



Azure Container Service & Serverless Computing

Abdul Rasheed Feroz Khan,
Microsoft MVP – Azure
Director - CodeSizzler



Agenda:

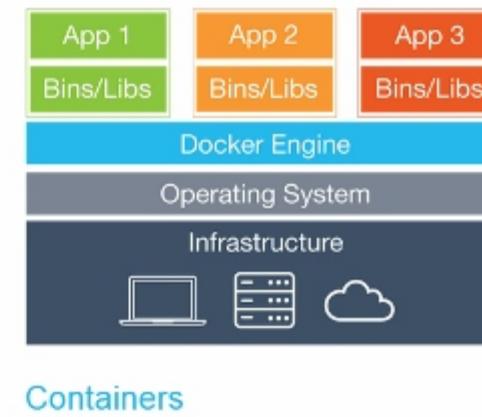
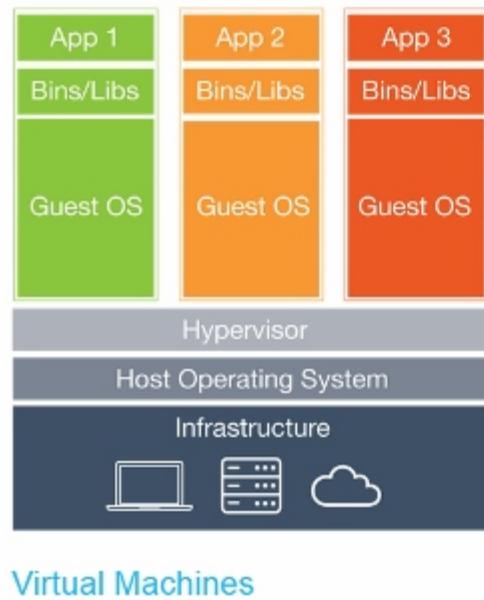
- Azure Container Service (AKS) - Containers are not VM's, Docker with Azure.
- Serverless Computing – SQL Data Warehouse, HDInsights, DevTest Labs, DevOps Tools Integration, Azure Lab Services.

Azure Container Service:

"Containers are not VM's.."

Containers

- Light weight alternatives to Virtual Machines
- Smaller, less expensive, faster to start up, and self-contained

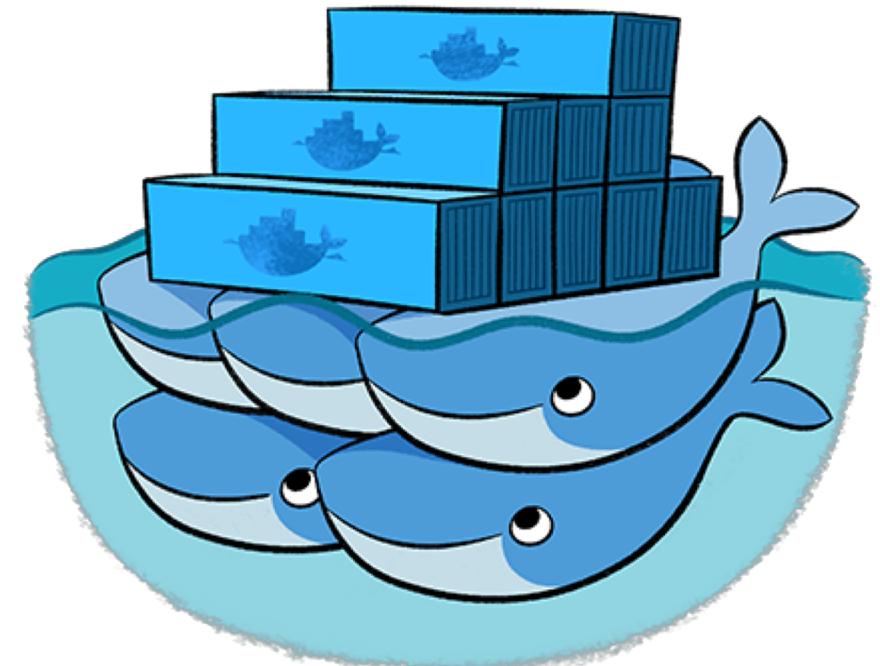


Dockers

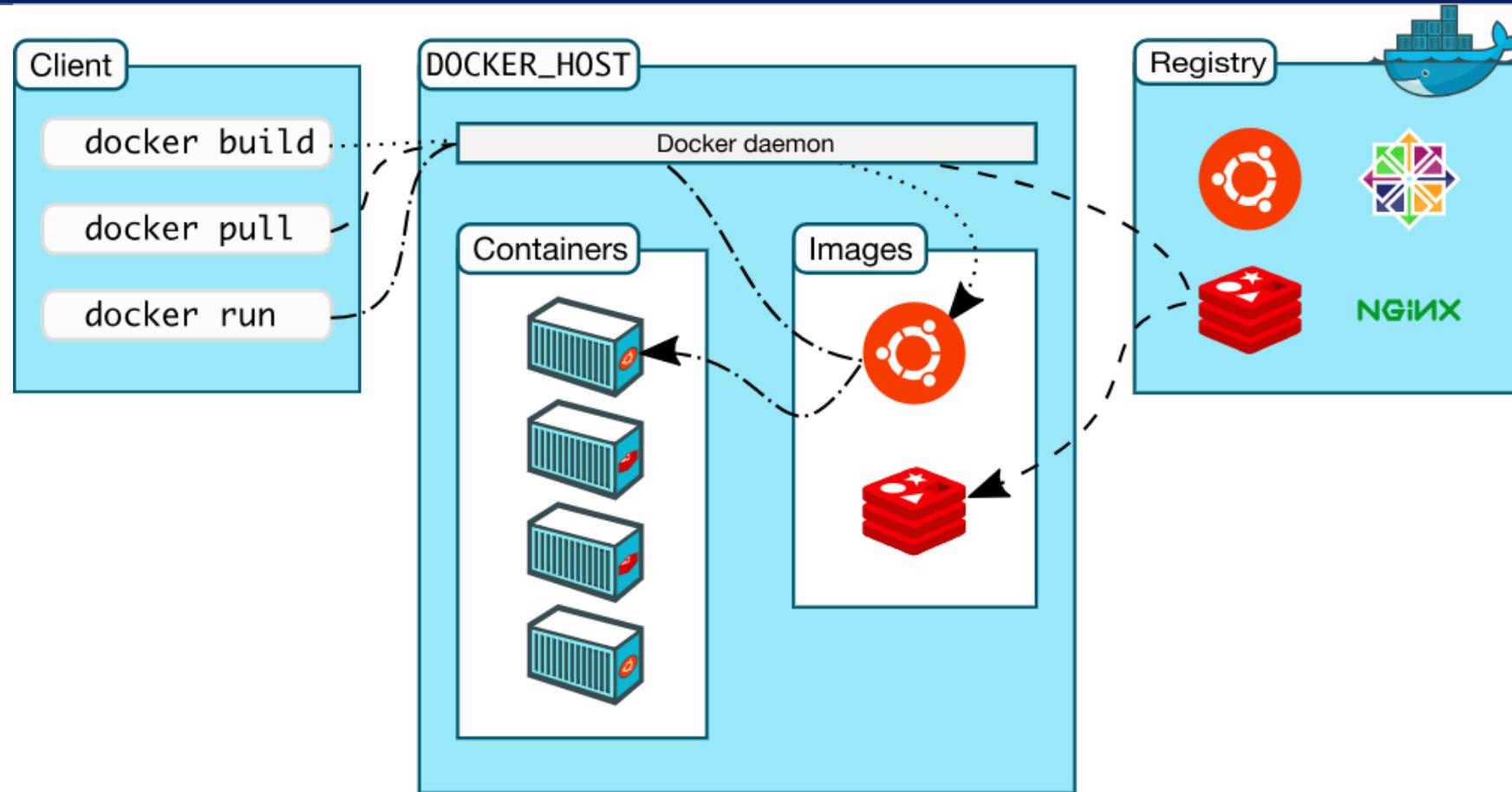
- Leading Open-Source containerization platform

