Create an Azure Content Understanding client application

1. Introduction

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/01-introduction

Introduction

Completed

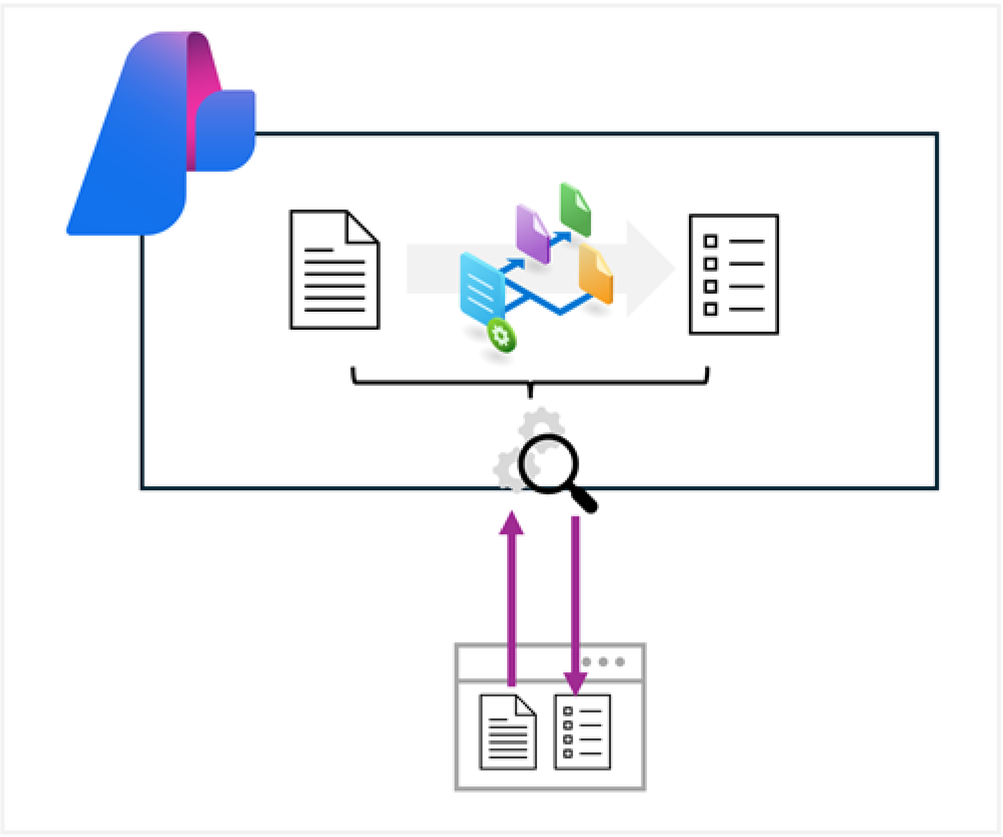
- 1 minute

Azure Content Understanding is a multimodal service that simplifies the creation of AI-powered analyzers that can extract information from multiple content formats, including documents, images, audio files, and videos.

Tip

To learn how to build Azure Content Understanding analyzers, complete the **Create a multimodal analysis solution with Azure Content Understanding** module.

You can develop client applications that use Azure Content Understanding analyzers by using the Azure Content Understanding REST API; which is the focus of this module.



In this module, you'll learn how to write code that uses the REST API to submit a content file to an analyzer and process the results.

Note

Azure Content Understanding is currently in public preview. Details described in this module are subject to change.

2. Prepare to use the AI Content Understanding REST API

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/02-prepare-content-understanding

Prepare to use the AI Content Understanding REST API

Completed

- 5 minutes

Before you can use the Azure Content Understanding REST API, you need a Foundry Tools multi-services resource in your Azure subscription. You can provision this resource in the following ways:

