

BI4Dynamics

BC Cloud on On-Premises Virtual Machine Installation Requirements

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1 Introduction

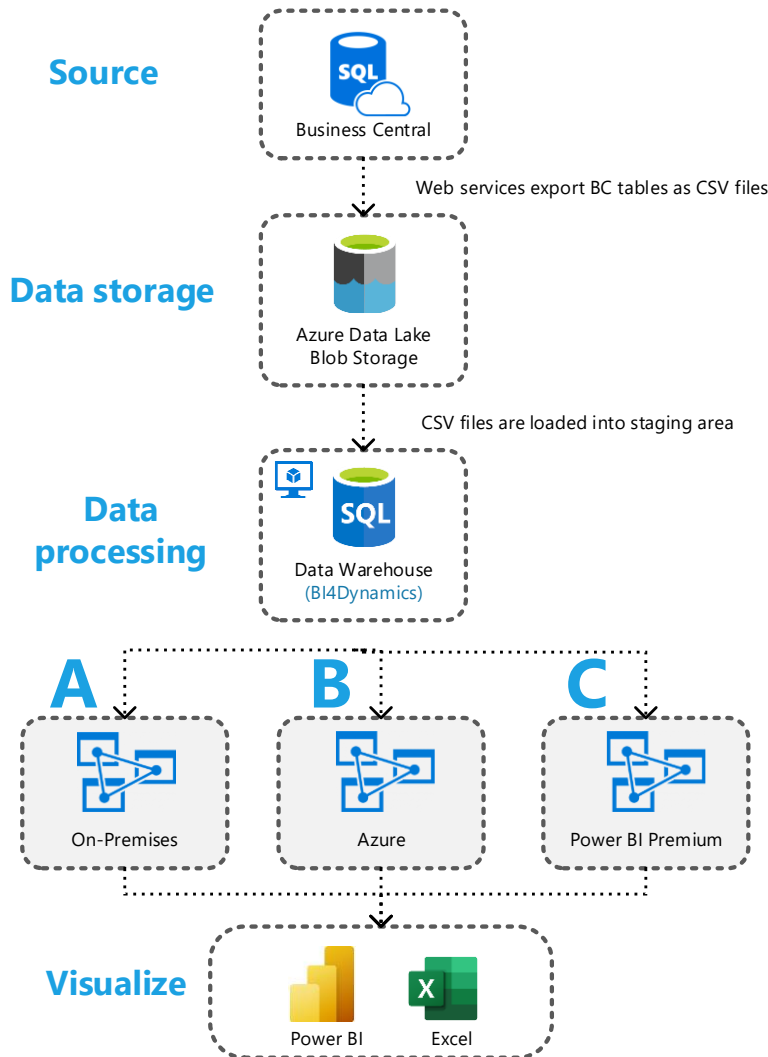
1.1 Implementation options

Source

BI4Dynamics can join **BC Cloud** with your legacy **BC or NAV** in one fully integrated BI solution. The first selected source in BI4Dynamics must be BC Cloud. BC or NAV can be added optionally.

Destination

- Data warehouse implemented on **On-Premises Virtual machine**
- Analytics can be implemented on the **same Virtual machine in SQL Server Analysis Services** or as **Azure Analysis services** or **Power BI Premium**.
 - Use same Virtual Machine when costs for VM are low,
 - Use AAS or Power BI Premium when performance, scalability, and flexibility matters.



2 On-Premises implementation

2.1 Permissions and Requirement

Local VM (Server)

Permissions for SQL installation and processing. All accounts to be combined into **one (1) Windows domain** account:

- Be administrator on the BI server where BI4Dynamics is installed.
- Administrator permissions on SQL Server where the BI4Dynamics DW will be deployed.
- Granted Server role on Analysis Services where the BI4Dynamics tabular model will be deployed. Additionally, the Analysis Server service should run under BI4Dynamics domain account.
- SQL Agent job Service user account needs all the above-stated permissions.