“Docker containers wrap up a piece of software in a complete filesystem that contains everything it needs to run: code, runtime, system tools, system libraries – anything you can install on a server. This guarantees that it will always run the same, regardless of the environment it is running in”

- Support Natively in Azure
 - <https://docs.docker.com/docker-for-azure/>

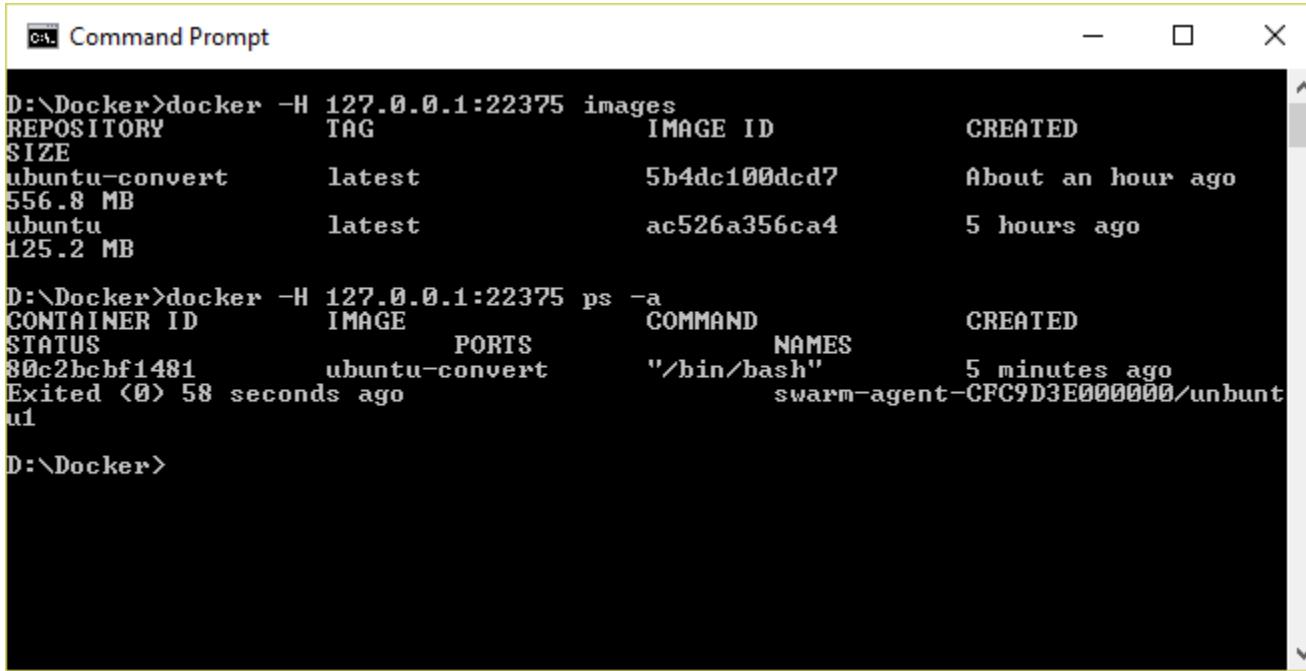


Docker Architecture



Docker CLI

Command-line interface for Docker, available for Linux, OS X, and Windows (available separately or as part of Docker Toolbox)



A screenshot of a Windows Command Prompt window titled "Command Prompt". The window contains two sets of command-line output from Docker:

```
D:\Docker>docker -H 127.0.0.1:22375 images
REPOSITORY          TAG      IMAGE ID      CREATED
SIZE
ubuntu-convert      latest   5b4dc100dcd7  About an hour ago
556.8 MB
ubuntu              latest   ac526a356ca4  5 hours ago
125.2 MB

D:\Docker>docker -H 127.0.0.1:22375 ps -a
CONTAINER ID        IMAGE      COMMAND      NAMES
STATUS              PORTS
80c2bcbf1481       ubuntu-convert    "/bin/bash"
Exited (0) 58 seconds ago
u1

D:\Docker>
```

