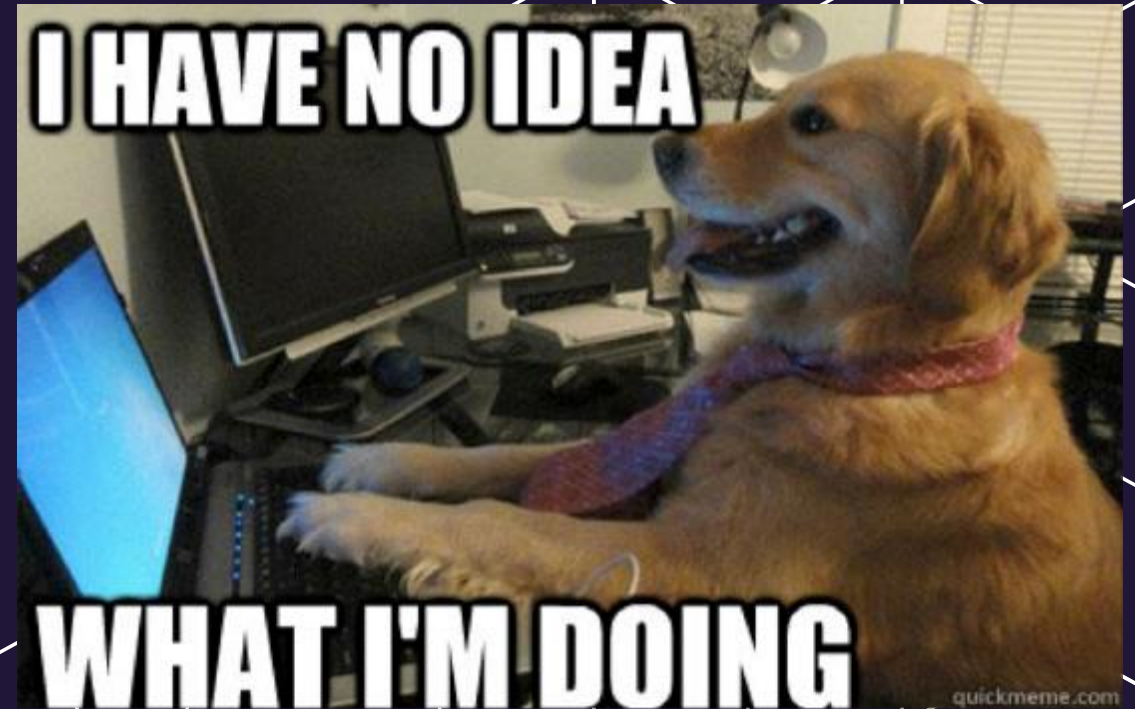


sqlbits

Leveraging Prebuilt AI Models in SQL Server 2019

*Anna Thomas, Data & Applied Scientist
SQL Server Engineering, Microsoft*



Introduction

Overview

In this session, you'll learn about the various prebuilt AI/ML models that are available for your consumption through Microsoft's Cognitive Services. Additionally, you'll see examples of how these prebuilt services can be leveraged with SQL Server 2019.

