image requires credentials, choose `Private`. Refer to container repositories and images for details on whether or not the container image is `Public` or `Private` ("Public Preview").
Image name	Enter the Cognitive Services container location. The location is what's used as an argument to the `docker pull` command. Refer to the container repositories and images for the available image names and their corresponding repository. The image name must be fully qualified specifying three parts. First, the container registry, then the repository, finally the image name: `<container-registry>/<repository>/<image-name>`. Here is an example, `mcr.microsoft.com/azure-cognitive-services/keyphrase` would represent the Key Phrase Extraction image in the Microsoft Container Registry under the Azure Cognitive Services repository. Another example is, `containerpreview.azurecr.io/microsoft/cognitive-services-speech-to-text` which would represent the Speech to Text image in the Microsoft repository of the Container Preview container registry.
OS type	`Linux`
Size	Change size to the suggested recommendations for your specific Cognitive Service container: 2 CPU cores 4 GB

3. On the **Networking** tab, enter the following details:

SETTING	VALUE

SETTING	VALUE
Ports	Set the TCP port to `5000`. Exposes the container on port 5000.

4. On the **Advanced** tab, enter the required **Environment Variables** for the container billing settings of the Azure Container Instance resource:

KEY	VALUE
`ApiKey`	Copied from the **Keys and endpoint** page of the resource. It is a 32 alphanumeric-character string with no spaces or dashes, `xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx`.
`Billing`	Your endpoint URL copied from the **Keys and endpoint** page of the resource.
`Eula`	`accept`

5. Click **Review and Create**

6. After validation passes, click **Create** to finish the creation process

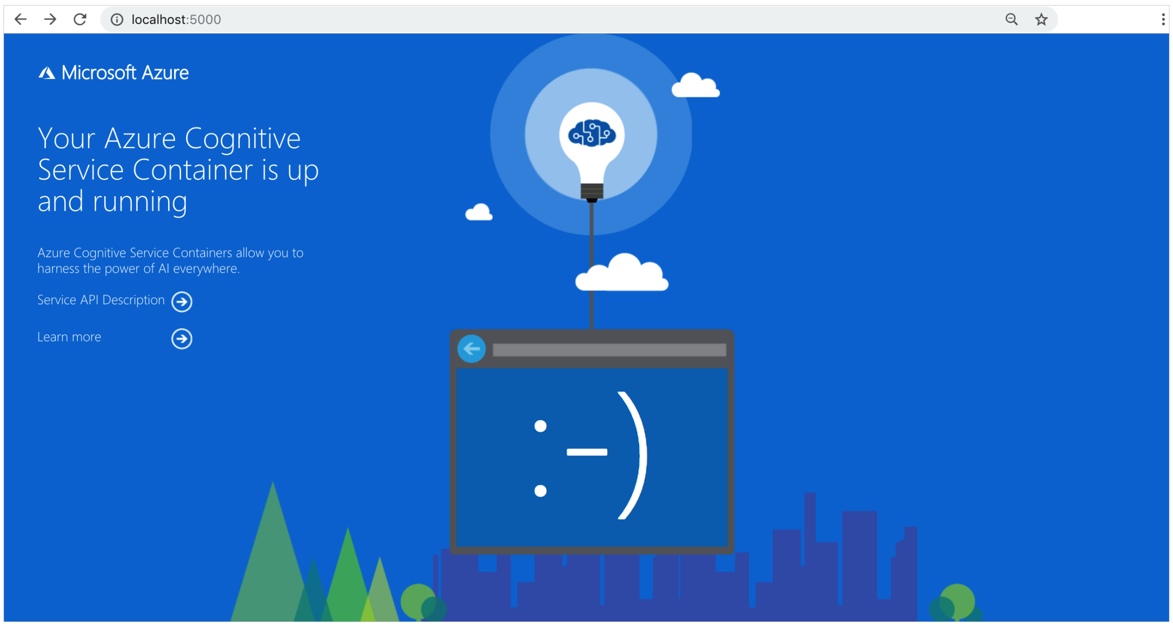
7. When the resource is successfully deployed, it's ready

Use the Container Instance

- Azure portal
- CLI

1. Select the **Overview** and copy the IP address. It will be a numeric IP address such as `55.55.55.55`.

2. Open a new browser tab and use the IP address, for example, `http://<IP-address>:5000 (http://55.55.55.55:5000`). You will see the container's home page, letting you know the container is running.


localhost:5000
Microsoft Azure
Your Azure Cognitive Service Container is up and running
Azure Cognitive Service Containers allow you to harness the power of AI everywhere.
Service API Description
Learn more

3. Select **Service API Description** to view the swagger page for the container.

4. Select any of the **POST** APIs and select **Try it out**. The parameters are displayed including the input. Fill

in the parameters.

5. Select **Execute** to send the request to your Container Instance.

   You have successfully created and used Cognitive Services containers in Azure Container Instance.

Deploy a Text Analytics container to Azure Kubernetes Service

3/5/2021 • 12 minutes to read • Edit Online

Learn how to deploy the Azure Cognitive Services Text Analytics container image to Azure Kubernetes Service (AKS). This procedure shows how to create a Text Analytics resource, how to create an associated sentiment analysis image, and how to exercise this orchestration of the two from a browser. Using containers can shift your attention away from managing infrastructure to instead focusing on application development.

Prerequisites

This procedure requires several tools that must be installed and run locally. Don't use Azure Cloud Shell. You need the following:

- An Azure subscription. If you don't have an Azure subscription, create a free account before you begin.
- A text editor, for example, Visual Studio Code.
- The Azure CLI installed.
- The Kubernetes CLI installed.
- An Azure resource with the correct pricing tier. Not all pricing tiers work with this container:
  - **Azure Text Analytics** resource with F0 or standard pricing tiers only.
  - **Azure Cognitive Services** resource with the S0 pricing tier.

Create a Cognitive Services Text Analytics resource

1. Sign in to the Azure portal.
2. Select **Create a resource**, and then go to **AI + Machine Learning** > **Text Analytics**. Or, go to Create Text Analytics.
3. Enter all the required settings:

SETTING	VALUE
Name	Enter a name (2-64 characters).
Subscription	Select the appropriate subscription.
Location	Select a nearby location.
Pricing tier	Enter **S**, the standard pricing tier.
Resource group	Select an available resource group.

4. Select **Create**, and wait for the resource to be created. Your browser automatically redirects to the newly created resource page.
5. Collect the configured `endpoint` and an API key:

RESOURCE TAB IN PORTAL	SETTING	VALUE
Overview	Endpoint	Copy the endpoint. It appears similar to `https://my-resource.cognitiveservices.azure.com/text/analytic` .

RESOURCE TAB IN PORTAL	SETTING	VALUE
Keys	API Key	Copy one of the two keys. It's a 32-character alphanumeric string with no spaces or dashes: < `xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx` >.

Create an Azure Kubernetes Service cluster resource

1. Go to Azure Kubernetes Service, and select **Create**.
2. On the **Basics** tab, enter the following information:

SETTING	VALUE
Subscription	Select an appropriate subscription.
Resource group	Select an available resource group.
Kubernetes cluster name	Enter a name (lowercase).
Region	Select a nearby location.
Kubernetes version	Whatever value is marked as **(default)**.
DNS name prefix	Created automatically, but you can override.
Node size	Standard DS2 v2: `2 vCPUs`, `7 GB`
Node count	Leave the slider at the default value.

3. On the **Node pools** tab, leave **Virtual nodes** and **VM scale sets** set to their default values.
4. On the **Authentication** tab, leave **Service principal** and **Enable RBAC** set to their default values.
5. On the **Networking** tab, enter the following selections:

SETTING	VALUE
HTTP application routing	No
Networking configuration	Basic

6. On the **Integrations** tab, make sure that **Container monitoring** is set to **Enabled**, and leave **Log Analytics workspace** as the default value.
7. On the **Tags** tab, leave the name/value pairs blank for now.
8. Select **Review and Create**.
9. After validation passes, select **Create**.

NOTE

If validation fails, it might be because of a "Service principal" error. Go back to the **Authentication** tab and then go back to **Review + create**, where validation should run and then pass.

- Key Phrase Extraction
- Language Detection

- Sentiment Analysis

Deploy the Key Phrase Extraction container to an AKS cluster

1. Open the Azure CLI, and sign in to Azure.

   ```
   az login
   ```

2. Sign in to the AKS cluster. Replace `your-cluster-name` and `your-resource-group` with the appropriate values.

   ```
   az aks get-credentials -n your-cluster-name -g -your-resource-group
   ```

   After this command runs, it reports a message similar to the following:

   ```
   Merged "your-cluster-name" as current context in /home/username/.kube/config
   ```

   WARNING

   If you have multiple subscriptions available to you on your Azure account and the `az aks get-credentials` command returns with an error, a common problem is that you're using the wrong subscription. Set the context of your Azure CLI session to use the same subscription that you created the resources with and try again.

   ```
   az account set -s subscription-id
   ```

3. Open the text editor of choice. This example uses Visual Studio Code.

   ```
   code .
   ```

4. Within the text editor, create a new file named *keyphrase.yaml*, and paste the following YAML into it. Be sure to replace `billing/value` and `apikey/value` with your own information.

```yaml
apiVersion: apps/v1beta1
kind: Deployment
metadata:
  name: keyphrase
spec:
  template:
    metadata:
      labels:
        app: keyphrase-app
    spec:
      containers:
      - name: keyphrase
        image: mcr.microsoft.com/azure-cognitive-services/keyphrase
        ports:
        - containerPort: 5000
        resources:
          requests:
            memory: 2Gi
            cpu: 1
          limits:
            memory: 4Gi
            cpu: 1
        env:
        - name: EULA
          value: "accept"
        - name: billing
          value: # {ENDPOINT_URI}
        - name: apikey
          value: # {API_KEY}

---
apiVersion: v1
kind: Service
metadata:
  name: keyphrase
spec:
  type: LoadBalancer
  ports:
  - port: 5000
  selector:
    app: keyphrase-app
```

5. Save the file, and close the text editor.

6. Run the Kubernetes `apply` command with the *keyphrase.yaml* file as its target:

   ```
   kubectl apply -f keyphrase.yaml
   ```

   After the command successfully applies the deployment configuration, a message appears similar to the following output:

   ```
   deployment.apps "keyphrase" created
   service "keyphrase" created
   ```

7. Verify that the pod was deployed:

   ```
   kubectl get pods
   ```

   The output for the running status of the pod:

   ```
   NAME                         READY     STATUS    RESTARTS   AGE
   keyphrase-5c9ccdf575-mf6k5   1/1       Running   0          1m
   ```

8. Verify that the service is available, and get the IP address.

```
kubectl get services
```

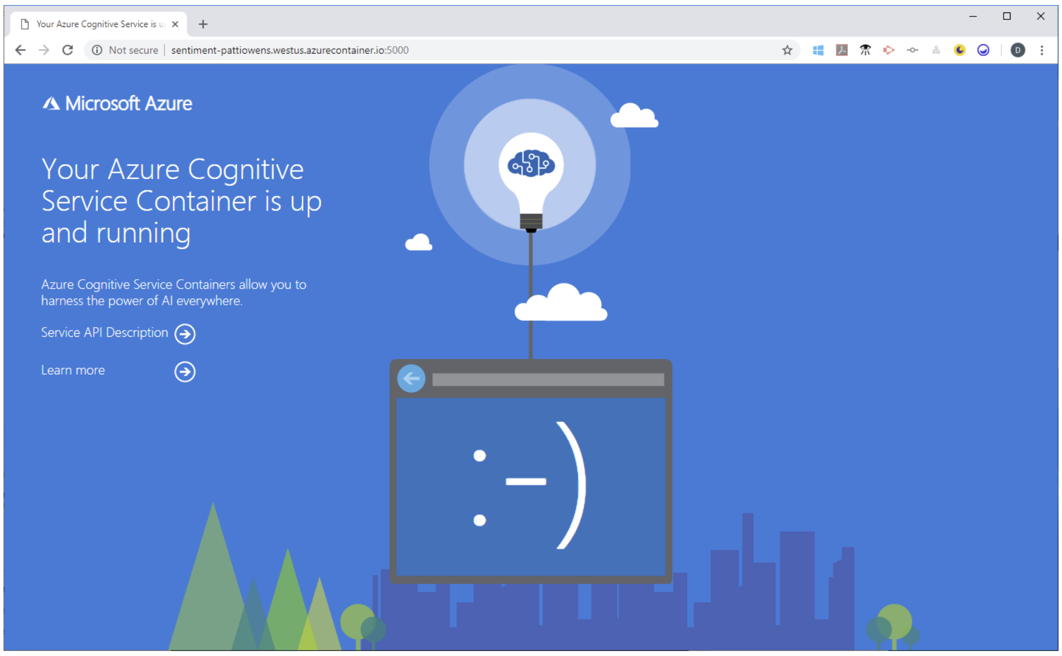
The output for the running status of the *keyphrase* service in the pod:

```
NAME         TYPE           CLUSTER-IP    EXTERNAL-IP      PORT(S)          AGE
kubernetes   ClusterIP      10.0.0.1      <none>           443/TCP          2m
keyphrase    LoadBalancer   10.0.100.64   168.61.156.180   5000:31234/TCP   2m
```

Verify the Key Phrase Extraction container instance

1. Select the **Overview** tab, and copy the IP address.

2. Open a new browser tab, and enter the IP address. For example, enter `http://<IP-address>:5000 (http://55.55.55.55:5000`). The container's home page is displayed, which lets you know the container is running.


Your Azure Cognitive Service is u
Not secure | sentiment-pattiowens.westus.azurecontainer.io:5000
Microsoft Azure
Your Azure Cognitive Service Container is up and running
Azure Cognitive Service Containers allow you to harness the power of AI everywhere.
Service API Description
Learn more

3. Select the **Service API Description** link to go to the container's Swagger page.

4. Choose any of the **POST** APIs, and select **Try it out**. The parameters are displayed, which includes this example input:

```
{
  "documents": [
    {
      "id": "1",
      "text": "Hello world"
    },
    {
      "id": "2",
      "text": "Bonjour tout le monde"
    },
    {
      "id": "3",
      "text": "La carretera estaba atascada. Había mucho tráfico el día de ayer."
    },
    {
      "id": "4",
      "text": ":) :( :D"
    }
  ]
}
```

5. Replace the input with the following JSON content:

```
{
  "documents": [
    {
      "language": "en",
      "id": "7",
      "text": "I was fortunate to attend the KubeCon Conference in Barcelona, it is one of the best
conferences I have ever attended. Great people, great sessions and I thoroughly enjoyed it!"
    }
  ]
}
```

6. Set **showStats** to `true`.

7. Select **Execute** to determine the sentiment of the text.

   The model that's packaged in the container generates a score that ranges from 0 to 1, where 0 is negative and 1 is positive.

   The JSON response that's returned includes sentiment for the updated text input:

```
{
  "documents": [
    {
      "id": "7",
      "keyPhrases": [
        "Great people",
        "great sessions",
        "KubeCon Conference",
        "Barcelona",
        "best conferences"
      ],
      "statistics": {
        "charactersCount": 176,
        "transactionsCount": 1
      }
    }
  ],
  "errors": [],
  "statistics": {
    "documentsCount": 1,
    "validDocumentsCount": 1,
    "erroneousDocumentsCount": 0,
    "transactionsCount": 1
  }
}
```

We can now correlate the document `id` of the response payload's JSON data to the original request payload document `id`. The resulting document has a `keyPhrases` array, which contains the list of key phrases that have been extracted from the corresponding input document. Additionally, there are various statistics such as `characterCount` and `transactionCount` for each resulting document.

Next steps

- Use more Cognitive Services containers
- Use the Text Analytics Connected Service

Configure Azure Cognitive Services virtual networks

6/15/2021 • 16 minutes to read • Edit Online

Azure Cognitive Services provides a layered security model. This model enables you to secure your Cognitive Services accounts to a specific subset of networks. When network rules are configured, only applications requesting data over the specified set of networks can access the account. You can limit access to your resources with request filtering. Allowing only requests originating from specified IP addresses, IP ranges or from a list of subnets in Azure Virtual Networks.

An application that accesses a Cognitive Services resource when network rules are in effect requires authorization. Authorization is supported with Azure Active Directory (Azure AD) credentials or with a valid API key.

IMPORTANT

Turning on firewall rules for your Cognitive Services account blocks incoming requests for data by default. In order to allow requests through, one of the following conditions needs to be met:

- The request should originate from a service operating within an Azure Virtual Network (VNet) on the allowed subnet list of the target Cognitive Services account. The endpoint in requests originated from VNet needs to be set as the custom subdomain of your Cognitive Services account.
- Or the request should originate from an allowed list of IP addresses.

Requests that are blocked include those from other Azure services, from the Azure portal, from logging and metrics services, and so on.

NOTE

This article has been updated to use the Azure Az PowerShell module. The Az PowerShell module is the recommended PowerShell module for interacting with Azure. To get started with the Az PowerShell module, see Install Azure PowerShell. To learn how to migrate to the Az PowerShell module, see Migrate Azure PowerShell from AzureRM to Az.

Scenarios

To secure your Cognitive Services resource, you should first configure a rule to deny access to traffic from all networks (including internet traffic) by default. Then, you should configure rules that grant access to traffic from specific VNets. This configuration enables you to build a secure network boundary for your applications. You can also configure rules to grant access to traffic from select public internet IP address ranges, enabling connections from specific internet or on-premises clients.

Network rules are enforced on all network protocols to Azure Cognitive Services, including REST and WebSocket. To access data using tools such as the Azure test consoles, explicit network rules must be configured. You can apply network rules to existing Cognitive Services resources, or when you create new Cognitive Services resources. Once network rules are applied, they're enforced for all requests.

Supported regions and service offerings

Virtual networks (VNETs) are supported in regions where Cognitive Services are available. Currently multi-service resource does not support VNET. Cognitive Services supports service tags for network rules configuration. The services listed below are included in the **CognitiveServicesManagement** service tag.

- Anomaly Detector
- Computer Vision
- Content Moderator
- Custom Vision
- Face
- Form Recognizer
- Immersive Reader
- Language Understanding (LUIS)
- Personalizer
- Speech Services
- Text Analytics
- QnA Maker
- Translator Text

NOTE

If you're using LUIS or Speech Services, the **CognitiveServicesManagement** tag only enables you use the service using the SDK or REST API. To access and use LUIS portal and/or Speech Studio from a virtual network, you will need to use the following tags:

- **AzureActiveDirectory**
- **AzureFrontDoor.Frontend**
- **AzureResourceManager**
- **CognitiveServicesManagement**

Change the default network access rule

By default, Cognitive Services resources accept connections from clients on any network. To limit access to selected networks, you must first change the default action.

WARNING

Making changes to network rules can impact your applications' ability to connect to Azure Cognitive Services. Setting the default network rule to **deny** blocks all access to the data unless specific network rules that **grant** access are also applied. Be sure to grant access to any allowed networks using network rules before you change the default rule to deny access. If you are allow listing IP addresses for your on-premises network, be sure to add all possible outgoing public IP addresses from your on-premises network.

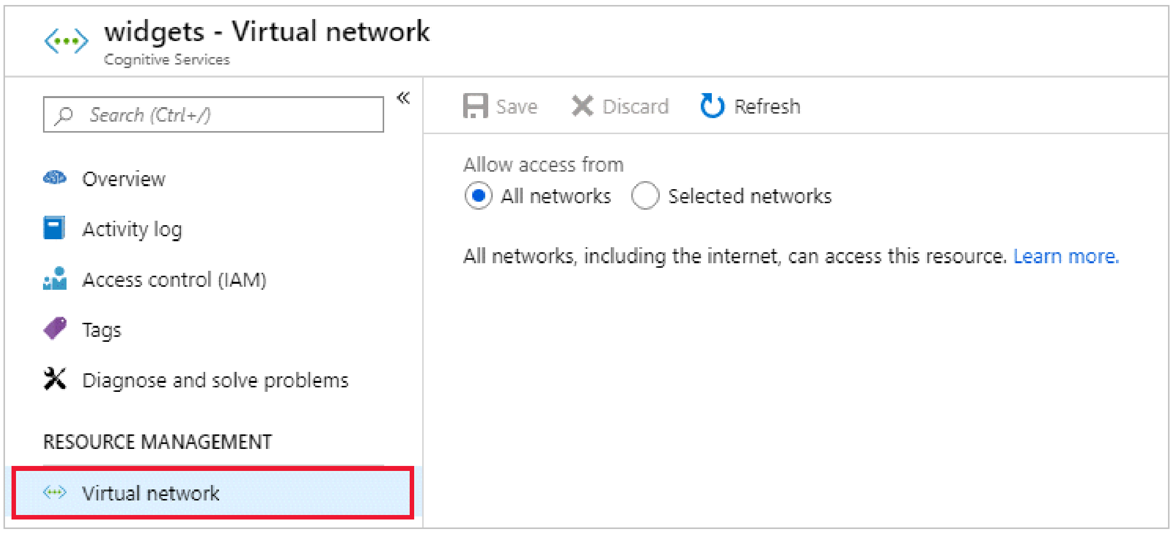
Managing default network access rules

You can manage default network access rules for Cognitive Services resources through the Azure portal, PowerShell, or the Azure CLI.

- Azure portal
- PowerShell
- Azure CLI

1. Go to the Cognitive Services resource you want to secure.

2. Select the **RESOURCE MANAGEMENT** menu called **Virtual network**.

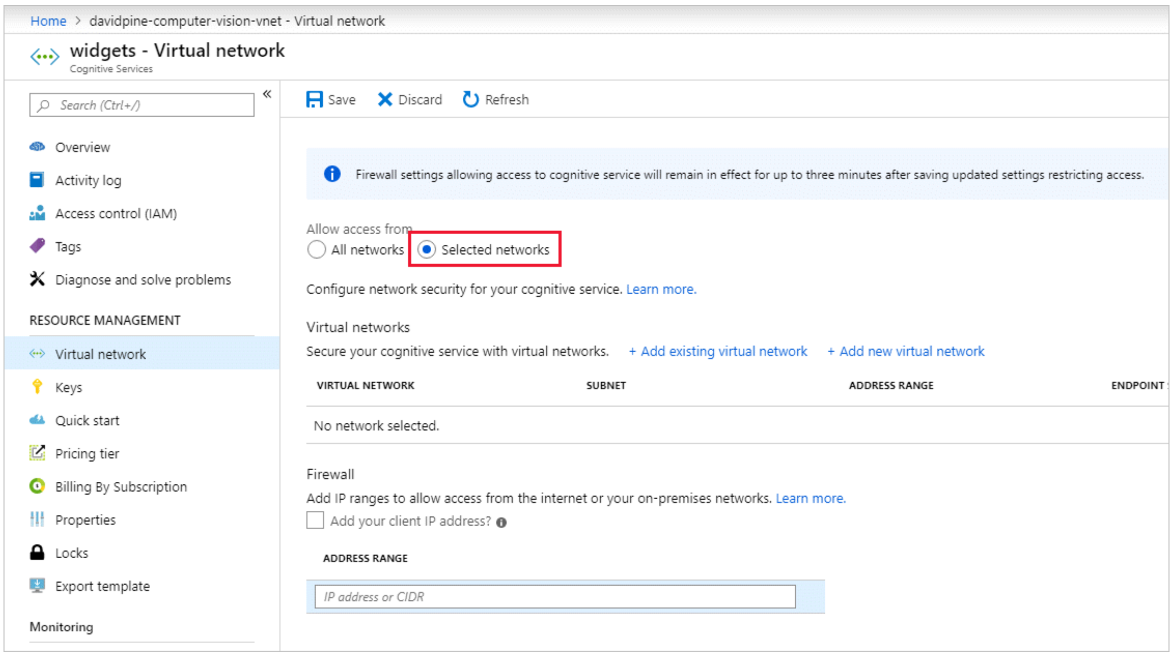


Allow access from
[✓ All networks] Selected networks

All networks, including the internet, can access this resource. Learn more.

3. To deny access by default, choose to allow access from **Selected networks**. With the **Selected networks** setting alone, unaccompanied by configured **Virtual networks** or **Address ranges** - all access is effectively denied. When all access is denied, requests attempting to consume the Cognitive Services resource aren't permitted. The Azure portal, Azure PowerShell or, Azure CLI can still be used to configure the Cognitive Services resource.

4. To allow traffic from all networks, choose to allow access from **All networks**.



Firewall settings allowing access to cognitive service will remain in effect for up to three minutes after saving updated settings restricting access.

Allow access from
All networks [✓ Selected networks]

Configure network security for your cognitive service. Learn more.

Virtual networks
Secure your cognitive service with virtual networks. + Add existing virtual network + Add new virtual network

VIRTUAL NETWORK	SUBNET	ADDRESS RANGE	ENDPOINT
No network selected.			

Firewall
Add IP ranges to allow access from the internet or your on-premises networks. Learn more.
☐ Add your client IP address?

ADDRESS RANGE
IP address or CIDR

5. Select **Save** to apply your changes.

Grant access from a virtual network

You can configure Cognitive Services resources to allow access only from specific subnets. The allowed subnets may belong to a VNet in the same subscription, or in a different subscription, including subscriptions belonging to a different Azure Active Directory tenant.

Enable a service endpoint for Azure Cognitive Services within the VNet. The service endpoint routes traffic from the VNet through an optimal path to the Azure Cognitive Services service. The identities of the subnet and the virtual network are also transmitted with each request. Administrators can then configure network rules for the Cognitive Services resource that allow requests to be received from specific subnets in a VNet. Clients granted access via these network rules must continue to meet the authorization requirements of the Cognitive Services resource to access the data.

Each Cognitive Services resource supports up to 100 virtual network rules, which may be combined with IP network rules.

Required permissions

To apply a virtual network rule to a Cognitive Services resource, the user must have the appropriate permissions for the subnets being added. The required permission is the default *Contributor* role, or the *Cognitive Services Contributor* role. Required permissions can also be added to custom role definitions.

Cognitive Services resource and the virtual networks granted access may be in different subscriptions, including subscriptions that are a part of a different Azure AD tenant.

> **NOTE**
> Configuration of rules that grant access to subnets in virtual networks that are a part of a different Azure Active Directory tenant are currently only supported through Powershell, CLI and REST APIs. Such rules cannot be configured through the Azure portal, though they may be viewed in the portal.

Managing virtual network rules

You can manage virtual network rules for Cognitive Services resources through the Azure portal, PowerShell, or the Azure CLI.

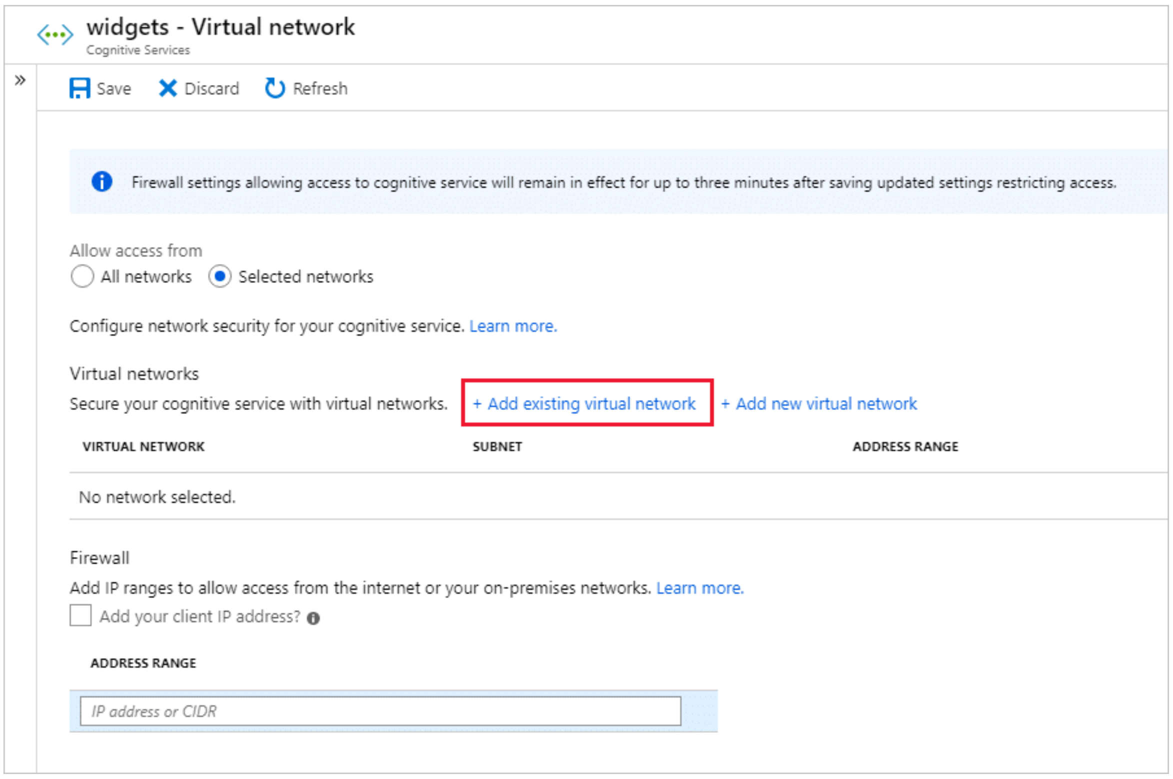
- Azure portal
- PowerShell
- Azure CLI

1. Go to the Cognitive Services resource you want to secure.

2. Select the **RESOURCE MANAGEMENT** menu called **Virtual network**.

3. Check that you've selected to allow access from **Selected networks**.

4. To grant access to a virtual network with an existing network rule, under **Virtual networks**, select **Add existing virtual network**.


widgets - Virtual network
Cognitive Services
Save
Discard
Refresh
+ Add existing virtual network
+ Add new virtual network

Firewall settings allowing access to cognitive service will remain in effect for up to three minutes after saving updated settings restricting access.

Allow access from
All networks [✓ Selected networks]

Configure network security for your cognitive service. Learn more.

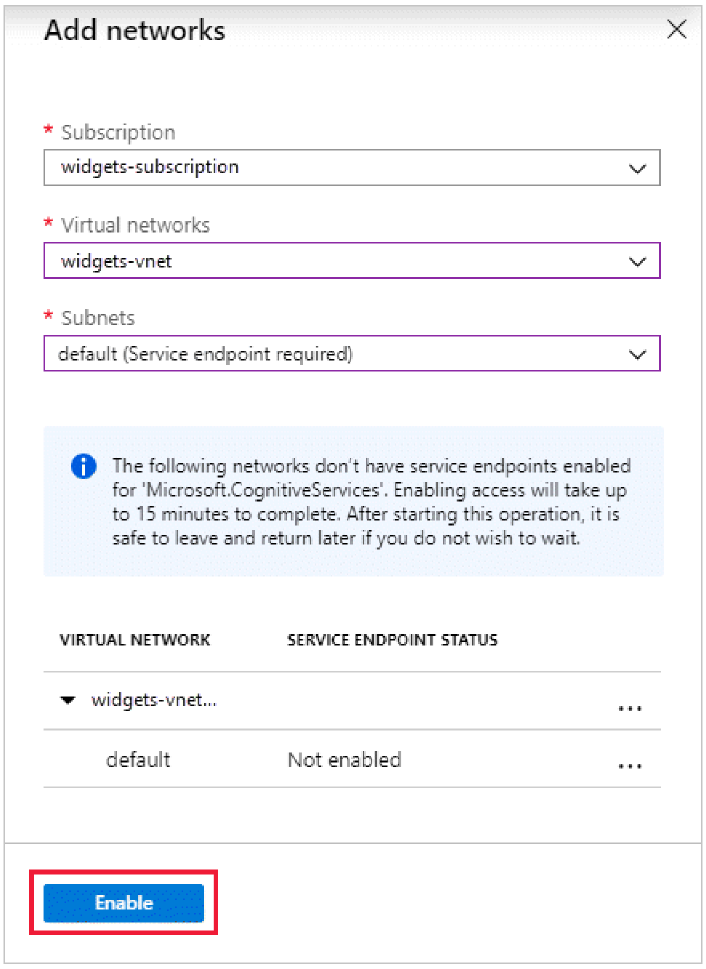
Virtual networks
Secure your cognitive service with virtual networks.

