

# AI-900 Azure AI Fundamentals



Session 4  
Traitement du Langage Naturel

*La session commence à 12h00*

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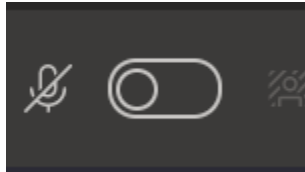


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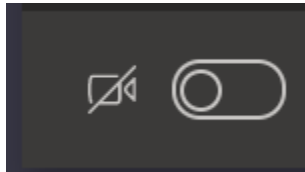
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# Agenda

- Présentation du NLP
- NLP dans Azure
- Quizz



# Sessions de l'académie AI-900

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## **Descriptif des sessions**

Session 1 : Lancement et Introduction au machine learning

Session 2 : Vision par ordinateur

Session 3 : Traitement automatique du langage naturel (NLP)

Session 4 : Détecteur d'anomalies et Recherche cognitive Azure

Session 5 : Klaxoon

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# Objectifs pédagogiques

Vous allez apprendre les concepts suivants :

- Présentation du traitement du langage naturel
  - Qu'est-ce que le traitement du langage naturel ?
  - Traitement du langage naturel dans Azure
- Utilisation des services de traitement du langage naturel
  - Analyse de texte
  - Reconnaissance et synthèse vocales
  - Traduction
  - Language Understanding



# Présentation du traitement du langage naturel

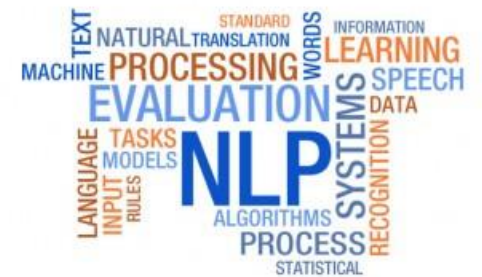




« ***Au commencement était le verbe.*** »

Évangile de Saint-Jean, premier chapitre

Sans langage il ne peut exister de pensée et sans pensée, aucune forme d'intelligence ne peut se développer.

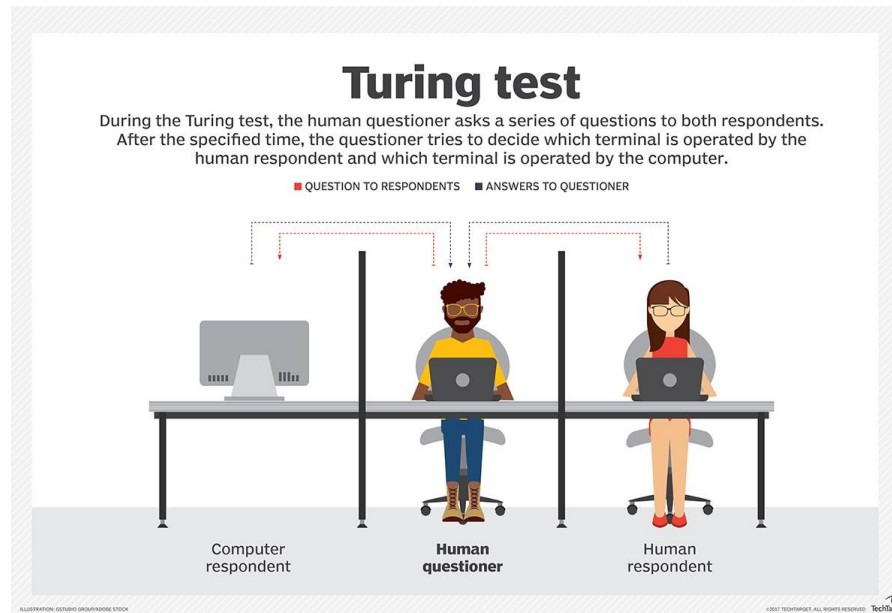


# What is Natural Language Processing?

**Natural language processing (NLP) is the relationship between computers and human language.** More specifically, natural language processing is the computer understanding, analysis, manipulation, and/or generation of natural language.