Running a Container

```
docker run -i -t ubuntu /bin/bash
```

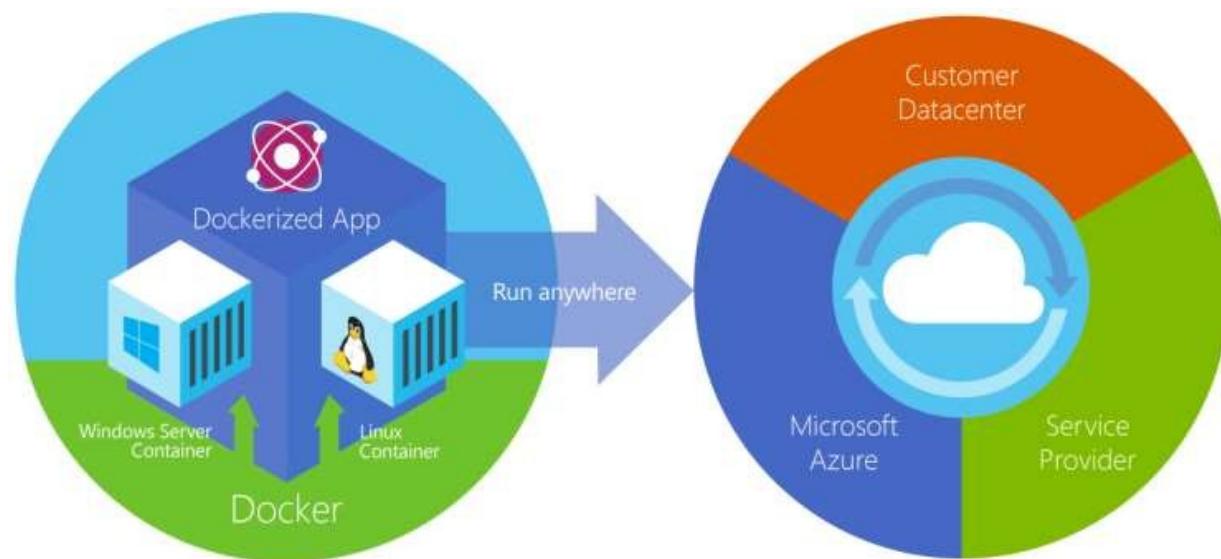
- docker - Docker CLI Command
- run -i -t - Run Container with interactive terminal
- ubuntu - Pull Ubuntu image from Docker hub or local registry
- /bin/bash - Command to execute in the container

Common Docker CLI Commands

- docker run - Use an image to run a container
- docker pull - Pull an image from a registry
- docker build - Build a Docker image
- docker images - List available Docker images
- docker ps - List running Docker containers
- docker exec - Execute a command in a container
- docker stop - Stop a running container

Azure Container Service

- Provides robust, ready-to-use Docker hosting environment
- Uses open-source orchestration tools (DC/OS and Swarm)

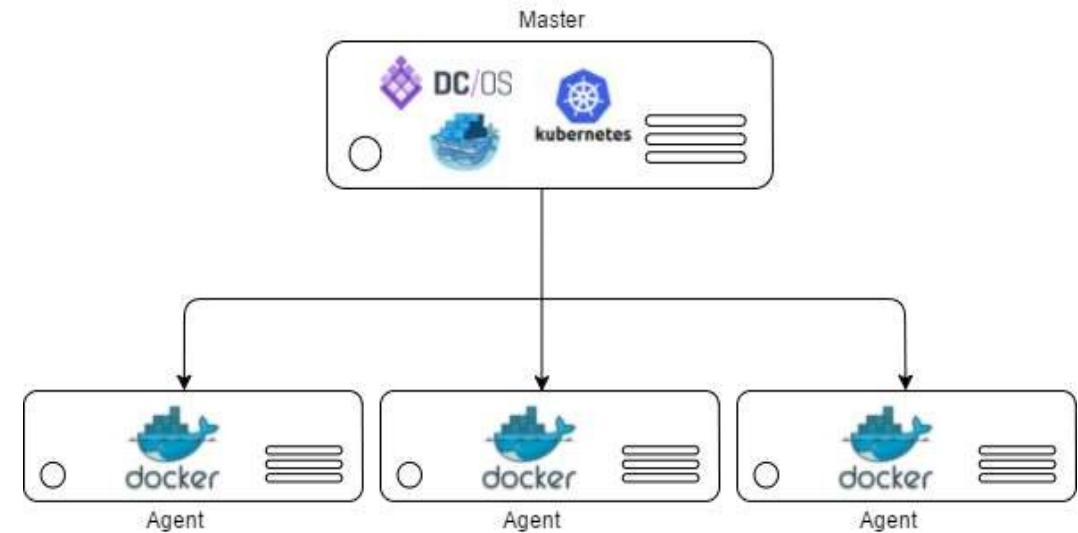


Container Orchestration

- Facilitates deployment and management of containers
- Containers by design are intended to be deployed in large volumes with some applications using dozens to even thousands of containers
- With this type of scale, automating container deployment and management with orchestration software becomes necessary
- Azure Container service supports Kubernetes, DC/OS, and Docker Swarm

Container Clusters

- Facilitate load balancing, scalability, and high availability
- A cluster is composed of master nodes which control the orchestration, and agent nodes that host the containers



Kubernetes

- Open-source orchestration engine from Google
- Provides a robust framework for container orchestration, yet remains lightweight and scalable
- Supported by Azure Container Service and tightly integrated with ACS, allowing Kubernetes to modify deployments



kubernetes
by Google™

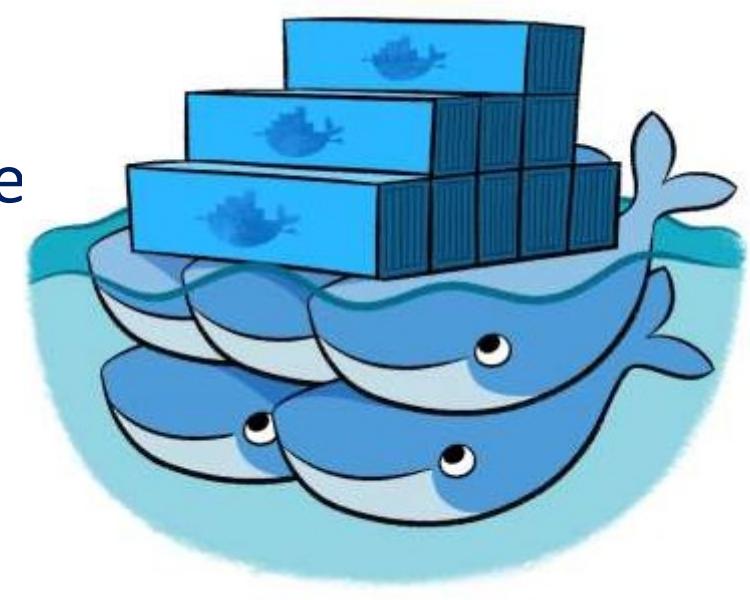
DC/OS

- Datacenter Operating System built on Apache Mesos
- Creates logical data centers and abstracts underlying hardware
- Provides resources traditionally provided by infrastructure, including networking, DNS, and load balancing
- Natively supported by Azure Container Service



Docker Swarm

- Docker's own orchestration engine
- Current releases of the Docker engine have “Swarm Mode” built in and can many of the same things that other orchestration engines do
- Lacks a GUI, but makes up for it with tight integration with Docker
- Natively supported by Azure Container Service



