



Azure Synapse Analytics

The unified, cloud-native platform for converged analytics

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Agenda

- Introduction to Azure Synapse Analytics
- Explore Azure Synapse Analytics
- Azure Synapse Analytics Resources
- Q&A



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Azure Synapse Analytics

The unified, cloud-native platform for converged analytics

Common customer journey

Big Data and advanced analytics

Modern data warehouse



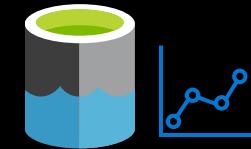
"Integrate all our data—including Big Data—with our data warehouse for analytics and reporting"

Advanced analytics



"Predict next best offer and customer churn"

Real-time analytics



"Derive insights from our devices and data streams in real-time"

Common customer use cases

Modern data warehouse

Advanced analytics

Real-time analytics

Sources (available to migrate to Azure)

- SQL, MySQL, PostgreSQL
- SAP on Azure
- Oracle to PostgreSQL
- File storage/Backup
- DB2, AS/400 Migration



Data Analytics Use Cases

- Sales Forecast
- Customer Segmentation
- Customer Lifetime Value
- Churn Prediction
- Recommendation
- Promotion Effectiveness
- Cross-sell/Upsell
- Enterprise Search



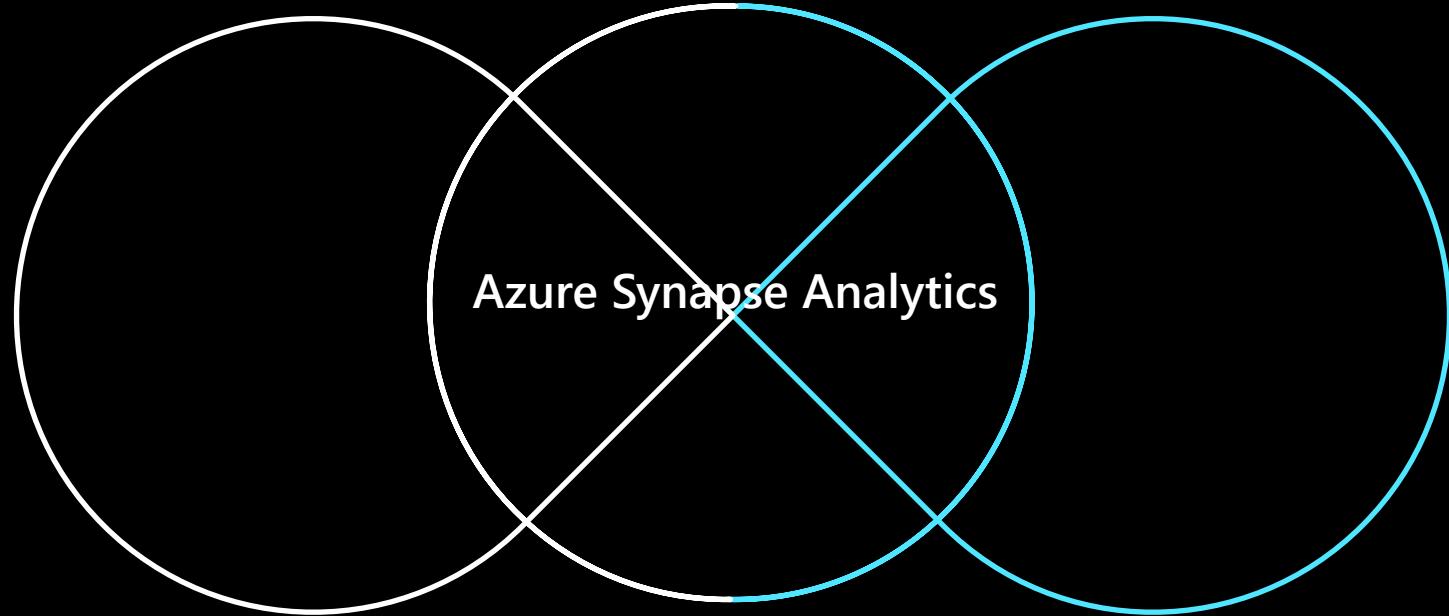
Real-time Analytics Use Cases

- Dynamic Pricing
- Fraud Detection
- Predictive Maintenance
- Workplace Security (CCTV)
 - Face recognition
 - Security alert
- Digital Twin (simulation)

Centralized Big Data

- Modern Data Warehouse
- Interactive Dashboard & Self-service BI

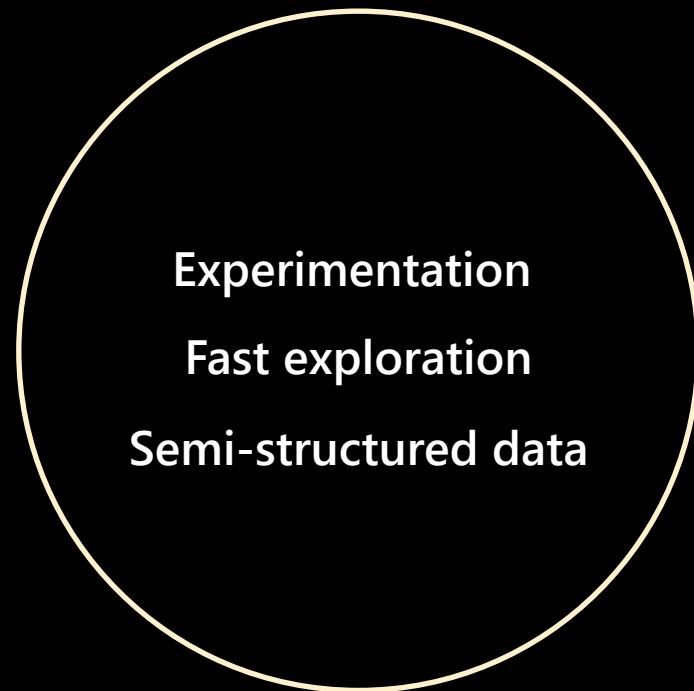
Azure brings these two worlds together, in a single service,
to provide limitless analytics



Welcome to limitless
Data warehousing & big data analytics—all in one service

This is a result of businesses being forced to maintain two critical, yet independent analytics systems

Big Data



Experimentation
Fast exploration
Semi-structured data

Data Lake

Relational Data



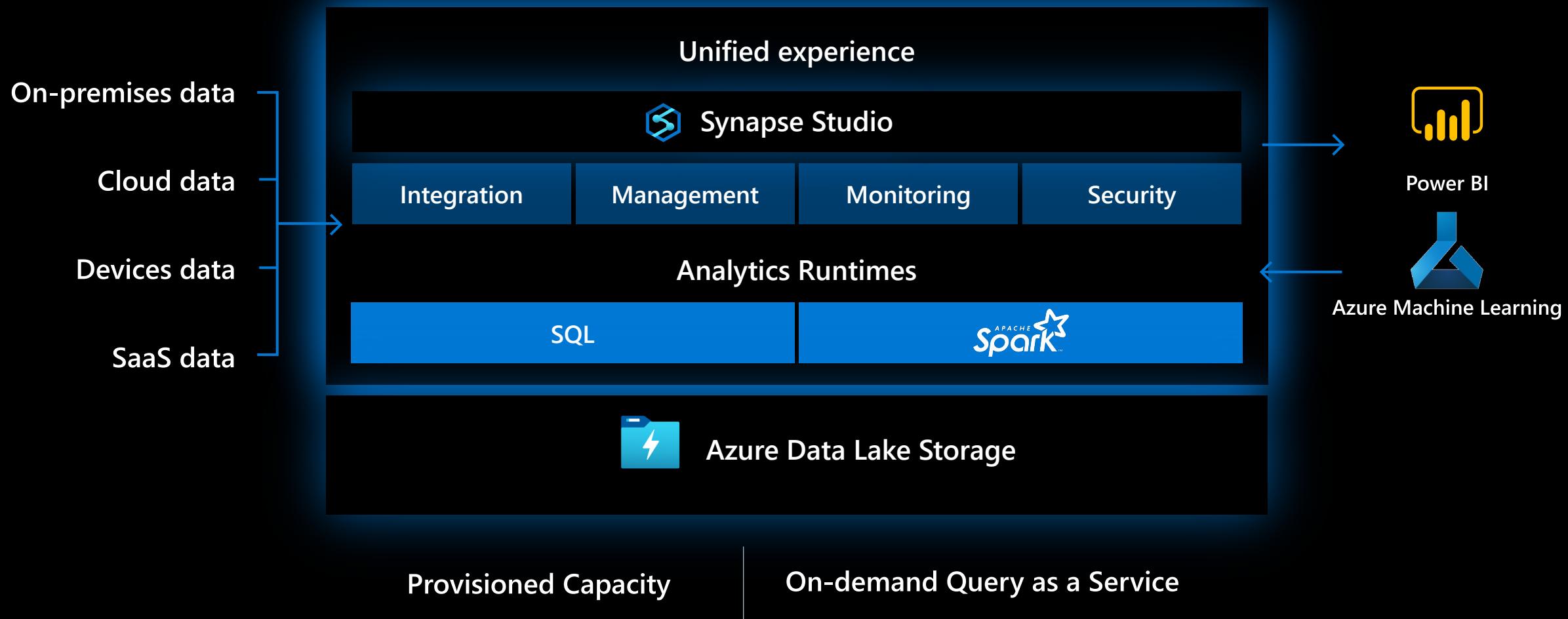
Proven security & privacy
Dependable performance
Operational data

Data Warehouse

OR

Azure Synapse Analytics

Limitless MPP data warehouse with unmatched time to insights



Azure Synapse Analytics

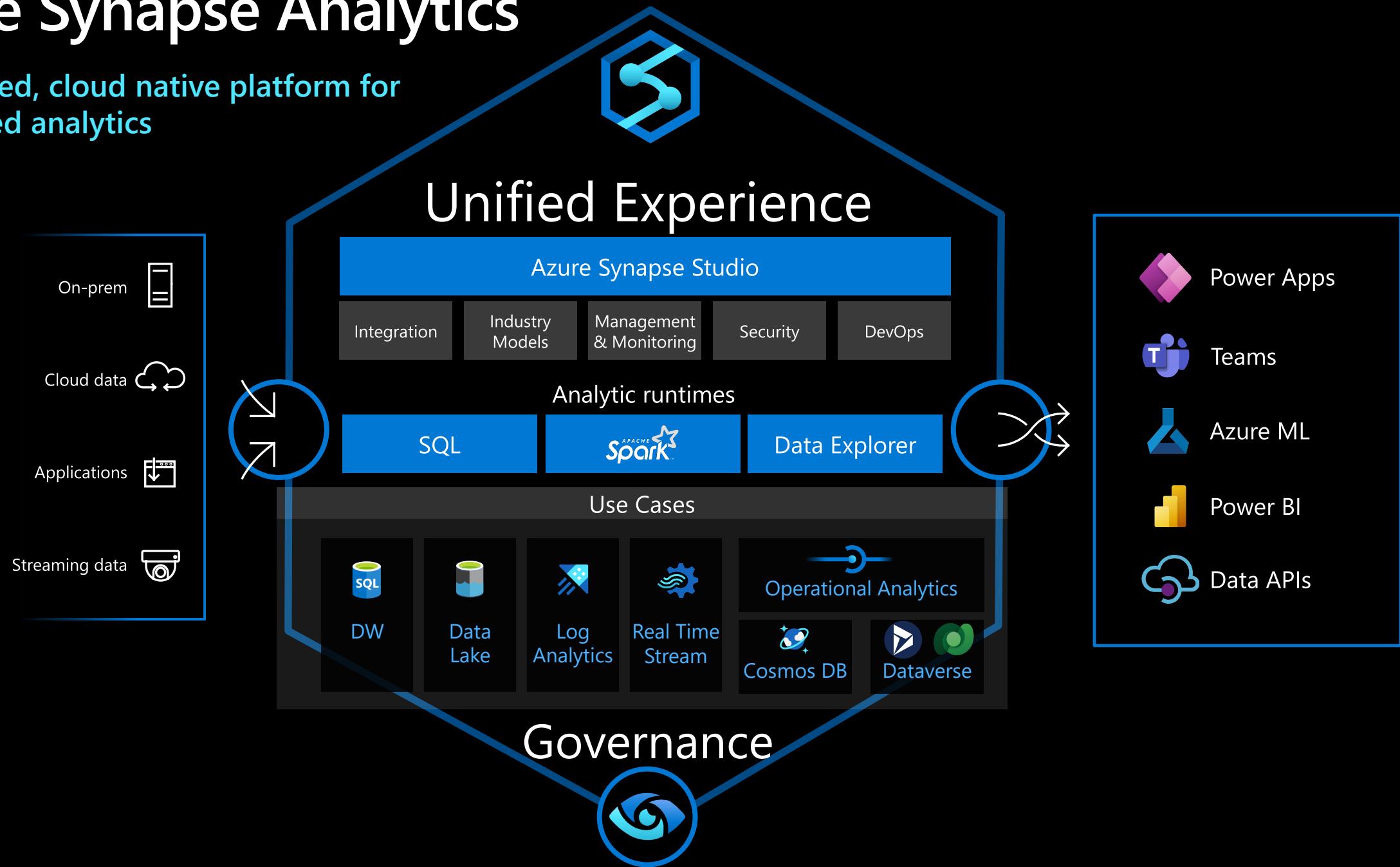
The first unified, cloud native platform for converged analytics



Azure Synapse is the only unified platform for analytics, blending big data, data warehousing, and data integration into a single cloud native service for end-to-end analytics at cloud scale.