Alan Turing  
1912-1954



# Objective of NLP

**The ultimate goal of natural language processing is for computers to achieve human-like comprehension of texts/languages.**

When this is achieved, computer systems will be able to understand, draw inferences from, summarize, **translate and generate accurate and natural human text and language.**

Around **80% of data held within an organization is in the form of text documents**—for example, reports, Web pages, e-mails, and call center notes.

**Text is a key factor** in enabling an organization to gain a better understanding of their customers' behavior.

# How NLP works?

There are some commonly used techniques that can be used to build software to analyze text, including:

- **Statistical analysis of terms used in the text.** For example, removing common "stop words" (words like "the" or "a", which reveal little semantic information about the text), and performing *frequency analysis* of the remaining words (counting how often each word appears) can provide clues about the main subject of the text.
- Extending frequency analysis to multi-term phrases, commonly known as *N-grams* (a two-word phrase is a *bi-gram*, a three-word phrase is a *tri-gram*, and so on).
- Applying *stemming or lemmatization algorithms* to normalize words before counting them - for example, so that words like "power", "powered", and "powerful" are interpreted as being the same word.

# How NLP works?

- Applying linguistic structure rules to analyze sentences - for example, breaking down sentences into tree-like structures such as a *noun phrase*, which itself contains *nouns*, *verbs*, *adjectives*, and so on.
- Encoding words or terms as numeric features that can be used to train a machine learning model. For example, to classify a text document based on the terms it contains. This technique is often used to perform *sentiment analysis*, in which a document is classified as positive or negative.
- Creating *vectorized models that capture semantic relationships* between words by assigning them to locations in n-dimensional space. This modeling technique might, for example, assign values to the words "flower" and "plant" that locate them close to one another, while "skateboard" might be given a value that positions it much further away.

# NLP – Use Cases

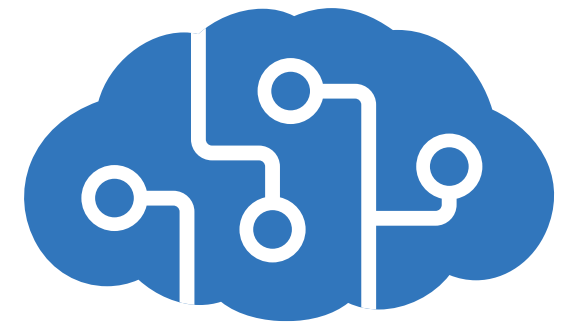
- **Translation** applications
- NLP helps in **detecting fake news**. For example, the NLP group at MIT has developed a system that identifies whether a source is politically biased or not. Based on the accuracy it suggests whether to trust a news source or not.
- NLP helps in **classifying emails**: analyze the text in our emails for filtering and stopping spams.
- NLP can help to **recognize and predict the patient's medical condition** or disease based on his own speech and some other records.
- **Financial traders** use NLP **for tracking news, reports, and comments**. All the insights gained are then feed in a trading algorithm for generating maximum profits.

# NLP – Use Cases

- **Various word processing applications** like Microsoft Word, Grammarly, etc use NLP for checking the grammatical errors in the text.
- Call centers respond to the customers' requests by using NLP in their **Interactive Voice Response(IVR) applications**.
- The organizations use NLP to **perform sentiment analysis** on the customer data collected from social media and other resources. This helps them to get insights about customers' choices and views about their products, reputation analysis, crisis management.
- **Personal Voice Assistants** (Cortana...) make use of NLP for responding to our vocal commands.
- **Content Moderation** to detect potentially offensive or unwanted content.
- And more...



# Utilisation des services de traitement du langage naturel



# NLP & Azure Cognitive Services

## Azure Cognitive Services

Decision

Language

Speech

Vision

Extract meaning from unstructured text

### Language Understanding

Build natural language understanding into apps, bots, and IoT devices.

### QnA Maker

Create a conversational question and answer layer over your data.

### Text Analytics

Detect sentiment, key phrases, and named entities.

### Translator

Detect and translate more than 90 supported languages.