Lifecycle management of Containerized Applications



Source: The New Stack

Customer Stories



“Red Hat really impressed us with its enterprise grade support. We were surprised that Red Hat open source and Azure support resided in the same office”

Richard Hum: Studio Head
Throwback Entertainment

Customer profile

Canadian-based Throwback Entertainment develops, creates and publishes immersive and interactive gaming titles. Its portfolio of games has accumulated over US\$3.5 billion in revenue, sold over 200 million copies and distributed to over 35 countries worldwide. Notable games include Vexx, Extreme G Racing, Gladiator: Sword of Vengeance, Deflector, Aggressive Inline, SX Superstar and more

Business goal

When Throwback acquired Acclaim Entertainment it gained an entire gaming library. Alongside selling these games it has also been redeveloping some of them. It wanted to rework a previous classic, released in 1999, called Iggy's Reckin Balls by bringing it up to date and enabling groups of players to play against each other.

Tactics

It decided to use the Red Hat open source software to redevelop the game and also chose to host it from the Azure platform because of its flexibility, always-on availability and close support for Red Hat. Importantly it also chose Red Hat on Azure to host Docker containers managed by Kubernetes, which was considered important to develop a cutting-edge back-end for cloud gaming

Results

Throwback has been able to launch the game successfully from Azure with a raft of new features such as 8-player groups and HD graphics. As such it has created a high-profit game that has been radically modernized while retaining its original features. Supported by Azure, the game has been successfully launched as a game for all age groups and one that is characterised from the back-end by security, stability and scalability.

Software and Services

- Microsoft Azure

Open Source Technologies

- Red Hat Linux
- Docker
- Kubernetes

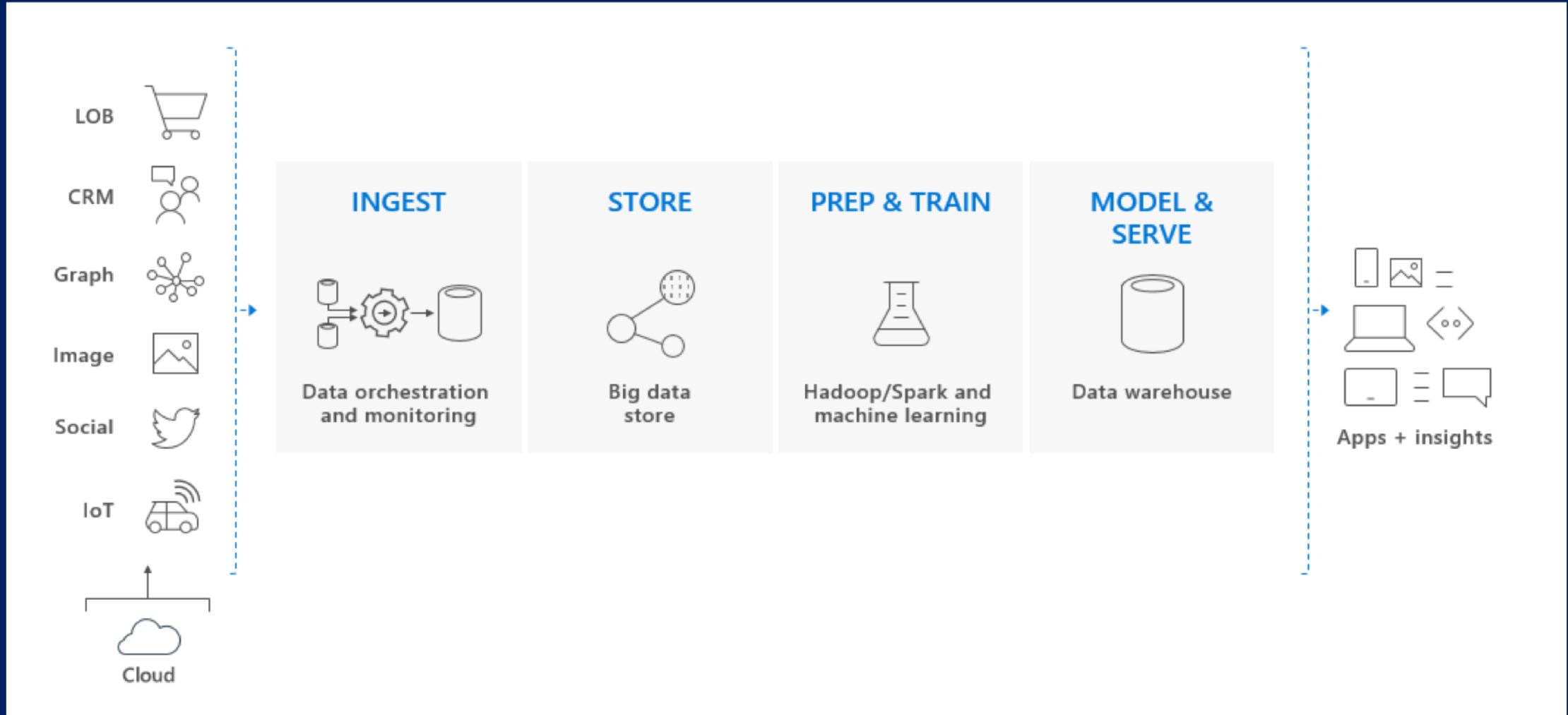
Demo – Azure Container Service

Azure SQL Data Warehouse

Azure SQL Data Warehouse

"SQL Data Warehouse is a cloud-based Enterprise Data Warehouse (EDW) that leverages Massively Parallel Processing (MPP) to quickly run complex queries across petabytes of data"

Big data solution architecture:



Why Azure SQL Data Warehouse?