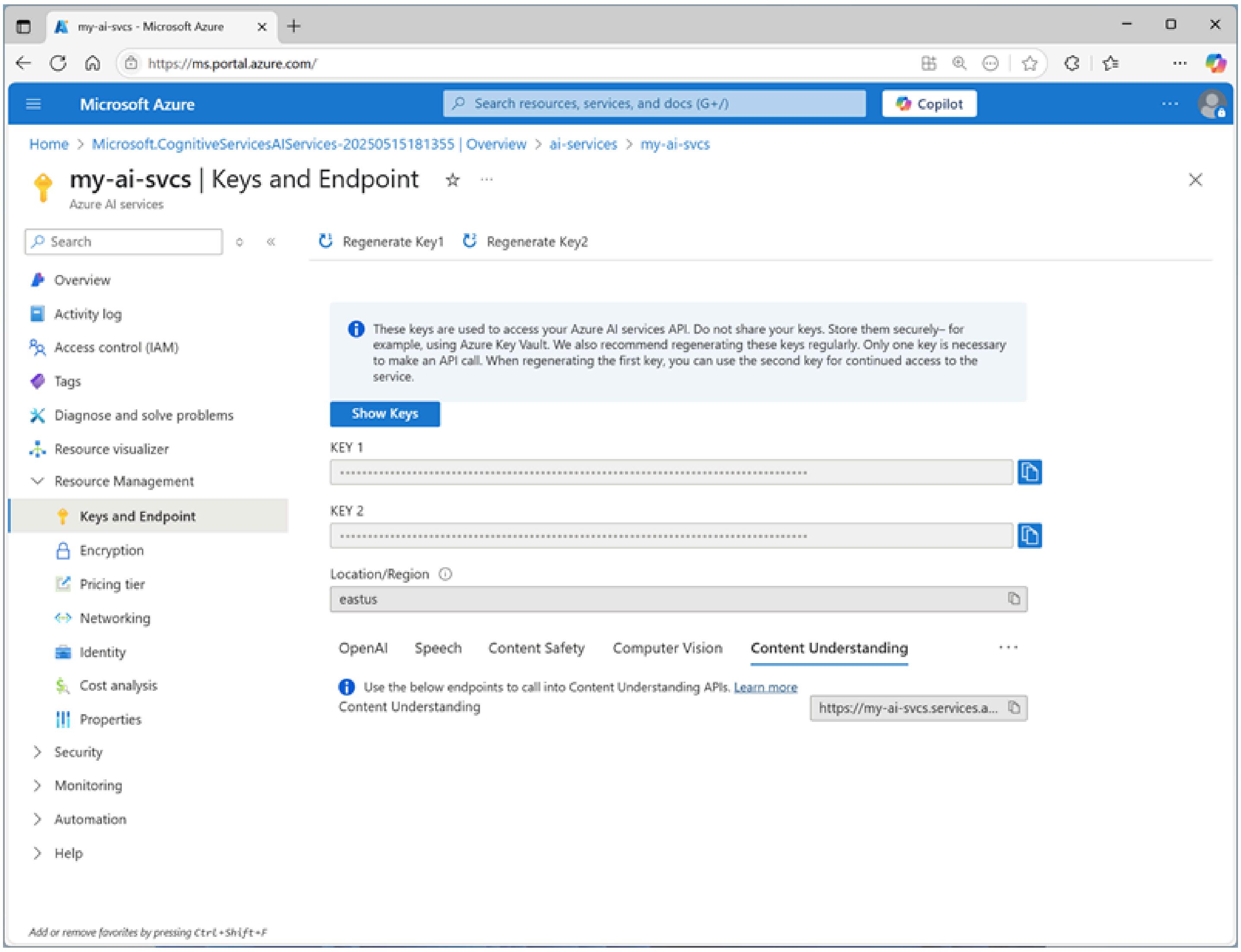
- Create a **Foundry Tools** resource in the Azure portal.
- Create a **Microsoft Foundry** hub, which includes a Foundry Tools resource by default.

> **Tip**
>
> Creating a Microsoft Foundry hub enables you to work in a Microsoft Foundry project, in which you can use visual tools to create and manage Azure Content Understanding schemas and analyzers.

After you've provisioned a Foundry Tools resource, you need the following information to connect to the Azure Content Understanding REST API from a client application:

- The Foundry Tools resource *endpoint*
- One of the API *keys* associated with the endpoint.