VIRTUAL NETWORK	SUBNET	ADDRESS RANGE
No network selected.		

Firewall
Add IP ranges to allow access from the internet or your on-premises networks. Learn more.
Add your client IP address?

ADDRESS RANGE
IP address or CIDR

5. Select the **Virtual networks** and **Subnets** options, and then select **Enable**.


Add networks

* Subscription
widgets-subscription

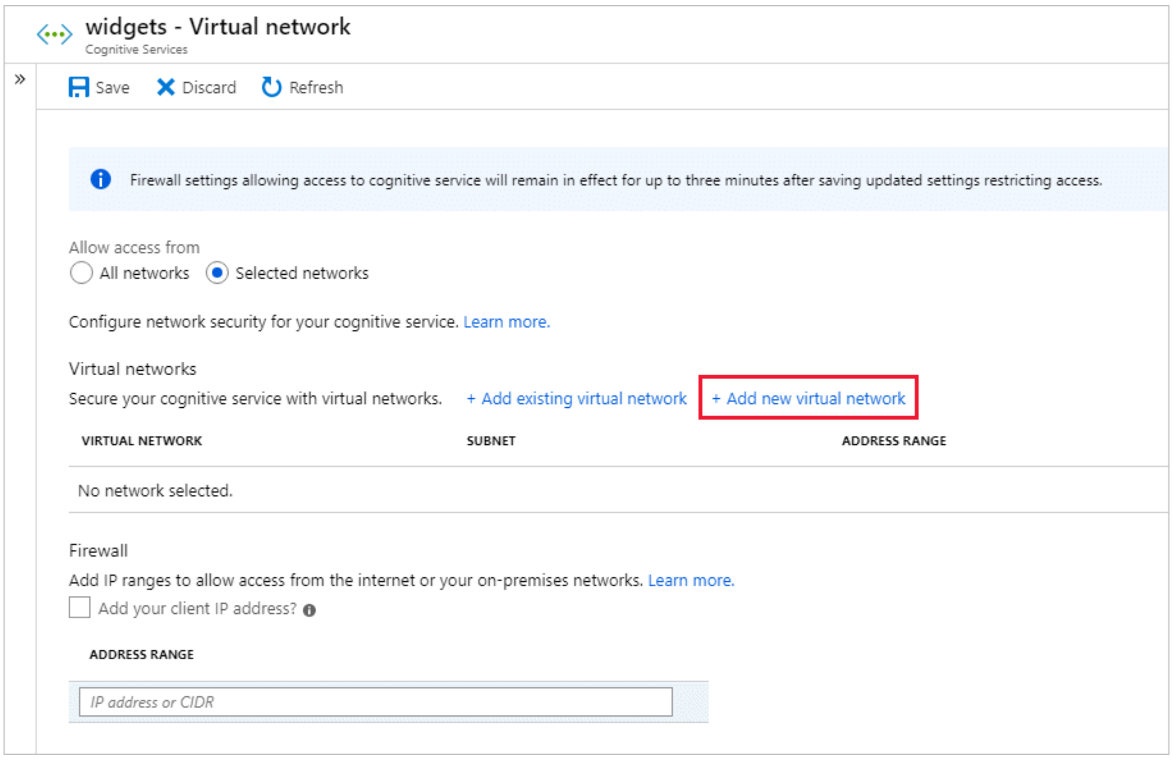
* Virtual networks
widgets-vnet

* Subnets
default (Service endpoint required)

The following networks don't have service endpoints enabled for 'Microsoft.CognitiveServices'. Enabling access will take up to 15 minutes to complete. After starting this operation, it is safe to leave and return later if you do not wish to wait.

VIRTUAL NETWORK	SERVICE ENDPOINT STATUS
widgets-vnet...	
default	Not enabled

6. To create a new virtual network and grant it access, select **Add new virtual network**.


widgets - Virtual network
Cognitive Services

Firewall settings allowing access to cognitive service will remain in effect for up to three minutes after saving updated settings restricting access.

Allow access from
All networks [✓ Selected networks]

Configure network security for your cognitive service. Learn more.

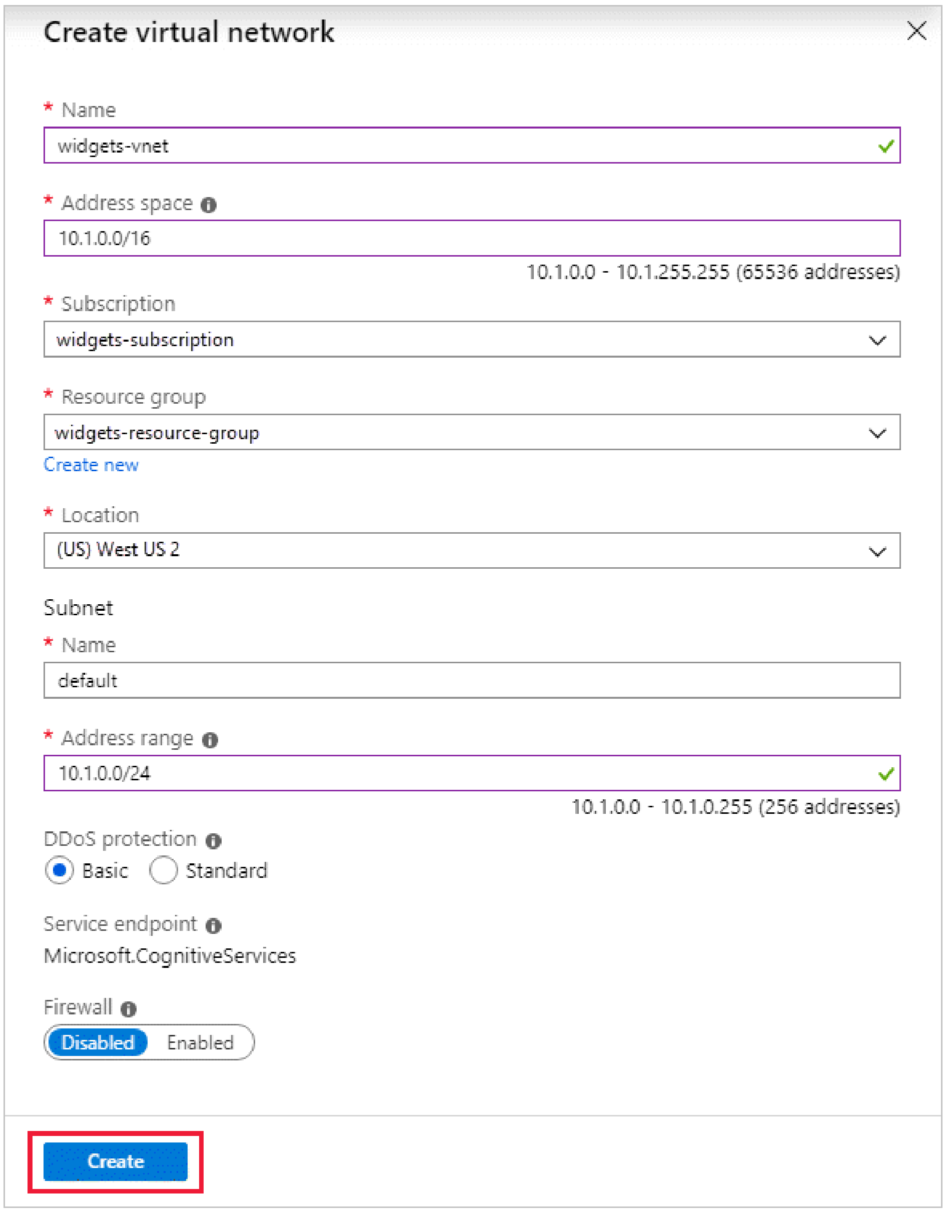
Virtual networks
Secure your cognitive service with virtual networks. + Add existing virtual network + Add new virtual network

VIRTUAL NETWORK	SUBNET	ADDRESS RANGE
No network selected.		

Firewall
Add IP ranges to allow access from the internet or your on-premises networks. Learn more.
Add your client IP address?

ADDRESS RANGE
IP address or CIDR

7. Provide the information necessary to create the new virtual network, and then select **Create**.



Create virtual network

* Name
widgets-vnet

* Address space
10.1.0.0/16
10.1.0.0 - 10.1.255.255 (65536 addresses)

* Subscription
widgets-subscription

* Resource group
widgets-resource-group
Create new

* Location
(US) West US 2

Subnet

* Name
default

* Address range
10.1.0.0/24
10.1.0.0 - 10.1.0.255 (256 addresses)

DDoS protection
[✓ Basic] Standard

Service endpoint
Microsoft.CognitiveServices

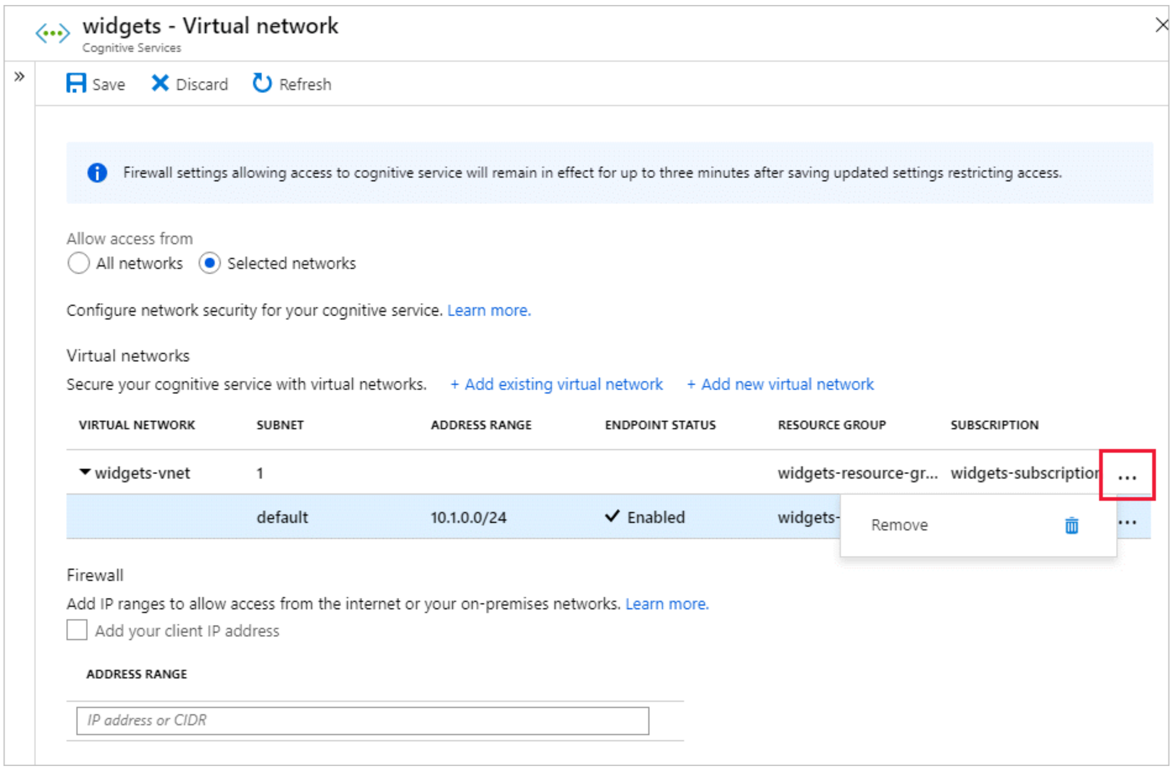
Firewall
[✓ Disabled] Enabled

NOTE

If a service endpoint for Azure Cognitive Services wasn't previously configured for the selected virtual network and subnets, you can configure it as part of this operation.

Presently, only virtual networks belonging to the same Azure Active Directory tenant are shown for selection during rule creation. To grant access to a subnet in a virtual network belonging to another tenant, please use Powershell, CLI or REST APIs.

8. To remove a virtual network or subnet rule, select **...** to open the context menu for the virtual network or subnet, and select **Remove**.


widgets - Virtual network
Cognitive Services

Save | Discard | Refresh

Firewall settings allowing access to cognitive service will remain in effect for up to three minutes after saving updated settings restricting access.

Allow access from
All networks [✓ Selected networks]

Configure network security for your cognitive service. Learn more.

Virtual networks
Secure your cognitive service with virtual networks. + Add existing virtual network + Add new virtual network

VIRTUAL NETWORK	SUBNET	ADDRESS RANGE	ENDPOINT STATUS	RESOURCE GROUP	SUBSCRIPTION
widgets-vnet	1			widgets-resource-gr...	widgets-subscriptior
	default	10.1.0.0/24	✓ Enabled	widgets-	

Remove

Firewall
Add IP ranges to allow access from the internet or your on-premises networks. Learn more.
Add your client IP address

ADDRESS RANGE
IP address or CIDR

9. Select **Save** to apply your changes.

IMPORTANT

Be sure to set the default rule to **deny**, or network rules have no effect.

Grant access from an internet IP range

You can configure Cognitive Services resources to allow access from specific public internet IP address ranges. This configuration grants access to specific services and on-premises networks, effectively blocking general internet traffic.

Provide allowed internet address ranges using CIDR notation in the form `16.17.18.0/24` or as individual IP addresses like `16.17.18.19`.

TIP

Small address ranges using "/31" or "/32" prefix sizes are not supported. These ranges should be configured using individual IP address rules.

IP network rules are only allowed for **public internet** IP addresses. IP address ranges reserved for private networks (as defined in RFC 1918) aren't allowed in IP rules. Private networks include addresses that start with `10.*`, `172.16.*` - `172.31.*`, and `192.168.*`.

Only IPV4 addresses are supported at this time. Each Cognitive Services resource supports up to 100 IP network rules, which may be combined with Virtual network rules.

Configuring access from on-premises networks

To grant access from your on-premises networks to your Cognitive Services resource with an IP network rule, you must identify the internet facing IP addresses used by your network. Contact your network administrator for help.

If you're using ExpressRoute on-premises for public peering or Microsoft peering, you'll need to identify the NAT

IP addresses. For public peering, each ExpressRoute circuit by default uses two NAT IP addresses. Each is applied to Azure service traffic when the traffic enters the Microsoft Azure network backbone. For Microsoft peering, the NAT IP addresses that are used are either customer provided or are provided by the service provider. To allow access to your service resources, you must allow these public IP addresses in the resource IP firewall setting. To find your public peering ExpressRoute circuit IP addresses, open a support ticket with ExpressRoute via the Azure portal. Learn more about NAT for ExpressRoute public and Microsoft peering.

Managing IP network rules

You can manage IP network rules for Cognitive Services resources through the Azure portal, PowerShell, or the Azure CLI.

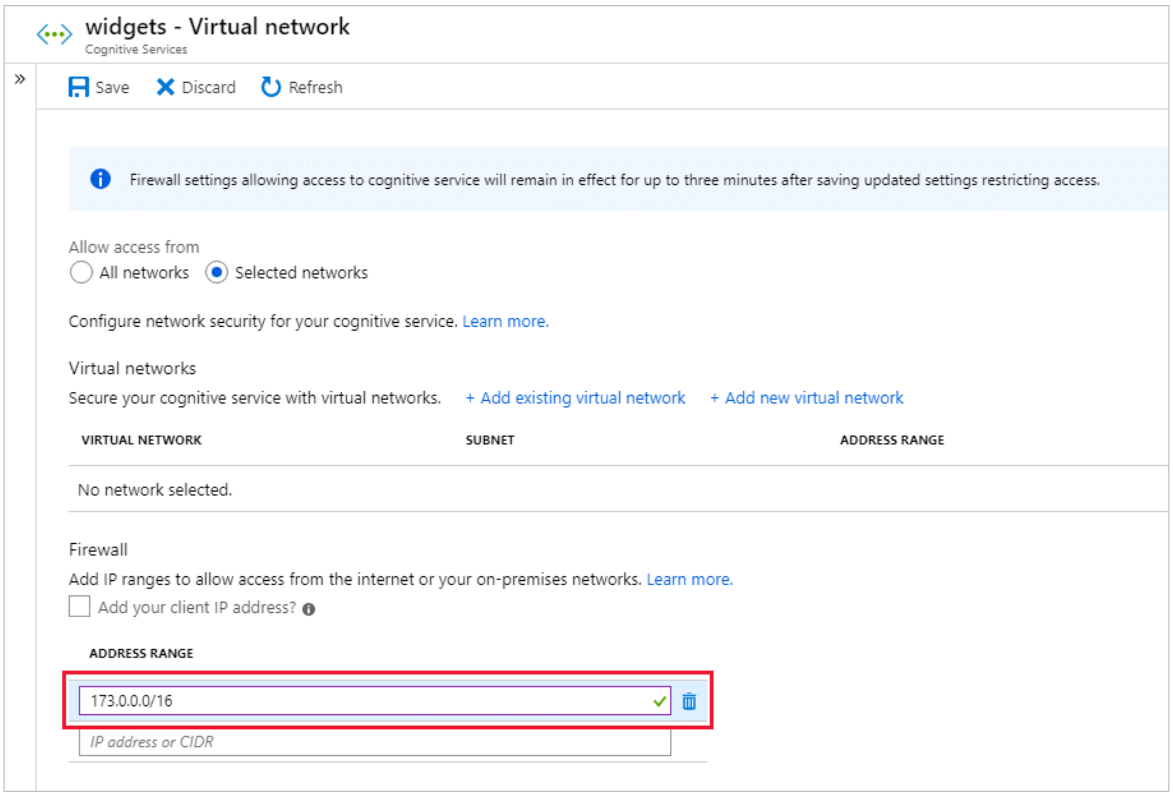
- Azure portal
- PowerShell
- Azure CLI

1. Go to the Cognitive Services resource you want to secure.

2. Select the **RESOURCE MANAGEMENT** menu called **Virtual network**.

3. Check that you've selected to allow access from **Selected networks**.

4. To grant access to an internet IP range, enter the IP address or address range (in CIDR format) under **Firewall** > **Address Range**. Only valid public IP (non-reserved) addresses are accepted.



widgets - Virtual network
Cognitive Services

Save | Discard | Refresh

Firewall settings allowing access to cognitive service will remain in effect for up to three minutes after saving updated settings restricting access.

Allow access from
All networks [✓ Selected networks]

Configure network security for your cognitive service. Learn more.

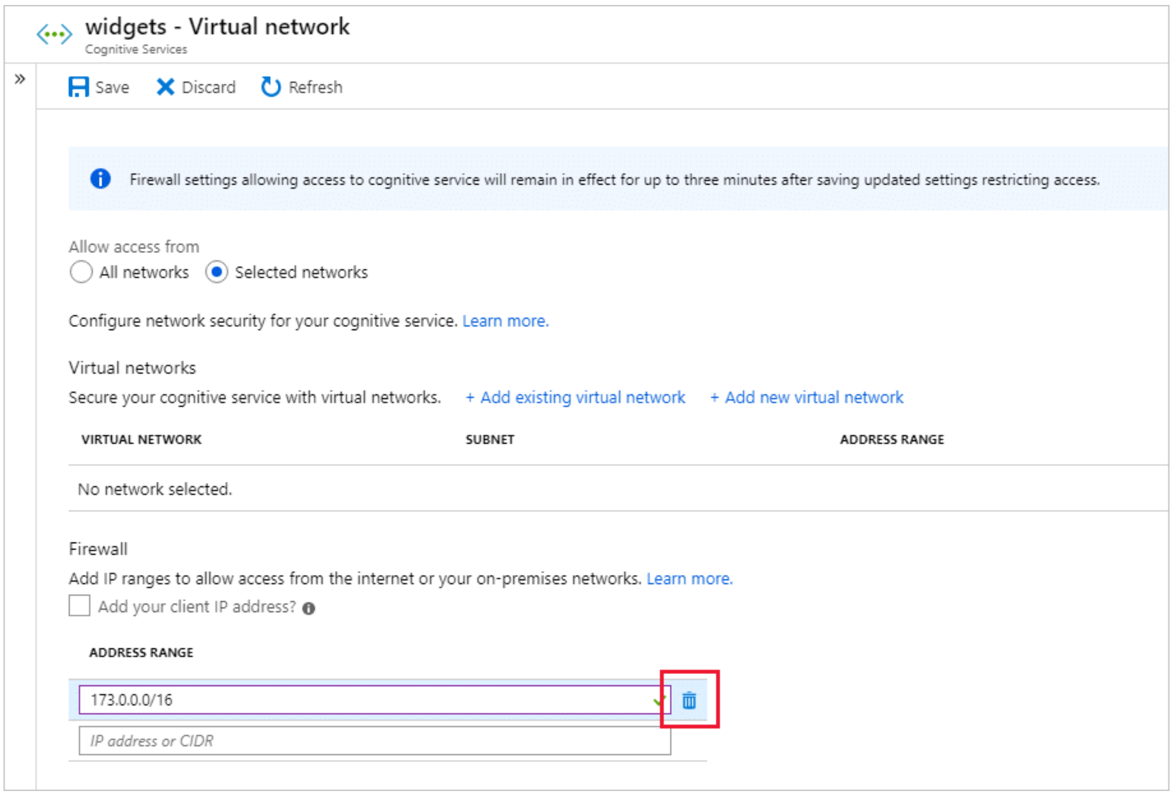
Virtual networks
Secure your cognitive service with virtual networks. + Add existing virtual network + Add new virtual network

VIRTUAL NETWORK	SUBNET	ADDRESS RANGE
No network selected.		

Firewall
Add IP ranges to allow access from the internet or your on-premises networks. Learn more.
Add your client IP address?

ADDRESS RANGE
173.0.0.0/16
IP address or CIDR

5. To remove an IP network rule, select the trash can icon next to the address range.



Firewall settings allowing access to cognitive service will remain in effect for up to three minutes after saving updated settings restricting access.

Allow access from
All networks [✓ Selected networks]

Configure network security for your cognitive service. Learn more.

Virtual networks
Secure your cognitive service with virtual networks. + Add existing virtual network + Add new virtual network

VIRTUAL NETWORK	SUBNET	ADDRESS RANGE
No network selected.		

Firewall
Add IP ranges to allow access from the internet or your on-premises networks. Learn more.
☐ Add your client IP address?

ADDRESS RANGE
173.0.0.0/16
IP address or CIDR

6. Select **Save** to apply your changes.

IMPORTANT

Be sure to set the default rule to **deny**, or network rules have no effect.

Use private endpoints

You can use private endpoints for your Cognitive Services resources to allow clients on a virtual network (VNet) to securely access data over a Private Link. The private endpoint uses an IP address from the VNet address space for your Cognitive Services resource. Network traffic between the clients on the VNet and the resource traverses the VNet and a private link on the Microsoft backbone network, eliminating exposure from the public internet.

Private endpoints for Cognitive Services resources let you:

- Secure your Cognitive Services resource by configuring the firewall to block all connections on the public endpoint for the Cognitive Services service.
- Increase security for the VNet, by enabling you to block exfiltration of data from the VNet.
- Securely connect to Cognitive Services resources from on-premises networks that connect to the VNet using VPN or ExpressRoutes with private-peering.

Conceptual overview

A private endpoint is a special network interface for an Azure resource in your VNet. Creating a private endpoint for your Cognitive Services resource provides secure connectivity between clients in your VNet and your resource. The private endpoint is assigned an IP address from the IP address range of your VNet. The connection between the private endpoint and the Cognitive Services service uses a secure private link.

Applications in the VNet can connect to the service over the private endpoint seamlessly, using the same connection strings and authorization mechanisms that they would use otherwise. The exception is the Speech Services, which require a separate endpoint. See the section on Private endpoints with the Speech Services. Private endpoints can be used with all protocols supported by the Cognitive Services resource, including REST.

Private endpoints can be created in subnets that use Service Endpoints. Clients in a subnet can connect to one

Cognitive Services resource using private endpoint, while using service endpoints to access others.

When you create a private endpoint for a Cognitive Services resource in your VNet, a consent request is sent for approval to the Cognitive Services resource owner. If the user requesting the creation of the private endpoint is also an owner of the resource, this consent request is automatically approved.

Cognitive Services resource owners can manage consent requests and the private endpoints, through the '*Private endpoints*' tab for the Cognitive Services resource in the Azure portal.

Private endpoints

When creating the private endpoint, you must specify the Cognitive Services resource it connects to. For more information on creating a private endpoint, see:

- Create a private endpoint using the Private Link Center in the Azure portal
- Create a private endpoint using Azure CLI
- Create a private endpoint using Azure PowerShell

Connecting to private endpoints

Clients on a VNet using the private endpoint should use the same connection string for the Cognitive Services resource as clients connecting to the public endpoint. The exception is the Speech Services, which require a separate endpoint. See the section on Private endpoints with the Speech Services. We rely upon DNS resolution to automatically route the connections from the VNet to the Cognitive Services resource over a private link.

We create a private DNS zone attached to the VNet with the necessary updates for the private endpoints, by default. However, if you're using your own DNS server, you may need to make additional changes to your DNS configuration. The section on DNS changes below describes the updates required for private endpoints.

Private endpoints with the Speech Services

See Using Speech Services with private endpoints provided by Azure Private Link.

DNS changes for private endpoints

When you create a private endpoint, the DNS CNAME resource record for the Cognitive Services resource is updated to an alias in a subdomain with the prefix '*privatelink*'. By default, we also create a private DNS zone, corresponding to the '*privatelink*' subdomain, with the DNS A resource records for the private endpoints.

When you resolve the endpoint URL from outside the VNet with the private endpoint, it resolves to the public endpoint of the Cognitive Services resource. When resolved from the VNet hosting the private endpoint, the endpoint URL resolves to the private endpoint's IP address.

This approach enables access to the Cognitive Services resource using the same connection string for clients in the VNet hosting the private endpoints and clients outside the VNet.

If you are using a custom DNS server on your network, clients must be able to resolve the fully qualified domain name (FQDN) for the Cognitive Services resource endpoint to the private endpoint IP address. Configure your DNS server to delegate your private link subdomain to the private DNS zone for the VNet.

TIP

When using a custom or on-premises DNS server, you should configure your DNS server to resolve the Cognitive Services resource name in the 'privatelink' subdomain to the private endpoint IP address. You can do this by delegating the 'privatelink' subdomain to the private DNS zone of the VNet, or configuring the DNS zone on your DNS server and adding the DNS A records.

For more information on configuring your own DNS server to support private endpoints, refer to the following articles:

- Name resolution for resources in Azure virtual networks
- DNS configuration for private endpoints

Pricing

For pricing details, see Azure Private Link pricing.

Next steps

- Explore the various Azure Cognitive Services
- Learn more about Azure Virtual Network Service Endpoints

Authenticate requests to Azure Cognitive Services

7/22/2021 • 8 minutes to read • Edit Online

Each request to an Azure Cognitive Service must include an authentication header. This header passes along a subscription key or access token, which is used to validate your subscription for a service or group of services. In this article, you'll learn about three ways to authenticate a request and the requirements for each.

- Authenticate with a single-service or multi-service subscription key
- Authenticate with a token
- Authenticate with Azure Active Directory (AAD)

Prerequisites

Before you make a request, you need an Azure account and an Azure Cognitive Services subscription. If you already have an account, go ahead and skip to the next section. If you don't have an account, we have a guide to get you set up in minutes: Create a Cognitive Services account for Azure.

You can get your subscription key from the Azure portal after creating your account.

Authentication headers

Let's quickly review the authentication headers available for use with Azure Cognitive Services.

HEADER	DESCRIPTION
Ocp-Apim-Subscription-Key	Use this header to authenticate with a subscription key for a specific service or a multi-service subscription key.
Ocp-Apim-Subscription-Region	This header is only required when using a multi-service subscription key with the Translator service. Use this header to specify the subscription region.
Authorization	Use this header if you are using an authentication token. The steps to perform a token exchange are detailed in the following sections. The value provided follows this format: `Bearer <TOKEN>`.

Authenticate with a single-service subscription key

The first option is to authenticate a request with a subscription key for a specific service, like Translator. The keys are available in the Azure portal for each resource that you've created. To use a subscription key to authenticate a request, it must be passed along as the `Ocp-Apim-Subscription-Key` header.

These sample requests demonstrates how to use the `Ocp-Apim-Subscription-Key` header. Keep in mind, when using this sample you'll need to include a valid subscription key.

This is a sample call to the Bing Web Search API:

```
curl -X GET 'https://api.cognitive.microsoft.com/bing/v7.0/search?q=Welsch%20Pembroke%20Corgis' \
-H 'Ocp-Apim-Subscription-Key: YOUR_SUBSCRIPTION_KEY' | json_pp
```

This is a sample call to the Translator service:

```
curl -X POST 'https://api.cognitive.microsofttranslator.com/translate?api-version=3.0&from=en&to=de' \
-H 'Ocp-Apim-Subscription-Key: YOUR_SUBSCRIPTION_KEY' \
-H 'Content-Type: application/json' \
--data-raw '[{ "text": "How much for the cup of coffee?" }]' | json_pp
```

The following video demonstrates using a Cognitive Services key.

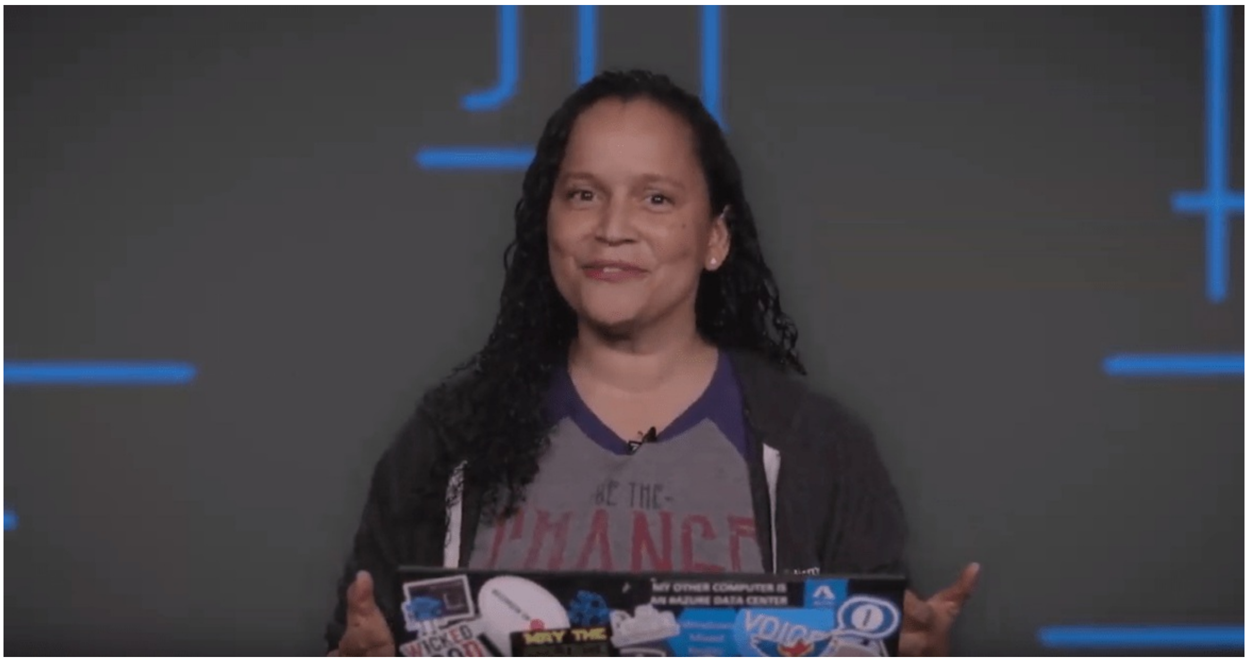
Authenticate with a multi-service subscription key

WARNING

At this time, the multi-service key doesn't support: QnA Maker, Immersive Reader, Personalizer, and Anomaly Detector.

