SIEMENS

Insights Hub

Insights Hub Business Intelligence

System Manual

05/2025

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Table of contents

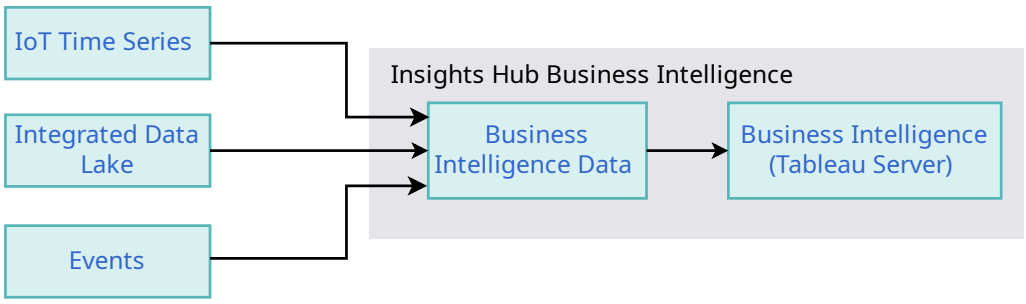
1 Introduction

Introduction

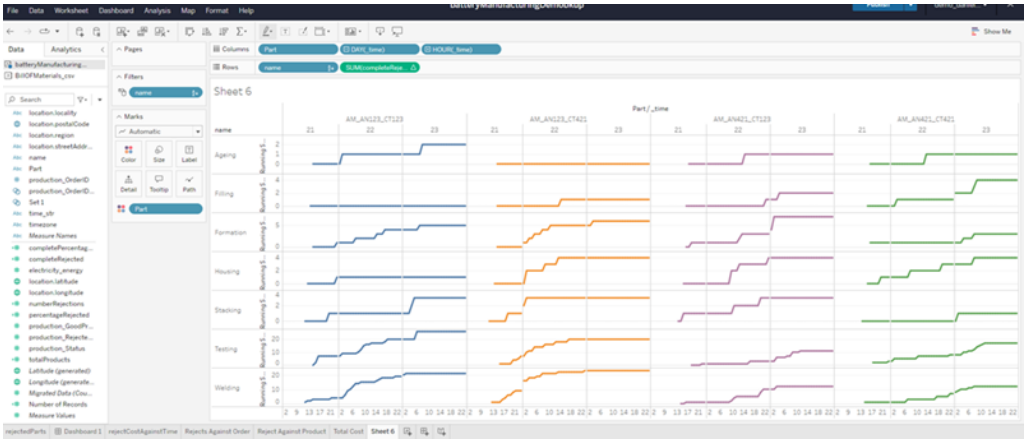
Insights Hub Business Intelligence enables the creation of custom visualizations from Insights Hub data, including IoT Time Series, Events and Integrated Data Lake (IDL).
The application is built on Tableau®, a leading platform in descriptive analytics and simplifies the creation of graphical data representations. These visualizations help users to explore patterns, analyze business performance and collaborate on data. Multiple visualizations are combined into a single shared dashboard, where users can apply filters to interact with the data and add comments directly on the dashboard.
Once the Insights Hub Business Intelligence is ordered from the Industrial IoT store, Insights Hub Business Intelligence Data and Insights Hub Business Intelligence applications are added to the Launchpad.
Insights Hub Business Intelligence Introduction Video
Insights Hub Business Intelligence Dashboard Creation Video

Insights Hub Business Intelligence Data

Before visualizing the data, the user needs to create a Tableau® data source using the Business Intelligence Data application. It works as an interface between Industrial IoT services and Tableau® server. The data sources are created from IoT Time Series, Integrated Data Lake, Events or Data Contextualization data sets.



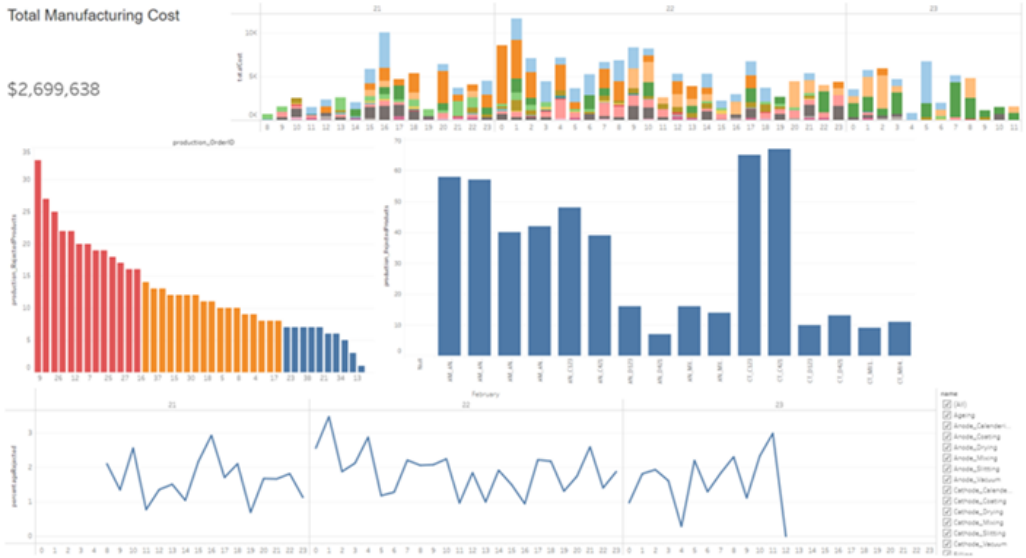
After creating the data source in Insights Hub Business Intelligence Data, the user can build powerful data visualizations in Insights Hub Business Intelligence. This application is built on Tableau® which offers many possibilities to analyze and visualize data. It includes an intuitive interface to drag-and-drop variables onto the sheet to quickly produce charts and data summaries.



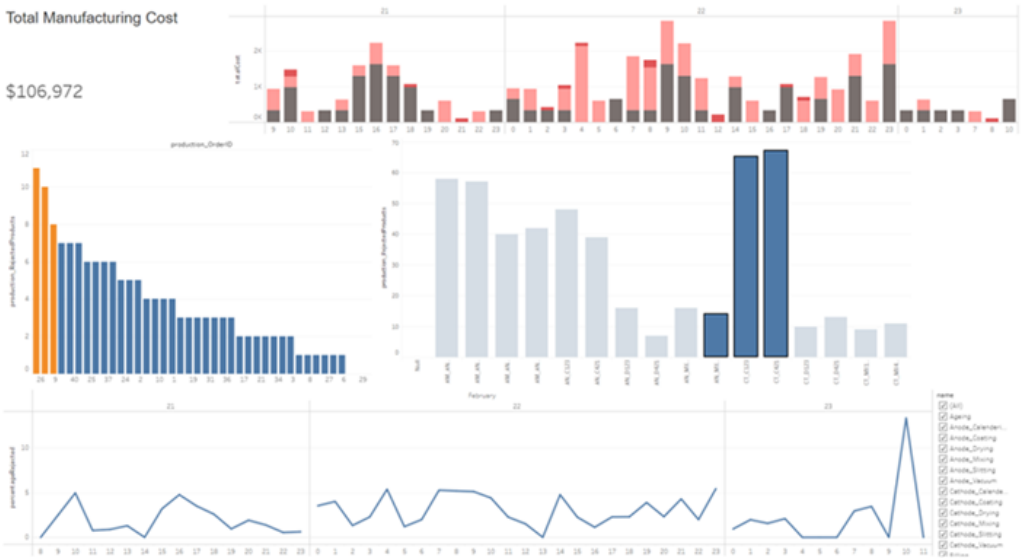
Insights Hub Business Intelligence Data makes requests to other services in the context of your tenant and is subjected to quota restrictions. If your individual quota is exceeded, Insights Hub Business Intelligence Data is also impacted.

Example Visualization

This example displays a combination of IoT Time Series and Integrated Data Lake files to show the manufacturing costs associated with each production process, product type and order.



Each component of this dashboard functions as a filter, displaying data related to a specific attribute such as a product, order or time range.



Subscriptions

You can configure the subscriptions or data-driven alerts to receive notifications or the entire dashboard in your inbox.

This documentation focusses on how to configure data sources from Insights Hub using the Business Intelligence Data application. These published data sources are used in the Business Intelligence application to create the visualizations. For more information on how to create the visualizations for your use case, refer to Tableau® documentation Creating Visualizations.