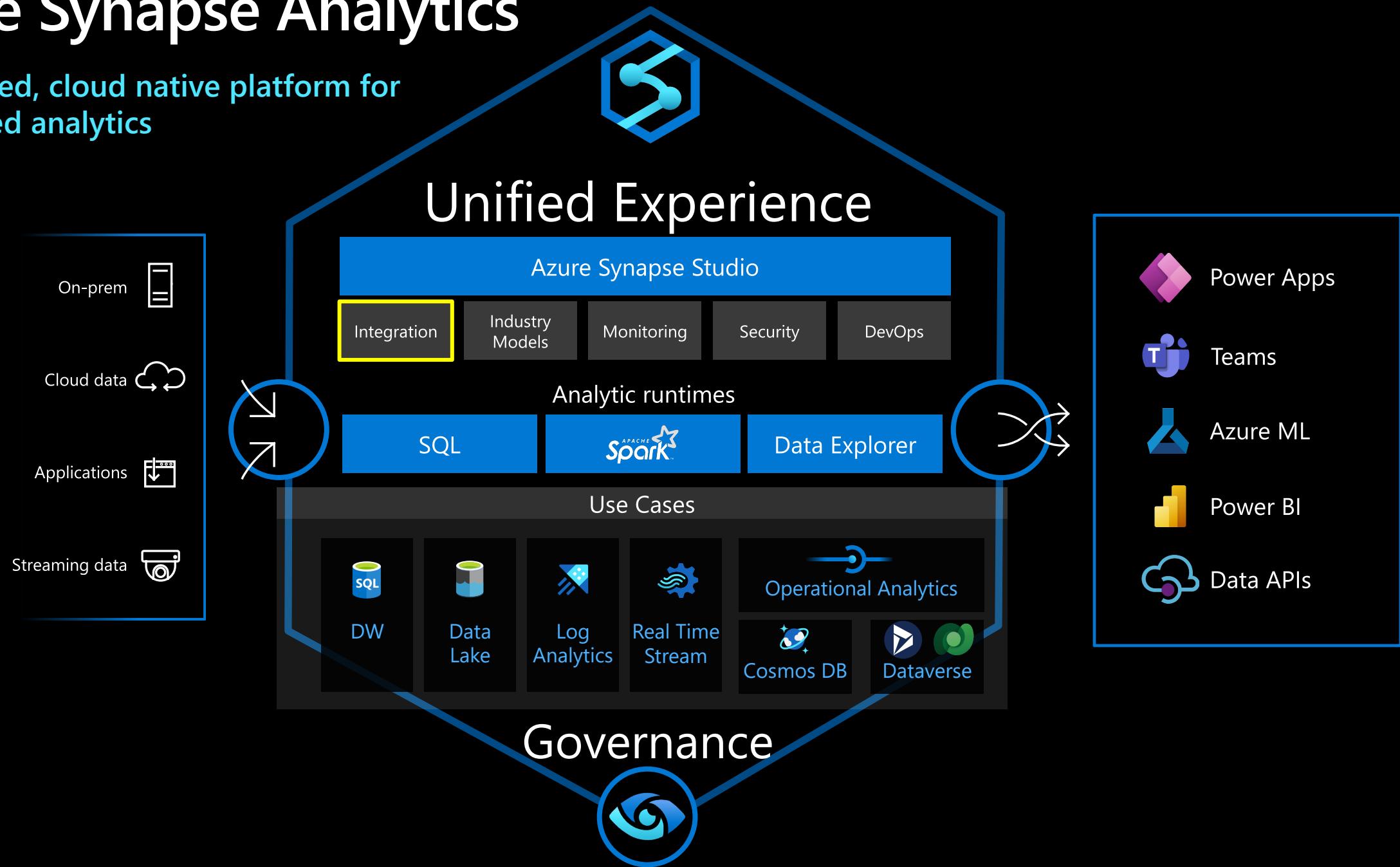
Azure Synapse Analytics

The unified, cloud native platform for converged analytics



Azure Synapse Analytics

The unified, cloud native platform for converged analytics



Hybrid Data Integration

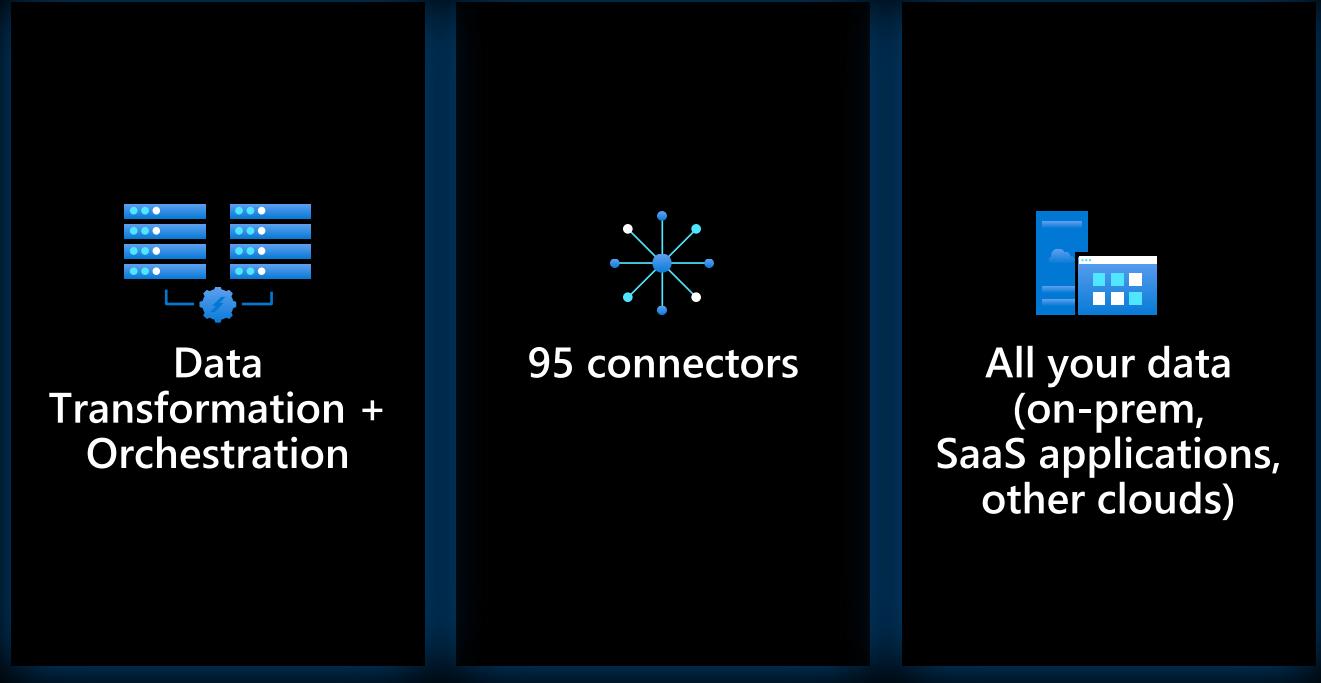
Cloud native ETL/ELT

95+ connectors available

Secure connectivity to on-premise data sources, other clouds, and SaaS applications

Code-first and low/no code design interfaces

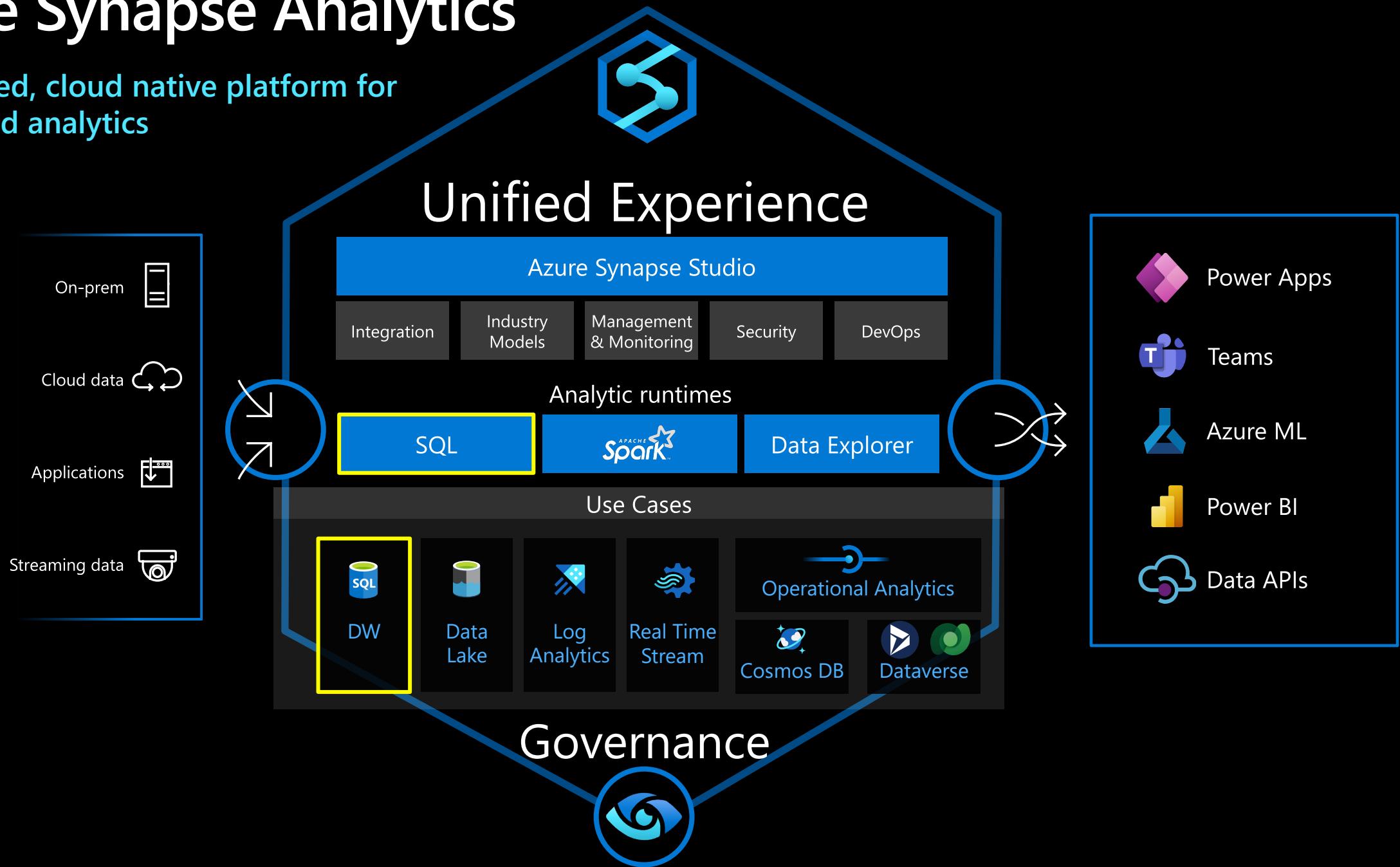
Schedule and Event based triggering



Code-free

Azure Synapse Analytics

The unified, cloud native platform for converged analytics

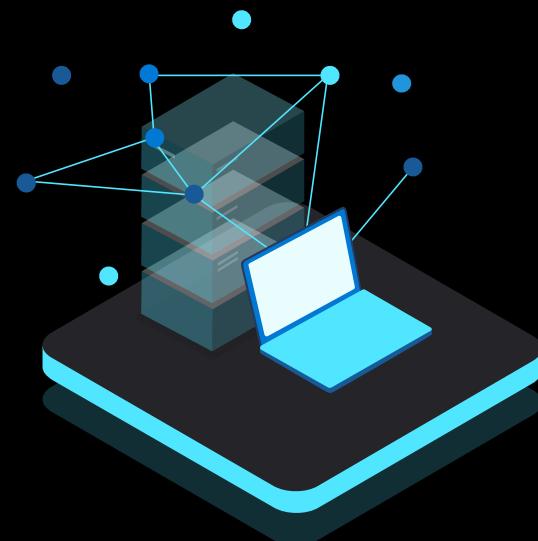


Dedicated + serverless SQL

Flexible consumption models

Serverless pay-per-query ideal for ad-hoc data lake exploration and transformation