This option also uses a subscription key to authenticate requests. The main difference is that a subscription key is not tied to a specific service, rather, a single key can be used to authenticate requests for multiple Cognitive Services. See Cognitive Services pricing for information about regional availability, supported features, and pricing.

The subscription key is provided in each request as the `Ocp-Apim-Subscription-Key` header.



Supported regions

When using the multi-service subscription key to make a request to `api.cognitive.microsoft.com`, you must include the region in the URL. For example: `westus.api.cognitive.microsoft.com`.

When using multi-service subscription key with the Translator service, you must specify the subscription region with the `Ocp-Apim-Subscription-Region` header.

Multi-service authentication is supported in these regions:

- `australiaeast`
- `brazilsouth`
- `canadacentral`
- `centralindia`
- `eastasia`

- `eastus`
- `japaneast`
- `northeurope`
- `southcentralus`
- `southeastasia`
- `uksouth`
- `westcentralus`
- `westeurope`
- `westus`
- `westus2`
- `francecentral`
- `koreacentral`
- `northcentralus`
- `southafricanorth`
- `uaenorth`
- `switzerlandnorth`

Sample requests

This is a sample call to the Bing Web Search API:

```
curl -X GET 'https://YOUR-REGION.api.cognitive.microsoft.com/bing/v7.0/search?q=Welsch%20Pembroke%20Corgis'
\
-H 'Ocp-Apim-Subscription-Key: YOUR_SUBSCRIPTION_KEY' | json_pp
```

This is a sample call to the Translator service:

```
curl -X POST 'https://api.cognitive.microsofttranslator.com/translate?api-version=3.0&from=en&to=de' \
-H 'Ocp-Apim-Subscription-Key: YOUR_SUBSCRIPTION_KEY' \
-H 'Ocp-Apim-Subscription-Region: YOUR_SUBSCRIPTION_REGION' \
-H 'Content-Type: application/json' \
--data-raw '[{ "text": "How much for the cup of coffee?" }]' | json_pp
```

Authenticate with an authentication token

Some Azure Cognitive Services accept, and in some cases require, an authentication token. Currently, these services support authentication tokens:

- Text Translation API
- Speech Services: Speech-to-text REST API
- Speech Services: Text-to-speech REST API

NOTE

QnA Maker also uses the Authorization header, but requires an endpoint key. For more information, see QnA Maker: Get answer from knowledge base.

WARNING

The services that support authentication tokens may change over time, please check the API reference for a service before using this authentication method.

Both single service and multi-service subscription keys can be exchanged for authentication tokens. Authentication tokens are valid for 10 minutes.

Authentication tokens are included in a request as the `Authorization` header. The token value provided must be preceded by `Bearer`, for example: `Bearer YOUR_AUTH_TOKEN`.

Sample requests

Use this URL to exchange a subscription key for an authentication token: `https://YOUR-REGION.api.cognitive.microsoft.com/sts/v1.0/issueToken`.

```
curl -v -X POST \
"https://YOUR-REGION.api.cognitive.microsoft.com/sts/v1.0/issueToken" \
-H "Content-type: application/x-www-form-urlencoded" \
-H "Content-length: 0" \
-H "Ocp-Apim-Subscription-Key: YOUR_SUBSCRIPTION_KEY"
```

These multi-service regions support token exchange:

- `australiaeast`
- `brazilsouth`
- `canadacentral`
- `centralindia`
- `eastasia`
- `eastus`
- `japaneast`
- `northeurope`
- `southcentralus`
- `southeastasia`
- `uksouth`
- `westcentralus`
- `westeurope`
- `westus`
- `westus2`

After you get an authentication token, you'll need to pass it in each request as the `Authorization` header. This is a sample call to the Translator service:

```
curl -X POST 'https://api.cognitive.microsofttranslator.com/translate?api-version=3.0&from=en&to=de' \
-H 'Authorization: Bearer YOUR_AUTH_TOKEN' \
-H 'Content-Type: application/json' \
--data-raw '[{ "text": "How much for the cup of coffee?" }]' | json_pp
```

Authenticate with Azure Active Directory

IMPORTANT

AAD authentication always needs to be used together with custom subdomain name of your Azure resource. Regional endpoints do not support AAD authentication.

In the previous sections, we showed you how to authenticate against Azure Cognitive Services using a single-service or multi-service subscription key. While these keys provide a quick and easy path to start development, they fall short in more complex scenarios that require Azure role-based access control (Azure RBAC). Let's take a look at what's required to authenticate using Azure Active Directory (AAD).

In the following sections, you'll use either the Azure Cloud Shell environment or the Azure CLI to create a subdomain, assign roles, and obtain a bearer token to call the Azure Cognitive Services. If you get stuck, links are provided in each section with all available options for each command in Azure Cloud Shell/Azure CLI.

Create a resource with a custom subdomain

The first step is to create a custom subdomain. If you want to use an existing Cognitive Services resource which does not have custom subdomain name, follow the instructions in Cognitive Services Custom Subdomains to enable custom subdomain for your resource.

1. Start by opening the Azure Cloud Shell. Then select a subscription:

```
Set-AzContext -SubscriptionName <SubscriptionName>
```

2. Next, create a Cognitive Services resource with a custom subdomain. The subdomain name needs to be globally unique and cannot include special characters, such as: ".", "!", ",".

```
$account = New-AzCognitiveServicesAccount -ResourceGroupName <RESOURCE_GROUP_NAME> -name
<ACCOUNT_NAME> -Type <ACCOUNT_TYPE> -SkuName <SUBSCRIPTION_TYPE> -Location <REGION> -
CustomSubdomainName <UNIQUE_SUBDOMAIN>
```

3. If successful, the **Endpoint** should show the subdomain name unique to your resource.

Assign a role to a service principal

Now that you have a custom subdomain associated with your resource, you're going to need to assign a role to a service principal.

NOTE

Keep in mind that Azure role assignments may take up to five minutes to propagate.

1. First, let's register an AAD application.

```
$SecureStringPassword = ConvertTo-SecureString -String <YOUR_PASSWORD> -AsPlainText -Force

$app = New-AzADApplication -DisplayName <APP_DISPLAY_NAME> -IdentifierUris <APP_URIS> -Password
$SecureStringPassword
```

   You're going to need the **ApplicationId** in the next step.

2. Next, you need to create a service principal for the AAD application.

```
New-AzADServicePrincipal -ApplicationId <APPLICATION_ID>
```

NOTE

If you register an application in the Azure portal, this step is completed for you.

3. The last step is to assign the "Cognitive Services User" role to the service principal (scoped to the resource). By assigning a role, you're granting service principal access to this resource. You can grant the same service principal access to multiple resources in your subscription.

   NOTE

   The ObjectId of the service principal is used, not the ObjectId for the application. The ACCOUNT_ID will be the Azure resource Id of the Cognitive Services account you created. You can find Azure resource Id from "properties" of the resource in Azure portal.

   ```
   New-AzRoleAssignment -ObjectId <SERVICE_PRINCIPAL_OBJECTID> -Scope <ACCOUNT_ID> -RoleDefinitionName
   "Cognitive Services User"
   ```

Sample request

In this sample, a password is used to authenticate the service principal. The token provided is then used to call the Computer Vision API.

1. Get your **TenantId**:

   ```
   $context=Get-AzContext
   $context.Tenant.Id
   ```

2. Get a token:

   NOTE

   If you're using Azure Cloud Shell, the `SecureClientSecret` class isn't available.

   - PowerShell
   - Azure Cloud Shell

   ```
   $authContext = New-Object "Microsoft.IdentityModel.Clients.ActiveDirectory.AuthenticationContext" -
   ArgumentList "https://login.windows.net/<TENANT_ID>"
   $secureSecretObject = New-Object "Microsoft.IdentityModel.Clients.ActiveDirectory.SecureClientSecret"
   -ArgumentList $SecureStringPassword
   $clientCredential = New-Object "Microsoft.IdentityModel.Clients.ActiveDirectory.ClientCredential" -
   ArgumentList $app.ApplicationId, $secureSecretObject
   $token=$authContext.AcquireTokenAsync("https://cognitiveservices.azure.com/",
   $clientCredential).Result
   $token
   ```

3. Call the Computer Vision API:

   ```
   $url = $account.Endpoint+"vision/v1.0/models"
   $result = Invoke-RestMethod -Uri $url  -Method Get -Headers
   @{"Authorization"=$token.CreateAuthorizationHeader()} -Verbose
   $result | ConvertTo-Json
   ```

Alternatively, the service principal can be authenticated with a certificate. Besides service principal, user principal is also supported by having permissions delegated through another AAD application. In this case, instead of passwords or certificates, users would be prompted for two-factor authentication when acquiring token.

Authorize access to managed identities

Cognitive Services support Azure Active Directory (Azure AD) authentication with managed identities for Azure resources. Managed identities for Azure resources can authorize access to Cognitive Services resources using Azure AD credentials from applications running in Azure virtual machines (VMs), function apps, virtual machine scale sets, and other services. By using managed identities for Azure resources together with Azure AD authentication, you can avoid storing credentials with your applications that run in the cloud.

Enable managed identities on a VM

Before you can use managed identities for Azure resources to authorize access to Cognitive Services resources from your VM, you must enable managed identities for Azure resources on the VM. To learn how to enable managed identities for Azure Resources, see:

- Azure portal
- Azure PowerShell
- Azure CLI
- Azure Resource Manager template
- Azure Resource Manager client libraries

For more information about managed identities, see Managed identities for Azure resources.

See also

- What is Cognitive Services?
- Cognitive Services pricing
- Custom subdomains

Migrate to version 3.x of the Text Analytics API

7/8/2021 • 4 minutes to read • Edit Online

If you're using version 2.1 of the Text Analytics API, this article will help you upgrade your application to use version 3.x. Version 3.1 and 3.0 are generally available and introduce new features such as expanded Named Entity Recognition (NER) and model versioning. Version of v3.1 is also available, which adds features such as opinion mining and Personally Identifying Information detection. The models used in v2 or 3.1-preview.x will not receive future updates.

- Sentiment analysis
- NER and entity linking
- Language detection
- Key phrase extraction

TIP
Want to use the latest version of the API in your application? See the sentiment analysis how-to article and quickstart for information on the current version of the API.

Feature changes

Sentiment Analysis in version 2.1 returns sentiment scores between 0 and 1 for each document sent to the API, with scores closer to 1 indicating more positive sentiment. Version 3 instead returns sentiment labels (such as "positive" or "negative") for both the sentences and the document as a whole, and their associated confidence scores.

Steps to migrate

REST API

If your application uses the REST API, update its request endpoint to the v3 endpoint for sentiment analysis. For example: `https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics/v3.1/sentiment`. You will also need to update the application to use the sentiment labels returned in the API's response.

See the reference documentation for examples of the JSON response.

- Version 2.1
- Version 3.0
- Version 3.1

Client libraries

To use the latest version of the Text Analytics v3 client library, you will need to download the latest software package in the `Azure.AI.TextAnalytics` namespace. The **Setting up** section in the quickstart article lists the commands you can use for your preferred language, with example code.

See also

- What is the Text Analytics API
- Language support
- Model versioning

Example user scenarios for the Text Analytics API

3/5/2021 • 2 minutes to read • Edit Online

The Text Analytics API is a cloud-based service that provides advanced natural language processing over text. This article describes some example use cases for integrating the API into your business solutions and processes.

Analyze Survey results

Draw insights from customer and employee survey results by processing the raw text responses using Sentiment Analysis. Aggregate the findings for analysis, follow up, and driving engagements.

Analyze recorded inbound customer calls

Extract insights from customer services calls using Speech-to-Text, Sentiment Analysis, and Key Phrase Extraction. Display the results in Power BI dashboard or a portal to better understand customers, highlight customer service trends, and drive customer engagement. Send API requests as a batch for reporting, or in real-time for intervention. See the sample code on GitHub.

Process and categorize support incidents

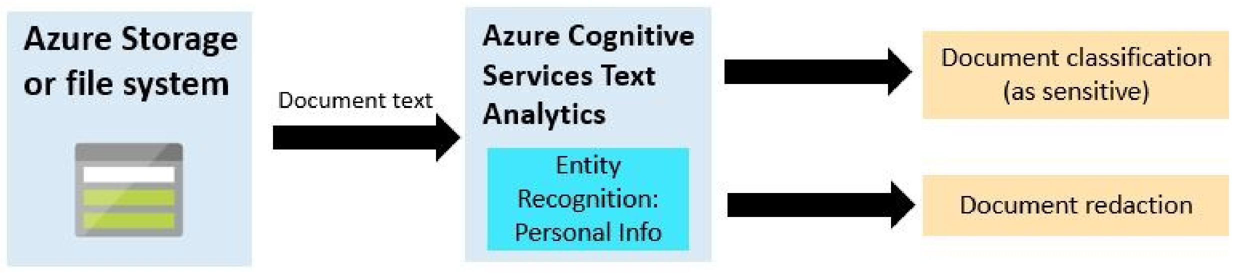
Use Key Phrase Extraction and Entity Recognition to process support requests submitted in unstructured textual format. Use the extracted phrases and entities to categorize the requests for resource planning and trend analysis.

Monitor your product's social media feeds

Monitor user product feedback on your product's twitter or Facebook page. Use the data to analyze customer sentiment toward new products launches, extract key phrases about features and feature requests, or address customer complaints as they happen. See the example Microsoft Power Automate template.

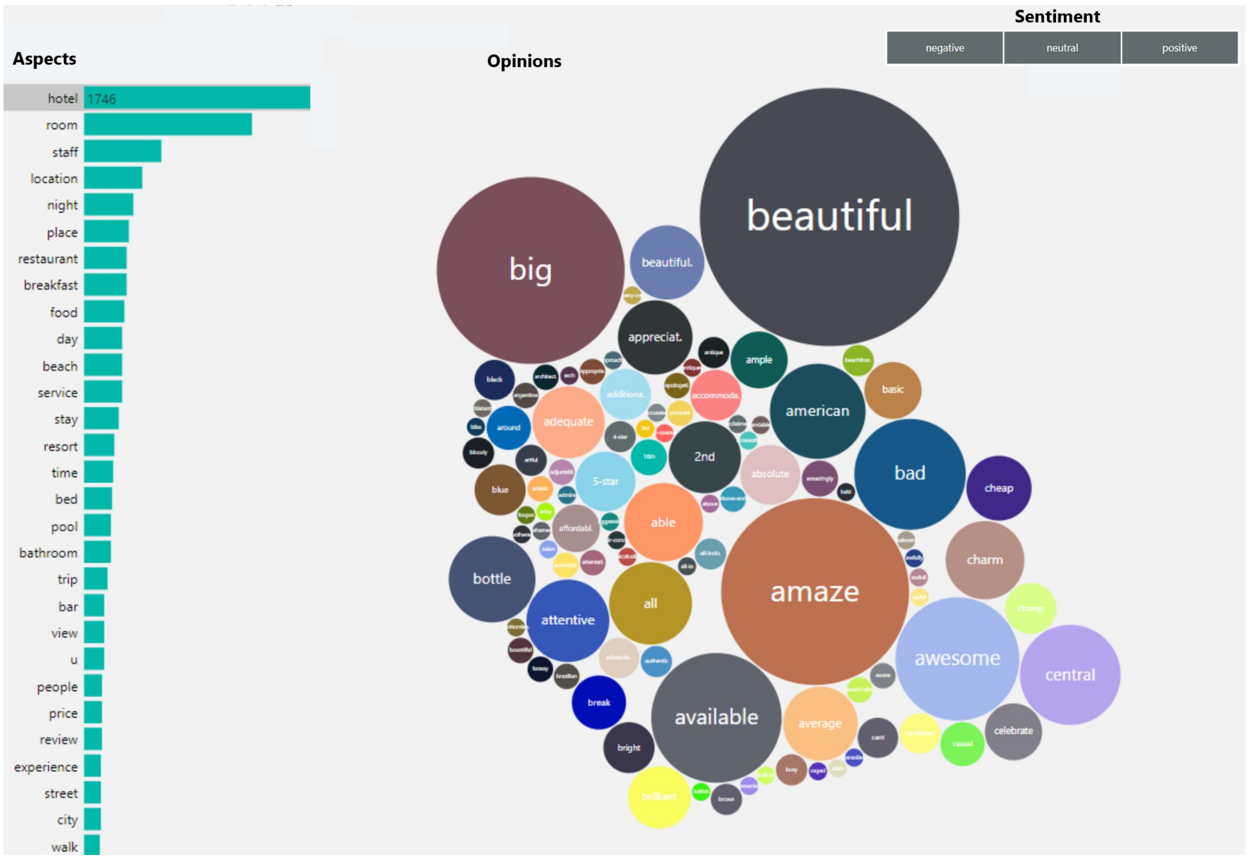
Classify and redact documents that have sensitive information

Use Named Entity Recognition to identify personal and sensitive information in documents. Use the data to classify documents or redact them so they can be shared safely.


Azure Storage or file system
Document text
Azure Cognitive Services Text Analytics
Entity Recognition: Personal Info
Document classification (as sensitive)
Document redaction

Perform opinion mining

Group opinions related to specific aspects of a product or service in surveys, customer feedback, or wherever text holds an opinion about an aspect. Use it to help guide product launches and improvements, marketing efforts, or highlight how your product or service is performing.



Next steps

- What is the Text Analytics API?
- Send a request to the Text Analytics API using the client library

Supported entity categories in the Text Analytics API v3

7/8/2021 • 33 minutes to read • Edit Online

Use this article to find the entity categories that can be returned by Named Entity Recognition (NER). NER runs a predictive model to identify and categorize named entities from an input document.

NER v3.1 is also available, which includes the ability to detect personal (`PII`) and health (`PHI`) information. Additionally, click on the **Health** tab to see a list of supported categories in Text Analytics for health.

You can find a list of types returned by version 2.1 in the migration guide

Entity categories

- General
- PII
- Health

The NER feature for Text Analytics returns the following general (non identifying) entity categories. for example when sending requests to the `/entities/recognition/general` endpoint.

CATEGORY	DESCRIPTION
Person	Names of people.
PersonType	Job types or roles held by a person.
Location	Natural and human-made landmarks, structures, geographical features, and geopolitical entities
Organization	Companies, political groups, musical bands, sport clubs, government bodies, and public organizations.
Event	Historical, social, and naturally occurring events.
Product	Physical objects of various categories.
Skill	A capability, skill, or expertise.
Address	Full mailing addresses.
Phone number	Phone numbers.
Email	Email addresses.
URL	URLs to websites.
IP	Network IP addresses.

CATEGORY	DESCRIPTION
DateTime	Dates and times of day.
Quantity	Numerical measurements and units.

Category: Person

This category contains the following entity:

Entity

Person

Details

Names of people.

Supported document languages

`ar`, `cs`, `da`, `nl`, `en`, `fi`, `fr`, `de`, `he`,
`hu`, `it`, `ja`, `ko`, `no`, `pl`, `pt-br`, `pt` - `pt`, `ru`, `es`, `sv`, `tr`

Category: PersonType

This category contains the following entity:

Entity

PersonType

Details

Job types or roles held by a person

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Category: Location

This category contains the following entity:

Entity

Location

Details

Natural and human-made landmarks, structures, geographical features, and geopolitical entities.

Supported document languages

`ar`, `cs`, `da`, `nl`, `en`, `fi`, `fr`, `de`, `he`, `hu`, `it`, `ja`, `ko`, `no`, `pl`, `pt-br`, `pt-pt`, `ru`, `es`, `sv`, `tr`

Subcategories

The entity in this category can have the following subcategories.

Entity subcategory

Geopolitical Entity (GPE)

Details

Cities, countries/regions, states.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Structural

Manmade structures.

`en`

Geographical

Geographic and natural features such as rivers, oceans, and deserts.

`en`

Category: Organization

This category contains the following entity:

Entity

Organization

Details

Companies, political groups, musical bands, sport clubs, government bodies, and public organizations. Nationalities and religions are not included in this entity type.

Supported document languages

`ar`, `cs`, `da`, `nl`, `en`, `fi`, `fr`, `de`, `he`, `hu`, `it`, `ja`, `ko`, `no`, `pl`, `pt-br`, `pt-pt`, `ru`, `es`, `sv`, `tr`

Subcategories

The entity in this category can have the following subcategories.

Entity subcategory

Medical

Details

Medical companies and groups.

Supported document languages

`en`

Stock exchange

Stock exchange groups.

`en`

Sports

Sports-related organizations.

`en`

Category: Event

This category contains the following entity:

Entity

Event

Details

Historical, social, and naturally occurring events.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt` and `pt-br`

Subcategories

The entity in this category can have the following subcategories.

Entity subcategory

Cultural

Details

Cultural events and holidays.

Supported document languages

`en`

Natural

Naturally occurring events.

`en`

Sports

Sporting events.

`en`

Category: Product

This category contains the following entity:

Entity

Product

Details

Physical objects of various categories.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Subcategories

The entity in this category can have the following subcategories.

Entity subcategory

Computing products

Details

Computing products.

Supported document languages

`en`

Category: Skill

This category contains the following entity:

Entity

Skill

Details

A capability, skill, or expertise.

Supported document languages

`en` , `es`, `fr`, `de`, `it`, `pt-pt`, `pt-br`

Category: Address

This category contains the following entity:

Entity

Address

Details

Full mailing address.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Category: PhoneNumber

This category contains the following entity:

Entity

PhoneNumber

Details

Phone numbers (US and EU phone numbers only).

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt` `pt-br`

Category: Email

This category contains the following entity:

Entity

Email

Details

Email addresses.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Category: URL

This category contains the following entity:

Entity

URL

Details

URLs to websites.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Category: IP

This category contains the following entity:

Entity

IP

Details

network IP addresses.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Category: DateTime

This category contains the following entities:

Entity

DateTime

Details

Dates and times of day.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Entities in this category can have the following subcategories

Subcategories

The entity in this category can have the following subcategories.

Entity subcategory

Date

Details

Calender dates.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Time

Times of day.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

DateRange

Date ranges.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

TimeRange

Time ranges.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Duration

Durations.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Set

Set, repeated times.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Category: Quantity

This category contains the following entities:

Entity

Quantity

Details

Numbers and numeric quantities.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `ja`, `ko`, `pt-pt`, `pt-br`

Subcategories

The entity in this category can have the following subcategories.

Entity subcategory

Number

Details

Numbers.

Supported document languages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Percentage

Percentages

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Ordinal numbers

Ordinal numbers.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Age

Ages.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Currency

Currencies

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Dimensions

Dimensions and measurements.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Temperature

Temperatures.

`en`, `es`, `fr`, `de`, `it`, `zh-hans`, `pt-pt`, `pt-br`

Next steps

- How to use Named Entity Recognition in Text Analytics

Text offsets in the Text Analytics API output

8/2/2021 • 2 minutes to read • Edit Online

Multilingual and emoji support has led to Unicode encodings that use more than one code point to represent a single displayed character, called a grapheme. For example, emojis like 🌷 and 👍 may use several characters to compose the shape with additional characters for visual attributes, such as skin tone. Similarly, the Hindi word `■■■■■■■■` is encoded as five letters and three combining marks.

Because of the different lengths of possible multilingual and emoji encodings, the Text Analytics API may return offsets in the response.

Offsets in the API response

Whenever offsets are returned in the API response, such as Named Entity Recognition or Sentiment Analysis, remember:

- Elements in the response may be specific to the endpoint that was called.
- HTTP POST/GET payloads are encoded in UTF-8, which may or may not be the default character encoding on your client-side compiler or operating system.
- Offsets refer to grapheme counts based on the Unicode 8.0.0 standard, not character counts.

Extracting substrings from text with offsets

Offsets can cause problems when using character-based substring methods, for example the .NET substring() method. One problem is that an offset may cause a substring method to end in the middle of a multi-character grapheme encoding instead of the end.

In .NET, consider using the StringInfo class, which enables you to work with a string as a series of textual elements, rather than individual character objects. You can also look for grapheme splitter libraries in your preferred software environment.

The Text Analytics API returns these textual elements as well, for convenience.

Offsets in API version 3.1

In version 3.1 of the API, all Text Analytics API endpoints that return an offset will support the `stringIndexType` parameter. This parameter adjusts the `offset` and `length` attributes in the API output to match the requested string iteration scheme. Currently, we support three types:

1. `textElement_v8` (default): iterates over graphemes as defined by the Unicode 8.0.0 standard
2. `unicodeCodePoint` : iterates over Unicode Code Points, the default scheme for Python 3
3. `utf16CodeUnit` : iterates over UTF-16 Code Units, the default scheme for JavaScript, Java, and .NET

If the `stringIndexType` requested matches the programming environment of choice, substring extraction can be done using standard substring or slice methods.

See also

- Text Analytics overview
- Sentiment analysis
- Entity recognition

- Detect language
- Language recognition

Data and rate limits for the Text Analytics API

3/5/2021 • 2 minutes to read • Edit Online

Use this article to find the limits for the size, and rates that you can send data to Text Analytics API. Note that pricing is not affected by the data limits or rate limits. Pricing is subject to your Text Analytics resource's pricing details.

Data limits

NOTE

- If you need to analyze larger documents than the limit allows, you can break the text into smaller chunks of text before sending them to the API.
- A document is a single string of text characters.

LIMIT	VALUE
Maximum size of a single document	5,120 characters as measured by StringInfo.LengthInTextElements. Also applies to Text Analytics for health.
Maximum size of a single document (`/analyze` endpoint)	125K characters as measured by StringInfo.LengthInTextElements. Does not apply to Text Analytics for health.
Maximum size of entire request	1 MB. Also applies to Text Analytics for health.

If a document exceeds the character limit, the API will behave differently depending on the endpoint you're using:

- `/analyze` endpoint:
  - The API will reject the entire request and return a `400 bad request` error if any document within it exceeds the maximum size.
- All other endpoints:
  - The API won't process a document that exceeds the maximum size, and will return an invalid document error for it. If an API request has multiple documents, the API will continue processing them if they are within the character limit.

The maximum number of documents you can send in a single request will depend on the API version and feature you're using, which is described in the table below.

- Version 3
- Version 2

The following limits are for the current v3 API. Exceeding the limits below will generate an HTTP 400 error code.

FEATURE	MAX DOCUMENTS PER REQUEST
Language Detection	1000

FEATURE	MAX DOCUMENTS PER REQUEST
Sentiment Analysis	10
Opinion Mining	10
Key Phrase Extraction	10
Named Entity Recognition	5
Entity Linking	5
Text Analytics for health	10 for the web-based API, 1000 for the container.
Analyze endpoint	25 for all operations.

Rate limits

Your rate limit will vary with your pricing tier. These limits are the same for both versions of the API. These rate limits don't apply to the Text Analytics for health container, which does not have a set rate limit.

TIER	REQUESTS PER SECOND	REQUESTS PER MINUTE
S / Multi-service	1000	1000
S0 / F0	100	300
S1	200	300
S2	300	300
S3	500	500
S4	1000	1000

Requests rates are measured for each Text Analytics feature separately. You can send the maximum number of requests for your pricing tier to each feature, at the same time. For example, if you're in the `S` tier and send 1000 requests at once, you wouldn't be able to send another request for 59 seconds.

See also

- What is the Text Analytics API
- Pricing details

Model versioning in the Text Analytics API

6/22/2021 • 2 minutes to read • Edit Online

Version 3 of the Text Analytics API lets you choose the model version that gets used on your data. Use the optional `model-version` parameter to select the version of the model in your API requests. For example: `<resource-url>/text/analytics/v3.0/sentiment?model-version=2020-04-01`. If this parameter isn't specified the API will default to the latest stable version.

Available versions

Use the table below to find which model versions are supported by each hosted endpoint.

ENDPOINT	SUPPORTED VERSIONS	LATEST VERSION
`/sentiment`	`2019-10-01`, `2020-04-01`	`2020-04-01`
`/languages`	`2019-10-01`, `2020-07-01`, `2020-09-01`, `2021-01-05`	`2021-01-05`
`/entities/linking`	`2019-10-01`, `2020-02-01`	`2020-02-01`
`/entities/recognition/general`	`2019-10-01`, `2020-02-01`, `2020-04-01`, `2021-01-15`, `2021-06-01`	`2021-06-01`
`/entities/recognition/pii`	`2019-10-01`, `2020-02-01`, `2020-04-01`, `2020-07-01`, `2021-01-15`	`2021-01-15`
`/entities/health`	`2021-05-15`	`2021-05-15`
`/keyphrases`	`2019-10-01`, `2020-07-01`, `2021-06-01`	`2021-06-01`

You can find details about the updates for these models in What's new.

Text Analytics for health

The Text Analytics for Health container uses separate model versioning than the above API endpoints. Please note that only one model version is available per container image.

ENDPOINT	CONTAINER IMAGE TAG	MODEL VERSION
`/entities/health`	`3.0.016230002-onprem-amd64` or latest	`2021-05-15`
`/entities/health`	`3.0.015370001-onprem-amd64`	`2021-03-01`
`/entities/health`	`1.1.013530001-amd64-preview`	`2020-09-03`

ENDPOINT	CONTAINER IMAGE TAG	MODEL VERSION
`/entities/health`	`1.1.013150001-amd64-preview`	`2020-07-24`
`/domains/health`	`1.1.012640001-amd64-preview`	`2020-05-08`
`/domains/health`	`1.1.012420001-amd64-preview`	`2020-05-08`
`/domains/health`	`1.1.012070001-amd64-preview`	`2020-04-16`

Next steps

- Text Analytics overview
- Sentiment analysis
- Entity recognition

Tutorial: Integrate Power BI with the Text Analytics Cognitive Service

7/8/2021 • 12 minutes to read • Edit Online

Microsoft Power BI Desktop is a free application that lets you connect to, transform, and visualize your data. The Text Analytics service, part of Microsoft Azure Cognitive Services, provides natural language processing. Given raw unstructured text, it can extract the most important phrases, analyze sentiment, and identify well-known entities such as brands. Together, these tools can help you quickly see what your customers are talking about and how they feel about it.

In this tutorial, you'll learn how to:

- Use Power BI Desktop to import and transform data
- Create a custom function in Power BI Desktop
- Integrate Power BI Desktop with the Text Analytics Key Phrases API
- Use the Text Analytics Key Phrases API to extract the most important phrases from customer feedback
- Create a word cloud from customer feedback

Prerequisites

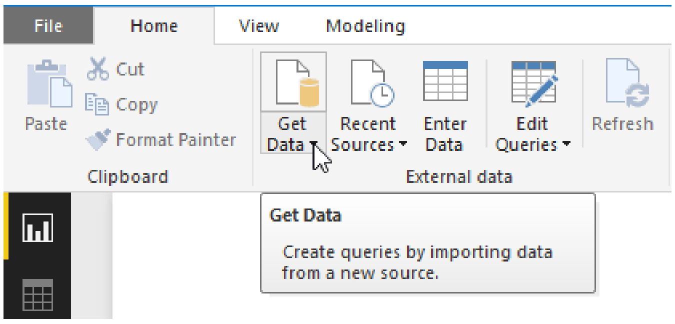
- Microsoft Power BI Desktop. Download at no charge.
- A Microsoft Azure account. Create a free account or sign in.
- A Cognitive Services API account with the Text Analytics API. If you don't have one, you can sign up and use the free tier for 5,000 transactions/month (see pricing details to complete this tutorial.
- The Text Analytics access key that was generated for you during sign-up.
- Customer comments. You can use our example data or your own data. This tutorial assumes you're using our example data.

Load customer data

To get started, open Power BI Desktop and load the comma-separated value (CSV) file `FabrikamComments.csv` that you downloaded in Prerequisites. This file represents a day's worth of hypothetical activity in a fictional small company's support forum.