# Azure Text Analytics

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](#), [key phrase extraction](#), [language detection](#) and [named entity recognition](#).

# Azure Text Analytics

## Sentiment Analysis

- Use [sentiment analysis](#) 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 preview, [opinion mining](#) 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.

# Azure Text Analytics

## Key Phrase Extraction

- Use [key phrase extraction](#) 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.

# Azure Text Analytics

## Names 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.

[Get started with Text Analytics on Azure - Learn | Microsoft Docs](#)

[Text Analytics | Microsoft Azure](#)

# Azure Language Understanding - LUIS

Build applications that can understand natural language.

Using machine teaching technology and our visual user interface, **developers and subject matter experts can build custom machine-learned language models that interpret user goals and extract key information from conversational phrases—all without any machine learning experience.**



Create custom language models specific to your use case with developer tools and a portal experience to simplify labeling



Build NLU models with no machine learning experience required



Run Language Understanding (LUIS) anywhere—in the cloud, on-premises, and at the edge with containers



Rely on enterprise-grade security and privacy applied to both your data and any trained models



# Application Development life cycle with LUIS



- **Plan:** Identify the scenarios that users might use your application for. Define the actions and relevant information that needs to be recognized.
- **Build:** Use your authoring resource to develop your app. Start by defining [intents](#) and [entities](#). Then, add training [utterances](#) for each intent.
- **Test and Improve:** Start testing your model with other utterances to get a sense of how the app behaves, and you can decide if any improvement is needed. You can improve your application by following these [best practices](#).
- **Publish:** Deploy your app for prediction and query the endpoint using your prediction resource. Learn more about authoring and prediction resources [here](#).
- **Connect:** Connect to other services such as [Microsoft Bot framework](#), [QnA Maker](#), and [Speech service](#).
- **Refine:** [Review endpoint utterances](#) to improve your application with real life examples

# LUIS – Utterance, Entities & Intents

## Utterance

- An utterance is an example of **something a user might say**, and which your application must interpret.
- For example, when using a home automation system, a user might use the following utterances

*"Switch the fan on."*

*"Turn on the light."*

# LUIS – Utterances, Entities & Intents

## Entity

- An entity is an item to which an utterance refers.
- For example, **fan** and **light** in the following utterances:

*"Switch the **fan** on."*

*"Turn on the **light**."*

You can think of the **fan** and **light** entities as being specific instances of a general **device** entity.

# LUIS – Utterances, Entities & Intents

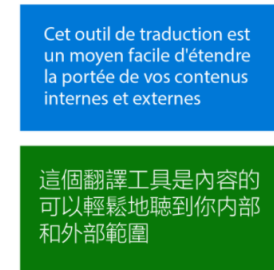
## Intent

- An intent represents the purpose, or goal, expressed in a user's utterance.
- For example, for both previously considered utterances, the intent is to turn a device on; so, in your Language Understanding application, you might define a **TurnOn** intent that is related to these utterances.

# Azure Translator

Translate text and document in real time or in batch across [90 languages and dialects](#), powered by the latest innovations in neural machine translation. Support a wide range of use cases, such as translation for call centers, web page localization enterprise internal communications, or eDiscovery.

Client app or web page



Web API



## Broad language coverage

Accurately translate text and documents between 90 languages and dialects.



## Customisable translations

Build custom models to handle domain-specific terminology.



## Production-ready

Access the same technology that powers billions of translations every day across Microsoft products.



## Security and flexible deployment

Your data remains yours. Deploy with containers to comply with specific data governance.

[Custom Translator \(azure.ai\)](https://azure.ai)

Integrated natively with PowerPoint => Demo

# Azure Translator – Create a Translator Service

## Create Translator ...

Basics Tags Review + create

Easily integrate real-time text translation capabilities into your application's websites, tools, or any solution requiring multi-language support such as website localization, e-commerce, customer support, messaging applications, internal communication, and more. [Learn more](#)

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ

Resource group \* ⓘ  [Create new](#)

### Instance details

**i** Please choose the Global region unless your business or application requires a specific region. Applications that do not offer a region selection use the Global region.