You can obtain these values from the Azure portal, as shown in the following image:



These keys are used to access your Azure AI services 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
••

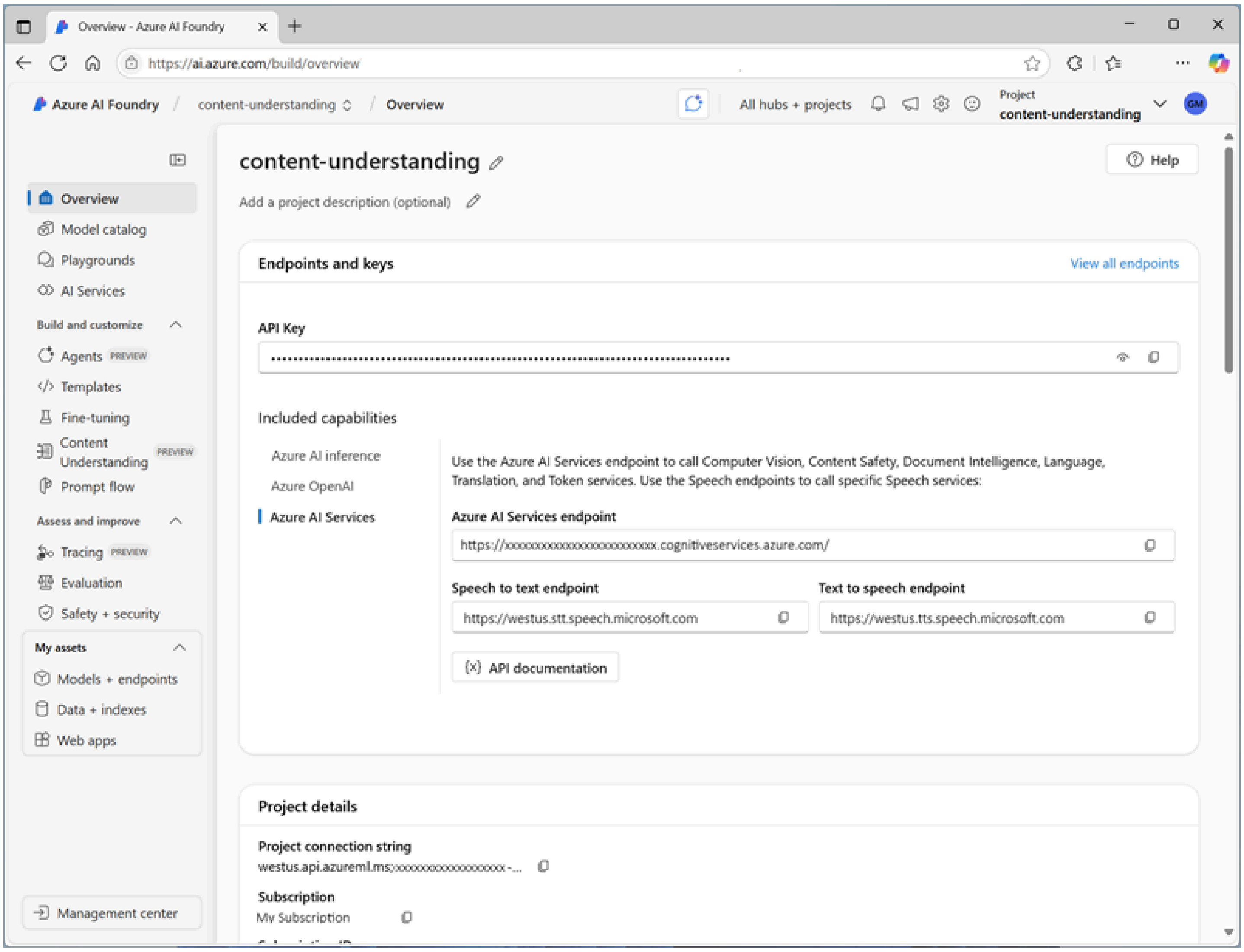
KEY 2
••

Location/Region
eastus

Use the below endpoints to call into Content Understanding APIs. Learn more

Content Understanding https://my-ai-svcs.services.a...

