

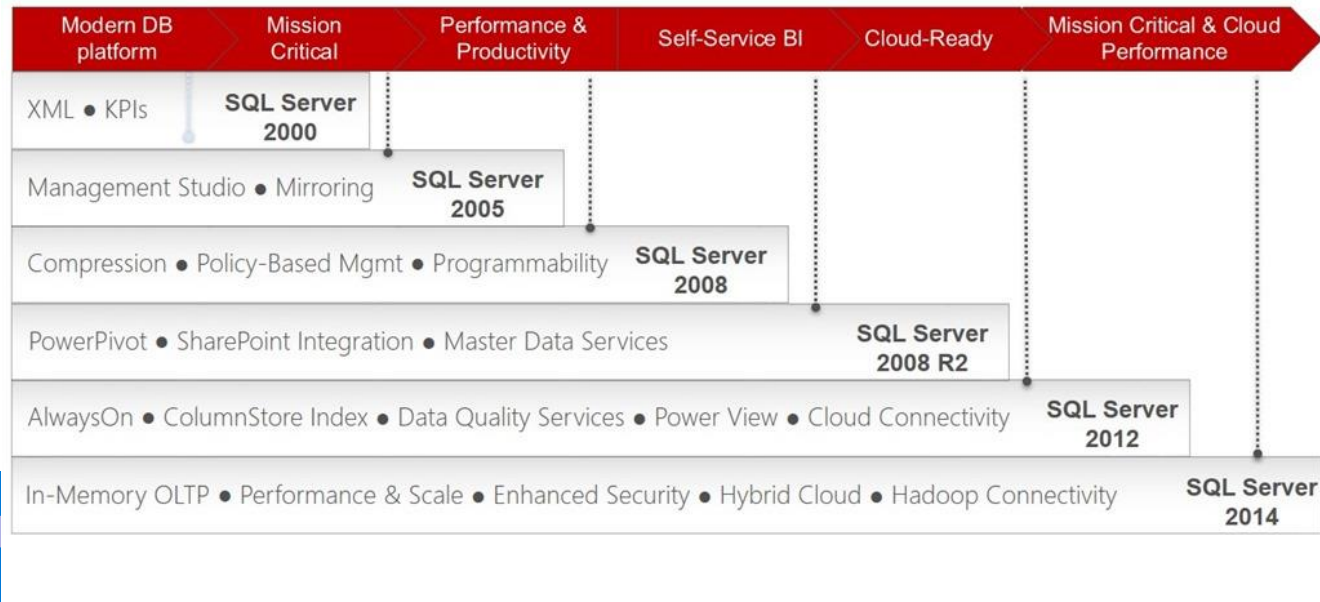
# LABORATORY OF DATA SCIENCE

## Microsoft SQL Server

# SQL Server versions and editions

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## The Evolution of SQL Server



SQL Server 2016 ed



### Enterprise

Comprehensive, mission-critical in-memory performance with unparalleled security, an end-to-end enterprise business intelligence solution with mobile BI built-in, and in-database advanced analytics at scale. Enterprise edition provides the highest service and performance for Tier-1 workloads.

[Learn more >](#)



### Express

Entry-level, free database that is ideal for deploying small databases in production environments. Build desktop and small server, data-driven applications up to 10 GB of disk size.

[Learn more >](#)

[Download >](#)



### Standard

Core data management and business intelligence capabilities with minimal IT resources.

[Learn more >](#)



### Developer

Free, full-featured set of SQL Server 2016 Enterprise edition software that allows developers to build, test, and demonstrate applications in a non-production environment.