Region \* ⓘ

Name \* ⓘ

Pricing tier \* ⓘ

[View full pricing details](#)

## Access the endpoint and the key

### translatorfg | Keys and Endpoint ...

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems

#### Resource Management

- Quick start
- Keys and Endpoint**
- Encryption
- Pricing tier
- Networking
- Identity
- Billing By Subscription
- Properties
- Locks

[Regenerate Key1](#) [Regenerate Key2](#)

**i** These 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.

[Show Keys](#)

KEY 1

.....



KEY 2

.....



Endpoint



Location ⓘ



# Azure Translator – Call the API Translator in AML

```
1 # Create a function that makes a REST request to the Text Translation service
2 def translate_text(cog_region, cog_key, text, to_lang='fr', from_lang='en'):
3     import requests, uuid, json
4
5     # Create the URL for the Text Translator service REST request
6     path = 'https://api.cognitive.microsofttranslator.com/translate?api-version=3.0'
7     params = '&from={}&to={}'.format(from_lang, to_lang)
8     constructed_url = path + params
9
10    # Prepare the request headers with Cognitive Services resource key and region
11    headers = {
12        'Ocp-Apim-Subscription-Key': cog_key,
13        'Ocp-Apim-Subscription-Region': cog_region,
14        'Content-type': 'application/json',
15        'X-ClientTraceId': str(uuid.uuid4())
16    }
17
18    # Add the text to be translated to the body
19    body = [{
20        'text': text
21    }]
22
23    # Get the translation
24    request = requests.post(constructed_url, headers=headers, json=body)
25    response = request.json()
26    return response[0]["translations"][0]["text"]
27
28
29 # Test the function
30 text_to_translate = "My tailor is rich"
31
32 translation = translate_text(cog_region, cog_key, text_to_translate, to_lang='fr', from_lang='en')
33 print('{} -> {}'.format(text_to_translate, translation))
✓ <1 sec
```

My tailor is rich -> Mon tailleur est riche

Python code to call  
the API Translator



# Azure Translator – Custom Translator

[Custom Translator](#) is a feature of the Microsoft Translator service, which enables Translator enterprises, app developers, and language service providers to build customized neural machine translation (NMT) systems. The customized translation systems seamlessly integrate into existing applications, workflows, and websites.

Feature	Description
<a href="#">Apply neural machine translation technology</a>	Improve your translation by applying neural machine translation (NMT) provided by Custom translator.
<a href="#">Build systems that knows your business terminology</a>	Customize and build translation systems using parallel documents, that understand the terminologies used in your own business and industry.
<a href="#">Use a dictionary to build your models</a>	If you don't have training data set, you can train a model with only dictionary data.
<a href="#">Collaborate with others</a>	Collaborate with your team by sharing your work with different people.
<a href="#">Access your custom translation model</a>	Your custom translation model can be accessed anytime by your existing applications/ programs via Microsoft Translator Text API V3.

# Azure QnA Maker

**QnA Maker** is a cloud-based API service that lets you [create a conversational question-and-answer layer over your existing data](#).

Use it to build a knowledge base by extracting questions and answers from your semi-structured content, including FAQ, manuals, and documents.

Answer users' questions with the best answers from the QnAs in your knowledge base—automatically.

Your knowledge base gets smarter, too, as it continually learns from user behavior.



Automatically extract question-answer pairs from semi-structured content, including FAQ, product manuals, guidelines, support documents, and policies



Improve your knowledge base with suggestions for alternative questions. Add or reject them based on their relevance



Easily create, edit, and train complex multiturn conversations in the QnA Maker portal or using REST APIs



Create and publish a bot in Microsoft Teams, Skype, or elsewhere—no code experience required. Simply upload a semi-structured document or URL

[QnA Maker](#)

# When to use QnA Maker?

- **When you have static information** - Use QnA Maker when you have static information in your knowledge base of answers. This knowledge base is custom to your needs, which you've built with documents such as [PDFs and URLs](#).
- **When you want to provide the same answer to a request, question, or command** - when different users submit the same question, the same answer is returned.
- **When you want to filter static information based on meta-information** - add [metadata](#) tags to provide additional filtering options relevant to your client application's users and the information. Common metadata information includes [chit-chat](#), content type or format, content purpose, and content freshness.
- **When you want to manage a bot conversation that includes static information** - your knowledge base takes a user's conversational text or command and answers it. If the answer is part of a pre-determined conversation flow, represented in your knowledge base with [multi-turn context](#), the bot can easily provide this flow.