- Scale and performance
- Trusted and secure
- Elastic and extensible
- Seamless integration

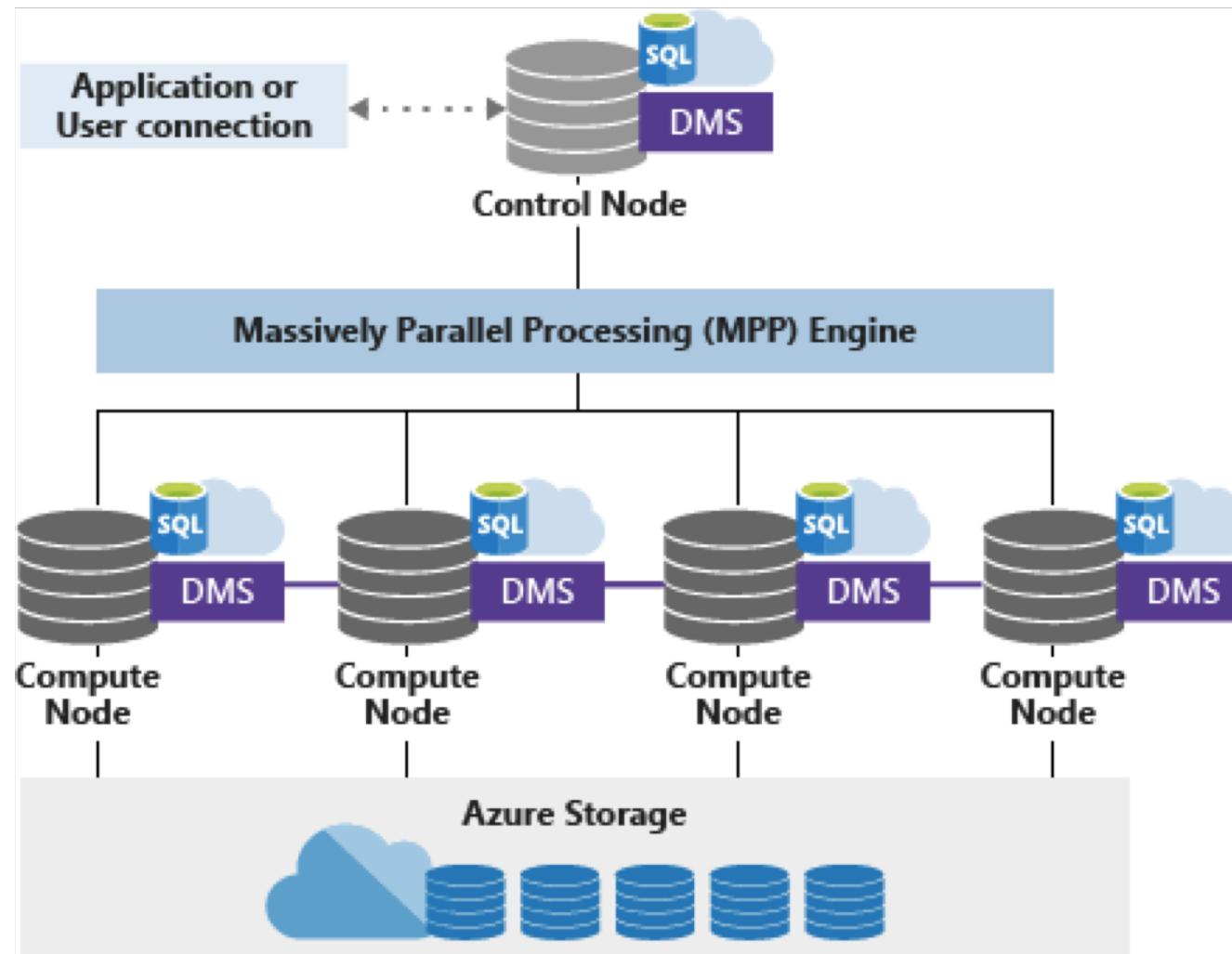


Service Capabilities

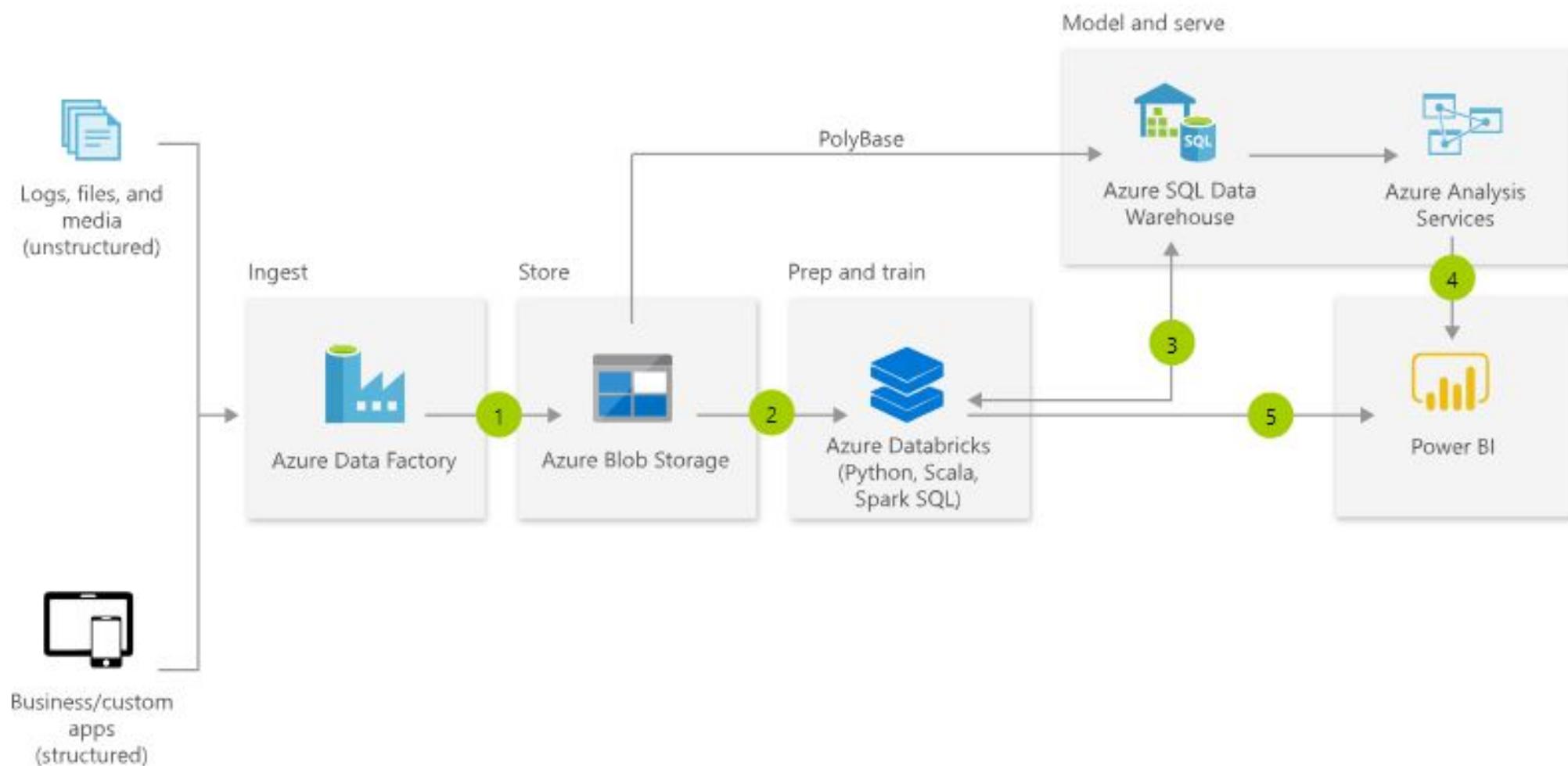
- ✓ Limitless concurrency
- ✓ Lightning-fast provisioning
- ✓ Advanced security
- ✓ Process any kind of data
- ✓ Truly elastic by design
- ✓ Fully managed infrastructure