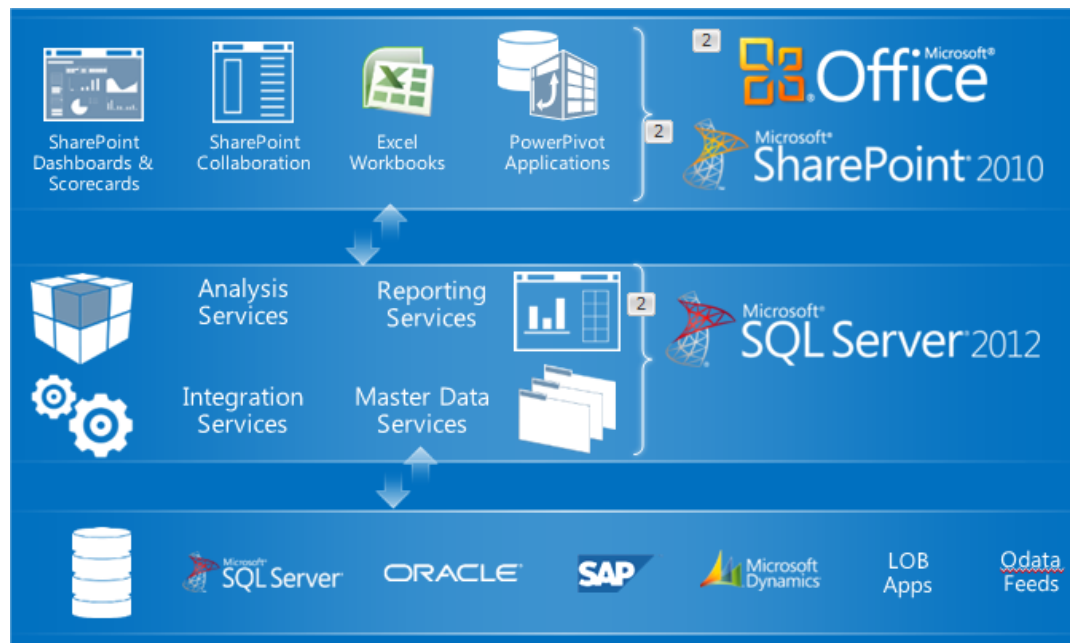
[Learn more >](#)

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# SQL Server Suite

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	On-premises	Cloud
DB/DW	SQL Server	Azure
Data integration	SQL Server Integration Services (SSIS)	Power Query for Excel
OLAP	SQL Server Analysis Services (SSAS)	Power Pivot for Excel
Reporting	SQL Server Reporting Services (SSRS)	Power BI



# SQL Server DB/DW

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## □ **Documentation**

- [Technical docs and tutorials](#)

