Reporting Suite

Reporting

Designer Guide

Data Designer and Report Designer

Version 5.6.0

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Enghouse Interactive

Contents

About this Guide

This Guide is intended for the designer roles of Reporting. The Designers must possess intermediate computer using skills and an understanding of database use and querying in order to be able to use this document.

New in this release

- Added two new custom variables (_reportTarget and _reprotType) to the variables list. For more information, please see the Variables page.
- Added information about validation, which is used to define and validate the content a user introduces in the filters or settings. For more information, please see the newly created Validation page.

Reference materials

Use this document with the following Guides:

- *Reporting Viewer Guide*
- *Reporting Standard Reports Guide*

Guide conventions

This Guide uses the following text formats and notation conventions:

Text format

Bold text indicates a button, field, link, option name, or similar function requiring an action.

Italicized text indicates new terms, directory paths, or references to external documents.

`Text in this font` indicates code.

Notes and cautions

Icons used throughout this Guide identify additional details or special conditions.

> **Note**
> Provides additional information or describes special circumstances.

> **Caution**
> Warns of user actions that may cause system failure or irreversible conditions.

Stop
Describes actions that you should only perform under the supervision of Enghouse Interactive Customer Support.

Legal disclaimer

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Contact information

To submit comments or questions about the content in this Guide, please open a case in Support.

Basic concepts and terminology

Reporting is a web-based framework for report designing. It includes a set of configurable standard reports that should cover most of any Contact Center product's needs, and which are built on top of the Standard Data Warehouse. A number of such assets are already available, and more are continually being developed.

The software provides its users with the following features and advantages:

- Complete overview of the system behavior
- Customizable display of detailed information about every relevant KPI and data point in your system
- Printable, paginated, shareable reports, exportable in several formats
- Customers or Enghouse professionals can create custom assets based on the Enghouse adopted framework

Dashboarding is an extension of Reporting with which users can create and work with dashboards, powerful data visualization boards that use charts, widgets, tables and text to help you understand your data.

> **Note**
> BI Dashboarding is not included in Reporting by default. Therefore, if it is not enabled in your system, any references to it in this and other documents do not apply to your use case.

User roles

The following user roles are available in Reporting and Dashboarding:

- **System Administrators**: In charge of tenants and ensuring that standard assets (such as standard reports) are available as necessary. Little to no other interaction with the system, such as working with reports, is expected from this user role. Aside from the Admin tab, they can only interact with the rest of the application the way Viewers do.
- **Administrators**: Manage users, groups, and certain data source, report, dashboard, and system settings for their tenant. In addition to some extra access, they also have the same access rights as Viewers (below).
- **Data Designers**: Create, manage and work on data sources, in addition to the same access rights as Report Designers and Viewers (below).
- **Designers**: Create, manage and work on reports and dashboards. They also have the same access rights as Viewers (below).
- **Power Viewers**: Work with views and styles based on assets shared with them. They cannot edit other assets in any way. They also have the same access rights as Viewers (below).
- **Viewers**: View reports and work with reports' and dashboards' filters and settings, and have access to subscriptions and downloads.

For more information on this topic, see *User Roles on page 10*.

Assets

Assets in Reporting and Dashboarding are the basic building blocks of the software and the primary components that users work with. They are **data models**, **reports**, **dashboards**, **report views** and **styles**. In the following section, you can read more about each type of asset in Reporting and Dashboarding.

Data models and sources

Data models are used to define connections and queries that Reporting uses to access data for reports and dashboards from the relevant databases and files. In Reporting, data models are organized in a Dictionary, which information about connections to databases, data sources and their relations, variables and other objects.

A data model is used as the basis for every report and dashboard. Each data model can have one or multiple data sources. A **data source** is like a program "layer" which provides data from a database or file and handles its conversion and to the report generator. In other words, the data source is a description of the methods, parameters, and data access methods.

In BI Reporting, the following data sources can be used for your reports and dashboards:

- Files:
  - CSV file
  - Excel file
  - JSON file
  - XML file
- Database connections:
  - MySQL
  - MS SQL
  - Oracle
  - PostgreSQL

Data models and their related sources are shown in the **Data** tab of Reporting and are only available to Data Designer users, who can view, edit and generally work with them, as well as Administrators, who can only interact with them to share with other users, typically Data Designers.

The **Standard Data Warehouse** (DWH) is a standardized database developed by the Enghouse BI Team, the goal of which is to provide a standardized and equal-for-all way of organizing data. This is done by using ETL (extract-transform-load) procedures to transfer data from, for example, a customer's database and to adapt it to the structure of the standard DWH without altering any of the data. This method is currently in the process of being implemented for a number of CC and CCaaS products in Enghouse.

Although Reporting and Dashboarding can be used without the DWH, instead utilizing one's own data or database directly, using the Standard DWH enables the use of **Standard Reports**, which are out-of-the-box reports that can be customized to a degree through Views, and can be utilized right away, without having to wait for the creation of individual reports. More information on both standard reports and report views can be found below.

Data models are primarily the focus of Data Designers, so refer to the *Reporting Designer Guide* for detailed information on this topic.

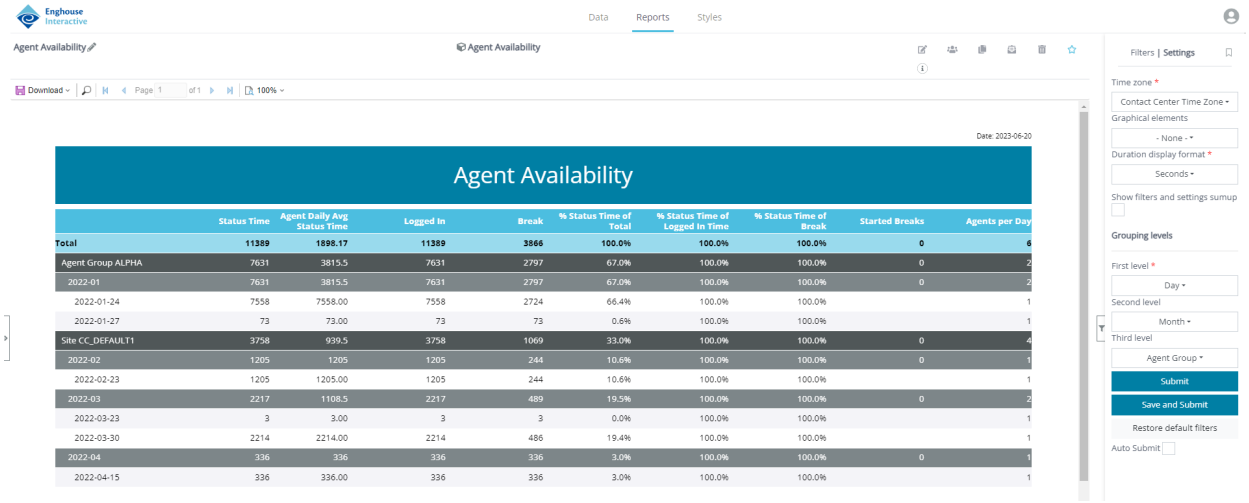
Reports

Reports are assets connected to your data models to show you the data in meaningful ways, in pixel-perfect and typically (but not only) tabular form. This gives you a simple, yet effective overview of all the data you may need. Their design can vary and be customized, depending on your needs. All the reports you can interact with, whether they were created by you or shared with you, are shown in the tiles of the **Reports** tab. Viewers and other users can interact with reports to filter the data they want to see, adjust some of the settings of the report, focus on the data they need, and perform other actions, all depending on the design of the report.

Additionally, Viewers and other users can also download the report in a number of formats, including printable ones, and they can subscribe to periodic updates via email or other channels.

Another interesting feature that is part of Reporting is the **Standard Reports**. Standard reports are a set of out-of-the-box reports which take advantage of the standard DWH to provide users with reports that are ready to use as soon as they enter the web application. In order to be able to use them, the original database must be integrated with the standard DWH. Standard reports are made to suit the needs of many different CC and CCaaS environments and use cases, and can be modified in terms of which data will or will not be shown through the use of report **Views**. You can read more about them in the upcoming sections.

Here is an example of a report from the perspective of a Designer:



Reports are the basic asset of Reporting and are available to all users, although they may interact with reports in different ways. For basic use and interaction with reports, see the *Reporting Viewer Guide*. For more advanced topics, particularly on the creation and management of reports, see the *Designer Guide*.

To find out more about the topic of standard reports and which ones are available to you, make sure to read the *Standard Reports Guide*.

Dashboards

Similarly to reports, dashboards are also assets connected to your data models to show data in meaningful ways – but while reports primarily rely on tabular form, dashboards utilize various custom or premade elements to display your data. Their design can also vary and be customized depending on your needs. Viewers and other users can interact with dashboards in that they can modify the filters to show only the needed data, adjust the settings to suit their preferences, and work with some of the individual elements to, e.g., increase the size of the viewing field for that element or to download it.

All the dashboards available to a user are shown in the **Dashboards** tab.

Just like with reports, users can download the dashboard in a number of formats or subscribe to it to receive periodic updates through one of the chosen channels.

In the same way Standard Reports are available, users can utilize **Standard Dashboards** as well, if their system is integrated with the Standard DWH. Some Standard Dashboards are already available and more are currently in the process of being developed.

Below is an example of a dashboard from the perspective of a Viewer.

Dashboards are also a basic asset of Reporting and are available to all users, even though they can interact with them differently. For basic use and interaction with dashboards, see the *Dashboarding Viewer Guide*. For more advanced topics, particularly on the creation and management of dashboards, see the *Dashboarding Designer Guide*.

Views

Reports may be comprehensive and contain a large number of options, KPIs and other metrics that may not always all be needed at the same time. For example, if your report has 10 columns, but you only want to show call center managers 7 of them, you would typically have to create a copy of the original report and then remove the 3 extra columns. However, creating separate reports to accommodate each (small) change in the content of a report may quickly become difficult to maintain.

This is why, for reports that contain a lot of data and are not intended to be used in their full form with all users, reports can instead be modified to show only the metrics needed for a certain user profile, while still preserving all the data and metrics within the report in the background. This is done with the **Report Views asset**, which is a powerful tool used to facilitate the way users interact with reports, allowing them to focus only on the most relevant information at a time, as opposed to everything the report contains. With this feature, you can also control the way a report is displayed, what the report page size is, how the fields are resized etc.

A report view (as opposed to a full report) is indicated with the view icon, as can be seen below:

Users that can create and work with views are Designer users and Power Viewers. From a Viewer perspective, in the Reports tab of Reporting, individual views function the same way reports normally do.

Refer to the *Reporting Designer Guide* and *Power Viewer Guide* for more information on how to work with Views. Since Views function the same way as reports do for Viewers, Administrators, and users that only have viewing permissions, see the *Viewer Guide* for more information.

Some Standard Reports also contain readily available standard views, which are another useful component of the out-of-the-box features available with Reporting. To find out more about this topic, make sure to read the *Standard Reports Guide*.

Styles

Styles are a feature that allows you to define a visual style or look an feel that you want to use across multiple assets. This feature is accessible to all Designer users and to Power Viewers, and they can utilize the styles and collections they make to modify what the reports, dashboards and views they work with will look like.

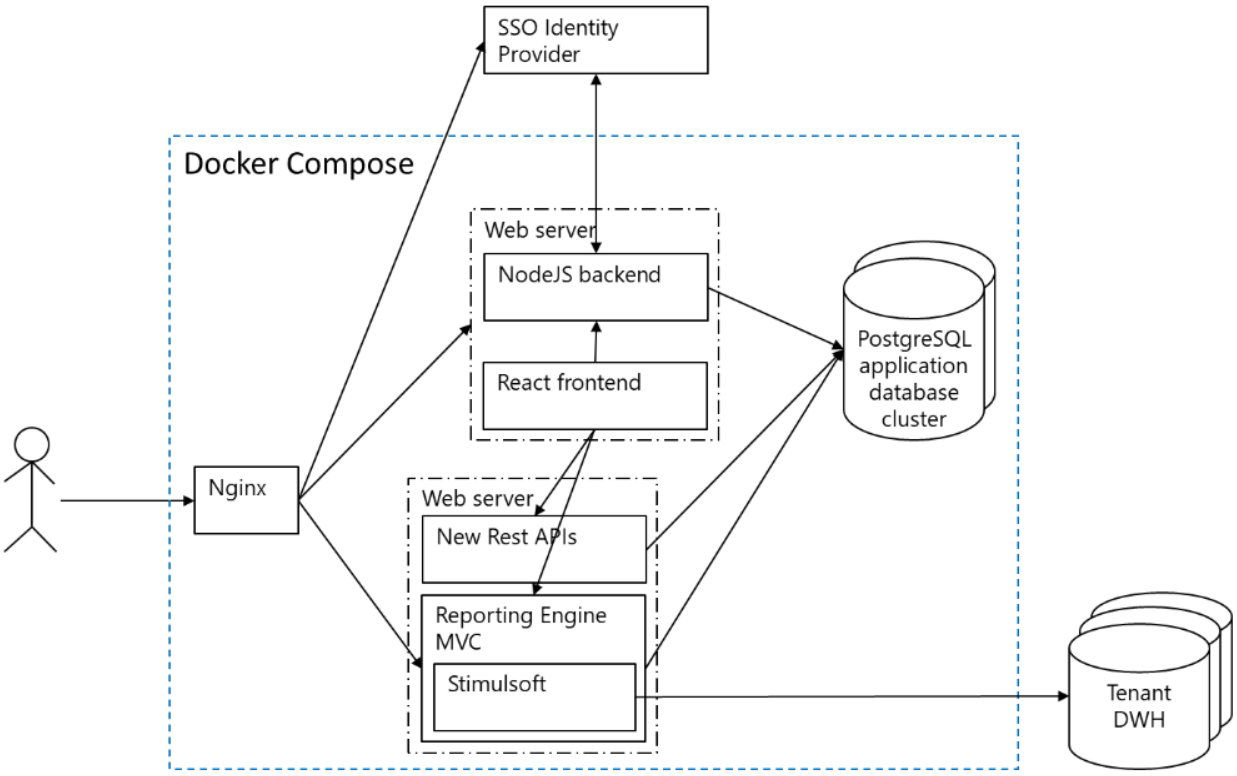
This allows users to create specific styles for different needs, which you can then quickly apply to assets without having to modify all the individual elements by hand.

The styles can be created, modified, deleted, and imported and exported. When a style is changed within the **Styles** tabs, these changes are also automatically shown in all the assets that the style was applied to, which means that you do not need to make the changes in the various places manually.

You can learn more about this topic in the *Designer Guide* and the *Power Viewer Guide*.

Architecture

The initial deployment of Reporting is done by installing Linux VMs using a template provided by the BI team. The deployment is based on Docker Compose and can be single-node or multi-node, the specific configuration and size depending the system's needs.



Reporting is deployed through Docker Compose and the individual system modules are organized in Docker containers. The Reporting Engine MVC module implements the designer and visualization features using the .NET version of Stimulsoft libraries.

When a user accesses Reporting, they first go through NginX, which is the proxy app that allows the user to enter just one entry point. Based on the full URL the user entered to access BI Reporting, NginX forwards the request to the right app. Additionally, a custom SSO configuration option has been added to the Reporting architecture in order to enable enhanced use, particularly in cloud environments. If SSO is enabled for a tenant, the unauthenticated user is redirected to the third-party identity provider for that tenant. The identity provider is not part of Reporting and should be managed in the cloud environment, outside the Reporting environment.

Within the Docker-compose configuration of Reporting, the application database is hosted on a PostgreSQL database, deployed through Docker Compose as well, which consists of 2 instances of PostgreSQL in a master-slave configuration.

The individual tenant data warehouses, however, are not part of the Reporting assets and are managed by the Enghouse Interactive DevOps team, and not Reporting or the BI team.

Multitenancy

With Reporting Version 4.0 and newer, this is a cloud-based product with the multitenancy feature. This means that the same instance of Reporting can support multiple tenants that are separated from each other, with their own data, users and settings. This enables, for example, multiple customers to use the same

instance/installation of Reporting without having access to each other's data and users in any form, thereby eliminating the need for individual installations for each customer.

Multitenancy-related features are managed by System Administrators. For more information, see *the Dashboarding System Administrator Guide*.

User Roles

Reporting provides the following user profiles:

- **System Administrator**: Users handling the tenants of a multi-tenant (cloud-deployed) system. They have the same access rights to the Admin tab that Administrators do, but typically don't interact with assets (reports, views, and data sources) in any way. They can only interact with these assets the way Viewers do, and they do not have access to e.g. the Data tab. They are in charge of creating and managing tenants in a Reporting instance. When initializing your Reporting instance, the System Administrator is the first user to be created, and whose role is to set up the rest of the system (tenants and administrators).

  > **Note**
  > System Administrators are special and unique users created and configured on system initialization. They cannot be added, modified or deleted by Administrators, which manage all other users in a Reporting instance.

- **Administrator**: The role with the highest level of access in a tenant. Administrators can perform all actions in charge of general Reporting configuration, user and group management. The **Administrator**-level user can also view all the reports, views, and data models. They can manipulate ownership and subscriptions of these assets. However, Administrators cannot edit any content, such as reports or data models. Otherwise, Administrators can use and interact with assets in the same way a Viewer can.
- **Data Designer**: User role in charge of creating, modifying and sharing data sources needed for the creation of reports. Data Designers have full data access and distribute limited data access to **Designer**-level users, through data model design. In the context of system-wide access to data and users, this role has a lower access level than **Administrators**, but higher than **Designers** and **Viewers**.
- **Designer**: Designers are in charge of creating, modifying and publishing reports. The data available for components is limited by the data models that are shared with a **Designer**. This role has a lower access level than **Administrators** and **Data Designers**, but higher than **Viewers**.
- **Power Viewer**: Power Viewers can work with existing reports in order to create new views. However, they cannot create their own components or edit existing ones, only use them as a basis for views. In order to be able to do so, both the original component and its data source must be shared with the Power Viewer. Compared to a Designer, a Power Viewer has fewer options available to them even when they have all the permissions needed for asset editing. Other than that, they have the same access level and can use and interact with reports same as a Viewer can.
- **Viewer**: Users with this role can access shared reports, report views, modify the way data is displayed in them by using filters and settings (depending on the design of the asset), view, print and export reports, views . This is the lowest access level.

Logging in

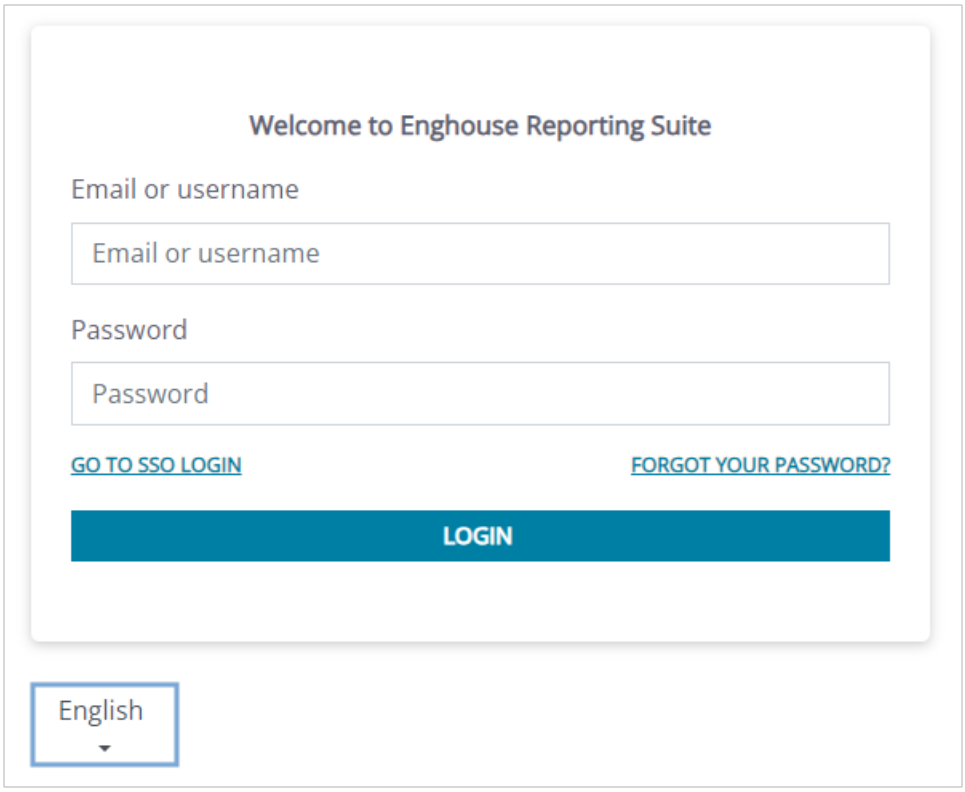
To log into Reporting, do the following:

1. Start up the application and enter the necessary data:
    - **Email or username**: Email or username used to register the user to the system.
    - **Password**: The password used for the selected account upon registration.

      A robust password policy requires a minimum length of eight characters and must include at least one digit, one lowercase letter, one uppercase letter, and one special character from the set [!@#$%^&*()-_=+{};:,<.>]. The system does not currently allow customization of these rules, nor does it enforce password expiration or retain a history of previously used passwords. System administrators can configure lockout behavior by setting the maximum number of failed login attempts and the lockout duration (in seconds). Because the platform primarily relies on Single Sign-On (SSO), the recommended approach is to delegate password management to the integrated identity provider (EIS), which offers finer-grained control over password complexity, rotation, and history across all Enghouse products.

> **Note**
>
> - An Administrator can provide an initial password for a user. In this case, the password must be communicated to the end user through some other channel.
> - If an SSO option is set up in your instance of the software, you will typically be redirected to the SSO login page automatically. However, in case you use a different URL than the standard to log in, you may have the **Go to SSO Login** option available in the login page, allowing you to manually access the SSO login page.
> - If you have forgotten your password, click the **Forgot your password?** link. The system will prompt you to enter your account's email address for the recovery process. Enter the address and click **Send**, then follow the instructions received via email.

2. Select the preferred language of the Reporting interface from the list of available languages in the dropdown menu (**English** is the default setting).



3. Click **Login** to enter the system.

User options menu

After a successful login, the **Data** page is displayed for Data Designers, and the **Reports** page for all other users.

Regardless of the user role you have, in the top right corner, the **User** icon  provides access to the user options menu.

The user's registered email address is displayed at the top of the menu. This is the address used for all Reporting related information, as well as automatic scheduling feature. Several user-related options are available from the menu:

- The currently selected interface language (**English** by default) is displayed under the email. Several other languages are available. To select another language, click English, and then click the desired language from the dropdown menu.
- **Change password**: Lets users change their own password at any time.
- **Logout**: Logs the current user out of the system. It is recommended that users log out before closing the web application window.

The last line of the menu displays the currently installed and used software version number. This number should be quoted when requesting assistance or used for selecting relevant user documentation.

Data models

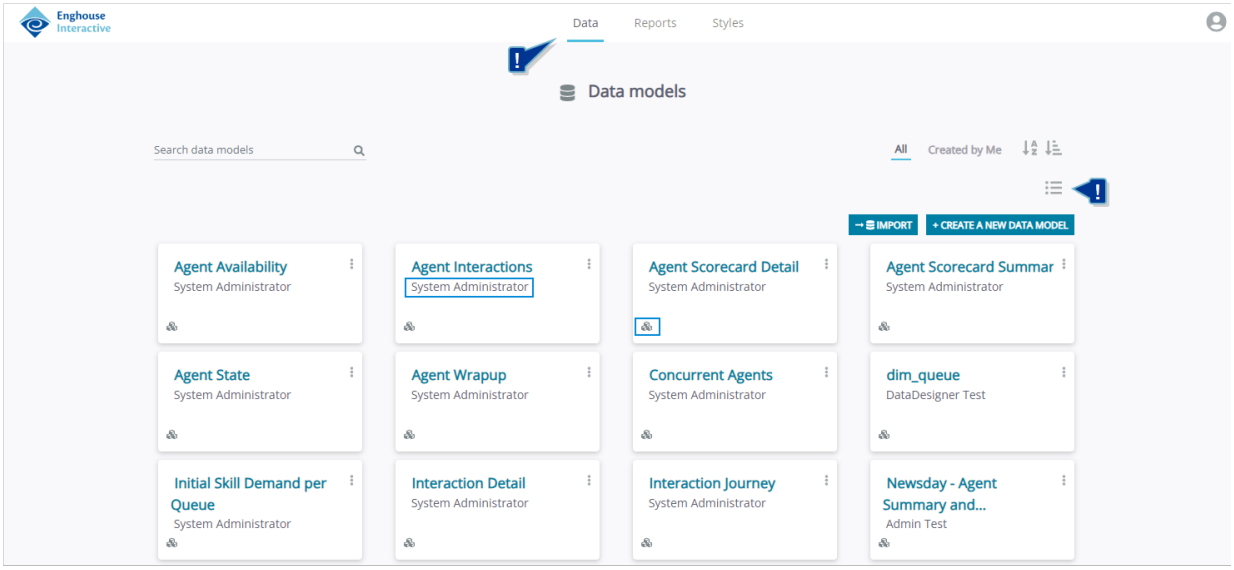
> **Note**
> Only Data Designers can use this tab of Reporting to create and edit data models, i.e., work with data. Data Designers and Administrators can also share these assets with other users.

The **Data** tab of the Reporting interface provides access to the data models management screen. Only Data Designers and Administrator users have access to this tab.

Data models are used to define connections and queries that Reporting uses to access data for reports from the relevant databases and files. All available data models are listed in this tab.

> **Note**
> A user's role defines the visible data models and the user's capability to edit them.

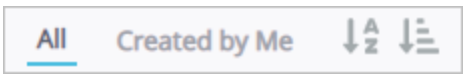
Data Designers can edit or duplicate existing data models, import them from other Reporting instances, export them, delete, or create new data models. The owner of a data model is listed under the model's name. Data models are also indicated with the icon .



You can use the search bar to search for a specific data model by name. The search function is not case-sensitive.

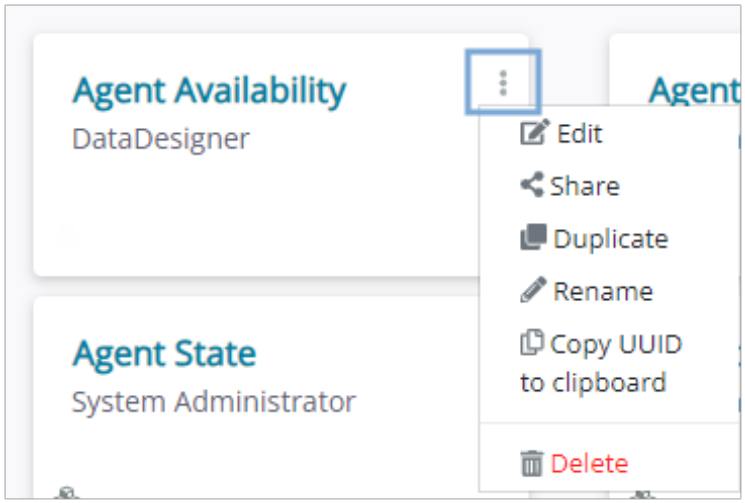
Click **Create a new data model** to configure a new data model directly. This procedure is described in *Creating a new data model on page 17*.