Insights Hub Business Intelligence is not applicable for Azure VPC.

User rights 2

User rights

Insights Hub Business Intelligence Data

In order to access Insights Hub Business Intelligence Data, you need the Author role. Subtenant users cannot use Insights Hub Business Intelligence Data irrespective of the assigned role.
For creating, viewing, editing or deleting a data source in Insights Hub Business Intelligence Data, you need to have the corresponding permission in Insights Hub Business Intelligence.

Insights Hub Business Intelligence

Roles & license types

You can purchase Insights Hub Business Intelligence license types "Creator", "Explorer", or "Viewer".
When opening Insights Hub Business Intelligence, users automatically assume a Tableau® role according to their Insights Hub Business Intelligence role from the Settings application. The following table shows the mapping of Insights Hub Business Intelligence roles to Tableau® roles and license types:

Insights Hub Business Intelligence Role	Tableau® role	License type
Viewer	Viewer	Viewer
Interactor	Explorer	Explorer
Publisher	Explorer (can publish)	Explorer
Administrator	Site Administrator Explorer	Explorer
Creator	Creator	Creator
Administrator + Creator	Site Administrator Creator	Creator

Except for the combination of Administrator and Creator, it is not recommended to assign multiple roles to a user. Subtenant users will always assume a Viewer role, regardless of the assigned role in the Settings application.
For more information about the license types, refer to Supplemental Terms.

Roles & permissions

Insights Hub Business Intelligence Role	Viewer	Interactor	Publisher	Administrator	Creator	Administrator + Creator
Tableau® role	*Viewer*	*Explorer*	*Explorer (can publish)*	*Site Administrator Explorer*	*Creator*	*Site Administrator Creator*
Use Insights Hub Business Intelligence	✓	✓	✓	✓	✓	✓
View visualizations	✓	✓	✓	✓	✓	✓
Create Alerts		✓	✓	✓	✓	✓
Create data sources in Insights Hub Business Intelligence Data			✓	✓	✓	✓
Create visualizations			✓	✓	✓	✓
Manage groups, projects and content access				✓		✓
Create live connections					✓	✓

For more information on user roles, refer to Tableau®.

Licensing

According to the purchased packages, you have a specific quota of licenses for each license type.

- Assigning one of the Insights Hub Business Intelligence user roles above entitles the acquisition of a corresponding license. Users will automatically acquire a license by opening Insights Hub Business Intelligence for the first time.
- Sharing a license among multiple users is not permitted, licenses cannot be reassigned frequently. Tenant administrators may reassign user roles in the Settings application, but that does not directly affect the license assignment in Insights Hub Business Intelligence. Insights Hub Business Intelligence Administrators can review the list of users and their current license assignment in the 'Users' menu of Insights Hub Business Intelligence.
- Revoking access to Insights Hub Business Intelligence via the Settings application does not immediately withdraw the license from the user. The user cannot log in, but remains on the server and still consumes a license. When the access has been revoked and the license is used for more than four weeks, then it is automatically removed and the user becomes available again.

Managing Content Access

With the Administrator role, you can manage content permissions on the server. Site Administrators are responsible for managing user groups, assigning users and granting fine-grained permissions on content (projects, data sources, workbooks, views). Before new users can

access projects, data sources or workbooks, an Administrator needs to assign them to a corresponding user group.
These access rights also apply to Insights Hub Business Intelligence Data. To create a new data source, you need to have the permission to publish on the project. To update an existing data source, you need to have the overwrite permission for it.
User groups is a powerful tool to support the subtenancy context. It can be leveraged to manage different permissions for the users from different tenants or sub-tenants. At the same time, the underlying data from IoT Time Series and Data Lake is always protected. The users from different subtenants may have access to the same dashboard, but they can only see the data of assets as per their access.
With content permissions, you can also control which views are available for individual users as dashboards in Insights Hub Monitor.
For more information, refer to Site Administrator Role and Tasks or Managing Content Access.

3 Connecting "Insights Hub Business Intelligence" to Industrial IoT data

3.1 Introduction

Introduction

To connect the Insights Hub Business Intelligence to Insights Hub data sets, access the Insights Hub Business Intelligence Data application and create or manage the data sources for the data that is expected to be visualized.
You can assign the Insights Hub Business Intelligence roles in the "Settings" application. For more information on user roles, refer to User roles for "Insights Hub Business Intelligence".

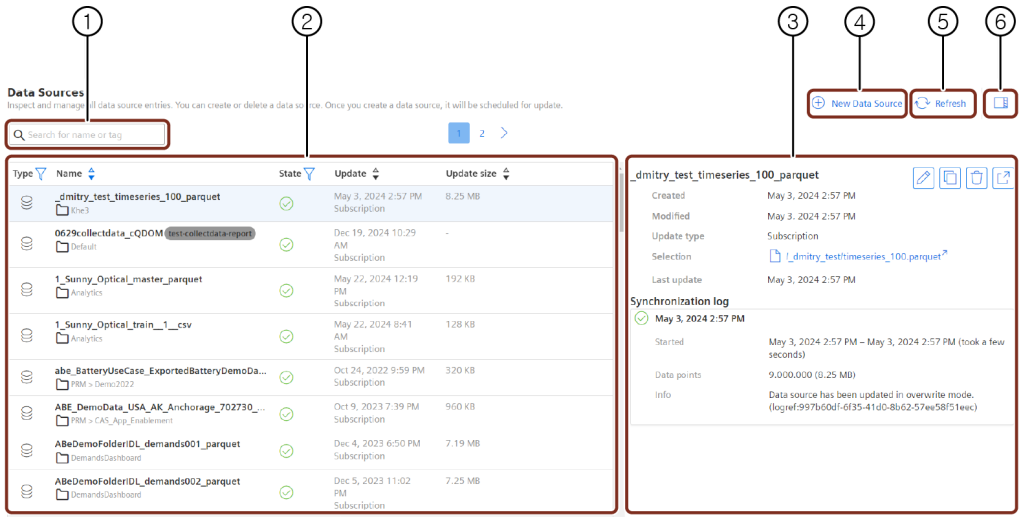
Subtenant users cannot work with Insights Hub Business Intelligence Data.

Insights Hub Business Intelligence Data leads to the following user interfaces:

- Select data source mode
- Select sources
- Select update mechanism
- Save data source

User Interface of Data Sources

The page lists all the data sources of which you have the access according to the permission configuration in Insights Hub Business Intelligence. You can use the pagination to scroll through the list or filter by entering a search term in the search field. The term will be searched in the data source by “name” and “tags”.



① Searches the required data source

② Lists all the Data sources

③ Displays the additional details of the selected data source

④ Creates a new data source

⑤ Refreshes the data source page

⑥ Hides or displays the additional details of the selected data source using toggle button

Symbols

On the left side of each data source, an icon is displayed that indicates the type of the data source. The table below describes the types of data source:

Icon	Data Source Type
	Assets
	Asset Types
	Integrated Data Lake
	Events
	DC (disabled)

In the “Name” column, you can also see the tags and the name of the project. The icon next to the data source name reflects its current processing state.

Icon	Processing State	Description
	Pending	The data source is waiting for the first synchronization since the last configuration change.
	Active	The data source is currently synchronizing.

Icon	Processing State	Description
	Suspended	The synchronization has been suspended due to a configuration error. Review the configuration of the data source. Save the configuration again to resume synchronization.
	In deletion	The data source is being deleted.
(no icon)	Idle	The data source is waiting for the next synchronization.

The state icon shows the result of the latest synchronization.

Icon	Result State	Description
	None	The data source is not yet processed.
	OK	The data source is fully synchronized.
	Warning	The data source is running and the issues are detected like data missing, then these issues are reported on the data source overview page. If the issues are not resolved, contact support team.
	Error	The data source is not updated, an outdated version of the data source may still be available in Insights Hub Business Intelligence. The issues are reported on the data source overview page. If the issue is not resolved, contact support team.

The “Update” column shows the date of the latest synchronization and the configured synchronization interval. You can edit, copy and delete the data sources with the right-side column buttons.

Button	Action	Description
	Edit	Change or update the configuration of the data source.
	Copy	Re-use the configuration to create a new data source.
	Delete	Permanently delete a data source.