Agenda

- SQL Server M
- AI
- Cogniti
- SQL S
- + Co
- Where to learn more

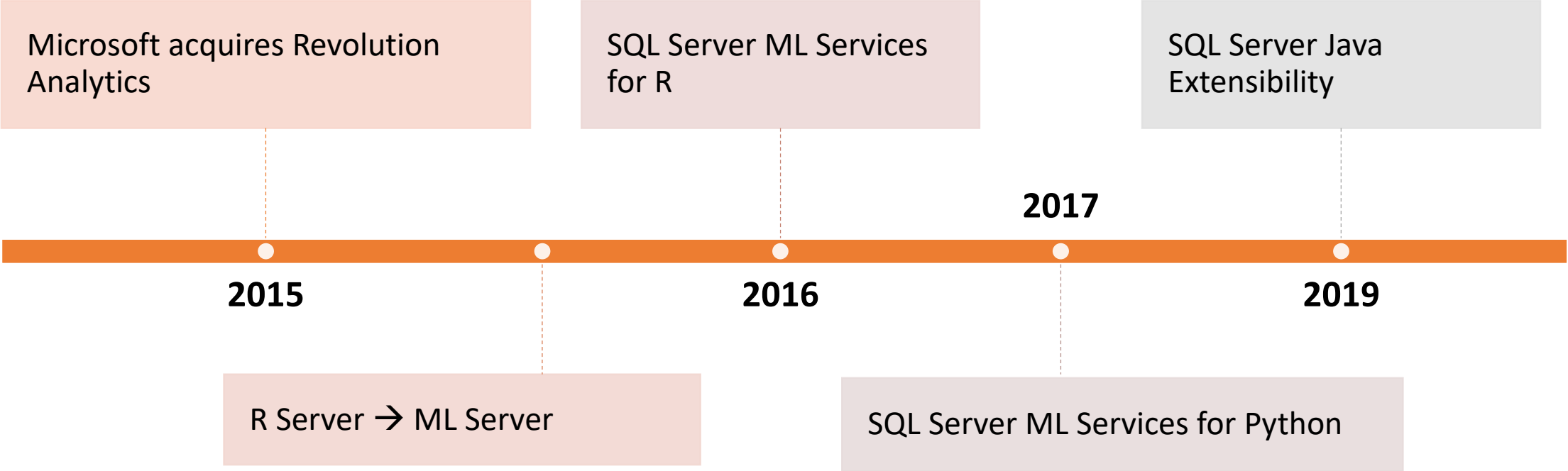


WARNING

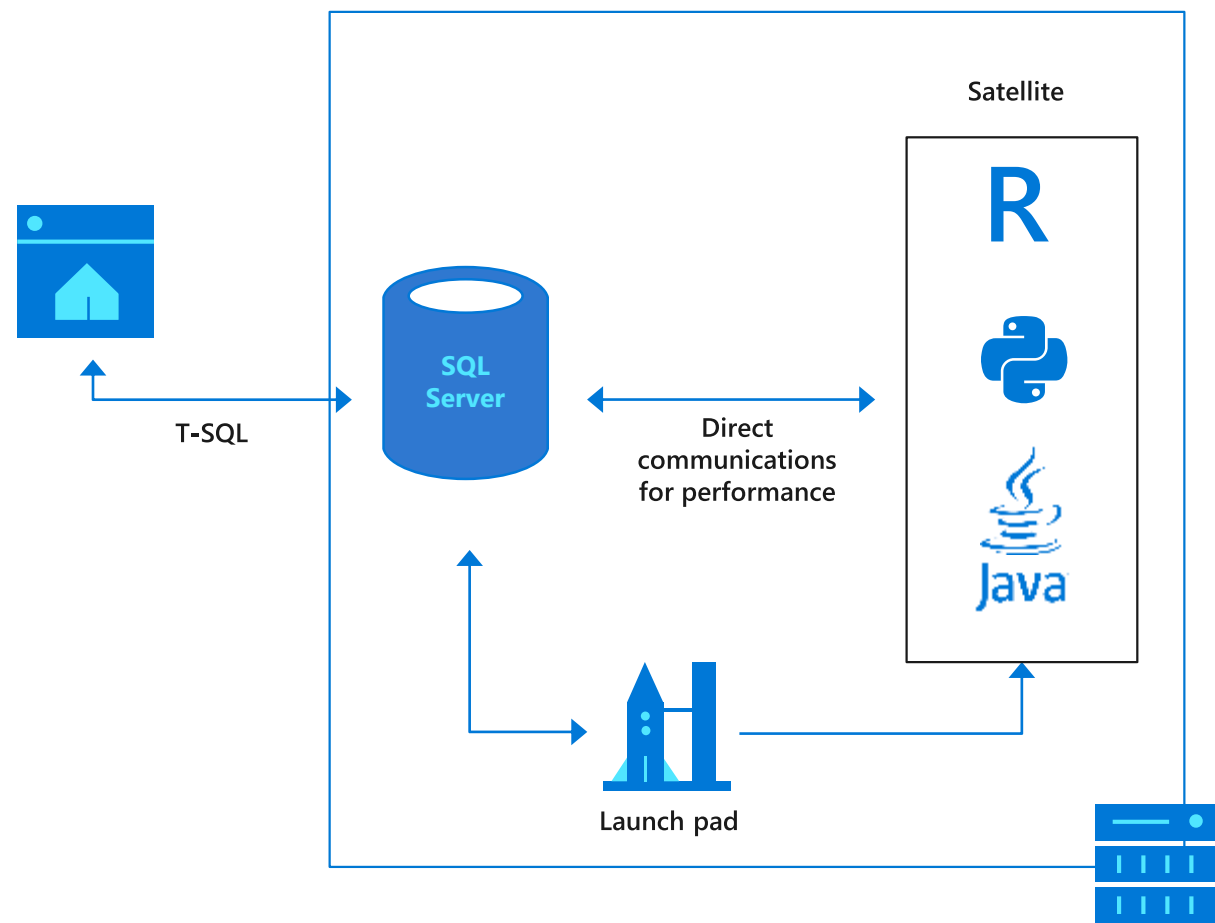


SQL Server ML Services + Extensibility

Evolution of SQL Server ML Services + Extensibility



Extend T-SQL with R, Python, and Java

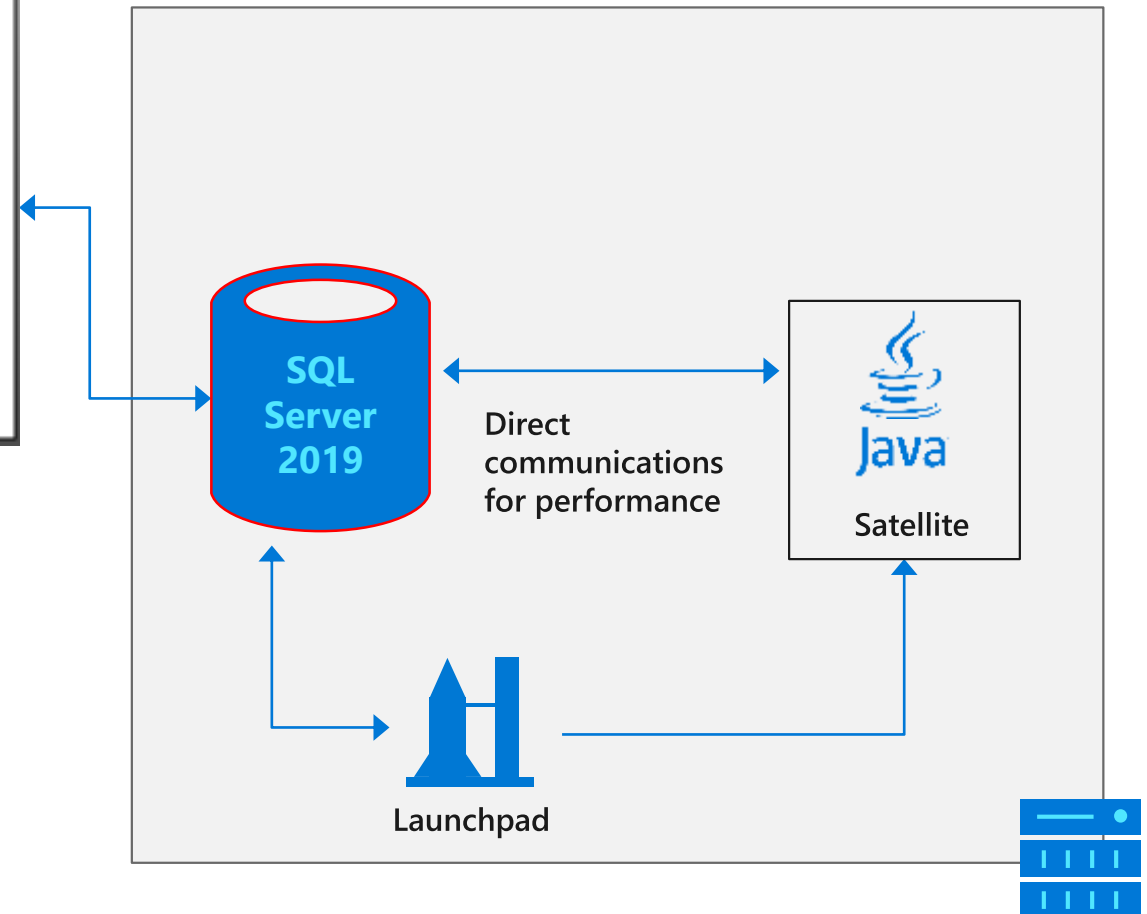


Extend T-SQL with R, Python, and Java

```
DECLARE @myClassPath nvarchar(30)
SET @myClassPath = N'<my path>/program.jar'
SET @param1 = 3

EXEC sp_execute_external_script
    @language = N'Java'
    , @script = N'package.ClassName.MethodName'
    , @input_data_1 = N'<Input Query>'
    , @params = N'@CLASSPATH nvarchar(30), @param1 INT'
    , @CLASSPATH = @myClassPath