The Data models view also offers the following filtering and sorting options:



- **All**: Full list of all the data models available to the logged-in user.
- **Created by Me**: List of only the data models created and owned by the logged-in user.
- : Sorting the listed data models by name (alphabetically) in ascending or descending order.
- : Sorting the listed data models by creation date in ascending or descending order.

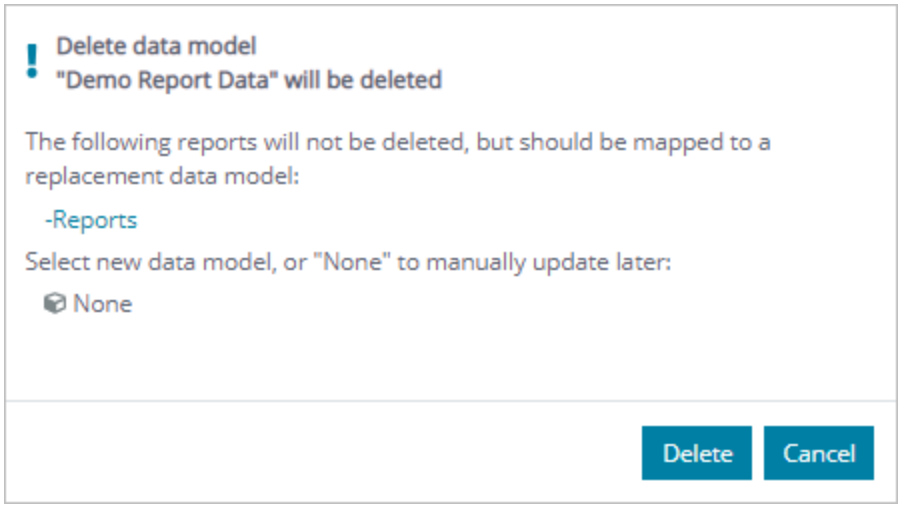
Each asset tile in the Data tab also has the **Options** menu in its upper right corner. Clicking it opens a dropdown list with the following options (the list varies based on whether you own the asset or not):



- **Edit**: Allows the user to modify the data model and all its components and data through the data model editor.
- **Share**: Lets the owner grant data model access to other users of the Reporting system. See *Data model sharing on page 48* for further details.
- **Duplicate**: Makes a copy of an existing data model. The new model can than be edited separately from the original one and is owned by the user who copied the data model. This option is available even when the user performing the copy action is not the owner.
- **Rename**: Changes the name of the selected data model to the desired text. Preexisting connections between the renamed data model and reports are retained.
- **Copy UUID to clipboard**: Copies the unique ID of the asset to the clipboard. This can be relevant, for example, when importing updated versions of a data model, to ensure that the asset is indeed the same.
- **Delete**: Deletes the selected data model.

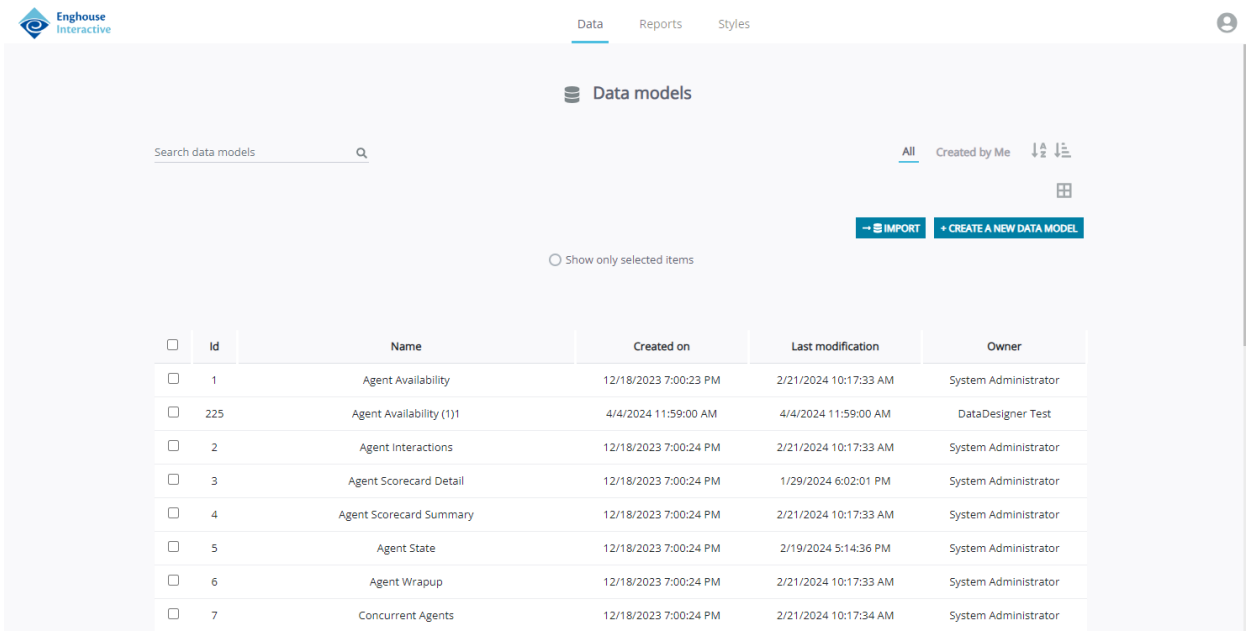
> **Caution**
> Deleting a data model cannot be undone. Always check before confirming this action.

> **Note**
> If a data model selected for deletion is connected to a report, the report should be mapped to a replacement data model before starting or finishing the action. The mapping can be postponed for a later time, but the report will not be functional until it is mapped to a new data model.



Data model importing is also available in this view by clicking **Import**. This topic is covered in more detail in *Data model export and import on page 49*.

Furthermore, you can also choose to see the data models in a tabular form. You can switch to this mode by clicking . The data models list is then shown as follows:



Here you can see the most important data about the assets, such as the UUID, name, relevant dates and the owner. In the first column of the table, you can select all or just some individual assets. To show only the selected items, click **Show only selected items** above the table.

Each asset row also has the **Options** menu at the right-hand end of the column. Here you can see the same options as described above.

Additionally, when you select one or more assets, additional options are shown for the asset(s):

- **Share**: Share the asset with other users or groups. See *Data model sharing on page 48* for further details.
- **Unshare**: Remove the access rights from users or groups. See *Data model sharing on page 48* for further details.
- **Delete**: Delete the selected asset(s). You must be the owner of an asset to be able to delete it. If there are any assets among the selected that you do not own, a warning message will be shown to indicate which assets the action will not be performed for.

> **Caution**
> Deleting a data model cannot be undone. Always check before confirming this action.

- **Export**: Export the selected asset(s). See *Data model export and import on page 49* for further details.

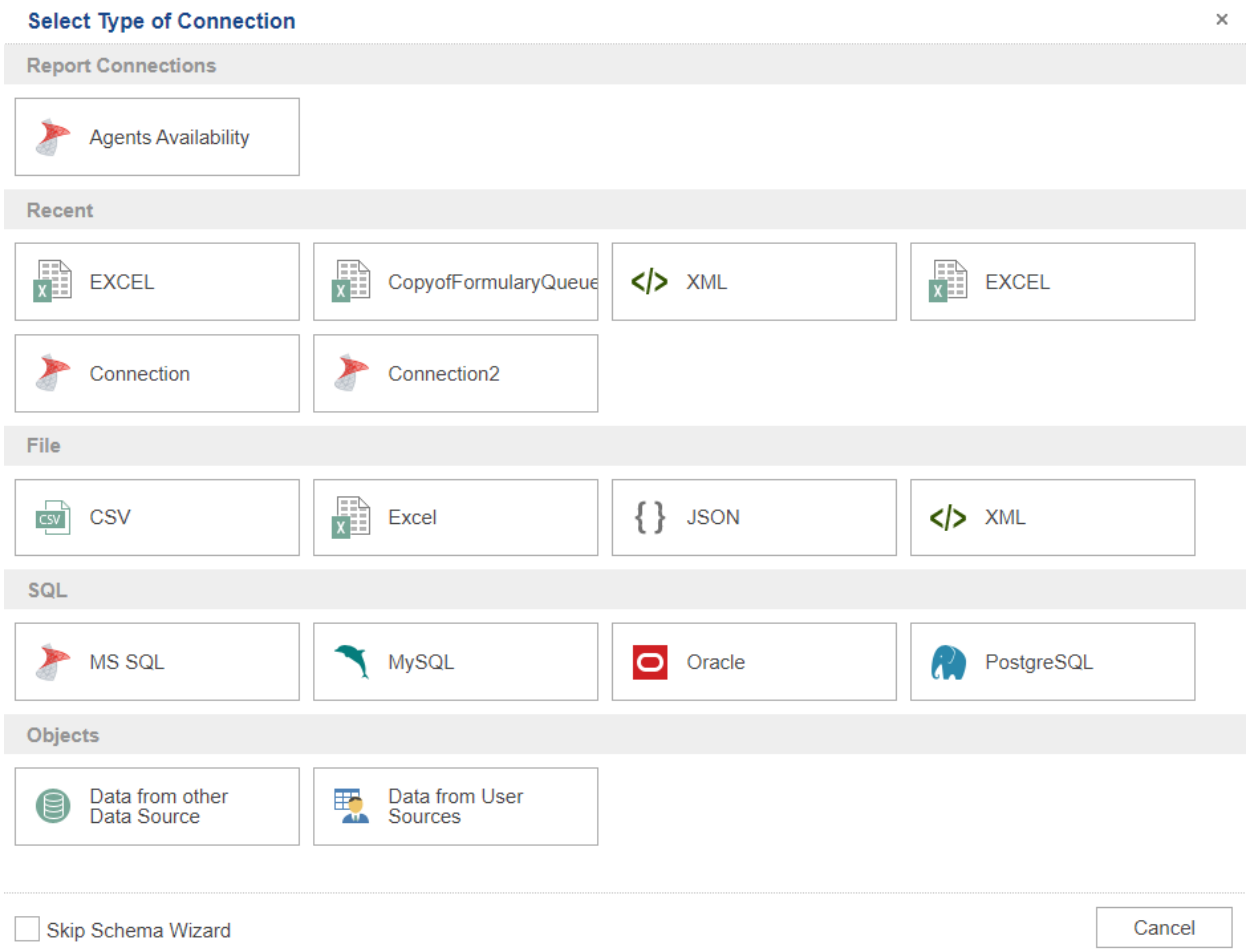
> **Note**
>
> - You need to have the relevant access level to an asset to be able to perform all of these actions. If you select any assets for which you do not have the needed access level (such as being the owner), you will not be able to perform the needed action for those assets. A warning message is shown in this case. If there are any assets left among the selected that you have the relevant access level for, you can proceed with the action for these assets only.
> - Hover over  in the top part of the pop-up window to see which assets you are working with if multiple are selected.

To turn the data model tile view back on, click  under the sorting tools in the upper right section of the **Data** tab.

Creating a new data model

To create a new data model within Reporting, you must follow these steps:

1. Click **Create a new data model** in the upper right corner of the **Data** tab.
2. In the pop-up window, enter the name for your data model.
3. A new window opens with an empty Data Model Editor. In the Dictionary toolbar, click **New**.
4. In the dropdown menu, click **New Data Source**.
5. The **Select Type of Connection** window opens. Here you select the needed data source. A data source is an entity used for storing data. It is usually located on a local or remote server disk. It can have different forms, database types, files, etc. Click the relevant file or connector to the data source for the new data model. This menu also offers using existing database connections for the new data model. All information related to the specific setup of each available data source is described in *Creating a data source on the next page*.



6. After setting up your data source, click **Continue**. This opens the *Data Model Editor on page 26* with your new data model and its data source.
7. To save the current data model, click Save just above the **Dictionary** and enter the name in **File Name**, then click **Save**. When creating a new data model, it is recommended to save it immediately after the Data model editor opens.

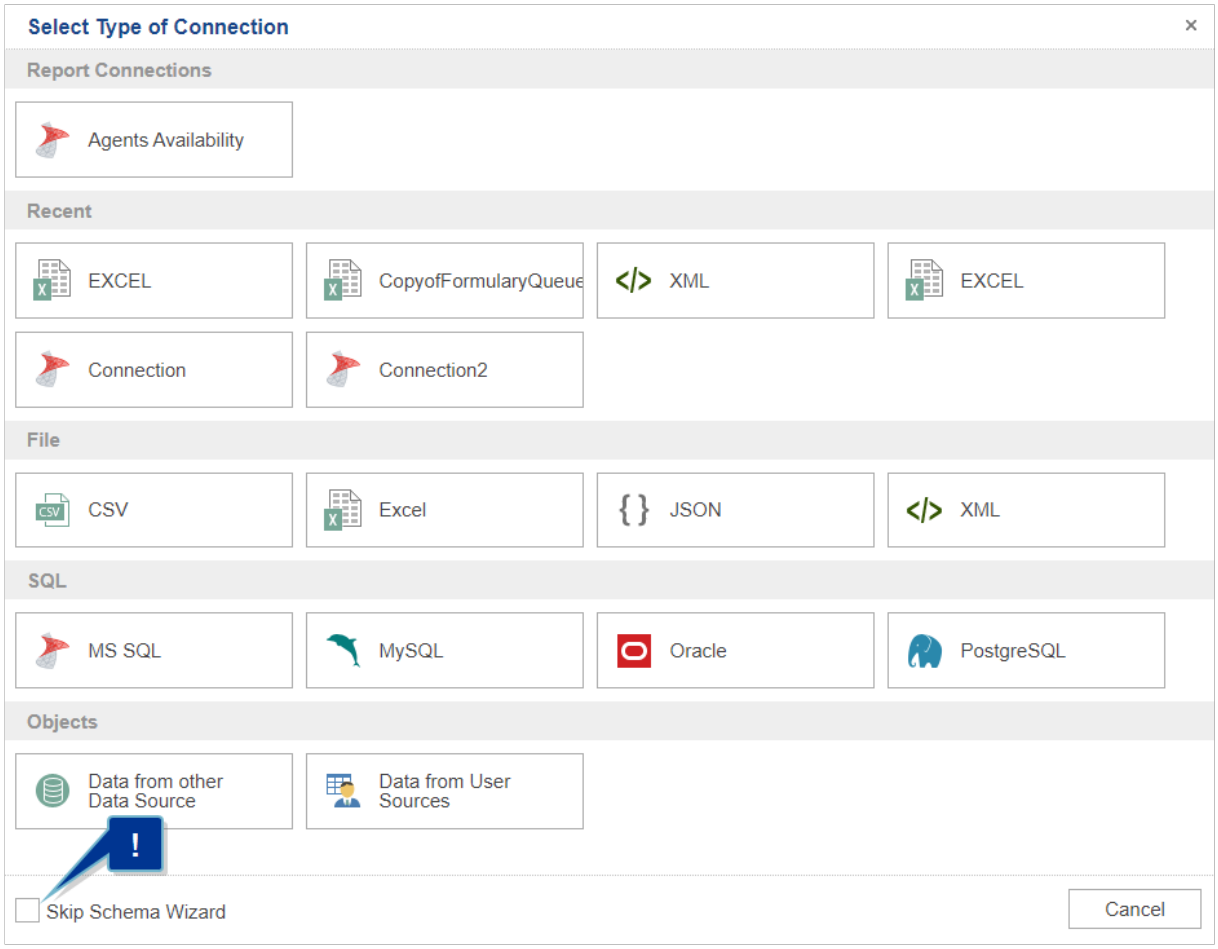
Creating a data source

All data models must have a data source to function. A data source can be added to a data model either when creating the data model, or later on through the Data model editor. To create a data source, a connection must be set up. You can use an existing one, or provide the parameters for a new one. To do so, follow these steps:

1. If the connection is not yet set up, in the Data model editor click **New Item**, and then click **New Data Source** in the **Dictionary** toolbar.
2. Choose the type of connection from the **Select Type of Connection** pop-up window. If you want to use a database connection as your preferred type of connection, see *New data source from database connection*

on page 20. If you want to use a file connection, see *New data source from file on page 22*. Alternatively, you can use other data sources as described in *New data source from other sources on page 25*.

3. Check the **Skip Schema Wizard** checkbox (indicated in the image below) to avoid the database schema wizard step or leave it unchecked to go through this step (described in the sections dedicated to each data connection type below).



Note

- In this window, you can also see recently used connections, as well as connections that are already connected to a report. You can select to create a new connection or use an already existing one as your new data source.
- You can also mark a connection type as a **favorite** by hovering over it and clicking in the upper right corner of the connection type (click again to remove from favorites). This places it in the Favorites section of the **Select Type of Connection** window, allowing for quicker access.

New data source from database connection

When selecting the **Type of connection**, several connections to databases can be used as data sources. The supported types are:

- **MS SQL**,
- **MySQL**,
- **Oracle**,
- **PostgreSQL**.

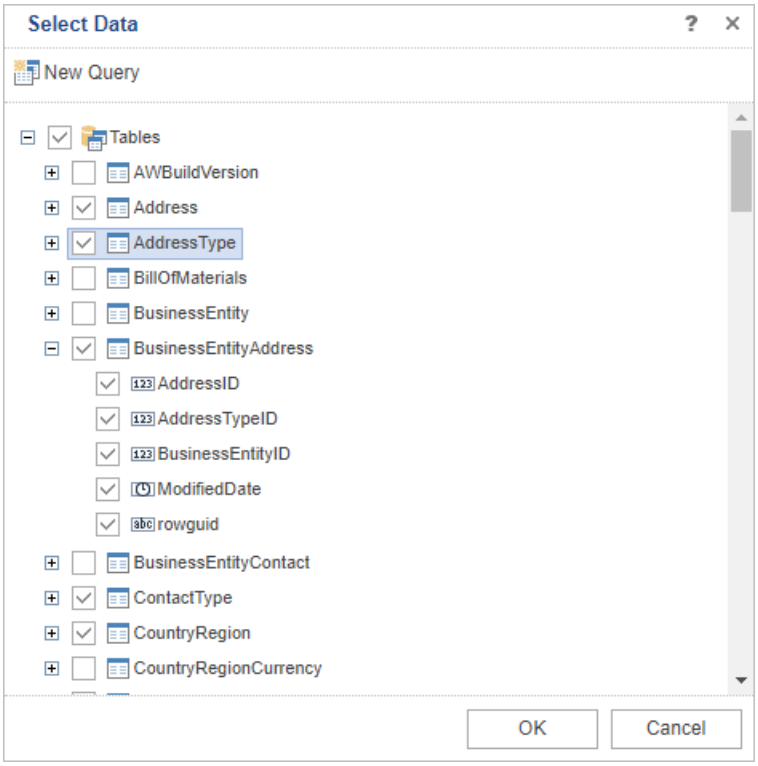
When connecting to a database, the procedure is similar to the one described in the *Creating a new data model on page 17* section, as the same parameters are required. Do the following:

1. Fill out the connection's **Name** and **Alias**.
2. Type the necessary parameters in **Connection string**.
   - Click **Info**  to fill in the connection string with an example configuration.
   - The **Port** parameter can be omitted if a standard port is used.
3. Validate the connection string by clicking the green check mark icon  . The **Eraser**  can be used to clear the connection string contents.
4. Check the **Skip Schema Wizard** checkbox (indicated in the image above) to avoid the database schema wizard step or leave it unchecked to go through this step. See *Retrieving the data schema for a database connection below* for more information.
5. Click **OK** to continue.

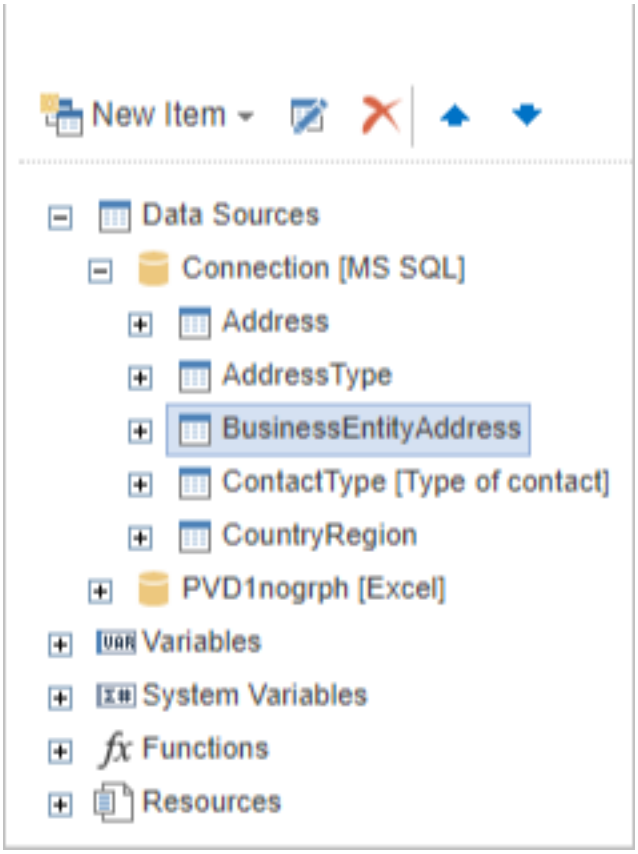
Retrieving the data schema for a database connection

Continue with this section if you have left the **Skip Schema Wizard** checkbox cleared when selecting the type of connection for your new data source.

After creating the connection, the **Select Data** dialogue opens:



You can expand and collapse the individual tables to select or deselect individual columns. All the selected tables (by default with all their columns) are added as new (separate) data sources to your Reporting Data model **Dictionary**.



Caution

The **Report Designer** application slows down significantly when working with large amounts of data. It is therefore best to limit the addition of data sources to only the data you are sure you will use in your report.

Note

If after following the previous instructions you are still left with a slowly responding **Report Designer** application, consider reducing the scope of the data requested from the database while designing the report. For design purposes, you can edit the data source query to `select top 200` to reduce the amount of data actively being used. For more info see *Data source editing on page 29*. Remove such changes from the query before sharing the report so the full extent of values can be displayed to the viewers.

New data source from file

When selecting the **Type of connection**, several file types can be used as an alternative to database connections. The supported types are:

- **CSV**,
- **Excel**,
- **JSON**,
- **XML**.

Full file import

New data sources from files can be added by dragging a file of a supported type from your file browser to the **Dictionary** of a relevant data model. In this case, the full structure of the imported file is retained. In the case of *CSV* files, the columns are all placed in the same table. For *Excel* files, separate sheets are treated as separate tables. If the uploaded *Excel* file contains graphical elements, importing will not work.

Alternatively, you can also follow the steps described in the following section to perform a full data import.

Partial or selective file import

To perform a selective or partial import from a file, do the following:

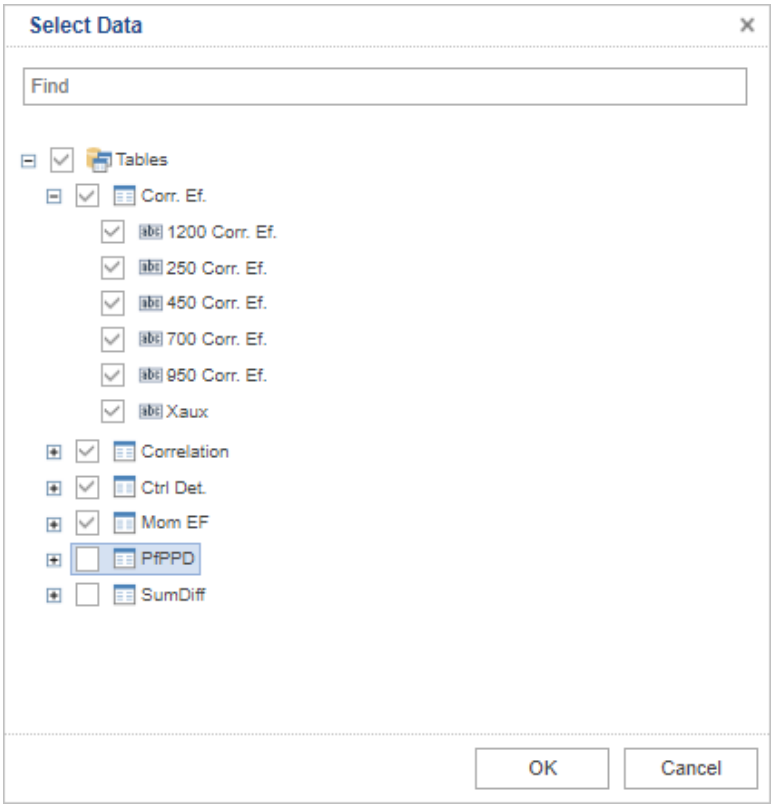
1. Click **New Item** in the data model editor, then click **New Data Source**.
2. Select a suitable file type connection from the menu. To be able to perform a selective import from the selected file, you must keep the **Skip Schema Wizard** checkbox cleared.
3. Fill out the **Name** and **Alias** of the new connection.
4. Enter the other relevant data for the new connection. This information will vary based on the file type you choose as your data source:

- **CSV**: Define the **Path to Data** (enter the local path or web location manually, or click ⋯ to open the file explorer), and select the **Encoding** method and **Separator** for your data from the corresponding dropdown lists.
- **Excel**: Define the **Path to Data** (enter the local path or web location manually, or click ⋯ to open the file explorer), and check **First Row is Header** if the data in your Excel file has a header row, which will then be imported accordingly.
- **JSON**: Define the **Path to JSON Data** (enter the local path or web location manually, or click ⋯ to open the file explorer), and then define the **Relation Direction** by selecting the relevant relation from the dropdown list.
- **XML**: From the dropdown list, select the relevant **XML Type**, then define the **Path to XSD Schema** and the **Path to XML Data** (enter the local path or web location manually, or click ⋯ to open the file explorer).

5. Once you have finished entering the required data, click **OK** to continue.
6. In the **Select Data** window (shown if you left the **Skip Schema Wizard** checkbox cleared), choose the relevant data you want to import. This is described in *Retrieving the data schema for a file connection below*.
7. When you have finished selecting the data you want to use as a data source, click **OK** to finish.

Retrieving the data schema for a file connection

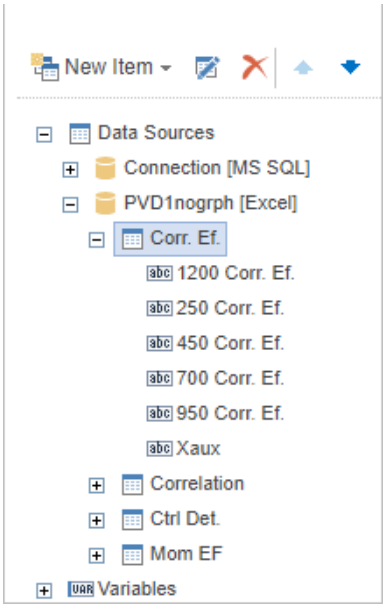
The data schema of the file is displayed the same way as with the database connection. To perform a selective or partial import of the file, you can expand and collapse the individual tables to select or deselect individual columns. All the columns of a selected table will be imported unless otherwise selected.