BC Cloud

- **Dynamics 365 administrator** ([How-to](#)) role,
- BI4Dynamics BC Extension must be installed on the **Production** environment only.
***Please note:** Any other extensions you might be using in BC and plan to include in the BI project must be installed on **Production** and **Sandbox** environment.

Azure Portal

- **Application Developer** ([How-to](#)) for application registration.
- **Azure Storage** info: Subscription, Resource group, Account name, Container name and Blob Key.

2.2 On-Premises implementation - Hardware

Dedicated infrastructure for BI stack is recommended.

CPU: 4 processors at least 2GHz; more cores bring more parallelism.

RAM: used for processing data warehouse and for storing Analysis services database (tabular option).

BC database size	CPU (logical processors)	RAM (GB)
< 50 GB	4	20
100 to 250 GB	6	40
250 to 500 GB	8	75
500 to 1000 GB	16	150
1 to 2 TB	24	300
2 to 4 TB	32	400
4 TB >	32	512

DISK (SSD):

- 2 x size of all source databases, when using standard **Rowstore** storage
- 1 x size when using **Columnstore** feature.

2.3 On-Premises implementation - Software

Operating system

When using SQL 2016 and SQL 2017: Windows Server 2012, 2012 R2, 2016, 2019 or Win 8,10

When using SQL 2019 and SQL 2022: Windows 10 TH1 1507 or greater, Windows Server 2016 or greater

SQL Server database

Recommended is version **2022** due to new features and better user experience.

	Local Analytics (A)	Azure Analytics (B)	Power BI Premium (C)
SQL Server version	2022 or 2019	2022 or 2019 2016 or 2017 (limited functionality due to BI4Dynamics SQL functionality that is not fully supported in lower versions of SQL)	

With **SQL Server 2022** composite models were introduced. This option allows a Power BI report to have two or more data connections from different source groups. These source groups can be one or more Direct Query connections and an import connection.

Analysis services (when implementing Analysis Services locally)

- **Tabular option:** SQL version **2019** and above

SQL Server features

- **Integration services**
- **PolyBase Query Services** and **Java connector for HDFS** data sources (**not required for SQL 2022**)

Other programs

PowerShell, NET Framework version 4.7.2 or higher

Azure CLI: set of commands that create and manage Azure resources, available [here](#).

Latest versions of system software

It is of utmost importance that all system software used in BI project is of the latest version (or latest – 1) and constantly updated. Any neglect might result in inability for BI4Dynamics to be installed or properly operate.

Note: Most common misunderstanding is that SQL updates will come automatically with Windows update. SQL server updates do not come with Windows update automatically. SQL updates must be downloaded manually from Microsoft page as CU update (cumulative update). Updates are coming frequently, every few months.

<https://learn.microsoft.com/en-us/troubleshoot/sql/releases/download-and-install-latest-updates>

Latest updates available for currently supported versions of SQL Server

Each of the following links provides information for all of the applicable products and technologies.

Version	Latest service pack	Latest GDR	Latest cumulative update
SQL Server 2022 - Build information - Installation	None	GDR (16.0.1050.5 - February 2023)	CU3 for 2022 (16.0.4025.1 - April 2023)
SQL Server 2019 - Build information - Installation	None	GDR (15.0.2101.7 - February 2023)	CU20 for 2019 (15.0.4312.2 - April 2023) CU18 + GDR (15.0.4280.7 - February 2023)

2.4 Other resources

Azure Storage Account: Storage Account with Container used for storing BC tables exported from BC.

Azure Docker: Specialized cloud engine that manages the export of BC tables to Blob Storage.

3 Analysis Services

We do support only **Tabular** model of analysis database. Tabular model can be implemented on:

- A. Azure VM or local server,
- B. Azure Analysis Services,
- C. Power BI Premium as XMLA endpoint feature.

When using Multidimensional model, you need to use older versions of BI4Dynamics.