    , @param1 = @param1
with result sets ((outputcol int, outputcol2 int))
```

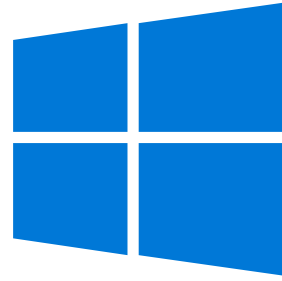
Run Java code using the same SQL
Extensibility Infrastructure



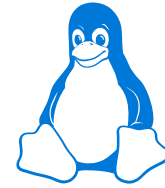
Enhancing the platform of choice

- Closing features gaps for SQL Server on Linux
- Open LDAP Provider support
- The Microsoft Container Registry
- SQL Server RedHat Container Images
- Always On Availability Groups on Kubernetes

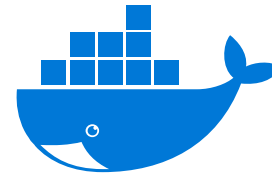
Windows



Linux

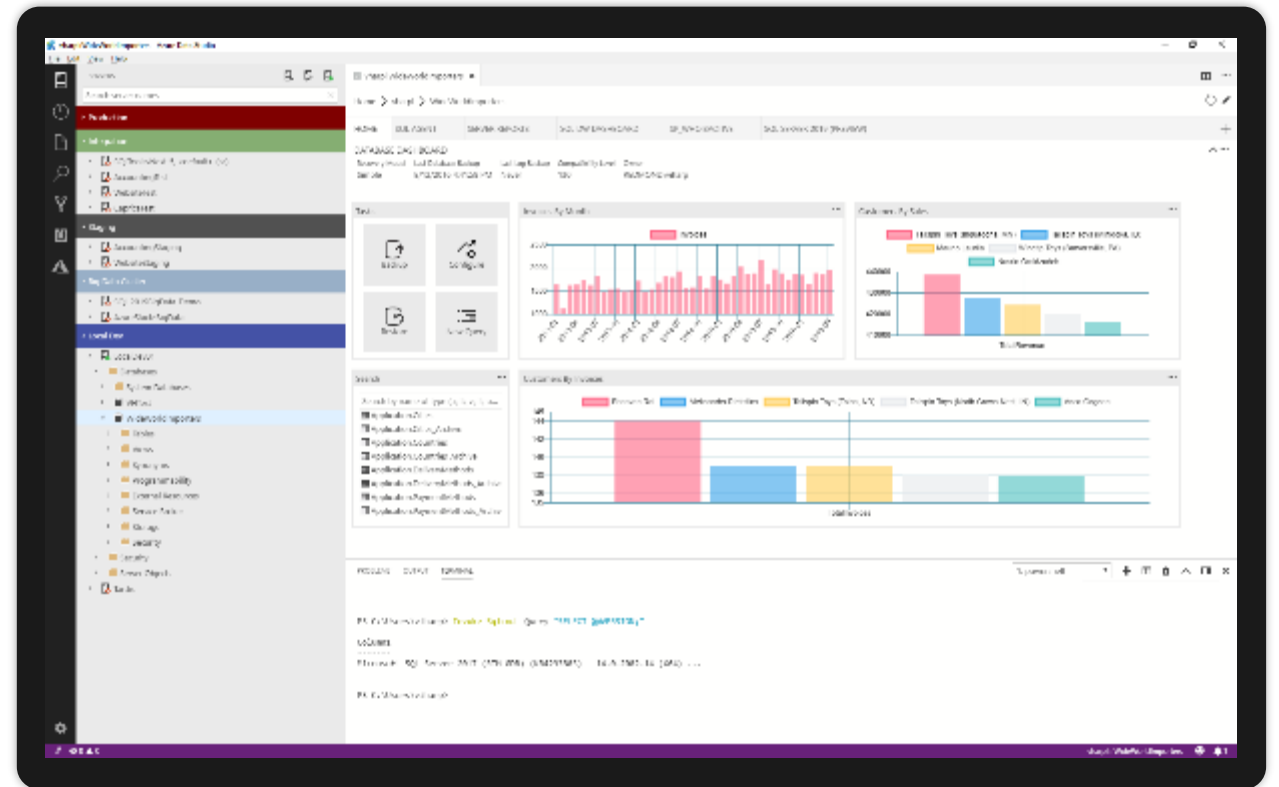


Docker containers and Kubernetes



Azure Data Studio

- Open source, cross-platform
- Graphical management tool
- Code editor
- Notebook interface





