Wherever your data is stored, Azure offers a comprehensive lineup of services to help you ingest, transform, and store data. This allows your stored data to be modeled and explored with Power BI, Excel, and other visualization tools.

Azure is an open platform, which provides tools to make sense of a broad range of data sources. These tools include:

- Well-structured operational databases hosted on-premises or in the cloud
- Online data sources similar to data from your cloud applications and other reporting services
- Stores of unstructured data, such as event logs, emails, documents, media files, and more
- Real-time data streams including telemetry from sensors and IoT devices
- Or even real-time data streams including telemetry from sensors and IoT devices

**INGEST/TRANSFER/STORE**

While working across disparate data sources, you will extract the data you want from each source. Next, you will transform it so that it can be unified and aggregated with other data. Finally, you will store it in a central data repository, so that you are able to scale up in order to hold all the data you need for reporting.

With structured data in operational databases on-premises, you can leave data where it is, or you can move it to one of
Azure’s many database options. Azure has a gallery of data connectors available to connect to Azure, or you can develop your own data connectors.

If you have large amounts of unstructured data to report on, using Azure’s scale-out compute power and analytics engines will extract information and transform it into a suitable state for storing and modeling.

To ensure that reporting stays up to date, it is important to automate the ingestion and transformation process on a schedule that suits your needs. Azure offers a variety of ways to do this, including scripting your own batch processes in Azure CLI, or using Azure Data Factory, which is a full hybrid data integration service. Azure Data Factory allows you to create, schedule, and orchestrate your Extract-Transform-Load or ETL. Azure Data Factory also allows you to create workflows at scale in the cloud or self-hosted on-premises.

For optimal reporting and business insights, collecting massive volumes of data from multiple structured and unstructured data sources requires a powerful storage service. In Azure, Azure SQL Data Warehouse has the performance, elasticity and compute power to scale up or down as needed. This allows you to host a curated central repository of virtually unlimited size. A full data warehouse solution is not always required. If total storage requirements aren’t going to exceed 4TB, Azure SQL Server is sufficient for your needs.

**MODELING**

The feeds from your data warehouse are ingested by your data models. The data model is the heart of any analytics system and establishes the structure of your data and the relationships between your data. Whatever the data source, models provide data views that can be explored for business intelligence. Data models need to be capable of quickly scaling out to user demand. In Azure, we’ve focused on enabling you to combine all relevant data into a rich, semantic, business-oriented data model that is able to cache billions of rows of data in memory for fast queries.

With Azure, you can create this semantic data model directly in Power BI for an all-in-one self-service solution, or you can use Azure Analysis Service to build out an IT-managed model accessible by Power BI and other data visualization tools.

Modeling in Power BI and Azure Analysis Service is very similar. In each case you create a semantic model that presents the data as logically linked tables from different sources, presenting a consistent view of the underlying data. This can also be created using friendly names understandable to business users. Using Data Analysis Expressions (DAX), you can also derive new data for the model. You can use this to filter the data, calculate, and create new Measures and KPIs.

Rather than ingesting the data into a data warehouse, you may ingest data directly into the model for ad hoc data modelling. This approach is appropriate while working with unstructured data sets and exploring data for patterns and structure not yet supported by the warehouse schema.

**AZURE ANALYSIS SERVICES**

If you are interested in a hybrid model, moving your data to Azure, and have worked with Microsoft SQL Analysis Services, you’ll find working with these data models very familiar. Moving from an existing on-premises SSAS implementation to Azure is straightforward:

- You can move your on-premises model to Azure, and continue to link to your existing on-premises databases via the Azure Gateway
- You can migrate your on-premises databases

To get started, give the service a name, specify the capacity that’s needed, and determine the geographic location where you want it hosted. Azure handles the rest.

Unlike implementing an analysis service on-premises, it is easy and efficient to create a new Azure Analysis Service, provision or de-provision capacity to meet changing business needs. Now that it is in the cloud, you no longer need to do capacity planning in advance. You can scale up, and out, to meet demand.

Additionally, with Web Designer, you can connect to the data warehouse and other sources to develop your data models. With the data model in place you can now visualize your data using your visualization tools of choice, like Microsoft Power BI.
POWER BI

Power BI is a versatile and easy way for everyone in your organization to access rich interactive reports to gain insights from the data. Using Power BI dashboards, you can create single panes showing 360-degree views of your business, project, or department. You can also provide real-time streaming of data into these dashboards from social media sources, service usage metrics, or sensors and IoT devices via Azure IoT services. These dashboards help everyone in the organization make data driven decisions, and allow comprehensive sharing of insights with other people and teams.

Regardless of familiarity with Power BI, each user can then build on top of this as they wish. Power BI’s support of natural query language means users can interrogate the model with the Q and A capability for the data view they need, without having to create a report first. Azure Cognitive Service integration into Power BI includes speech recognition, removing the users need to type.

Azure Cognitive Service integration into Power BI includes speech recognition, removing the users need to type.

Data Visualization and Modeling

Demo Topics

AZURE DATA INGESTION

Whether you’re working with well-managed operational databases hosted on-premises or in the cloud with online data sources, Azure provides you the tools you need to make sense of it all. Azure Data Factory allows you to create, schedule and orchestrate your ETL (Extract, Transform and Load workflows) at scale from structured and unstructured data sources. Within the Data Factory settings, you can create and manage linked services, datasets, pipelines and integration runtimes connected to on-premises data stores.

STORAGE OPTIONS

Collecting massive volumes of data from structured and unstructured data sources and ingesting data from all of them in parallel requires a powerful storage service to give you the foundation for reporting and business insights. Azure SQL Data Warehouse has the performance, elasticity and compute power to scale up or down as needed. It is a cloud-based Enterprise Data Warehouse that leverages Massively Parallel Processing (MPP) to quickly run complex queries over large quantities of data. When a full data warehouse solution is not required, like if your total storage requirements are not going to exceed 4 terabytes, Azure SQL Server is likely sufficient for your needs.

DATA MODELING

The data model is the heart of any analytics system and establishes the structure of your data and the relationships between your data. Whatever the data source, data models provide us data views that can be explored for business intelligence. In Azure we focus on enabling you to combine all relevant data into a rich semantic business oriented data model. You can create this semantic model directly in Power BI for an all in one self-service solution or you can use Azure Analysis Services to build out an IT managed model accessible by Power BI as well as other data visualization tools.
**VISUALIZATION & ANALYSIS**

If you have worked with Microsoft SQL Analysis or SSAS on-premises before, you will find working with these data models very familiar. Unlike on-premises implementations, it takes just a few minutes to spin up a new instance of Azure Analysis Services, provision or de-provision capacity to meet changing business needs. Because everything is in the cloud you no longer need to do capacity planning in advance, you can easily scale up and out to meet demand. Power BI is a versatile and easy way to get everyone in your organization to use rich interactive reports to gain insights from the data from many angles. Its support of natural query language means users can interrogate the model with Q&A capability and return the data view they need without having to create a report first.

**ADDITIONAL RESOURCES**

Explore the services Azure offers to help model and visualize your data for interactive reporting and business intelligence. You can learn more with these useful resources:

**MICROSOFT MECHANICS**

- An introduction to Azure Analysis Services
- Azure Stack integrated systems – how to bring Azure to your data center

**AZURE LEARNING PATHS**

- Azure Learning Paths

**HANDS-ON LABS**

- PowerBI Embedded