> **NOTE**
> Power BI can use data from a wide variety of web-based sources, such as SQL databases. See the Power Query documentation for more information.

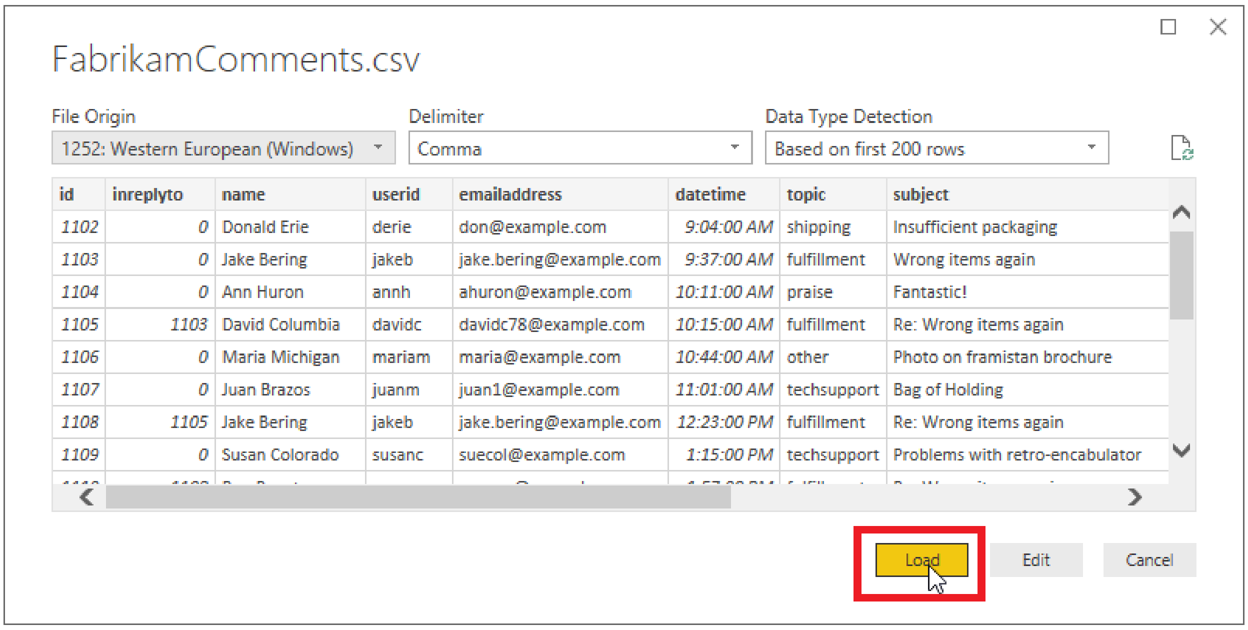
In the main Power BI Desktop window, select the **Home** ribbon. In the **External data** group of the ribbon, open the **Get Data** drop-down menu and select **Text/CSV**.



Get Data

Create queries by importing data from a new source.

The Open dialog appears. Navigate to your Downloads folder, or to the folder where you downloaded the `FabrikamComments.csv` file. Click `FabrikamComments.csv`, then the **Open** button. The CSV import dialog appears.



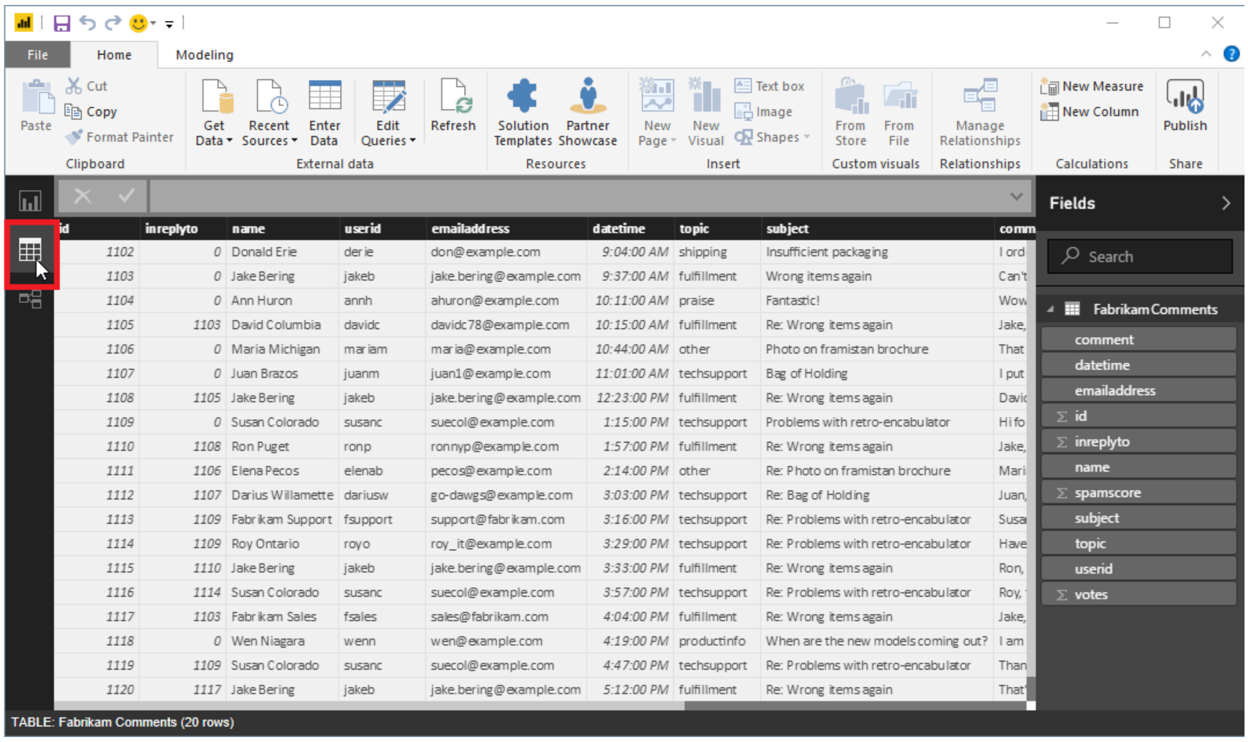
FabrikamComments.csv

File Origin: 1252: Western European (Windows)
Delimiter: Comma
Data Type Detection: Based on first 200 rows

id	inreplyto	name	userid	emailaddress	datetime	topic	subject
1102	0	Donald Erie	derie	don@example.com	9:04:00 AM	shipping	Insufficient packaging
1103	0	Jake Bering	jakeb	jake.bering@example.com	9:37:00 AM	fulfillment	Wrong items again
1104	0	Ann Huron	annh	ahuron@example.com	10:11:00 AM	praise	Fantastic!
1105	1103	David Columbia	davidc	davidc78@example.com	10:15:00 AM	fulfillment	Re: Wrong items again
1106	0	Maria Michigan	mariam	maria@example.com	10:44:00 AM	other	Photo on framistan brochure
1107	0	Juan Brazos	juanm	juan1@example.com	11:01:00 AM	techsupport	Bag of Holding
1108	1105	Jake Bering	jakeb	jake.bering@example.com	12:23:00 PM	fulfillment	Re: Wrong items again
1109	0	Susan Colorado	susanc	suecol@example.com	1:15:00 PM	techsupport	Problems with retro-encabulator

The CSV import dialog lets you verify that Power BI Desktop has correctly detected the character set, delimiter, header rows, and column types. This information is all correct, so click **Load**.

To see the loaded data, click the **Data View** button on the left edge of the Power BI workspace. A table opens that contains the data, like in Microsoft Excel.



id	inreplyto	name	userid	emailaddress	datetime	topic	subject	comm
1102	0	Donald Erie	derie	don@example.com	9:04:00 AM	shipping	Insufficient packaging	I ord
1103	0	Jake Bering	jakeb	jake.bering@example.com	9:37:00 AM	fulfillment	Wrong items again	Can't
1104	0	Ann Huron	annh	ahuron@example.com	10:11:00 AM	praise	Fantastic!	Wow
1105	1103	David Columbia	davidc	davidc78@example.com	10:15:00 AM	fulfillment	Re: Wrong items again	Jake,
1106	0	Maria Michigan	mariam	maria@example.com	10:44:00 AM	other	Photo on framistan brochure	That
1107	0	Juan Brazos	juanm	juan1@example.com	11:01:00 AM	techsupport	Bag of Holding	I put
1108	1105	Jake Bering	jakeb	jake.bering@example.com	12:23:00 PM	fulfillment	Re: Wrong items again	David
1109	0	Susan Colorado	susanc	suecol@example.com	1:15:00 PM	techsupport	Problems with retro-encabulator	Hi fo
1110	1108	Ron Puget	ronp	ronnyp@example.com	1:57:00 PM	fulfillment	Re: Wrong items again	Jake,
1111	1106	Elena Pecos	elenab	pecos@example.com	2:14:00 PM	other	Re: Photo on framistan brochure	Mari
1112	1107	Darius Willamette	dariusw	go-dawgs@example.com	3:03:00 PM	techsupport	Re: Bag of Holding	Juan,
1113	1109	Fabrikam Support	fsupport	support@fabrikam.com	3:16:00 PM	techsupport	Re: Problems with retro-encabulator	Susa
1114	1109	Roy Ontario	royo	roy_it@example.com	3:29:00 PM	techsupport	Re: Problems with retro-encabulator	Have
1115	1110	Jake Bering	jakeb	jake.bering@example.com	3:33:00 PM	fulfillment	Re: Wrong items again	Ron,
1116	1114	Susan Colorado	susanc	suecol@example.com	3:57:00 PM	techsupport	Re: Problems with retro-encabulator	Roy,
1117	1103	Fabrikam Sales	fsales	sales@fabrikam.com	4:04:00 PM	fulfillment	Re: Wrong items again	Jake,
1118	0	Wen Niagara	wenn	wen@example.com	4:19:00 PM	productinfo	When are the new models coming out?	I am
1119	1109	Susan Colorado	susanc	suecol@example.com	4:47:00 PM	techsupport	Re: Problems with retro-encabulator	Than
1120	1117	Jake Bering	jakeb	jake.bering@example.com	5:12:00 PM	fulfillment	Re: Wrong items again	That'

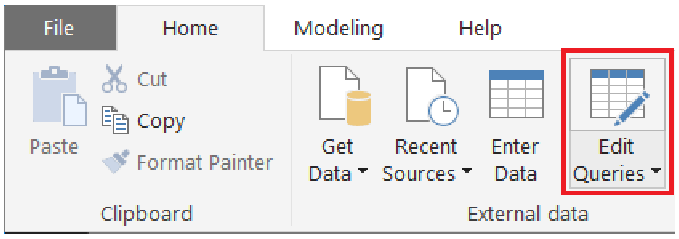
TABLE: Fabrikam Comments (20 rows)

Prepare the data

You may need to transform your data in Power BI Desktop before it's ready to be processed by the Key Phrases API of the Text Analytics service.

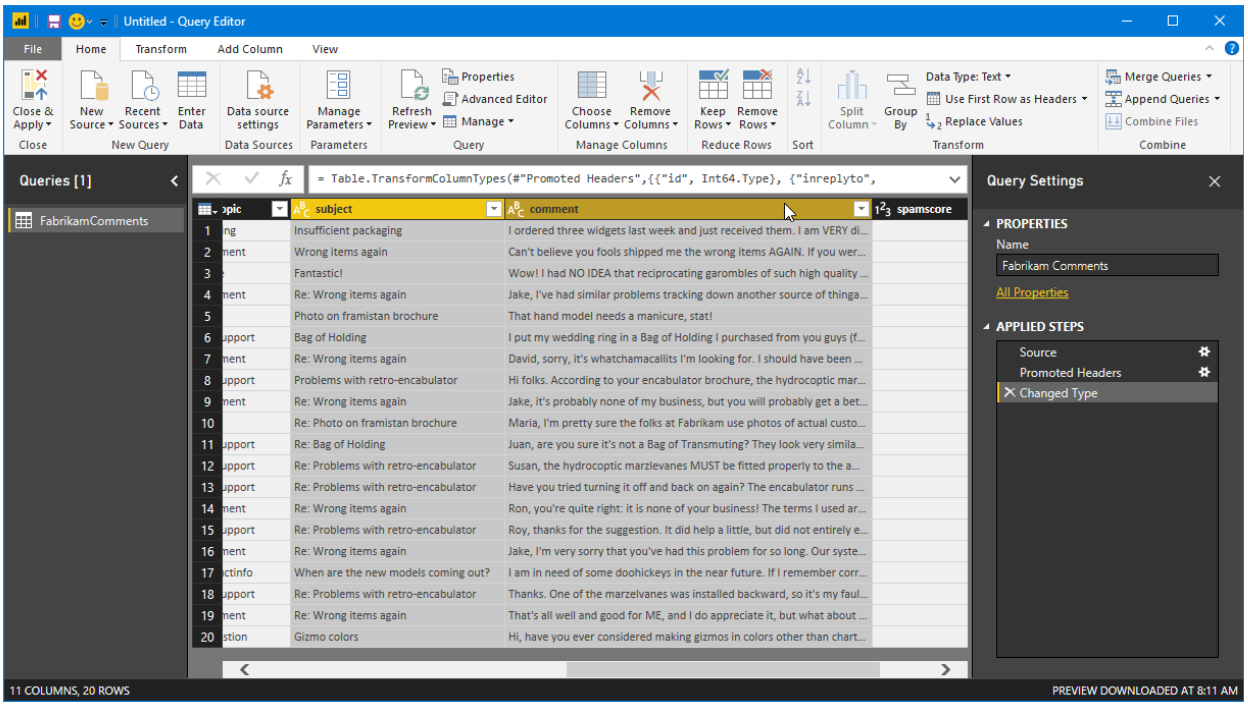
The sample data contains a `subject` column and a `comment` column. With the Merge Columns function in Power BI Desktop, you can extract key phrases from the data in both these columns, rather than just the `comment` column.

In Power BI Desktop, select the **Home** ribbon. In the **External data** group, click **Edit Queries**.



Select `FabrikamComments` in the **Queries** list at the left side of the window if it isn't already selected.

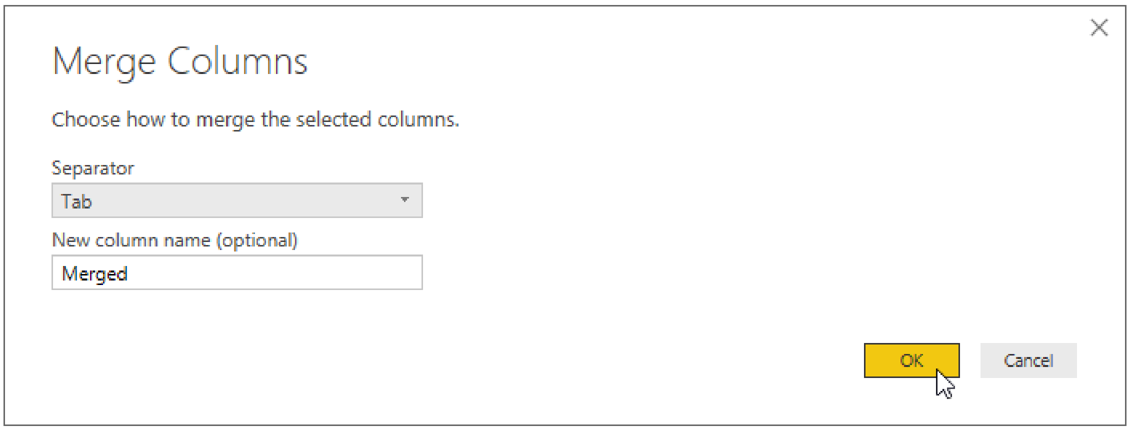
Now select both the `subject` and `comment` columns in the table. You may need to scroll horizontally to see these columns. First click the `subject` column header, then hold down the Control key and click the `comment` column header.



```
= Table.TransformColumnTypes(#"Promoted Headers",{{"id", Int64.Type}, {"inreplyto",
```

	›pic	subject	comment	spamscore
1	ng	Insufficient packaging	I ordered three widgets last week and just received them. I am VERY di...	
2	ment	Wrong items again	Can't believe you fools shipped me the wrong items AGAIN. If you wer...	
3		Fantastic!	Wow! I had NO IDEA that reciprocating garombles of such high quality ...	
4	ment	Re: Wrong items again	Jake, I've had similar problems tracking down another source of thinga...	
5		Photo on framistan brochure	That hand model needs a manicure, stat!	
6	upport	Bag of Holding	I put my wedding ring in a Bag of Holding I purchased from you guys (f...	
7	ment	Re: Wrong items again	David, sorry, it's whatchamacallits I'm looking for. I should have been ...	
8	upport	Problems with retro-encabulator	Hi folks. According to your encabulator brochure, the hydrocoptic mar...	
9	ment	Re: Wrong items again	Jake, it's probably none of my business, but you will probably get a bet...	
10		Re: Photo on framistan brochure	Maria, I'm pretty sure the folks at Fabrikam use photos of actual custo...	
11	upport	Re: Bag of Holding	Juan, are you sure it's not a Bag of Transmuting? They look very simila...	
12	upport	Re: Problems with retro-encabulator	Susan, the hydrocoptic marzlevanes MUST be fitted properly to the a...	
13	upport	Re: Problems with retro-encabulator	Have you tried turning it off and back on again? The encabulator runs ...	
14	ment	Re: Wrong items again	Ron, you're quite right: it is none of your business! The terms I used ar...	
15	upport	Re: Problems with retro-encabulator	Roy, thanks for the suggestion. It did help a little, but did not entirely e...	
16	ment	Re: Wrong items again	Jake, I'm very sorry that you've had this problem for so long. Our syste...	
17	ctinfo	When are the new models coming out?	I am in need of some doohickeys in the near future. If I remember corr...	
18	upport	Re: Problems with retro-encabulator	Thanks. One of the marzelvanes was installed backward, so it's my faul...	
19	ment	Re: Wrong items again	That's all well and good for ME, and I do appreciate it, but what about ...	
20	stion	Gizmo colors	Hi, have you ever considered making gizmos in colors other than chart...	

Select the **Transform** ribbon. In the **Text Columns** group of the ribbon, click **Merge Columns**. The Merge Columns dialog appears.


Merge Columns

Choose how to merge the selected columns.

Separator: Tab

New column name (optional): Merged

In the Merge Columns dialog, choose `Tab` as the separator, then click **OK**.

You might also consider filtering out blank messages using the Remove Empty filter, or removing unprintable characters using the Clean transformation. If your data contains a column like the `spamscore` column in the sample file, you can skip "spam" comments using a Number Filter.

Understand the API

The Key Phrases API of the Text Analytics service can process up to a thousand text documents per HTTP request. Power BI prefers to deal with records one at a time, so in this tutorial your calls to the API will include only a single document each. The Key Phrases API requires the following fields for each document being processed.

FIELD	DESCRIPTION
`id`	A unique identifier for this document within the request. The response also contains this field. That way, if you process more than one document, you can easily associate the extracted key phrases with the document they came from. In this tutorial, because you're processing only one document per request, you can hard-code the value of `id` to be the same for each request.
`text`	The text to be processed. The value of this field comes from the `Merged` column you created in the previous section, which contains the combined subject line and comment text. The Key Phrases API requires this data be no longer than about 5,120 characters.
`language`	The code for the natural language the document is written in. All the messages in the sample data are in English, so you can hard-code the value `en` for this field.

Create a custom function

Now you're ready to create the custom function that will integrate Power BI and Text Analytics. The function receives the text to be processed as a parameter. It converts data to and from the required JSON format and makes the HTTP request to the Key Phrases API. The function then parses the response from the API and returns a string that contains a comma-separated list of the extracted key phrases.

NOTE

Power BI Desktop custom functions are written in the Power Query M formula language, or just "M" for short. M is a functional programming language based on F#. You don't need to be a programmer to finish this tutorial, though; the required code is included below.

In Power BI Desktop, make sure you're still in the Query Editor window. If you aren't, select the **Home** ribbon, and in the **External data** group, click **Edit Queries**.

Now, in the **Home** ribbon, in the **New Query** group, open the **New Source** drop-down menu and select **Blank Query**.

A new query, initially named `Query1`, appears in the Queries list. Double-click this entry and name it `KeyPhrases`.

Now, in the **Home** ribbon, in the **Query** group, click **Advanced Editor** to open the Advanced Editor window. Delete the code that's already in that window and paste in the following code.

NOTE

Replace the example endpoint below (containing `<your-custom-subdomain>`) with the endpoint generated for your Text Analytics resource. You can find this endpoint by signing in to the Azure portal, selecting your Text Analytics subscription, and selecting `Quick start`.

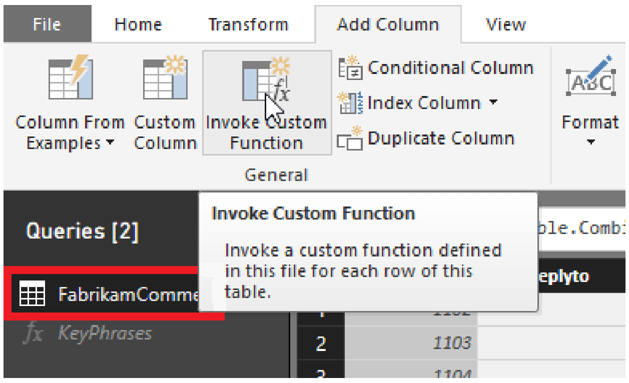
```
// Returns key phrases from the text in a comma-separated list
(text) => let
    apikey      = "YOUR_API_KEY_HERE",
    endpoint    = "https://<your-custom-subdomain>.cognitiveservices.azure.com/text/analytics" &
"/v3.0/keyPhrases",
    jsontext    = Text.FromBinary(Json.FromValue(Text.Start(Text.Trim(text), 5000))),
    jsonbody    = "{ documents: [ { language: ""en"", id: ""0"", text: " & jsontext & " } ] }",
    bytesbody   = Text.ToBinary(jsonbody),
    headers     = [#"Ocp-Apim-Subscription-Key" = apikey],
    bytesresp   = Web.Contents(endpoint, [Headers=headers, Content=bytesbody]),
    jsonresp    = Json.Document(bytesresp),
    keyphrases  = Text.Lower(Text.Combine(jsonresp[documents]{0}[keyPhrases], ", "))
in  keyphrases
```

Replace `YOUR_API_KEY_HERE` with your Text Analytics access key. You can also find this key by signing in to the Azure portal, selecting your Text Analytics subscription, and selecting the Overview page. Be sure to leave the quotation marks before and after the key. Then click **Done.**

Use the custom function

Now you can use the custom function to extract the key phrases from each of the customer comments and store them in a new column in the table.

In Power BI Desktop, in the Query Editor window, switch back to the `FabrikamComments` query. Select the **Add Column** ribbon. In the **General** group, click **Invoke Custom Function**.

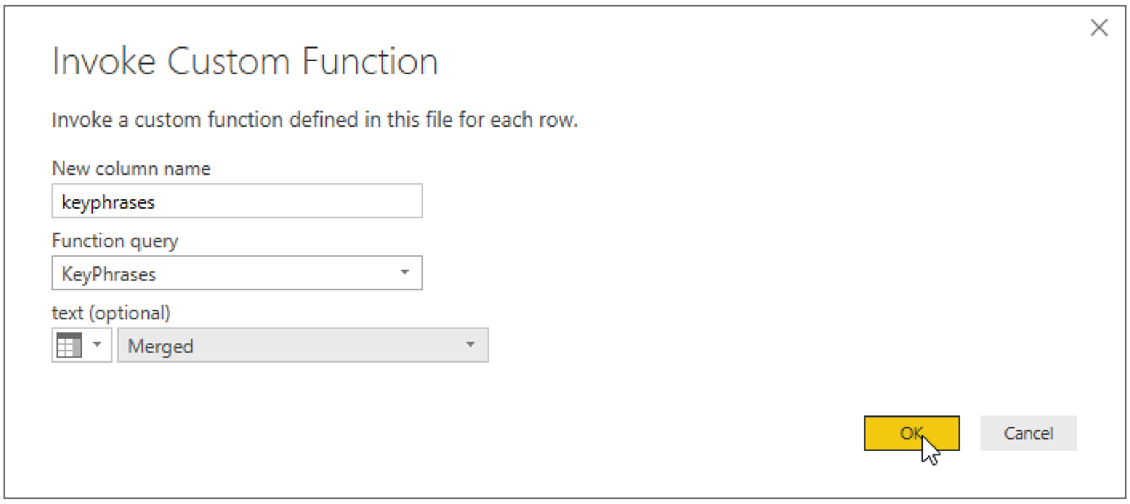


Invoke Custom Function

Invoke a custom function defined in this file for each row of this table.

The Invoke Custom Function dialog appears. In **New column name**, enter `keyphrases`. In **Function query**, select the custom function you created, `KeyPhrases`.

A new field appears in the dialog, **text (optional)**. This field is asking which column we want to use to provide values for the `text` parameter of the Key Phrases API. (Remember that you already hard-coded the values for the `language` and `id` parameters.) Select `Merged` (the column you created previously by merging the subject and message fields) from the drop-down menu.



Invoke Custom Function

Invoke a custom function defined in this file for each row.

New column name: keyphrases

Function query: KeyPhrases

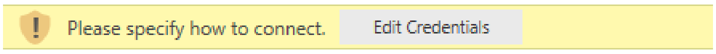
text (optional): Merged

Finally, click **OK**.

If everything is ready, Power BI calls your custom function once for each row in the table. It sends the queries to the Key Phrases API and adds a new column to the table to store the results. But before that happens, you may need to specify authentication and privacy settings.

Authentication and privacy

After you close the Invoke Custom Function dialog, a banner may appear asking you to specify how to connect to the Key Phrases API.

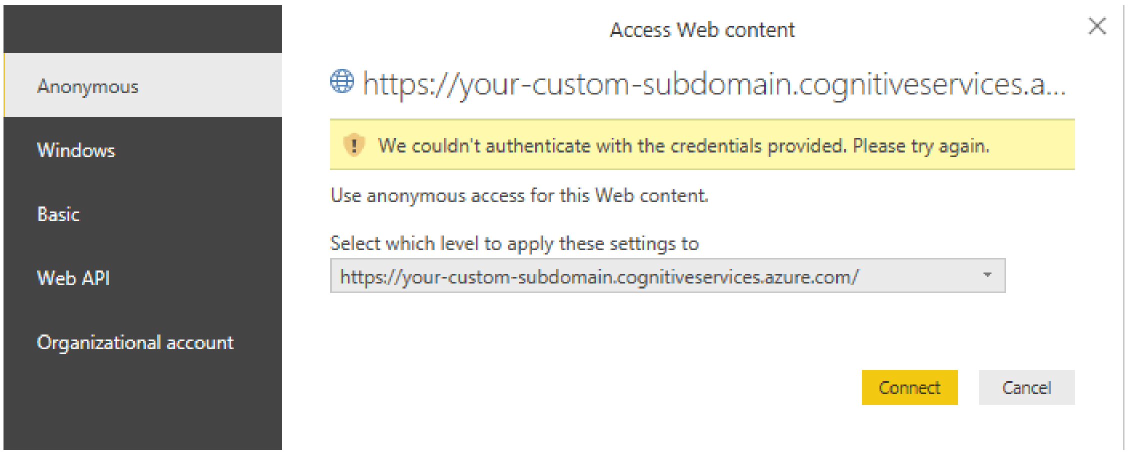


Please specify how to connect.

Click **Edit Credentials**, make sure `Anonymous` is selected in the dialog, then click **Connect**.

NOTE

You select `Anonymous` because the Text Analytics service authenticates you using your access key, so Power BI does not need to provide credentials for the HTTP request itself.



Access Web content

https://your-custom-subdomain.cognitiveservices.a...

We couldn't authenticate with the credentials provided. Please try again.

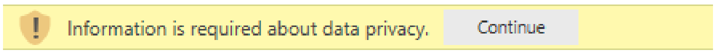
Use anonymous access for this Web content.

Select which level to apply these settings to

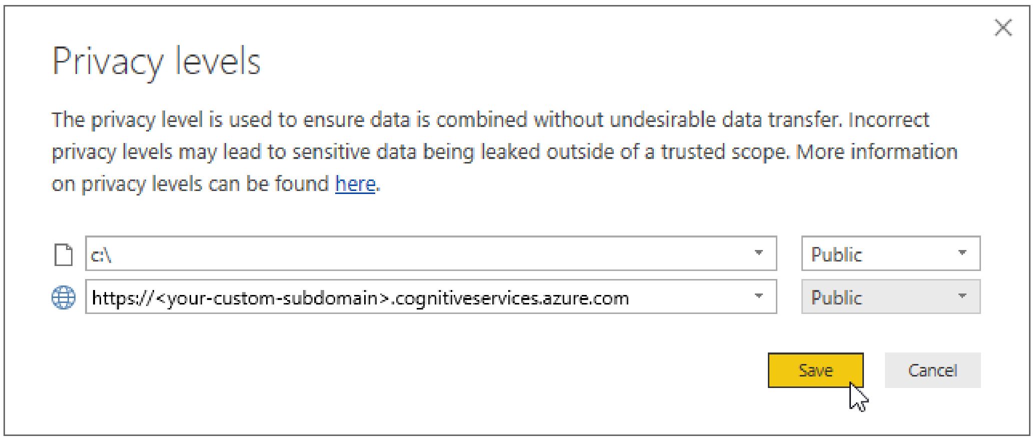
https://your-custom-subdomain.cognitiveservices.azure.com/

If you see the Edit Credentials banner even after choosing anonymous access, you may have forgotten to paste your Text Analytics access key into the code in the `KeyPhrases` custom function.

Next, a banner may appear asking you to provide information about your data sources' privacy.


Information is required about data privacy.

Click **Continue** and choose `Public` for each of the data sources in the dialog. Then click **Save**.


Privacy levels

The privacy level is used to ensure data is combined without undesirable data transfer. Incorrect privacy levels may lead to sensitive data being leaked outside of a trusted scope. More information on privacy levels can be found here.

c:\	Public
https://<your-custom-subdomain>.cognitiveservices.azure.com	Public

Create the word cloud

Once you have dealt with any banners that appear, click **Close & Apply** in the Home ribbon to close the Query Editor.