Azure Data Studio + Java

Demo

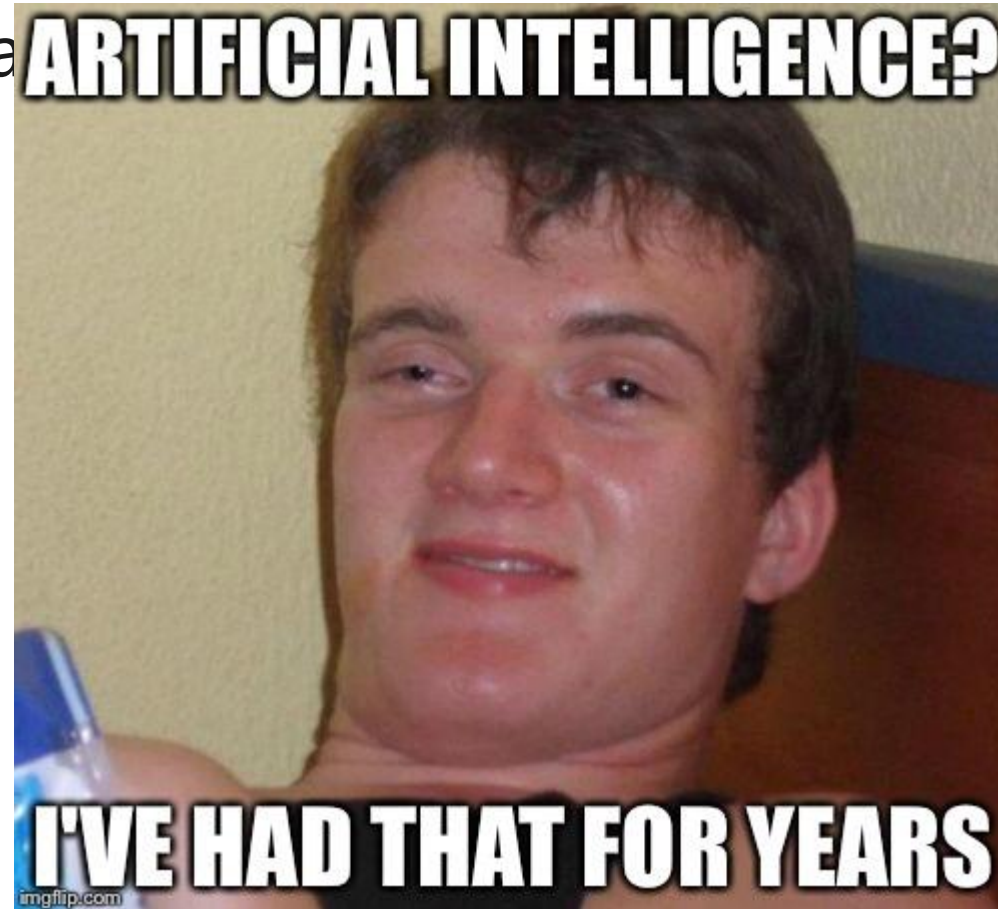


Prebuilt AI



What is AI?

The capability of a machine to **ARTIFICIAL INTELLIGENCE?** for



What is *Prebuilt* AI?

Leveraging existing models to add intelligence to your applications, *without* having to build the models



Cognitive Services

<https://media.tenor.com/images/2322d33b51af745c13e7e397bc9b14c0/tenor.gif>

Azure Cognitive Services

Give your apps a human side



Vision

From objects to faces and feelings, enable your apps to analyze still images and video.



Speech

Speak to and hear your users, compensating for environmental noise.
Use with **Language** for max results.



Language

Analyze text to extract user feeling and intent.
Extract knowledge from existing sources and use it to seed chat bots.
Translate between 60+ languages and growing.



Search

Access billions of web pages, images, videos, and news with the power of Bing.



Knowledge

Preview the newest capabilities from analyzing time series to personalization over reinforcement learning.

Cognitive Services capabilities

Infuse your apps, websites, and bots with human-like intelligence



Vision

Object, scene, and activity detection

Face recognition and identification*

Celebrity and landmark recognition

Emotion recognition

Text and handwriting recognition (OCR)*

Customizable image recognition

Video metadata, audio, and keyframe extraction and analysis

Explicit or offensive content moderation

Container support



Speech

Speech transcription (speech-to-text)

Custom speech models for unique vocabularies or complex environment

Text-to-speech

Custom Voice

Real-time speech translation

Customizable speech transcription and translation

Speaker identification and verification



Language

Language detection*

Named entity recognition

Key phrase extraction*

Text sentiment analysis*

Multilingual and contextual spell checking

Explicit or offensive text content moderation

PII detection for text moderation

Text translation

Customizable text translation

Contextual language understanding*

Container Support



Knowledge

Q&A extraction from unstructured text

Knowledge base creation from collections of Q&As

Semantic matching for knowledge bases

Customizable content personalization learning



Search

Ad-free web, news, image, and video search results

Trends for video, news

Image identification, classification and knowledge extraction

Identification of similar images and products

Named entity recognition and classification

Knowledge acquisition for named entities

Search query autosuggest

Ad-free custom search engine creation

*** Also available with container support**



Intelligent Kiosk

Demo



SQL Server + Cognitive Services



SQL Server + Cognitive Services

- Add intelligence to your data WITHOUT Data Scientists



Face Recognition

Face detection

Detect faces and their attributes within an image

Face verification

Check if two faces belong to the same person

Similar face searching

Find similar faces within a set of images

Face grouping

Organize many faces into groups

Face identification

Search which person a face belongs to



Computer Vision

Analyze an image

Understand content within an image

OCR

Detect and recognize words within an image

Recognize celebrities

Thanks to domain-specific models, ability to recognize 200K celebrities from business, politics, sports, and entertainment around the world