3.2 User Interface of "Data Sources"

User Interface of "Data Sources"

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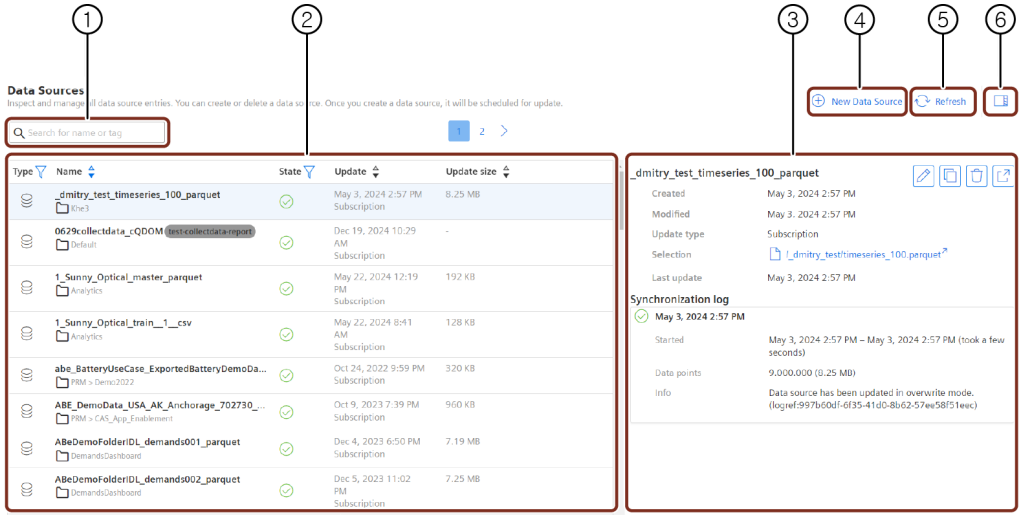

① Search field
② Data sources list
③ Selected data source additional details pane
④ Create new data source
⑤ Updates the latest changes
⑥ Toggle to hide or display data source additional details pane

Symbols

On the left side of each data source, an icon is displayed that indicates the type of the data source. The table below describes the types of data source:

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	Delete	Permanently delete a data source.

Insights Hub Business Intelligence Data leads to the following user interfaces:

- Select data source mode

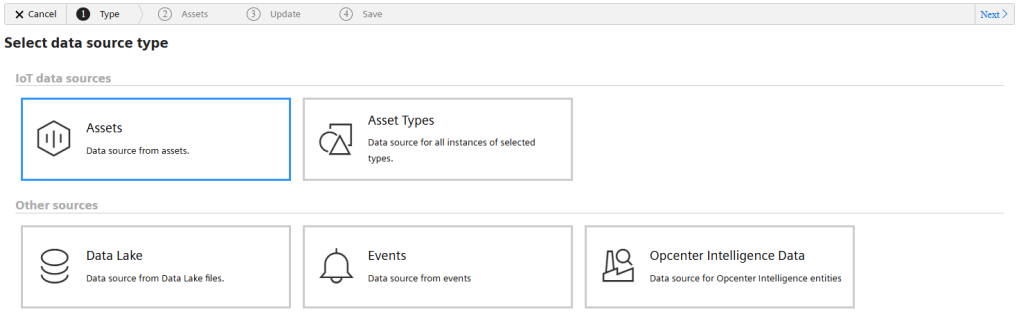
- Select sources
- Select update mechanism
- Save data source

3.3 Creating and editing a data source

Adding a data source

To add a new data source in Insights Hub Business Intelligence Data, click 

.
You can select between five different data source modes:



Data source mode	Description
Assets	This mode allows you to create a data source for specific assets from a list of assets.
Asset Types	This mode allows you to create a data source for all assets of a certain asset type. This mode ensures that the newly connected assets of the selected asset types are continuously included in the data source and synchronized.
Integrated Data Lake	This mode allows you to create a data source based on data stored in Integrated Data Lake.
Event	This mode allows you to create a data source from Insights Hub Events.
Opcenter Intelligence Data	This mode allows you to create a data source for Opcenter Intelligence entities.

Select sources

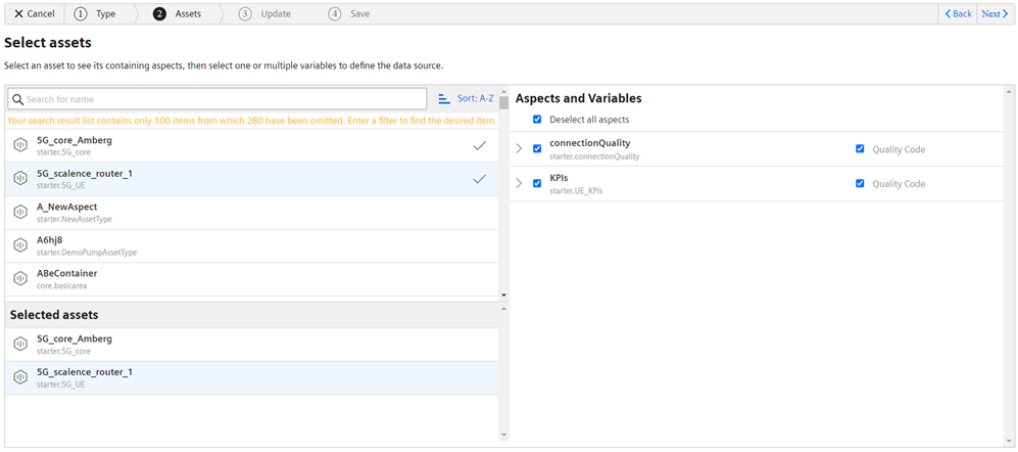
You can select the data for the "data source" mode selected in previous step.

For data source mode "Assets" and "Asset Type"

- To exclude quality codes from the data source, you can deselect the respective checkbox on the right for each aspect.
- By expanding the aspect details, you can also select or deselect individual variables or their quality codes.

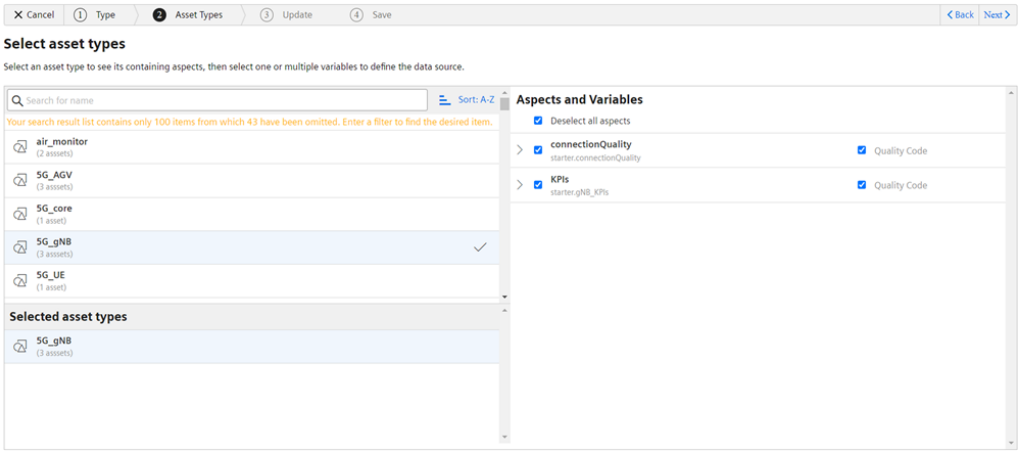
Data source mode "Assets"

With this data source mode, you can select specific aspects and variables from assets that are connected to Insights Hub.
To select assets and aspects for the data source, select the respective assets and check the boxes next to the variables in each aspect.



Data source mode "Asset Types"

In this data source mode, you can select data from specific asset types. The created data source will contain data from all assets of the selected asset types that are connected to Insights Hub.
To select asset types and aspects for the data source, click the respective asset types and check the boxes next to the relevant aspect variables. The number displayed next to an asset type indicates the count of asset instances of that type.
If you select an asset type and a new asset of that type is subsequently connected, the asset will automatically be inserted into the data source.



