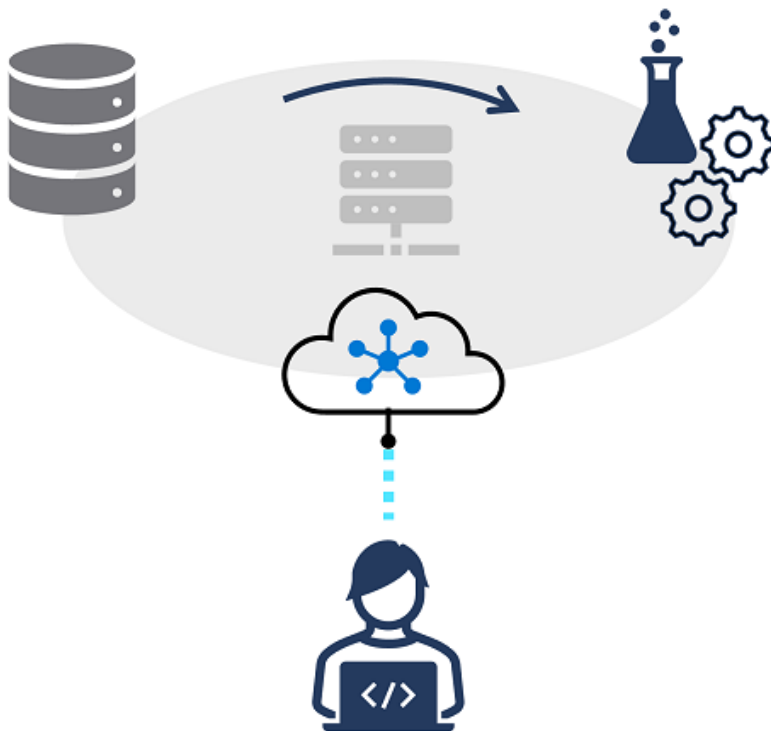## AI Services in Microsoft Azure

- Azure Machine Learning – Platform for training, deploying and managing machine learning models
- Cognitive Service – A Suite of services with four main pillars: - Vision, Speech, Language and Decision
- Azure Bot Service – A Cloud based platform for developing and managing conversational bots
- Azure Cognitive Search – Data extraction, enrichment and indexing for intelligent search and knowledge mining.

## Azure Machine Learning



Microsoft Azure provides the **Azure Machine Learning** service - a cloud-based platform for running experiments at scale to train predictive models from data, and publish the trained models as services.

**Azure Machine Learning** is designed for developers to train, test, deploy and manage ML Models from scratch. Meaning they can experiment with data to make predictions. They can work starting from a data set and manipulate it to generate insights and predictions from the data with fully autonomy on what type of model you use. How to make predictions.

And you're usually going to find the data scientists and data analysts are playing around this tool.

A Major advantage of this tool that you don't have to worry about spending any time setting up the environment. The moment you deploy the service can immediately start hacking and building out your solution using the tools inside of the azure machine learning environment

| Feature | Capability |
|---------|-----------|
| Automated machine learning | This feature enables non-experts to quickly create an effective machine learning model from data. |
| Azure Machine Learning designer | A graphical interface enabling no-code development of machine learning solutions. |
| Data and compute management | Cloud-based data storage and compute resources that professional data scientists can use to run data experiment code at scale. |
| Pipelines | Data scientists, software engineers, and IT operations professionals can define pipelines to orchestrate model training, deployment, and management tasks. |

**Roles**

Data scientists can use Azure Machine Learning throughout the entire machine learning lifecycle to:

- Ingest and prepare data.

- Run experiments to explore data and train predictive models.

- Deploy and manage trained models as web services.

Software engineers may interact with Azure Machine Learning in the following ways:

- Using Automated Machine Learning or Azure Machine Learning designer to train machine learning models and deploy them as REST services that can be integrated into AI-enabled applications.

- Collaborating with data scientists to deploy models based on common frameworks such as Scikit-Learn, PyTorch, and TensorFlow as web services, and consume them in applications.

- Using Azure Machine Learning SDKs or command-line interface (CLI) scripts to orchestrate DevOps processes that manage versioning, deployment, and testing of machine learning models as part of an overall application delivery solution.