Text Analytics

Sentiment analysis

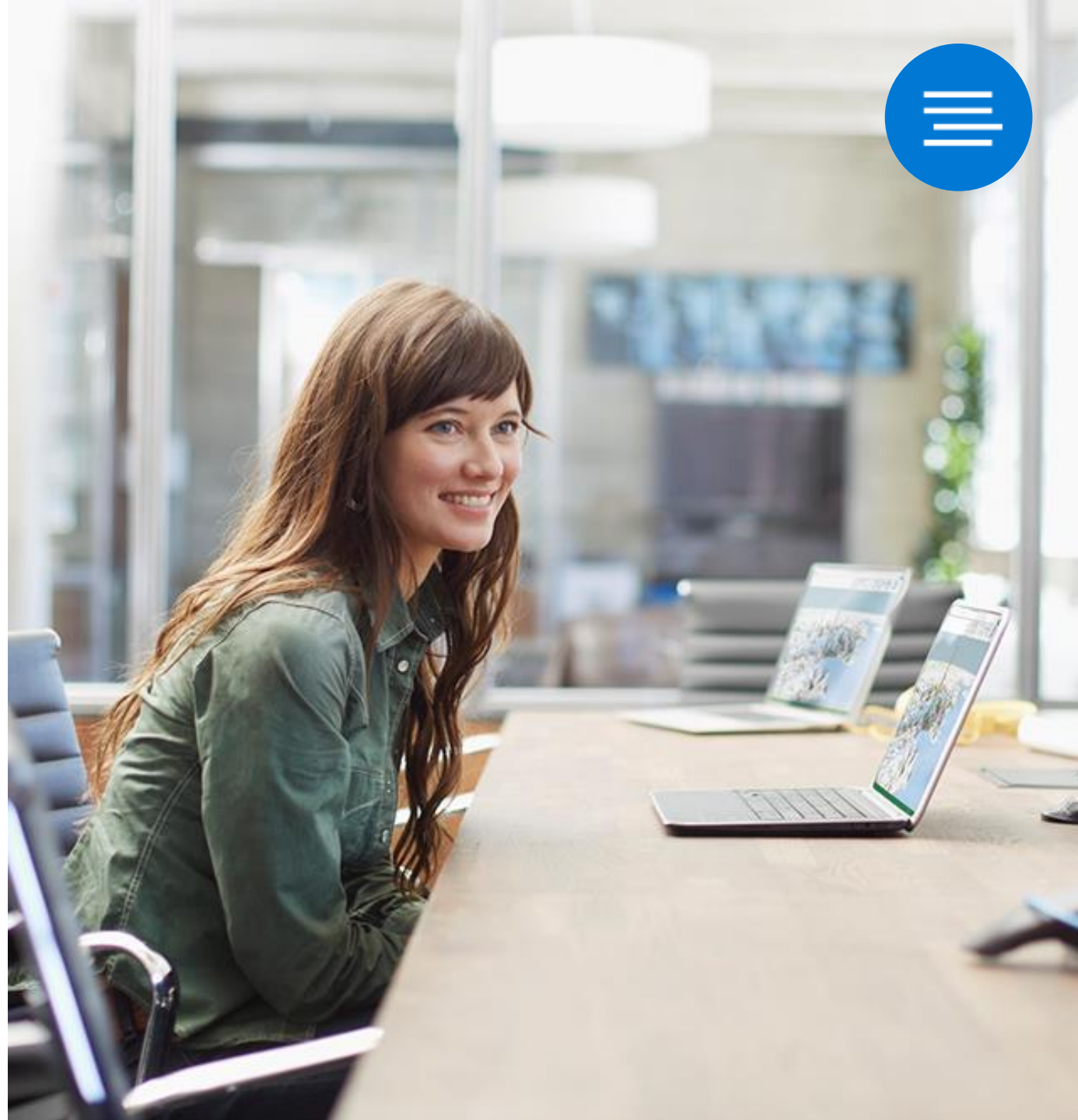
Understand if a record has positive or negative sentiment

Key phrase extraction

Extract key phrases from a piece of text, and retrieve topics

Language detection

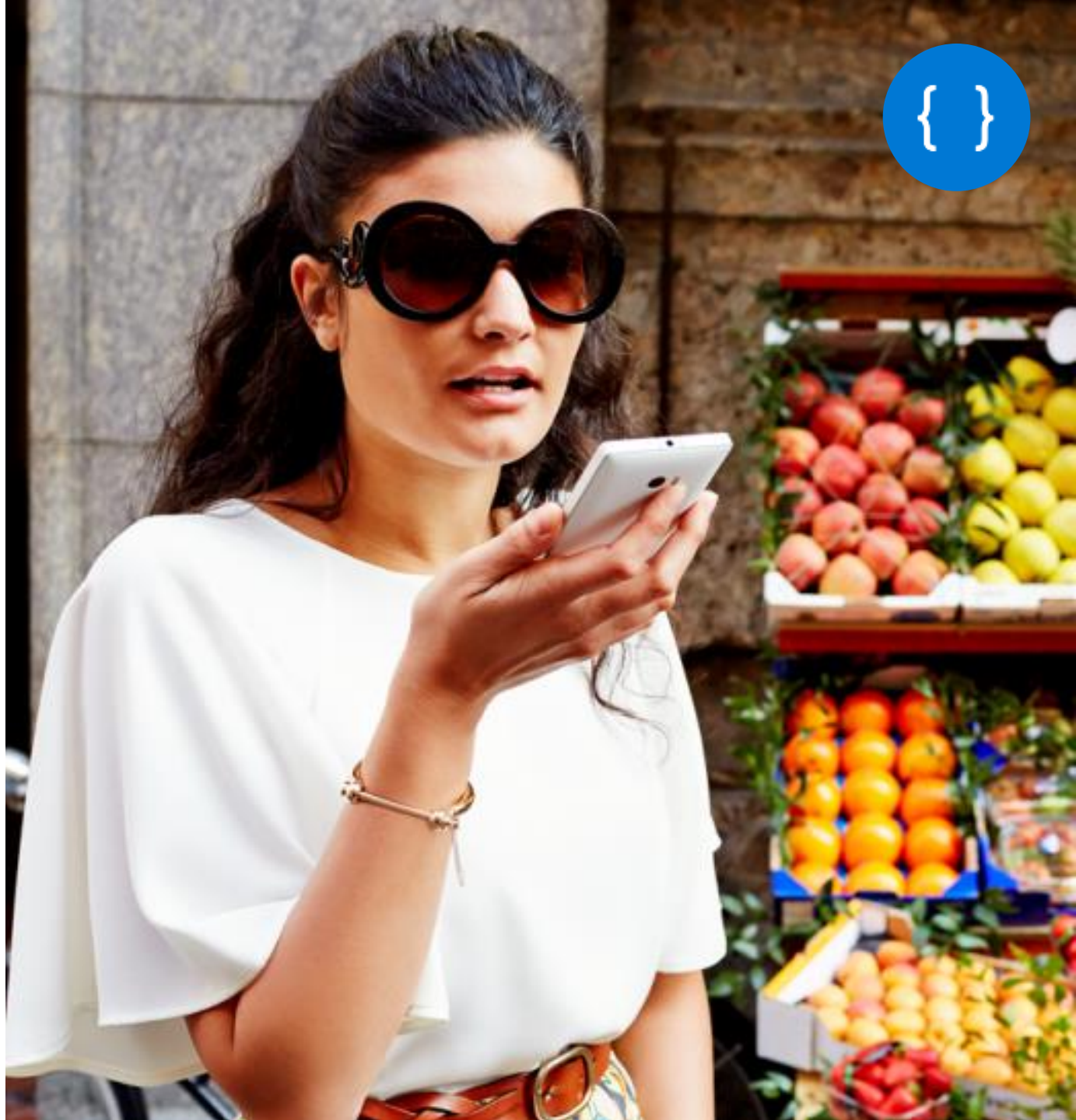
Identify the language,
120 supported languages