Data fields

After selecting the assets and aspects, the corresponding data will be saved in a data source, forming the foundation for visualizations in Insights Hub Business Intelligence. All IoT data sources contain the following fields:

- Time stamp of measurement (_time)
- Asset metadata (assetId, name, description, timezone, location details)
- Static variables
- Static aspects (naming scheme: "`<aspectName>.<variableName>`")

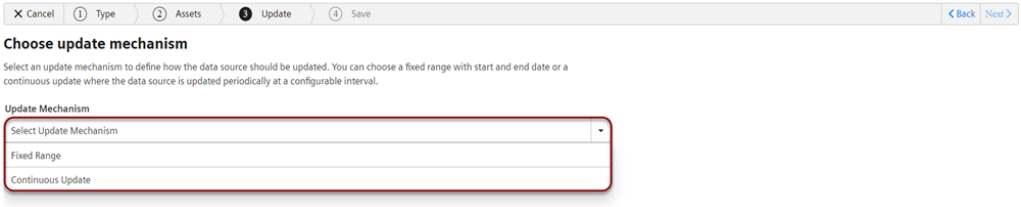
The variable fields are named corresponding to the pattern of "`<aspectName>_<variableName>`". If the naming scheme is ambiguous within a data source, the field names will additionally be prefixed by the asset type name. These data fields will be listed as "Dimension" or "Measure" in Tableau®, depending on their data type.

Example: The asset named "machine" with aspect type "airSensor" collects the variables "airTemperature" and "airPressure". In this case, the respective data fields are:

- airSensor_airTemperature
- airSensor_airPressure

Choose update mechanism

You can select any one of the following update mechanisms for the data source as shown in the below image.



Update mechanism	Description

Update mechanism	Description
Fixed Range	This mechanism ensures one-time data extraction from Insights Hub to Insights Hub Business Intelligence.
Continuous Update	This mechanism ensures ongoing synchronization between Insights Hub data and the data source.

Update mechanisms and user permissions

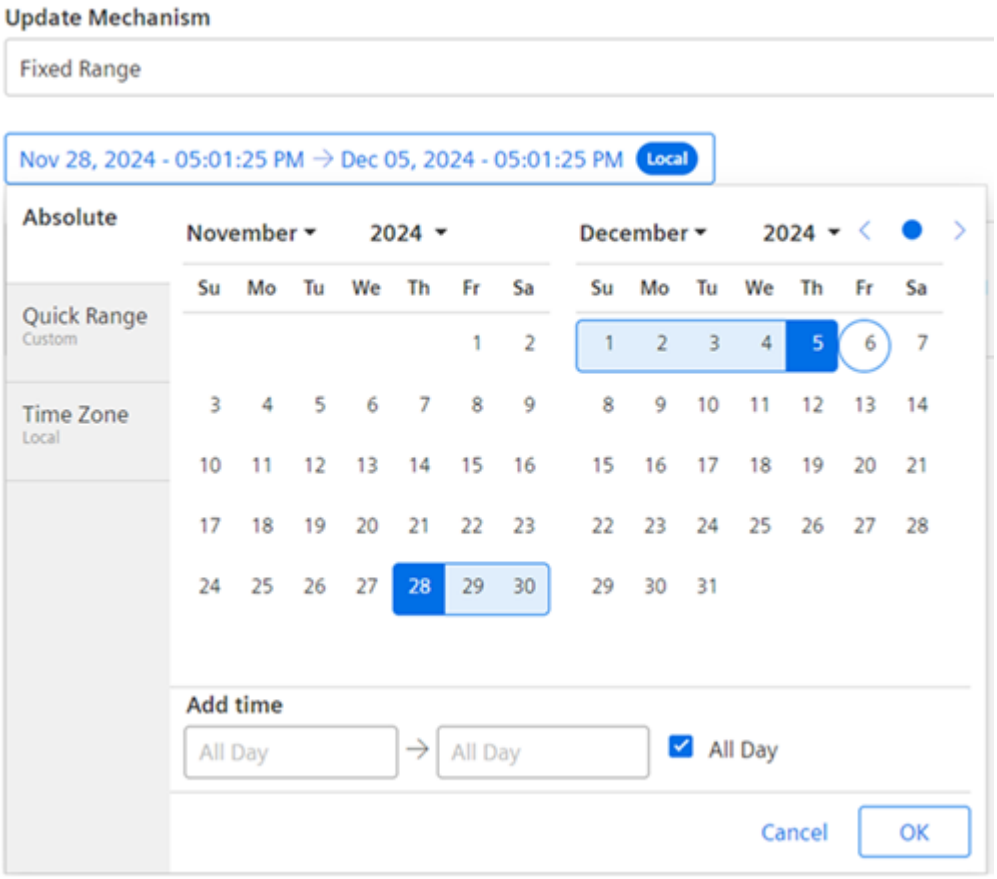
While creating or updating a new data source, a copy of Insights Hub user permissions is also created in the backend. Access rights on assets are checked and transferred to the newly created data source.

- For a data source with the update mechanism "Fixed Range", these access rights will not be updated.
- For a data source with the update mechanism "Continuous Update", these access rights are identified with every data source update.

Update mechanism of Fixed Range

In this update mechanism, you can select a fixed start and end date. This should be the time frame for the data in the data source.

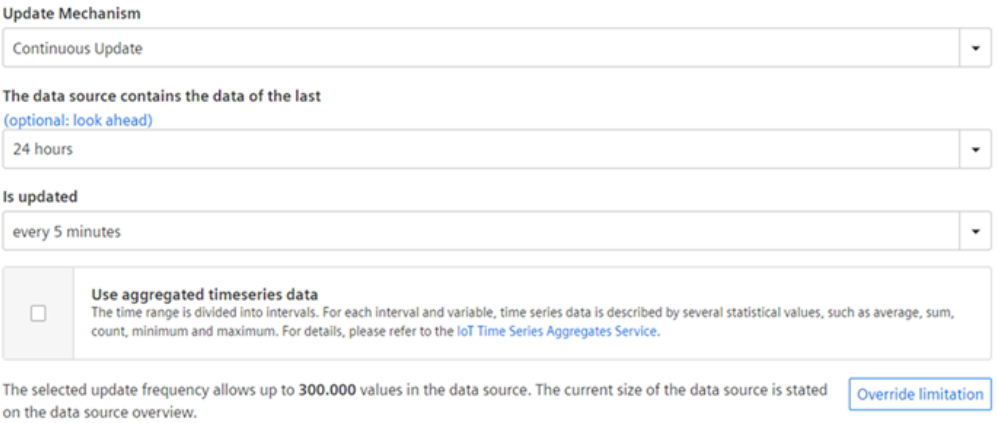
The following screenshot displays the configuration for a single update with a fixed start and end date.



Update mechanism of Continuous Update

This update mechanism ensures a continuous synchronization of Insights Hub data with the data source.

The following screenshot displays a periodic update where the start and end dates are related to the update time.

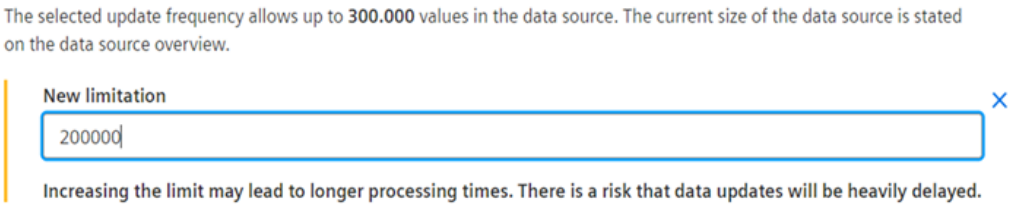


Use cases for periodic updates

- The periodic update allows the user to configure a window around the update time. It is commonly used to create a report of the last 30 days.
- By including future data, the user has the ability to compare the desired values with the actual values.

The continuous update can contain up to 3,000,000 data points. The higher update frequencies (less than 1 hour) have additional restrictions in place that are evaluated during the update process. This limits the amount of data to keep latency low. For a particular use cases, the limitation is too conservative, so the Insights Hub Business Intelligence Data provide the ways to override these values:

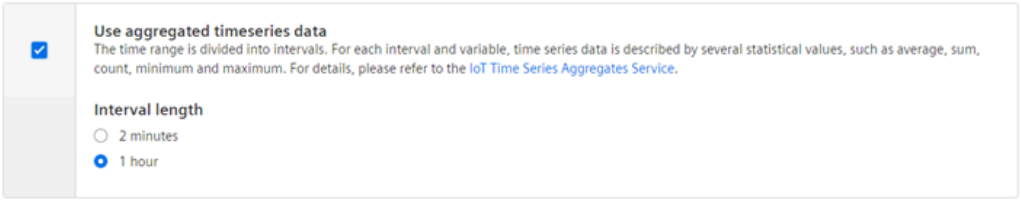
1. Click "Override limitation".
2. Enter the custom limitation (must be a number).
3. Proceed with the configuration of the data source.