Caution

The **Report Designer** application slows down significantly when working with large amounts of data. It is therefore best to limit the addition of data sources to only the data you are sure to use in your report.

After the relevant data has been selected, new data sources are added in the Dictionary, corresponding to the selected tables (and selected columns).



New data source from other sources

Data sources can also draw their data from other sources, such as data from a combination of existing sources etc. These are as follows:

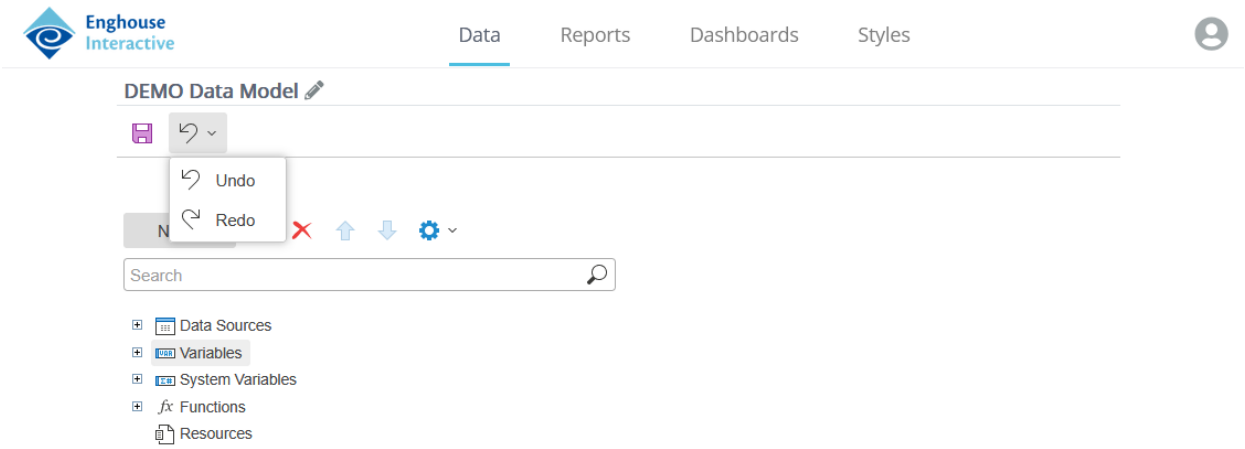
- **Data from other Data Source**: With this option, you can create a data source that is based on data from a preexisting data source, which you can then transform in various ways. This can be used, for example, to simplify and filter out data from a more extensive data source, such as a database connection. If you select this option, in the **New Data Source** window you can choose data from the data sources you have already added to your dictionary. Then you can sort, filter and group it, or add aggregations and other calculations to it.
- **Data from User Sources**: With this option, you can create a data source that is based on data from preexisting user sources, which you can then work with further or combine them.

Data Model Editor

The data model editor is used to set up all connections to data sources used in the data model. To enter the Data model editor, click a data model tile in the Data view or click on the more options button of a data model and then click **Edit**.

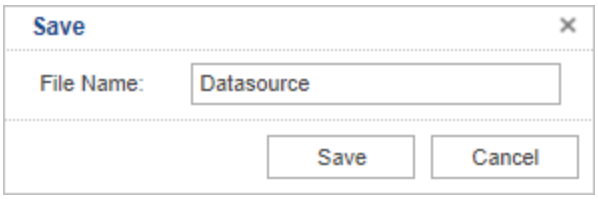
In the **Data model editor** window, the **Dictionary** is the left side pane. Its structure similar to the hierarchical folder structure of standard file explorers. For more information, see *Dictionary on the next page*.

After you've finished editing a data model—following the steps outlined in the *Creating a new data model on page 17* and *Creating a data source on page 18* sections—simply click the **Save** icon to commit your changes. If you need to revert or reapply recent edits, you can also use the **Undo** and **Redo** button , which let you step backward or forward through your modification history before saving.

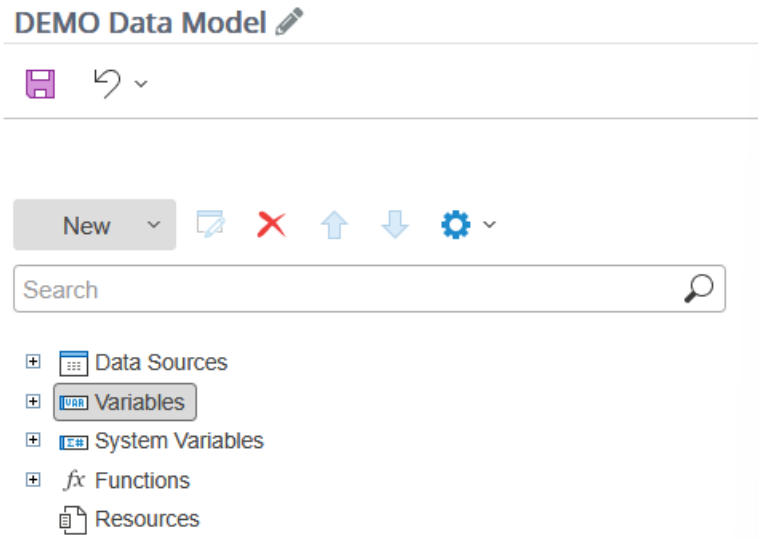


When creating a new data model, it is recommended to save it immediately after the data model editor opens. That way you can also give it a new and distinct name, thus avoiding using the default *Datasource*.

Type the name of the data model in **File Name**, then click **Save**.



The name is then displayed above the save icon in the data model editor, and can be edited by clicking the pencil icon .



D

Dictionary

Every data model is defined through its related data **Dictionary**. The Dictionary is the connection between the data and the reports the data is connected to. The Dictionary and the information contained therein are used by the Report Designer to create relevant reports.

The **Dictionary** includes:

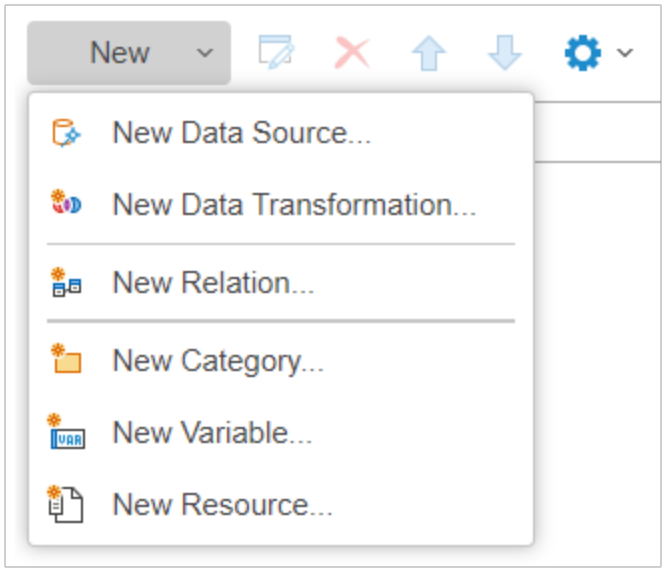
- **Data Sources**: Database connections and/or files, as set up when creating the data model

> **Note**
> If on creating a new data model no existing data connection was used or no new one was created, the newly created data model is empty, with no defined **Data Sources** in the **Dictionary**. See *Creating a new data model on page 17* for more.

- **Relations**: Data on how the data sources relate to each other. See more in *Data relations on page 31*.
- **Variables**: A list of all the user-defined or system-defined variables in the selected data model. For more, see *Variables on page 33*.
- **Functions**: A list of all functions available within in the selected data model.
- **Resources**: A list of all the additional resources in the selected data model, such as uploaded files or images.

All the components of the **Dictionary** are structured in a tree form similar to folder hierarchy in standard file explorers.

In the top part of the **Dictionary** there are several menus and contextual tools:



- The **New Item** dropdown menu provides the following options:
  - **New Data Source**: Lets you define a new source of data (i.e. database connection or data file). See more in *Creating a data source on page 18*.
  - **New Data Transformation**: Used for compiling and/or aggregating existing data from multiple sources into a new temporary data source. Used for report generation, automated for all reports.

    > **Note**
    > It is possible to prepare the data transformation manually before rendering individual reports in order to simplify report design, filtering, data grouping etc. If a Data Transformation is defined, it can be used for report generation in the same way as all other data sources in a data model.

  - **New Relation**: Used to bind together data from different data sources into a parent and child relationship. The corresponding categories of the sources should be identified and bound together in order to adequately display, sort and filter data contained in different sources, which is required to render a report. See more in *Data relations on page 31*.
  - **New Category**: Used to group user-defined variables for a more organized overview or easier access. It does not affect the functionality of the data model.
  - **New Variable**: Creates a new value container that can be defined form available data, either through an expression or by the user. It can be defined on the data model level or on the report designer level. When used inside queries, it should be defined on the data model level.

    > **Caution**
    > Variable parameters can be changed on the report designer level, affecting the relevant connected report.

  - **New Resource**: Used for uploading data files, such as images, to the Reporting system, which will then be used for report rendering. For example, to place an image, such as a logo, in a report, you would

upload it here and drag and drop it into the report.

- The remaining **Dictionary** tools are of contextual nature, and are available only when an applicable element from the dictionary is selected. Respectively they are:
  - **Edit**  : Access the parameters of the selected object.
  - **Delete**  : Remove the selected object from the **Dictionary.**
  - **Move Up/Down**  : Change the position of an object inside a relevant structure.

Data source editing

Double-clicking on an individual **table** in a data source component or right-clicking it and clicking **Edit** opens the **Edit Data Source** window, where the following parameters can be configured:

- **Name in Source**: The connection where this data source is located.
- **Name**: Reference to the data source used in Reporting.
- **Alias**: Alternative reference that can be more descriptive.
- **Run** : Checks the SQL statement validity.
- **Edit Query**  : Opens a dedicated SQL query edit window.
- **View Data**  : Checks the result of the input SQL query by displaying resulting data.
- **Query Text**: Used to input the SQL query.

> **Note**
> For security and practical reasons, queries should be filtered and limited to display only authorized (allowed for the Viewer or Designer) and relevant (filtered by user set parameters) data. For additional information on database queries consult *Database queries on the next page*.

- **Type**: Define whether the statement is a *Query* or a *Stored Procedure*.
- **Query Timeout**: Define the execution time for the database query in seconds.

In the bottom part of the window, there are details on imported columns of the data source. To edit an existing column or parameter, locate it in the provided list. It is possible to expand or collapse the list for easier navigation. You can edit the data of the existing columns and/or parameters or do the following:

- **New Column**  : Add a new column to the data source and define its data.
- **New Calculated Column**  : Add a new calculated column to the data source and define its data.
- **New Parameter**  : Add a new parameter to the data source.
- **Delete**  : Delete a selected column or parameter (new or original).

- **Retrieve Columns**  : Retrieve queried columns from the data source. If an imported column is modified, this will retrieve a copy of the original column and keep the modified version.

To finish, click **Save a Copy** to save a copy of this modified data source along with the original, or click **OK** to overwrite the original settings of this data source.

Database queries

This section provides details and examples of SQL queries for several types of data filtering options.

The security filtering can be performed by limiting the database query using the Viewer (user) info-related variables starting with *_reportViewer*. Other types of filtering can be applied depending on user input, using **Request from User (RfU)** variables. See *Request from User (RfU) variables on page 37* for more details.

The standard function used for filtering in Reporting is a conditional ternary expression. The syntax is **`{Condition? Value1: Value2}`**, where everything inside the **{}** indicates an expression to be evaluated, **Condition** is the boolean statement under evaluation, **Value1** is the result for the *True* case of the evaluation, and **Value2** is the result for the *False* case of the evaluation.

Query examples

All the following examples are written for a PostgreSQL database. The syntax should be modified accordingly for all other database types.

Ex.1

The following example is a simple query to the *report* table, using an RfU string variable *NameLike*

```
select id, name, "dateCreated" from report where
{NameLike == "" ? " 1=1 " : " name like '%" + NameLike + "%'" }
```

- In case *NameLike* equals an empty string, then it is ignored (query executes 1=1).
- In case *NameLike* is not an empty string, fetch the *select id*, *name* and *dateCreated* column values for all records where *name* column contains the string from *NameLike*.

> **Note**
> The string `_OPTIONAL_` is used as a keyword in the **Init by** field of an RfU variable to indicate that it is not required (mandatory) to input a value for report rendering.

Ex.2

NameSelected is an RfU variable with a populated list of values, acquired from the database.

Only the data for the selected report name will be displayed.

```
select id, name, "dateCreated" from report where
{NameSelected == "_OPTIONAL_" ? " 1=1 " : (" name = '" + NameSelected + "'") }
```

Ex.3

This example is similar to the previous one, however, a list is used to display available items, making multiple selections possible.

```
select id, name, "dateCreated" from report where
{NamesSelectedList == "_OPTIONAL_" ? " 1=1 " : (" name in (" + ListToQueryString
(NamesSelectedList) + ")") }
```

A special custom function *ListToQueryString* is used to populate the list dropdown menu. The function reformats the values acquired from the *name* column of the connected table to a list required format: `"abc,def"` => `"'abc','def'"`

Function body: `(list) => list.split(",").map(elem => `'${elem}'`).join(",")`

> **Note**
>
> In this version of Reporting, custom functions are **not available**. This feature will be made available in the upcoming releases.

Ex.4

Display only data for the submitted *Id* value.

```
select id, name, "dateCreated" from report where
{Id > 0 ? "id=" + Id : " 1=1 "}
```

Ex.5

Multiselect *Id* from list, similar to **Ex.3**.

```
select id, name, "dateCreated" from report where
{IdsItems == "" ? " 1=1 " : "id in(" + IdsItems + ")"}
```

Ex.6

Filter data to be fetched and displayed based on the user input date, but ignore if date is invalid.

```
select id, name, "dateCreated" from report where
{DateCreatedExact.ToString() == "" || DateCreatedExact.ToString() == "Invalid date" ? "
1=1 " : " \"dateCreated\"::date ='" + DateCreatedExact.ToString("YYYY-MM-DD") +
"'::date" }
```

Ex.7

Filter data to be fetched and displayed based on the user input date range.

```
select id, name, "dateCreated" from report where
"dateCreated" >= '{DateCreated.From.ToString("YYYY-MM-DDTHH:mm:ss")}'::timestamptz
and
"dateCreated" < ('{DateCreated.To.ToString("YYYY-MM-DDTHH:mm:ss")}'::timestamptz)
```

Ex.8

Display only data about reports owned by the current viewer using the *_reportViewerUsername* automatically created variable.

```
select r.name, r.id, r."dateCreated" from public.report r join public.user u on
r."userId" = u.id where u.username='{_reportViewerUsername}'
```

Data relations

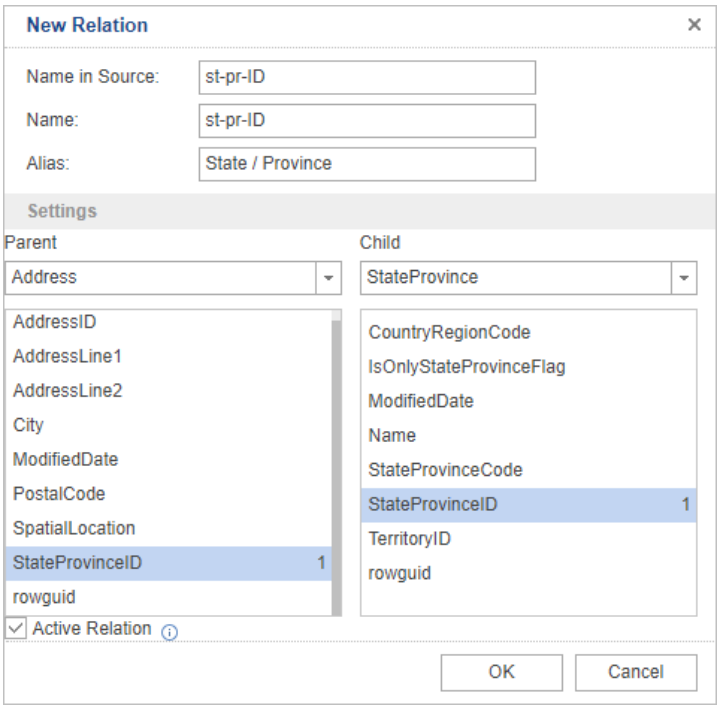
It is possible to create a relation between data sources in the Dictionary. In order to do this, follow these steps:

1. Right-click the data source you want to relate to another data source or click **New Item** in the Dictionary menu.
2. Click **New Relation** in the context menu.
3. Fill out the following information:

- **Name in Source**:Specify the name for the relation. This is the referent value for the data set in the **Dictionary**.
- **Name**: Referent value in a connected report. It can match the **Name in Source**.
- **Alias**: A hint for the relation that will be displayed to the user. This value can be more descriptive.
- **Parent**: The parent data source of the relation.
- **Child**: The child data source for this relation.

> **Note**
>
> The fields under Parent/Child Data Source allow the choice of specific data source columns to be connected in the Parent and Child data sources, respectively.

- **Active Relation**: Check this box to confirm the use of the configured relation by default, for example, when performing a new data transformation. It is possible to have multiple relations defined between two tables, but only one of them can be active at any time. Marking a new relation replaces any previously active relation.



> **Note**
>
> - The relations editor has a built-in control. In case of issues with relation creation, an error message will be displayed. New relations cannot be confirmed until all issues are fixed.
> - New relations are shown as part of the Child table in the Dictionary after creation.

Variables

Variables are used as data containers for values that are subject to change over time, depending on calculations, user input or other factors. They are often used in database queries and report rendering setups (filtering, grouping, etc.).

The Reporting **Dictionary** provides two general categories of data containers for values:

- **Variables**: custom variable data containers that can be configured for specific report needs.
- **System Variables**: a predefined set of variables with some of the typical parameters required for report generation, provided by Reporting.

System variables

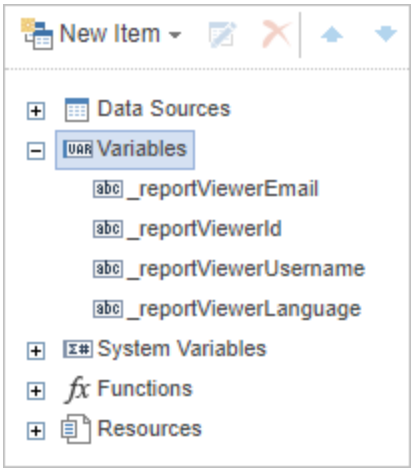
The **System Variables** category in the data model editor **Dictionary** is populated with predefined variables that are typically used for standard report generation. More information on each of the system variables is provided in Reporting. Click on a variable to see an explanation of its function in the bottom part of the screen.

Custom variables

There are a number of variables in Reporting that were designed specifically for use in data models and assets, such as reports. These variables **should not be edited** and are used as placeholders when designing. Additionally, custom variables and their values can be added and defined as needed for each data model and/or asset.

_reportViewer variables

Variables starting with *_reportViewer* in the data model editor **Dictionary** are used for viewer identification. They are **automatically generated**, and are not visible in the report designer. They can be used for security data filtering on the data model level (such as in database queries), or for read purposes, such as, for example, to always show the report viewer's username in a report. **They should not be edited** as they are automatically populated from the database when a report is opened/rendered.



Other Reporting variables

In addition to the _reportViewer variables, the following Reporting-specific variables can be seen in the data model or report editor:

- **_viewHiddenVars**: Used in report views to stop parameters hidden from viewers from appearing in the filters and settings sumup section of a generated report view.
- **databaseType**: Used to detect the type of database used in a data source for various purposes, such as custom functions, as described within the Reporting web app.
- **_reportTarget**: Used to specify the delivery format for an asset, indicating whether the target is SUBSCRIPTION or WEB_UI.
- **_reportType**: Used to indicate which type of element (DATASOURCE, REPORT, REPORT_VIEW, or DASHBOARD) is represented in the data model or assets.

Same as the _reportViewer variables, these are **not intended to be edited or modified in any way**, nor usually explicitly used in data sources or assets, and are instead only placeholders needed for the proper functioning of Reporting.

Custom variables

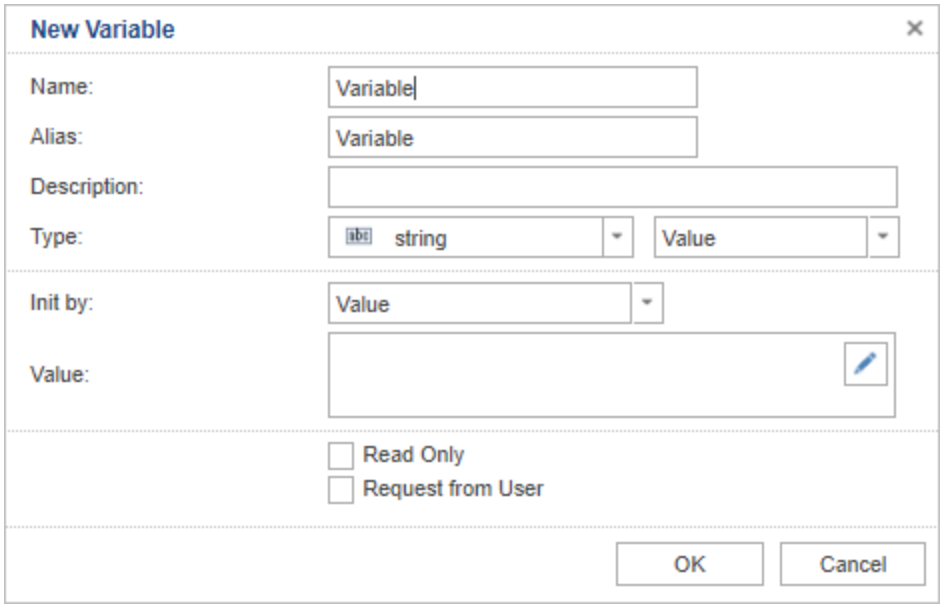
Two distinct modes of variable functioning are available in Reporting:

- **Autonomous**: not dependent on user input. To create an autonomous variable, leave the **Request from User** check box further in the steps unchecked.
- **User-controlled**: directly related to user input. To create a user-controlled variable, check the **Request from User** check box further in the steps. There are two variations of this variable:
  - selecting preset values, such as from a dropdown menu of predefined options.
  - free input of values, such as entering values into a field.

To create a new custom variable, follow these steps:

1. Click **New Item** in the **Dictionary** toolbar OR right-click the **Variables** category in the **Dictionary**.
2. Click **New Variable**.

3. The **New Variable** pop-up window for variable configuration opens. Enter the following configuration parameters:

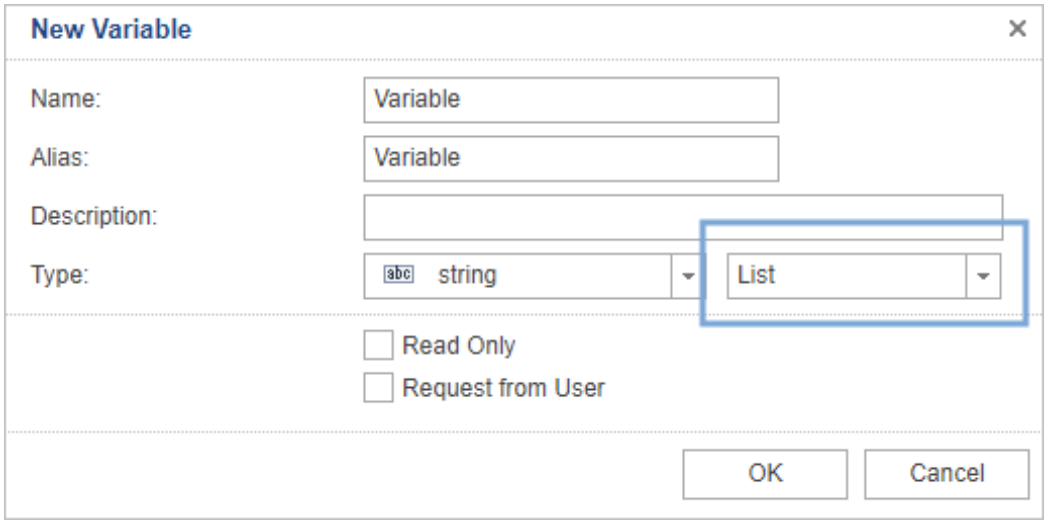


- **Name**: the variable reference used in the system. It should not contain special characters or spaces (underscores "_" can be used).
- **Alias**: label displayed to the user (if the variable has the **Request from User** check box checked).

> **Note**
> If this label is used for variable reference, it should be placed in square brackets [*Alias*]. By default, **Alias** is copied from the **Name** parameter, and it is recommended to keep it similar (identical, if possible) to **Name**.

- **Description**: used to document the purpose of the relevant variable.
- **Type**: is defined by two parameters:
  - the type of data of the variable value, such as string, timespan, integer, image or others.
  - the nature of the variable (Value, Nullable Value, Range or List).