Language Understanding Intelligent Service (LUIS)

**Understand what
your users are saying and
create agents that perform
custom actions**

Use pre-built models or create your own

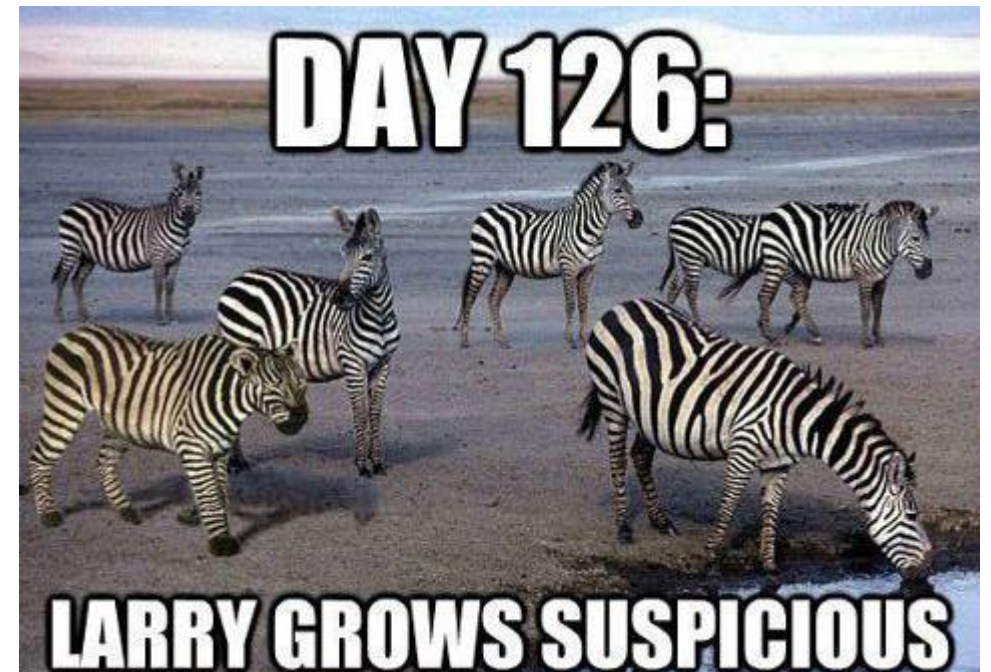


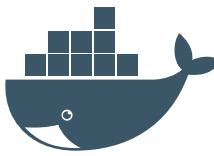


SQL Server + Cognitive Services

Demo

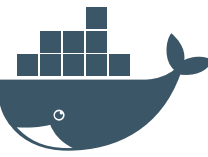
Does anyone see any issues with this?





Why might you want a container?

- Enterprise need
 - Unable to load data into the cloud
 - Regulatory requirements
 - Security/Privacy concerns
 - Low bandwidth or intermittently connected
- Customer benefits
 - Control over data
 - Control over model updates
 - High throughput/low latency