Tableau® aggregates and processes the data in the background. This may lead to Tableau® Server being unresponsive. Also, for higher update frequencies, a higher limitation may delay the data processing. It will extend the time to finish the data processing.

Use aggregated time series data

By activating the corresponding checkbox, you can select to use aggregated time series data instead of raw data.



This is useful to reduce the amount of data points for large time ranges or assets with high frequency data. The time range is then divided into intervals.
For each interval and variable, the time series data is described by several statistical values like average, sum, count, minimum and maximum. For more information, refer to IoT Time Series

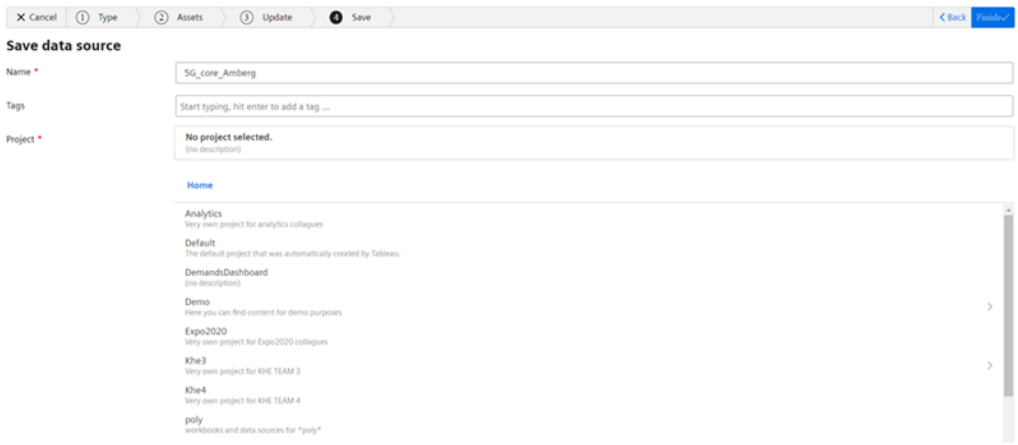
Aggregates Service.
According to the chosen time range, you can select from the different interval lengths.
The following interval lengths are supported:

- 2 minutes
- 1 hour
- 1 day
- 1 week
- 1 month

- The structure of an aggregated time series data source differs from regular IoT data sources. After activating the aggregated time series for an existing data source, you need to rebuild any workbooks that already use it.
- With the already existing pre-aggregated data in your data sources, be cautious with the use of aggregations on top of that in Insights Hub Business Intelligence workbooks. Some combinations make no sense and some may lead to wrong conclusions. For instance, creating an average of interval averages will not be equal to the overall average if the number of data points varies between intervals.

Save data source

You can choose a name for the data source and select a project on Tableau® Server where you want it to be located. You can also add tags to the data source for better organization and filtering.



The datasource configuration is now stored in Insights Hub. Depending on the selected update mode, the data will be scheduled for processing. On completion of the data processing, it is indicated with a green checkmark. The datasource also contains static data of assets along with the IoT data.

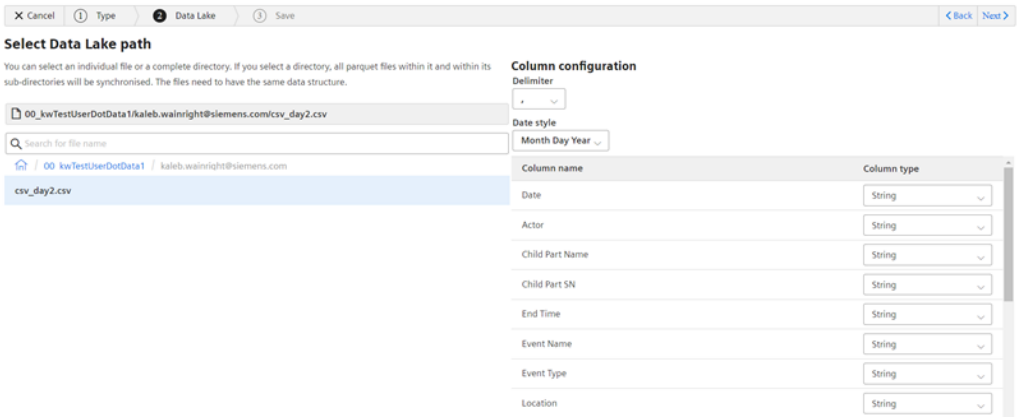
The static data contains the following asset information:

- Name
- Description
- Time zone
- Location (country, region and locality)

When you move an existing data source from one project to another, a new data source will be created on Tableau Server at the new location. The original data source will remain in the old project on Tableau Server until it is manually deleted. Existing workbooks based on the original data source will not be migrated and will not receive any further data updates.

Integrated Data Lake data sources

If Integrated Data Lake is provisioned for your tenant, you can subscribe to files from it. The data source will automatically synchronize upon every file update.



To create an Integrated Data Lake data source, follow these steps:

1. Select either a file or an entire directory by browsing Integrated Data Lake. !!! note - In the search field, you can search in the list of files that are directly located in the selected directory.
- For CSV files, the wizard tries to infer the delimiter, the date style and the column data types automatically. On the right-hand, you can review the changes, if necessary.
- For a selected directory, the synchronization will include all the parquet files within that directory and its sub-directories.
These files may not have different data types for columns with the same name.

2. Click "Next" to proceed to the "Save" step. !!! note You can specify the name of the data source, tags can be assigned and a project can be selected.

3. Click "Finish" to save the data source.

Supported files and file sizes

A total of 20 MB data is supported per Integrated Data Lake data source. Each tenant can subscribe to a maximum of 10 data sources. For CSV files, the supported encodings are UTF-8, UTF-16-LE and UTF-16-BE.

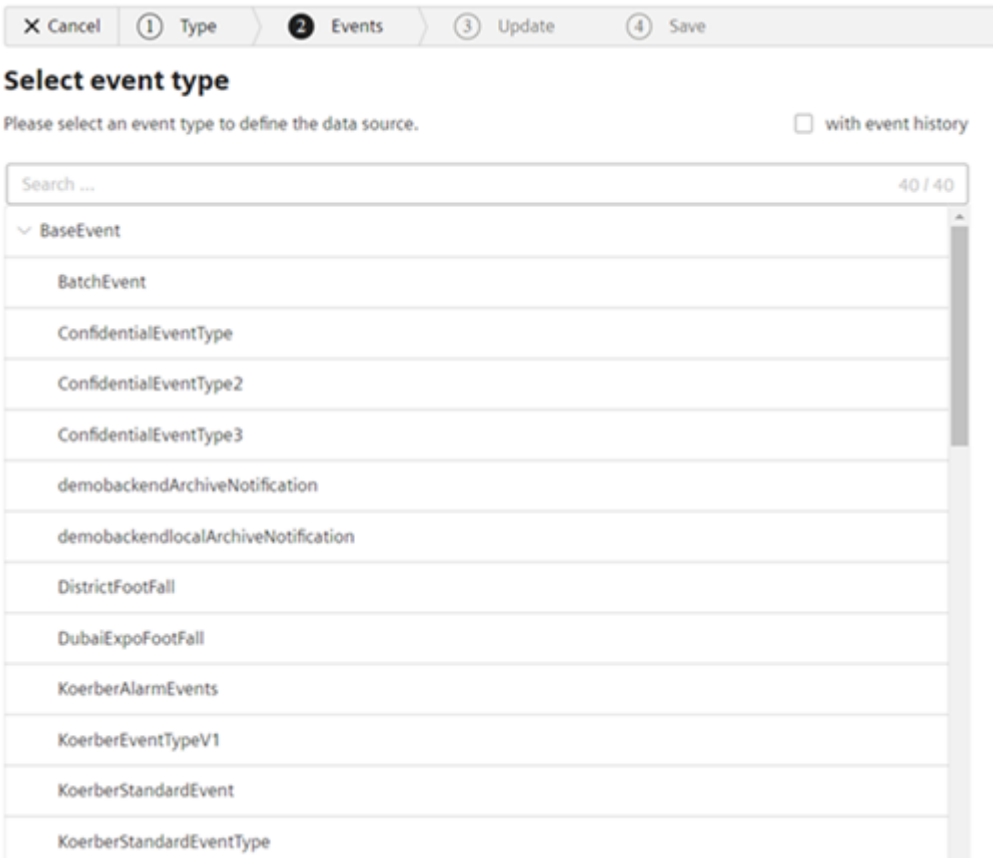
Date style

Almost all date and time formats are supported. The order of the year, month and day may be ambiguous for some dates and formats. This order is defined by the date style. It applies to all date or timestamp columns throughout the file. Different date styles within the same file are not supported.

