

Executive Summary for Azure Synapse Analytics Cookbook



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Overview

Data is generated rapidly by every organization. Data warehouse management to store data and derive insights from it has become essential to successful organizations. Choosing and running the right, most efficient, cost-effective data solution is even more important.

Azure Synapse Analytics is a limitless and unified analytics service that brings together data integration, data exploration, enterprise data warehousing, and modern data platform analytics integrated with Azure Machine Learning and Microsoft Power BI. It helps get insights from batch and real-time transactional data stored in operational databases such as Azure Cosmos DB with Azure Synapse Link.

Azure Synapse Analytics offers simplified ETL, code-free interactive data exploration, an optimized Apache Spark engine with in-engine predictive analytics, and intelligent workload management, which can optimize the functions of a data warehouse.

Azure Synapse Analytics is the right choice of strategic modern data service for your organization to maximize the value of existing SQL developer skillsets.

This executive summary is designed to give a high-level overview of Azure Synapse Analytics. We discuss key features, a case study for the service, and a recipe from *Azure Synapse Analytics Cookbook*.



Key service capabilities of Azure Synapse Analytics

Modernize analytics infrastructure without the operational cost along with the seamless performance and cost efficiencies of Azure Synapse Analytics, which combines all the features of modern analytics services, as shown in the following diagram.

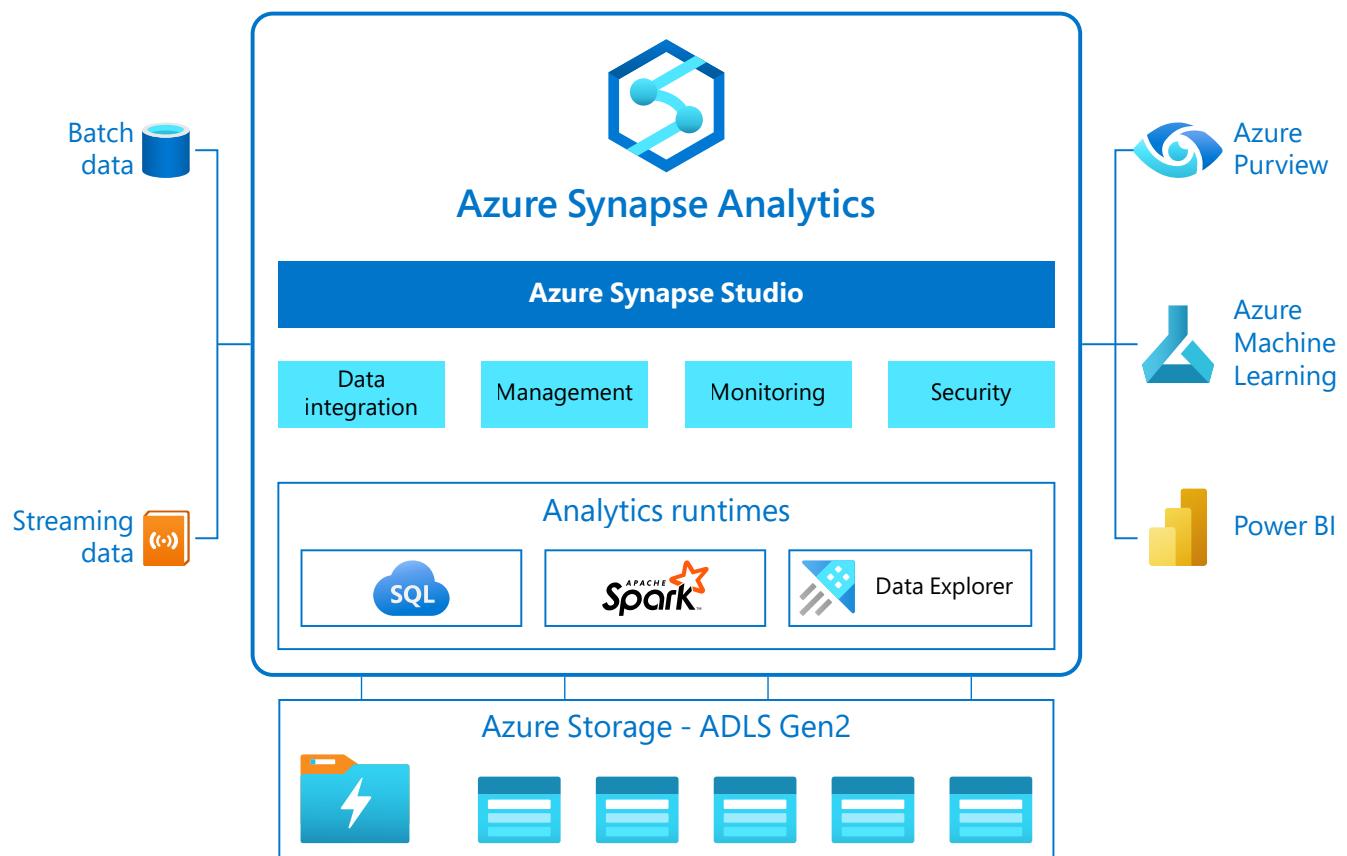


Figure 1: Azure Synapse Analytics architecture

Key benefits:

1. Modern analytics service

- ➔ Deliver insights from data across the organization by combining batch and streaming data with SQL and Spark Analytics runtimes.
- ➔ Build a mission-critical data warehouse using Azure Synapse Analytics, which is 14x faster¹ than other cloud data warehouses.
- ➔ Ingest and query massive data streams with Azure Data Explorer, which provides the advantages of a fully managed service, combining column storage text indexing and data sharing capabilities.
- ➔ Bring together relational and non-relational data and easily query files in the data lake with the same service used to build data warehousing solutions.

2. Effective data democratization

- ➔ Remove barriers to accessing data and enable the analysis of operational and business data with Azure Synapse Link and Azure Cosmos DB.
- ➔ Build real-time dashboards, create self-serve reporting, and deliver insights efficiently with Microsoft Power BI.
- ➔ Support both data lake (Delta Lake) and data warehouse use cases with a single analytics service.

1 [Analytics in Azure is up to 14x faster and costs 94% less than other cloud providers. Why go anywhere else? | Azure Blog and Updates | Microsoft Azure](#)

3. Seamless data integration and data governance

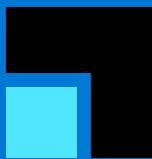
- ➔ Build code-free hybrid data integration with an ETL/ELT process in a visual environment to easily ingest and integrate data from more than 95 native connectors. Read more about [pipelines and activities in Azure Data Factory and Azure Synapse Analytics](#).
- ➔ Achieve scalable discovery and govern the data with Azure Purview Data Catalog and access policies.

4. Advanced analytics with machine learning capabilities

- ➔ Build an end-to-end analytics solution with deep integration of Azure Machine Learning and Azure Cognitive Services.
- ➔ Use Azure SynapseML libraries in a Synapse Analytics Spark pool to use machine learning capabilities or deploy a custom algorithm in Azure Machine Learning.

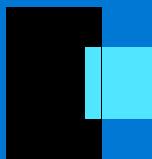
5. Unmatched security and easier maintenance

- ➔ Use advanced security techniques to keep data secure, such as column-level encryption and transparent data encryption.
- ➔ Manage with ease and monitor with rich capabilities built within Azure Synapse Analytics and native integration with Azure Monitor.



Limitless scale

Deliver insights from all your data across data warehouses and big data analytics systems with blazing speed.



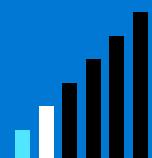
Powerful insights

Expand the discovery of insights from all your data and apply machine learning models to all your intelligent apps.



Unified experience

Significantly reduce project development time with a unified experience for developing end-to-end analytics solutions.



Converged analytics

Eliminate data barriers and perform analytics on operational and business app data with Azure Synapse Link—no data movement required.



Unmatched security

Secure data with the most advanced security and privacy features on the market, such as column - and row-level security and dynamic data masking.

Microsoft case study: Walgreens

[Walgreens](#), a 118-year-old drugstore chain, has more than 9,200 stores across the United States, Puerto Rico, and the US Virgin Islands and employs more than 240,000 people. To help determine which products customers want, Walgreens must process, analyze, and report on vast amounts of store data every day. A data warehouse in the cloud helped Walgreens transform operations and accelerate decision making.

Context

Walgreens serves approximately 8 million customers daily, in stores and online, creating vast volumes of data over time. To generate insights that help store managers and staff provide customers with the products they want and best manage inventory, these transactions are compared to at least 2 years of historical data across the supply chain. On top of this complex data landscape, Walgreens has recently acquired other retail pharmacies, adding even more data points to analyze.

Walgreens expanded its own data warehouse by adding storage to the physical datacenter, which took 6 months and required capital investments. Despite this, as its data grew over time, its on-premises solution could no longer support the speed or amount of data being added to the system.

Solution

Walgreens partnered with Microsoft and discovered Azure Synapse Analytics was the right solution for Walgreens after a detailed evaluation and performance benchmarking exercise. Walgreens developed an Azure Synapse Pilot proof of concept, after which they moved the service directly into production. The Pilot proof of concept involved the migration of a few tables of inventory management of Walgreens, which were stored in an on-premises data warehouse, to Azure Synapse Analytics.