> **Note**
>
> - If the **String** data type is selected, the **Nullable Value** option is not allowed, and will automatically be changed to **Value**.
> - If the **Range** option is selected, the **Value/Expression** field below is replaced by two input fields labeled **From:** and **To:**. Enter relevant data to define the range here.
> - If the **List** option is selected, the complete value initializing section, which is located under the Type field, is removed, as seen in the image below.
> - All variable types are supported in the preview mode of the report designer. However, the full report viewer mode currently supports:
>   - ***String*** as *Value* or *List*
>   - ***Datetime*** as *Value* or *Range*
>   - ***Numbers*** as *Value* or *List*



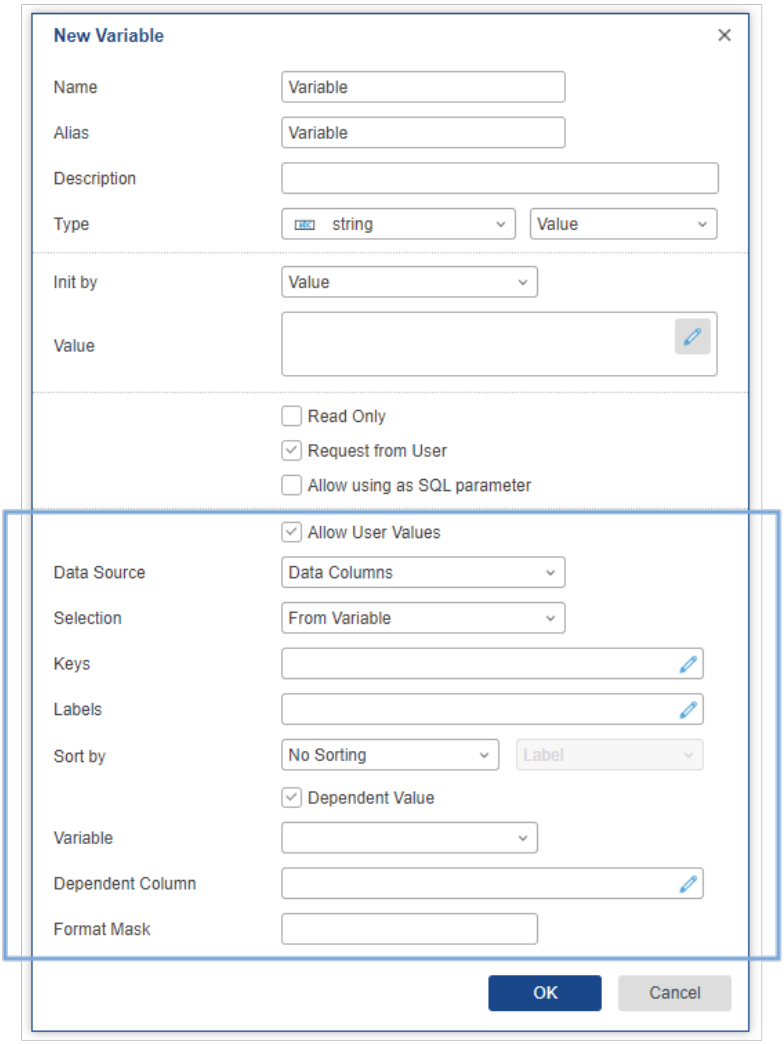
- **Init by**: sets the initial value (before report rendering) for the variable, with two options available in the dropdown menu:
  - **Value**: explicitly declared in the following parameter field.
  - **Expression**: built using different functions and other objects from the **Dictionary**, and can vary from rendering to rendering.
- **Value/Expression**: used to input the value or expression (depending on the choice for the **Init by** field) for the initial variable value.
- **Read Only**: if this check box is checked, the value of the variable is locked and cannot be edited by other users in the report rendering process.
- **Request from User**: if checked, the user is required to input and submit a value for the variable prior to report rendering. This makes the variable user-controlled. This option is unavailable if **Read Only** is checked.

> **Note**
>
> Checking the **Request from User** check box opens another part of the window with further fields. A detailed overview of **Request from User** options is available in *Request from User (RfU) variables on the next page*.

4. Once all the relevant data is entered into corresponding fields, click **OK** to finish the variable creation process.

Request from User (RfU) variables

All Request from User (RfU) variables are user-controlled. When this option is selected upon variable creation, the **New Variable** window expands with new options for variable configuration.



In order to successfully set up such a variable, you must enter the following information:

- **Allow User Values**: Lets users freely input values when prompted during report creation. This option can be used in combination with preset value lists or by itself.
- **Data Source**: Defines the type of the preset list of values that are offered for user selection. These options are available in the dropdown menu:
  - **Items**: The preset values are defined explicitly by the data designer in the **Items** list. For more details for the needed data, see *Select from a custom list of items on the next page*.

- **Data Columns**: Uses data source columns as a list of presets. This is used if you want to directly use content provided by the data source. For more details for the setup process, see *Select from data columns on page 40*.

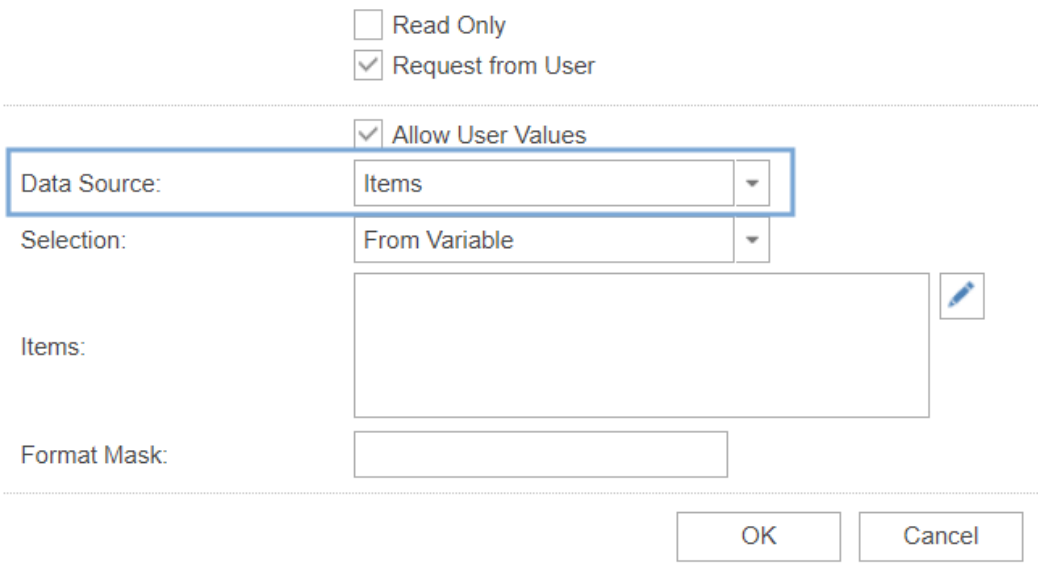
- **Selection**: allows the option to define an initial value. The user can leave it as is or enter a different value. The following options are available from the dropdown menu:
  - **From Variable**: Sets the chosen **Init by** option as the one initially displayed.
  - **First**: leaves the variable value field empty and sets the first value of the preset data source (which can be an Item or Data column) as the initially displayed value.
- **Format Mask**:provides an option for defining a format in which the items will be displayed to the user, and is dependent on the variable data type. In the case of *Datetime*, for instance, you can select between displaying both the date and time, only date or only time.

Additional options available in this dialog depend on the chosen **Data Source**. For options available when choosing the **Items** option as **Data Source**, see *Select from a custom list of items below*. For the options used when **Data Columns** is selected, see *Select from data columns on page 40*.

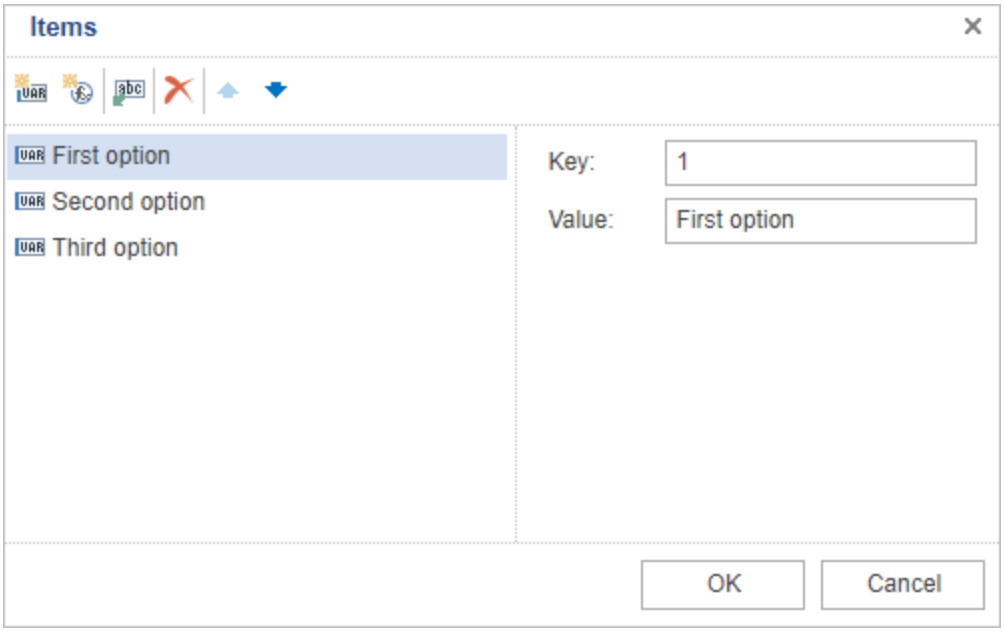
> **Note**
> In full report viewer, all the **Request from User (RfU)** variables are required by default, and the report will not render unless the variable values are submitted first. This is not the case in report preview mode. However, the variables, with the exception of *Datetime Range*, can be made optional. For details on making variables optional see *Making RfU list selection variables optional on page 42*.

Select from a custom list of items

Follow these instructions if you are creating a new user-controlled variable and you have selected **Items** in the **Data Source** dropdown menu in the **New Variable** window. If you have selected **Data Columns**, see *Select from data columns on page 40*.



The **Items** editing menu is accessed by clicking the **Items** field on the **New Variable** menu, or by clicking the pencil icon  next to the **Items** field. This opens a new window.



The toolbar provides several options for item configuration:

- **New Value**: used to add a new value item to the list.
- **New Expression**: used to define a new list item by using an expression.
- **Select Columns**: used to specify data source columns to be used as **Keys** and **Values.**

> **Note**
> It is not recommended to use **Items** as a data source selection if you need to modify columns, unless the existing data source list (from a column) needs to be edited (expanded or shortened). Using an edited existing data column facilitates completing the list by copying the column contents. When the data columns are selected, their contents are added to the list as single entries, which can then be edited. If complete columns need to be used, with no additional editing, it's better to use the **Data Columns** selection as the data source. See *Select from data columns on the next page*.

- **Delete**: deleting an existing list item.
- **Up/Down**: used to change the order of items in the list.

On the right side of the **Items** window are the input fields used to define values of the list items:

- **Key**: actual value of the selected item, used in the background for data manipulation.
- **Value**: GUI representation of the item. This is what the user sees and selects.

Note

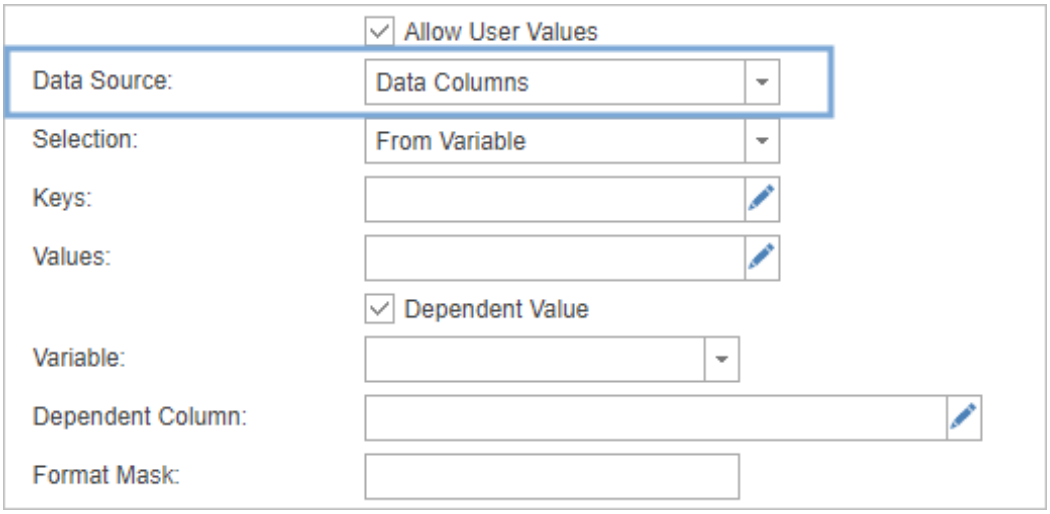
An example for setting different **Keys** and **Values** is using a table with city names and a unique numerical ID for each city, among other data categories. Users usually prefer selecting the city name from a dropdown list with full names, and not a numerical ID assigned to the city. However, in the report background calculations, it may be easier to work with a city's numerical ID, as opposed to its full name. In such a case, **Values** would be set to the city names, and **Keys** would be set to unique numerical IDs for each of the cities in the list.

The **Keys** and **Values** don't have to differ, they can be identical. In that case, the same content can be entered into both fields or **Values** can be left empty.

After entering all the relevant information in the required fields, click **OK** to continue.

Select from data columns

Follow these instructions if you are creating a new user-controlled variable and you have selected **Data Columns** in the **Data Source** dropdown menu in the **New Variable** window. If you have selected **Items**, see *Select from a custom list of items on page 38*.



Enter relevant data in **Keys** and **Values**:

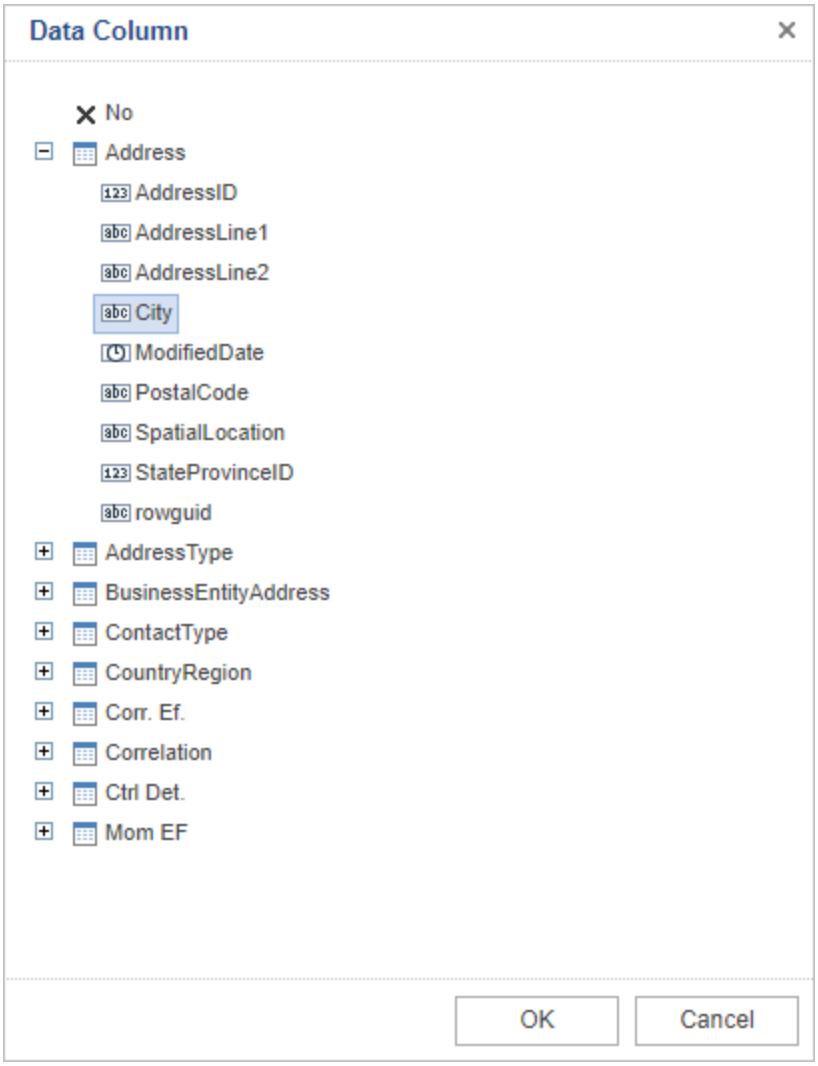
- **Keys**: Actual values of the selection, used in the background for data manipulation.
- **Values**: GUI representation of the selections - what the user sees and selects.

Note

An example for setting different **Keys** and **Values** is using a table with city names and a unique numerical ID for each city, among other data categories. Users usually prefer selecting the city name from a dropdown list with full names, and not a numerical ID assigned to the city. However, in the report background calculations, it may be easier to work with a city's numerical ID, as opposed to its full name. In such a case, **Values** would be set to the city names, and **Keys** would be set to unique numerical IDs for each of the cities in the list.

The **Keys** and **Values** don't have to differ- they can be identical. In that case the same content can be entered into both fields or **Values** can be left empty.

To modify **Keys** or **Values**, click the respective field or pencil icon next to the field you want to edit. This opens a new window:



Here you can locate the column (in its respective table) to be used as the **Keys** and/or **Values** data in a variable. Click No to remove the current column selection or click **OK** to continue.

If **Value** is selected in the **Type** dropdown menu in the upper half of the **New Variable** window, enter the following additional data as well:

- **Dependent Value**: Select this checkbox to filter the provided column-related selection content, depending on a separate **Variable** value.
- **Variable**: Reference to the variable used for selection filtering. Can be entered if the **Dependent Value** check box is checked.
- **Dependent Column**: Column of the data source related to the filtering variable. Can be entered if the **Dependent Value** check box is checked.

After entering all the relevant information in the required fields, click **OK** to continue.

When using dependent variables, make sure to also **include a condition in the query** that corresponds with this. Below is an example of how dependent values can be used.

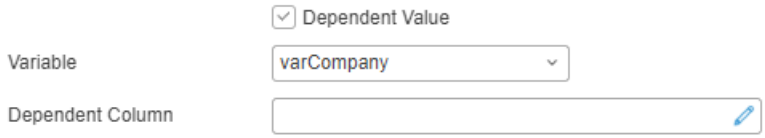
> **Caution**
>
> When using Dependent Values, the dependency needs to be defined both in the variable window AND in the query. Otherwise, the dependency will not work properly.

Dependent value example

Let's assume there are a number of contact centers (sites) across a variety of companies in your data set. Both of these can be used as filters in reports and they can both show all the available companies and sites in their respective dropdown lists, which you can then select as needed and use to filter data by in your report.

For number of reasons, such as facilitating viewing, you may want to create a dependent value, which will function in such a way that when you select a value in the Company filter, only the Contact Center values related to it will be shown in its filter dropdown menu, and only those values can be used as filters in the report.

This can be done by making the site a dependent value, that is, it becomes dependent on the Company variable (in this case):



After adding this option in the Contact Center variable (which is used as a filter in the report), a condition along the lines of the following also needs to be added to the query to ensure that the query, report and dependency functionality all work properly:

```
SELECT
    DM.site AS "site", <.... rest of the query ...>
WHERE {varCompany.Count == 0 ? "": "AND company IN (" + varCompany.ToQueryString("'")
+ ")"}
```

In this case, the WHERE condition ensures that if there is nothing selected for the company filter (varCompany), all contact centers (site) will be included in the report; if something is selected for the company filter (varCompany.Count is not 0), a condition is added to load only those sites that belong to the company or companies selected for the varCompany filter. That way, only the sites related to the selected companies are shown.

Once all these steps are completed and saved, the Contact Center filter becomes dependent on the Company filter, so that if one or multiple Company values are selected, only those Contact Center values related to the selected Company values will be shown in the Contact Center filter dropdown list.

Making RfU list selection variables optional

In Reporting, all **RfU (Request from User) variables** in reports are required (marked with *) by default. Reports connected to data models that include RfU variables, or reports that require RfUs themselves (defined in the report editor Dictionary), will not be rendered unless the viewer of the report submits a value for all required variables.

To allow viewers the possibility of filtering using variables, but not making it mandatory, it is possible to make most of the variables optional. The possibility to make a variable optional depends on the data **Type** field.

For example, with numerical values it is possible to use the **Nullable Value** nature of the value, and entering *0* in the **Value** field can represent *no selection* from viewers. However, the **String** data type cannot be used in combination with *Nullable Value*. If this combination is selected, a warning is displayed, and the selection is automatically changed to **Value**.

Simple string variable

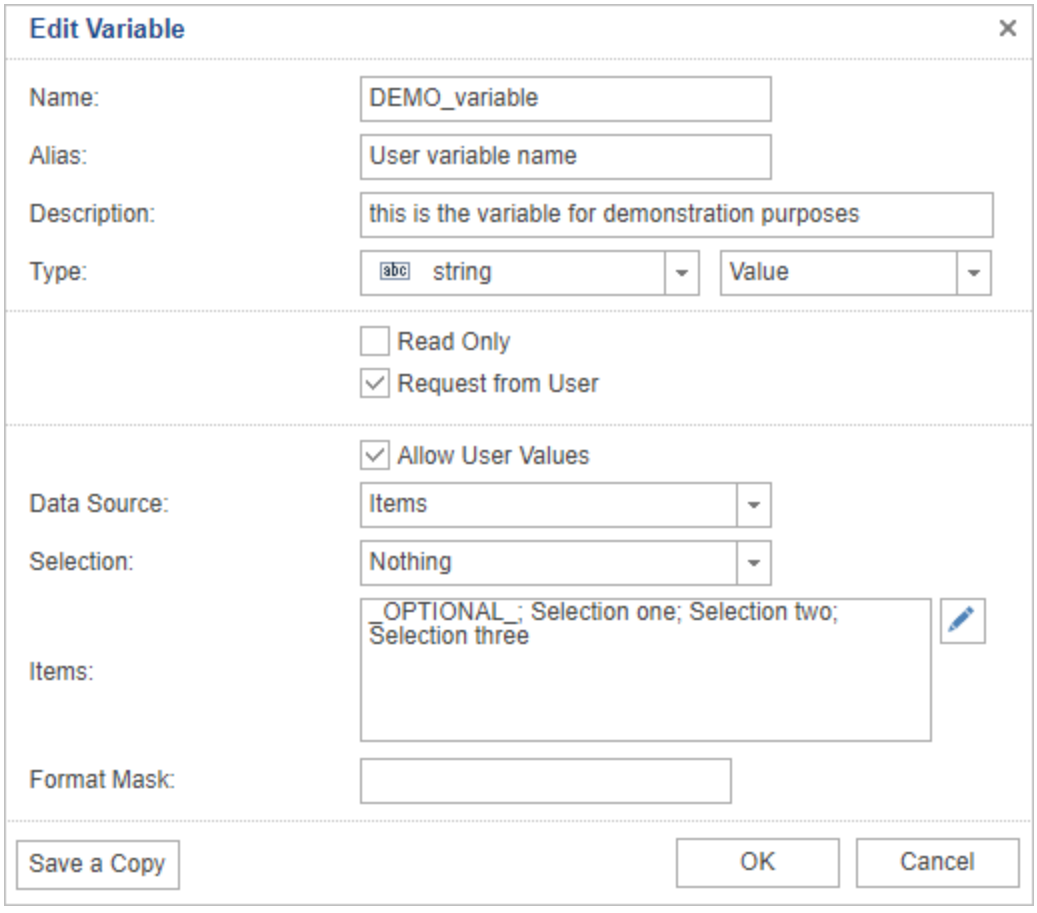
To make a simple string variable optional, the **Init by** field must be set to **Value**, and the keyword *_OPTIONAL_* should be added to the front of the **Value** field. If a default value is desired for the string variable, it should be added directly after the *_OPTIONAL_* keyword.

When viewing the report (not in preview, but in full view), the variable is not marked with the * symbol anymore, signaling that it is not required.

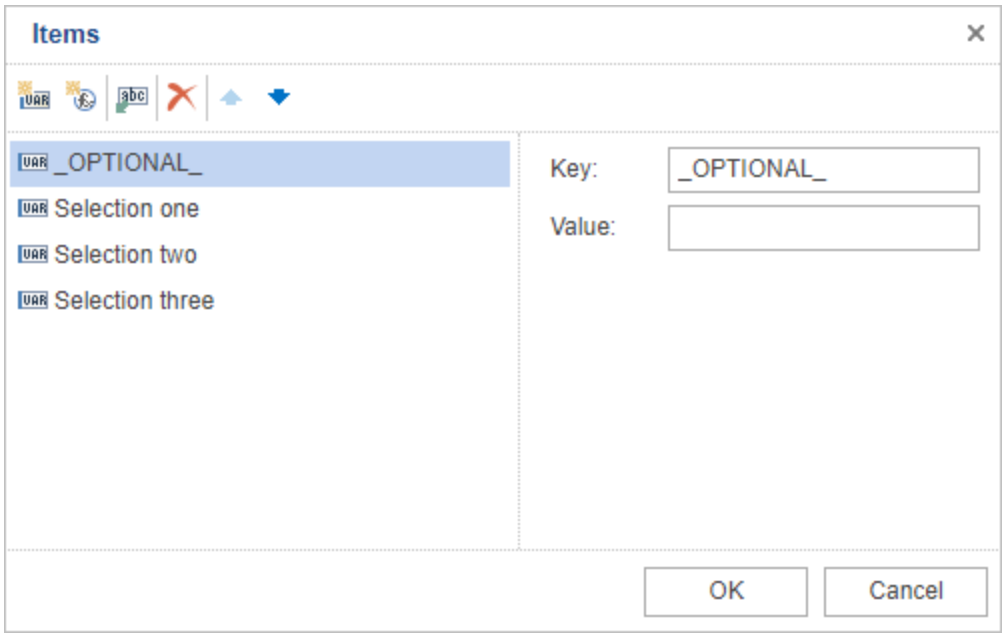
Select from a list of items string variable

When using a custom set of items as the selection list source, one of the items in the list should have **Keys** set to *_OPTIONAL_*, and **Value** should always display the default - *None* -.

Here is an example for this configuration:



After clicking the **Items** field or edit icon, **Value** is left blank in the new **Items** window.



For more details on the other settings for Items, see *Select from a custom list of items on page 38*.

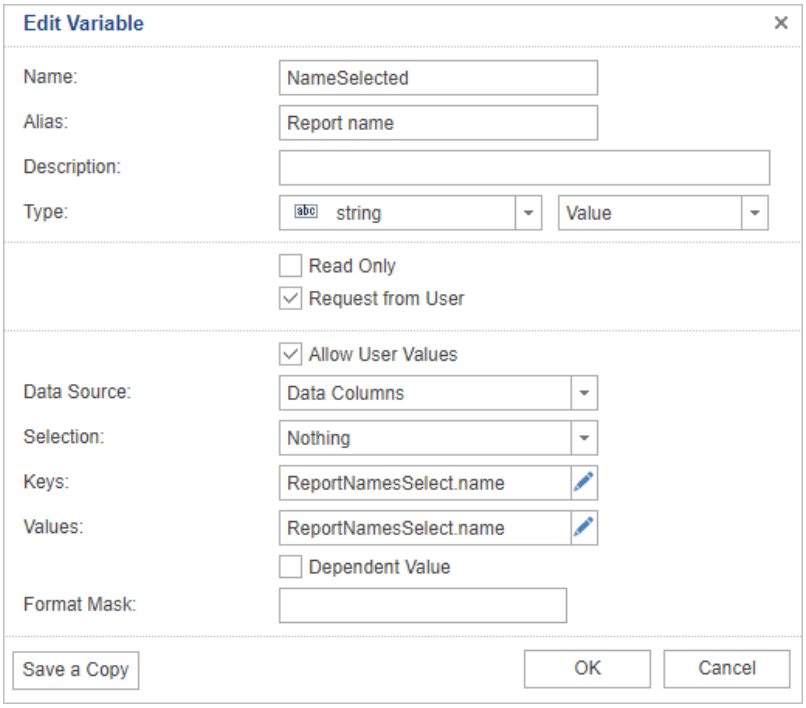
Select from a data column string variable

If the user is offered a list of items fetched from a data source column, then the data fetched from the column should be expanded with an additional record *_OPTIONAL_* that is offered for selection.

Here is an example query for the *ReportNamesSelect* data source that generates the *name* column. In this example, this is used as the source for the dropdown list a user sees when generating a report:

```
select '_OPTIONAL_' as name union select name from report order by name asc
```

The configuration for the related string select variable is as follows:



The non-selection is by default represented in the list as - *None* -.

> **Note**
> It is also possible to use a different data sources for **Keys** and **Values**, as explained in *Select from data columns on page 40*.