Dedicated clusters optimized mission-critical data warehouse workloads



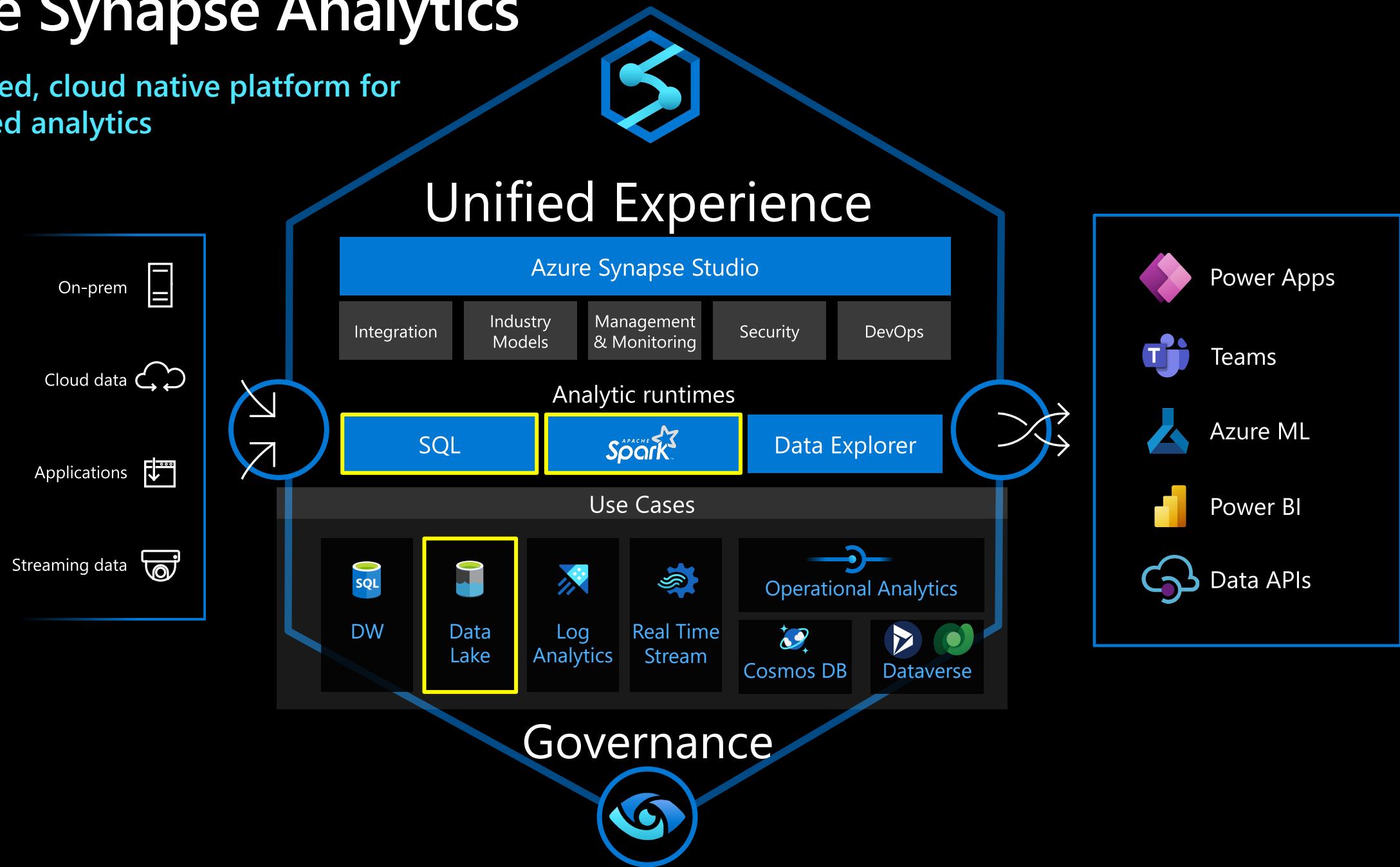
Serverless



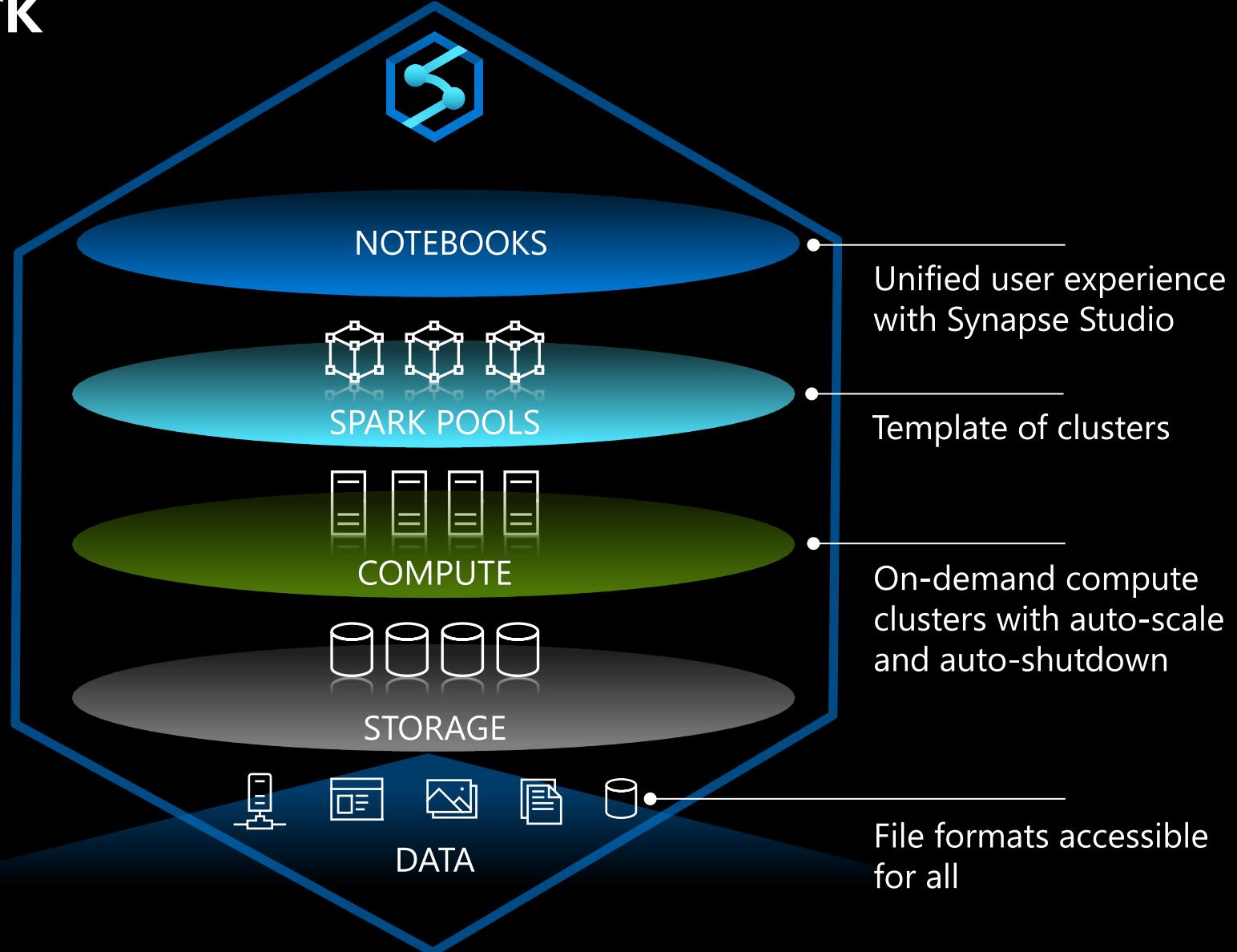
Dedicated

Azure Synapse Analytics

The unified, cloud native platform for converged analytics

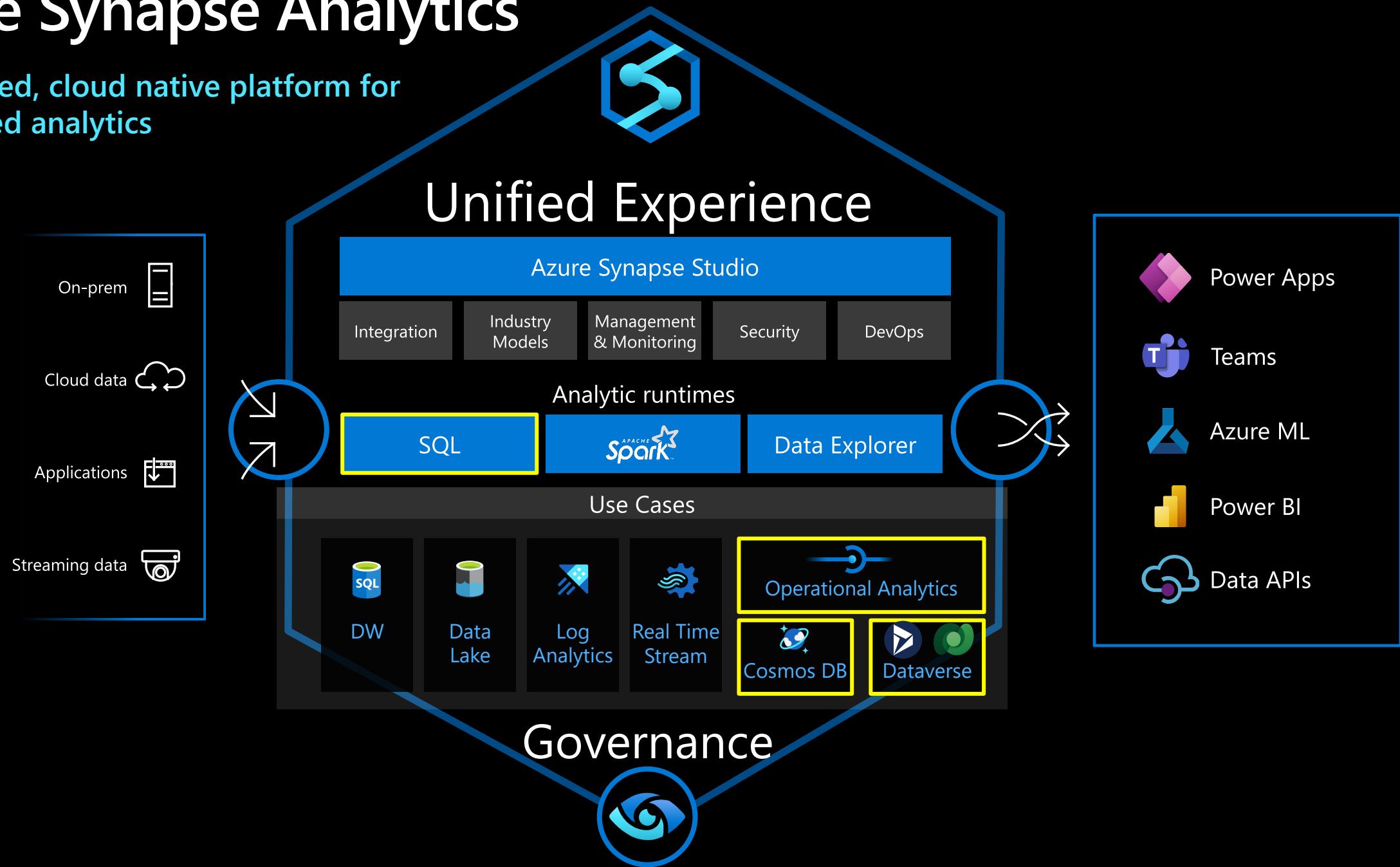


Serverless Spark Job Service



Azure Synapse Analytics

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Integrating operational data with analytics systems