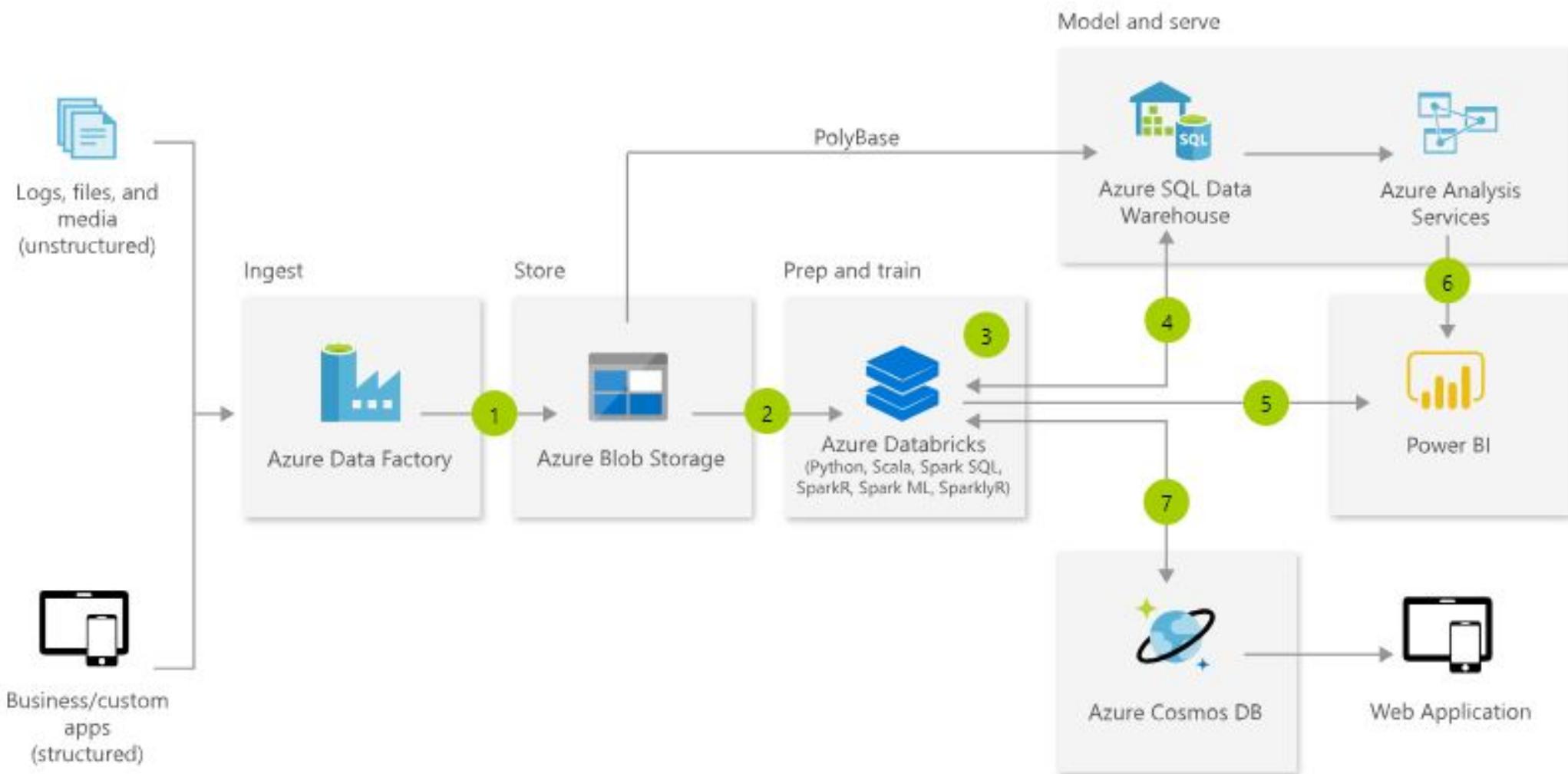
MPP Architecture



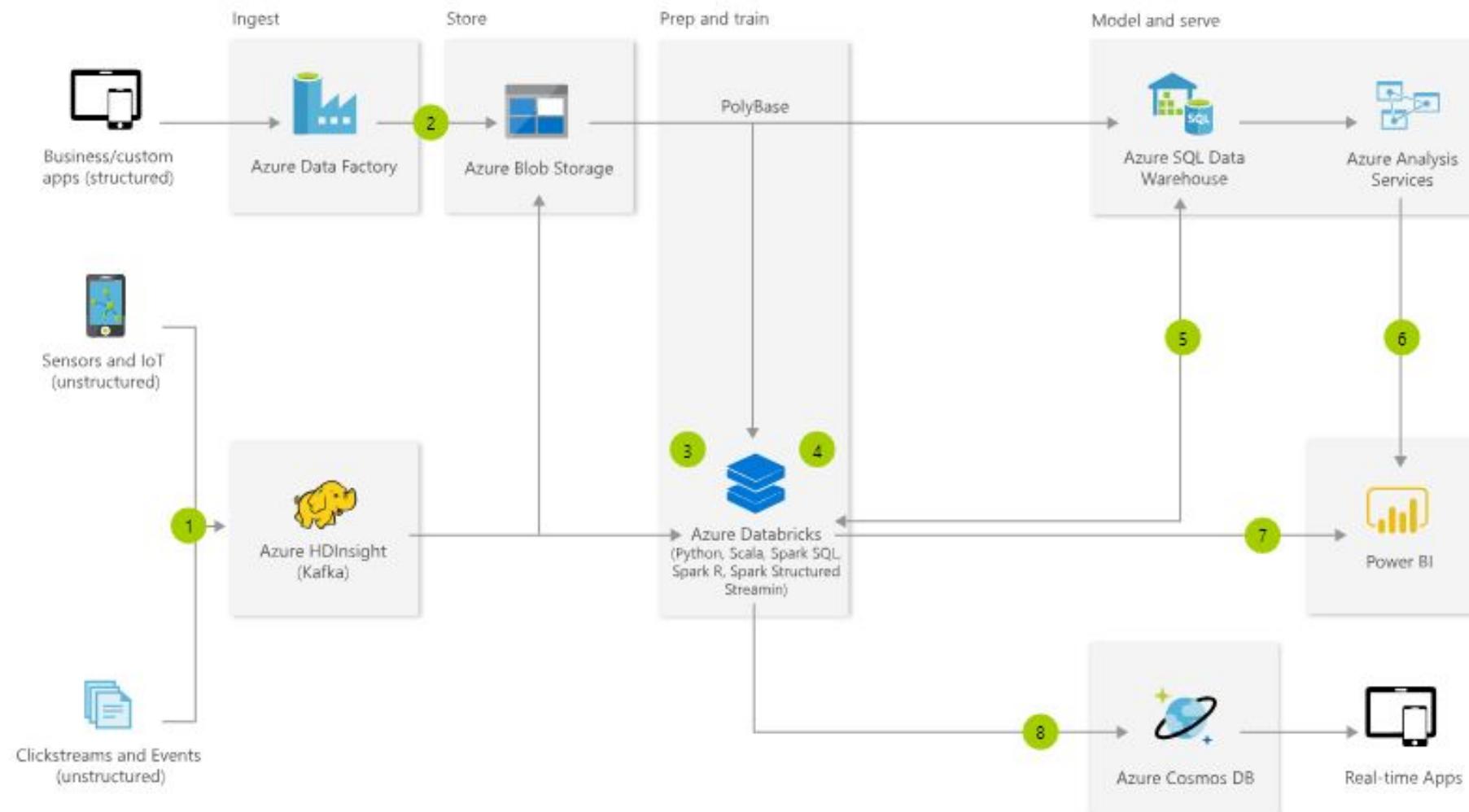
Modern Data Warehouse



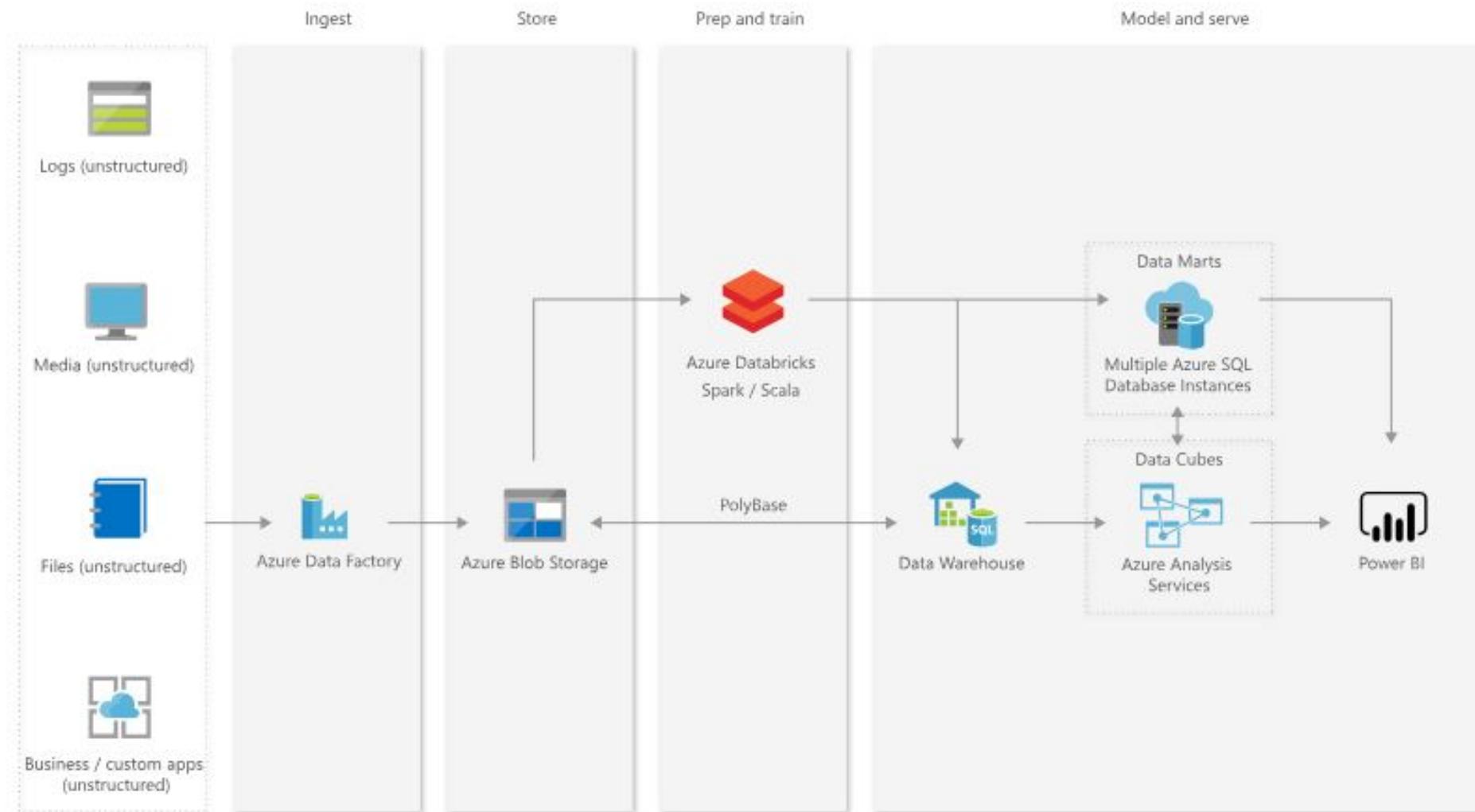
Advanced Analytics on Big Data



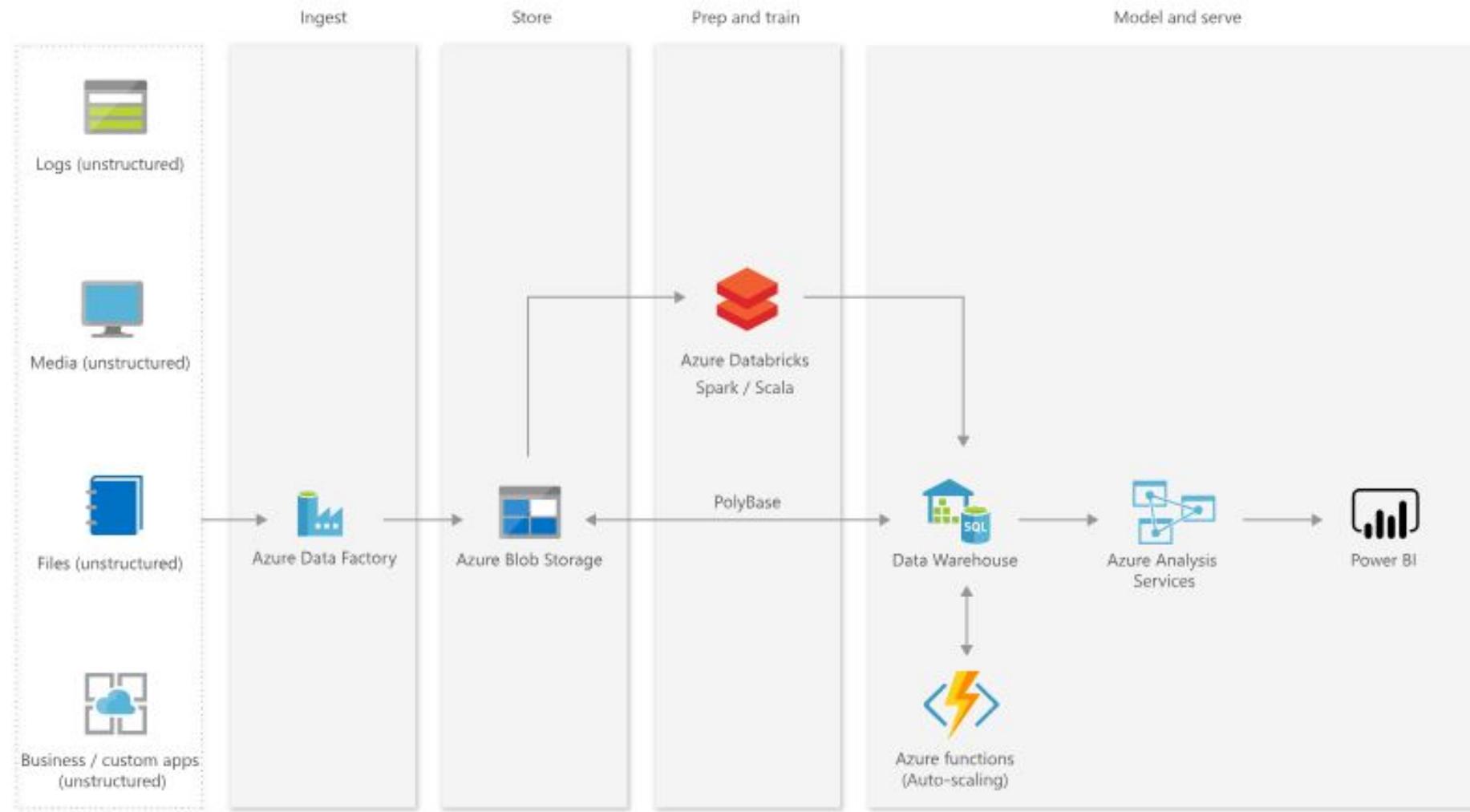
Real-time Analytics



Hub and Spoke Architecture for BI



Auto-Scaling Cloud Data Warehouse



Pricing

SQL Warehouse is available with two pricing tiers namely,

- Compute-optimised Gen1
- Compute-optimised Gen2

Pricing - Compute-optimised Gen1

Service Level	DWU	Price
DW100	100	₹79.96/hour
DW200	200	₹159.92/hour
DW300	300	₹239.87/hour
DW400	400	₹319.83/hour
DW500	500	₹399.79/hour
DW600	600	₹479.74/hour
DW1000	1000	₹799.57/hour
DW1200	1200	₹959.48/hour
DW1500	1500	₹1,199.35/hour
DW2000	2000	₹1,599.14/hour
DW3000	3000	₹2,398.70/hour
DW6000	6000	₹4,797.40/hour

Pricing - Compute-optimised Gen2

Service Level	DWU	Price
DW1000c	1000	₹798.45/hour
DW1500c	1500	₹1,197.67/hour
DW2000c	2000	₹1,596.89/hour
DW2500c	2500	₹1,996.11/hour
DW3000c	3000	₹2,395.33/hour
DW5000c	5000	₹3,992.22/hour
DW6000c	6000	₹4,790.66/hour
DW7500c	7500	₹5,988.33/hour