## □ **Administration**

- Management studio

## □ **Development**

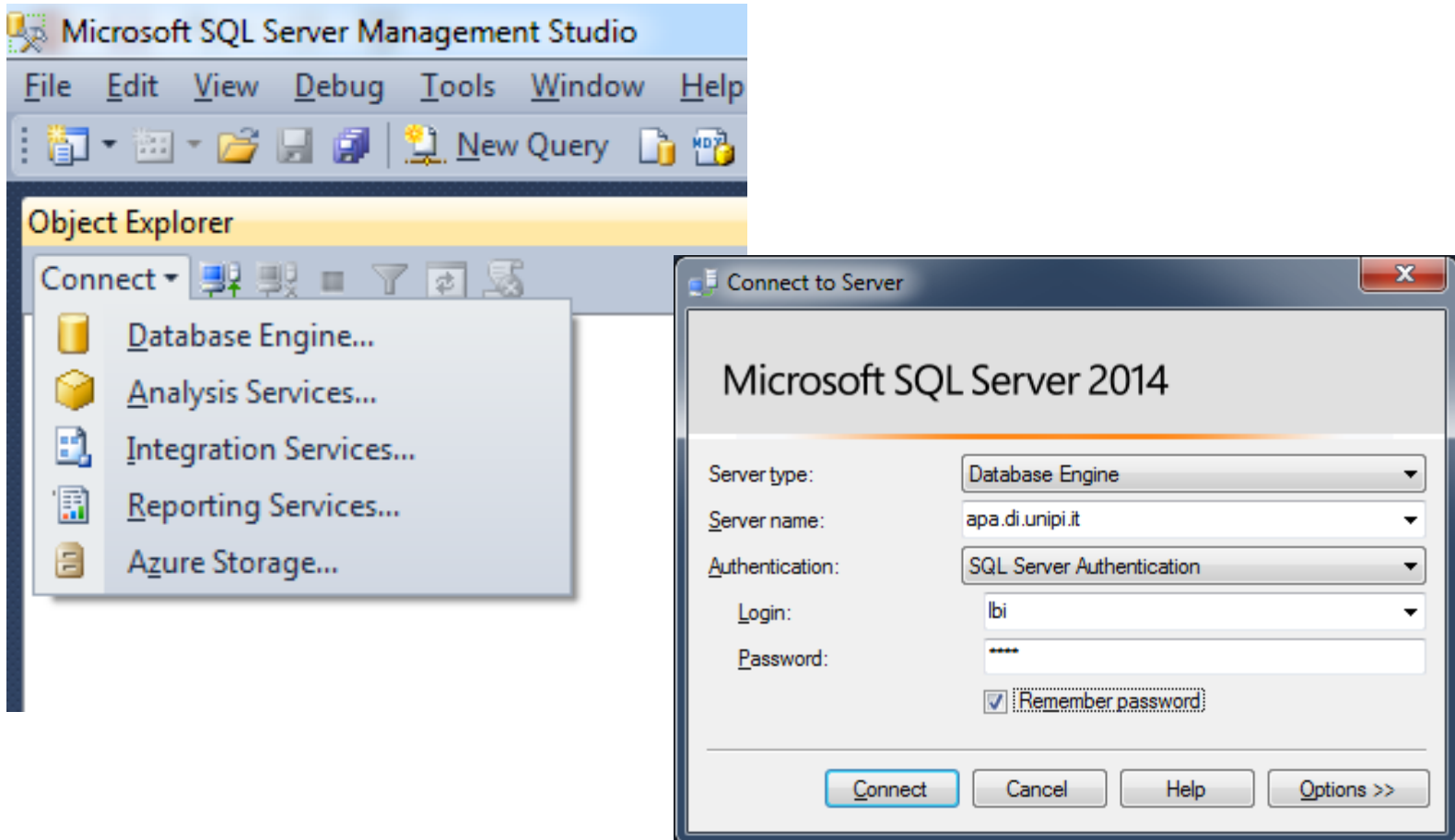
- SQL Server Data Tools / Business Intelligence Development Studio

## □ **Web resources**

- Developer center <http://msdn.microsoft.com/en-us/sqlserver>
- Data developer center <http://msdn.microsoft.com/en-us/data>
- SQL Team <http://www.sqlteam.com>
- Microsoft BI <http://www.microsoft.com/en-us/bi>

# Management Studio: Demo Session

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# Databases

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## □ System Databases

- master
  - login, settings
- model
  - empty db template
- msdb
  - Job scheduling
  - SSIS packages
- tempdb
  - temporary tables

## □ Sample Databases

- pubs
  - equal to pubs.mdb
- lbi
  - course database
- FoodMart
  - sample foodstore data
- [WideWorldImporters](#)
  - larger db & dw