Azure Synapse Link

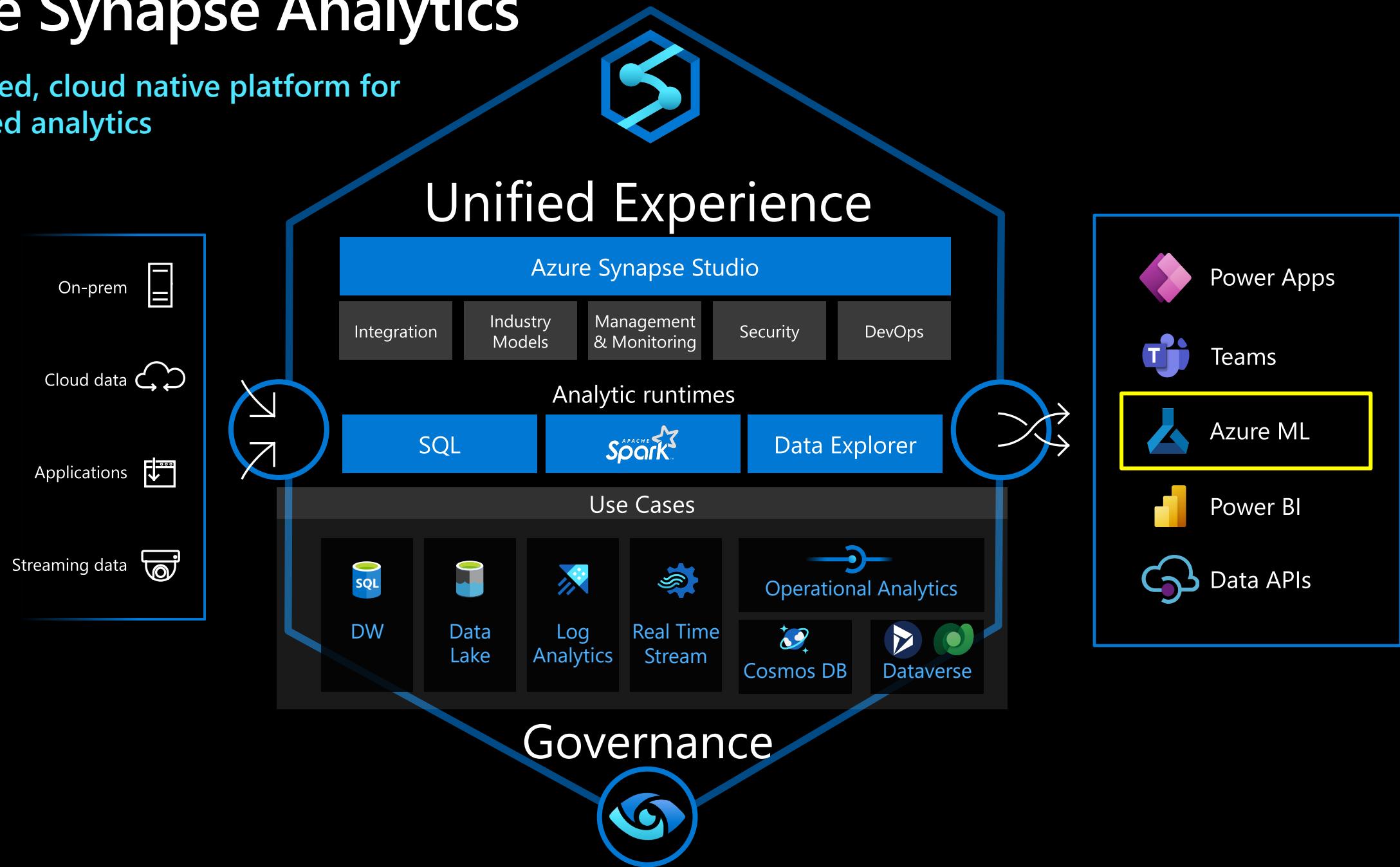
Real-time data analytics

No ETL required

No performance impact on transactions

Azure Synapse Analytics

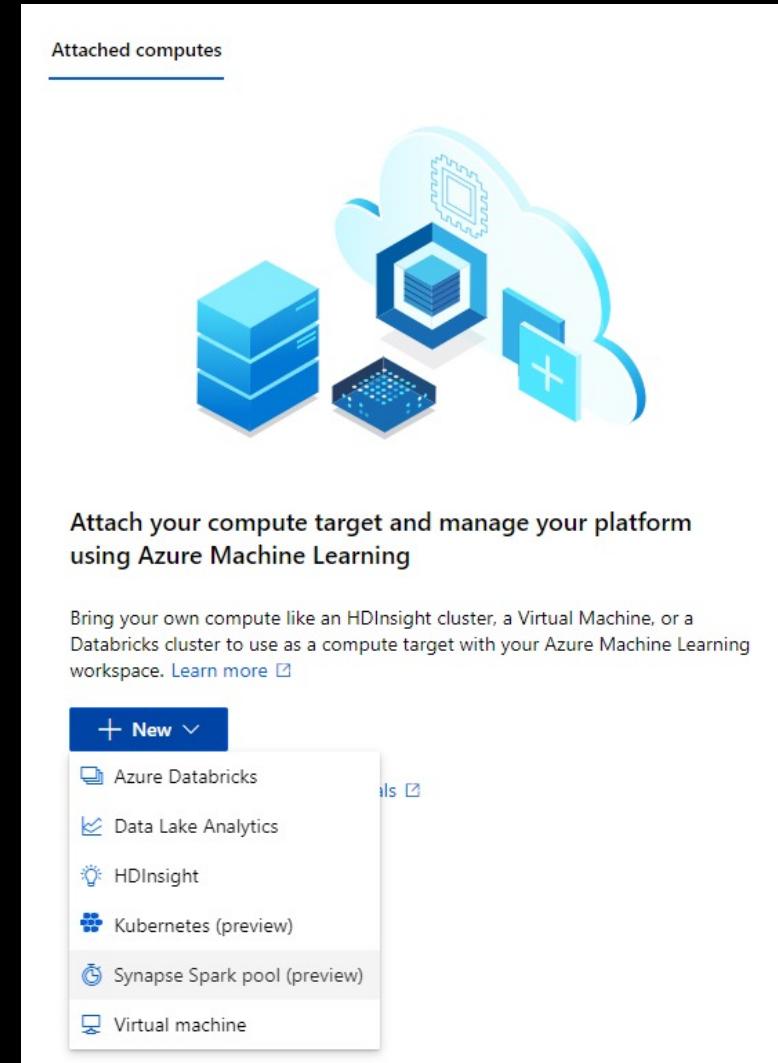
The unified, cloud native platform for converged analytics



Spark-enabled Azure Machine Learning

Spark Compute

The Azure Synapse Analytics integration with Azure Machine Learning (preview) allows you to attach an Apache Spark pool backed by Azure Synapse for interactive data exploration and preparation. With this integration, you can have a dedicated compute for data wrangling at scale.



Machine Learning

Democratize data science to all

Synapse makes predictive analytics accessible to all

Notebooks provides a code authoring experience for complex predictive models

Automatic ML graphical interface provides a no-code experience for creating ML models

Native integration with Azure Cognitive Search provides access to pre-built models



All Code

Notebook IDE
PySpark/Scala



Low/No-Code

Classification
Regression
Time-series



Pre-built models

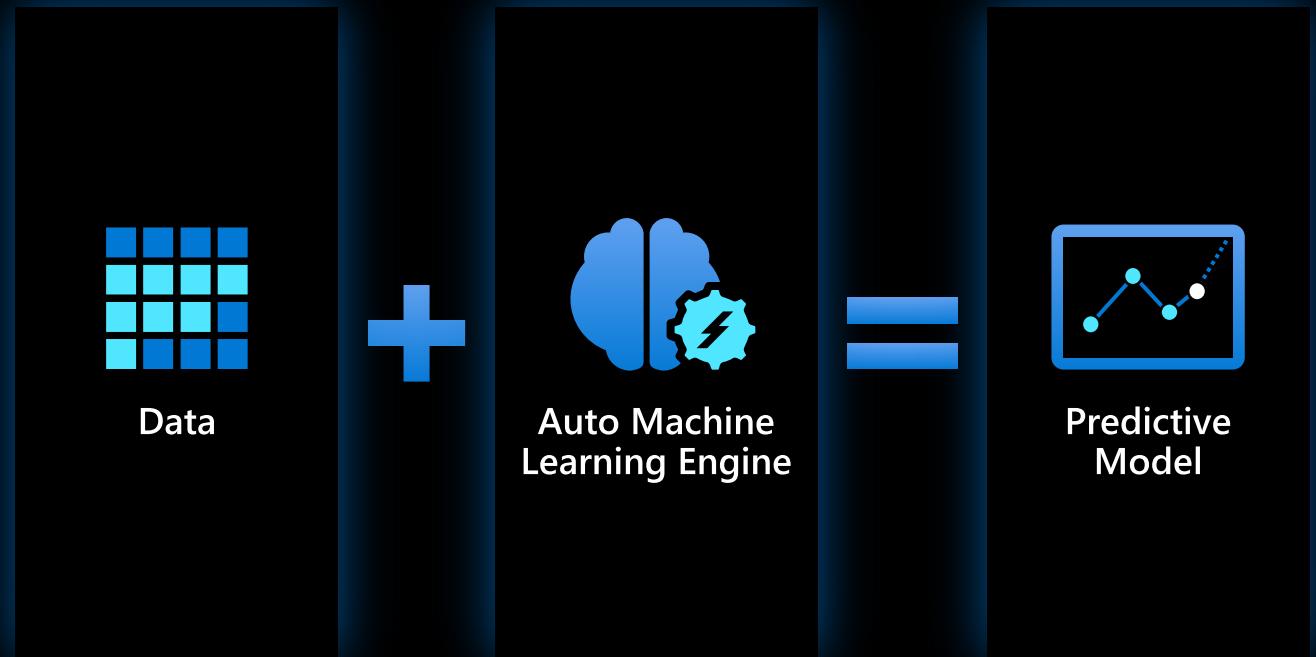
Anomaly Detector
Sentiment Analysis



Automatic Machine Learning

All you need is data

Fully automated feature exploration



Automatic Machine Learning

Code-free in Synapse Studio

No-code creation on Machine Learning models

Democratize ML to everyone since no data science domain knowledge required

Support for ensemble models

Supports classification, regression, and time-series forecasting

The screenshot shows the Microsoft Azure Synapse Analytics Studio interface. The left sidebar displays a 'Data' section with 'Workspace' and 'Linked' options, and a list of databases including 'newpoll (SQL)', 'NYCTaxi_Pool (SQL)', 'Predict_Pool (SQL)', 'Streaming_Pool (SQL)', 'WWI_Pool (SQL)', 'NYT2020 (SQL)', 'SQLServerlessDB (SQL)', 'default (Spark)', 'retaildata (Spark)', and tables like 'retailsales' and 'surfacesalesdb (Spark)'. The main workspace shows a code editor with Python code for model alignment:

```
from pandas import *
from azureml import *
from matplotlib import *
from automl import *
def align_(df):
    if (horizon == 'short-term'):
        df = df[['X', 'y']]
    else:
        df = df[['X', 'y']]
    # align X_train, X_test, X_test together
    # X_te: df_fcs1 X_te: together
    # drop clean :
    return df
X_test[time] = df_all['a']
# use autor
```