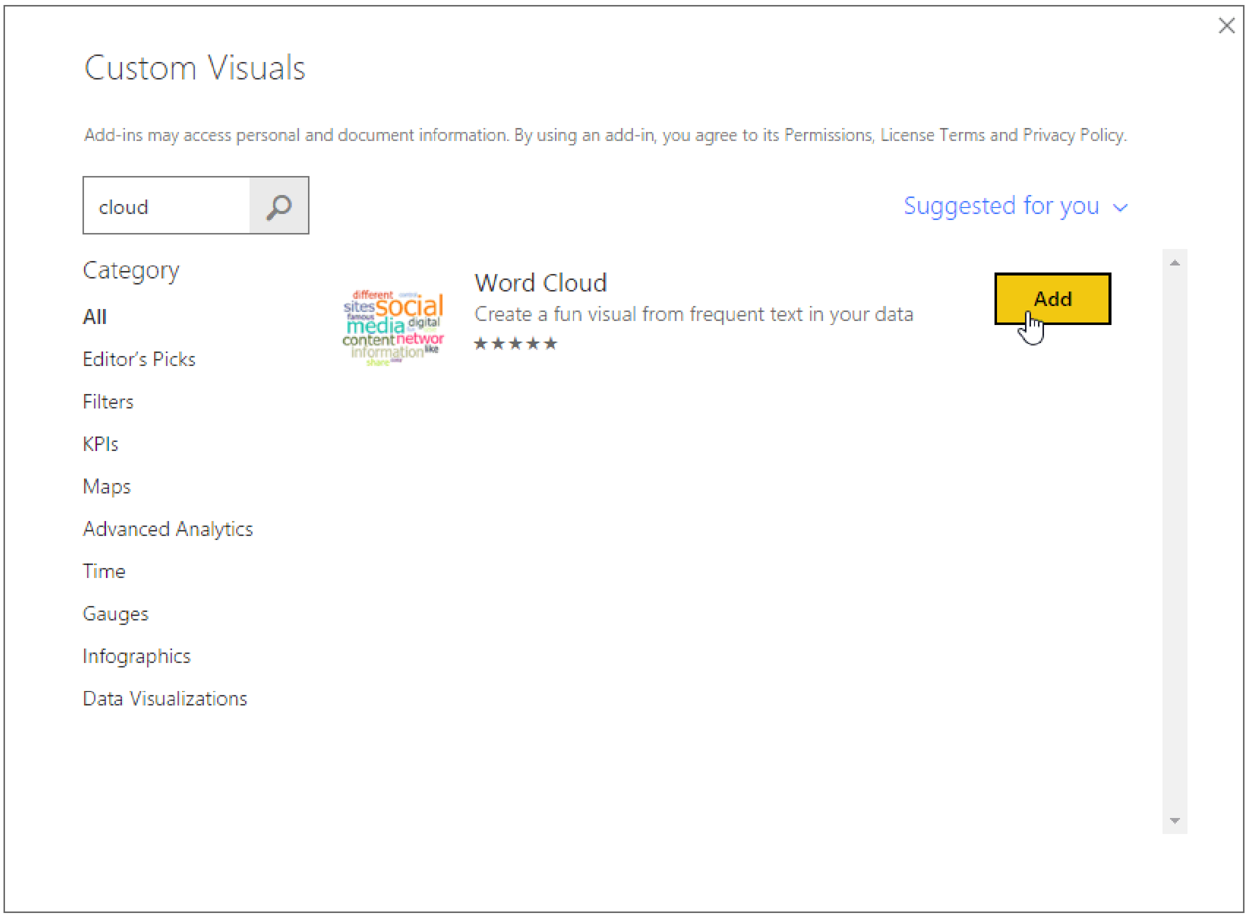
Power BI Desktop takes a moment to make the necessary HTTP requests. For each row in the table, the new `keyphrases` column contains the key phrases detected in the text by the Key Phrases API.

Now you'll use this column to generate a word cloud. To get started, click the **Report** button in the main Power BI Desktop window, to the left of the workspace.

NOTE

Why use extracted key phrases to generate a word cloud, rather than the full text of every comment? The key phrases provide us with the *important* words from our customer comments, not just the *most common* words. Also, word sizing in the resulting cloud isn't skewed by the frequent use of a word in a relatively small number of comments.

If you don't already have the Word Cloud custom visual installed, install it. In the Visualizations panel to the right of the workspace, click the three dots (...) and choose **Import From Market**. If the word "cloud" is not among the displayed visualization tools in the list, you can search for "cloud" and click the **Add** button next the Word Cloud visual. Power BI installs the Word Cloud visual and lets you know that it installed successfully.


Custom Visuals

Add-ins may access personal and document information. By using an add-in, you agree to its Permissions, License Terms and Privacy Policy.

cloud

Suggested for you

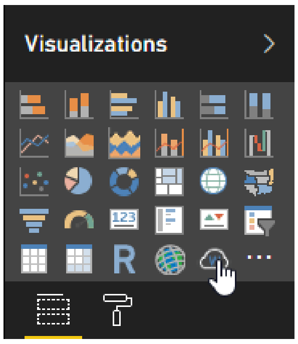
Category

All
Editor's Picks
Filters
KPIs
Maps
Advanced Analytics
Time
Gauges
Infographics
Data Visualizations

Word Cloud
Create a fun visual from frequent text in your data
★★★★★

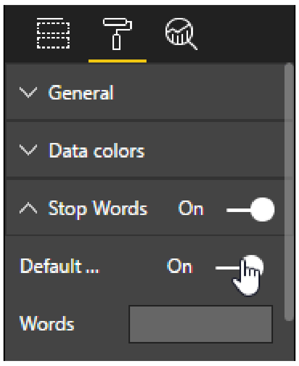
Add

First, click the Word Cloud icon in the Visualizations panel.

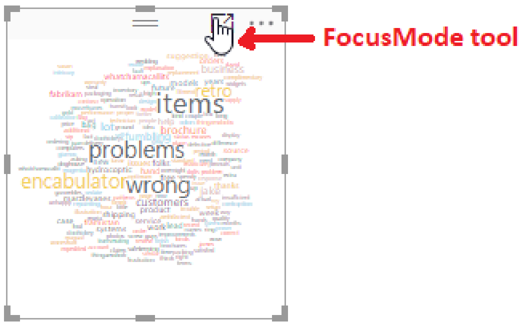


A new report appears in the workspace. Drag the `keyphrases` field from the Fields panel to the Category field in the Visualizations panel. The word cloud appears inside the report.

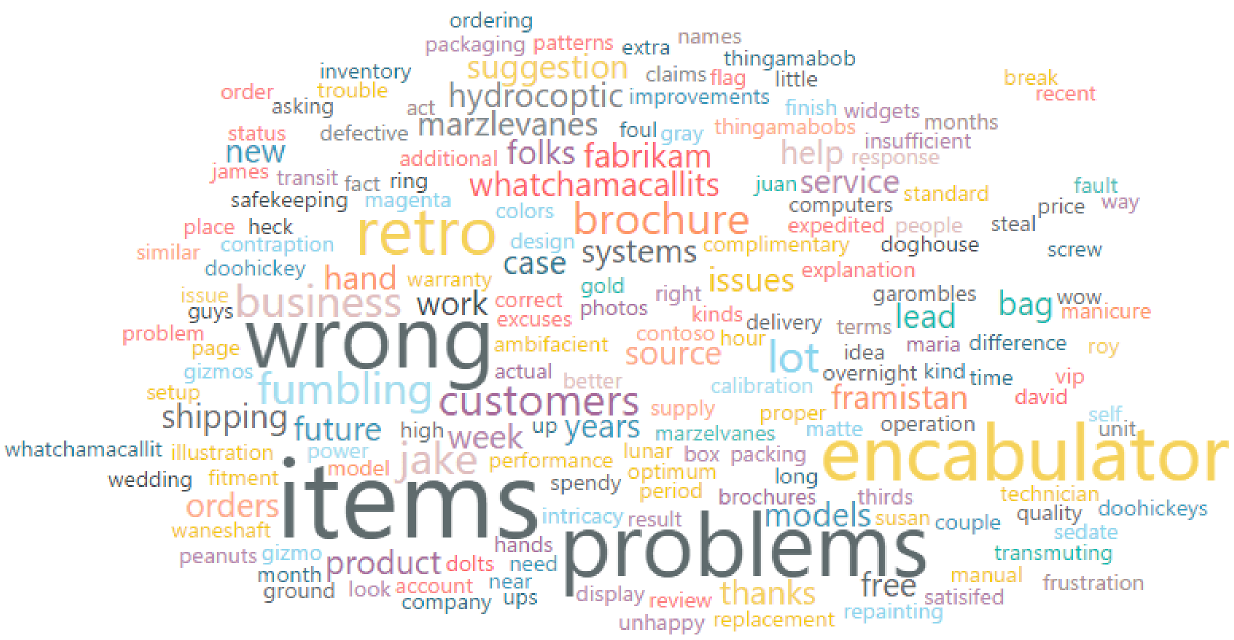
Now switch to the Format page of the Visualizations panel. In the Stop Words category, turn on **Default Stop Words** to eliminate short, common words like "of" from the cloud. However, because we're visualizing key phrases, they might not contain stop words.


General
Data colors
Stop Words On
Default ... On
Words

Down a little further in this panel, turn off **Rotate Text** and **Title**.



Click the Focus Mode tool in the report to get a better look at our word cloud. The tool expands the word cloud to fill the entire workspace, as shown below.



More Text Analytics services

The Text Analytics service, one of the Cognitive Services offered by Microsoft Azure, also provides sentiment analysis and language detection. The language detection in particular is useful if your customer feedback isn't all in English.

Both of these other APIs are similar to the Key Phrases API. That means you can integrate them with Power BI Desktop using custom functions that are nearly identical to the one you created in this tutorial. Just create a blank query and paste the appropriate code below into the Advanced Editor, as you did earlier. (Don't forget your access key!) Then, as before, use the function to add a new column to the table.

The Sentiment Analysis function below returns a label indicating how positive the sentiment expressed in the text is.

```
// Returns the sentiment label of the text, for example, positive, negative or mixed.
(text) => let
    apikey = "YOUR_API_KEY_HERE",
    endpoint = "<your-custom-subdomain>.cognitiveservices.azure.com" & "/text/analytics/v3.1/sentiment",
    jsontext = Text.FromBinary(Json.FromValue(Text.Start(Text.Trim(text), 5000))),
    jsonbody = "{ documents: [ { language: ""en"", id: ""0"", text: " & jsontext & " } ] }",
    bytesbody = Text.ToBinary(jsonbody),
    headers = [#"Ocp-Apim-Subscription-Key" = apikey],
    bytesresp = Web.Contents(endpoint, [Headers=headers, Content=bytesbody]),
    jsonresp = Json.Document(bytesresp),
    sentiment   = jsonresp[documents]{0}[sentiment]
    in sentiment
```

Here are two versions of a Language Detection function. The first returns the ISO language code (for example, `en` for English), while the second returns the "friendly" name (for example, `English`). You may notice that only the last line of the body differs between the two versions.

```
// Returns the two-letter language code (for example, 'en' for English) of the text
(text) => let
    apikey      = "YOUR_API_KEY_HERE",
    endpoint    = "https://<your-custom-subdomain>.cognitiveservices.azure.com" &
"/text/analytics/v3.1/languages",
    jsontext    = Text.FromBinary(Json.FromValue(Text.Start(Text.Trim(text), 5000))),
    jsonbody    = "{ documents: [ { id: ""0"", text: " & jsontext & " } ] }",
    bytesbody   = Text.ToBinary(jsonbody),
    headers     = [#"Ocp-Apim-Subscription-Key" = apikey],
    bytesresp   = Web.Contents(endpoint, [Headers=headers, Content=bytesbody]),
    jsonresp    = Json.Document(bytesresp),
    language    = jsonresp [documents]{0}[detectedLanguage] [iso6391Name] in language
```

```
// Returns the name (for example, 'English') of the language in which the text is written
(text) => let
    apikey      = "YOUR_API_KEY_HERE",
    endpoint    = "https://<your-custom-subdomain>.cognitiveservices.azure.com" &
"/text/analytics/v3.1/languages",
    jsontext    = Text.FromBinary(Json.FromValue(Text.Start(Text.Trim(text), 5000))),
    jsonbody    = "{ documents: [ { id: ""0"", text: " & jsontext & " } ] }",
    bytesbody   = Text.ToBinary(jsonbody),
    headers     = [#"Ocp-Apim-Subscription-Key" = apikey],
    bytesresp   = Web.Contents(endpoint, [Headers=headers, Content=bytesbody]),
    jsonresp    = Json.Document(bytesresp),
    language    jsonresp [documents]{0}[detectedLanguage] [iso6391Name] in language
```

Finally, here's a variant of the Key Phrases function already presented that returns the phrases as a list object, rather than as a single string of comma-separated phrases.

NOTE

Returning a single string simplified our word cloud example. A list, on the other hand, is a more flexible format for working with the returned phrases in Power BI. You can manipulate list objects in Power BI Desktop using the Structured Column group in the Query Editor's Transform ribbon.

```
// Returns key phrases from the text as a list object
(text) => let
    apikey      = "YOUR_API_KEY_HERE",
    endpoint    = "https://<your-custom-subdomain>.cognitiveservices.azure.com" &
"/text/analytics/v3.1/keyPhrases",
    jsontext    = Text.FromBinary(Json.FromValue(Text.Start(Text.Trim(text), 5000))),
    jsonbody    = "{ documents: [ { language: ""en"", id: ""0"", text: " & jsontext & " } ] }",
    bytesbody   = Text.ToBinary(jsonbody),
    headers     = [#"Ocp-Apim-Subscription-Key" = apikey],
    bytesresp   = Web.Contents(endpoint, [Headers=headers, Content=bytesbody]),
    jsonresp    = Json.Document(bytesresp),
    keyphrases  = jsonresp[documents]{0}[keyPhrases]
in  keyphrases
```

Next steps

Learn more about the Text Analytics service, the Power Query M formula language, or Power BI.

Text Analytics API reference

Power Query M reference

Power BI documentation

Tutorial: Build a Flask app with Azure Cognitive Services

3/24/2021 • 24 minutes to read • Edit Online

In this tutorial, you'll build a Flask web app that uses Azure Cognitive Services to translate text, analyze sentiment, and synthesize translated text into speech. Our focus is on the Python code and Flask routes that enable our application, however, we will help you out with the HTML and JavaScript that pulls the app together. If you run into any issues let us know using the feedback button below.

Here's what this tutorial covers:

- Get Azure subscription keys
- Set up your development environment and install dependencies
- Create a Flask app
- Use the Translator to translate text
- Use Text Analytics to analyze positive/negative sentiment of input text and translations
- Use Speech Services to convert translated text into synthesized speech
- Run your Flask app locally

TIP
If you'd like to skip ahead and see all the code at once, the entire sample, along with build instructions are available on GitHub.

What is Flask?

Flask is a microframework for creating web applications. This means Flask provides you with tools, libraries, and technologies that allow you to build a web application. This web application can be some web pages, a blog, a wiki or go as substantive as a web-based calendar application or a commercial website.

For those of you who want to deep dive after this tutorial here are a few helpful links:

- Flask documentation
- Flask for Dummies - A Beginner's Guide to Flask

Prerequisites

Let's review the software and subscription keys that you'll need for this tutorial.

- Python 3.6 or later
- Git tools
- An IDE or text editor, such as Visual Studio Code or Atom
- Chrome or Firefox
- A **Translator** subscription key (you can likely use the **global** location.)
- A **Text Analytics** subscription key in the **West US** region.
- A **Speech Services** subscription key in the **West US** region.

Create an account and subscribe to resources

As previously mentioned, you're going to need three subscription keys for this tutorial. This means that you need to create a resource within your Azure account for:

- Translator
- Text Analytics
- Speech Services

Use Create a Cognitive Services Account in the Azure portal for step-by-step instructions to create resources.

> **IMPORTANT**
> For this tutorial, please create your resources in the West US region. If using a different region, you'll need to adjust the base URL in each of your Python files.

Set up your dev environment

Before you build your Flask web app, you'll need to create a working directory for your project and install a few Python packages.

Create a working directory

1. Open command line (Windows) or terminal (macOS/Linux). Then, create a working directory and sub directories for your project:

   ```
   mkdir -p flask-cog-services/static/scripts && mkdir flask-cog-services/templates
   ```

2. Change to your project's working directory:

   ```
   cd flask-cog-services
   ```

Create and activate your virtual environment with `virtualenv`

Let's create a virtual environment for our Flask app using `virtualenv`. Using a virtual environment ensures that you have a clean environment to work from.

1. In your working directory, run this command to create a virtual environment: **macOS/Linux:**

   ```
   virtualenv venv --python=python3
   ```

   We've explicitly declared that the virtual environment should use Python 3. This ensures that users with multiple Python installations are using the correct version.

   Windows CMD / Windows Bash:

   ```
   virtualenv venv
   ```

   To keep things simple, we're naming your virtual environment venv.

2. The commands to activate your virtual environment will vary depending on your platform/shell:

PLATFORM	SHELL	COMMAND
macOS/Linux	bash/zsh	`source venv/bin/activate`

PLATFORM	SHELL	COMMAND
Windows	bash	`source venv/Scripts/activate`
	Command Line	`venv\Scripts\activate.bat`
	PowerShell	`venv\Scripts\Activate.ps1`

After running this command, your command line or terminal session should be prefaced with `venv`.

3. You can deactivate the session at any time by typing this into the command line or terminal: `deactivate`.

NOTE

Python has extensive documentation for creating and managing virtual environments, see virtualenv.

Install requests

Requests is a popular module that is used to send HTTP 1.1 requests. There's no need to manually add query strings to your URLs, or to form-encode your POST data.

1. To install requests, run:

```
pip install requests
```

NOTE

If you'd like to learn more about requests, see Requests: HTTP for Humans.

Install and configure Flask

Next we need to install Flask. Flask handles the routing for our web app, and allows us to make server-to-server calls that hide our subscription keys from the end user.

1. To install Flask, run:

```
pip install Flask
```

Let's make sure Flask was installed. Run:

```
flask --version
```

The version should be printed to terminal. Anything else means something went wrong.

2. To run the Flask app, you can either use the flask command or Python's -m switch with Flask. Before you can do that you need to tell your terminal which app to work with by exporting the `FLASK_APP` environment variable:

macOS/Linux:

```
export FLASK_APP=app.py
```

Windows:

```
set FLASK_APP=app.py
```

Create your Flask app

In this section, you're going to create a barebones Flask app that returns an HTML file when users hit the root of your app. Don't spend too much time trying to pick apart the code, we'll come back to update this file later.

What is a Flask route?

Let's take a minute to talk about "routes". Routing is used to bind a URL to a specific function. Flask uses route decorators to register functions to specific URLs. For example, when a user navigates to the root (`/`) of our web app, `index.html` is rendered.

```
@app.route('/')
def index():
    return render_template('index.html')
```

Let's take a look at one more example to hammer this home.

```
@app.route('/about')
def about():
    return render_template('about.html')
```

This code ensures that when a user navigates to `http://your-web-app.com/about` that the `about.html` file is rendered.

While these samples illustrate how to render html pages for a user, routes can also be used to call APIs when a button is pressed, or take any number of actions without having to navigate away from the homepage. You'll see this in action when you create routes for translation, sentiment, and speech synthesis.

Get started

1. Open the project in your IDE, then create a file named `app.py` in the root of your working directory. Next, copy this code into `app.py` and save:

   ```
   from flask import Flask, render_template, url_for, jsonify, request

   app = Flask(__name__)
   app.config['JSON_AS_ASCII'] = False

   @app.route('/')
   def index():
       return render_template('index.html')
   ```

   This code block tells the app to display `index.html` whenever a user navigates to the root of your web app (`/`).

2. Next, let's create the front-end for our web app. Create a file named `index.html` in the `templates` directory. Then copy this code into `templates/index.html`.

```
<!doctype html>
<html lang="en">
  <head>
    <!-- Required metadata tags -->
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
    <meta name="description" content="Translate and analyze text with Azure Cognitive Services.">
    <!-- Bootstrap CSS -->
    <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css" integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm" crossorigin="anonymous">
    <title>Translate and analyze text with Azure Cognitive Services</title>
  </head>
  <body>
    <div class="container">
      <h1>Translate, synthesize, and analyze text with Azure</h1>
      <p>This simple web app uses Azure for text translation, text-to-speech conversion, and
sentiment analysis of input text and translations. Learn more about <a
href="https://docs.microsoft.com/azure/cognitive-services/">Azure Cognitive Services</a>.
     </p>
     <!-- HTML provided in the following sections goes here. -->

     <!-- End -->
    </div>

    <!-- Required Javascript for this tutorial -->
    <script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCkRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN" crossorigin="anonymous"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.3.1/jquery.min.js"></script>
    <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js"
integrity="sha384-ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
    <script src="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/js/bootstrap.min.js"
integrity="sha384-JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYl"
crossorigin="anonymous"></script>
    <script type = "text/javascript" src ="static/scripts/main.js"></script>
  </body>
</html>
```

3. Let's test the Flask app. From the terminal, run:

```
flask run
```

4. Open a browser and navigate to the URL provided. You should see your single page app. Press **Ctrl** + **C** to kill the app.

Translate text

Now that you have an idea of how a simple Flask app works, let's:

- Write some Python to call the Translator and return a response
- Create a Flask route to call your Python code
- Update the HTML with an area for text input and translation, a language selector, and translate button
- Write JavaScript that allows users to interact with your Flask app from the HTML

Call the Translator

The first thing you need to do is write a function to call the Translator. This function will take two arguments: `text_input` and `language_output`. This function is called whenever a user presses the translate button in your app. The text area in the HTML is sent as the `text_input`, and the language selection value in the HTML is sent as `language_output`.

1. Let's start by creating a file called `translate.py` in the root of your working directory.
2. Next, add this code to `translate.py`. This function takes two arguments: `text_input` and `language_output`.

```
import os, requests, uuid, json

# Don't forget to replace with your Cog Services subscription key!
# If you prefer to use environment variables, see Extra Credit for more info.
subscription_key = 'YOUR_TRANSLATOR_TEXT_SUBSCRIPTION_KEY'
location = 'YOUR_TRANSLATOR_RESOURCE_LOCATION'
# Don't forget to replace with your Cog Services location!
# Our Flask route will supply two arguments: text_input and language_output.
# When the translate text button is pressed in our Flask app, the Ajax request
# will grab these values from our web app, and use them in the request.
# See main.js for Ajax calls.
def get_translation(text_input, language_output):
    base_url = 'https://api.cognitive.microsofttranslator.com'
    path = '/translate?api-version=3.0'
    params = '&to=' + language_output
    constructed_url = base_url + path + params

    headers = {
        'Ocp-Apim-Subscription-Key': subscription_key,
        'Ocp-Apim-Subscription-Region': location,
        'Content-type': 'application/json',
        'X-ClientTraceId': str(uuid.uuid4())
    }

    # You can pass more than one object in body.
    body = [{
        'text' : text_input
    }]
    response = requests.post(constructed_url, headers=headers, json=body)
    return response.json()
```

3. Add your Translator subscription key and save.

Add a route to `app.py`

Next, you'll need to create a route in your Flask app that calls `translate.py`. This route will be called each time a user presses the translate button in your app.

For this app, your route is going to accept `POST` requests. This is because the function expects the text to translate and an output language for the translation.

Flask provides helper functions to help you parse and manage each request. In the code provided, `get_json()` returns the data from the `POST` request as JSON. Then using `data['text']` and `data['to']`, the text and output language values are passed to `get_translation()` function available from `translate.py`. The last step is to return the response as JSON, since you'll need to display this data in your web app.

In the following sections, you'll repeat this process as you create routes for sentiment analysis and speech synthesis.

1. Open `app.py` and locate the import statement at the top of `app.py` and add the following line:

```
import translate
```

   Now our Flask app can use the method available via `translate.py`.

2. Copy this code to the end of `app.py` and save:

```
@app.route('/translate-text', methods=['POST'])
def translate_text():
    data = request.get_json()
    text_input = data['text']
    translation_output = data['to']
    response = translate.get_translation(text_input, translation_output)
    return jsonify(response)
```

Update `index.html`

Now that you have a function to translate text, and a route in your Flask app to call it, the next step is to start building the HTML for your app. The HTML below does a few things:

- Provides a text area where users can input text to translate.
- Includes a language selector.
- Includes HTML elements to render the detected language and confidence scores returned during translation.
- Provides a read-only text area where the translation output is displayed.
- Includes placeholders for sentiment analysis and speech synthesis code that you'll add to this file later in the tutorial.

Let's update `index.html`.

1. Open `index.html` and locate these code comments:

```
<!-- HTML provided in the following sections goes here. -->

<!-- End -->
```

2. Replace the code comments with this HTML block:

```
<div class="row">
  <div class="col">
    <form>
      <!-- Enter text to translate. -->
      <div class="form-group">
        <label for="text-to-translate"><strong>Enter the text you'd like to translate:</strong>
</label>
        <textarea class="form-control" id="text-to-translate" rows="5"></textarea>
      </div>
      <!-- Select output language. -->
      <div class="form-group">
        <label for="select-language"><strong>Translate to:</strong></label>
        <select class="form-control" id="select-language">
          <option value="ar">Arabic</option>
          <option value="ca">Catalan</option>
          <option value="zh-Hans">Chinese (Simplified)</option>
          <option value="zh-Hant">Chinese (Traditional)</option>
          <option value="hr">Croatian</option>
          <option value="en">English</option>
          <option value="fr">French</option>
          <option value="de">German</option>
          <option value="el">Greek</option>
          <option value="he">Hebrew</option>
          <option value="hi">Hindi</option>
          <option value="it">Italian</option>
          <option value="ja">Japanese</option>
          <option value="ko">Korean</option>
          <option value="pt">Portuguese</option>
          <option value="ru">Russian</option>
          <option value="es">Spanish</option>
          <option value="th">Thai</option>
          <option value="tr">Turkish</option>
```

```
            <option value="tr">Turkish</option>
            <option value="vi">Vietnamese</option>
          </select>
        </div>
        <button type="submit" class="btn btn-primary mb-2" id="translate">Translate text</button></br>
        <div id="detected-language" style="display: none">
          <strong>Detected language:</strong> <span id="detected-language-result"></span><br />
          <strong>Detection confidence:</strong> <span id="confidence"></span><br /><br />
        </div>

        <!-- Start sentiment code-->

        <!-- End sentiment code -->

      </form>
    </div>
    <div class="col">
      <!-- Translated text returned by the Translate API is rendered here. -->
      <form>
        <div class="form-group" id="translator-text-response">
          <label for="translation-result"><strong>Translated text:</strong></label>
          <textarea readonly class="form-control" id="translation-result" rows="5"></textarea>
        </div>

        <!-- Start voice font selection code -->

        <!-- End voice font selection code -->

      </form>

      <!-- Add Speech Synthesis button and audio element -->

      <!-- End Speech Synthesis button -->

    </div>
  </div>
```

The next step is to write some JavaScript. This is the bridge between your HTML and Flask route.

Create `main.js`

The `main.js` file is the bridge between your HTML and Flask route. Your app will use a combination of jQuery, Ajax, and XMLHttpRequest to render content, and make `POST` requests to your Flask routes.

In the code below, content from the HTML is used to construct a request to your Flask route. Specifically, the contents of the text area and the language selector are assigned to variables, and then passed along in the request to `translate-text`.

The code then iterates through the response, and updates the HTML with the translation, detected language, and confidence score.

1. From your IDE, create a file named `main.js` in the `static/scripts` directory.
2. Copy this code into `static/scripts/main.js`:

```
//Initiate jQuery on load.
$(function() {
  //Translate text with flask route
  $("#translate").on("click", function(e) {
    e.preventDefault();
    var translateVal = document.getElementById("text-to-translate").value;
    var languageVal = document.getElementById("select-language").value;
    var translateRequest = { 'text': translateVal, 'to': languageVal }

    if (translateVal !== "") {
      $.ajax({
        url: '/translate-text',
        method: 'POST',
        headers: {
            'Content-Type':'application/json'
        },
        dataType: 'json',
        data: JSON.stringify(translateRequest),
        success: function(data) {
          for (var i = 0; i < data.length; i++) {
            document.getElementById("translation-result").textContent = data[i].translations[0].text;
            document.getElementById("detected-language-result").textContent =
data[i].detectedLanguage.language;
            if (document.getElementById("detected-language-result").textContent !== ""){
              document.getElementById("detected-language").style.display = "block";
            }
            document.getElementById("confidence").textContent = data[i].detectedLanguage.score;
          }
        }
      });
    };
  });
  // In the following sections, you'll add code for sentiment analysis and
  // speech synthesis here.
})
```

Test translation

Let's test translation in the app.

```
flask run
```

Navigate to the provided server address. Type text into the input area, select a language, and press translate. You should get a translation. If it doesn't work, make sure that you've added your subscription key.

TIP

If the changes you've made aren't showing up, or the app doesn't work the way you expect it to, try clearing your cache or opening a private/incognito window.

Press **CTRL + c** to kill the app, then head to the next section.

Analyze sentiment

The Text Analytics API can be used to perform sentiment analysis, extract key phrases from text, or detect the source language. In this app, we're going to use sentiment analysis to determine if the provided text is positive, neutral, or negative. The API returns a numeric score between 0 and 1. Scores close to 1 indicate positive sentiment, and scores close to 0 indicate negative sentiment.

In this section, you're going to do a few things:

- Write some Python to call the Text Analytics API to perform sentiment analysis and return a response
- Create a Flask route to call your Python code
- Update the HTML with an area for sentiment scores, and a button to perform analysis
- Write JavaScript that allows users to interact with your Flask app from the HTML

Call the Text Analytics API

Let's write a function to call the Text Analytics API. This function will take four arguments: `input_text`, `input_language`, `output_text`, and `output_language`. This function is called whenever a user presses the run sentiment analysis button in your app. Data provided by the user from the text area and language selector, as well as the detected language and translation output are provided with each request. The response object includes sentiment scores for the source and translation. In the following sections, you're going to write some JavaScript to parse the response and use it in your app. For now, let's focus on call the Text Analytics API.

1. Let's create a file called `sentiment.py` in the root of your working directory.
2. Next, add this code to `sentiment.py`.

```
import os, requests, uuid, json

# Don't forget to replace with your Cog Services subscription key!
subscription_key = 'YOUR_TEXT_ANALYTICS_SUBSCRIPTION_KEY'
endpoint = "YOUR_TEXT_ANALYTICS_ENDPOINT"
# Our Flask route will supply four arguments: input_text, input_language,
# output_text, output_language.
# When the run sentiment analysis button is pressed in our Flask app,
# the Ajax request will grab these values from our web app, and use them
# in the request. See main.js for Ajax calls.

def get_sentiment(input_text, input_language):
    path = '/text/analytics/v3.0/sentiment'
    constructed_url = endpoint + path

    headers = {
        'Ocp-Apim-Subscription-Key': subscription_key,
        'Content-type': 'application/json',
        'X-ClientTraceId': str(uuid.uuid4())
    }

    # You can pass more than one object in body.
    body = {
        'documents': [
            {
                'language': input_language,
                'id': '1',
                'text': input_text
            },
        ]
    }
    response = requests.post(constructed_url, headers=headers, json=body)
    return response.json()
```

3. Add your Text Analytics subscription key and save.

Add a route to `app.py`

Let's create a route in your Flask app that calls `sentiment.py`. This route will be called each time a user presses the run sentiment analysis button in your app. Like the route for translation, this route is going to accept `POST` requests since the function expects arguments.

1. Open `app.py` and locate the import statement at the top of `app.py` and update it:

```
import translate, sentiment
```

Now our Flask app can use the method available via `sentiment.py`.

2. Copy this code to the end of `app.py` and save:

```
@app.route('/sentiment-analysis', methods=['POST'])
def sentiment_analysis():
    data = request.get_json()
    input_text = data['inputText']
    input_lang = data['inputLanguage']
    response = sentiment.get_sentiment(input_text, input_lang)
    return jsonify(response)
```

Update `index.html`

Now that you have a function to run sentiment analysis, and a route in your Flask app to call it, the next step is to start writing the HTML for your app. The HTML below does a few things:

- Adds a button to your app to run sentiment analysis
- Adds an element that explains sentiment scoring
- Adds an element to display the sentiment scores

1. Open `index.html` and locate these code comments:

```
<!-- Start sentiment code-->

<!-- End sentiment code -->
```

2. Replace the code comments with this HTML block:

```
<button type="submit" class="btn btn-primary mb-2" id="sentiment-analysis">Run sentiment
analysis</button></br>
<div id="sentiment" style="display: none">
   <p>Sentiment can be labeled as "positive", "negative", "neutral", or "mixed". </p>
   <strong>Sentiment label for input:</strong> <span id="input-sentiment"></span><br />
</div>
```

Update `main.js`

In the code below, content from the HTML is used to construct a request to your Flask route. Specifically, the contents of the text area and the language selector are assigned to variables, and then passed along in the request to the `sentiment-analysis` route.

The code then iterates through the response, and updates the HTML with the sentiment scores.