DW10000c	10000	₹7,984.43/hour
DW15000c	15000	₹11,976.65/hour
DW30000c	30000	₹23,953.29/hour

Demo – Azure SQL Data Warehouse

Integration and Ingestion

In addition to its core functionality, SQL Data Warehouse enables users to integrate with many of the other services in Azure. Some of these services include:

- Power BI
- Azure Data Factory
- Azure Machine Learning
- Azure Stream Analytics

Power BI

Power BI integration allows you to combine the compute power of SQL Data Warehouse with the dynamic reporting and visualization of Power BI. Power BI integration currently includes:

- **Direct Connect:** A more advanced connection with logical pushdown against SQL Data Warehouse. Pushdown provides faster analysis on a larger scale.
- **Open in Power BI:** The 'Open in Power BI' button passes instance information to Power BI for a simplified way to connect.

Azure Data Factory

Azure Data Factory gives users a managed platform to create complex extract and load pipelines. SQL Data Warehouse's integration with Azure Data Factory includes:

- **Stored Procedures:** Orchestrate the execution of stored procedures on SQL Data Warehouse.
- **Copy:** Use ADF to move data into SQL Data Warehouse. This operation can use ADF's standard data movement mechanism or PolyBase under the covers.

Azure Machine Learning

Azure Machine Learning is a fully managed analytics service, which allows you to create intricate models using a large set of predictive tools. SQL Data Warehouse is supported as both a source and destination for these models with the following functionality:

- **Read Data:** Drive models at scale using T-SQL against SQL Data Warehouse.
- **Write Data:** Commit changes from any model back to SQL Data Warehouse.

Azure Stream Analytics

Azure Stream Analytics is a complex, fully managed infrastructure for processing and consuming event data generated from Azure Event Hub. Integration with SQL Data Warehouse allows for streaming data to be effectively processed and stored alongside relational data enabling deeper, more advanced analysis.

- **Job Output:** Send output from Stream Analytics jobs directly to SQL Data Warehouse.

Thank You