Modern analytics service with on-demand scalability

In three months, Walgreens was able to migrate its entire on-premises data warehouse for inventory management into Azure Synapse. Data flows into the cloud through Azure ExpressRoute and into Azure Blob Storage. Employees can consume the data through visualization tools such as Microsoft Power BI.

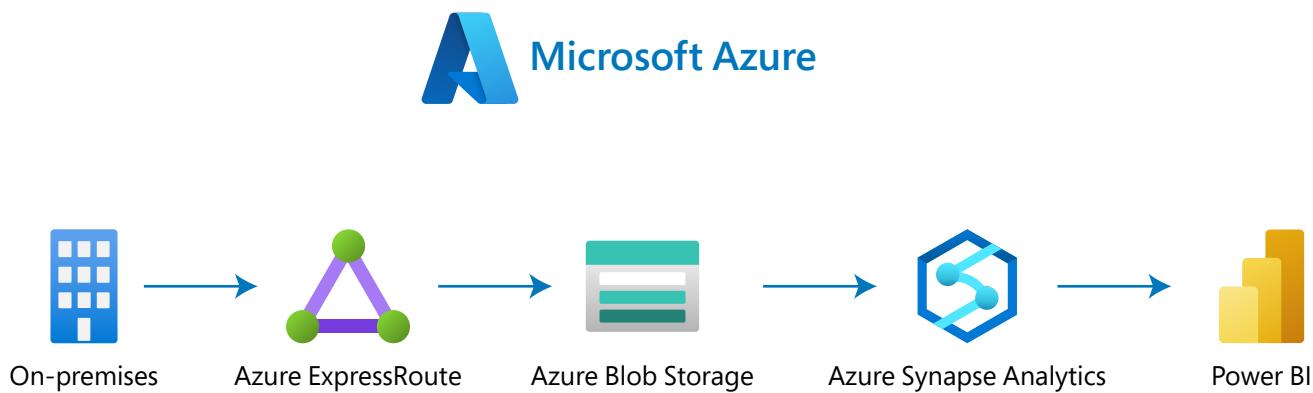


Figure 2: Walgreens Azure Synapse Analytics solution architecture

Benefits

The results were transformative for Walgreens. Instead of waiting until as late as 1:00 PM to get a report on the previous day's data, employees now have reports available by 9:00 AM every weekday. Supply chain analysts can also get more out of their reports by connecting their Power BI app to Azure Synapse Analytics.

Walgreens has seen annual maintenance costs for its data warehouse solution drop significantly while performance is at least three times faster with Azure Synapse Analytics.

A cookbook recipe to implement modern data services

In this section, we will look at migrating on-premises data warehouses to Azure Synapse Analytics using Azure Synapse Pathway. This excerpt from *Chapter 9* of the *Azure Synapse Analytics Cookbook* shows how simple it can be to migrate to Azure Synapse Analytics.

Get the full [e-book](#) *Azure Synapse Analytics Cookbook* to see how this recipe works as well as to review other migration and solution scenarios.

MPP Platform Migration to Azure Synapse Analytics

You can use Azure Synapse Pathway for data source migration with a few simple steps. The following list highlights the key steps to be executed.

How to do it...

Open the Azure Synapse Pathway tool and get the .SQL files ready from one of the data sources by doing the following:

1. Extract the source files from the data warehouse.
2. Copy the content from the files and save it in your system folder.
3. Set the translation type as **IBM Netezza** or **Microsoft SQL Server** or whichever data source you intend to migrate.
4. Select **Input directory** and browse to the folder where the input data source .SQL files are stored. Also, browse the output directory folder where the results must be stored.
5. Click **Translate** and view the results.