Events data sources

By using Events data sources, you can include Insights Hub Events in Insights Hub Business Intelligence visualizations.
To use an Event, follow these steps:

1. In "Events" tab, select an Event type from the tenant and click "Next".



2. In "Update" tab, select the update details similar to update mechanism in "Assets". For more information, refer to Choose update mechanism.

3. Click "Next".

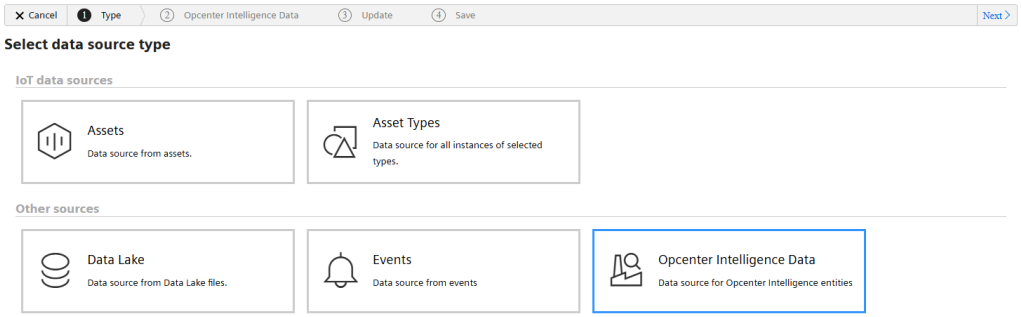
4. In "Save data source" tab, save the data source similar to save data source in "Assets". For more information, refer to Save data source.

Opcenter Intelligence Data

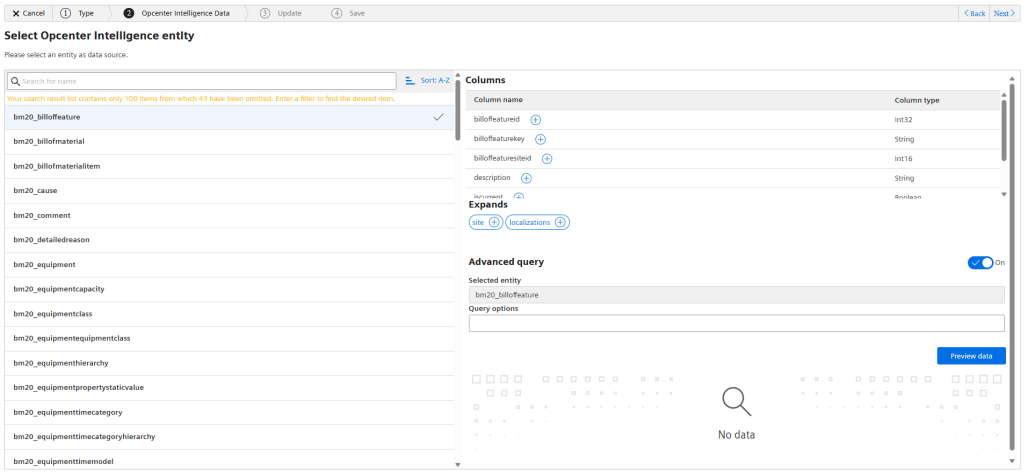
Opcenter Intelligence Data is an advanced manufacturing analytics and business intelligence solution within the Siemens Opcenter suite.
To create a data source for Opcenter Intelligence entities, follow these steps:

1. In "Insights Hub Business Intelligence Data" application, click New Data Source.

2. In "Type" tab, select "Opcenter Intelligence Data" and click "Next".



3. In "Opcenter Intelligence Data" tab,
   - Select an entity as a data source.
   - Enable "Advanced query" toggle button to enter a custom oData query.
   - To check the output of your request, click "Preview data".
   - Click "Next".



4. In "Update" tab, select the update details similar to update mechanism in "Assets". For more information, refer to Choose update mechanism.

5. Click "Next".

6. In "Save data source" tab, save the data source similar to save data source in "Assets". For more information, refer to Save data source.

Opcenter Intelligence Direct Connection

Opcenter Intelligence Direct Connection is a specialized data connectivity solution, enabling direct real-time data integration between manufacturing systems and business intelligence platforms.

In order to connect to Opcenter Intelligence, contact support team.

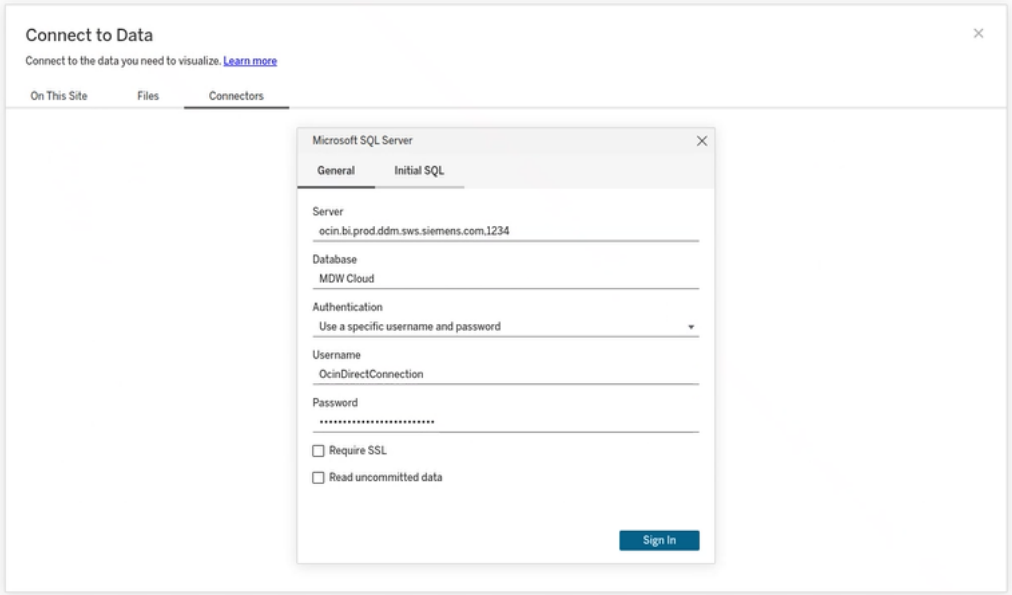
To publish a data source for Opcenter Intelligence entities, follow these steps:

1. Open the "Insights Hub Business Intelligence" application.

2. To create a new datasource, select "New" and click "Published Data Source" from the dropdown menu.

3. Select "Connectors" and click "Microsoft SQL Server". !!! note Only the "Microsoft SQL Server" connector is supported from the list.

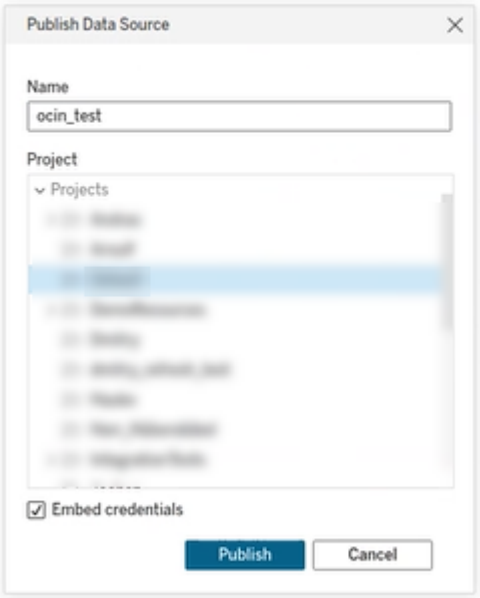
4. Enter the details in "General" tab and for information about Intial SQL, refer to Run Initial SQL.
    - Enter the Server as received from customer support.
    - Enter the Database.
    - In Authentificarion section, select "Use a specific username and password" and enter the details. !!! info In order to get username and password, contact support team.
    - Click "Sign In".