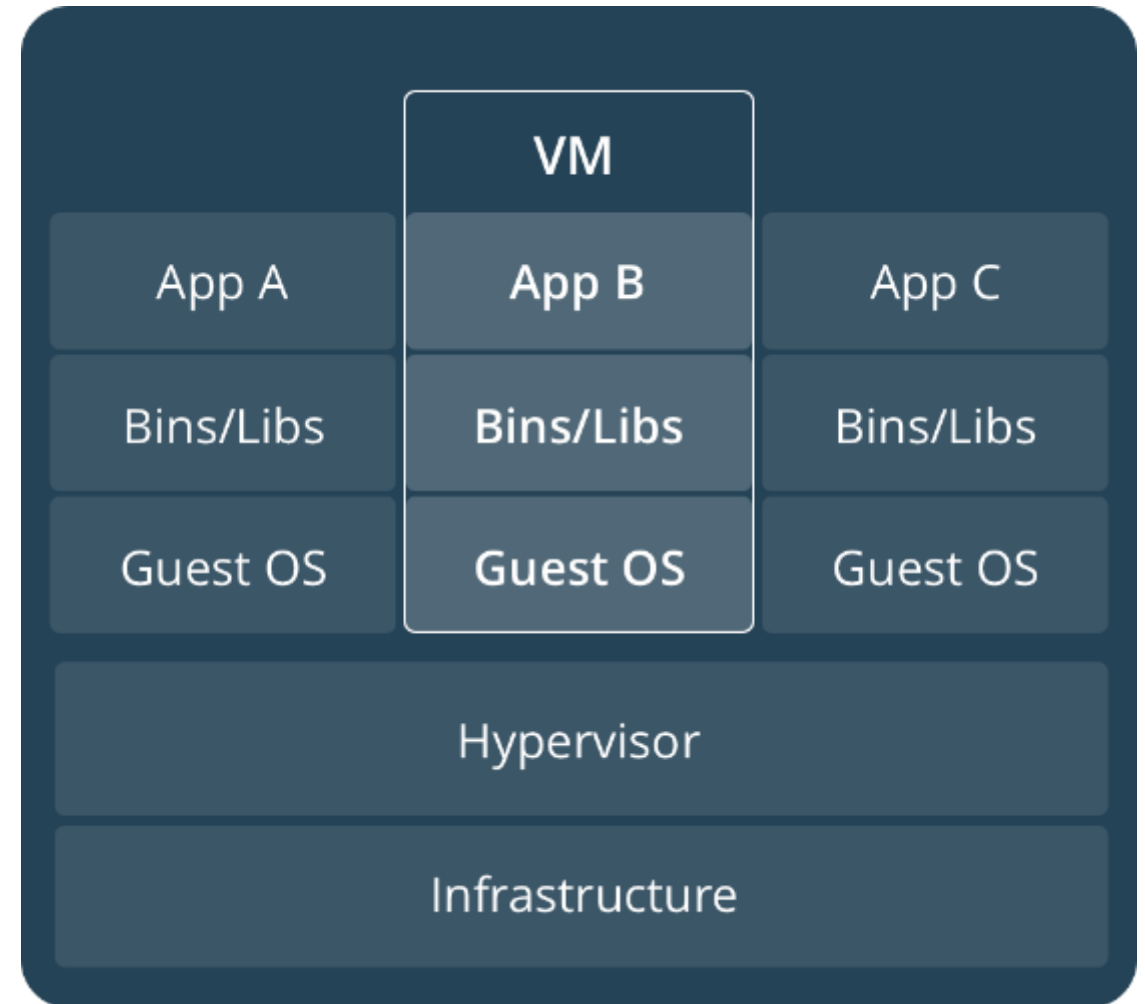


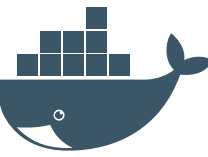
Virtualization

Hardware Abstraction

Building on hardware, you can create a complete “PC” on top of a Hypervisor layer, which abstracts out the hardware. You still own the Operating System and up