1. From your IDE, create a file named `main.js` in the `static` directory.

2. Copy this code into `static/scripts/main.js`:

```
//Run sentiment analysis on input and translation.
$("#sentiment-analysis").on("click", function(e) {
  e.preventDefault();
  var inputText = document.getElementById("text-to-translate").value;
  var inputLanguage = document.getElementById("detected-language-result").innerHTML;
  var outputText = document.getElementById("translation-result").value;
  var outputLanguage = document.getElementById("select-language").value;

  var sentimentRequest = { "inputText": inputText, "inputLanguage": inputLanguage};

  if (inputText !== "") {
    $.ajax({
      url: "/sentiment-analysis",
      method: "POST",
      headers: {
          "Content-Type":"application/json"
      },
      dataType: "json",
      data: JSON.stringify(sentimentRequest),
      success: function(data) {
        for (var i = 0; i < data.documents.length; i++) {
          if (typeof data.documents[i] !== "undefined"){
            if (data.documents[i].id === "1") {
              document.getElementById("input-sentiment").textContent = data.documents[i].sentiment;
            }
          }
        }
        for (var i = 0; i < data.errors.length; i++) {
          if (typeof data.errors[i] !== "undefined"){
            if (data.errors[i].id === "1") {
              document.getElementById("input-sentiment").textContent = data.errors[i].message;
            }
          }
        }
        if (document.getElementById("input-sentiment").textContent !== ''){
          document.getElementById("sentiment").style.display = "block";
        }
      }
    });
  }
});
// In the next section, you'll add code for speech synthesis here.
```

Test sentiment analysis

Let's test sentiment analysis in the app.

```
flask run
```

Navigate to the provided server address. Type text into the input area, select a language, and press translate. You should get a translation. Next, press the run sentiment analysis button. You should see two scores. If it doesn't work, make sure that you've added your subscription key.

TIP

If the changes you've made aren't showing up, or the app doesn't work the way you expect it to, try clearing your cache or opening a private/incognito window.

Press `CTRL + c` to kill the app, then head to the next section.

Convert text-to-speech

The Text-to-speech API enables your app to convert text into natural human-like synthesized speech. The service supports standard, neural, and custom voices. Our sample app uses a handful of the available voices, for a full list, see supported languages.

In this section, you're going to do a few things:

- Write some Python to convert text-to-speech with the Text-to-speech API
- Create a Flask route to call your Python code
- Update the HTML with a button to convert text-to-speech, and an element for audio playback
- Write JavaScript that allows users to interact with your Flask app

Call the Text-to-Speech API

Let's write a function to convert text-to-speech. This function will take two arguments: `input_text` and `voice_font`. This function is called whenever a user presses the convert text-to-speech button in your app. `input_text` is the translation output returned by the call to translate text, `voice_font` is the value from the voice font selector in the HTML.

1. Let's create a file called `synthesize.py` in the root of your working directory.

2. Next, add this code to `synthesize.py`.

```
import os, requests, time
from xml.etree import ElementTree

class TextToSpeech(object):
    def __init__(self, input_text, voice_font):
        subscription_key = 'YOUR_SPEECH_SERVICES_SUBSCRIPTION_KEY'
        self.subscription_key = subscription_key
        self.input_text = input_text
        self.voice_font = voice_font
        self.timestr = time.strftime('%Y%m%d-%H%M')
        self.access_token = None

    # This function performs the token exchange.
    def get_token(self):
        fetch_token_url = 'https://westus.api.cognitive.microsoft.com/sts/v1.0/issueToken'
        headers = {
            'Ocp-Apim-Subscription-Key': self.subscription_key
        }
        response = requests.post(fetch_token_url, headers=headers)
        self.access_token = str(response.text)

    # This function calls the TTS endpoint with the access token.
    def save_audio(self):
        base_url = 'https://westus.tts.speech.microsoft.com/'
        path = 'cognitiveservices/v1'
        constructed_url = base_url + path
        headers = {
            'Authorization': 'Bearer ' + self.access_token,
            'Content-Type': 'application/ssml+xml',
            'X-Microsoft-OutputFormat': 'riff-24khz-16bit-mono-pcm',
            'User-Agent': 'YOUR_RESOURCE_NAME',
        }
        # Build the SSML request with ElementTree
        xml_body = ElementTree.Element('speak', version='1.0')
        xml_body.set('{http://www.w3.org/XML/1998/namespace}lang', 'en-us')
        voice = ElementTree.SubElement(xml_body, 'voice')
        voice.set('{http://www.w3.org/XML/1998/namespace}lang', 'en-US')
        voice.set('name', 'Microsoft Server Speech Text to Speech Voice {}'.format(self.voice_font))
        voice.text = self.input_text
        # The body must be encoded as UTF-8 to handle non-ascii characters.
        body = ElementTree.tostring(xml_body, encoding="utf-8")

        #Send the request
        response = requests.post(constructed_url, headers=headers, data=body)

        # Write the response as a wav file for playback. The file is located
        # in the same directory where this sample is run.
        return response.content
```

3. Add your Speech Services subscription key and save.

Add a route to `app.py`

Let's create a route in your Flask app that calls `synthesize.py`. This route will be called each time a user presses the convert text-to-speech button in your app. Like the routes for translation and sentiment analysis, this route is going to accept `POST` requests since the function expects two arguments: the text to synthesize, and the voice font for playback.

1. Open `app.py` and locate the import statement at the top of `app.py` and update it:

```
import translate, sentiment, synthesize
```

Now our Flask app can use the method available via `synthesize.py`.

2. Copy this code to the end of `app.py` and save:

```
@app.route('/text-to-speech', methods=['POST'])
def text_to_speech():
    data = request.get_json()
    text_input = data['text']
    voice_font = data['voice']
    tts = synthesize.TextToSpeech(text_input, voice_font)
    tts.get_token()
    audio_response = tts.save_audio()
    return audio_response
```

Update `index.html`

Now that you have a function to convert text-to-speech, and a route in your Flask app to call it, the next step is to start writing the HTML for your app. The HTML below does a few things:

- Provides a voice selection drop-down
- Adds a button to convert text-to-speech
- Adds an audio element, which is used to play back the synthesized speech

1. Open `index.html` and locate these code comments:

```
<!-- Start voice font selection code -->

<!-- End voice font selection code -->
```

2. Replace the code comments with this HTML block:

```
<div class="form-group">
  <label for="select-voice"><strong>Select voice font:</strong></label>
  <select class="form-control" id="select-voice">
    <option value="(ar-SA, Naayf)">Arabic | Male | Naayf</option>
    <option value="(ca-ES, HerenaRUS)">Catalan | Female | HerenaRUS</option>
    <option value="(zh-CN, HuihuiRUS)">Chinese (Mainland) | Female | HuihuiRUS</option>
    <option value="(zh-CN, Kangkang, Apollo)">Chinese (Mainland) | Male | Kangkang, Apollo</option>
    <option value="(zh-HK, Tracy, Apollo)">Chinese (Hong Kong)| Female | Tracy, Apollo</option>
    <option value="(zh-HK, Danny, Apollo)">Chinese (Hong Kong) | Male | Danny, Apollo</option>
    <option value="(zh-TW, Yating, Apollo)">Chinese (Taiwan)| Female | Yating, Apollo</option>
    <option value="(zh-TW, Zhiwei, Apollo)">Chinese (Taiwan) | Male | Zhiwei, Apollo</option>
    <option value="(hr-HR, Matej)">Croatian | Male | Matej</option>
    <option value="(en-US, AriaRUS)">English (US) | Female | AriaRUS</option>
    <option value="(en-US, Guy24kRUS)">English (US) | Male | Guy24kRUS</option>
    <option value="(en-IE, Sean)">English (IE) | Male | Sean</option>
    <option value="(fr-FR, Julie, Apollo)">French | Female | Julie, Apollo</option>
    <option value="(fr-FR, HortenseRUS)">French | Female | Julie, HortenseRUS</option>
    <option value="(fr-FR, Paul, Apollo)">French | Male | Paul, Apollo</option>
    <option value="(de-DE, Hedda)">German | Female | Hedda</option>
    <option value="(de-DE, HeddaRUS)">German | Female | HeddaRUS</option>
    <option value="(de-DE, Stefan, Apollo)">German | Male | Apollo</option>
    <option value="(el-GR, Stefanos)">Greek | Male | Stefanos</option>
    <option value="(he-IL, Asaf)">Hebrew (Isreal) | Male | Asaf</option>
    <option value="(hi-IN, Kalpana, Apollo)">Hindi | Female | Kalpana, Apollo</option>
    <option value="(hi-IN, Hemant)">Hindi | Male | Hemant</option>
    <option value="(it-IT, LuciaRUS)">Italian | Female | LuciaRUS</option>
    <option value="(it-IT, Cosimo, Apollo)">Italian | Male | Cosimo, Apollo</option>
    <option value="(ja-JP, Ichiro, Apollo)">Japanese | Male | Ichiro</option>
    <option value="(ja-JP, HarukaRUS)">Japanese | Female | HarukaRUS</option>
    <option value="(ko-KR, HeamiRUS)">Korean | Female | Heami</option>
    <option value="(pt-BR, HeloisaRUS)">Portuguese (Brazil) | Female | HeloisaRUS</option>
    <option value="(pt-BR, Daniel, Apollo)">Portuguese (Brazil) | Male | Daniel, Apollo</option>
    <option value="(pt-PT, HeliaRUS)">Portuguese (Portugal) | Female | HeliaRUS</option>
    <option value="(ru-RU, Irina, Apollo)">Russian | Female | Irina, Apollo</option>
    <option value="(ru-RU, Pavel, Apollo)">Russian | Male | Pavel, Apollo</option>
    <option value="(ru-RU, EkaterinaRUS)">Russian | Female | EkaterinaRUS</option>
    <option value="(es-ES, Laura, Apollo)">Spanish | Female | Laura, Apollo</option>
    <option value="(es-ES, HelenaRUS)">Spanish | Female | HelenaRUS</option>
    <option value="(es-ES, Pablo, Apollo)">Spanish | Male | Pablo, Apollo</option>
    <option value="(th-TH, Pattara)">Thai | Male | Pattara</option>
    <option value="(tr-TR, SedaRUS)">Turkish | Female | SedaRUS</option>
    <option value="(vi-VN, An)">Vietnamese | Male | An</option>
  </select>
</div>
```

3. Next, locate these code comments:

```
<!-- Add Speech Synthesis button and audio element -->

<!-- End Speech Synthesis button -->
```

4. Replace the code comments with this HTML block:

```
<button type="submit" class="btn btn-primary mb-2" id="text-to-speech">Convert text-to-speech</button>
<div id="audio-playback">
  <audio id="audio" controls>
    <source id="audio-source" type="audio/mpeg" />
  </audio>
</div>
```

5. Make sure to save your work.

Update `main.js`

In the code below, content from the HTML is used to construct a request to your Flask route. Specifically, the translation and the voice font are assigned to variables, and then passed along in the request to the `text-to-speech` route.

The code then iterates through the response, and updates the HTML with the sentiment scores.

1. From your IDE, create a file named `main.js` in the `static` directory.
2. Copy this code into `static/scripts/main.js`:

```
// Convert text-to-speech
$("#text-to-speech").on("click", function(e) {
  e.preventDefault();
  var ttsInput = document.getElementById("translation-result").value;
  var ttsVoice = document.getElementById("select-voice").value;
  var ttsRequest = { 'text': ttsInput, 'voice': ttsVoice }

  var xhr = new XMLHttpRequest();
  xhr.open("post", "/text-to-speech", true);
  xhr.setRequestHeader("Content-Type", "application/json");
  xhr.responseType = "blob";
  xhr.onload = function(evt){
    if (xhr.status === 200) {
      audioBlob = new Blob([xhr.response], {type: "audio/mpeg"});
      audioURL = URL.createObjectURL(audioBlob);
      if (audioURL.length > 5){
        var audio = document.getElementById("audio");
        var source = document.getElementById("audio-source");
        source.src = audioURL;
        audio.load();
        audio.play();
      }else{
        console.log("An error occurred getting and playing the audio.")
      }
    }
  }
  xhr.send(JSON.stringify(ttsRequest));
});
// Code for automatic language selection goes here.
```

3. You're almost done. The last thing you're going to do is add some code to `main.js` to automatically select a voice font based on the language selected for translation. Add this code block to `main.js`:

```
// Automatic voice font selection based on translation output.
$('select[id="select-language"]').change(function(e) {
  if ($(this).val() == "ar"){
    document.getElementById("select-voice").value = "(ar-SA, Naayf)";
  }
  if ($(this).val() == "ca"){
    document.getElementById("select-voice").value = "(ca-ES, HerenaRUS)";
  }
  if ($(this).val() == "zh-Hans"){
    document.getElementById("select-voice").value = "(zh-HK, Tracy, Apollo)";
  }
  if ($(this).val() == "zh-Hant"){
    document.getElementById("select-voice").value = "(zh-HK, Tracy, Apollo)";
  }
  if ($(this).val() == "hr"){
    document.getElementById("select-voice").value = "(hr-HR, Matej)";
  }
  if ($(this).val() == "en"){
    document.getElementById("select-voice").value = "(en-US, Jessa24kRUS)";
  }
  if ($(this).val() == "fr"){
    document.getElementById("select-voice").value = "(fr-FR, HortenseRUS)";
  }
  if ($(this).val() == "de"){
    document.getElementById("select-voice").value = "(de-DE, HeddaRUS)";
  }
  if ($(this).val() == "el"){
    document.getElementById("select-voice").value = "(el-GR, Stefanos)";
  }
  if ($(this).val() == "he"){
    document.getElementById("select-voice").value = "(he-IL, Asaf)";
  }
  if ($(this).val() == "hi"){
    document.getElementById("select-voice").value = "(hi-IN, Kalpana, Apollo)";
  }
  if ($(this).val() == "it"){
    document.getElementById("select-voice").value = "(it-IT, LuciaRUS)";
  }
  if ($(this).val() == "ja"){
    document.getElementById("select-voice").value = "(ja-JP, HarukaRUS)";
  }
  if ($(this).val() == "ko"){
    document.getElementById("select-voice").value = "(ko-KR, HeamiRUS)";
  }
  if ($(this).val() == "pt"){
    document.getElementById("select-voice").value = "(pt-BR, HeloisaRUS)";
  }
  if ($(this).val() == "ru"){
    document.getElementById("select-voice").value = "(ru-RU, EkaterinaRUS)";
  }
  if ($(this).val() == "es"){
    document.getElementById("select-voice").value = "(es-ES, HelenaRUS)";
  }
  if ($(this).val() == "th"){
    document.getElementById("select-voice").value = "(th-TH, Pattara)";
  }
  if ($(this).val() == "tr"){
    document.getElementById("select-voice").value = "(tr-TR, SedaRUS)";
  }
  if ($(this).val() == "vi"){
    document.getElementById("select-voice").value = "(vi-VN, An)";
  }
});
```

Test your app

Let's test speech synthesis in the app.

```
flask run
```

Navigate to the provided server address. Type text into the input area, select a language, and press translate. You should get a translation. Next, select a voice, then press the convert text-to-speech button. the translation should be played back as synthesized speech. If it doesn't work, make sure that you've added your subscription key.

> **TIP**
>
> If the changes you've made aren't showing up, or the app doesn't work the way you expect it to, try clearing your cache or opening a private/incognito window.

That's it, you have a working app that performs translations, analyzes sentiment, and synthesized speech. Press `CTRL + c` to kill the app. Be sure to check out the other Azure Cognitive Services.

Get the source code

The source code for this project is available on GitHub.

Next steps

- Translator reference
- Text Analytics API reference
- Text-to-speech API reference

Extract information in Excel using Text Analytics and Power Automate

5/13/2021 • 6 minutes to read • Edit Online

In this tutorial, you'll create a Power Automate flow to extract text in an Excel spreadsheet without having to write code.

This flow will take a spreadsheet of issues reported about an apartment complex, and classify them into two categories: plumbing and other. It will also extract the names and phone numbers of the tenants who sent them. Lastly, the flow will append this information to the Excel sheet.

In this tutorial, you'll learn how to:

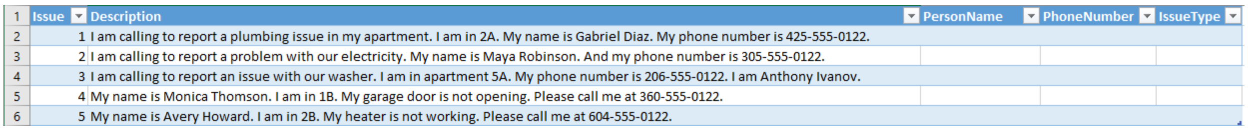
- Use Power Automate to create a flow
- Upload Excel data from OneDrive for Business
- Extract text from Excel, and send it to the Text Analytics API
- Use the information from the API to update an Excel sheet.

Prerequisites

- A Microsoft Azure account. Create a free account or sign in.
- A Text Analytics resource. If you don't have one, you can create one in the Azure portal and use the free tier to complete this tutorial.
- The key and endpoint that was generated for you during sign-up.
- A spreadsheet containing tenant issues. Example data is provided on GitHub
- Microsoft 365, with OneDrive for business.

Add the Excel file to OneDrive for Business

Download the example Excel file from GitHub. This file must be stored in your OneDrive for Business account.

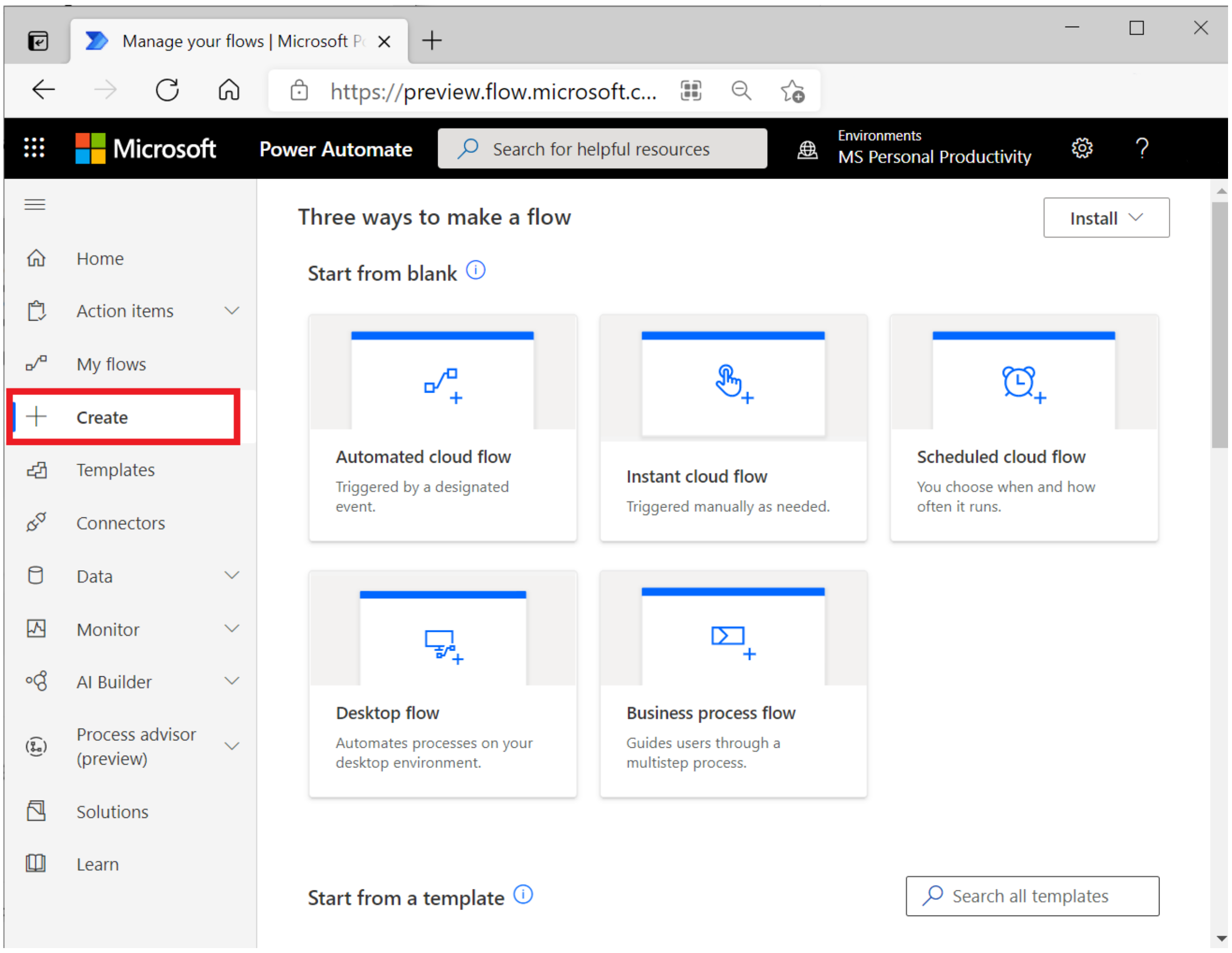


	Issue	Description	PersonName	PhoneNumber	IssueType
1					
2	1	I am calling to report a plumbing issue in my apartment. I am in 2A. My name is Gabriel Diaz. My phone number is 425-555-0122.			
3	2	I am calling to report a problem with our electricity. My name is Maya Robinson. And my phone number is 305-555-0122.			
4	3	I am calling to report an issue with our washer. I am in apartment 5A. My phone number is 206-555-0122. I am Anthony Ivanov.			
5	4	My name is Monica Thomson. I am in 1B. My garage door is not opening. Please call me at 360-555-0122.			
6	5	My name is Avery Howard. I am in 2B. My heater is not working. Please call me at 604-555-0122.			

The issues are reported in raw text. We will use the Text Analytics API's Named Entity Recognition to extract the person name and phone number. Then the flow will look for the word "plumbing" in the description to categorize the issues.

Create a new Power Automate workflow

Go to the Power Automate site, and login. Then click **Create** and **Scheduled flow**.

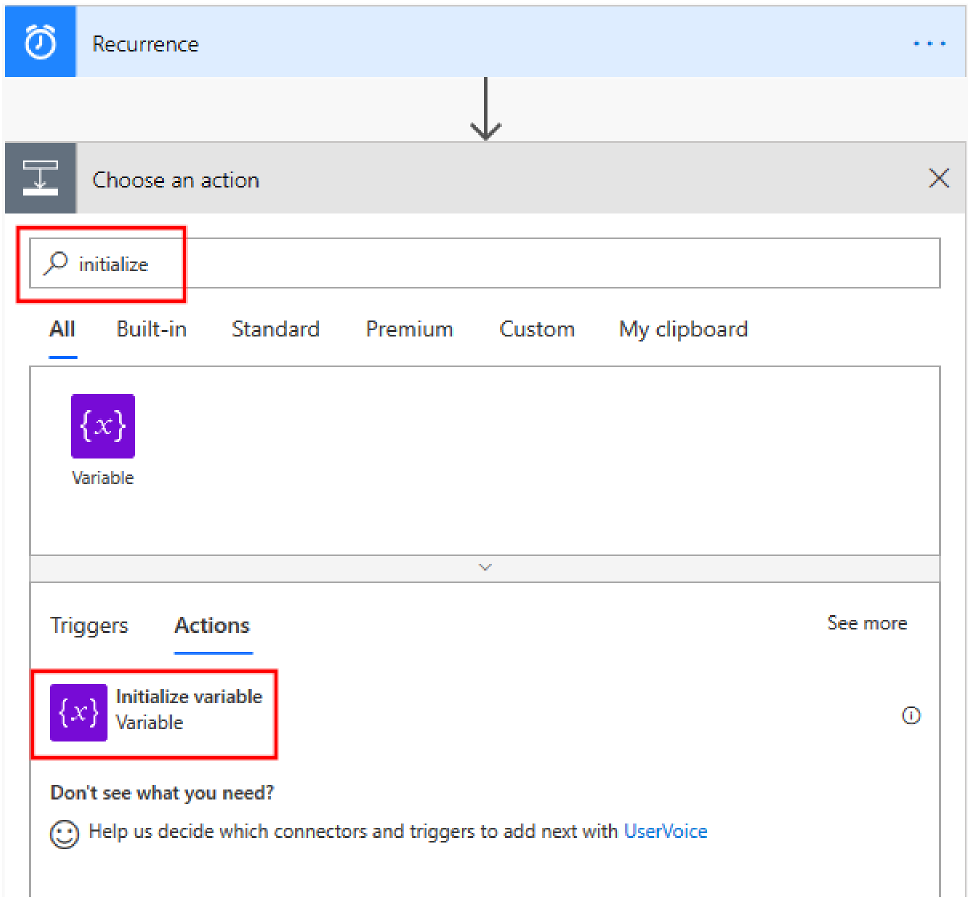

Manage your flows | Microsoft P
https://preview.flow.microsoft.c...
Microsoft
Power Automate
Search for helpful resources
Environments
MS Personal Productivity
Home
Action items
My flows
Create
Templates
Connectors
Data
Monitor
AI Builder
Process advisor (preview)
Solutions
Learn
Three ways to make a flow
Install
Start from blank
Automated cloud flow
Triggered by a designated event.
Instant cloud flow
Triggered manually as needed.
Scheduled cloud flow
You choose when and how often it runs.
Desktop flow
Automates processes on your desktop environment.
Business process flow
Guides users through a multistep process.
Start from a template
Search all templates

On the **Build a scheduled cloud flow** page, initialize your flow with the following fields:

FIELD	VALUE
Flow name	**Scheduled Review** or another name.
Starting	Enter the current date and time.
Repeat every	**1 hour**

Add variables to the flow

Create variables representing the information that will be added to the Excel file. Click **New Step** and search for **Initialize variable**. Do this four times, to create four variables.


Recurrence

Choose an action

initialize

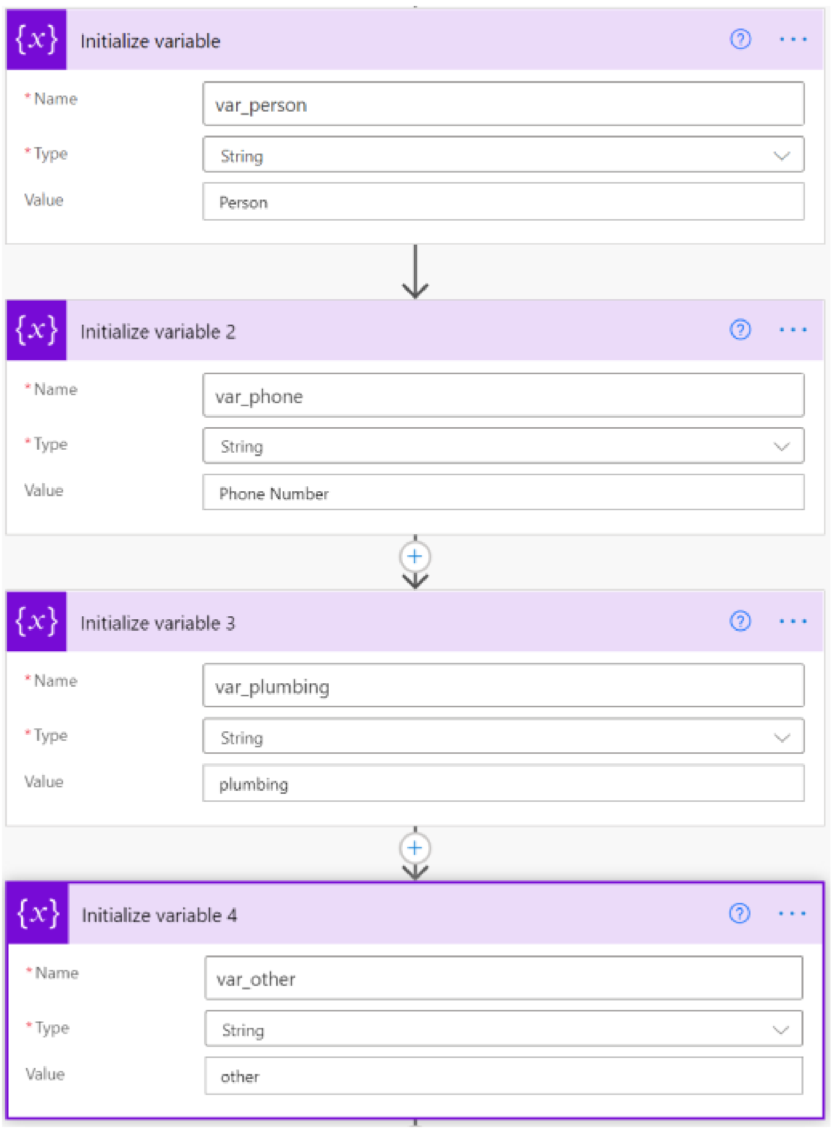
Initialize variable
Variable

Don't see what you need?

Help us decide which connectors and triggers to add next with UserVoice

Add the following information to the variables you created. They represent the columns of the Excel file. If any variables are collapsed, you can click on them to expand them.

ACTION	NAME	TYPE	VALUE
Initialize variable	var_person	String	Person
Initialize variable 2	var_phone	String	Phone Number
Initialize variable 3	var_plumbing	String	plumbing
Initialize variable 4	var_other	String	other



Initialize variable

* Name	var_person
* Type	String
Value	Person

Initialize variable 2

* Name	var_phone
* Type	String
Value	Phone Number

Initialize variable 3

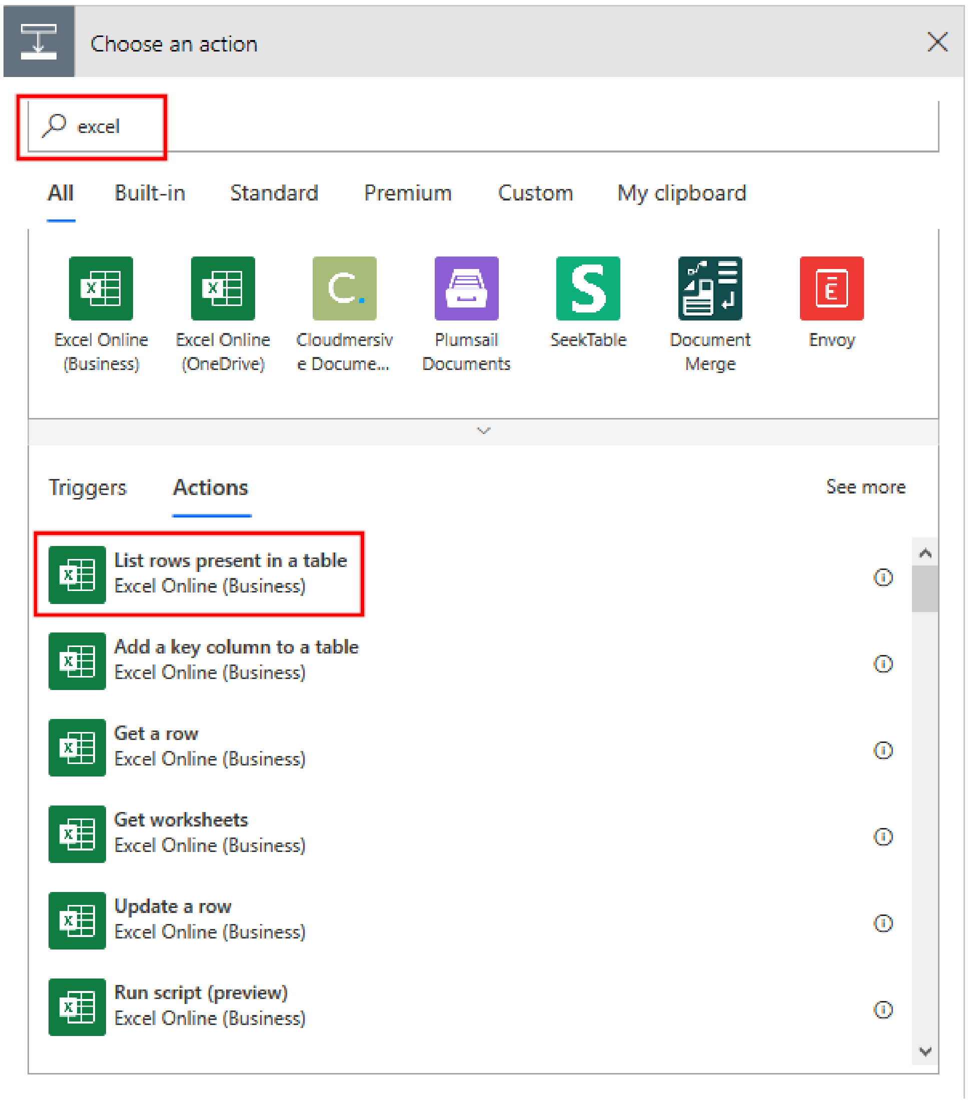
* Name	var_plumbing
* Type	String
Value	plumbing

Initialize variable 4

* Name	var_other
* Type	String
Value	other

Read the excel file

Click **New Step** and type **Excel**, then select **List rows present in a table** from the list of actions.