If you're working within a Microsoft Foundry project, you can find the endpoint and key for the associated Foundry Tools resource in the Microsoft Foundry portal, as shown in the following image:



content-understanding

Add a project description (optional)

Endpoints and keys

API Key
••

Included capabilities

Use the Azure AI Services endpoint to call Computer Vision, Content Safety, Document Intelligence, Language, Translation, and Token services. Use the Speech endpoints to call specific Speech services:

Azure AI Services endpoint
https://xxxxxxxxxxxxxxxxxxxxxxxxxx.cognitiveservices.azure.com/

Speech to text endpoint
https://westus.stt.speech.microsoft.com

Text to speech endpoint
https://westus.tts.speech.microsoft.com

Project details

Project connection string
westus.api.azureml.ms;xxxxxxxxxxxxxxxxxx-...

Subscription
My Subscription

When working in a Microsoft Foundry project, you can also write code that uses the Microsoft Foundry SDK to connect to the project using Microsoft Entra ID authentication, and retrieve the connection details for the Foundry Tools resource; including the endpoint and key.

Tip

To learn more about programming with the Microsoft Foundry SDK, complete the **Develop an AI app with the Microsoft Foundry SDK** module.

3. Create a Content Understanding analyzer

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/03-create-analyzer

Create a Content Understanding analyzer

Completed

- 5 minutes

In most scenarios, you should consider creating and testing analyzers using the visual interface in the Microsoft Foundry portal. However, in some cases you might want to create an analyzer by submitting a JSON definition of the schema for your desired content fields to the REST API.

Defining a schema for an analyzer

Analyzers are based on schemas that define the fields you want to extract or generate from a content file. At its simplest, a schema is a set of fields, which can be specified in a JSON document, as shown in this example of an analyzer definition:

```
{
    "description": "Simple business card",
    "baseAnalyzerId": "prebuilt-documentAnalyzer",
    "config": {
        "returnDetails": true
    },
    "fieldSchema": {
        "fields": {
            "ContactName": {
                "type": "string",
                "method": "extract",
                "description": "Name on business card"
            },
            "EmailAddress": {
                "type": "string",
                "method": "extract",
                "description": "Email address on business card"
            }
        }
    }
}
```

This example of a custom analyzer schema is based on the pre-built *document* analyzer, and describes two fields that you would expect to find on a business card: *ContactName* and *EmailAddress*. Both fields are defined as string data types, and are expected to be *extracted* from a document (in other words, the string values are expected to exist in the document so they can be "read"; rather than being fields that can be *generated* by inferring information about the document).

Note

This example is deliberately simple, with the minimal information needed to create a working analyzer. In reality, the schema would likely include more fields of different types, and the analyzer definition would include more configuration settings. The JSON might even include a sample document. See the Azure Content Understanding REST API documentation for more details.

Using the REST API to create an analyzer

With your analyzer definition in place, you can use the REST API to submit it to Azure Content Understanding to be created. The JSON data is submitted as a `PUT` request to the endpoint with the API key in the request header to start the analyzer creation operation.

The response from the `PUT` request includes a **Operation-Location** in the header, which provides a *callback* URL that you can use to check on the status of the request by submitting a `GET` request.

You can use any HTTP-capable client tool or language to submit the request. For example, the following Python code submits a request to create an analyzer based on the contents of a file named *card.json* (which is assumed to contain the JSON definition described previously)

```
 import json
import requests

# Get the buisness card schema
with open("card.json", "r") as file:
    schema_json = json.load(file)

# Use a PUT request to submit the schema for a new analyzer
analyzer_name = "business_card_analyser"

headers = {
    "Ocp-Apim-Subscription-Key": "<YOUR_API_KEY>",
    "Content-Type": "application/json"}

url = f"{<YOUR_ENDPOINT>}/contentunderstanding/analyzers/{analyzer_name}?api-version=2025-05-01-pr

response = requests.put(url, headers=headers, data=json.dumps(schema_json))

# Get the response and extract the ID assigned to the operation
callback_url = response.headers["Operation-Location"]

# Use a GET request to check the status of the operation
result_response = requests.get(callback_url, headers=headers)
```

```
# Keep polling until the operation is complete
status = result_response.json().get("status")
while status == "Running":
    result_response = requests.get(callback_url, headers=headers)
    status = result_response.json().get("status")

print("Done!")
```