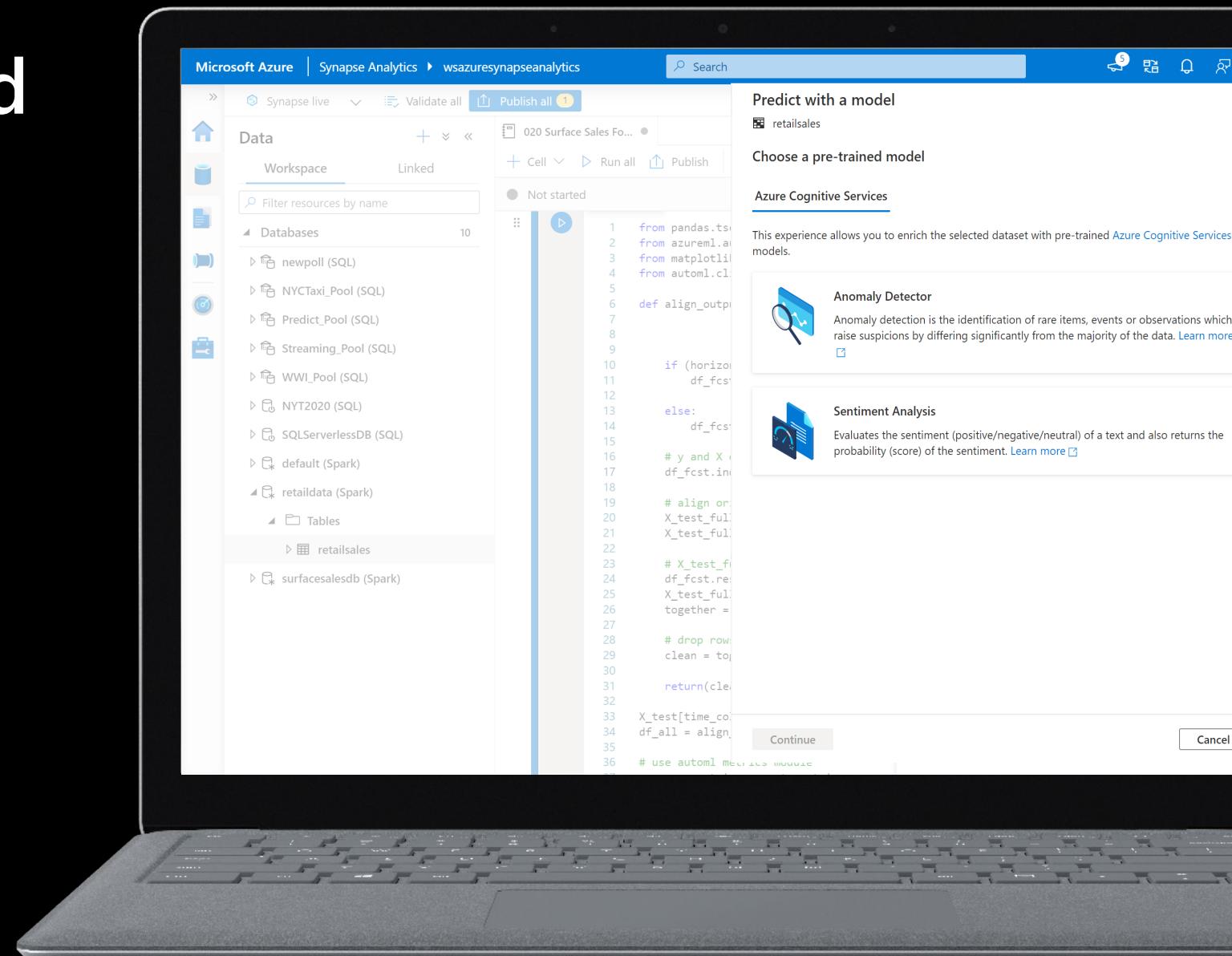
To the right, there's a 'Choose a model type' section with three options: 'Classification' (with a bar chart icon), 'Regression' (with a stack of bars icon), and 'Time series forecasting' (with a clock icon). Each option has a brief description and an example.

Predict with Pre-trained Model

Code-free in Synapse Studio

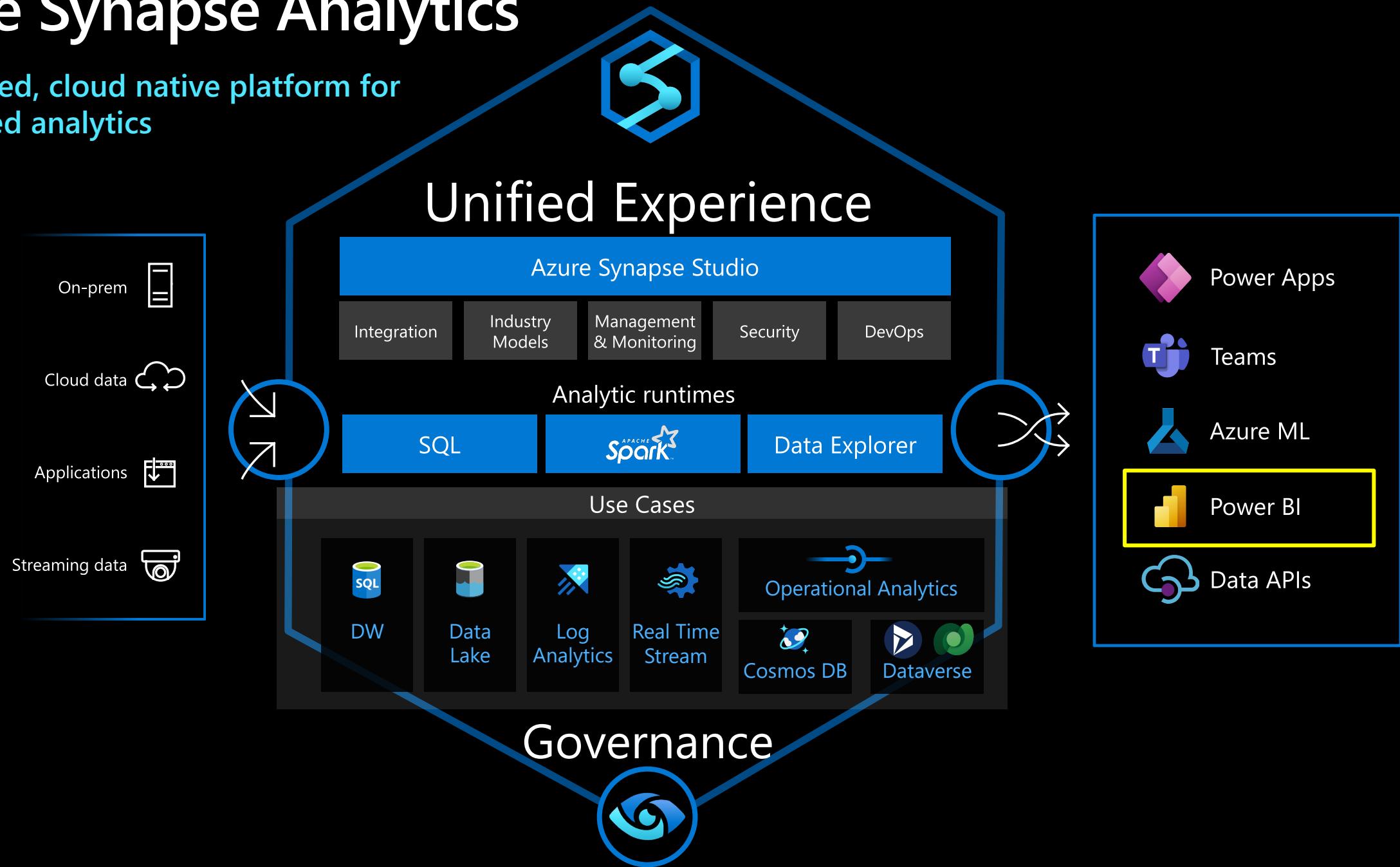
Native integration with Azure Cognitive Search provides access to pre-built models

Supports Anomaly Detector and Sentiment Analysis



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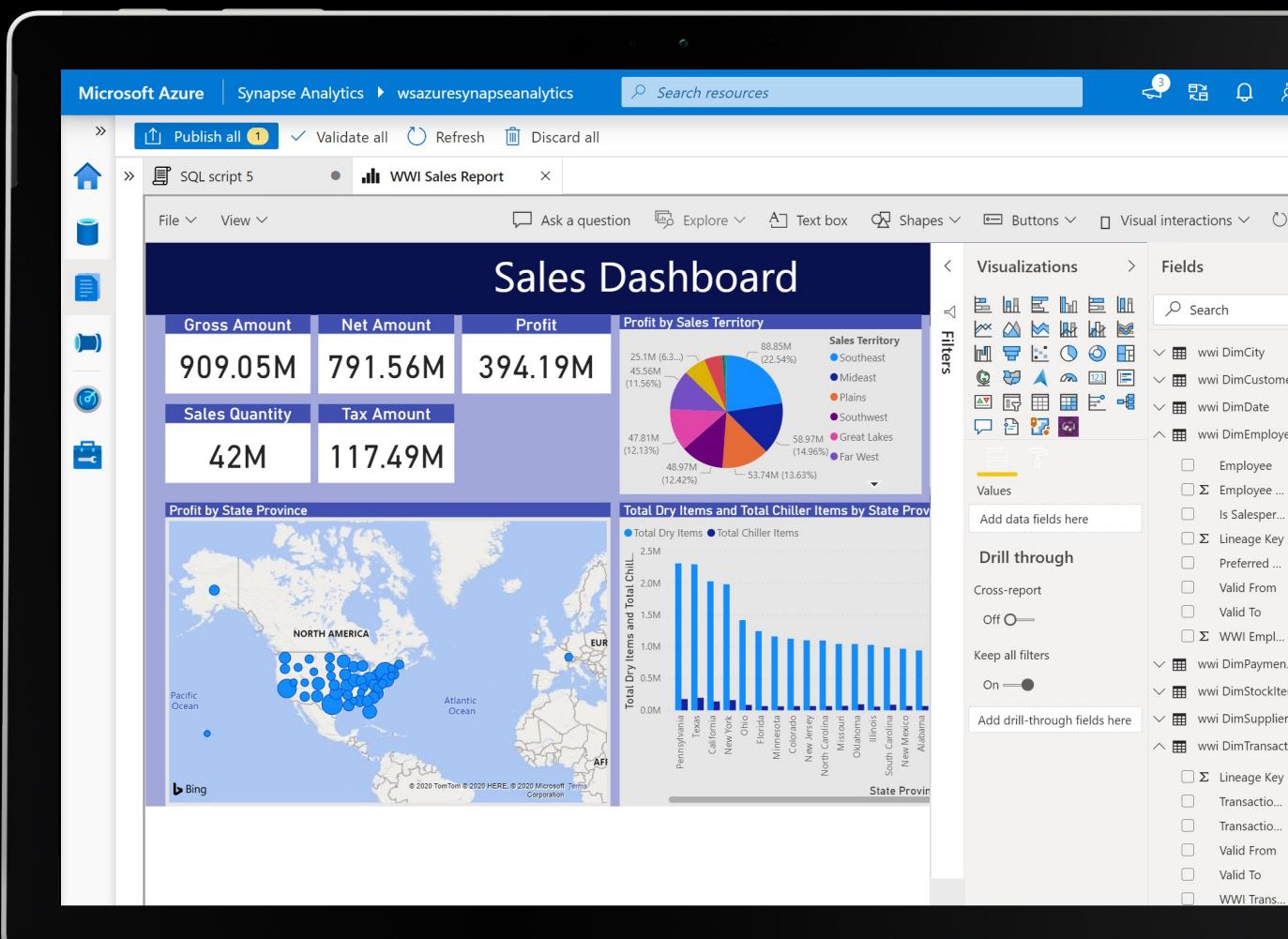