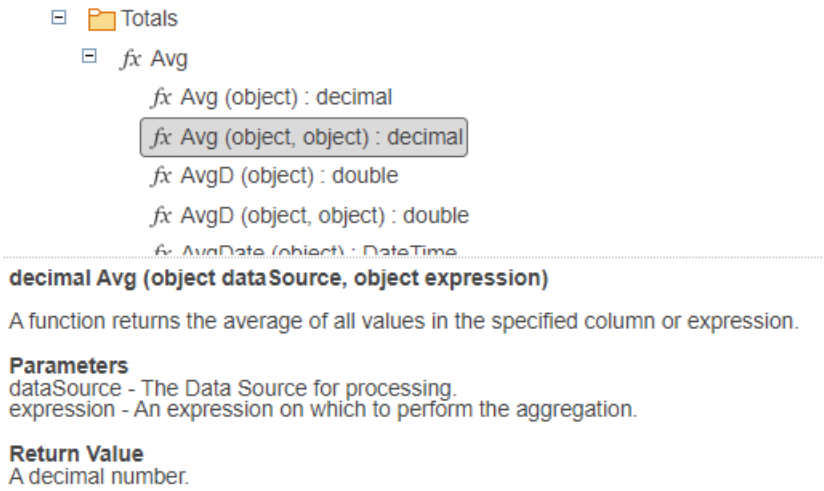
Select from a list of items numeric variable

The configuration for a numeric data type custom items list is very similar, the only difference being that **Key** has to be numeric. The keyword *_OPTIONAL_* is therefore entered in the **Value** field. The numeric **Key** related to the *_OPTIONAL_* **Value** will be *0* by default, and will be ignored.

Built-in functions

In Reporting, in the *Dictionary on page 27* you can find built-in functions that can be applied to your queries and reports. This category contains the elements using which you can, for example, calculate a specific total or return the desired value.

All elements of the Function category are divided into groups. When you open a functions folder, click on a function to see its short description, parameters (if available) and what the return value for the function is.



One of the folders is the EIBI folder, a set of custom Enghouse functions needed primarily for use in standard assets, for purposes such as, for example, converting timestamps into other formats of showing time. Each of these functions also contains a description with the needed parameters and sample return value and an example. These functions often also make use of the variables described in previous sections.

Functions in Reporting cannot be edited. Reporting currently does not support creating your own custom functions.

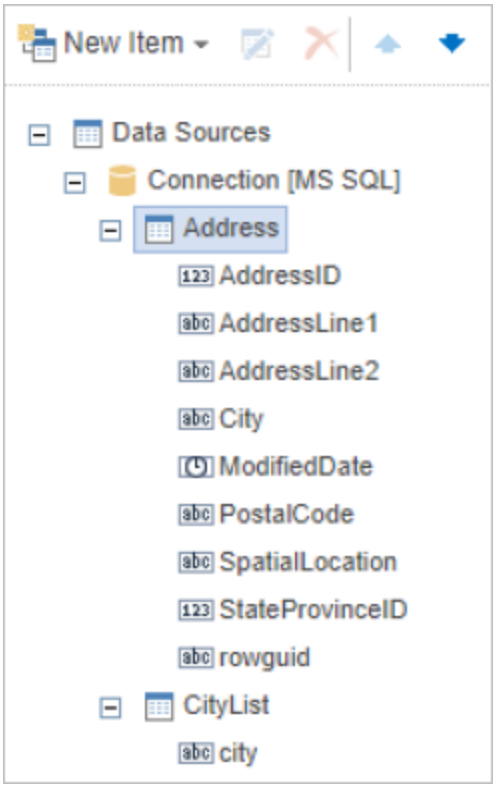
Data design good practice examples

This section is devoted to presenting good practice solutions to several standard problems associated with custom report production. The goal is to help ensure well-functioning background data organization so that report generation (described further in this Guide) can run smoothly.

Selection from a preloaded list

To complete Ex.2 from *Database queries on page 30*, a preloaded list of values needs to be created for the RfU variable. This requires a separate data source query that fetches all the elements that populate the selection list.

In the following image, the same database is queried for two different tables. The first table is *Address*, and the second is *CityList*. The latter is used in this example, so that a full set of available items (cities) is fetched from the given database. In this case, the database contains just one column, *City*, as seen in the hierarchical structure of the **Dictionary**.



The second table, *Address*, contains a variable query dependent on viewer selection from a preloaded list. It fetches several columns, but it is limited only to items (cities) that have been selected in the list (RfU variable). Using a list enables multiple choice as well. This significantly reduces the size of the final report dataset that is fetched from the data source, and increases the performance of the tool on the viewer end.

> **Note**
>
> A special custom function is needed to reformat the string value acquired from the RfU variable to a set of values (representing individual list items) required by the database query. This function is same as the one used in the Ex.3 in *Database queries on page 30*. Note that in the current version of Reporting, custom functions are not available. This feature will be available in the upcoming releases.

Filter data by user

If not all data should be accessible to all users, an additional table that defines the access level for every viewer should be set up in the data model. Take note that all these users are *Viewers* from the Reporting system's perspective, but additional sub-levels of authorization from the data security perspective can be set up if needed.

The relation between the tables can be based on the user identifier, such as *_reportViewerUsername*, *_reportViewerEmail* or the *_reportViewerId* which is Reporting specific.

In the following example, the report is populated only with data for a list of companies that the current viewer is authorized to access.

```
SELECT company
FROM companies as c
JOIN user_visibility as v on v.id_security_class = c.id_security_class
```

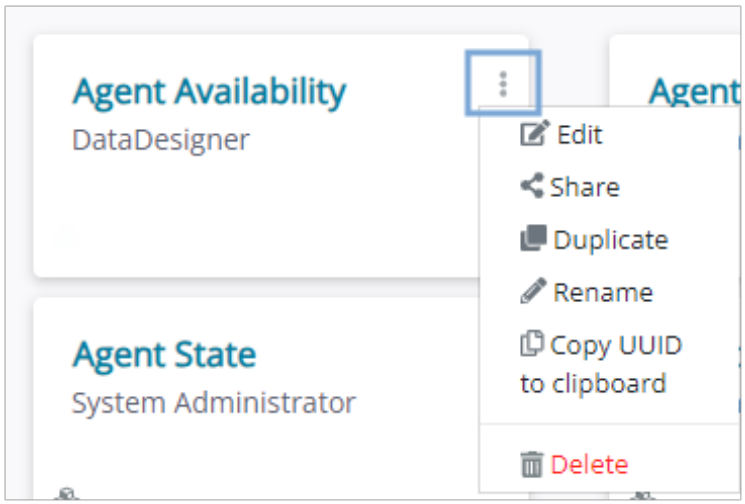
```
JOIN users as u on u.id_user = v.id_user
AND u.user_id = '{_reportViewerUsername}'
```

Data model sharing

The data model sharing option lets the **owner** of the data model grant access to other users or groups in Reporting.

It is located in the options menu for all owned data models in the data models list. To share a data model with other users, do the following:

1. Click **Options** ⋮ of an owned data model, then click **Share** in the dropdown menu.



2. In the **Search user or group** search box, enter the group name or individual user name or email address. If the asset is already shared with users or groups, you will see the list below the search bar.
3. Click the user or group you want to share the data model with.
4. Select one of the following sharing options from the dropdown list:

- **Can query**: The user or group gains permission to view or create reports that access any data included in the data model, but cannot access or change the parameters of the model or the data itself. Available for all user roles. Data Designers can also duplicate a data model (and become the copy's owner) if they are shared an asset with the Can Query access level.
- **Can edit**: The user or group can use and duplicate the data model and/or change the model parameters, but not share it with other users. Available only for Data Designers. This applies to users or a group a data model was shared with; if there are, e.g., Viewers in such a group, they will not be able to edit the data model, as this action goes beyond their role access level.
- **Make owner**: Ownership of the data model is transferred to the user. Current owner loses all access rights to the data model. Available for Data Designers and Administrators. The owner can share the asset with other users.

> **Caution**
>
> Transferring ownership cannot be undone by the original owner. It can be reversed only by the new owner or the tenant Administrator or System Administrator.

Existing sharing settings for each user or group can be modified (dropdown list) or deleted ( ).

Bulk asset sharing

If you use the tabular view , you can share and unshare the assets in bulk. To do so, follow these steps:

1. Select one or more assets in the table.
2. Click **Share** or **Unshare**.
3. Search for the user(s) or group you want to share or unshare the asset for.
4. For sharing, choose the access level you want to grant to the user(s) or group. The same rules apply as described in the section above. For unsharing, click next to the user(s) or group you want to remove access from.
5. When done with the changes, click **Share** or **Unshare** to shave your changes.

> **Note**
>
> - You need to have the relevant access level to an asset to be able to perform all of these actions. If you select any assets for which you do not have the needed access level (such as being the owner), you will not be able to perform the needed action for those assets. A warning message is shown in this case. If there are any assets left among the selected that you have the relevant access level for, you can proceed with the action for these assets only.
> - Hover over in the top part of the pop-up window to see which assets you are working with if multiple are selected.

Data model export and import

It is possible to export and import data models in the **Data** tab view of the Reporting.

Asset export

Using the tabular view , you can export individual assets or assets in bulk. To do so, follow these steps:

1. Select one or more assets in the table.
2. Click **Export**. All the assets to be exported are listed in this window.
3. Select **Include Universal ID** to include the unique ID of the selected asset in the exported data.

> **Note**
>
> The Universal ID is a unique string ID assigned to an individual asset within the Reporting instance. It is used to update an existing asset in the system with its versions created or modified outside the current system. Such a modified asset can be imported into the system to seamlessly replace an existing one via the Universal ID.

4. To confirm, click **Export**. The assets are bundled in a single file that is then downloaded to the default browser download folder, and can be accessed using the file browser.

During this procedure, a warning pops up saying that the data model connection strings (parameters) will not be included in the exported data model. This is a security feature, preventing unauthorized copying of database access parameters.

Data model import

To import data models into Reporting, you must do the following:

1. Click **Import** at the top right of the **Data models** window to start the importing procedure.
2. Choose the format for the data model file. Older Reporting versions use the *.mrt* format, while the newer versions are switched to the *.ebimodels* format. The format should correspond to the file that is being imported.
3. In the file browser, navigate to the file location and select it.

- A warning pops up stating that the data models that are about to be imported do not contain corresponding connection strings. Imported data models will not be functional until the connection strings are configured after import.
- The pop up also lists all the data models that will be imported.

4. Select **Replace existing datasource by Universal ID** to update the existing data model in Reporting with the imported data model. Leave cleared if you want to import a new data model. For more information on the Universal Datasource ID, see *Data Model Export*.
5. Click **Confirm** to finish the importing process. The imported data models contained in the file are imported and added to the **Data models** list in the **Data** tab.

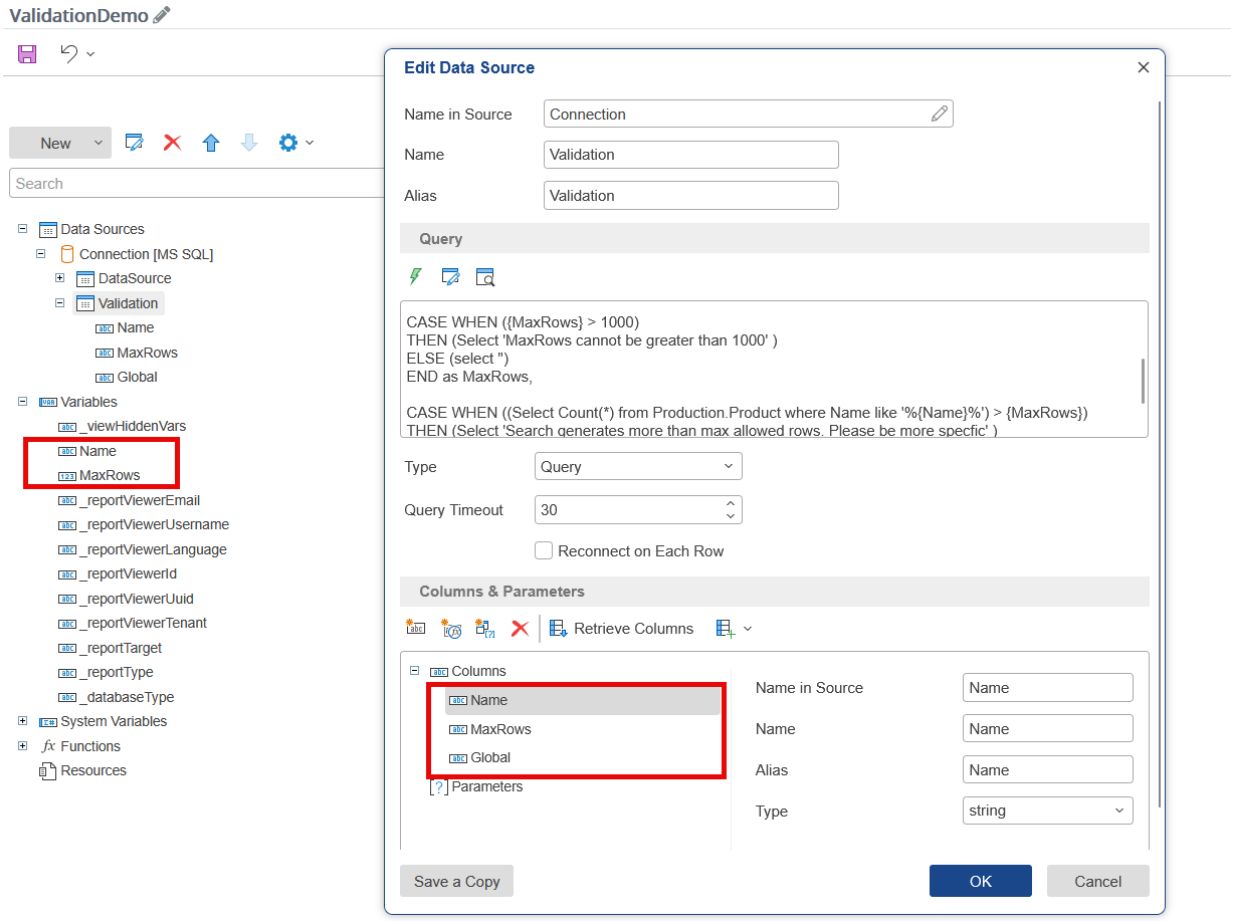
Validation

Validation ensures that filter values entered by users meet business rules before a report runs. In Reporting, you can create a validation data source that can be applied to your queries and reports. This data source enables you to define and validate the content a user introduces in the filters and settings.

This data source must be called **Validation** and its query must include columns bearing the **same name** as the variables we wish to validate. Additionally, the validation data source may include the **Global** column, which contains the global validation.

To create a validation data source, do the following:

1. Create a new data source and name it **Validation**. For more details on the setup process, see *Creating a new data model on page 17*.
2. Add a column with the **exact** same names as variables you wish to validate (see the **Name** and **MaxRows** variables and columns in the example below). For more details on editing the query, see *Data source editing on page 29*.



> **Caution**
> Column names must **exactly** match the variable names. Otherwise, validation will be bypassed.

3. In the **Query** section, specify how you validate each column. See the following example for the MaxRows column in SQL code:

```
CASE WHEN ({MaxRows} > 1000)
THEN (Select 'MaxRows cannot be greater than 1000' )
ELSE (select '')
END as MaxRows
```

4. You can optionally create a **Global** column. To do so, specify the Global validation column in the **Query** section. The following example shows that the global validation message uses the variables that we previously specified for the columns (such as the maximum number of rows and the name restrictions).

```
CASE WHEN ((Select Count(*) from Production.Product where Name like '%{Name}%') >
{MaxRows})
THEN (Select 'Search generates more than max allowed rows. Please be more specfic'
)
ELSE (select '')
END as Global
```

The data designer creates the data source and defines validation rules for each filter variable. Once the data source is defined, it will be used and validated when filtering the reports and the appropriate messages will be shown when and if necessary.

Reports

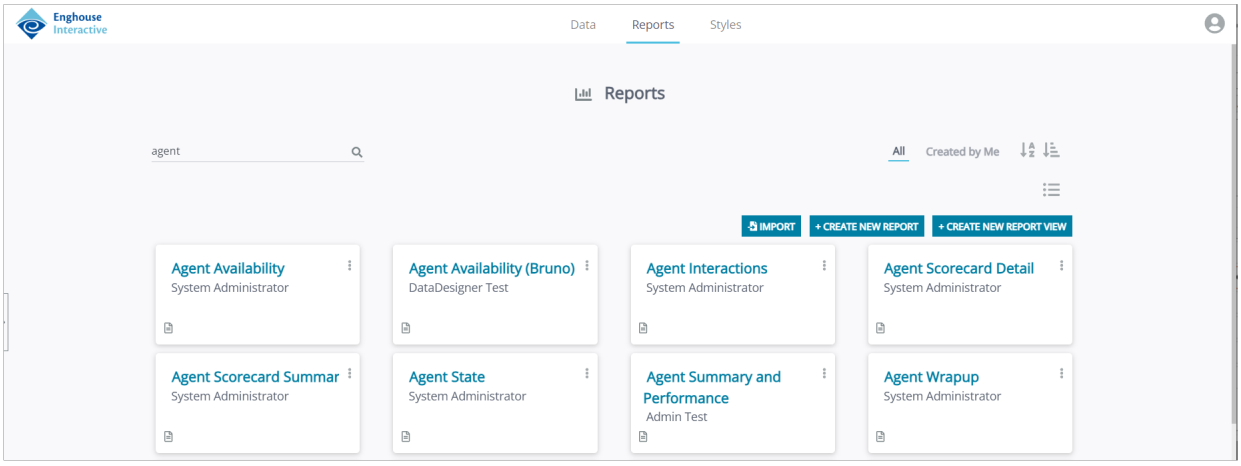
The **Reports** tab of the Reporting interface provides access to the reports management screen.

Reports and report views are connected to your data models to show you the data in meaningful ways. All the assets you can interact with, whether they were created by you or shared with you, are shown in the tiles of the **Reports** tab.

> **Note**
>
> A user's role defines the user's capability to edit reports and views or just view them. A user needs to either create a report or report view to be able to interact with it, or a report and report view (and the corresponding data source) needs to be shared with them by the owner or an Administrator.

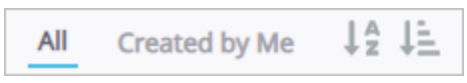
The owner of an asset is listed under the asset's name. Users can edit or duplicate an existing report or view, import assets from other Reporting instances or users, or create new ones.

- Click **Import** to import assets. Find out more about asset importing and exporting in *Report and report view export and import on page 100*.
- Click **+Create new report** to start working on a new report. See more on creating reports and working with them in *Report designer on page 57*.
- Click **+Create new report view** to start working on a new view. Read about working with report views in *Report views on page 89*.



You can use the search bar to search for a specific asset by name, as shown in the screenshot above. The search function is not case-sensitive.

The **Reports** tab also offers the following filtering and sorting options:



- **All**: Full list of all the assets available to the current user.
- **Created by Me**: List of only the assets created and owned by the current user.
-  : Sorting the listed assets by name (alphabetically) in ascending or descending order.
-  : Sorting the listed assets by creation date in ascending or descending order.

Click **Options** next to the asset name in the tile to see further actions you can perform with an asset. If a user owns reports or views, there is an extended options menu available for each of the assets.

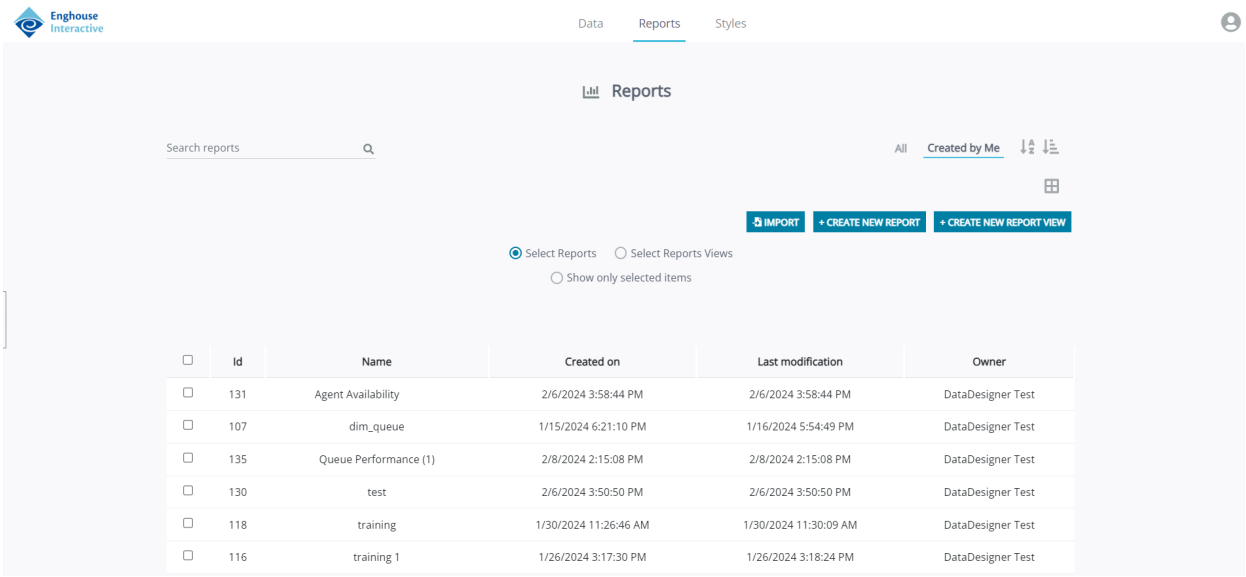
Depending on your shared access level, you can choose among the following options:

- **Subscribe**: Set up the automated report delivery. For details refer to *Automated report delivery on page 103*.
- **Edit**: Go to the **Editor** to edit the asset, its content, structure, filters etc. See more in *Report designer on page 57* for reports and *Report views on page 89* for views.
- **Share**: Manage asset access for other users (viewing, editing or ownership transfer). See *Report and report view sharing on page 98* for more information.
- **Duplicate**: Makes a copy of an existing asset. The new asset can than be edited separately from the original and is owned by the user who copied the asset.
- **Rename**: Modify the title of the report or view.
- **Copy UUID to clipboard**: Copy the unique ID of the asset to your clipboard. This is needed, for example, for master-detail report relationships.
- **Delete**: Deletes the selected asset.

> **Caution**
> Deleting an asset **cannot be undone**. Always check before confirming this action.

> **Note**
> If a report selected for deletion is connected to report views, the views should be mapped to a replacement report before starting or finishing the action. The mapping can be postponed for a later time, but the view will not be functional until it is mapped to a new report (and adjusted as needed).

Furthermore, you can also choose to see the **Reports** tab in a tabular form. You can switch to this mode by clicking  . The asset list is then shown as follows:



Here you can see the most important data about the assets, such as the UUID, name, relevant dates and the owner. In the first column of the table, you can select all or just some individual assets. To show only the selected items, click **Show only selected items** above the table. You can switch between showing only reports or only views by selecting either **Select Reports** or **Select Report Views**.

Each asset row also has the **Options** menu at the right-hand end of the column. Here you can see the same options as described above.

Additionally, when you select one or more assets, additional options are shown for the multiple selected asset (s):

- **Share**: Share the asset with other users or groups. See *Report and report view sharing on page 98* for further details.
- **Unshare**: Remove the access rights from users or groups. See *Data model sharing on page 48* for further details.
- **Delete**: Delete the selected asset(s). You must be the owner of an asset to be able to delete it. If there are any assets among the selected that you do not own, a warning message will be shown to indicate which assets the action will not be performed for.

> **Caution**
> Deleting an asset cannot be undone. Always check before confirming this action.

- **Export**: Export the selected asset(s). See *Report and report view export and import on page 100* for further details.

Note

- You need to have the relevant access level to an asset to be able to perform all of these actions. If you select any assets for which you do not have the needed access level (such as being the owner), you will not be able to perform the needed action for those assets. A warning message is shown in this case. If there are any assets left among the selected that you have the relevant access level for, you can proceed with the action for these assets only.
- Hover over  in the top part of the pop-up window to see which assets you are working with if multiple are selected.

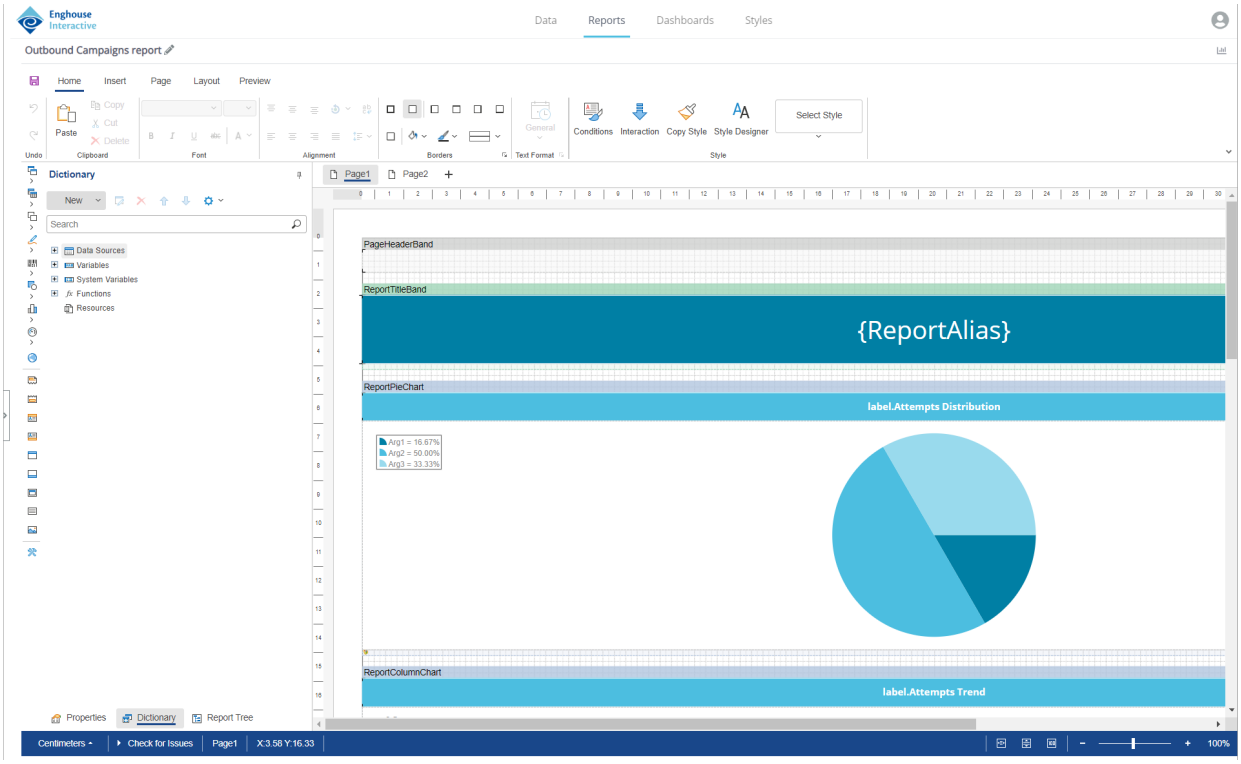
To turn the tile view back on, click  under the sorting tools in the upper right section of the **Reports** tab.