# FoodMart

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- Snowflake schema

- sales\_fact

  - store\_sales

    - total amount sold

  - store\_cost

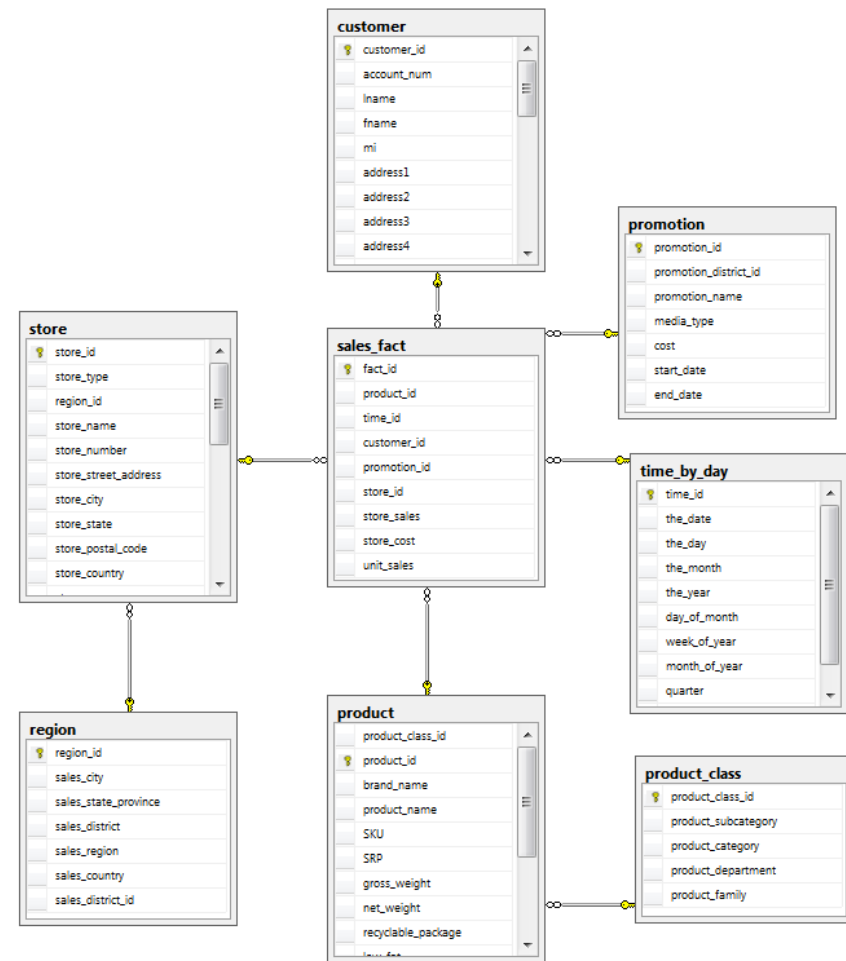
  - unit\_sales

    - number of units sold

    - unitary price is:  $\text{store\_sales} / \text{unit\_sales}$

- dimension tables

  - store, customer, time\_by\_day, product, promotion



# Notice

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- By default, SQL Server Management Studio poses some restrictions to the modification of table schema, returning an error after modifications.