Choose an action

excel

All | Built-in | Standard | Premium | Custom | My clipboard

Excel Online (Business) | Excel Online (OneDrive) | Cloudmersive Docume... | Plumsail Documents | SeekTable | Document Merge | Envoy

Triggers | Actions | See more

List rows present in a table
Excel Online (Business)

Add a key column to a table
Excel Online (Business)

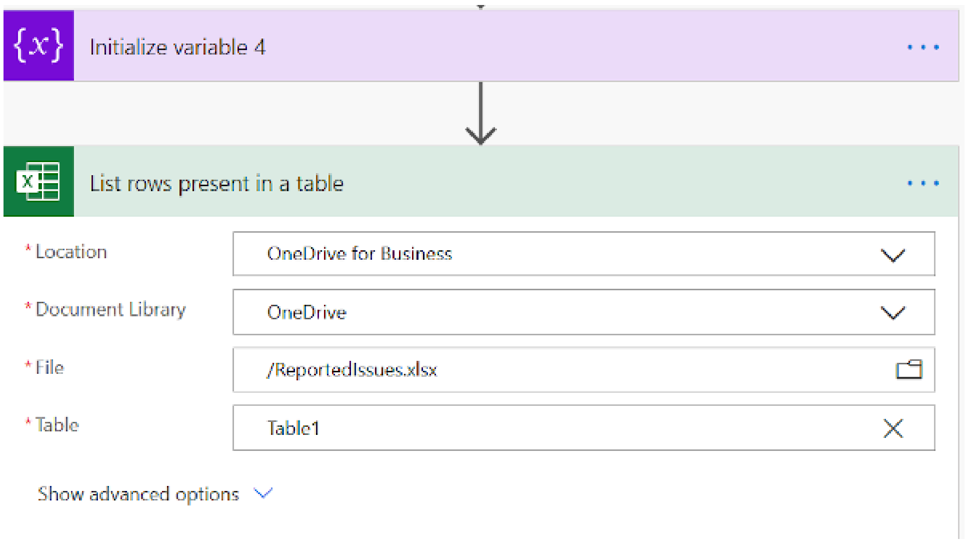
Get a row
Excel Online (Business)

Get worksheets
Excel Online (Business)

Update a row
Excel Online (Business)

Run script (preview)
Excel Online (Business)

Add the Excel file to the flow by filling in the fields in this action. This tutorial requires the file to have been uploaded to OneDrive for Business.

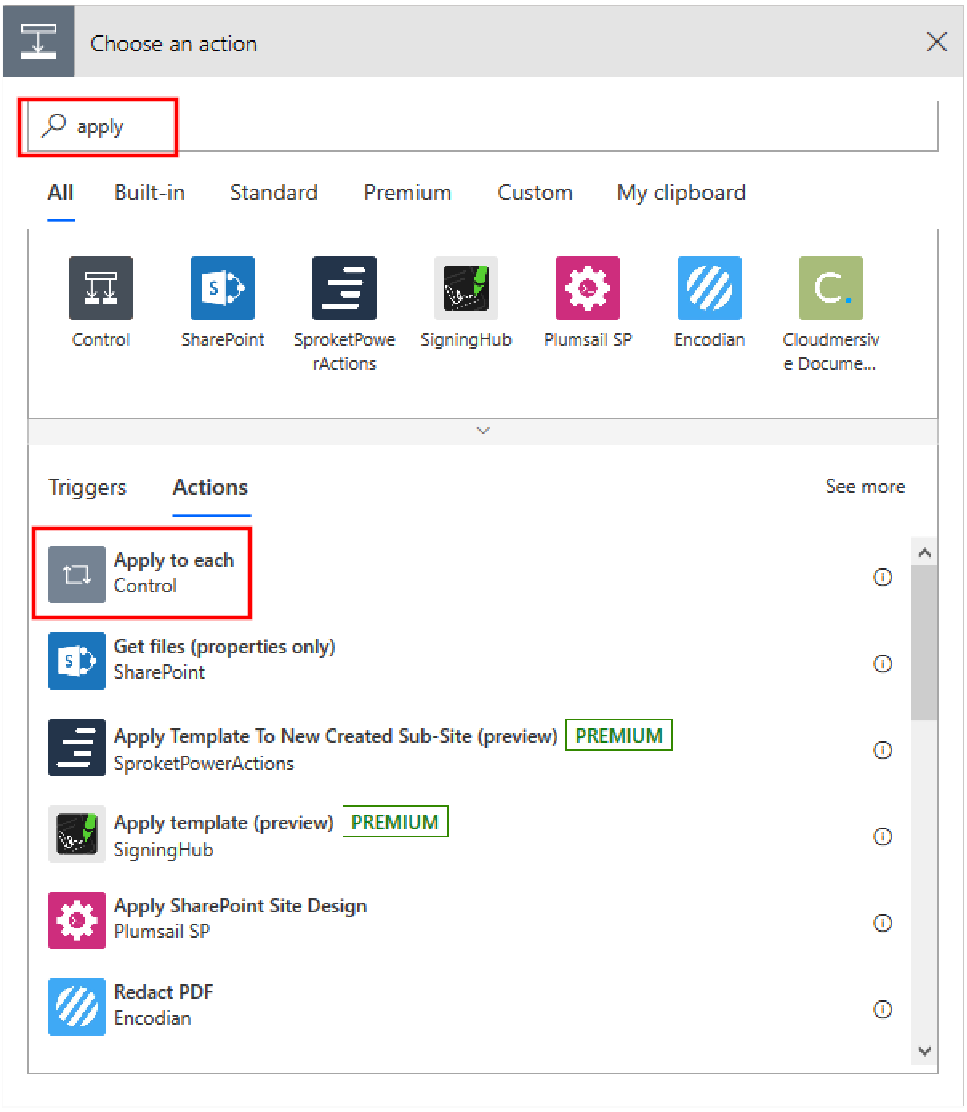

Initialize variable 4

List rows present in a table

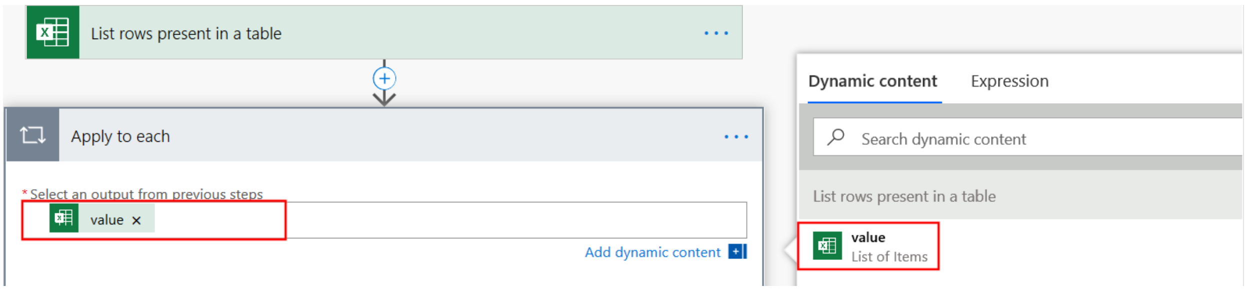
* Location	OneDrive for Business
* Document Library	OneDrive
* File	/ReportedIssues.xlsx
* Table	Table1

Show advanced options

Click **New Step** and add an **Apply to each** action.



Click on **Select an output from previous step**. In the Dynamic content box that appears, select **value**.



Send a request to the Text Analytics API

If you haven't already, you need to create a Text Analytics resource in the Azure portal.

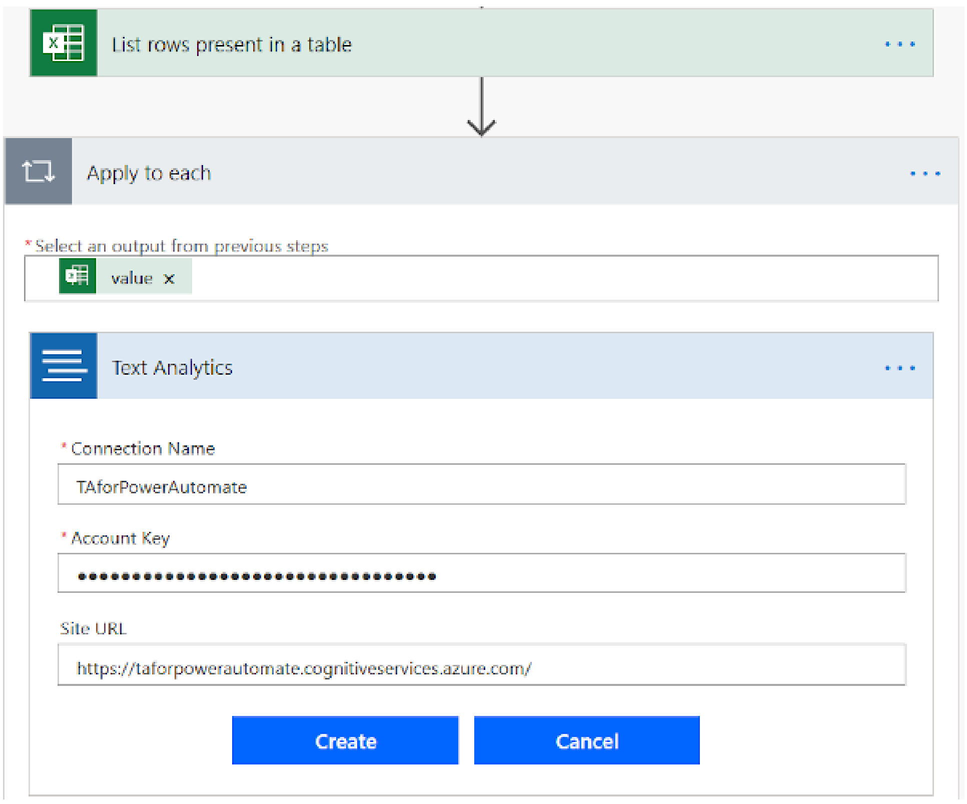
Create a Text Analytics connection

In the **Apply to each**, click **Add an action**. Go to your Text Analytics resource's **key and endpoint** page in the Azure portal, and get the key and endpoint for your Text Analytics resource.

In your flow, enter the following information to create a new Text Analytics connection.

> **NOTE**
>
> If you already have created a Text Analytics connection and want to change your connection details, Click on the ellipsis on the top right corner, and click **+ Add new connection**.

FIELD	VALUE
Connection Name	A name for the connection to your Text Analytics resource. For example, `TAforPowerAutomate`.
Account key	The key for your Text Analytics resource.
Site URL	The endpoint for your Text Analytics resource.


List rows present in a table
Apply to each
Select an output from previous steps
value ×
Text Analytics
Create
Cancel

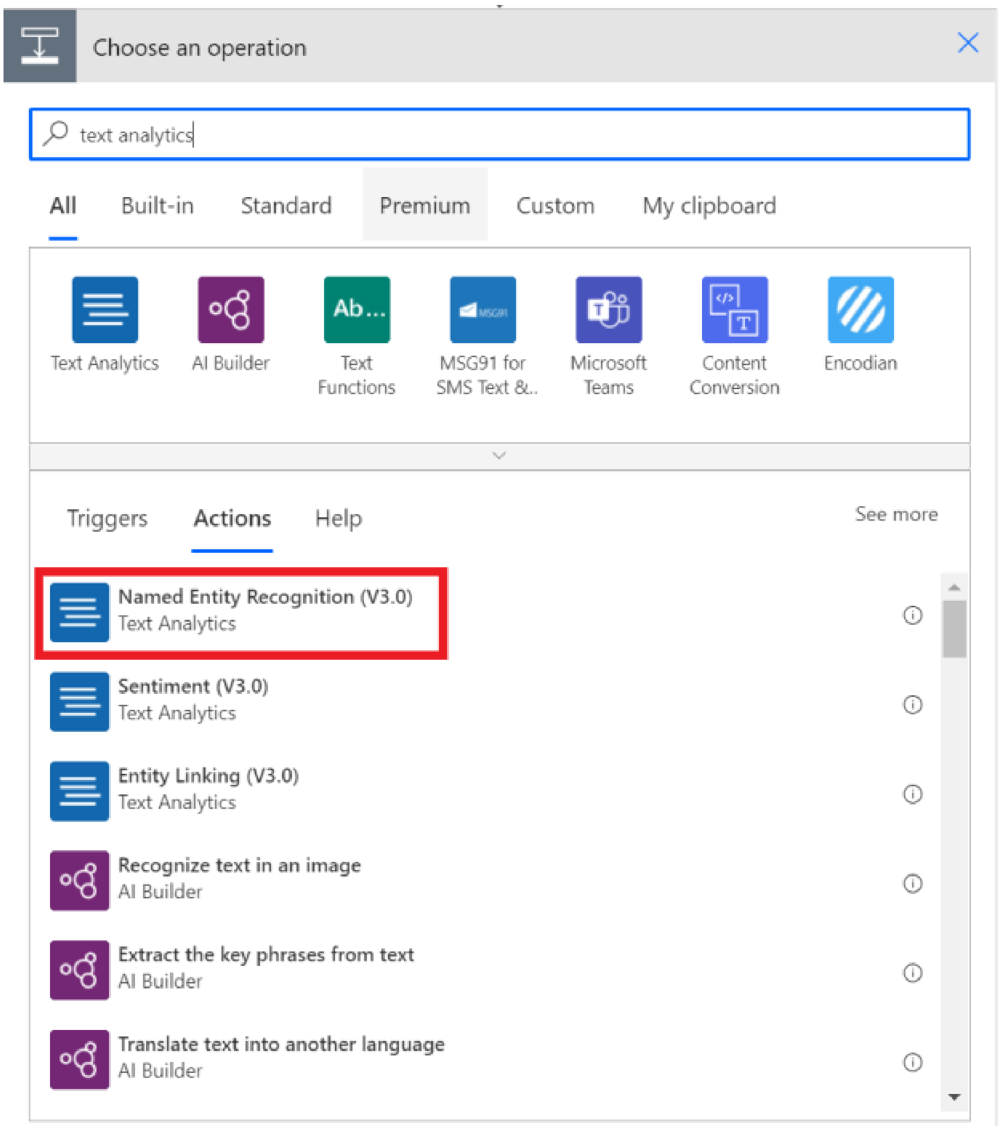
Connection Name: TAforPowerAutomate

Account Key: ••••••••••••••••••••••••••••••••••

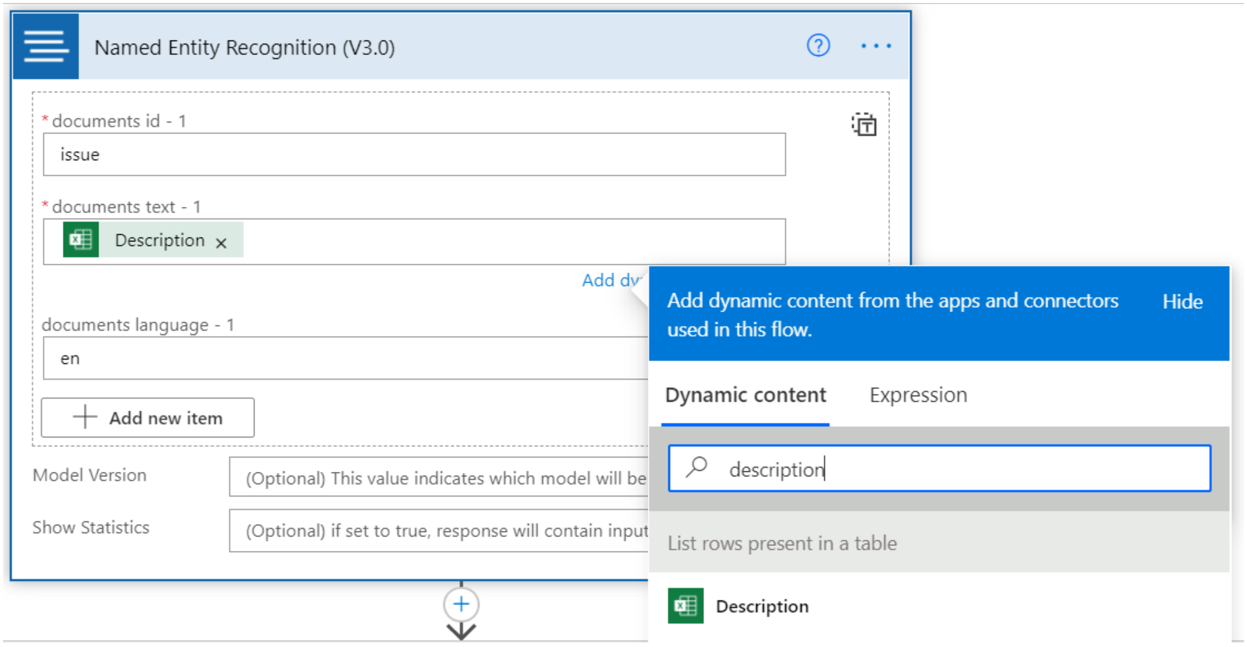
Site URL: https://taforpowerautomate.cognitiveservices.azure.com/

Extract the excel content

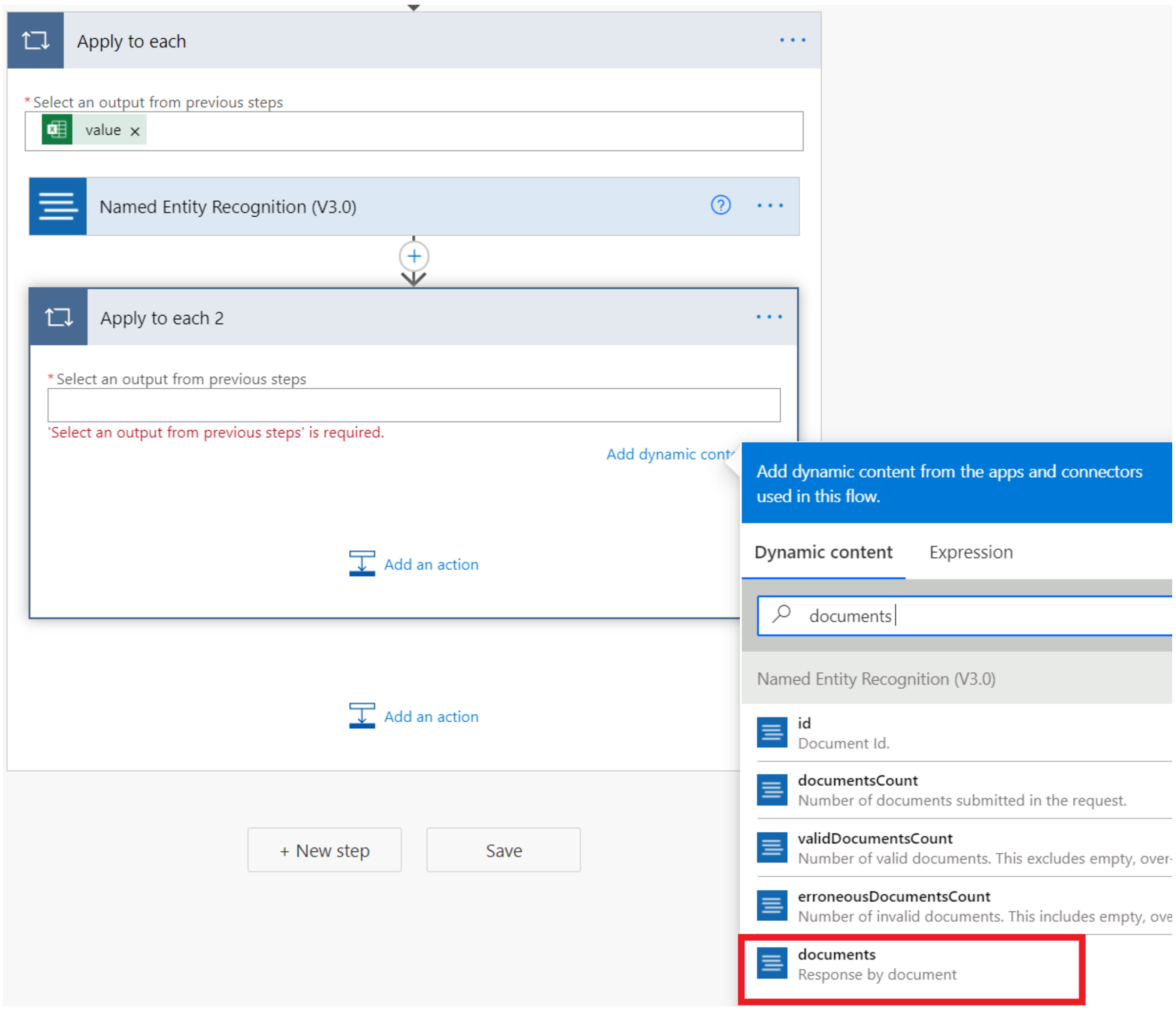
After the connection is created, search for **Text Analytics** and select **Named Entity Recognition**. This will extract information from the description column of the issue.



Click in the **Text** field and select **Description** from the Dynamic content windows that appears. Enter `en` for Language, and a unique name as the document ID (you might need to click **Show advanced options**).

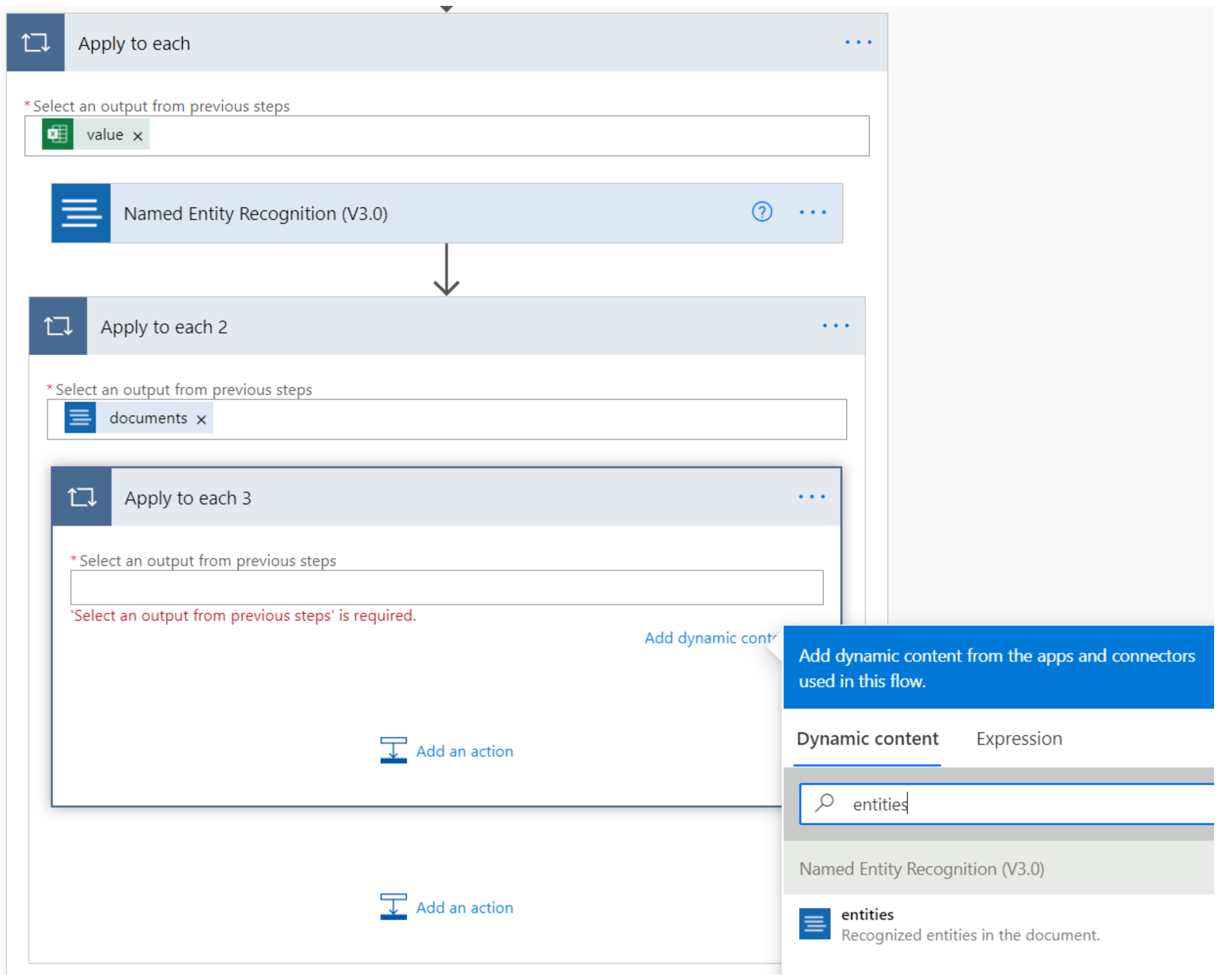

Named Entity Recognition (V3.0)
* documents id - 1
issue
* documents text - 1
Description
Add dy
documents language - 1
en
Add new item
Model Version
(Optional) This value indicates which model will be
Show Statistics
(Optional) if set to true, response will contain input
Add dynamic content from the apps and connectors used in this flow.
Hide
Dynamic content
Expression
description
List rows present in a table
Description

Within the **Apply to each**, click **Add an action** and create another **Apply to each** action. Click inside the text box and select **documents** in the Dynamic Content window that appears.

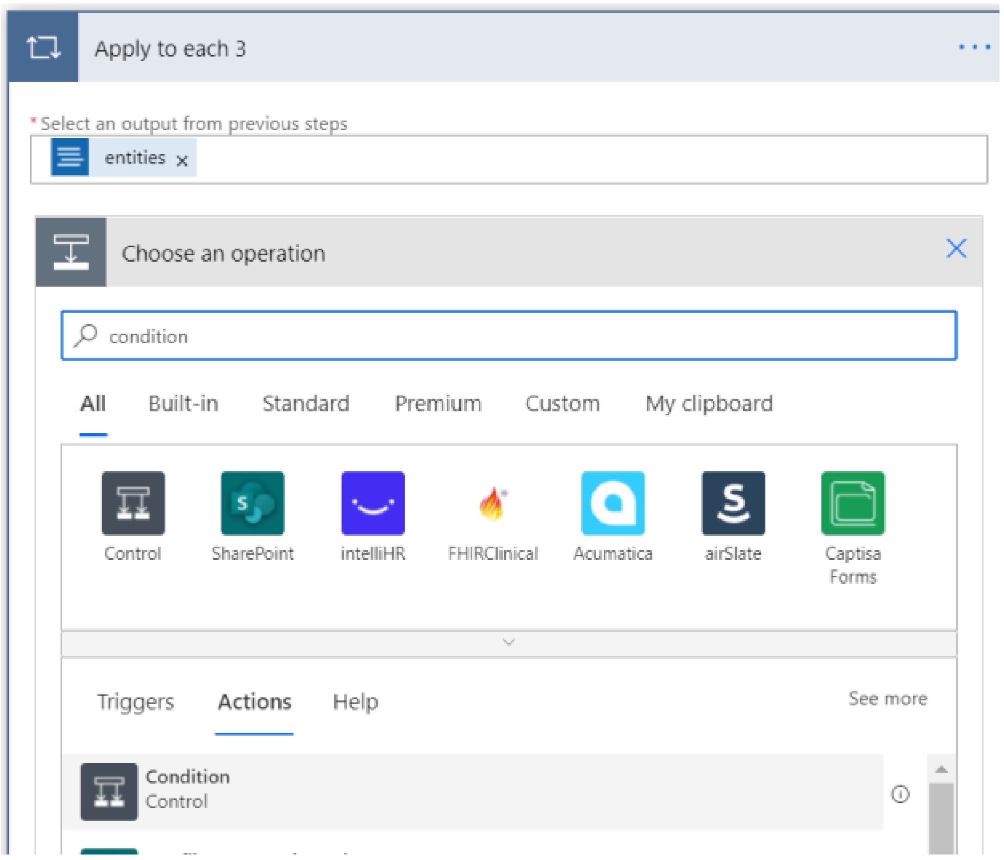

Apply to each
* Select an output from previous steps
value ×
Named Entity Recognition (V3.0)
Apply to each 2
* Select an output from previous steps
'Select an output from previous steps' is required.
Add dynamic cont
Add an action
Add an action
+ New step
Save
Add dynamic content from the apps and connectors used in this flow.
Dynamic content
Expression
documents
Named Entity Recognition (V3.0)
id
Document Id.
documentsCount
Number of documents submitted in the request.
validDocumentsCount
Number of valid documents. This excludes empty, over-
erroneousDocumentsCount
Number of invalid documents. This includes empty, ove
documents
Response by document

Extract the person name

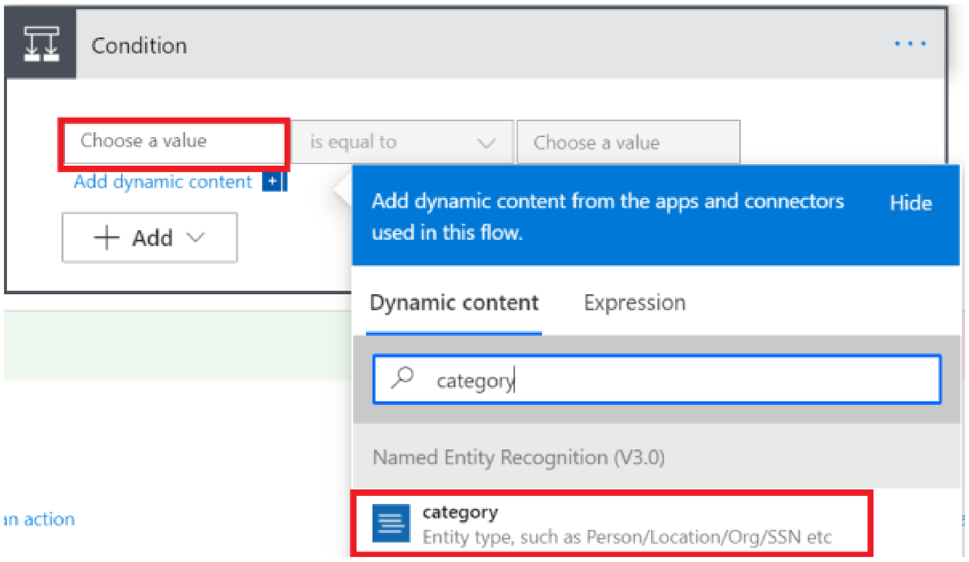
Next, we will find the person entity type in the Text Analytics output. Within the **Apply to each 2**, click **Add an action**, and create another **Apply to each** action. Click inside the text box and select **Entities** in the Dynamic Content window that appears.


Apply to each
* Select an output from previous steps
value ×
Named Entity Recognition (V3.0)
Apply to each 2
* Select an output from previous steps
documents ×
Apply to each 3
* Select an output from previous steps
'Select an output from previous steps' is required.
Add dynamic cont
Add an action
Add an action
Add dynamic content from the apps and connectors used in this flow.
Dynamic content
Expression
entities
Named Entity Recognition (V3.0)
entities
Recognized entities in the document.