Power BI integration

Build dashboard in Synapse Studio

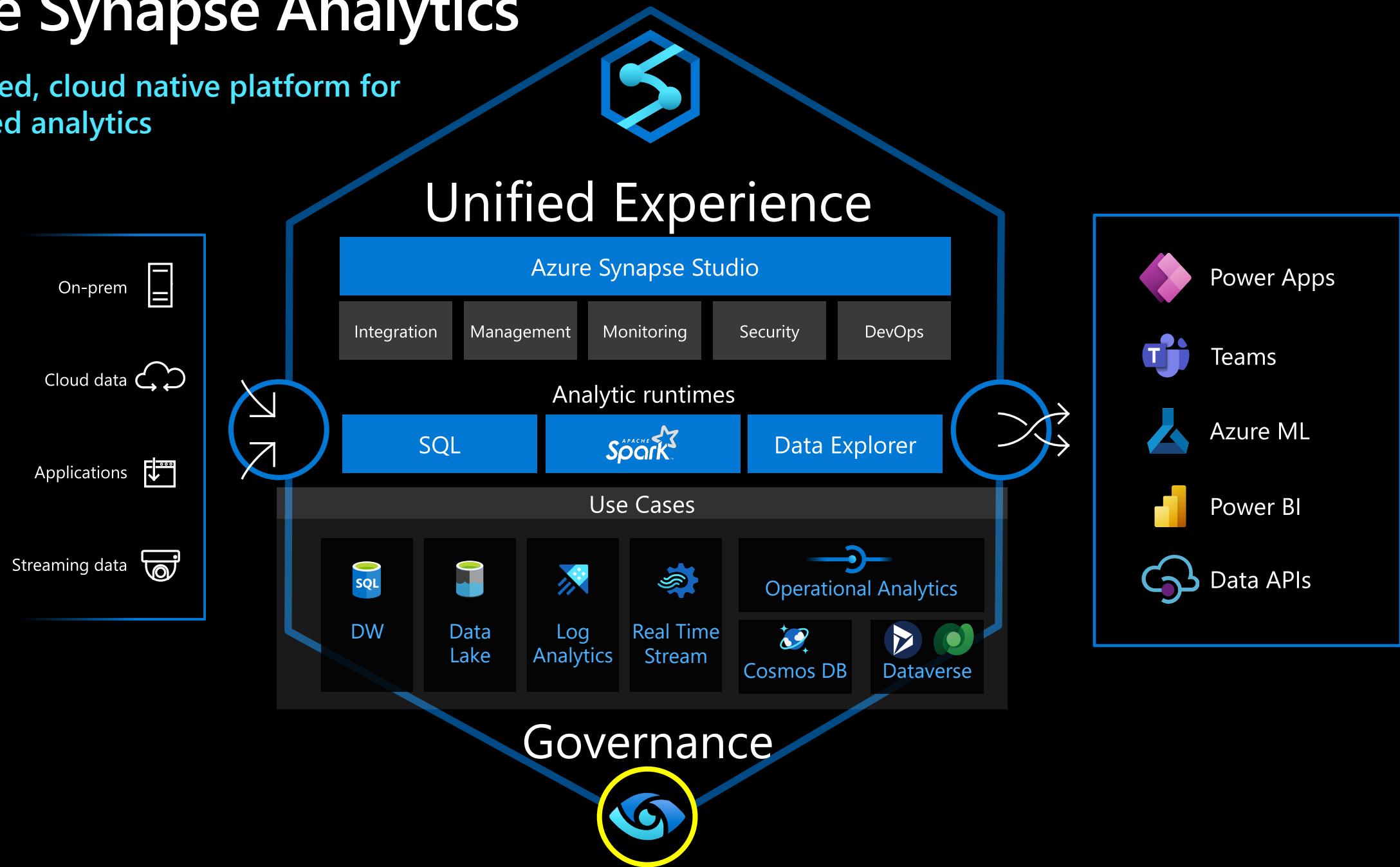
Code-free experience for development rich visualizations