5. To edit the datsource, refer to Tableau.

6. To publish the data source, click "Publish As".

7. Enter the "Name" and enable the checkbox of "Embed credentials".



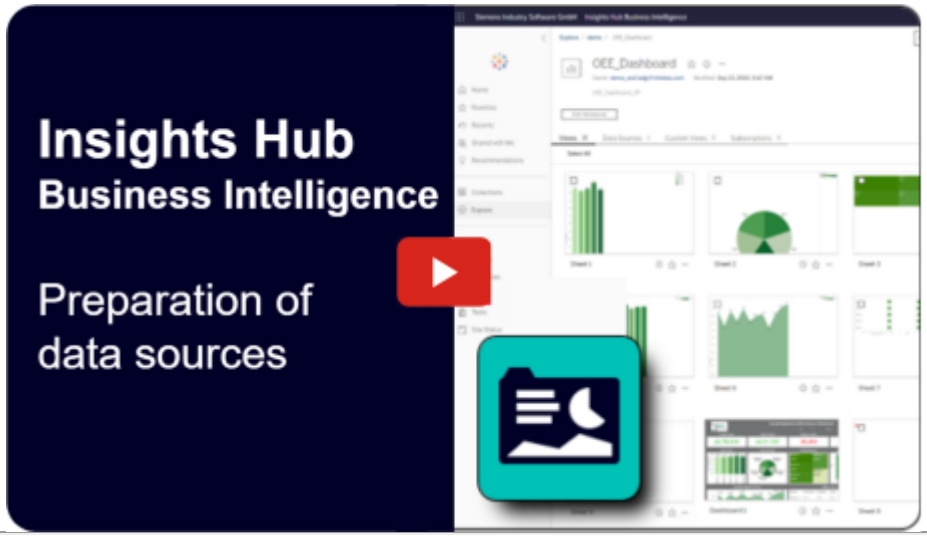
8. Click "Publish".

Insights Hub Business Intelligence videos

This page provides quick links to the Insights Hub Business Intelligence videos.
For detailed documentation on Insights Hub Business Intelligence, refer to the section Insights Hub Business Intelligence.

Preparation of data sources

This video provides an overview of Business Intelligence applications, an effective tool for creating visual analytics and professional reports using your data sources.



Build your first dashboard

This video shows how to build your first dashboard using IoT time series data. It covers how to use a data source in a new workbook, create customized KPIs and charts, and arrange them on a dashboard to effectively monitor critical KPIs.

Creating Visualizations 4

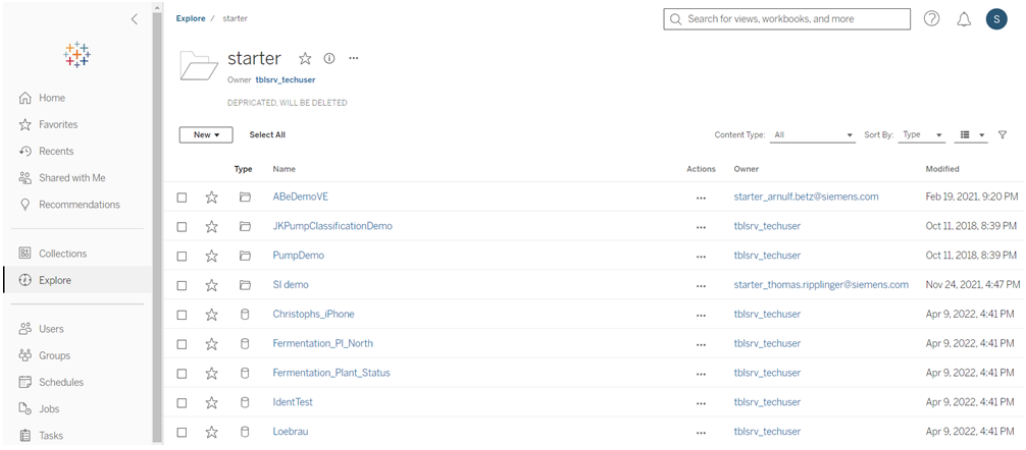
4.1 Using a data source

Using a data source

To use a data source from Insights Hub Business Intelligence Data in Insights Hub Business Intelligence, follow these steps:

1. In Insights Hub Launchpad, click "Insights Hub Business Intelligence".
2. In Insights Hub Business Intelligence, click the project in which the data source is saved.
3. Click "Data sources".
4. Select the box next to the respective data source.
5. Click ••• and select "New workbook".

The data source is then displayed in Insights Hub Business Intelligence at "Data sources".



For detailed instructions on creating workbooks, views and dashboards, refer to Tableau Help.

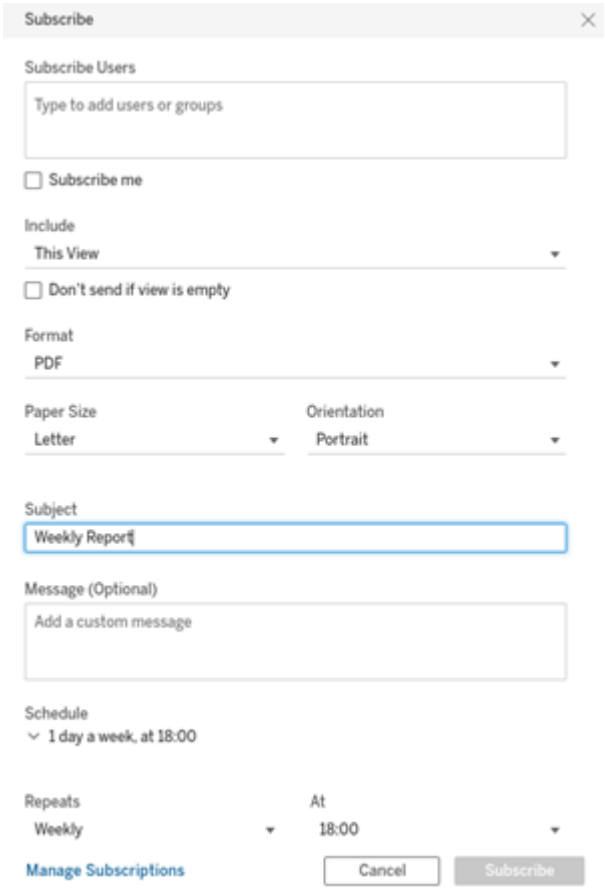
4.2 Scheduling Reports

Scheduling Reports

By subscribing to a "View" or a "Workbook", the creation of a report can be scheduled.
To create a subscription, follow these steps:

1. Click "Subscribe" from an opened view.

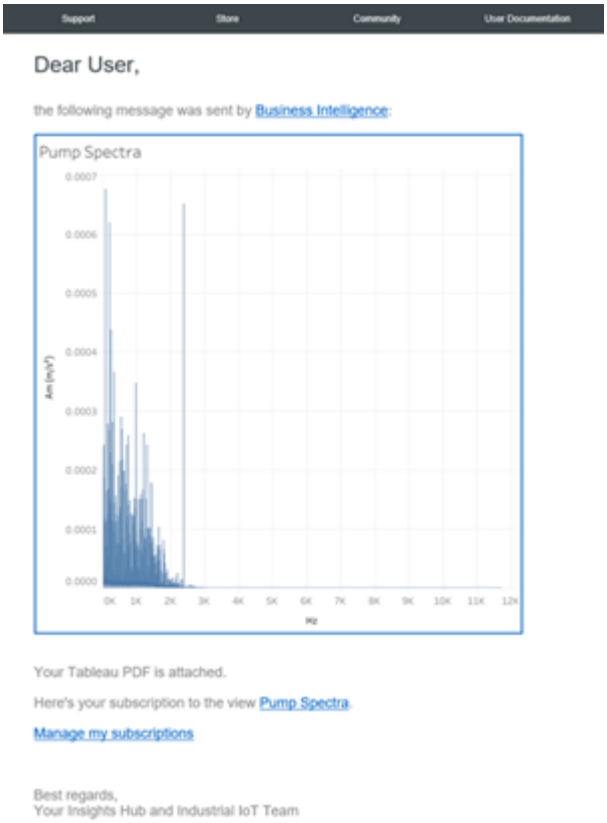
2. In "Subscribe" dialog, enter the details.



!!! note The wizard provides the following options to define recipients, by selecting “This View” or “Workbook”, the “Format, a “Subject” and “Schedule”.