**Lab-1**

Azure portal→

Dataset URL

aka.ms/bike-rentals

Experiment Time out: 30 minutes

Max Threshold : 0.085%

```
{
 "Inputs": {
  "data": [
   {
     "day": 1,
     "mnth": 1,
     "year": 2024,
     "season": 2,
     "holiday": 0,
     "weekday": 1,
     "workingday": 1,
     "weathersit": 2,
     "temp": 0.6,
     "atemp": 0.3,
     "hum": 0.3,
     "windspeed": 0.3
   }
  ]
 },
 "GlobalParameters": 1.0
}
```

## Azure Cognitive Services

**Azure Cognitive Services** are cloud-based services that encapsulate AI capabilities. Rather than a single product, you should think of Azure Cognitive Services as a set of individual services that you can use as building blocks to compose sophisticated, intelligent applications.

| Capabilities: - | | | |
|---|---|---|---|
| **Language** | **Speech** | **Vision** | **Decision** |
| Text analysis | Speech to Text | Image analysis | Anomaly detection |
| Question answering | Text to Speech | Video analysis | Content moderation |

| Language understanding | Speech Translation | Image classification | Content personalization |
|---|---|---|---|
| Translation | Speaker Recognition | Object detection | |
| | | Facial analysis | |
| | | Optical character recognition | |

**Azure Bot Services**
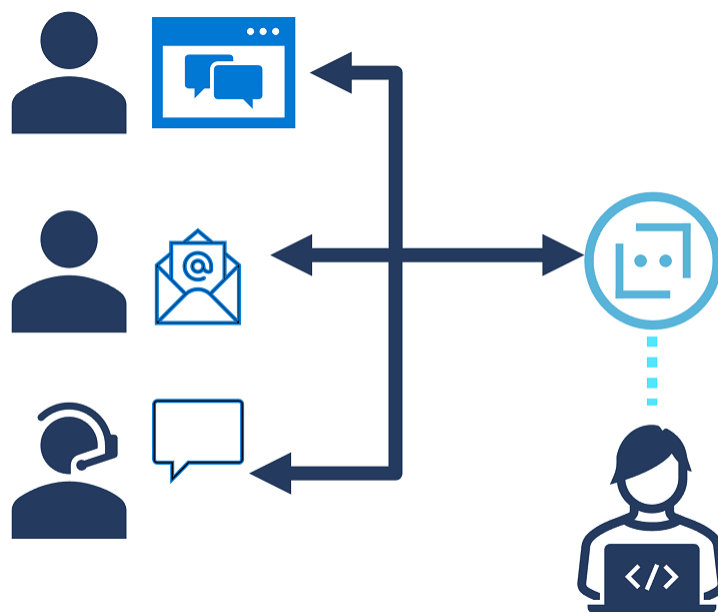


- *Bots* **are AI-powered** software agents that can engage in conversational interactions.
- Example
  - Web site may include a *chat bot* interface in which users can submit questions using natural language and receive conversational responses, or an organization might use a bot to answer incoming phone calls and gather initial information before forwarding the call to the appropriate operator.

- The **Azure Bot Service** is an Applied AI service for developing and delivering bot solutions that support conversational interactions across multiple *channels*, such as web chat, email, Microsoft Teams, and others.
- AI engineers can develop Bots by writing code, using the classes available in the *Bot Framework SDK*. Alternatively, you can use the *Bot Framework Composer* to develop complex bots using a visual design interface.

**Azure Cognitive Services**
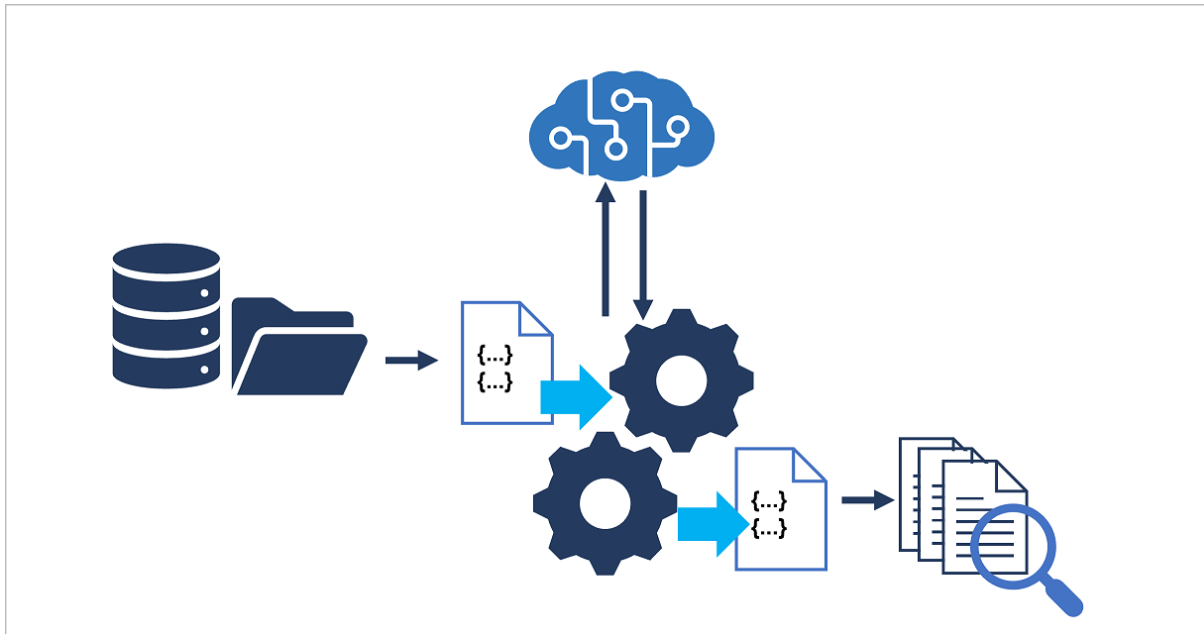
**Azure Cognitive Search** is an Applied AI Service that enables you to ingest and index data from various sources, and search the index to find, filter, and sort information extracted from the source data.