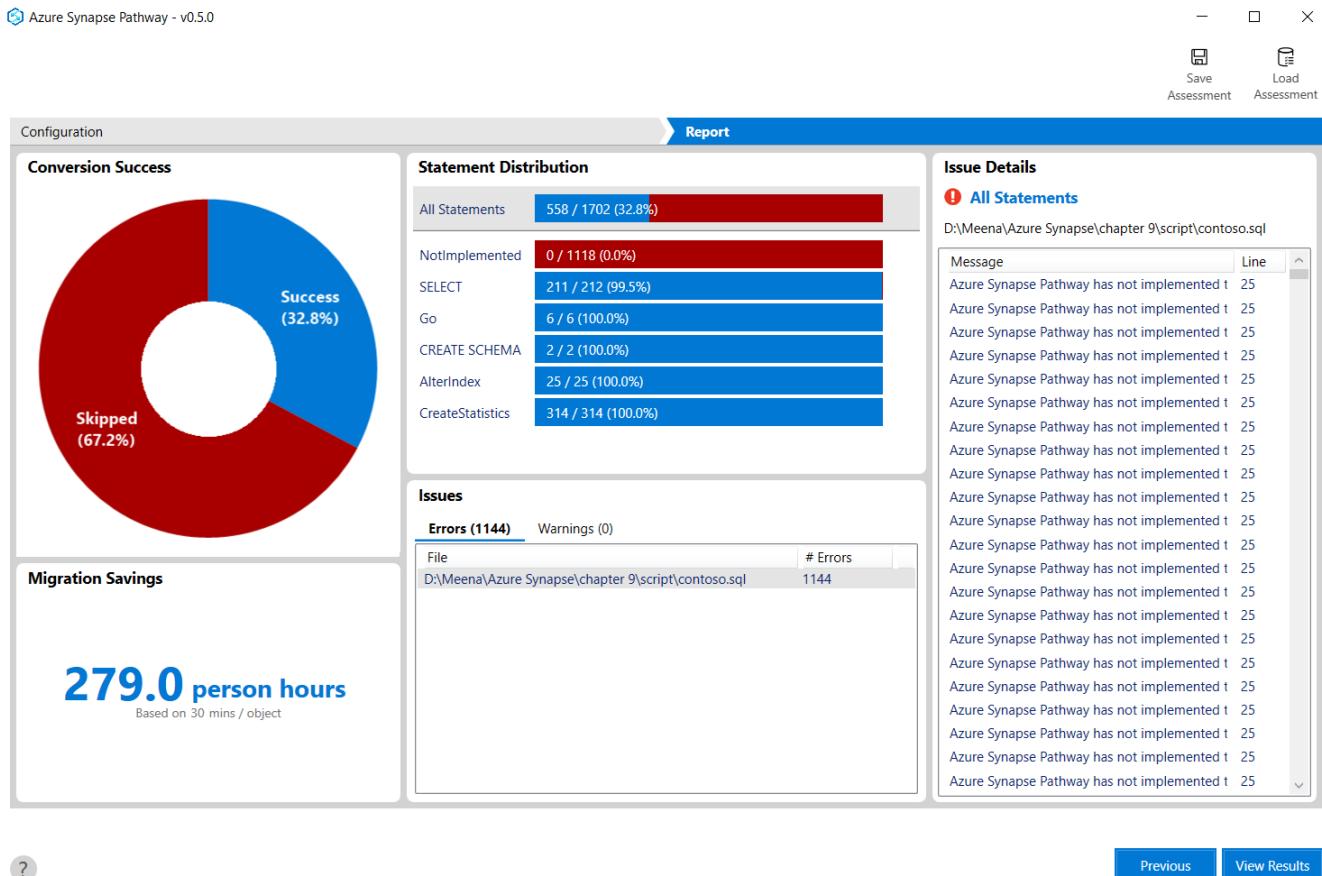


Figure 3: Monitoring the savings in Azure Synapse Pathway

Figure 3 shows the results of conversion success, migration savings, a list of statements that have been migrated, and details of issues in migration.

Adopt Azure Synapse Analytics in your business portfolios and migrate the data from a larger on-premises data warehouse to Azure Synapse Analytics using the Azure Synapse Pathway tool. To learn more, read the complete recipe.

Conclusion

Using Azure Synapse Analytics, an integrated data service from Microsoft Azure has the following benefits:

-  Modernize your data service by migrating to an Azure Synapse Analytics SQL pool and build OLAP capabilities on your data.
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-  Integrate data sources using more than 95 native connectors provided by Azure Synapse Analytics data integration.
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-  Standardize, cleanse, and transform data using an optimized Apache Spark pool with the latest Spark runtime, enabling massively parallel processing of your data.
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-  Integrate your current machine learning algorithms in Azure Machine Learning, which has native support for Azure Synapse Analytics. Design your new ML algorithms using Azure SynapseML libraries or the latest Spark MLLib libraries in a Spark pool.
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-  Discover and govern data efficiently using Azure Purview integration.
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-  Democratize data efficiently with Azure Data Explorer and Power BI.
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-  Analyze data in real time using Azure Synapse Link integration with Azure Cosmos DB.

To learn more about Azure Synapse Analytics

- Get started on Azure Synapse Analytics with an [Azure free account](#).
- Try Azure Synapse Analytics for yourself. Run your first query on pre-loaded sample data in just a few minutes with the [Quickstart Guide: Create an Azure Synapse workspace](#).
- Explore [demo videos](#) to see Azure Synapse Analytics in action.
- Find an Azure expert partner to get help tailored to your needs: [Connect with an Azure Partner | Microsoft Azure](#)
- Hear from experts and ask questions at an upcoming [Azure analytics webinar](#).
- [Get in touch with an Azure sales specialist](#) if you have any questions or need help.