One-click publishing to for secure consumption across the enterprise



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Azure Purview

UNIFIED DATA GOVERNANCE

Data Map

- Automate and manage metadata at scale

Data Catalog

- Enable effortless discovery for data consumers

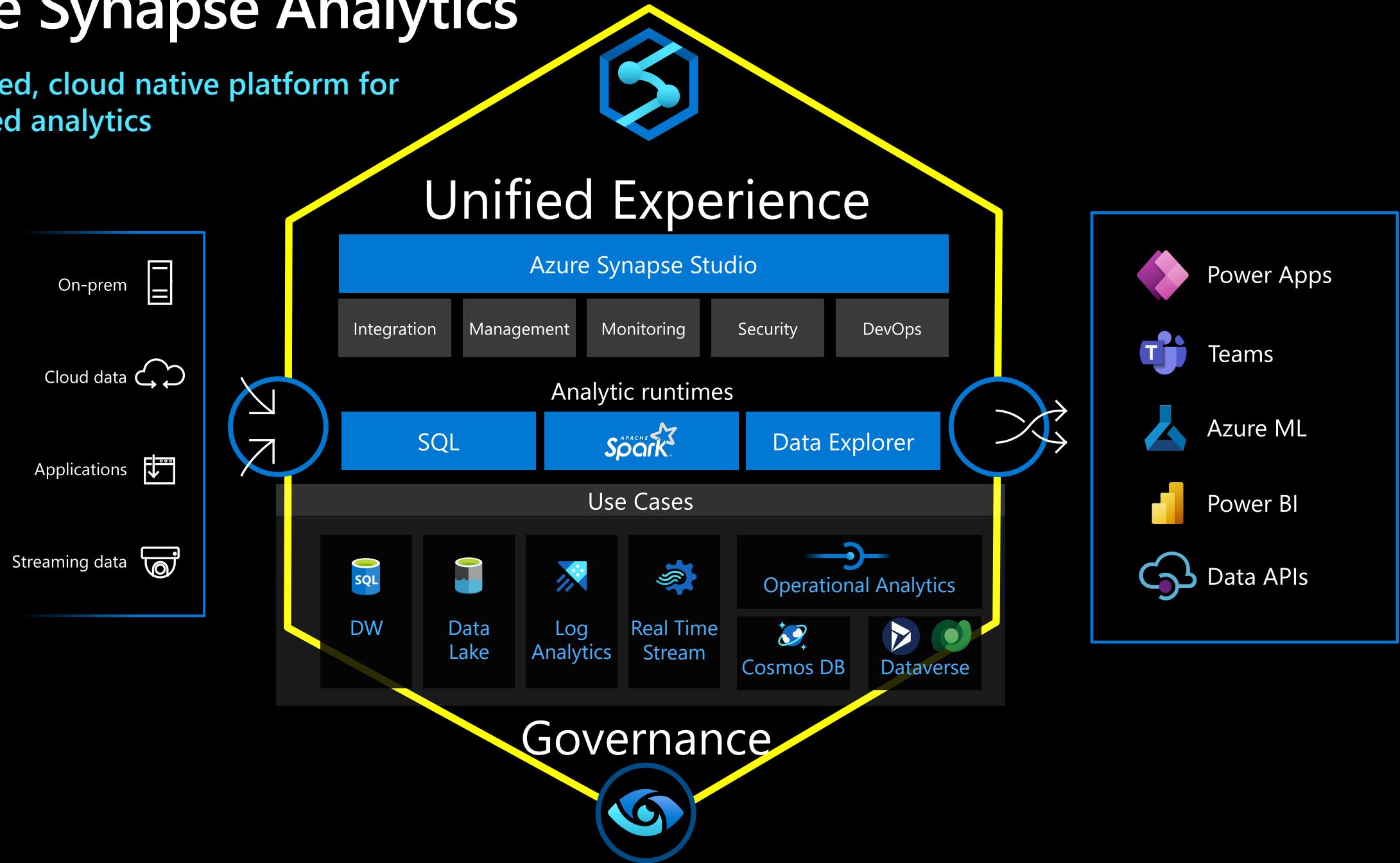
Data Insights

- Assess data usage across your organization

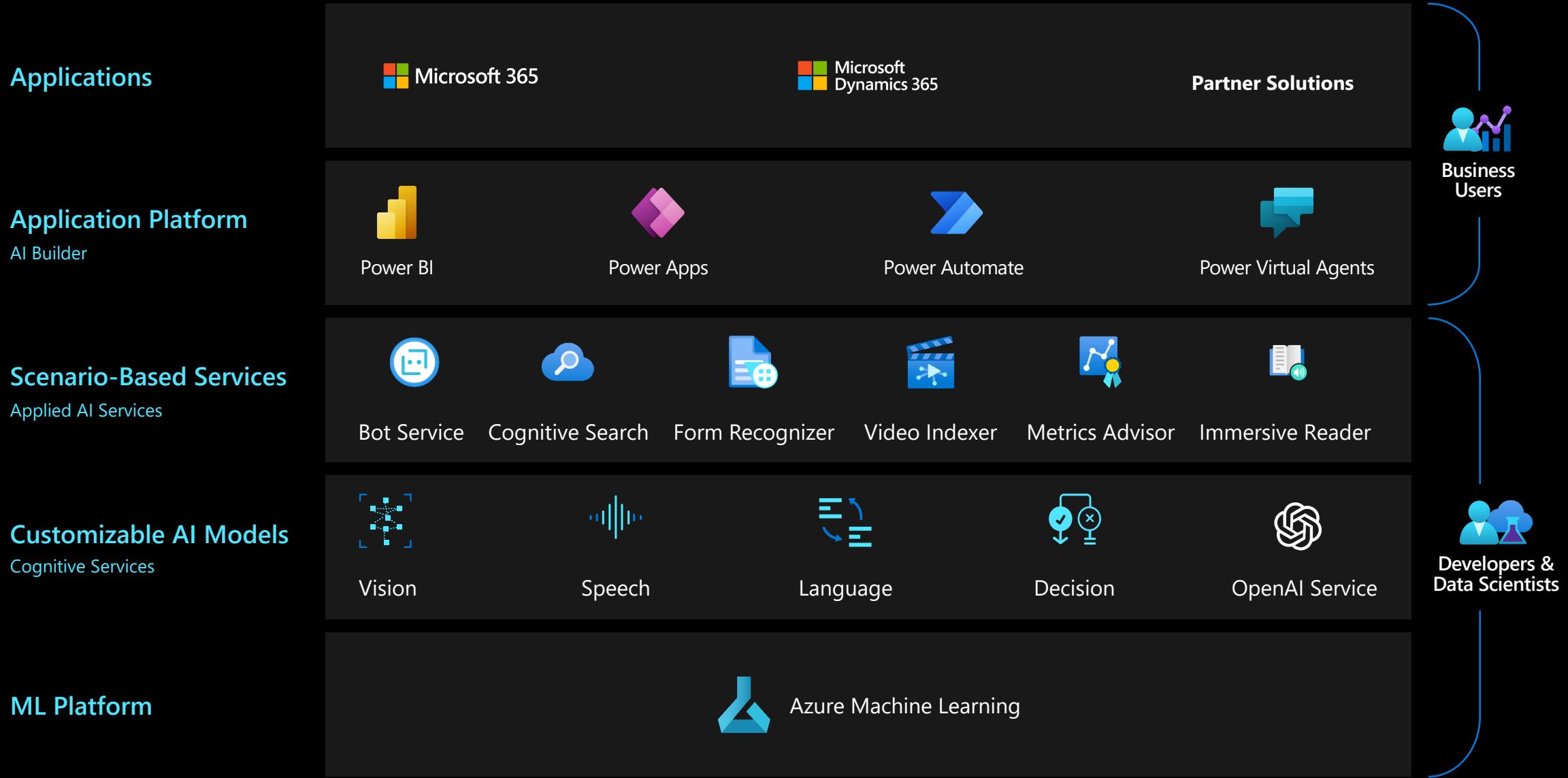


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Azure AI



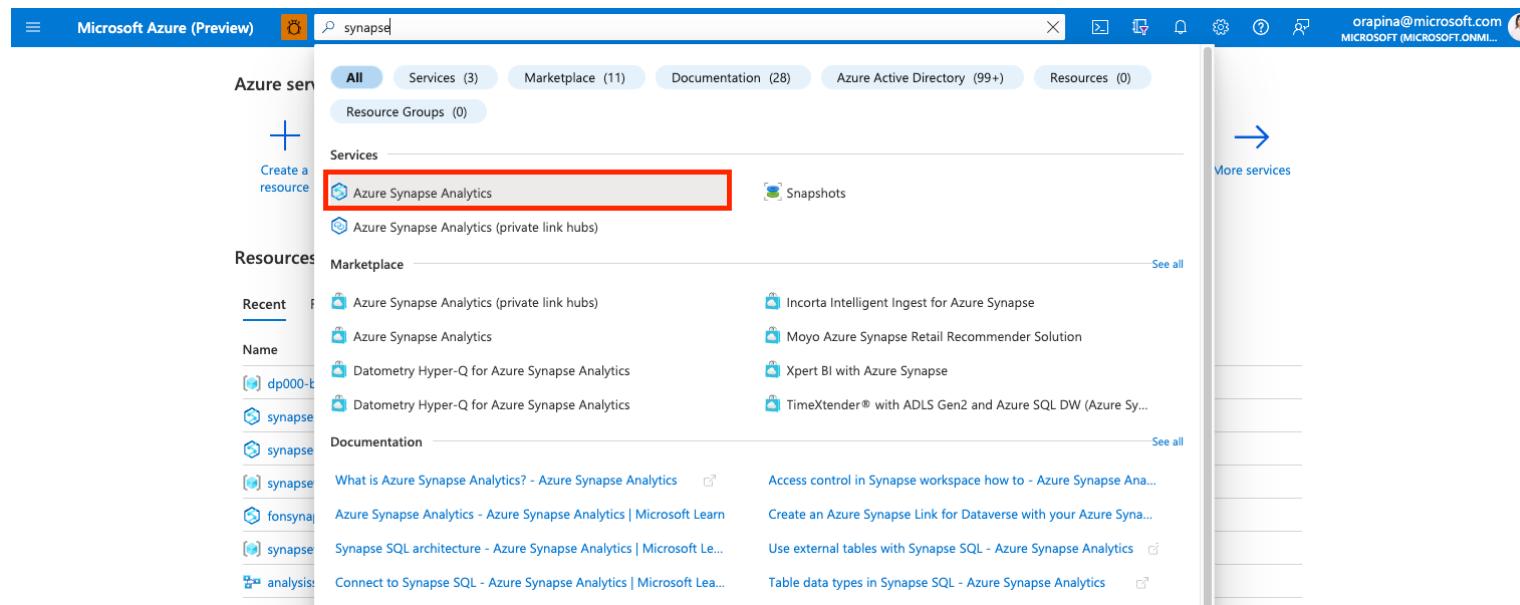
Demo

STEP 1 - Create and setup a Synapse workspace

Create a Synapse workspace in the Azure portal

Start the process

1. Open the Azure portal, in the search bar enter Synapse without hitting enter.
2. In the search results, under Services, select Azure Synapse Analytics.



STEP 1 - Create and setup a Synapse workspace

Create a Synapse workspace in the Azure portal

Start the process

3. Select **Create** to create a workspace.

The screenshot shows the Microsoft Azure (Preview) portal with the Azure Synapse Analytics service page. The top navigation bar includes 'Microsoft Azure (Preview)', a search bar, and user information for 'orapina@microsoft.com'. Below the navigation is the service title 'Azure Synapse Analytics' with a 'Create' button. The main content area displays a message 'No Azure Synapse Analytics to display' with a descriptive paragraph about Synapse Analytics and a prominent blue 'Create Synapse workspace' button, which is highlighted with a red rectangular border. At the bottom, there are links for 'Service overview' and other navigation options.

STEP 1 - Create and setup a Synapse workspace

Basics tab > Project Details

Fill in the following fields:

- 1. Subscription** - Pick the subscription that would like to use in this tutorial
- 2. Resource group** - Use any resource group.

rg-synapse-xxxx

xx will refer to participant name

- 3. Managed Resource group** - Leave this blank.

The screenshot shows the Microsoft Azure (Preview) portal interface. At the top, there's a blue header bar with the Microsoft Azure logo, a search bar, and a 'Search resources, services, and docs (G+/-)' input field. Below the header, the URL 'Home > Azure Synapse Analytics >' is visible. The main title 'Create Synapse workspace' is centered above a form. The form contains three sections: 'Subscription *' with a dropdown menu, 'Resource group *' with a dropdown menu showing 'rg_synapse_fon' and a 'Create new' link, and 'Managed resource group *' with an input field 'Enter managed resource group name'.

Subscription *

Resource group *

rg_synapse_fon

Create new

Managed resource group *

Enter managed resource group name

STEP 1 - Create and setup a Synapse workspace

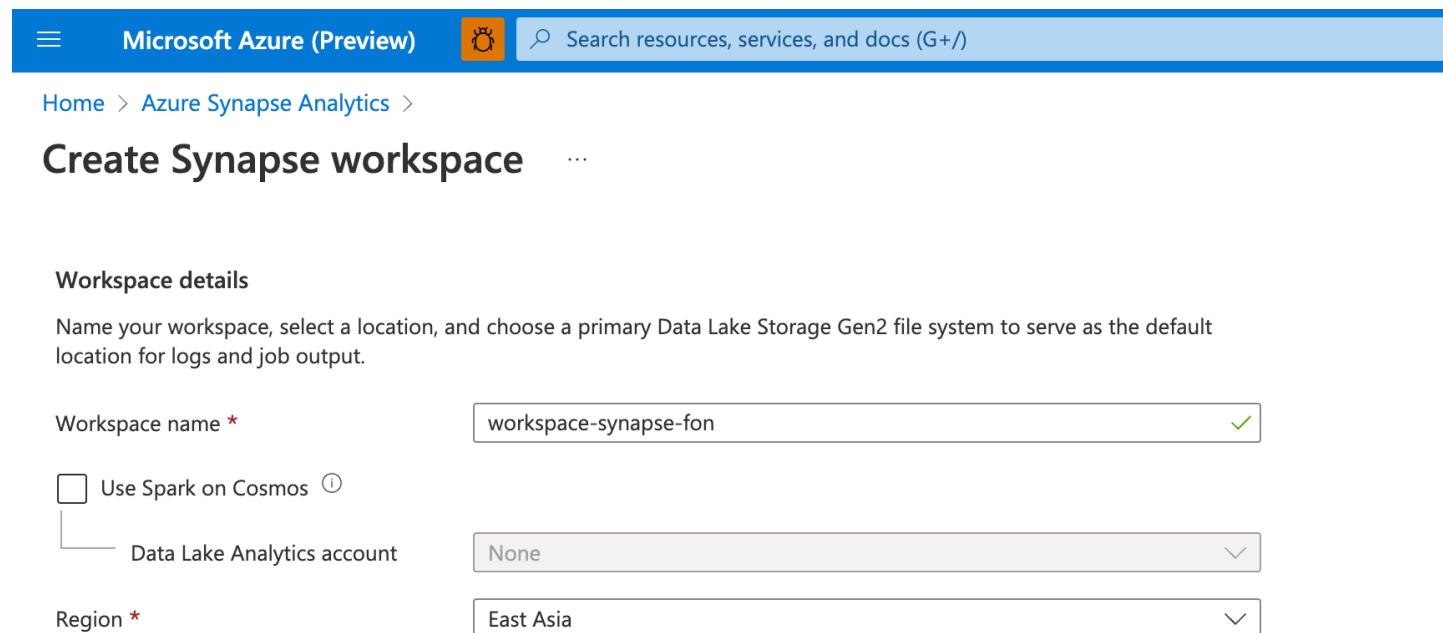
Basics tab > Workspace details

1. **Workspace name** - Pick any globally unique name.

In this tutorial, we'll use **workspace-synapse-xx**

xx will refer to participant name

2. **Region** - East Asia



The screenshot shows the 'Create Synapse workspace' page in the Microsoft Azure (Preview) portal. The 'Region' dropdown is set to 'East Asia'. Other fields include 'Workspace name' (workspace-synapse-fon), 'Data Lake Analytics account' (None), and 'Region' (East Asia).

Note

A workspace that is not co-located with the client applications or storage can be the root cause of many performance issues. If your data or the clients are placed in multiple regions, you can create separate workspaces in different regions co-located with your data and clients.

STEP 1 - Create and setup a Synapse workspace

Select Data Lake Storage Gen 2

1. By **Account name**, select **Create New** and name the new storage account **xxxdatalake** or similar as the name **must be unique**.

2. By **File system name**, select **Create New** and name it **data**.

*This will create a storage container called **data**. The workspace will use this storage account as the "primary" storage account to Spark tables and Spark application logs.*

3. Check the "Assign myself the Storage Blob Data Contributor role on the Data Lake Storage Gen2 account" box.

Microsoft Azure (Preview) Search resources, services, and docs (G+)

Home > Azure Synapse Analytics > Create Synapse workspace

Name your workspace, select a location, and choose a primary Data Lake Storage Gen2 file system to serve as the default location for logs and job output.

Workspace name *

workspace-synapse-fon

Use Spark on Cosmos ⓘ

Data Lake Analytics account

Region *

None

East Asia

Select Data Lake Storage Gen2 * ⓘ

From subscription Manually via URL

Account name * ⓘ

fondatalake

Create new

File system name *

(New) data

Create new

STEP 1 - Create and setup a Synapse workspace

Security

≡ Microsoft Azure (Preview) Report a bug

Home > Azure Synapse Analytics >

Create Synapse workspace

* Basics * **Security** Networking Tags Review + create

Configure security options for your workspace.

Authentication

Choose the authentication method for access to workspace resources such as SQL pools. The authentication method can be changed later on. [Learn more](#)

Authentication method (1)

Use both local and Azure Active Directory (Azure AD) authentication
 Use only Azure Active Directory (Azure AD) authentication

SQL Server admin login * (1)

sqladminuser

SQL Password (1)

..... (1)

Confirm password

..... (1)

System assigned managed identity permission

Select to grant the workspace network access to the Data Lake Storage Gen2 account using the workspace system identity. [Learn more](#)

Allow network access to Data Lake Storage Gen2 account. (1)

(i) The selected Data Lake Storage Gen2 account does not restrict network access using any network access rules, or you selected a storage account manually via URL under Basics tab. [Learn more](#)

STEP 1 - Create and setup a Synapse workspace

Microsoft Azure (Preview) ⟳ Search resources, services, and docs (G+/-)

Home > Azure Synapse Analytics >

Create Synapse workspace

Validation succeeded

* Basics * Security Networking Tags Review + create

Product Details

Azure Synapse Analytics workspace by Microsoft Serverless SQL est. cost/TB ⓘ
5.00 USD

[Terms of use](#) | [Privacy policy](#)

Terms

By clicking Create, I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. For additional details see [Azure Marketplace Terms](#).