Report designer

The **Report Designer** is a part of Reporting dedicated to the creation, modification and publishing of visual and paginated reports.

In this section, you can find:

- Key features and tools of the report designer
- Components needed to create reports.

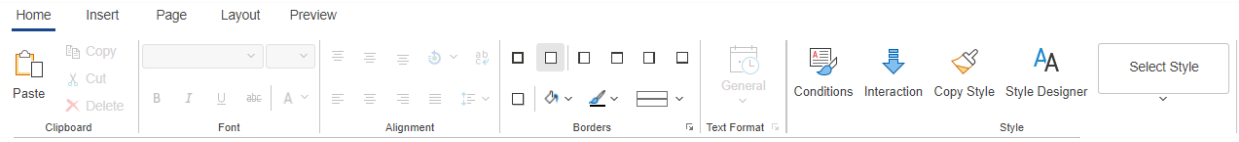


The report designer provides five different toolbar tabs in the upper part of the screen: **Home**, **Page**, **Layout**, **Insert** and **Preview**. Many of the options included therein are similar to options found in standard text-editing software.

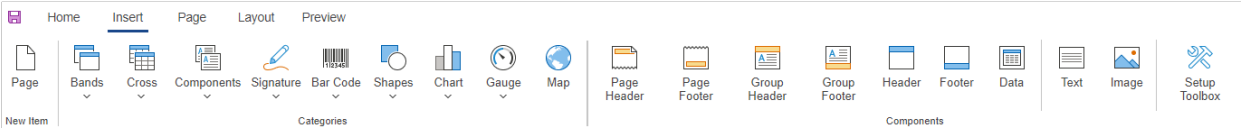
> **Note**
> All options are object-dependent and not all of them may be available for your current selection.

- **Home**: This tab contains typical customizing tools arranged into categories:
  - **Clipboard**: Contains basic actions, such as **Paste**, **Copy**, **Cut** and **Delete**.
  - **Font**: Edit font stylization, such as the selection of the font, the size, and other decorations (e.g., bold).
  - **Alignment**: Define the alignment of the text and other elements. Includes additional options, such as word wrap and spacing.

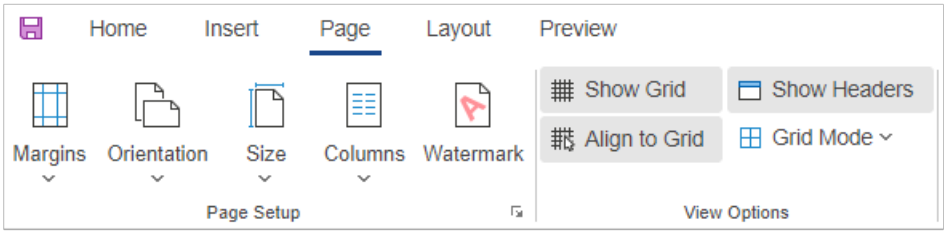
- **Borders**: Adjust the borders of the report components, including their color and type, or add a shadow to a component.
- **Text Format**: Change the format of the text in your report to visualize it as needed, such as a string, currency, date, or other formats.
- **Style**: Working with report component styles. Described in more detail in *Styles on page 96*.



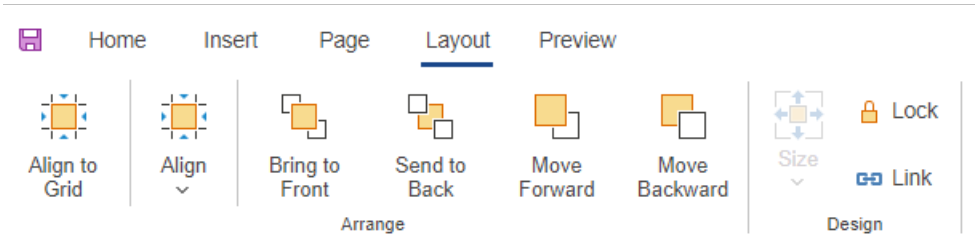
- **Insert**: Contains the objects that can be added to your report. These are explained in more detail in *Paginated report on page 66*.



- **Page**: This tab contains options important for the print page setup, as well as **View Options** for dashboard editing.
  - **Margins**: Specify the margins of your (printed) report.
  - **Orientation**: Define the paper orientation of your (printed) report.
  - **Size**: Choose the size of your report. You can select one of the predefined paper sizes or specify a custom one.
  - **Columns**: Select up to three columns for your report.
  - **Watermark**: Set up a watermark and its settings for the report.
  - **Show grid**: Choose whether you want to show the grid in the background of the report. Useful e.g. for aligning elements.
  - **Show headers**: Choose to show or not show header bands placed in the report.
  - **Align to grid**: Toggle on to automatically snap all components to the grid lines.
  - **Grid mode**: Choose between showing a grid with lines or dots.



- **Layout**: Tools for precise object positioning in your report. If you select multiple components, you can use the **Size** option to adjust the sizes to be the same as the first selected component.



- **Preview**: Allows you to preview and check the look of your design for the report as the end-user will see it, without all the toolbars and designer options.

> **Note**
>
> The only significant difference between the Preview view and an end-user's view is the **Filters** pane, which is located on the right hand side of the screen for the viewers, but in **Preview** mode it is shown on top of the report screen. Some background functions are also affected, as mentioned in previous chapters.

In the top right corner of the **Report Designer**, there is **View report**. This opens the report in the form that the end-users and Viewers see it in (as opposed to a preview).

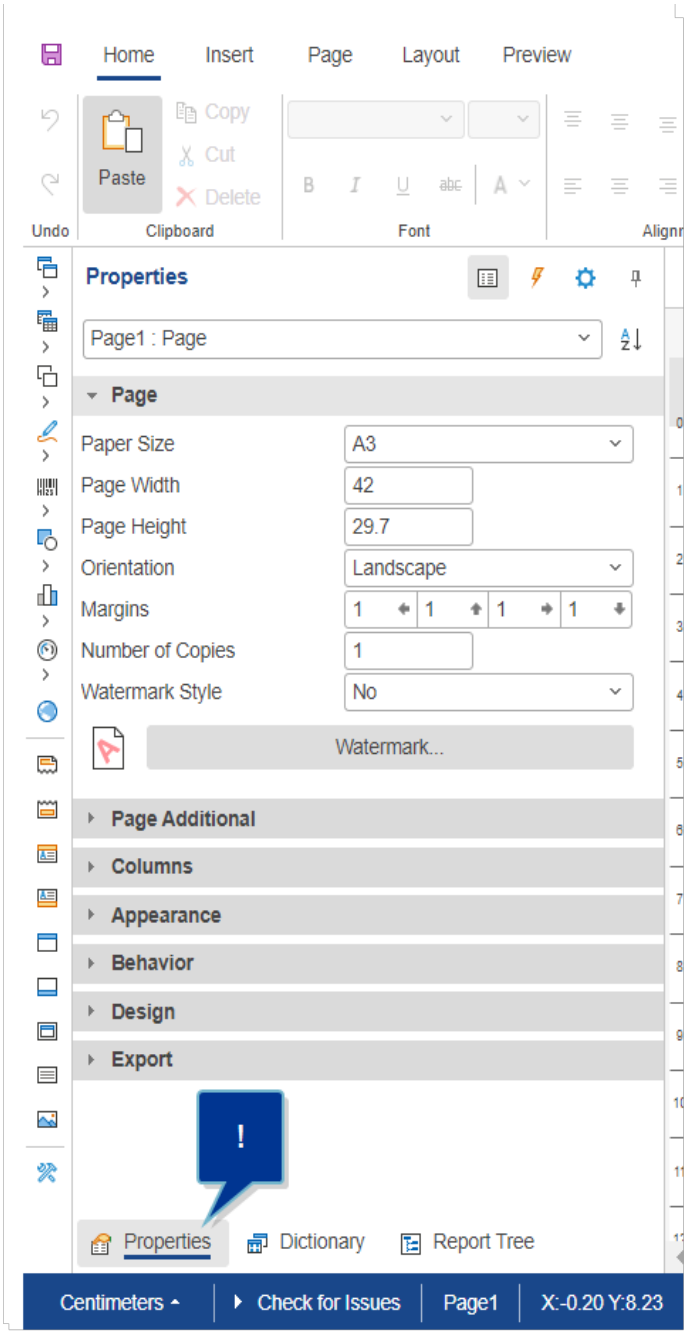
To save a newly created report or modifications of an existing one, click **Save** at the top left-hand corner of the Report designer.

Report designer pane

The Report designer includes a special pane covering additional options needed for report design. The pane is located on the left-hand side of the window and its three tabs are in the bottom of the pane.

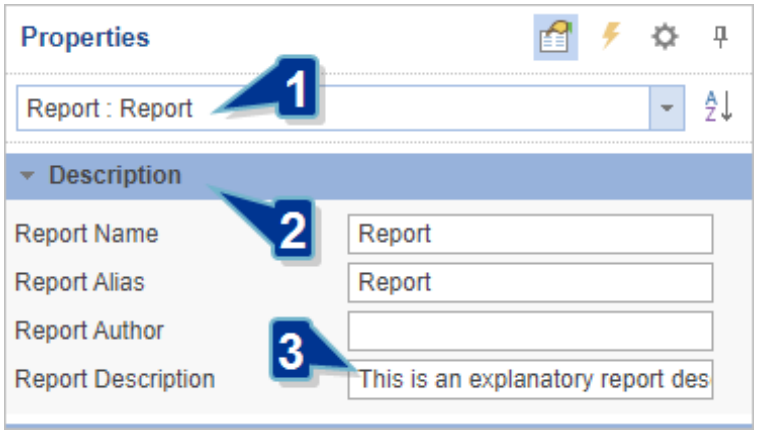
The pane consists of these three tabs: **Properties**, **Dictionary** and **Report Tree**.

- **Properties**: This tab provides access to contextual properties for the selected objects, or the dashboard/page properties if none of the objects are selected. The editable properties listed in this tab vary depending on the selected object. To select an object, locate it in the dropdown menu in the top part of the **Properties** pane.



To enter a report description (to be displayed for viewers in **Report Details**), do the following:

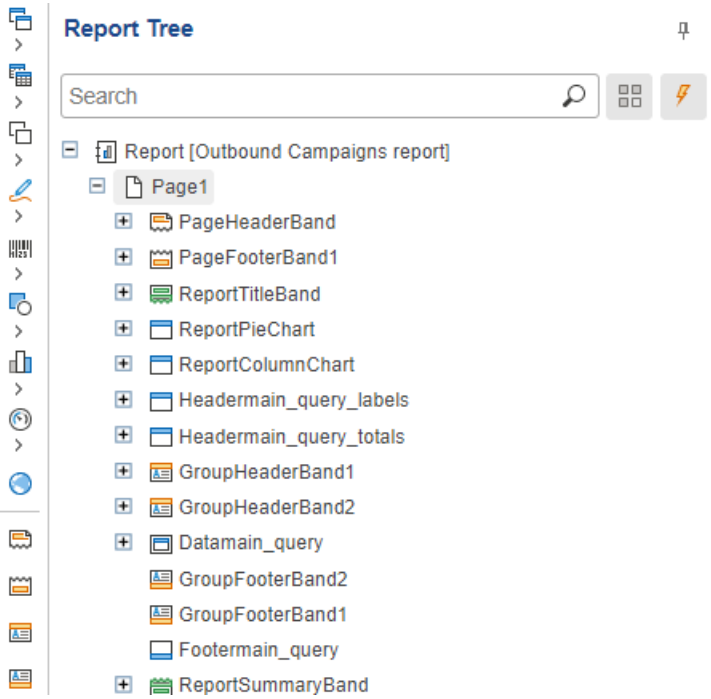
- In the dropdown menu in the **Properties** tab, navigate to the top-level report and click it.
- Select the **Description** section.
- Enter an appropriate description for the report in **Report Description**.



- **Dictionary**: Shows the connected data, available data sources, system variables and functions as they are shown in the data model editor, provided appropriate permissions are given to the Designer of a report. To read more about the options available in the **Dictionary**, see *Dictionary on page 27*.

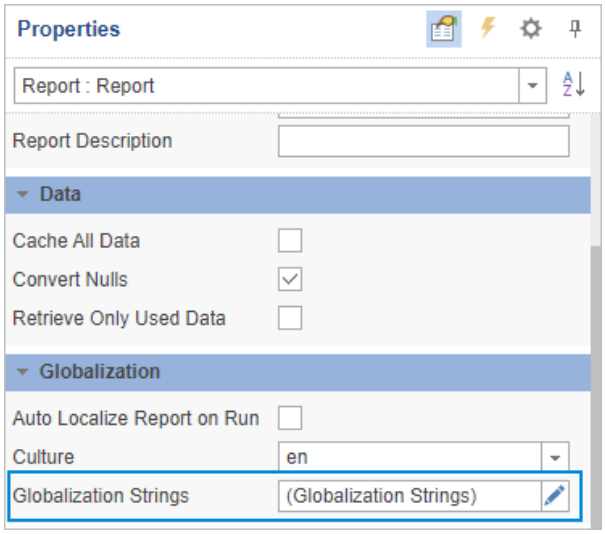
> **Note**
>
> Some options described in *Dictionary on page 27* may not be available withing the Report Designer, as they are actions performed by Data Designers.

- **Report Tree**: Shows the hierarchy of the report. All the components of a report are shown in the form of a tree hierarchy. In addition, if an event handler is added to the component, it will also be displayed in the hierarchy of the report.



Localization of the static report parts

The static parts of the report can be localized by translating them using an additional table. This table is included in the data model as an extra resource. Individual elements suited for localization can be identified through the **Globalization editor** located in the **Designer pane** under **Properties**.



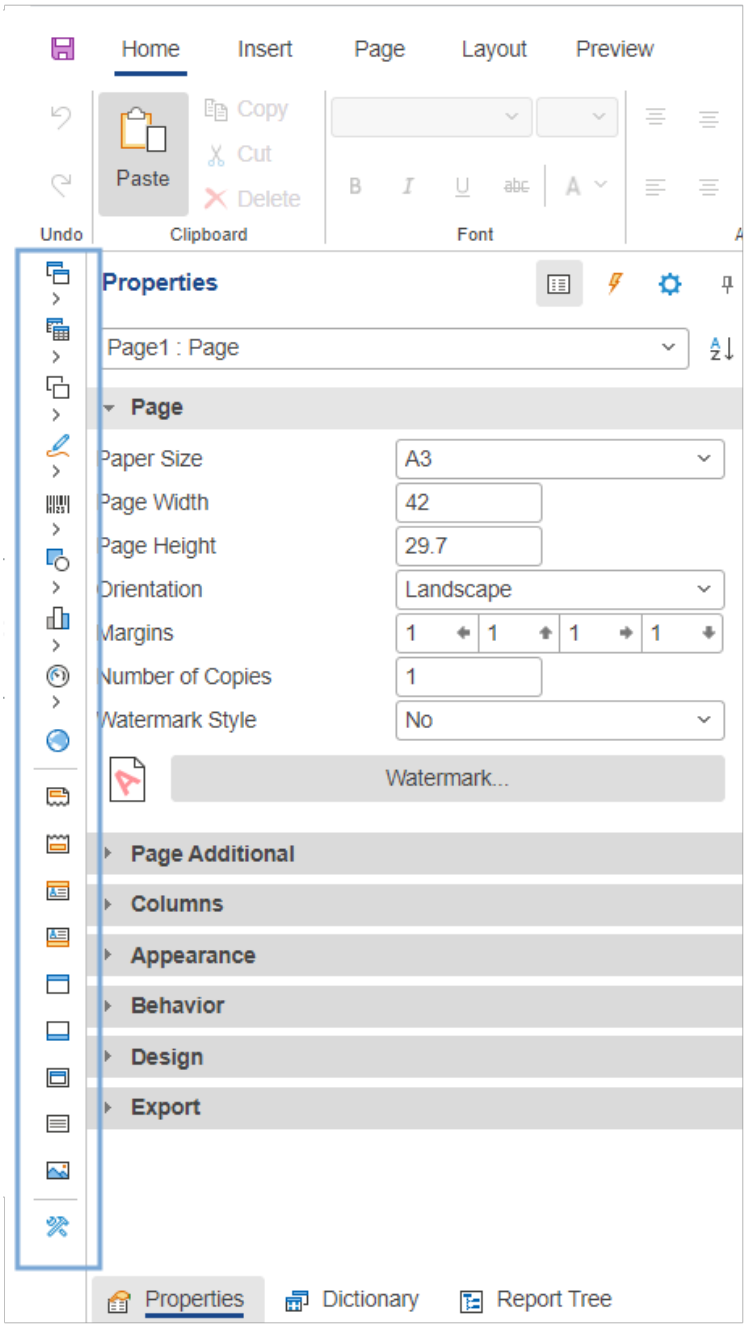
To partially automate the localization, the *_reportViewerLanguage* variable can be used. The output data needs to be joined with the additional translation table in order for it to be translated.

A query that includes the translation of the *productivity* field using an extra *resource_bundle* translation table would take the following form:

```
SELECT
IFNULL(rb.value, p.productivity) AS productivity
FROM productivities AS p
LEFT JOIN resource_bundle AS rb ON rb.string_id = p.productivity
AND rb.language = '{ _reportViewerLanguage }'
```

Report designer toolbox

The Report designer also includes a **Toolbox** on the left side of the window which is used for quicker access to data visualization elements, data bands etc. The Toolbox is located next to the **Designer pane**, on the left edge of the window.



Through the **Toolbox**, you can quickly add visualization or band elements to your reports. To use an element, drag it from the Toolbox into your active page or dashboard and place the element.

The **Toolbox** can also be customized to show the tools you choose. To do this, follow these steps:

1. Click **Setup Toolbox** in the **Toolbox** itself or in the **Insert** tab of the Report designer.
2. A new window opens, showing you a list of options for the **Toolbox**. Select the checkboxes next to the tools and visualization elements you want to be displayed in the **Toolbox**.

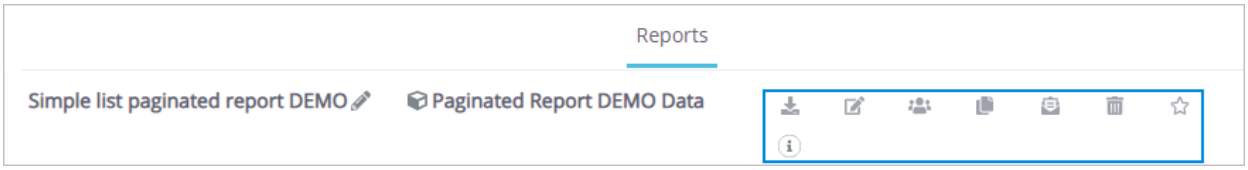
3. You can also choose to not show the **Toolbox** or the **Insert** tab here by clearing the **Show Toolbox** or **Show 'Insert' Tab** checkboxes.

> **Note**
> You cannot clear both the **Show Toolbox** and the **Show 'Insert' Tab** check boxes. If one is already cleared and you attempt to clear the other, the first is automatically checked again.

4. To confirm your choice, click **OK**. The various tools and options will be displayed depending on whether you currently have a page or a dashboard tab open.

View report

When viewing the report from the Viewer perspective, additional options are available via buttons at the top right corner of the **Report** window:



The availability of the buttons depends on the user's access level for the report.

- **Edit**: Return to the **Report Designer** view.
- **Share**: Manage report access for other users (viewing, editing or ownership transfer). See more in *Report and report view sharing on page 98*.

> **Note**
> In order for other users to generate a report, the relevant data model (for the report) also needs to be shared with them on the same level as the report. This is done by Administrators or Data Designers.

- **Duplicate**: Produce a copy of the current report. If you wish to use a report as the basis for another one, or you want to let someone else use it while preserving the original, you can make a duplicate of the report and change it as needed, or transfer ownership of the copy to other users. A copy requires a unique name. By default it retains the same name with an addition of the first available numeral. It is placed in the same folder as the original report.

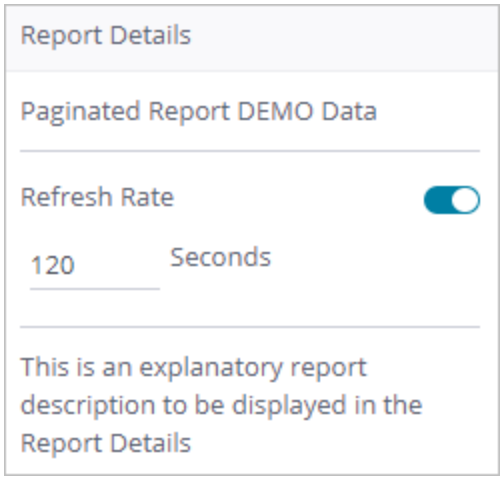
> **Note**
> You can create duplicates of the reports that are shared with you. The user who creates the duplicate becomes the owner of the duplicate report.

- **Subscribe**: Set up the automated report delivery. For details refer to *Automated report delivery on page 103*.

- **Delete**: Delete the report. This action can only be performed by the report owner. Users that the report was shared with will also lose access to the report.

> **Caution**
> Deleting a report is permanent and **cannot be undone**. A deleted report can only be restored with a backup (exported instance). Take extra care when deleting reports.

- **Favorite**: Toggles the report as favorite/non-favorite. Refer to *Favorites on page 102* for more details.
- **Report Details**: Provides details on the last refresh and an option to set an automatic refresh rate. After it has been generated and displayed, the report can be refreshed manually or automatically. If the report designer provided a description of the report, that description will show here.



Paginated report

Reporting paginated reports consist of multiple pages with fewer visualization elements used to display information in form of data or tables. Paginated reports are done in pages in the Report designer. The paginated report panel is created in the Report designer, and viewed in the preview panel in the Report designer, or in the Report viewer. Creating a paginated report, and organizing data display in it, is based on using **Bands**.

Paginated report bands

Bands are used in paginated reports to separate the report into functional units that share some common properties.

There are several different types of bands available, that cover most of the usual needs for creating reports:

- **Report Title**: Used to output the report title. It is rendered at the beginning of the report.
- **Report Summary**: Used to output summary data throughout the entire report. It is rendered once at the end of the report.
- **Page Header**: Used to output the page header or footer, i.e. page numbers, dates or other additional information. It is rendered on the top/bottom of each page.
- **Group Header**: Basic (minimal necessary) band for rendering reports with grouping. The distinctive group information components are placed in the group header. Usually they contain the group name, dates, conditions of grouping or similar information. This band is rendered once at the beginning of each group.
- **Group Footer**: Used to display the group footer information. It is placed after the relevant **Data band**, which needs to be paired with a corresponding **Group Header**. Unless the **Group Footer** is linked to a corresponding **Group Header** (numbered automatically when added to the page), it will not be displayed.
- **Header/Footer**: Used to output a custom header or footer. It is used with an individual data band.
- **Column Header/Footer**: Used to output column headers and footers. It is rendered only once, but all the contained components are printed above or under each column.
- **Data**: Connected to a data source and is printed as many times as there are available rows in the data source.
- **Hierarchical Data**: Connected to a data source and is printed as many times as there are available rows in the data source. The data is structured in a tree form.
- **Child**: Can be used to print two bands on one data row.
- **Empty Data**: Used to fill free space on the bottom of the page. It fills free space on each page of the report.
- **Overlay**: Used to print watermarks on the page.

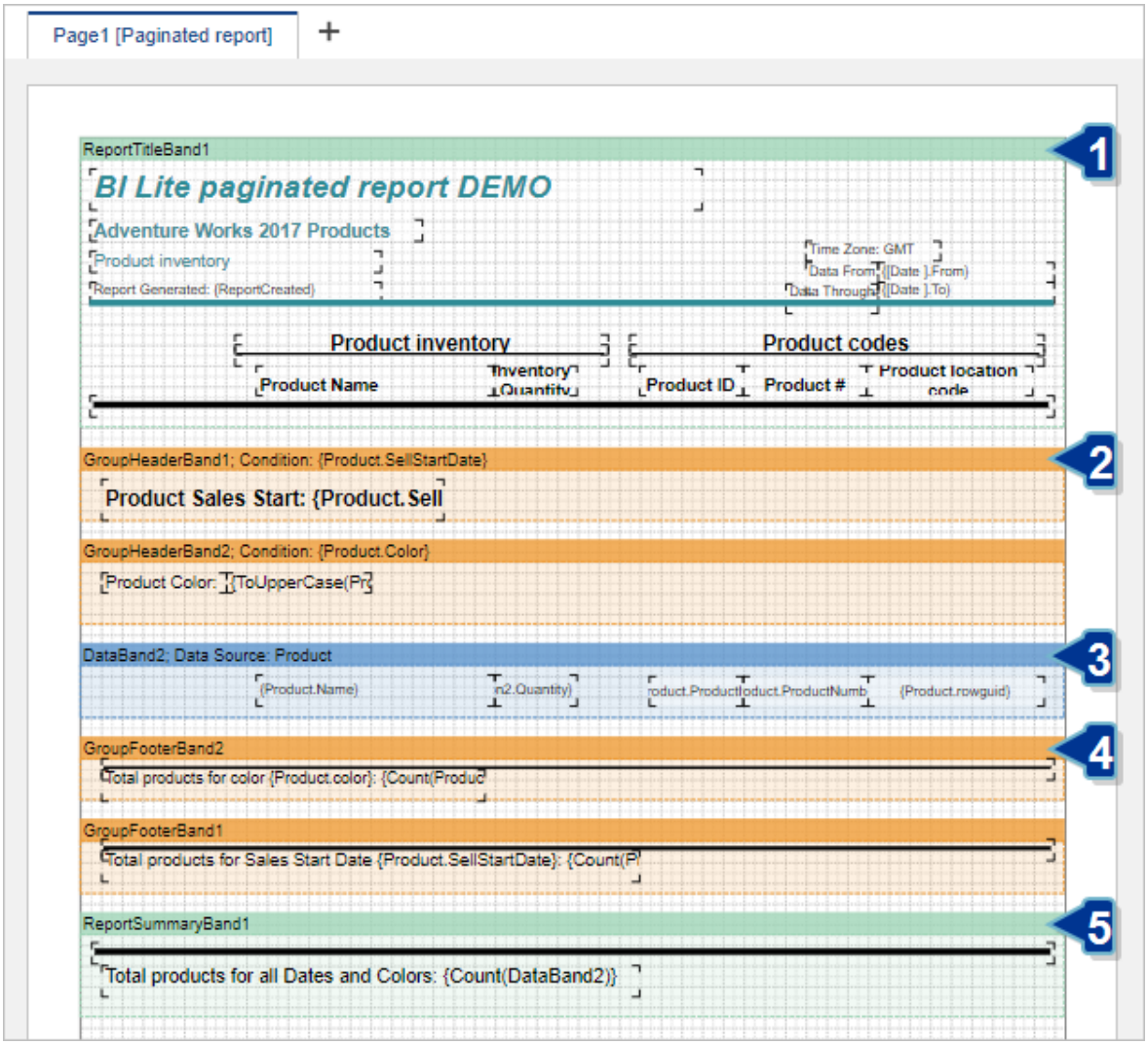
Different band types are marked by different colors and automatic naming conventions. Some elements are automatically placed in a logical position when placed onto a page. For example, a **Report Title** band will always be placed on top of a page, or a **Page Footer** band will always automatically be placed at the bottom of a page.