- In addition to basic text-based indexing, Azure Cognitive Search enables you to define an *enrichment pipeline* that uses AI skills to enhance the index with insights derived from the source data.
  - For example: -
    - By using computer vision and natural language processing capabilities to generate descriptions of images, extract text from scanned documents, and determine key phrases in large documents that encapsulate their key points.
    - Not only does this AI enrichment produce a more useful search experience, but the insights also extracted by your enrichment pipeline can be persisted in a ==*knowledge*== *store* for further analysis or integration into a data pipeline for a business intelligence solution.
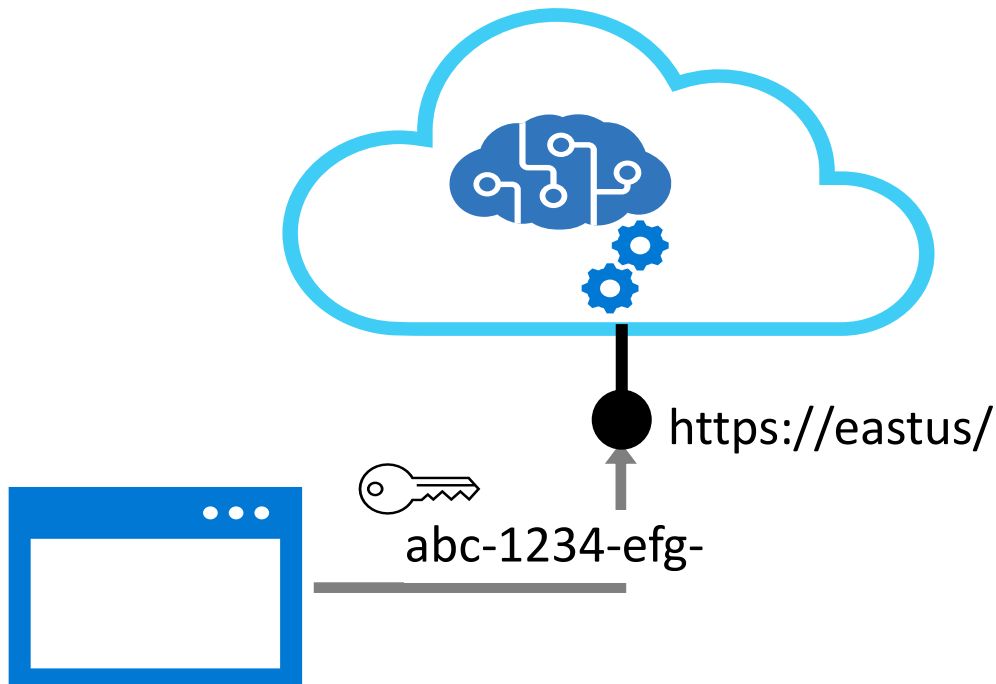
## Azure AI Services

**AI application resources in an Azure subscription:**

- **Standalone resources for specific services**
- **General Azure AI services resource for multiple services**

**Consumed by applications via:**

- **A REST endpoint (https://address)**
- **An authentication key or authorization token**

https://eastus/

abc-1234-efg-

**Applied AI Services**

You can use Cognitive Services to build your own AI solutions, and they also underpin *Azure Applied AI Services* that provide out-of-the-box solutions for common AI scenarios. Applied AI Services include:

- **Azure Form Recognizer** - an optical character recognition (OCR) solution that can extract semantic meaning from forms, such as invoices, receipts, and others.

- **Azure Metrics Advisor** - A service built on the Anomaly Detector cognitive service that simplifies real-time monitoring and response to critical metrics.

- **Azure Video Analyzer for Media** - A comprehensive video analysts solution build on the Video Indexer cognitive service.

- **Azure Immersive Reader** - A reading solution that supports people of all ages and abilities.

- **Azure Bot Service** - A cloud service for delivering conversational AI solutions, or *bots*.

- **Azure Cognitive Search** - A cloud-scale search solution that uses cognitive services to extract insights from data and documents.

**Lab-2**

Create an Azure AI Content Safety

Create an Azure AI Translator