- To remove such restrictions de-select Tools->Options->Designers->"Prevent Saving changes that require table re-creation".



# Import-export

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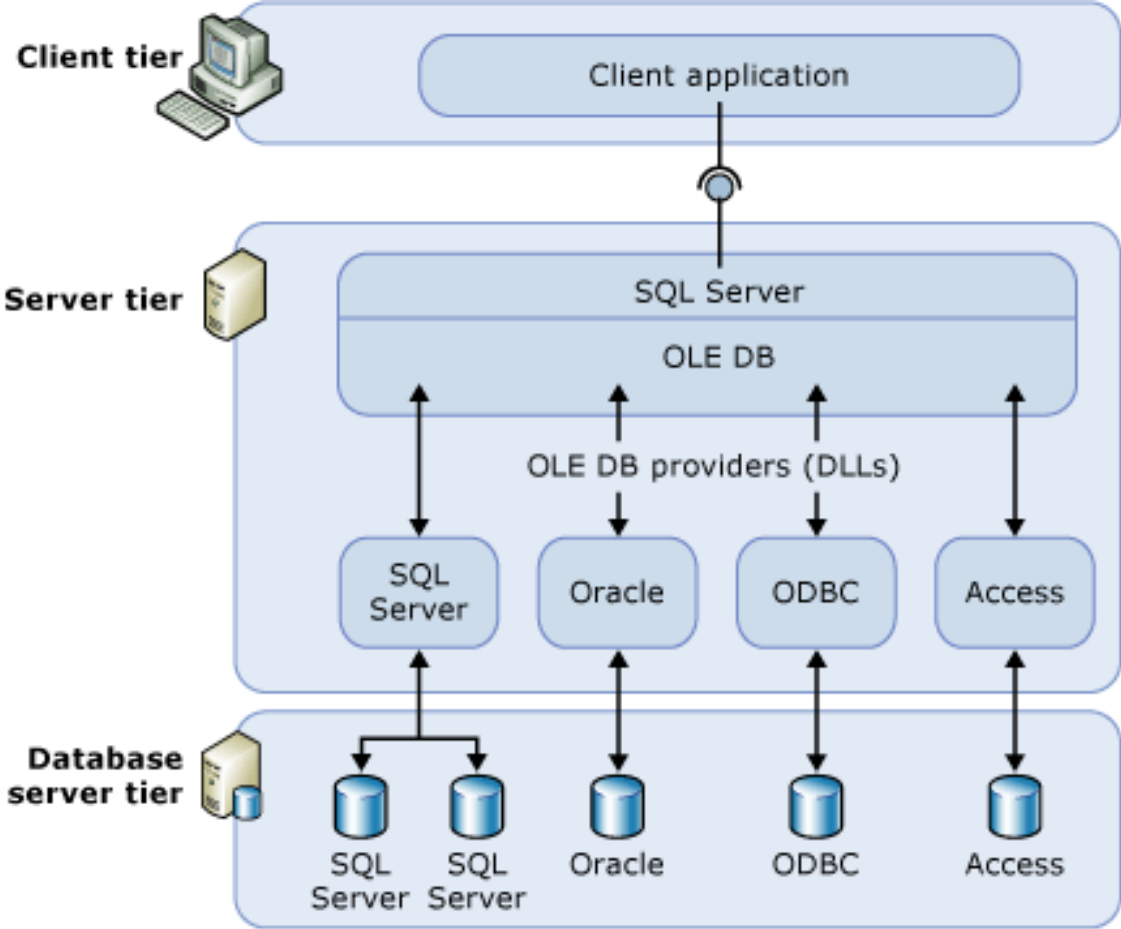
- Management Studio → Database
  - ▣ Right-click → Tasks → Import / Export Data
    - Import/export from/to
      - text files, ODBC, OLE DB
- XML
  - ▣ SELECT ... FOR XML RAW
    - SELECT fname, lname FROM employee FOR XML RAW
    - XML in ROW format (without the root tag)
      - <row fname =“Luigi” lname=“Rossi”/>
      - <row fname =“Mario” lname=“Bianchi”/>
    - [XML in SQL Server details](#)