# What is a Knowledge Base?

QnA Maker [imports your content](#) into a [knowledge base](#) of question-and-answer pairs.

The import process extracts information about the relationship between the parts of your structured and semi-structured content to imply relationships between the question-and-answer pairs.

You can edit these question-and-answer pairs or add new pairs.

The content of the question-and-answer pair includes:

- All the alternate forms of the question
- Metadata tags used to filter answer choices during the search
- Follow-up prompts to continue the search refinement

Question	Answer	Metadata tags ?
Original source: <a href="https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/faqs">https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/faqs</a>		
I accidentally deleted a part of my QnA Maker, what should I do? <span>×</span>	All deletes are permanent, including question and answer pairs, files, URLs, custom questions and answers, knowledge bases, or Azure resources. Make sure you export your knowledge base from the <b>**Settings**</b> page before deleting any part of your knowledge base.	Type : troubleshooting <span>×</span>
Can I undo deleted questions and answers? <span>✓</span> <span>×</span>		Format : text-only <span>×</span>
		Nextstep : recover <span>×</span> <span>+</span>

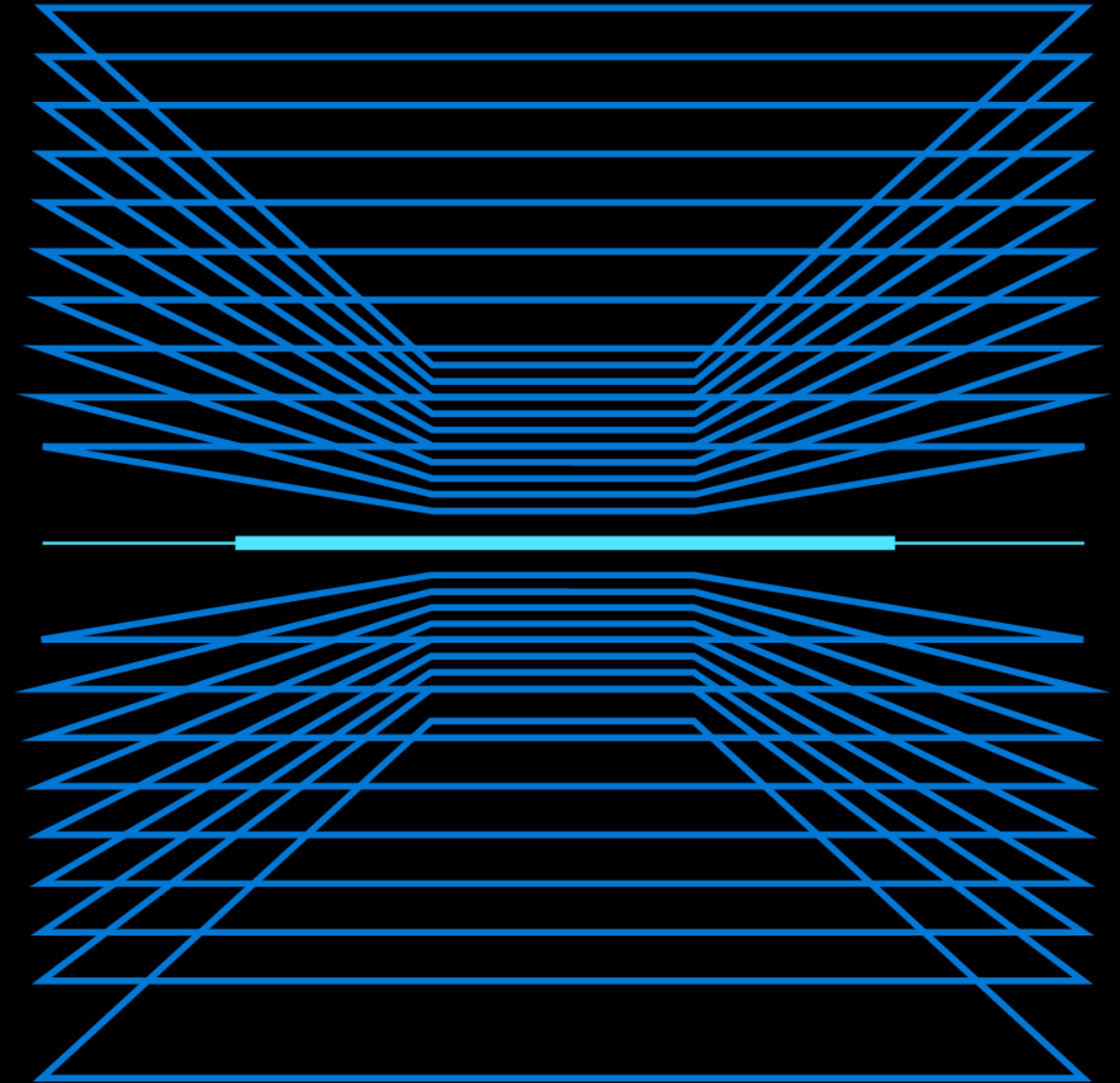
# Atelier

## Language Understanding

1. Accédez au module Microsoft Learn à l'adresse <https://aka.ms/learn-luis-fra>
2. Suivez les instructions de l'unité

### **Exercice - Créer une application LUIS**

Réutilisez votre Codespace de l'atelier précédent



# Aperçu du module

Nous avons traité les concepts suivants :

- Présentation du traitement du langage naturel
  - Qu'est-ce que le traitement du langage naturel ?
  - Traitement du langage naturel dans Azure
- Utilisation des services de traitement du langage naturel
  - Analyse de texte