This allows for scale by ring-fencing OS-level dependencies





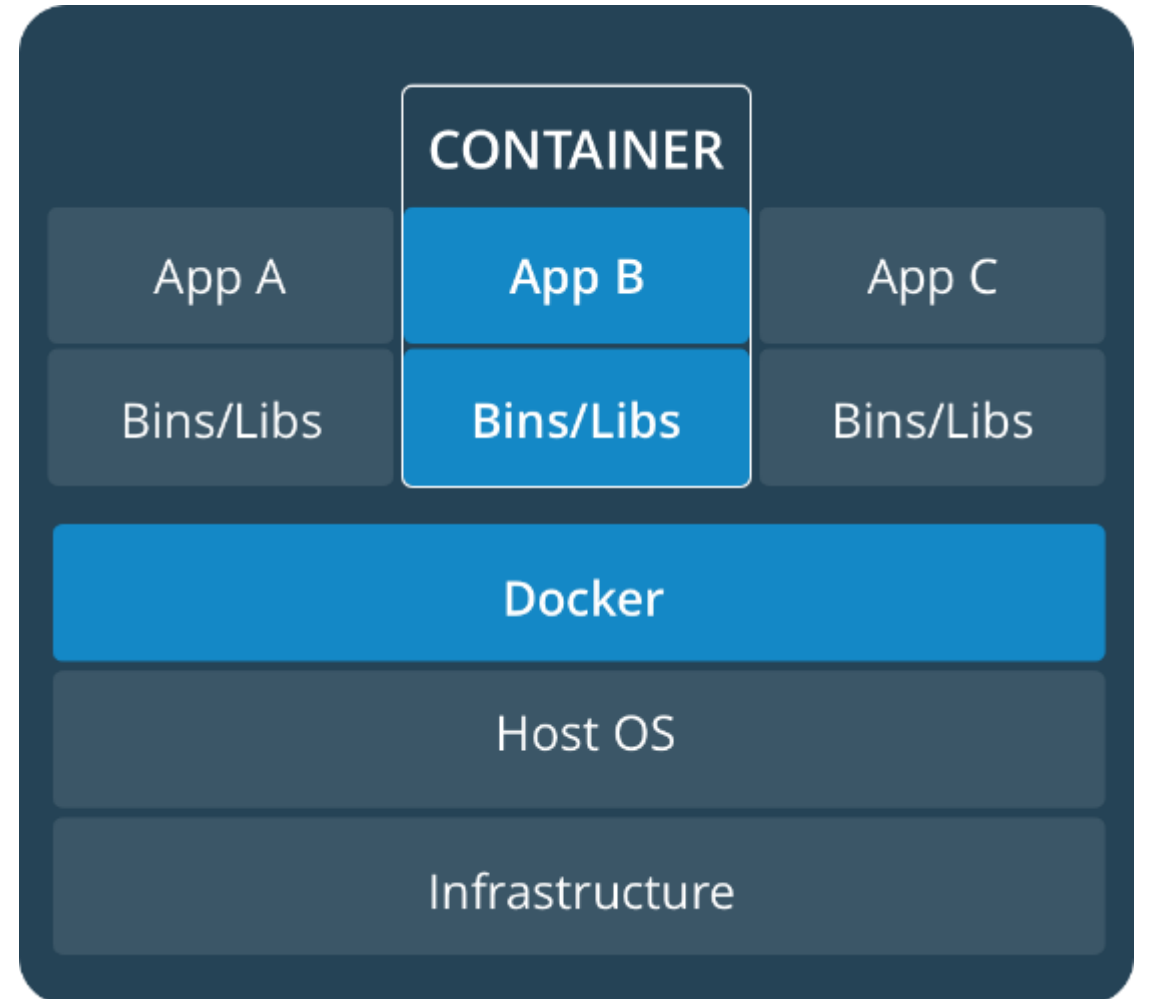
Containers

Abstracting the OS, Allowing complete portability

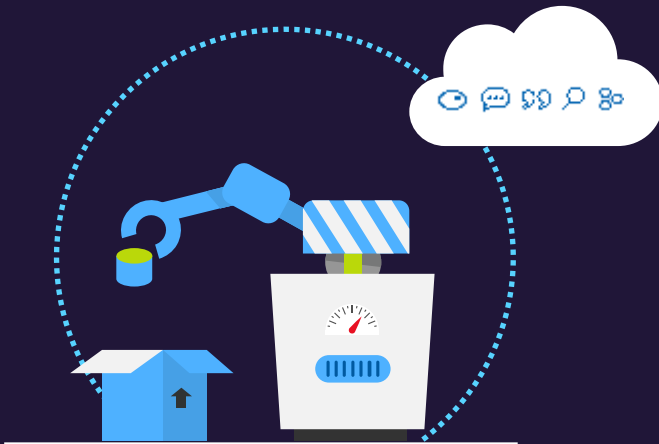
Containers go one level further than the Hypervisor, and focusing on binaries and applications

Storage and networking are a consideration

Scale is achieved through multiple containers



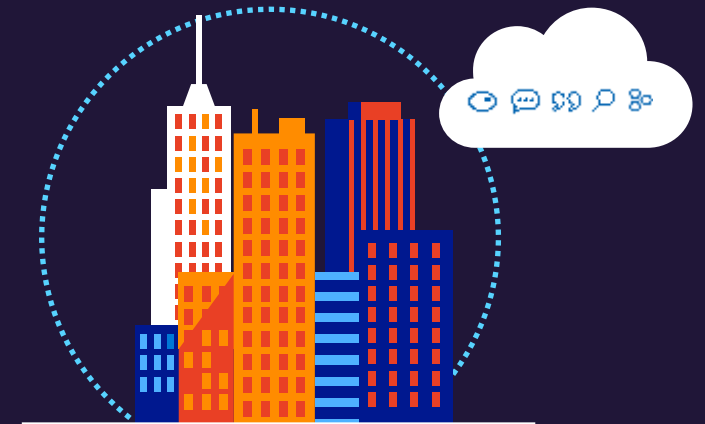
Azure SQL Server in Containers



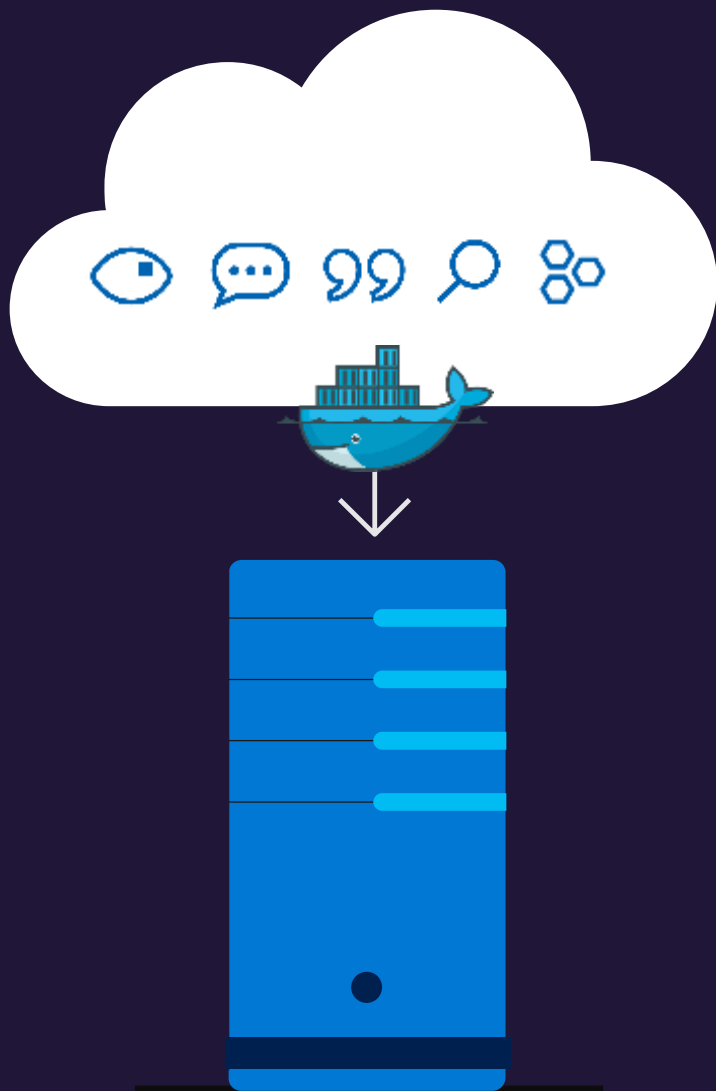
At the edge and
disconnected



Meet every regulatory
requirement



Cloud application
model on-premises



Now In Public Preview

Cognitive Services Containers

No app changes & Compatible with full Cognitive Services feature-set

Support for 6 key AI capabilities:

- Key Phrase Extraction
- Language Detection
- Sentiment Analysis
- Face & Emotion Detection
- OCR / Text Recognition
- Language Understanding

Run & manage locally, Try for free

Connect to Billing service for report back, unified billing with on-cloud and off-cloud transactions

Additional Capabilities coming soon (e.g. Speech)



SQL Server + Cognitive Services + Containers

Demo

Where to learn more

Resources

- Slides from today: <https://aka.ms/annalytics>
- SQL Workshops: <https://aka.ms/sqlworkshops>
- Related sessions later today – BDC, ADS



Questions? Product Feedback? Ideas for AI and SQL Server?

Thank you!

Twitter: @AnalyticAnna
LinkedIn: amthomas46
antho@microsoft.com