Bands use overview

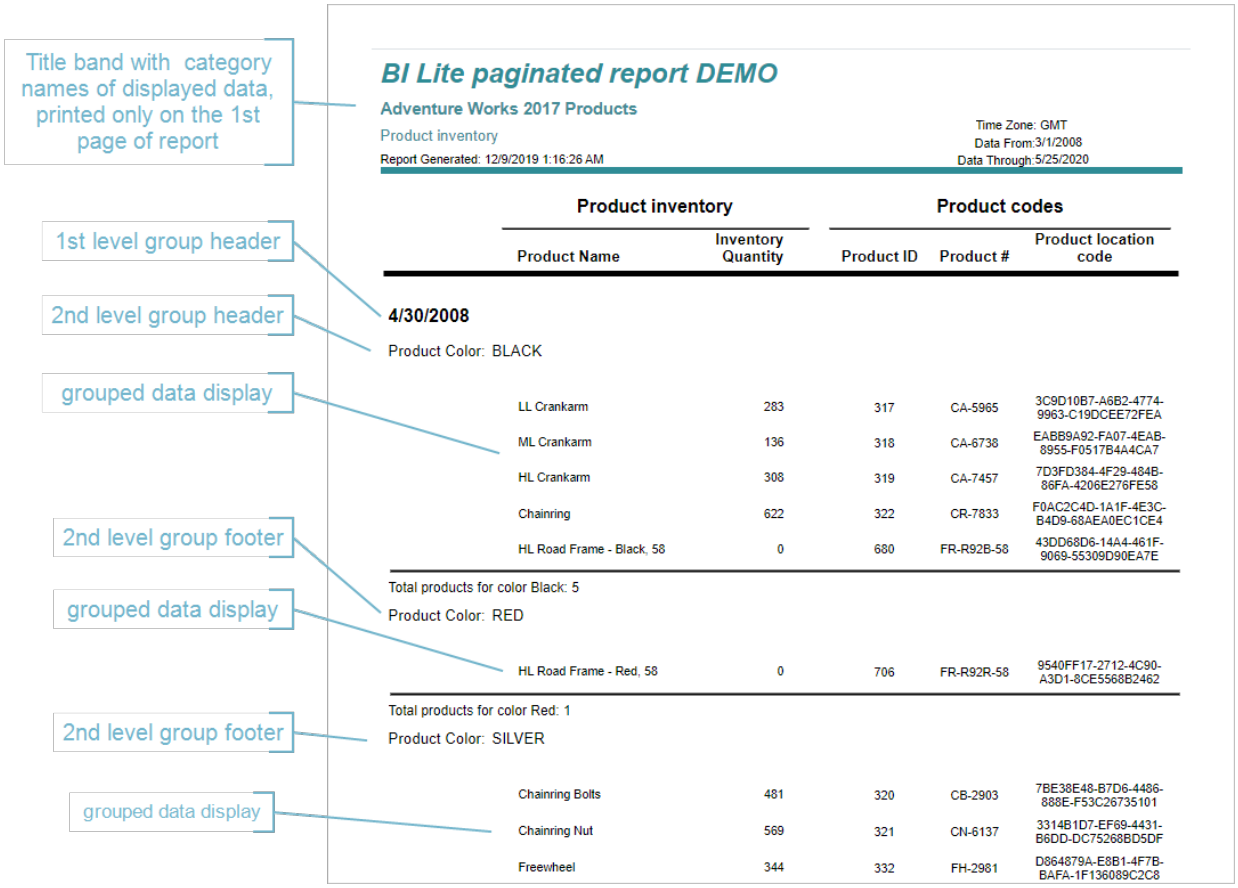
In the following example, the *Paginated report DEMO* is used to illustrate band usage. For details on designing this type of report please refer to the *Paginated report example on page 74* section of this Guide.

These are the standard band types and their use:

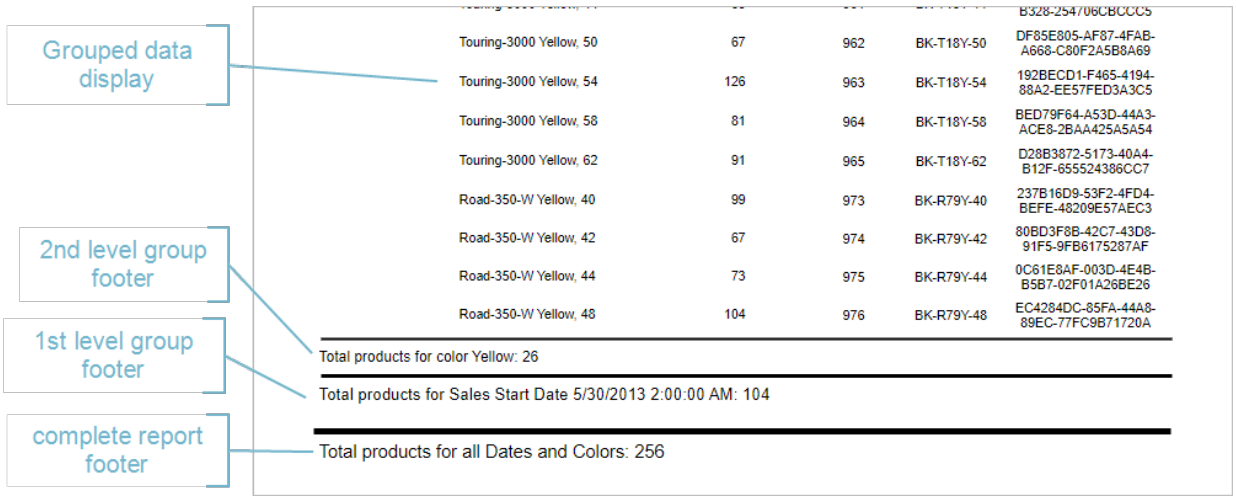
1. The top of the page presents a turquoise **Title band**. It displays general report information and descriptions of the displayed data (category names).
2. Following is a pair of ocher **Group header** bands. The example report includes two-level grouping - by *Date* and by the *Product Color* category. The group headers are numbered in the order of adding to the page, and their label includes the grouping condition.
3. The light blue **Data** band is placed under *GroupHeaderBand2* and is therefore named *DataBand2*. The label also includes the relevant data source used to fetch the displayed data. The data band is directly linked to *GroupHeaderBand2*. However, it is also indirectly linked to *GroupHeaderBand1* which encloses both *GroupHeaderBand2* and *DataBand2*. This results in the two-level grouping described in the previous point.
4. The following ocher **Group Footer** bands are used to print summary information for the second and first level of grouping. They are directly linked to the corresponding **Group Header** bands (same numeration). The *GroupFooterBand2* summary information (grouping by color) is printed for each color group separately, while the *GroupFooterBand1* summary information is printed for each separate date, which includes all the colors available for that date.
5. Finally, the green *ReportSummaryBand1* displays summary information for the complete report (including all colors over all dates).



The resulting report first page section looks like this:



A section of the report's last page displays the rest of the report components, such as group and report footers:

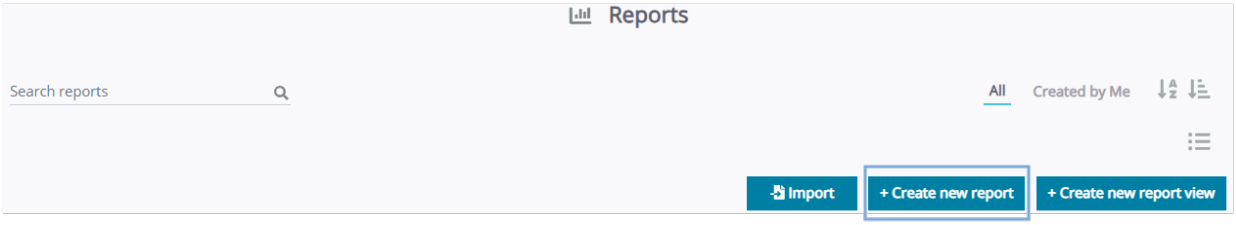


Simple paginated report

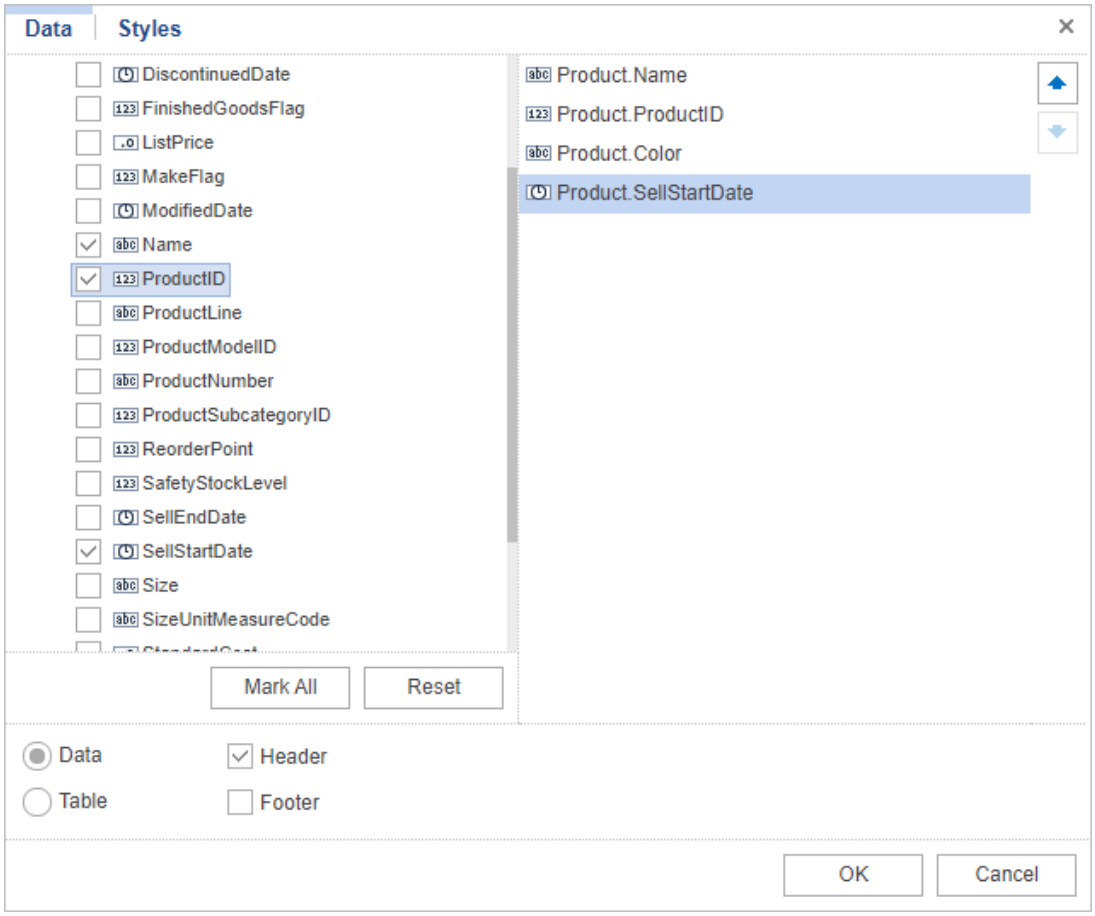
In order to create a simple paginated report, a data source needs to be defined and available for querying to a Designer level user. All the following examples are based on the *Paginated report DEMO data* data source that is shared for querying with the user creating the report. For further details on paginated report designing, see *Paginated report example on page 74*.

To create a simple paginated report, follow these steps:

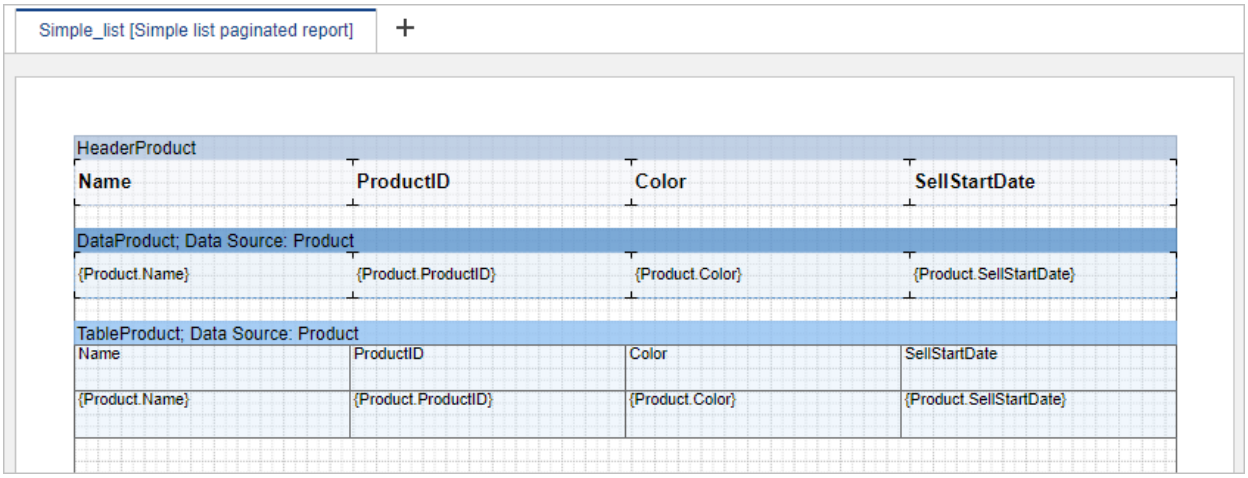
1. In the **Reports** tab of Reporting, click **+Create new report** located at the top right corner.

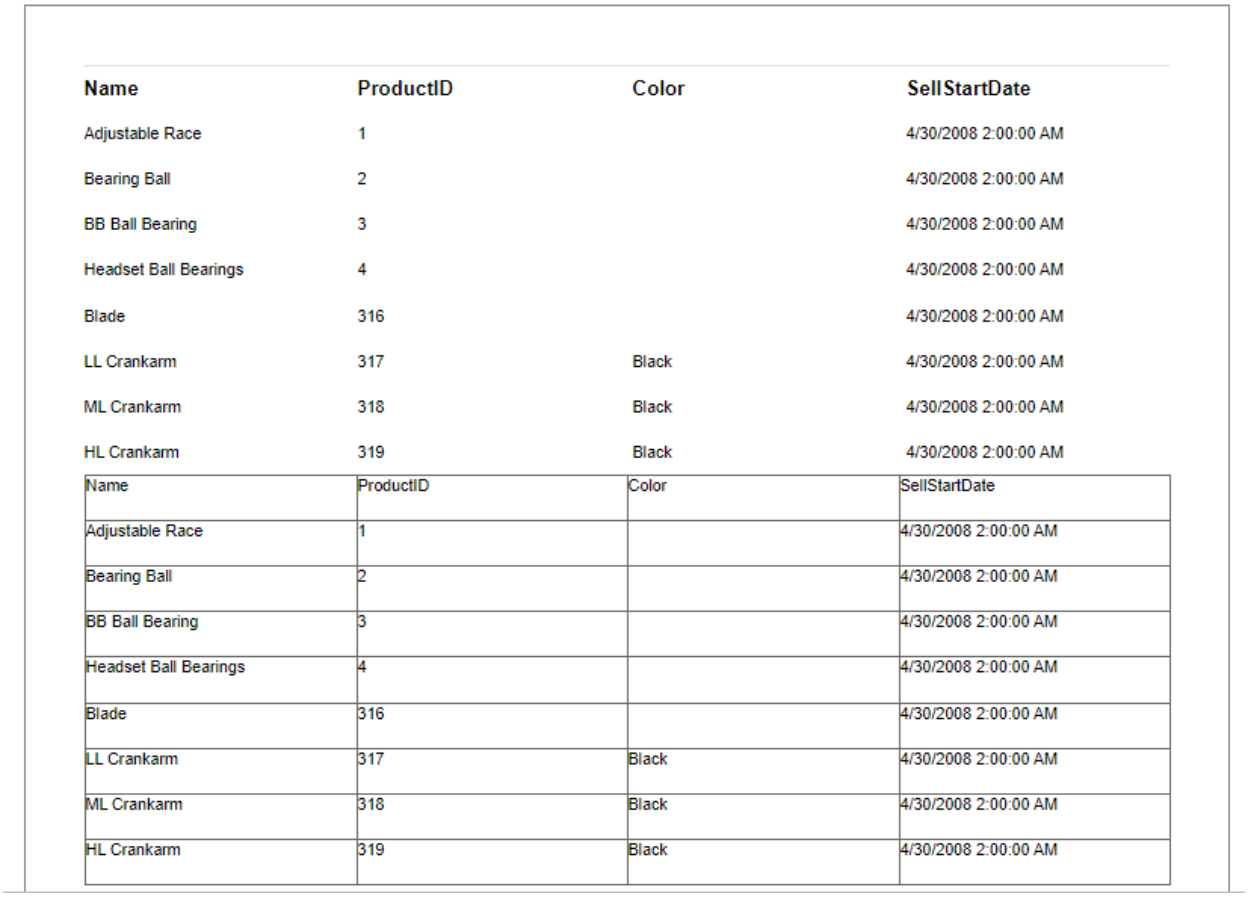


2. A new window pops up, prompting you to enter the report title and to select a data source. The data source is one of the data models shared with the Report designer. When all necessary data is entered, click **Create a report** to continue.
3. In the **Report designer**, select the desired data source table from the **Dictionary** tab in the pane and drag and drop it in the report **Page** in the main window.
4. A dedicated menu pops up, allowing the selection of specific source table categories to be added to the paginated report in the left pane of the menu. It also enables the configuration of the display order of selected data categories in the right pane of the menu. By default, the categories are displayed in the order in which they were added (check box checked) from the left pane list.



- Click one of the bottom segment radio buttons to change between the **Data** (simple categorized list) and **Table** (data organized in cells) representation of available records.
- The **Header**/**Footer** check boxes enable adding automatic category labels (*Header*) and summary data band (*Footer*) to the list. The footer band is only arranged graphically to correspond to the list categories, but does not include any expressions and needs to be configured additionally in order to display relevant data.
- The following examples present both types of record representation (**Data** and **Table**) on the designer side, as well as on the viewer side respectively:



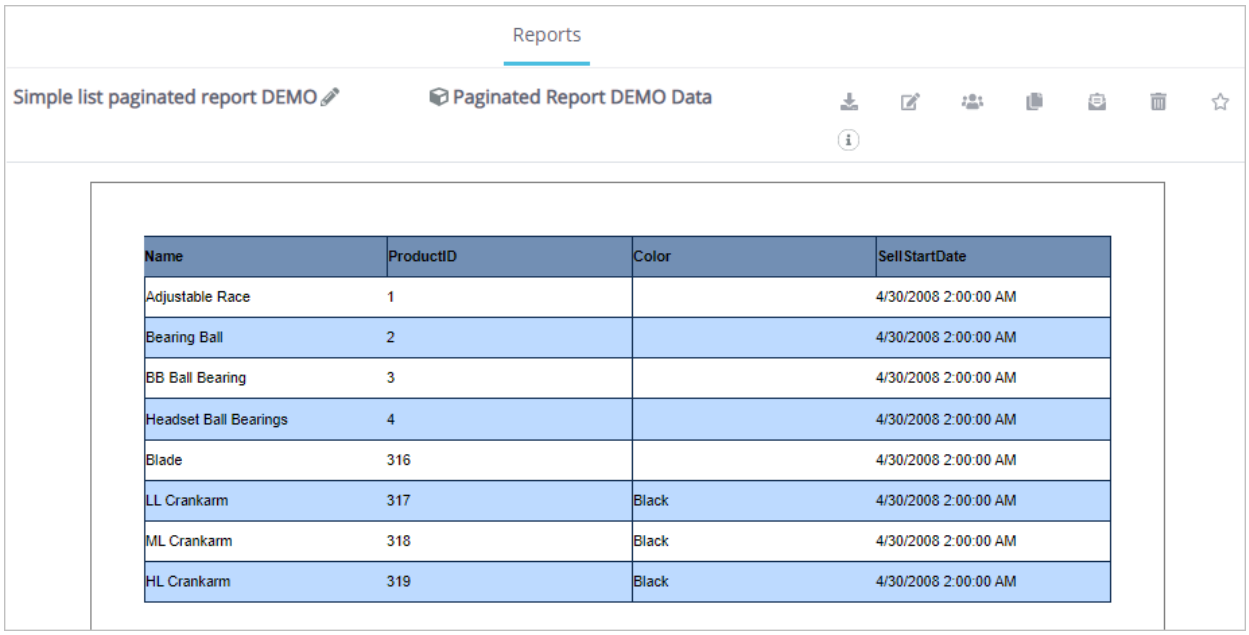


Name	ProductID	Color	SellStartDate
Adjustable Race	1		4/30/2008 2:00:00 AM
Bearing Ball	2		4/30/2008 2:00:00 AM
BB Ball Bearing	3		4/30/2008 2:00:00 AM
Headset Ball Bearings	4		4/30/2008 2:00:00 AM
Blade	316		4/30/2008 2:00:00 AM
LL Crankarm	317	Black	4/30/2008 2:00:00 AM
ML Crankarm	318	Black	4/30/2008 2:00:00 AM
HL Crankarm	319	Black	4/30/2008 2:00:00 AM

Name	ProductID	Color	SellStartDate
Adjustable Race	1		4/30/2008 2:00:00 AM
Bearing Ball	2		4/30/2008 2:00:00 AM
BB Ball Bearing	3		4/30/2008 2:00:00 AM
Headset Ball Bearings	4		4/30/2008 2:00:00 AM
Blade	316		4/30/2008 2:00:00 AM
LL Crankarm	317	Black	4/30/2008 2:00:00 AM
ML Crankarm	318	Black	4/30/2008 2:00:00 AM
HL Crankarm	319	Black	4/30/2008 2:00:00 AM

5. In the provided examples, no additional graphic editing was done. However, visual editing can be done when adding the table or list to the page by clicking the **Style** tab at the top of the dedicated pop-up menu (described in the previous step), or it can be customized from the individual elements after the data or table is added to the page. To do this, click on the data or table you want to edit, then click the **Properties** tab in the Designer pane. Navigate to the **Appearance** section and click it to see the settings you can edit.

The following example illustrates using a style for an improved visual impression. It contains a list-type representation (**Data**) with the graphical style applied to it:



Name	ProductID	Color	Sell StartDate
Adjustable Race	1		4/30/2008 2:00:00 AM
Bearing Ball	2		4/30/2008 2:00:00 AM
BB Ball Bearing	3		4/30/2008 2:00:00 AM
Headset Ball Bearings	4		4/30/2008 2:00:00 AM
Blade	316		4/30/2008 2:00:00 AM
LL Crankarm	317	Black	4/30/2008 2:00:00 AM
ML Crankarm	318	Black	4/30/2008 2:00:00 AM
HL Crankarm	319	Black	4/30/2008 2:00:00 AM

Note

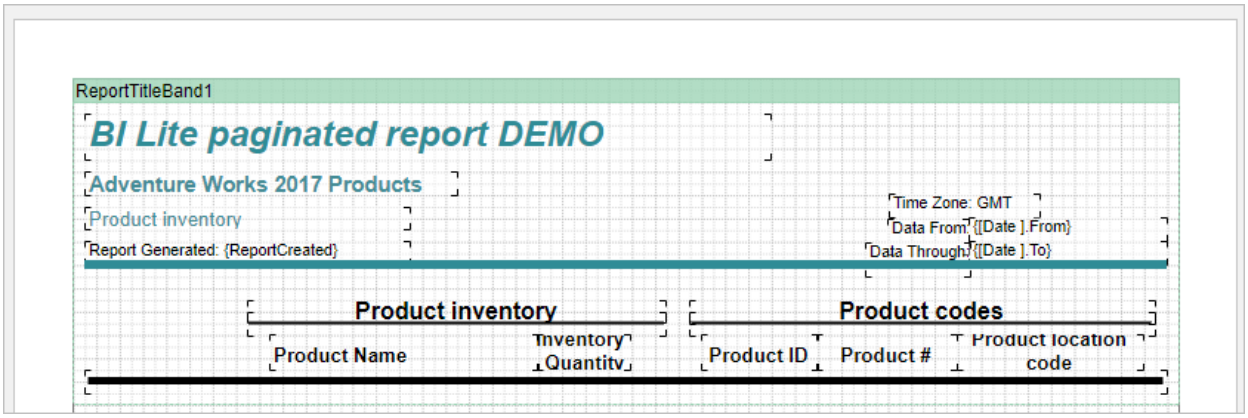
A **Data band** (including a related header, footer and other elements) can also be added manually from the toolbar at the top of the main **Report designer** window, or from the **Toolbox** to the left of the main window.

Paginated report example

The *Paginated report DEMO* is used as a basis for building a paginated report. This is a report of medium complexity, which does not include any special graphical elements, but does include two-level grouping of the displayed data, as well as multiple level headers and footers for local group summary information.

Report title

In the final report there is a report title section (light green band). It includes data such as the report title, additional information, date, time, etc. The report title is rendered only on the first page of the report.



Textual elements

The report title includes multiple textual elements which can be used as simple labels, as variable elements (expressions), or as a combination of the two. All the elements in this example report were placed and arranged manually.

Each element is indicated by four cornering symbols, as seen with this placeholder text:

In this example, the simple labels are:

- *Paginated report DEMO*
- *Adventure Works 2017 Products*
- *Product Inventory*
- *Time zone: GMT*
- *Data From*

- *Data Through*
- all the elements between the thick turquoise and black lines, which are table category labels (names), and their grouping labels.

> **Note**
> Simple labels (non-expression text elements) are cells that on rendering directly print the text they contain. The text can be formatted to any preference.

The primary distinction between a simple text element and one containing a data reference, which is called a variable element, is denoted by the use of curly brackets {}. Anything located inside the curly brackets is treated as an expression, which can contain data references, as well as operators (mathematical, logical, formatting, etc.) and custom functions. Variable elements containing a data reference, which are called expressions, in this example are:

- *{[Date].From}*
- *{[Date].To}*

> **Note**
>
> - The variable element *{[Date].From}* refers to a custom-defined variable of the *Date range* type, with an **Alias** *Date*. When referring to a variable with an alias, it needs to be placed in square brackets [ ]. Since a *Date range* variable consists of two values (lower and upper range limits), it is denoted by the *.From* text, meaning that this is a reference to the lower range limit of the variable with the alias *Date*.
> - In a similar fashion, *{[Date].To}* is an expression referring to the upper range limit of the variable with the alias *Date*.