  - Reconnaissance et synthèse vocales
  - Traduction
  - Language Understanding





# Le Quizz



# Module Quizz



Vous envisagez d'utiliser le service Analyse de texte (Text Analytics) pour déterminer les principaux sujets abordés dans un document texte. Quelle fonctionnalité du service devez-vous utiliser ?

---

- ☐ Analyse des Sentiments
- ☐ Extraction de phrases clés
- ☐ Détection d'Entités

# Module Quizz



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- ☒ Extraction de phrases clés
- ☐ Détection d'Entités

# Module Quizz



Vous créez une application Language Understanding pour gérer une horloge internationale. Vous voulez que les utilisateurs puissent demander l'heure actuelle dans une ville spécifiée, par exemple « Quelle heure est-il à Londres ? ». Que devez-vous faire ?

- ☐ Définir une entité « ville » et une intention « ObtenirHeure » avec des énoncés qui indiquent l'intention « ville ».
- ☐ Créer une intention pour chaque ville, chacune avec un énoncé qui demande l'heure dans cette ville.
- ☐ Ajouter l'énoncé « Quelle heure est-il dans ville » à l'intention « Aucun ».

# Module Quizz



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# Module Quizz



Vous envisagez de créer une application qui utilise le service Speech pour transcrire les enregistrements audios d'appels téléphoniques en texte, puis qui envoie le texte transcrit au service Analyse de texte pour en extraire les phrases clés. Vous souhaitez gérer l'accès et la facturation des services d'application dans une seule ressource Azure. Quel type de ressource Azure devez-vous créer ?

- ☐ Speech
- ☐ Analyse de Texte
- ☐ Cognitive Services



# Module Quizz



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- ☐ Speech
- ☐ Analyse de Texte
- ☒ Cognitive Services

# Aller plus loin sur Microsoft Learn

Explorez le traitement du langage naturel  
<https://aka.ms/explore-nlp-fra>