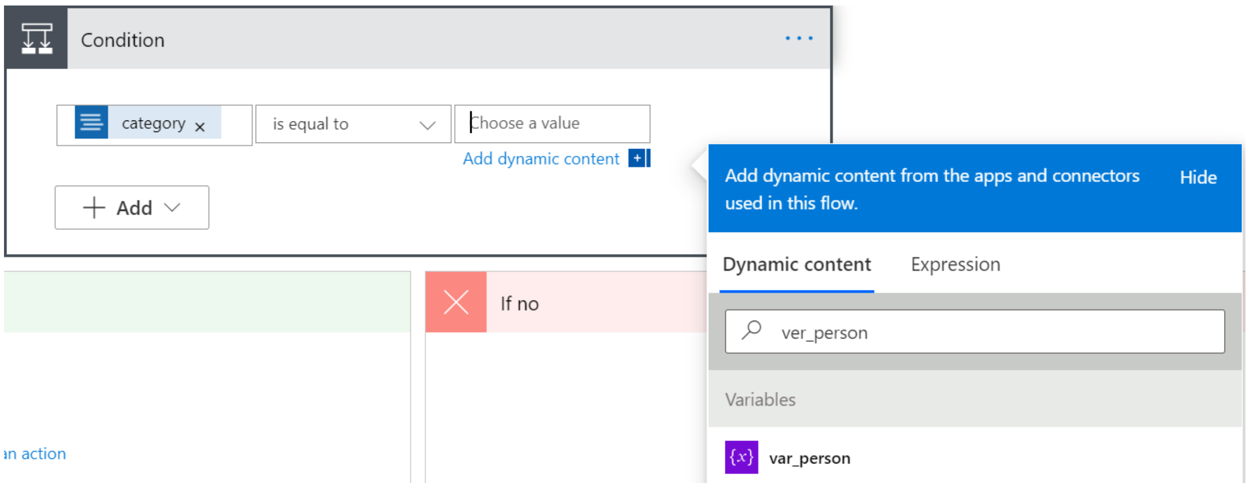
Within the newly created **Apply to each 3** action, click **Add an action**, and add a **Condition** control.



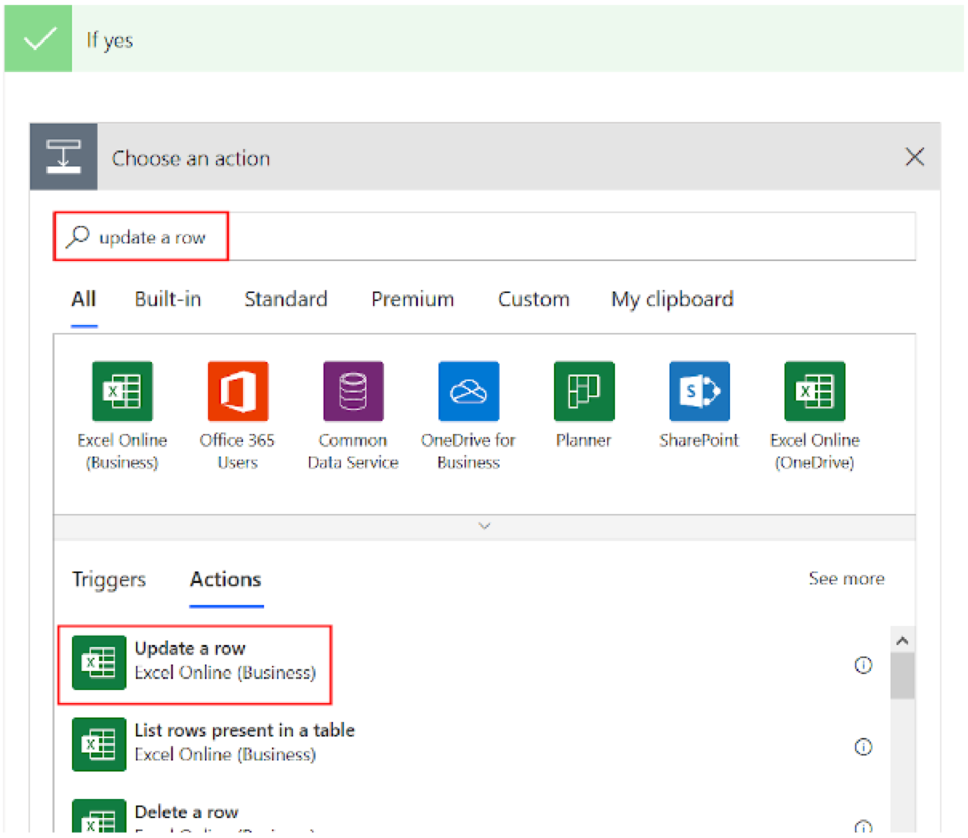
In the Condition window, click on the first text box. In the Dynamic content window, search for **Category** and select it.


Condition
Choose a value
is equal to
Choose a value
Add dynamic content
Add
Add dynamic content from the apps and connectors used in this flow.
Hide
Dynamic content
Expression
category
Named Entity Recognition (V3.0)
category
Entity type, such as Person/Location/Org/SSN etc
n action

Make sure the second box is set to **is equal to**. Then select the third box, and search for `var_person` in the Dynamic content window.



In the **If yes** condition, type in Excel then select **Update a Row**.


If yes

Choose an action

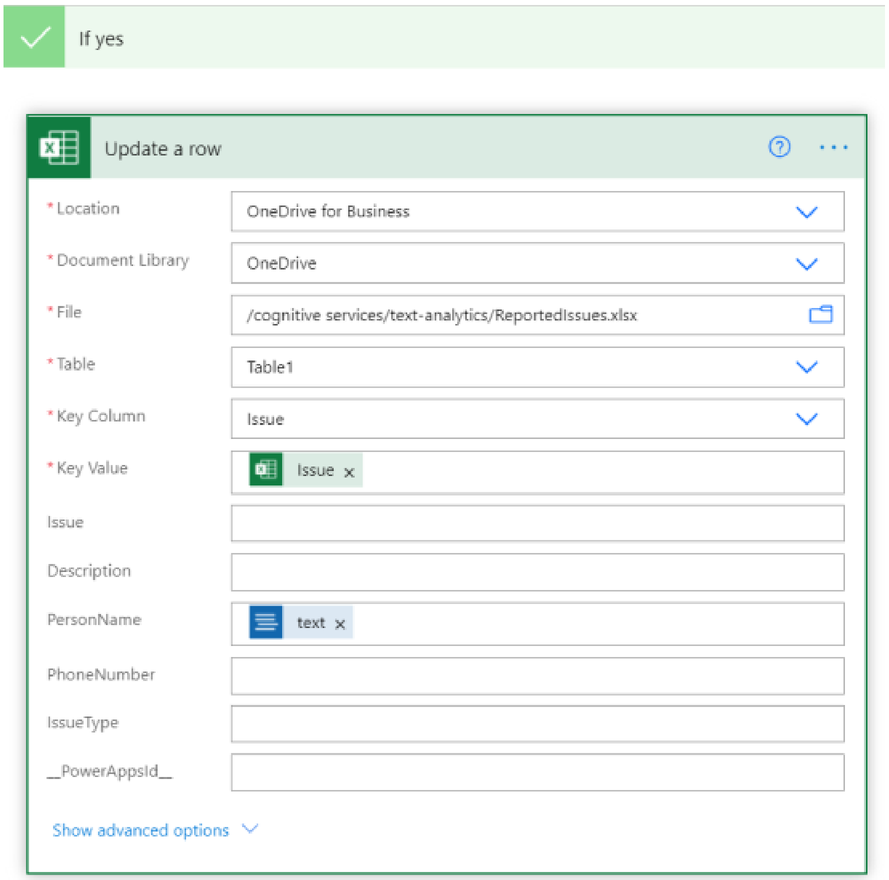
update a row

Update a row
Excel Online (Business)

List rows present in a table
Excel Online (Business)

Delete a row

Enter the Excel information, and update the **Key Column**, **Key Value** and **PersonName** fields. This will append the name detected by the API to the Excel sheet.

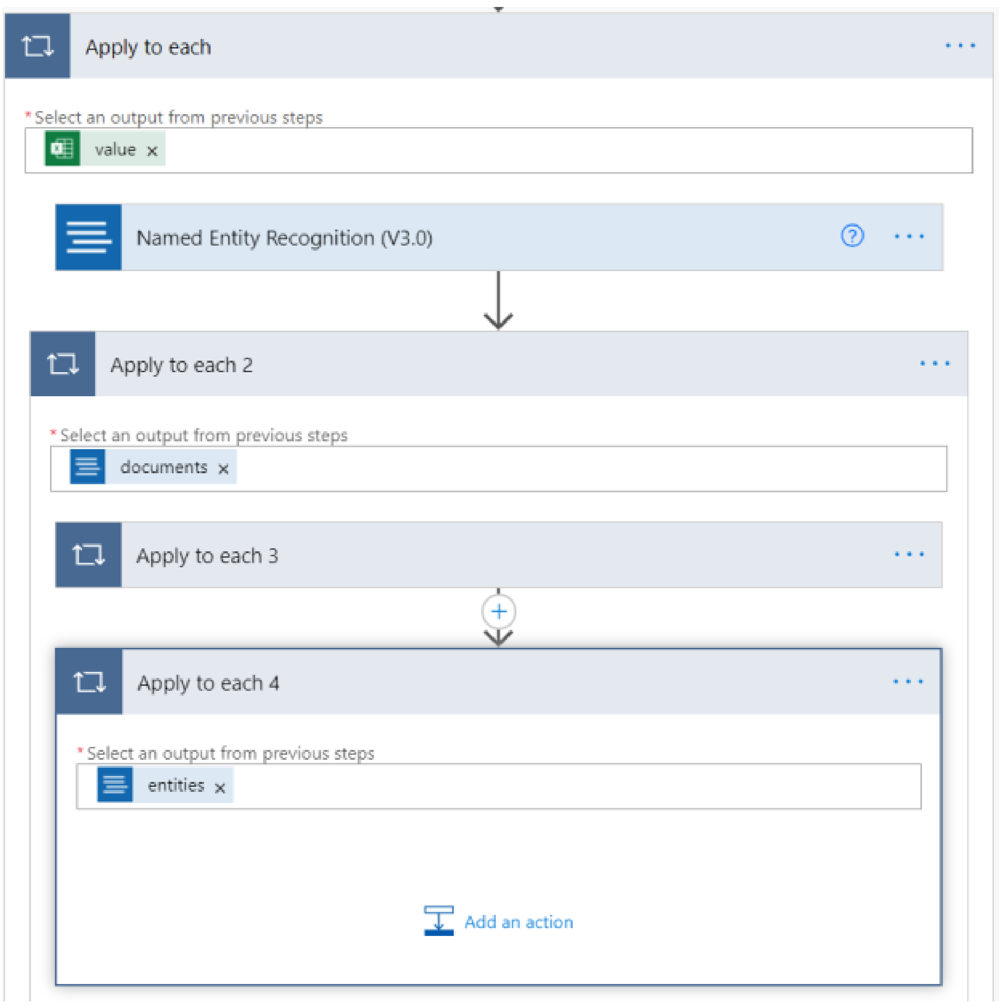

If yes

Update a row

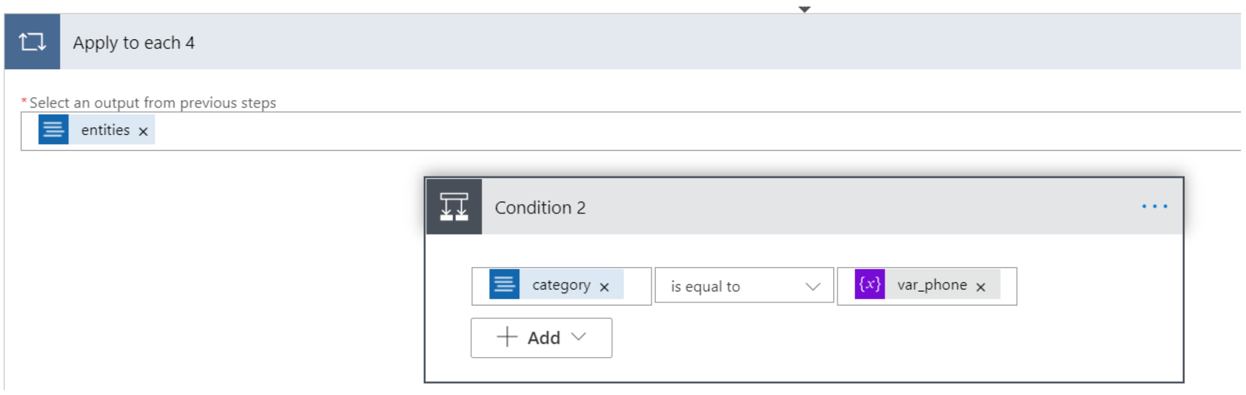
* Location	OneDrive for Business
* Document Library	OneDrive
* File	/cognitive services/text-analytics/ReportedIssues.xlsx
* Table	Table1
* Key Column	Issue
* Key Value	Issue ×
Issue	
Description	
PersonName	text ×
PhoneNumber	
IssueType	
__PowerAppsId__	

Get the phone number

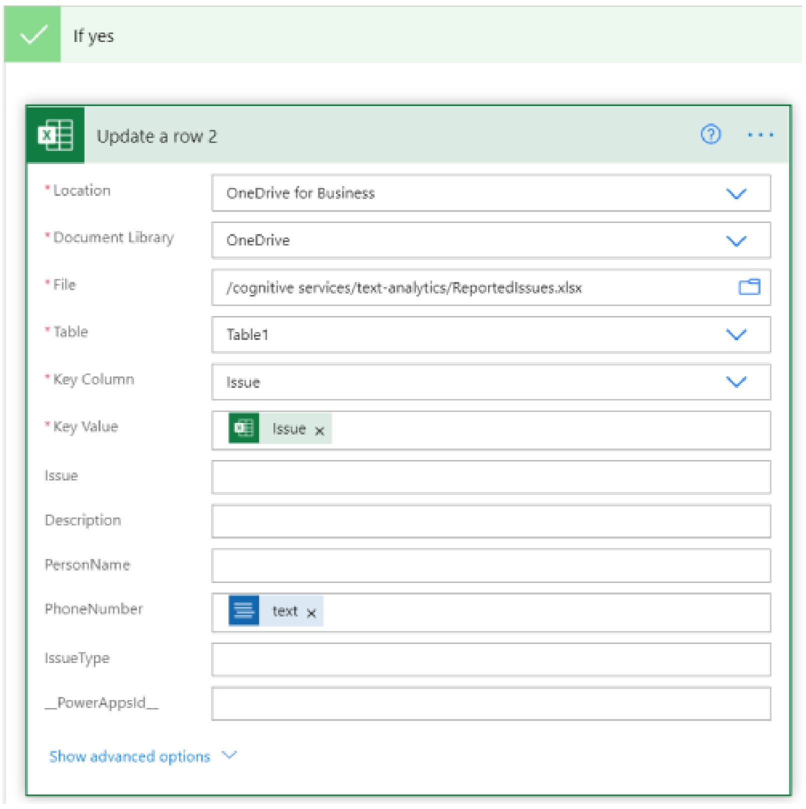
Minimize the **Apply to each 3** action by clicking on the name. Then add another **Apply to each** action to **Apply to each 2**, like before. it will be named **Apply to each 4**. Select the text box, and add **entities** as the output for this action.


Apply to each
Select an output from previous steps
value
Named Entity Recognition (V3.0)
Apply to each 2
Select an output from previous steps
documents
Apply to each 3
Apply to each 4
Select an output from previous steps
entities
Add an action

Within **Apply to each 4**, add a **Condition** control. It will be named **Condition 2**. In the first text box, search for, and add **categories** from the Dynamic content window. Be sure the center box is set to **is equal to**. Then, in the right text box, enter `var_phone`.



In the **If yes** condition, add an **Update a row** action. Then enter the information like we did above, for the phone numbers column of the Excel sheet. This will append the phone number detected by the API to the Excel sheet.



If yes

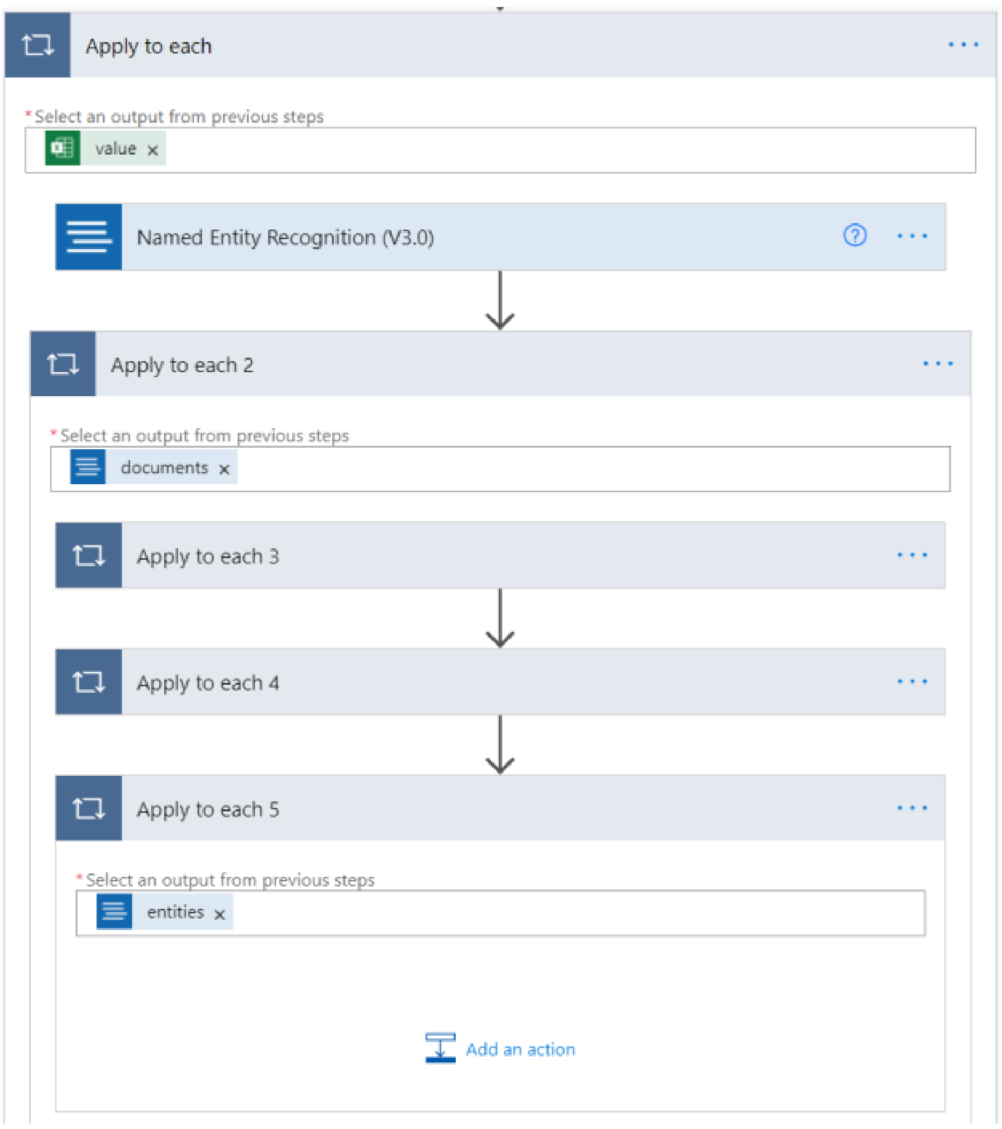
Update a row 2

* Location	OneDrive for Business
* Document Library	OneDrive
* File	/cognitive services/text-analytics/ReportedIssues.xlsx
* Table	Table1
* Key Column	Issue
* Key Value	Issue ×
Issue	
Description	
PersonName	
PhoneNumber	text ×
IssueType	
__PowerAppsId__	

Show advanced options

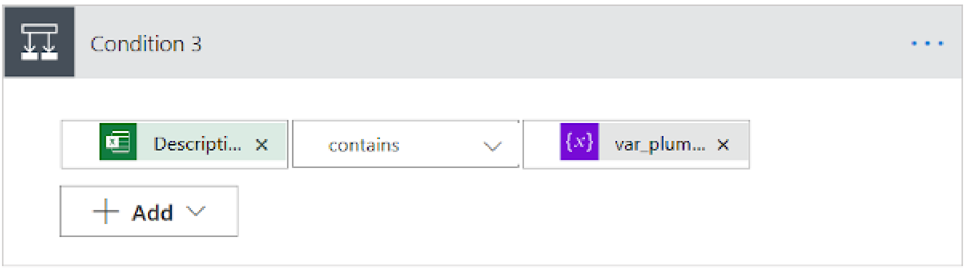
Get the plumbing issues

Minimize **Apply to each 4** by clicking on the name. Then create another **Apply to each** in the parent action. Select the text box, and add **Entities** as the output for this action from the Dynamic content window.


Apply to each
* Select an output from previous steps
value
Named Entity Recognition (V3.0)
Apply to each 2
* Select an output from previous steps
documents
Apply to each 3
Apply to each 4
Apply to each 5
* Select an output from previous steps
entities
Add an action

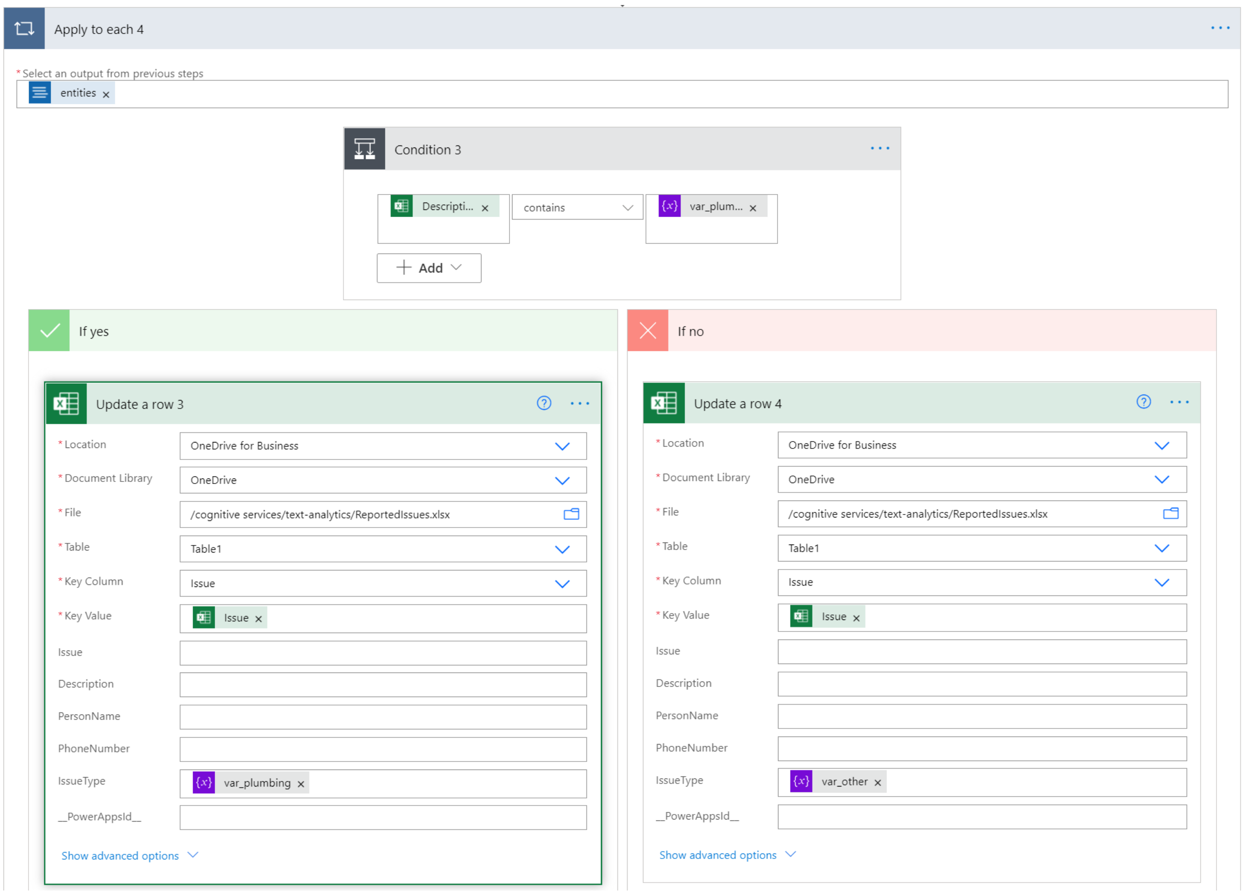
Next, the flow will check if the issue description from the Excel table row contains the word "plumbing". If yes, it will add "plumbing" in the IssueType column. If not, we will enter "other."

Inside the **Apply to each 4** action, add a **Condition** Control. It will be named **Condition 3**. In the first text box, search for, and add **Description** from the Excel file, using the Dynamic content window. Be sure the center box says **contains**. Then, in the right text box, find and select `var_plumbing`.



In the **If yes** condition, click **Add an action**, and select **Update a row**. Then enter the information like before. In the IssueType column, select `var_plumbing`. This will apply a "plumbing" label to the row.

In the **If no** condition, click **Add an action**, and select **Update a row**. Then enter the information like before. In the IssueType column, select `var_other`. This will apply an "other" label to the row.



Apply to each 4

* Select an output from previous steps: entities

Condition 3

Descripti... | contains | var_plum...

Add

If yes

Update a row 3

* Location	OneDrive for Business
* Document Library	OneDrive
* File	/cognitive services/text-analytics/ReportedIssues.xlsx
* Table	Table1
* Key Column	Issue
* Key Value	Issue
Issue	
Description	
PersonName	
PhoneNumber	
IssueType	var_plumbing
__PowerAppsId__	

Show advanced options

If no

Update a row 4

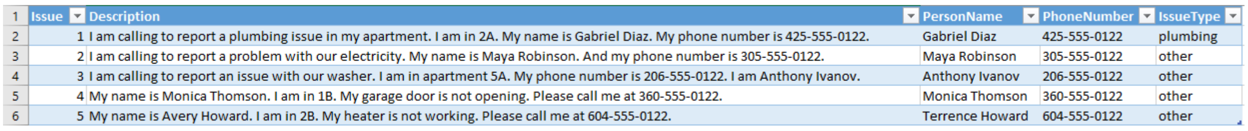
* Location	OneDrive for Business
* Document Library	OneDrive
* File	/cognitive services/text-analytics/ReportedIssues.xlsx
* Table	Table1
* Key Column	Issue
* Key Value	Issue
Issue	
Description	
PersonName	
PhoneNumber	
IssueType	var_other
__PowerAppsId__	

Show advanced options

Test the workflow

In the top-right corner of the screen, click **Save**, then **Test**. Under **Test Flow**, select **manually**. Then click **Test**, and **Run flow**.

The Excel file will get updated in your OneDrive account. It will look like the below.



1	Issue	Description	PersonName	PhoneNumber	IssueType
2	1	I am calling to report a plumbing issue in my apartment. I am in 2A. My name is Gabriel Diaz. My phone number is 425-555-0122.	Gabriel Diaz	425-555-0122	plumbing
3	2	I am calling to report a problem with our electricity. My name is Maya Robinson. And my phone number is 305-555-0122.	Maya Robinson	305-555-0122	other
4	3	I am calling to report an issue with our washer. I am in apartment 5A. My phone number is 206-555-0122. I am Anthony Ivanov.	Anthony Ivanov	206-555-0122	other
5	4	My name is Monica Thomson. I am in 1B. My garage door is not opening. Please call me at 360-555-0122.	Monica Thomson	360-555-0122	other
6	5	My name is Avery Howard. I am in 2B. My heater is not working. Please call me at 604-555-0122.	Terrence Howard	604-555-0122	other

Next steps

Explore more solutions

Azure Cognitive Services support and help options

3/20/2021 • 2 minutes to read • Edit Online

Are you just starting to explore the functionality of Azure Cognitive Services? Perhaps you are implementing a new feature in your application. Or after using the service, do you have suggestions on how to improve it? Here are options for where you can get support, stay up-to-date, give feedback, and report bugs for Cognitive Services.

Create an Azure support request

Explore the range of Azure support options and choose the plan that best fits, whether you're a developer just starting your cloud journey or a large organization deploying business-critical, strategic applications. Azure customers can create and manage support requests in the Azure portal.

- Azure portal
- Azure portal for the United States government

Post a question on Microsoft Q&A

For quick and reliable answers on your technical product questions from Microsoft Engineers, Azure Most Valuable Professionals (MVPs), or our expert community, engage with us on Microsoft Q&A, Azure's preferred destination for community support.

If you can't find an answer to your problem using search, submit a new question to Microsoft Q&A. Use one of the following tags when you ask your question:

- Cognitive Services

Vision

- Computer Vision
- Custom Vision
- Face
- Form Recognizer
- Video Indexer

Language

- Immersive Reader
- Language Understanding (LUIS)
- QnA Maker
- Text Analytics
- Translator

Speech

- Speech service

Decision

- Anomaly Detector

- Content Moderator
- Metrics Advisor (preview)
- Personalizer

Post a question to Stack Overflow

For answers on your developer questions from the largest community developer ecosystem, ask your question on Stack Overflow.

If you do submit a new question to Stack Overflow, please use one or more of the following tags when you create the question:

- Cognitive Services

Vision

- Computer Vision
- Custom Vision
- Face
- Form Recognizer
- Video Indexer

Language

- Immersive Reader
- Language Understanding (LUIS)
- QnA Maker
- Text Analytics
- Translator

Speech

- Speech service

Decision

- Anomaly Detector
- Content Moderator
- Metrics Advisor (preview)
- Personalizer

Submit feedback on User Voice

To request new features, post them on UserVoice. Share your ideas for making Cognitive Services and its APIs work better for the applications you develop.

- Cognitive Services

Vision

- Computer Vision
- Custom Vision
- Face

- Form Recognizer
- Video Indexer

Language

- Immersive Reader
- Language Understanding (LUIS)
- QnA Maker
- Text Analytics
- Translator

Speech

- Speech service

Decision

- Anomaly Detector
- Content Moderator
- Metrics Advisor (preview)
- Personalizer

Stay informed

Staying informed about features in a new release or news on the Azure blog can help you find the difference between a programming error, a service bug, or a feature not yet available in Cognitive Services.

- Learn more about product updates, roadmap, and announcements in Azure Updates.
- See what Cognitive Services articles have recently been added or updated in What's new in docs?
- News about Cognitive Services is shared in the Azure blog.
- Join the conversation on Reddit about Cognitive Services.

Next steps

What are Azure Cognitive Services?

External & community content for the Text Analytics Cognitive Service

5/4/2021 • 2 minutes to read • Edit Online

Links in this article lead you to helpful web content developed and produced by partners and professionals with experience in using the Text Analytics API.

Blogs

- Text Analytics API original announcement (Azure blog)
- Using Text Analytics Key Phrase Cognitive Services API from PowerShell (AutomationNext blog)
- R Quick tip: Azure Cognitive Services’ Text Analytics API (R Bloggers)
- Sentiment analysis in Logic App using SQL Server data (TechNet blog)
- Sentiment analysis with Dynamics 365 CRM Online (MSDN blog)
- Power BI blog: Extraction of key phrases from Facebook messages: Part 1 and Part 2
- Identify the sentiment of comments in a Yammer group with MS Flow (Microsoft tech community)

Videos

- Logic App to detect sentiment and extract key phrases from your text
- Sentiment Analysis using Power BI and Azure Cognitive Services
- Text analytics extract key phrases using Power BI and Azure Cognitive Services

Next steps

Are you looking for information about a feature or use-case that we don't cover? Consider requesting or voting for it using the feedback tool.

See also

StackOverflow: Azure Text Analytics API
StackOverflow: Azure Cognitive Services