4. Analyze content

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/04-analyze

Analyze content

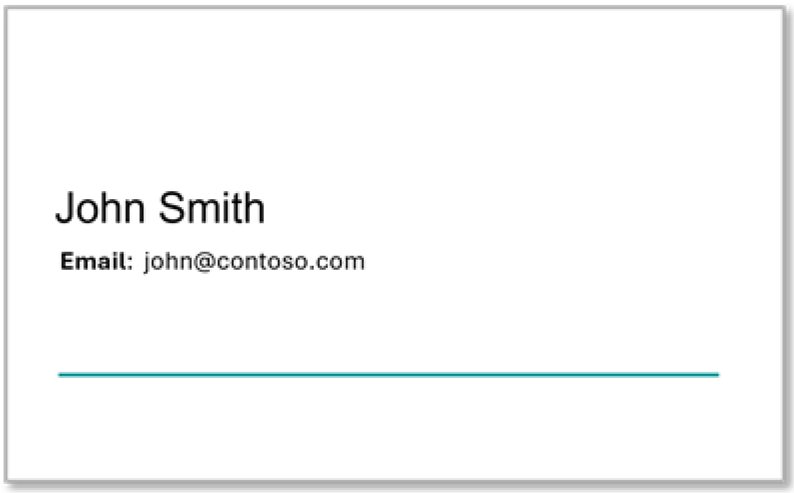
Completed

- 5 minutes

To analyze the contents of a file, you can use the Azure Content Understanding REST API to submit it to the endpoint using a `POST` request. You can specify the content as a URL (for a file hosted in an Internet-accessible location) or as the binary contents of the file (for example, a .pdf document, a .png image, an .mp3 audio file, or an .mp4 video file). The request header must include the API key, and the endpoint address for the **analyze** request includes the analyzer to be used.

As with the request to create an analyzer, the **analyze** request starts an asynchronous operation. The `POST` request returns a unique operation ID, which you can then use in a `GET` request to check the status of the analysis operation.

For example, suppose you want to use the business card analyzer discussed previously to extract the name and email address from the following scanned business card image:


John Smith

Email: john@contoso.com

The following Python code submits a request for analysis, and then polls the service until the operation is complete and the results are returned.

```
 import json
import requests

# Read the image data
with open("business-card.png", "rb") as file:
        image_data = file.read()

## Use a POST request to submit the image data to the analyzer
analyzer_name = "business_card_analyser"

headers = {
        "Ocp-Apim-Subscription-Key": "<YOUR_API_KEY>",
        "Content-Type": "application/octet-stream"}

url = f"{<YOUR_ENDPOINT>}/contentunderstanding/analyzers/{analyzer_name}:analyze?api-version=2025-

response = requests.post(url, headers=headers, data=image_data)

# Get the response and extract the ID assigned to the analysis operation
response_json = response.json()
id_value = response_json.get("id")

# Use a GET request to check the status of the analysis operation
result_url = f"{<YOUR_ENDPOINT>}/contentunderstanding/analyzerResults/{id_value}?api-version=2025-

result_response = requests.get(result_url, headers=headers)

# Keep polling until the analysis is complete
status = result_response.json().get("status")
while status == "Running":
        result_response = requests.get(result_url, headers=headers)
        status = result_response.json().get("status")

# Get the analysis results
if status == "Succeeded":
    result_json = result_response.json()
```

Processing analysis results

The results in the response JSON depend on:

- The kind of content the analyzer is designed to analyze (for example, document, video, image, or audio).
- The schema for the analyzer.
- The contents of the file that was analyzed.

For example, the response from the *document*-based business card analyzer when analyzing the business card described previously contain:

- The extracted fields
- The optical character recognition (OCR) layout of the document, including locations of lines of text, individual words, and paragraphs on each page.