# Namespaces

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- Users are assigned
  - ▣ a default database in a server
  - ▣ a default schema in each database
  - ▣ syntax of objects names (tables, views, ...): `[dbname.][schema.]object`
- `SELECT * FROM census`
  - ▣ census table on the `default schema` of the user
- `SELECT * FROM dbo.census`
  - ▣ census table on the schema `dbo`
- `SELECT * FROM lbi.census`
  - ▣ census table on the default schema of the user in the lbi database
- `SELECT * FROM lbi.dbo.census`
  - ▣ census table on the schema `dbo` of the database `lbi`

# Linked servers



# Linked servers

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## □ Linked Server

- ▣ Name that refers to connection to OLE DB data sources
- ▣ Ex., patterns refers to a DBMS server on Oracle/DB2/MySQL etc.
  - `patterns.pubs.dbo.authors` is the table `authors` of schema `dbo` on the database `pubs` of the linked server `patterns`

## □ Distributed queries and transactions

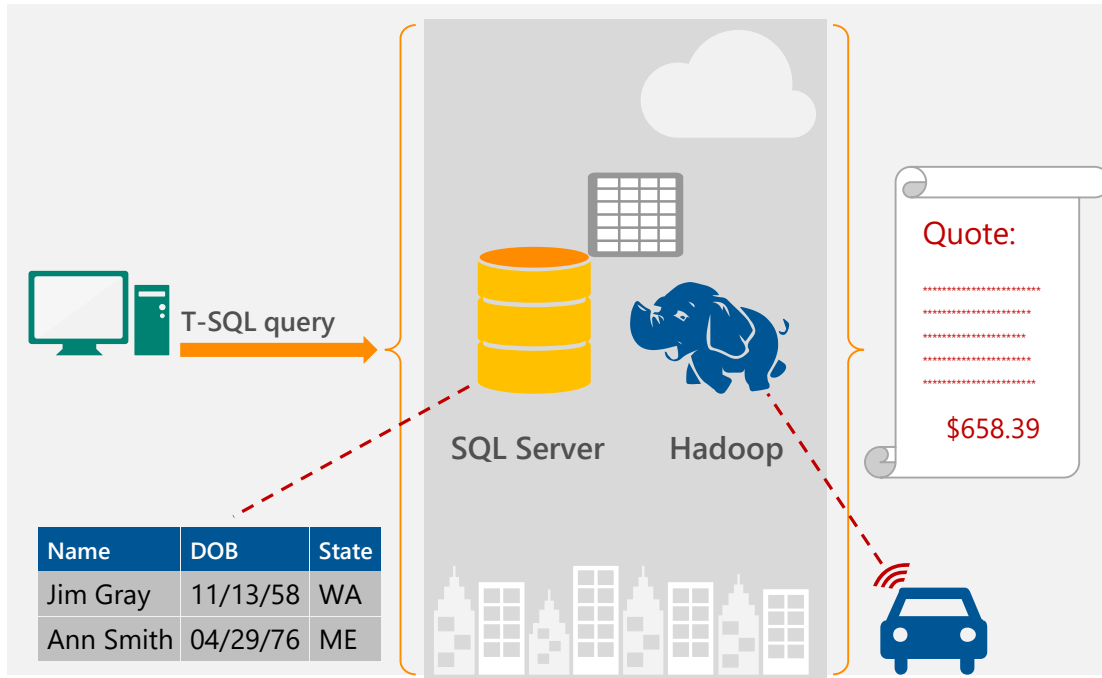
```
select *
```

```
from patterns.pubs.dbo.authors as A, pubs.dbo.authors B
```

```
where A.au_id = B.au_id and A.address <> B.address
```

# SQL Server 2016 news

# PolyBase: Query relational and non-relational data with T-SQL



## Capability

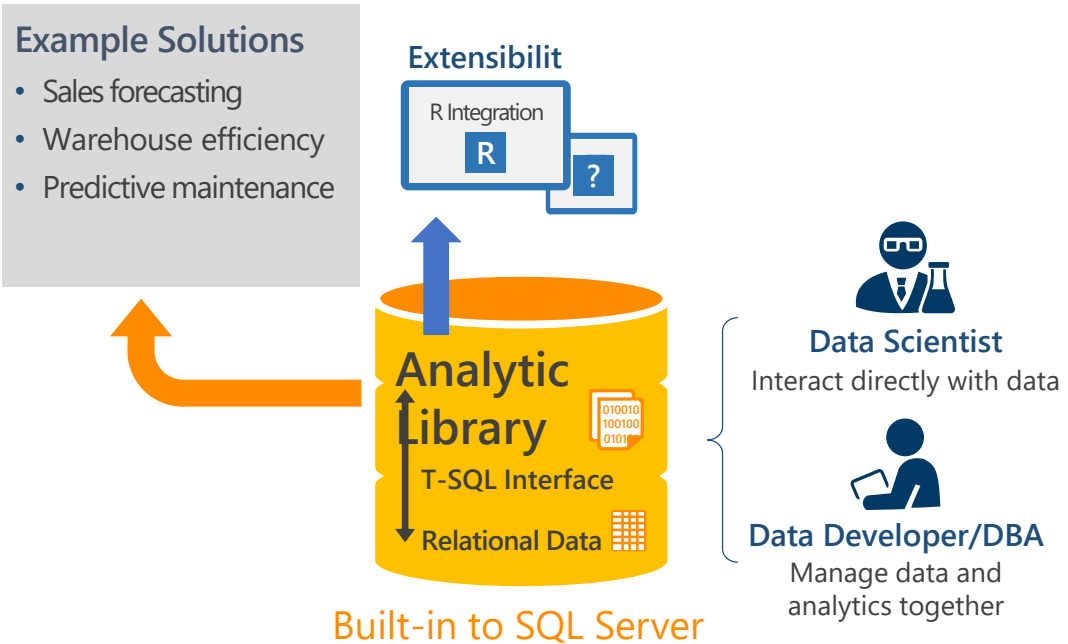
T-SQL for querying relational and non-relational data across SQL Server and Hadoop

## Benefits

- ➔ New business insights across your data lake
- ➔ Leverage existing skillsets and BI tools
- ➔ Faster time to insights and simplified ETL process

# Built-in advanced analytics

## In-database analytics at massive scale



Deeper insights across data