Basics

Subscription

Resource group rg_synapse_fon

Region East Asia

Workspace name (new) workspace-synapse-fon

Data Lake Storage Gen2 account

Data Lake Storage Gen2 file system (new) data

Buttons

[Create](#) [< Previous](#) [Next >](#) [Download a template for automation](#)

STEP 1 - Create and setup a Synapse workspace

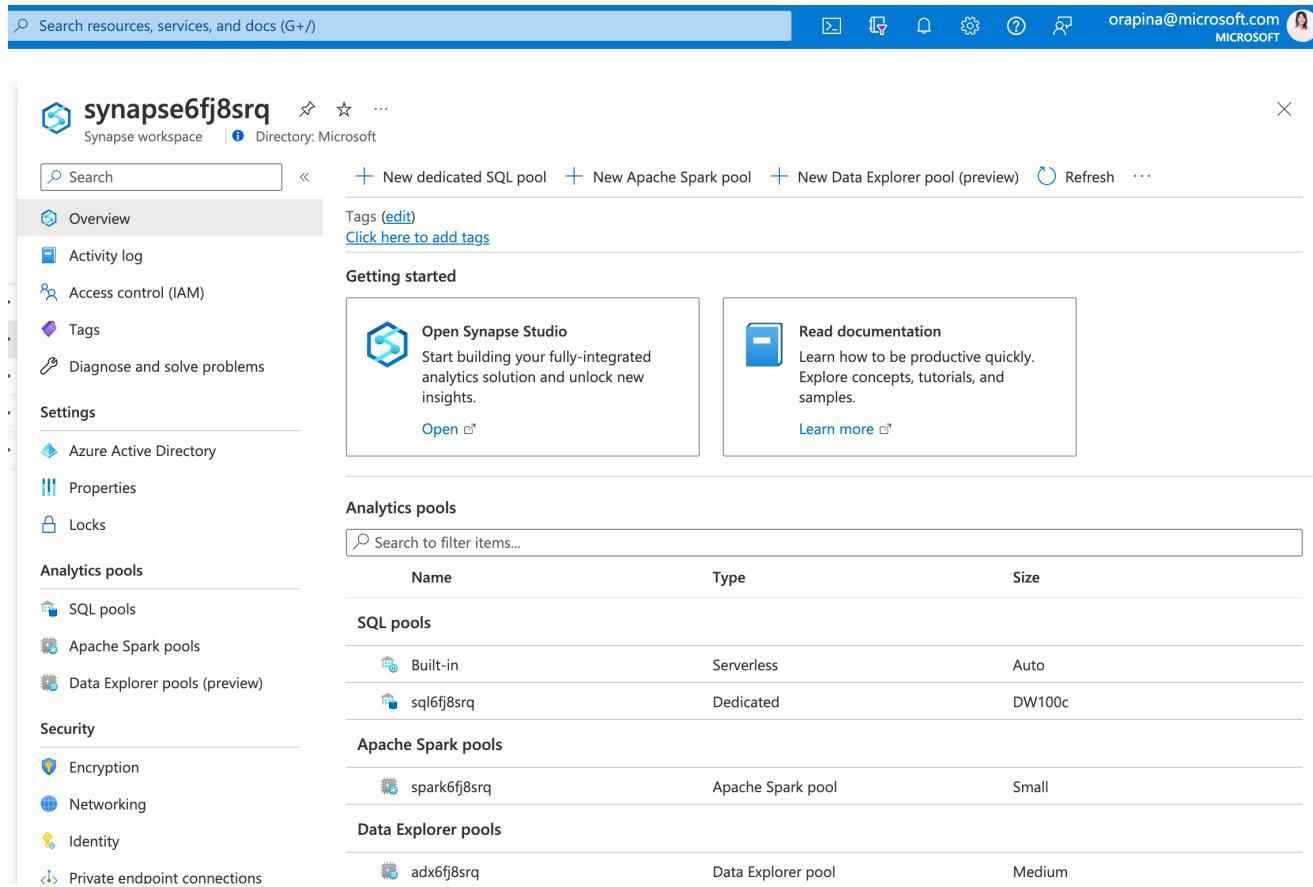
The screenshot shows the Microsoft Azure (Preview) interface. At the top, there's a navigation bar with a search bar containing "Search resources, services, and docs (G+/-)". Below the navigation bar, the page title is "Microsoft.Azure.SynapseAnalytics- Deployment". On the left, there's a sidebar with links: "Overview" (which is selected and highlighted in grey), "Inputs", "Outputs", and "Template". The main content area has a heading "Your deployment is complete" with a green checkmark icon. It displays deployment details: "Deployment name: Microsoft.Azure.SynapseAnalytics", "Subscription: synapse101-orapin", "Resource group: synapse101-orapin", "Start time: 11/6/2022, 11:48:27 PM", and "Correlation ID: [redacted]". There are also "Deployment details" and "Next steps" sections, with a "Go to resource group" button. At the bottom, there are "Give feedback" and "Tell us about your experience with deployment" links.

Select **Review + create > Create**. Your workspace is ready in a few minutes.

STEP 1 - Open Synapse Studio

After your Azure Synapse workspace is created, you have two ways to open Synapse Studio:

1. Open your Synapse workspace in the [Azure portal](#), in the **Overview** section of the Synapse workspace, select **Open** in the Open Synapse Studio box.
2. Go to the <https://web.azuresynapse.net> and sign in to your workspace.



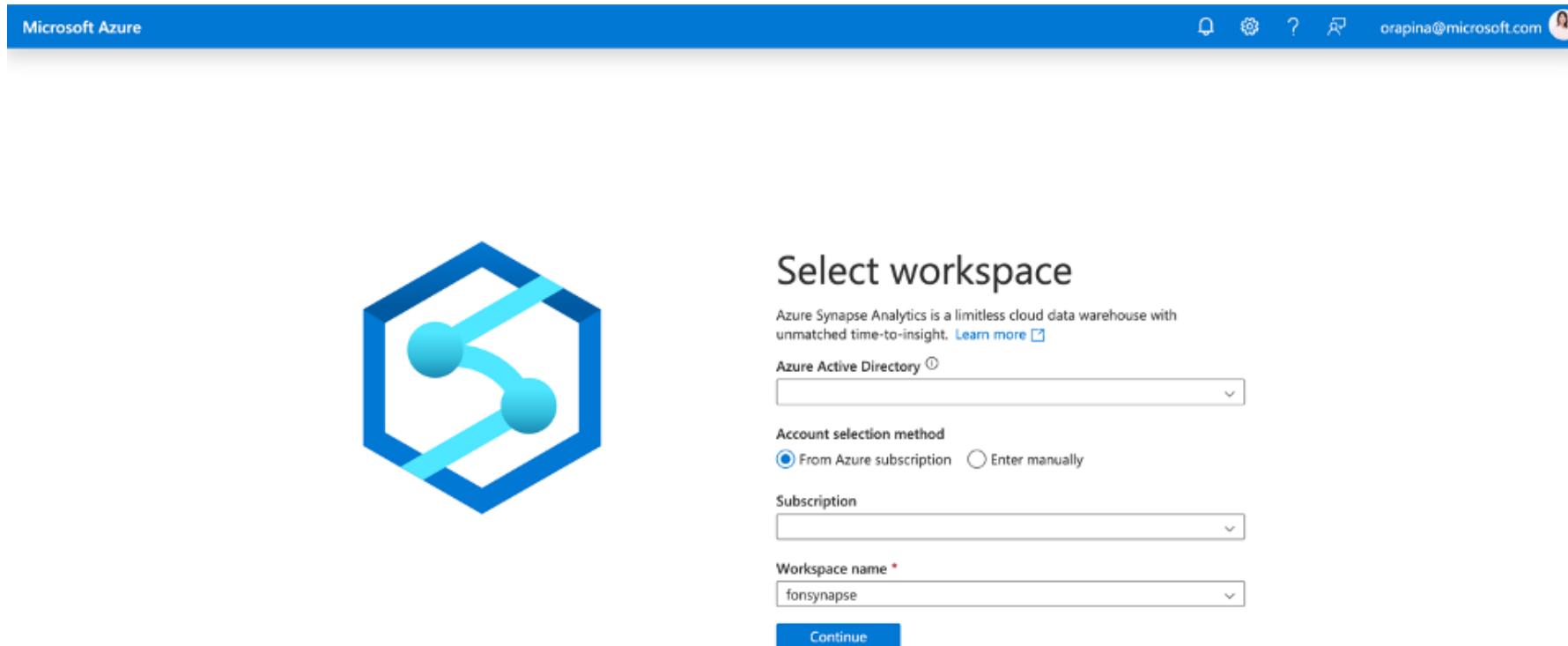
The screenshot shows the Azure Synapse workspace Overview page. The left sidebar includes sections for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (with sub-options for Azure Active Directory, Properties, and Locks), Analytics pools (with sub-options for SQL pools, Apache Spark pools, and Data Explorer pools (preview)), and Security (with sub-options for Encryption, Networking, Identity, and Private endpoint connections). The main content area features a search bar, a 'Getting started' section with 'Open Synapse Studio' and 'Read documentation' buttons, and a 'Analytics pools' section listing three pools: 'Built-in' (Serverless, Auto), 'sql6fj8srq' (Dedicated, DW100c), and 'spark6fj8srq' (Apache Spark pool, Small). A 'Data Explorer pools' section also lists one pool: 'adx6fj8srq' (Data Explorer pool, Medium).

| Name | Type | Size |
|--------------|--------------------|--------|
| Built-in | Serverless | Auto |
| sql6fj8srq | Dedicated | DW100c |
| spark6fj8srq | Apache Spark pool | Small |
| adx6fj8srq | Data Explorer pool | Medium |

STEP 1 - Open Synapse Studio

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The screenshot shows the Microsoft Azure web browser interface. At the top, there is a blue header bar with the Microsoft Azure logo on the left and user account information on the right. Below the header, the main content area has a white background. On the left side, there is a large blue hexagonal icon with a stylized network or flow pattern inside it. To the right of the icon, the text "Select workspace" is displayed in a bold, black font. Underneath this, there is a brief description of Azure Synapse Analytics: "Azure Synapse Analytics is a limitless cloud data warehouse with unmatched time-to-insight. [Learn more](#)". Below the description, there are several input fields and selection options:

- A dropdown menu labeled "Azure Active Directory".
- A section titled "Account selection method" with two radio buttons: one selected ("From Azure subscription") and one unselected ("Enter manually").
- A dropdown menu labeled "Subscription".
- A dropdown menu labeled "Workspace name *".

At the bottom of the form, there is a blue "Continue" button.

Explore Synapse Studio

Microsoft Azure | synapse6fj8srq

Synapse Analytics workspace
synapse6fj8srq

New ▾

Ingest Explore and analyze Visualize

Discover more

Knowledge center Browse partners

Recent resources

| Name | Last opened by you |
|-------------------------|--------------------|
| Aggregate product sales | 4 days ago |



The screenshot shows the Microsoft Azure Synapse Studio interface. At the top, there's a blue header bar with the Microsoft Azure logo, the workspace name 'synapse6fj8srq', and a user profile for 'orapina@microsoft.com'. Below the header is a sidebar with icons for Home, Ingest, Explore and analyze, Visualize, and other workspace management options. The main content area is titled 'Synapse Analytics workspace' and displays the workspace name 'synapse6fj8srq'. It features three primary buttons: 'Ingest' (cloud icon), 'Explore and analyze' (3D bar chart icon), and 'Visualize' (bar chart icon). Below these are sections for 'Discover more' (Knowledge center and Browse partners) and 'Recent resources' (a table showing a single item: 'Aggregate product sales' last opened 4 days ago). A large, stylized 3D bar chart with a network graph overlay is prominently displayed in the background.

To Follow the exercise

<https://microsoftlearning.github.io/dp-203-azure-data-engineer/Instructions/Labs/01-Explore-Azure-Synapse.html#before-you-start>

Data:

<https://raw.githubusercontent.com/MicrosoftLearning/dp-203-azure-data-engineer/master/Allfiles/labs/01/adventureworks/products.csv>

Delete Azure resources

Now that you've finished exploring Azure Synapse Analytics, you should delete the resources you've created to avoid unnecessary Azure costs.

- 1.Close the Synapse Studio browser tab and return to the Azure portal.
- 2.On the Azure portal, on the **Home** page, select **Resource groups**.
- 3.Select the **rg-synapse101-xxxx** resource group for your Synapse Analytics workspace (not the managed resource group), and verify that it contains the Synapse workspace, storage account, SQL pool, Data Explorer pool, and Spark pool for your workspace.
- 4.At the top of the **Overview** page for your resource group, select **Delete resource group**.
- 5.Enter the **rg-synapse101-xxxx** resource group name to confirm you want to delete it, and select **Delete**.
- 6.After a few minutes, your Azure Synapse workspace resource group and the managed workspace resource group associated with it will be deleted.

Azure Synapse Analytics

Resources

- [Watch Azure Synapse Analytics demo videos](#)
- [Get Started](#)
- [Realize Integrated Analytical Solutions with Azure Synapse Analytics \(Learning\)](#)
- [Integrate Azure Synapse Analytics with Azure Data and AI services \(Learning\)](#)
- [Documentation](#)
- [Knowledge Center](#)