3. Click "Subscribe".

After subscription, the reports will be sent out via email.

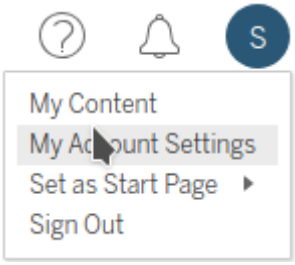


If Integrated Data Lake is provisioned for your tenant, the report will also be placed there in the following directory: `/BusinessIntelligence/<user-name>/subscriptions/<subject>/<workbook-name>`.

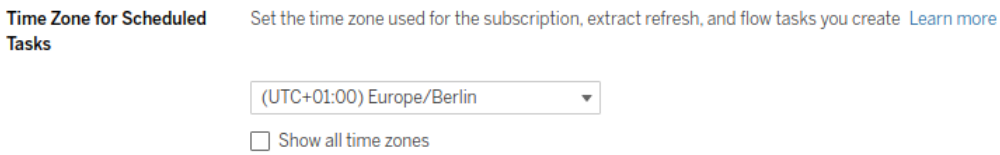
Adjusting your time zone

To adjust the time zone for the report schedule, follow these steps in Account Settings:

1. Click your user icon on the upper right and select "My Account Settings".



2. Scroll down to "Time Zone for Scheduled Tasks" and adjust the time zone.



4.3 Further Help

Further Help

Insights Hub Business Intelligence is based on Tableau®. Following are the useful information on how to get started with Tableau®.

- Get Started with Web Authoring
- Edit Tableau Views on the Web
- Explore and Manage Web Content
- Share and Collaborate on the Web

Limits and restrictions 5

Limits and restrictions

The following restrictions are applicable on the working environment but are continuously subject to update:

Dashboard extensions

Dashboard extensions are not allowed to be run. Technical issues might occur while working with 32-bit Google Chrome Version 71.0.3578.98 (Official Build). Embedded views may have some issues in working with Chrome 80. For more information, refer to Tableau Knowledge Base.

Tableau Version

Currently, we are running Tableau Server version 2024.2.

Quota limits

The table shows the quota limits of data sources based on its type:

Data source type	Limits
IoT (Assets & Asset Types), continuous update	- A maximum of 300000 to 3 million data points per data source, depending on the selected synchronization interval. - This limit can be overridden to maximum 30 million data points at the risk of heavily delaying synchronization.
IoT (Assets & Asset Types), fixed range	A maximum of 30 million data points per data source.
Integrated Data Lake	Maximum 10 MB per parquet file, Maximum 20 MB per csv file, Maximum 10 data lake data sources in total.

Overall, the following quota limits apply:

Quota	Limits
Data sources in Standard Capability Package	Maximum 50 data sources per tenant.
Data sources in Premium Capability Package	Maximum 100 data sources per tenant.

Quota	Limits
Storage capacity for data sources & workbooks	Maximum 10 GB per tenant.

Requirements for Private Cloud installations

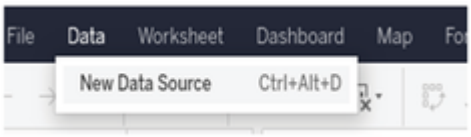
You can recommend against running antivirus software on the machines that host Tableau Server as this may significantly impact performance and stability. All the program directories should be excluded from any scan. For more information, refer to Minimum Hardware Requirements and Recommendations for Tableau Server.

Tips and Tricks 6

Tips and Tricks

Adding Multiple Data Sources to one Workbook

Multiple data sources are included in one workbook. The navigation starts from one particular data source in the Insights Hub Business Intelligence and then a workbook is based on this data source and it is possible to add additional data sources to a workbook by selecting data from "New Data Source".



Using VFC to add Sample Data

Follow these steps to add sample data:

1. In the Asset Manager, add an asset with a particular "Type".

2. Write data to the asset from the Visual Flow Creator application and use the corresponding timeseries write nodes.

3. Create a periodically updated data source in Insights Hub Business Intelligence Data.

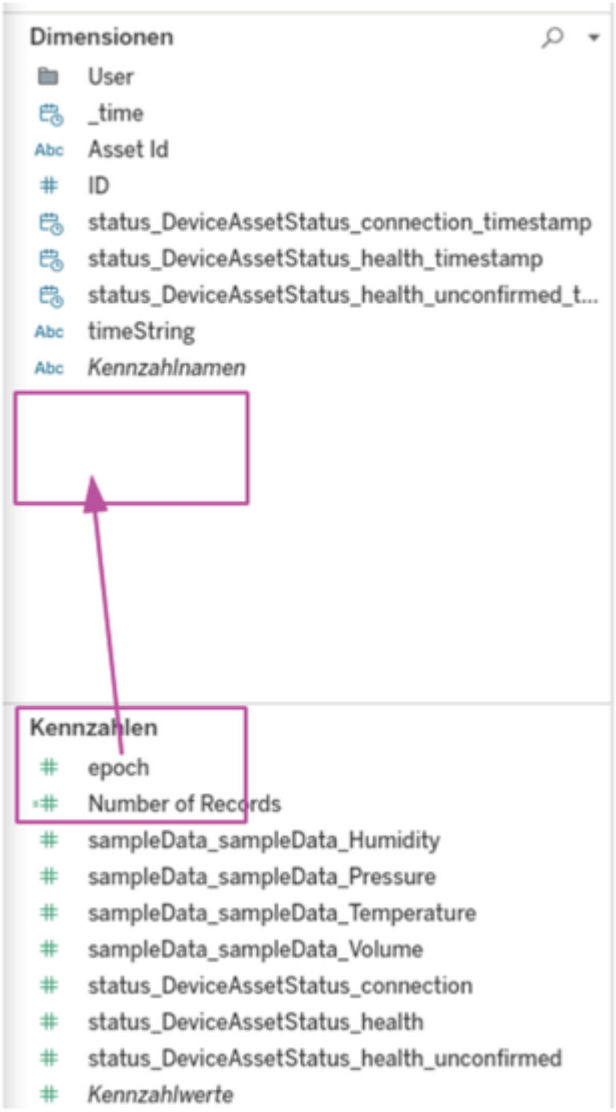
Row-level Security

The data sources created by Insights Hub Business Intelligence Data enable Row-level Security. It protects against the ability to share dashboards among multiple users. Records in a data source belong to assets. Assets displayed on the dashboard are dependent on the logged-in Insights Hub user. This enables you to access different data from the same dashboard at the same time. An OEM can create a visualization for a fleet and transfer it to subtenants. The subtenants can access assets that are enabled for them.

Dealing with Numeric Overflows

By default, Tableau® aggregates measure type values. With every Drag and Drop of a measure from the left side to the visualization, Tableau® tries to sum up the values. This is not convenient

with multiple values and when a single value is not distant from the numeric limit of a variable type. For instance, many epoch time stamps may easily exceed the long integer data type. In this case, circumvent the aggregation by first converting the measure into a dimension. Drag it in the left panel from "Measures" to "Dimensions".



Update a Fixed Range Data Source

Switching between the update modes at any time is possible by editing the data source configuration. "Fixed Range" data sources are edited to update the time range of interest. Even without changes to the time range, the data source is treated as a new source and accordingly updated.

Dealing with a Limited Amount of Data

Insights Hub limits the amount of data per data source, as the Tableau® server cannot optimize too much data at the same time. The user interface shows the upper limit of records per data source. Processing a data source requires some time and for some frequencies, different limits

apply in the continuous mode. These are listed in the user interface. However, in some cases these limitations may be too conservative. The Insights Hub Business Intelligence provides a way to override the limitation, refer to Choose update mechanism. The higher limitations are feasible in the particular use case, it is not guaranteed that the data transformation process will finish in time. You need to verify whether the update performance is still within the tolerances of the dashboard. To work around those limitations, the following points are emphasized:

- Pre-processing the data with a different tool such as Visual Flow Creator.
- Selecting a shorter time range.
- Dividing the data into multiple sources: one source with much data, but low frequent updates, and another data source with only the latest data, but higher frequency.

Collaboration

The ownership of a workbook lies with the creator. This means that nobody other than the creator can introduce any changes. To change this, the creator must explicitly set permissions. There are two ways to do this:

- Workbook ownership can be transferred to another user.
- Fine-grained permissions can be assigned.

Both options are available in the corresponding menu in the workbook list.