Permissions

	Azure Portal	Analysis Database	Power BI Premium
Administrator	Analysis Services Admin	Server Administrator	Workspace Admin
Business User	Reader Role	Read Role	Viewer

3.1 SQL Analysis Services on Azure Virtual Machine (A)

Permissions

- Admin rights to Analysis Services Instance ([How-To](#))
- Configure the Analysis Services service to run under an administrator account.

3.2 Azure Analysis Services AAS (B)

AAS in memory database available for user queries by any BI client (Excel, Power BI)

Permissions

- Administrator rights on Azure Analysis Services in Azure Portal and
- Configure the Analysis Services service to run under an administrator account.

On-Premises Gateway: provides bridge data transfer between on-premises data and Microsoft cloud service.

3.3 Power BI Premium (C)

Permissions

- Admin role in Power BI Premium is required to update workspaces, contributor role is needed to publish reports. ([How-to](#))
- Configure the Analysis Services service to run under an administrator account.

On-Premises Gateway: provides bridge data transfer between on-premises data and Microsoft cloud service. Additional information on purchasing Power BI Premium subscription could be found [here](#).

Detailed information about:

- [How to](#) create and configure Azure Virtual Machine with SQL server
- [How to](#) Install BI4Dynamics application and configure On-premises Data Gateway

4 Best practice and recommendations

4.1 SQL Server features and settings

SQL Server editions

All BI4Dynamics features run on **Standard** SQL Edition. It also runs on Enterprise edition. **Per instance Limitation** of SQL Server Standard Edition:

- SQL Server engine Buffer pool 128 GB
- Analysis Services Tabular 16 GB

When data size requires more hardware resources, BI project should be **split into two instances**:

- **Finance** (Finance, Receivables, Payables, Fixed Assets, Bank Account)
- **Operations** (Sales, Inventory, Purchase, Retail, Manufacturing, Warehouse, Service)

SQL Server settings

Volumes, drives: Separate volume/drive for Data (#1) and Log & Temp (#2).

Temp db: set 4 or 8 data files and 1 log to avoid the GAM/PFS page contention issue described [here](#).

Collation: the collation of the data warehouse server should match the collation of the BC database.

UAC should be **disabled**, or application needs to be installed outside Program Files folder.

Network availability:

- **Online servers:** The server is connected to the Internet with port 80 opened (if the server is under proxy, the application needs access to our authorization web service)
- **Offline servers:** special offline license is required; please contact sales@bi4dynamics.com

Integration services

Integration Services can speed up the processing Stage and Data warehouse from 50 to 150% by running stored procedures in parallel. If not installed or selected processing will be much slower.

PolyBase

- Install PolyBase Query Services and Java connector for HDFS data sources. These features are a part of SQL server used for (among others) loading Blob storage files (**not required from SQL 2022**).

Columnstore option

BI4Dynamics supports Columnstore storage in staging (schema = stage) and Data warehouse area (schema = fact). Columnstore can achieve 10X compression. Dim schema is not supported with Columnstore as dimensional table are usually smaller and compression does not help performance. Loading may be increased by 10-20% due to building Columnstore indexes.

4.2 Faster processing and querying

Fast data warehouse processing

- **Fast disks:** disk speed is the most important part as data warehouse reads and writes a lot of data
- **Enough RAM:** RAM amount under the recommended size will significantly affect the processing speed.
- **Good CPU** with many cores

Fast Analysis Services processing and querying

- Data warehouse engine requires fast disks, many cores for parallelism.
- Tabular engine requires fast CPU and fast memory.

These are hardware components that affect performance for Tabular engine:

- **Fast CPU** speed is better and will affect query time (interaction between front end tools (Excel and Power BI) and Tabular engine when a user is analyzing data
- **Fast memory:** fast memory can be more expensive, but it is worth the investment
- Memory size should be 2X of sum of size of all Tabular databases; If there is not enough memory that data will be partly written to the disk and performance will be slow or not perform at all.