Here's the complete JSON response for the business card analysis:

```
{
    "id": "00000000-0000-0000-0000-a00000000000",
    "status": "Succeeded",
    "result": {
        "analyzerId": "biz_card_analyser_2",
        "apiVersion": "2025-05-01-preview",
        "createdAt": "2025-05-16T03:51:46Z",
        "warnings": [],
        "contents": [
            {
                "markdown": "John Smith\nEmail: john@contoso.com\n",
                "fields": {
                    "ContactName": {
                        "type": "string",
                        "valueString": "John Smith",
                        "spans": [
                            {
                                "offset": 0,
                                "length": 10
                            }
                        ],
                        "confidence": 0.994,
                        "source": "D(1,69,234,333,234,333,283,69,283)"
                    },
                    "EmailAddress": {
```

```
                    "type": "string",
                    "valueString": "john@contoso.com",
                    "spans": [
                        {
                            "offset": 18,
                            "length": 16
                        }
                    ],
                    "confidence": 0.998,
                    "source": "D(1,179,309,458,309,458,341,179,341)"
                }
            },
            "kind": "document",
            "startPageNumber": 1,
            "endPageNumber": 1,
            "unit": "pixel",
            "pages": [
                {
                    "pageNumber": 1,
                    "angle": 0.03410444,
                    "width": 1000,
                    "height": 620,
                    "spans": [
                        {
                            "offset": 0,
                            "length": 35
                        }
                    ],
                    "words": [
                        {
                            "content": "John",
                            "span": {
                                "offset": 0,
                                "length": 4
                            },
                            "confidence": 0.992,
                            "source": "D(1,69,234,181,234,180,283,69,283)"
                        },
                        {
                            "content": "Smith",
                            "span": {
                                "offset": 5,
                                "length": 5
                            },
                            "confidence": 0.998,
                            "source": "D(1,200,234,333,234,333,282,200,283)"
                        },
                        {
                            "content": "Email:",
                            "span": {
                                "offset": 11,
                                "length": 6
```

```json
                        },
                        "confidence": 0.995,
                        "source": "D(1,75,310,165,309,165,340,75,340)"
                    },
                    {
                        "content": "john@contoso.com",
                        "span": {
                            "offset": 18,
                            "length": 16
                        },
                        "confidence": 0.977,
                        "source": "D(1,179,309,458,311,458,340,179,341)"
                    }
                ],
                "lines": [
                    {
                        "content": "John Smith",
                        "source": "D(1,69,234,333,233,333,282,69,282)",
                        "span": {
                            "offset": 0,
                            "length": 10
                        }
                    },
                    {
                        "content": "Email: john@contoso.com",
                        "source": "D(1,75,309,458,309,458,340,75,340)",
                        "span": {
                            "offset": 11,
                            "length": 23
                        }
                    }
                ]
            }
        ],
        "paragraphs": [
            {
                "content": "John Smith Email: john@contoso.com",
                "source": "D(1,69,233,458,233,458,340,69,340)",
                "span": {
                    "offset": 0,
                    "length": 34
                }
            }
        ],
        "sections": [
            {
                "span": {
                    "offset": 0,
                    "length": 34
                },
                "elements": [
                    "/paragraphs/0"
                    ]
                }
            ]
        }
    ]
  }
}
```

Your application must typically parse the JSON to retrieve field values. For example, the following python code extracts all of the *string* values:

```python
# (continued from previous code example)

# Iterate through the fields and extract the names and type-specific values
contents = result_json["result"]["contents"]
for content in contents:
    if "fields" in content:
        fields = content["fields"]
        for field_name, field_data in fields.items():
            if field_data['type'] == "string":
                print(f"{field_name}: {field_data['valueString']}")
```

The output from this code is shown here:

```
ContactName: John Smith
EmailAddress: john@contoso.com
```

5. Exercise - Develop a Content Understanding client application

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/05-exercise

Exercise - Develop a Content Understanding client application

Completed

- 40 minutes

Now it's your turn to build your own Content Understanding client application!

In this exercise, you use the Azure Content Understanding REST API to extract information from content by submitting a file to an analyzer.

> **Note**
>
> To complete this lab, you need an **Azure subscription** in which you have administrative access.

Launch the exercise and follow the instructions.

Launch Exercise

6. Module assessment

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/06-knowledge-check

Module assessment

Completed

- 3 minutes

7. Summary

https://learn.microsoft.com/en-us/training/modules/analyze-content-ai-api/07-summary

Summary

Completed

- 1 minute

Azure Content Understanding is a multimodal AI service that enables you to extract information from many different kinds of content. The REST API for the service enables you to create client applications that analyze content to extract and generate field values.

Note

For more information about Azure Content Understanding, see **Azure Content Understanding documentation**.