In this example, the compound element consisting of a textual and a variable (data related) part is:

- *Report Generated: {ReportCreated}*

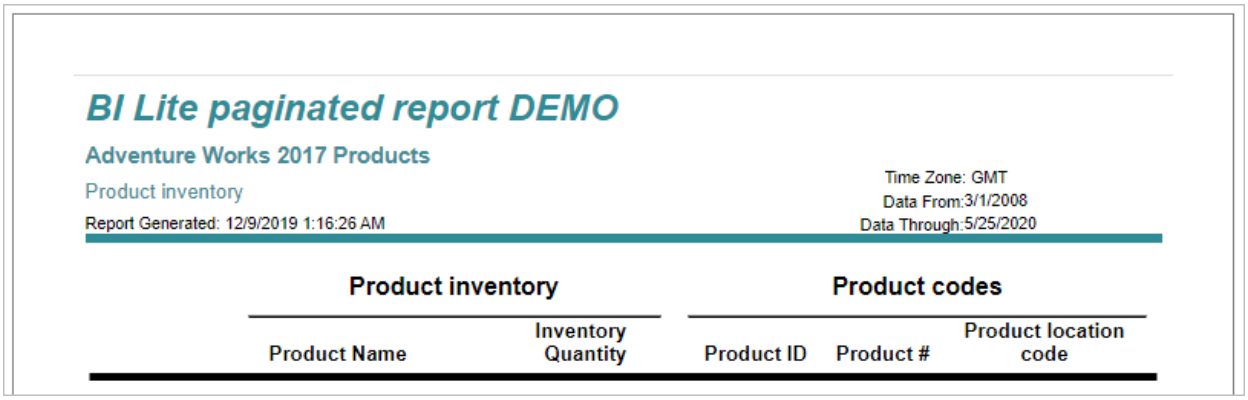
> **Note**
> The first part of the compound text element is a simple label *Report Generated:*. The second part, *{ReportCreated}*, is a reference to the **System Variable**, which is available by default in the **Dictionary**. It provides the date of the report rendering, thus denoting the date when the data contained in the report was fetched from the database.

By default, the text of the cell is normal weight, font size 8, and alignment is top and left. All of these properties, as well as many others, are available in the **Home** tab of the Report designer, or in the Designer pane under the **Properties** tab.

Some of the standard properties are font and background color, weight, cell borders (colors, weight), angle of text, etc. However, there are more advanced functionalities specific to Reporting which introduce some interaction options for the Viewer. These can include functions such as drilling into data, filtering, etc. They are addressed in more detail in the following chapters.

To edit an element of the report, it needs to be clicked. The properties are then contextually changed and available for editing.

The final look of the report title for this example is as follows:



The only graphical elements used in the report title are horizontal lines, which can be added as corresponding text cell borders.

However, in this example all the cell borders were kept invisible, and the lines were added as individual independent elements. This allows for greater flexibility, since the lines are not directly related in size and position to any one text cell. More on this in the following section.

Basic shapes

Along with textual elements, the title band includes several horizontal lines, which are simple graphical additions. They can frame and group separate report elements together, improving readability and visual impression of the report.

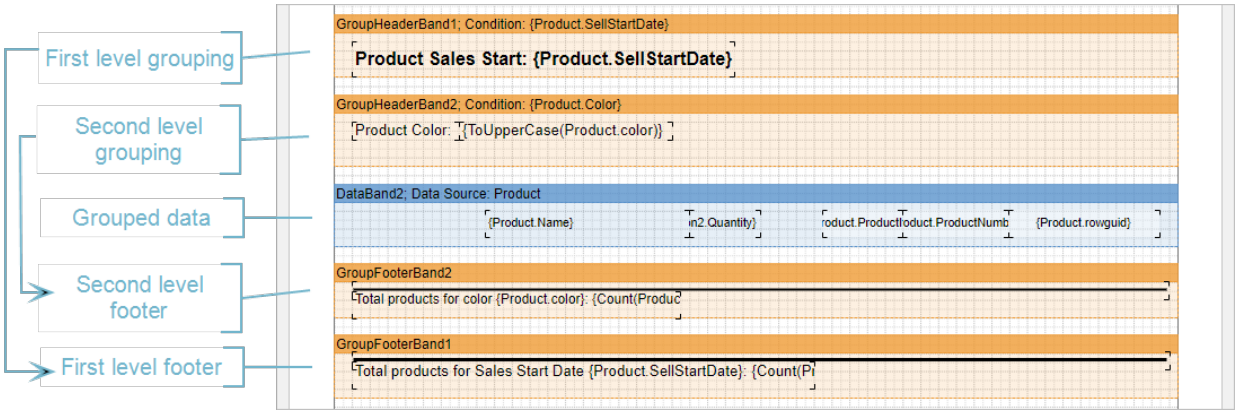
To add a new shape, do the following:

1. Go to the **Insert** tab of the Report designer OR go to the **Toolbox** on the left side of the screen.
2. Click the **Shapes** button. A dropdown menu appears.
3. Click the shape you want to create.
4. Click and drag on the page to draw the shape. Release to place it.
5. For some shapes, a new **Shapes** window will appear upon placement. You will be prompted to modify certain shape settings. Once the settings are in place, click **OK** to continue. To reopen this menu, double-click the shape placed on the page.

The properties of the elements can also be edited in the Designer pane **Properties** tab, after clicking the relevant element in the page. These additional options include properties such as the position of the shape, its behavior etc.

Data grouping

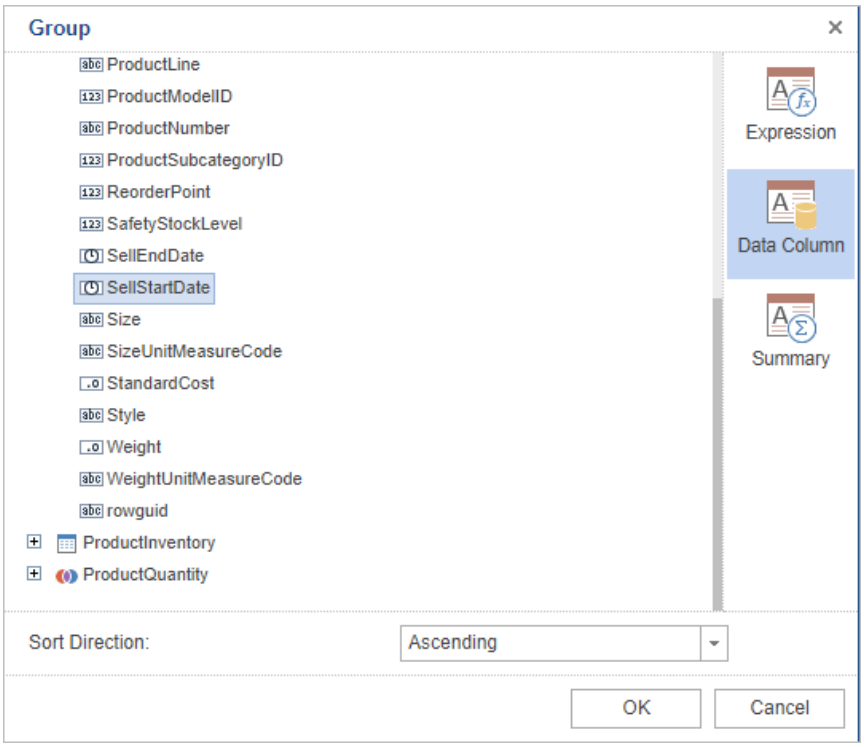
This example was designed to group data fetched from the database according to certain category values. The grouping was performed on two different levels, with all the records first grouped by the *Product Sales Start* date, and then inside every date a second level of grouping was done by *Product Color*.



In order to render a report with these groupings, two group header bands (ocher) were added.

First level grouping

On the first level *GroupHeaderBand1*, grouping by date was applied. In the band **Group** menu, which is accessed by double-clicking the group header, the grouping condition was selected from the relevant table of the **Dictionary:**



> **Note**
>
> The grouping condition does not have to be a direct record from the data source. It is possible to use the **Expression** or **Summary** tabs, and there define some other, custom, more complex grouping conditions. The **Group** menu also allows selecting the sorting direction of the records around which the grouping is performed.

The title of the band now displays a reference to the data relation *{Product.SellStartDate}* as the condition used to group other elements, which are included in the *GroupHeaderBand1* section of the report.

It is not necessary to place any additional elements in the group band itself, but it is advisable to include some group specific information, such as the record used to group other displayed report elements. In this example, that is the actual date of the sales start.

The used text cell is of the compound type, displaying the label *Product Sales Start:*, followed by the *{Product.SellStartDate}* data reference, which is used to display the actual record on which the grouping is based. The complete text has been formatted so that it stands out in the report - it is weighted (bold), and the font is somewhat larger than the rest of the report text.

The group header (text title) is printed at the top of every date group.

Second level grouping

The *GroupHeaderBand2* works in the same way as the previous band, but is placed inside it and groups records by product colors. That means that the grouping performed by this band will be limited inside each value of the records for the previous grouping category. In other words - for every *Sales Start Date*, the complete list of products will be grouped by their *Product Color*. That is why the *GroupHeaderBand2* condition states *{Product.Color}*.

Two text cells are used, one of which is a simple label, while the other is a data reference (expression):

- The simple label prints *Product Color:*.
- The expression *{ToUpperCase(Product.color)}* consists of an operator and a data reference:
    - The operator is a string function with the call *ToUpperCase (string):string*, which transforms all the characters of a given string to upper case letters, and returns the modified string.
    - The operation is performed on the *(Product.color)* record of the data, meaning that the color for the grouped products is displayed at the top of the grouping in capital letters to make them stand out.

Font size is also increased compared to other report elements, but still smaller than the font size for the *GroupHeaderBand1*. The group header (text title) is printed at the top of every color group.

Grouped data

Finally, the grouped data which will be listed in the report is defined in the data band *DataBand2* (light blue). The data band is directly related to the grouping band that encompasses it. Since the encompassing *GroupHeaderBand2* belongs to the *GroupHeaderBand1*, the *DataBand2* is indirectly related to that band as well.

The values listed in the band are simple expressions with direct relations to table categories of the data source. Their labels were included in the report title, and are not repeated. Only the records are listed in this part of the report.

	Mountain-100 Silver, 48	62	774	BK-M82S-48	BA5551DF-C9EE-4B43-B3CA-8C19D0F9384D

Total products for color Silver: 9

Product Color: WHITE

	Mountain Bike Socks, M	180	709	SO-B909-M	18F95F47-1540-4E02-8F1F-CC1BCB6828D0
	Mountain Bike Socks, L	216	710	SO-B909-L	161C035E-21B3-4E14-8E44-AF508F35D80A

Total products for color White: 2

Total products for Sales Start Date 5/31/2011 2:00:00 AM: 72

5/30/2012

Product Color: BLACK

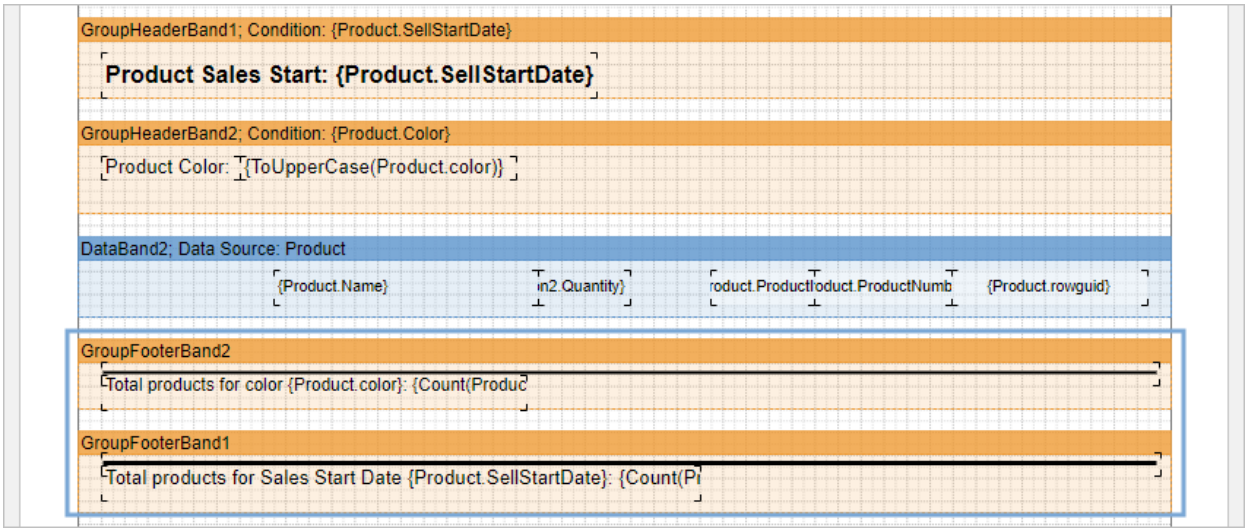
	Mountain-200 Black, 38	100	782	BK-M68B-38	82CB8F9B-B8BB-4841-98D3-BCDB807C4DD8
	Mountain-200 Black, 42	65	783	BK-M68B-42	2B0AF5B9-7571-4621-B760-47DF599F9650

Group footers

The group footer bands are placed automatically, and provide an endpoint for the grouping function started by the group header. The condition applied is the one defined for the related group header, and cannot be changed for the footer. The order of group footers is inverse to the order of the group headers when the groups are nested.

Group footers are usually used to display relevant summary information for separate groupings of records.

In this example, a horizontal line is used to denote the end of a second level group (product color), and summary information is displayed at the bottom for every second level group.



The text cell is of the compound type, with several elements:

- a simple label *Total products for color*
- a data reference *{Product.color}* which displays the current group color
- a simple label *:*
- an expression *{Count(Product.Name)}* consisting of an operator and a data reference
  - totals function *Count(object):long* which returns the number of occurrences of an object
  - data reference *Product.Name*, which is the object for the function.

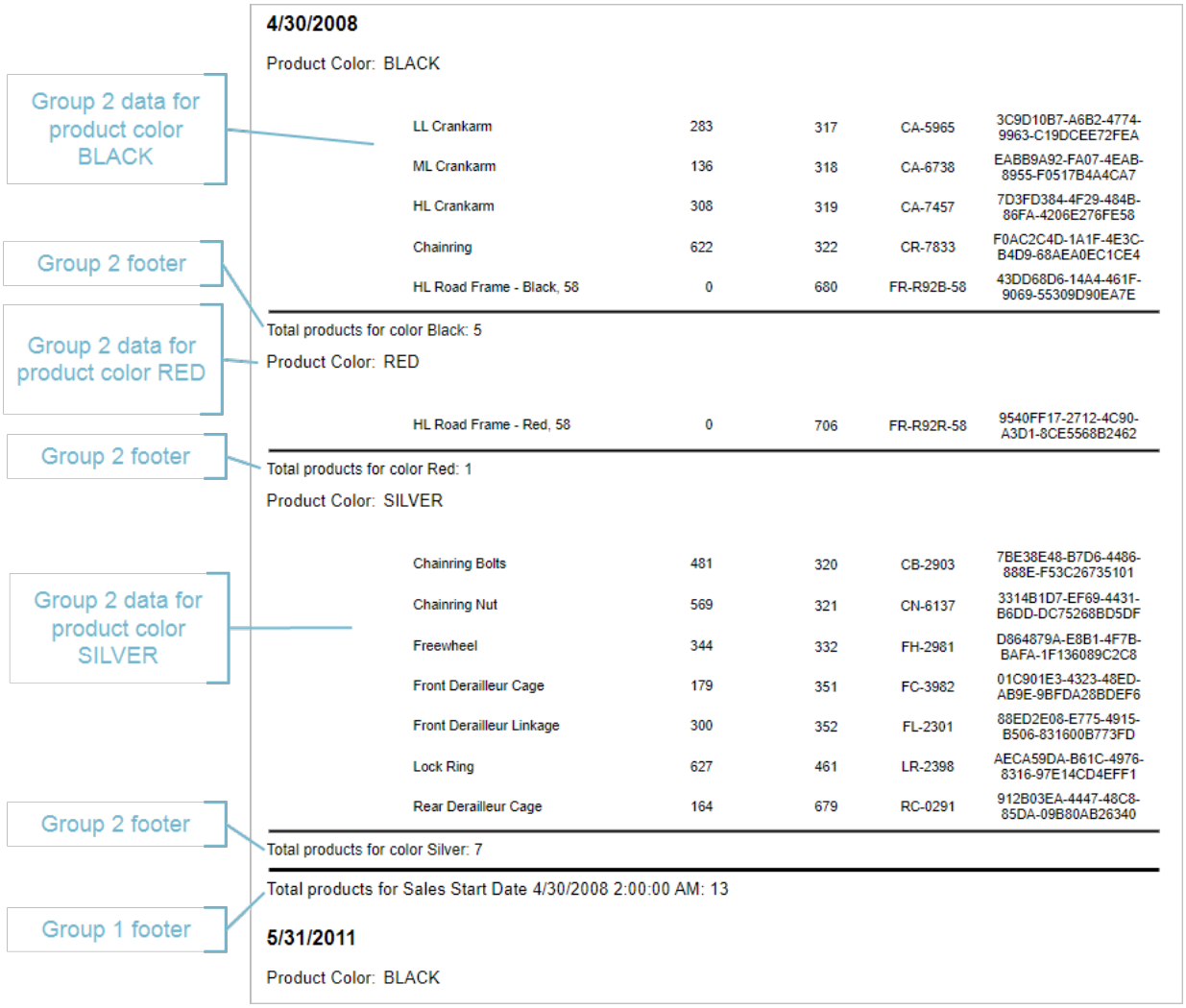
This means that *GroupFooterBand2* displays the total number of products with a given color for one sales start date. It is printed for every product color group inside a single date group.

Following a horizontal thick black line is the group footer *GroupFooterBand1*, which works in a similar fashion as the previous one.

The text cell prints the following:

- a simple label *Total products for Sales Start Date*
- a data reference *{Product.SellStartDate}*, which displays the current group date
- a simple label *:*
- an expression {Count(Product.Name)}, similar to the previous group's footer.

The *GroupFooterBand1* displays the total number of products for a given sales start date regardless of the product color - it is equivalent to the sum of all color totals for that given date. It is printed for every date group in the report.



Report Summary

In this example, a report is rounded off with a *ReportSummaryBand1* (light green in the editor). It is printed only once, at the end of the report.

Under the thickest horizontal black line, marking the end of the report data bands, the following text elements are present:

- a simple label *Total products for all Dates and Colors:*
- an expression *{Count(DataBand2)}*, similar as in the group footers.

This cell prints the total of all the products displayed in the report (regardless of product color and for all the available dates).

	Road-350-W Yellow, 44	73	975	BK-R79Y-44	0C61E8AF-003D-4E4B-B5B7-02F01A26BE26
	Road-350-W Yellow, 48	104	976	BK-R79Y-48	EC4284DC-85FA-44A8-89EC-77FC9B71720A

Total products for color Yellow: 26

Total products for Sales Start Date 5/30/2013 2:00:00 AM: 104

Total products for all Dates and Colors: 256

URL parameters

In Reporting, you can use URL parameters to modify the way certain UI elements are displayed, particularly for situations such as when reports are embedded in third-party environments. With this tool, you can ensure that the reports are shown in their full size, while also controlling whether or not the viewers can use filters and settings, see other reports , use the top menu to download assets, etc.

In other words, with the help of URL parameters, you can choose to show or hide the various panes and menus, as well as apply filters.

When adding URL parameters, the following format must be used:

- parameters are added to the base URL by entering '?' before the parameters
- the parameters are concatenated with '&'
- the filtering variables are prefixed by '_'
- for example: http://reportingapp/viewer/538**?**header=hidden**&**reportsPane=collapsed

> **Note**
> The individual URL parameters can be used in any order and combined regardless of the sections they are divided in in this document. Some parameters have a short version, indicated in brackets. Both the long and short version can be used.

Show or hide panes and menus

You can use the following parameters to show or hide the reports pane, parameters pane, top menu, title bar or header:

- **header (h)**: If this value set to 'hidden' or 'false', the header will be hidden, meaning that the top section of the window, which includes e.g. the Reports tab, will not be shown. Otherwise the header is visible. This is applicable to all Reporting pages that contain the header section, including reports, the Data tab, etc. For example:
  - http://reportingapp/viewer/538?header=hidden
  - or short version: http://reportingapp/viewer/538?h=hidden
- **navgationPane (l)**: If value set to 'hidden' or 'false', the navigation pane, i.e., Reports pane (left pane) will be hidden and unavailable to viewers. If this value is set to 'collapsed', the pane will be available to viewers, but collapsed initially, so the viewer has to expand it to see it. In all other cases, the pane is visible. This is applicable to all Reporting pages that contain the navigation pane.
  - for example: http://reportingapp/viewer/538?h=hidden&l=collapsed
- **parametersPane (r)**: If this value set to 'hidden' or 'false', the parameters pane (right pane) will be hidden and unavailable to users. the pane will be available to viewers, but collapsed initially, so the viewer has to expand it to see it. In all other cases, the pane is visible.
  - for example: http://reportingapp/viewer/538?h=hidden&l=collapsed&parametersPane=false

> **Note**
>
> If a report has filters that viewers can modify, and the parameters pane is hidden, the autoSubmit parameter (in next section) is automatically set to 'true', unless explicitly set to 'hidden' or 'false'. In other words, if the right pane is hidden, the report is automatically submitted on open, unless explicitly stated that it should not be.

- **titleBar (t)**: If this value set to 'hidden' or 'false', the title bar of a report will be hidden and unavailable to viewers. Otherwise the title bar is visible.
  - for example: http://reportingapp/viewer/538?h=hidden&l=collapsed&parametersPane=false&t=hidden
- **topMenu (m)**: If this value set to 'hidden' or 'false', the title bar of a report will be hidden and unavailable to viewers. Otherwise the title bar is visible.
  - for example: http://reportingapp/viewer/538?h=hidden&l=collapsed&parametersPane=false&t=hidden&topMenu=false

Additional settings

You can set up the following additional report settings through URL parameters:

- **autoSubmit (s)**: If autoSubmit is set to 'true', report will be automatically submitted on open. Otherwise the report has to be manually submitted through the right pane, as normally. If the autoSubmit parameter is specified, it has priority over the autoSubmit setting in the parameters pane.
  - for example: http://reportingapp/viewer/538?h=hidden&l=collapsed&s=true
- **refreshPeriod (p)**: This value should be set to a numeric value that specifies how often the report is refreshed. The refresh period is expressed in seconds, i.e., the numeric value entered is the number of seconds of the refresh period. This parameters has priority over the refresh period setting in the report itself. This value cannot be lower than the global minimum refresh period value set up by the Administrator.
  - for example: http://reportingapp/viewer/538?h=hidden&l=collapsed&s=true&refreshPeriod=10

Using filtering values

As previously mentioned, filtering values can also be specified in the URL through URL parameters. They behave slightly differently than the parameters mentioned above.

Filtering variables in the URL **must be prefixed by an underscore '_'** in order to be applied.

When filtering variables are defined in the URL, it typically makes sense to also set the autoSubmit parameter to 'true'. Otherwise the filtering values entered through the URL are only used to populate the parameters pane (right pane) and, depending on the parametersPane value, can be additionally modified later on by viewers.

Filter and value names

Depending on the situation, the Designer may choose to assign labels to filters and values that are different from their original keys used in, e.g., the database.

In cases where the label and original key do not correspond, to use filters and their specific values as URL parameters, the used parameters need to correspond to the keys the filters and values have in the database/report, and not the labels used to display them in the report itself.

This means that you need to know **the original keys of the values and filters**, which are typically set by the Designer.

For example, a filter in a report might be shown as "Color", but its original key is "ColorVar". In this case, you need to use 'ColorVar' as a URL parameter, for example: http://biportingapp/viewer/538?_ColorVar=Black

The same is true for the filtering values themselves, such as the items shown in a dropdown menu – the values used in the URL need to correspond to the original keys, not the labels in the dropdown (in case they do not correspond).

Filtering value options and limitations

Below you can find a list of options when it comes to filtering through URL parameters. There some limitations that need to be considered when using URL parameters to filter reports.

Here is an example URL with a nubmer of URL parameters applied to it:

http://biportingapp/viewer/538?_SimpleInput=hello&_TimeRange=yesterday&_DateWithTime=2015-03-03T09:30:00&DateNoTime=2020-01-01&CheckboxSimple=true&Number=101&CheckboxNullable=null&ListValues=val1,val2,val3

> **Note**
>
> The examples below reflect the types of input that can be available to filter by, depending on what is made available in the report.
>
> For example, if there is a filter with a dropdown menu, the description used for _ListValues would refer to it, but the actual entry in the URL would be, for example, "_ColorVar=Black,Blue,Yellow" or something along those lines.

- **_SimpleInput**: Simple text value entry, for filters where you need to manually enter a value.
- **_TimeRange**:
  - Used with date and time range filters, in form or just a date ("_TimeRange=YYYY-MM-DD,YYYY-MM-DD) or both a date and time (_TimeRange=YYYY-MM-DDTHH:MM,YYYY-MM-DDTHH:MM). The to and from range are separate with a comma ','. For example:
    - "_TimeRange=2020-01-01,2022-02-02" for just the date range, or
    - "_TimeRange=2020-01-01**T**01:01,2022-02-02**T**22:22" for the date and time range.

    > **Note**
    >
    > When using URL parameters that include a date and time value for filters, note that '**T**' is used to separate the date from the time. The 'T' is in bold in the examples above and below to highlight it.

  - You can also use it for filters with a relative time range. See *Relative time range interval values on the next page* for more information (e.g., _TimeRange=yesterday).
- **_DateWithTime**: Format used for filters that specify a specific date with a specific time. The format shown in the example must be used (_DateWithTime=YYYY-MM-DD**T**HH:MM:SS).

- **_DateNoTime**: Format used for filters that specify only a date, without a time. The format as in the example (_DateNoTime=YYYY-MM-DD) must be used.
- **_CheckboxSimple**: Used for filters that include a simple checkbox. The possible values are 'true' to select the checkbox and 'false' to clear it.
- **_Number**: Simple numeric value entry, for filters where you need to manually enter a numeric value.
- **_CheckboxNullable**: In cases where a filter is a nullable checkbox. The possible values are 'true' to select it, 'false' to clear it, or 'null' for the undefined state of the checkbox.
- **_ListValues**: Format used for filters that include a single-select or multi-select dropdown list. In case the list allows selection of multiple items, they are here delimitited with a comma. Note that this cannot be used with values that contain commas within the values themselves, as this will cause the value to be delimited, resulting in issues.

Here is an example of what a URL with realistic URL filtering may look like:

http://reportingapp/viewer/538?_InteractionID=ff665d65f96e6&_DateAndTime=2015-03-03T09:30:00&_ShowRelatedInteractions=true&QueueID=1052984641&ContactCenter=Milano,Rome,Naples

Relative time range interval values

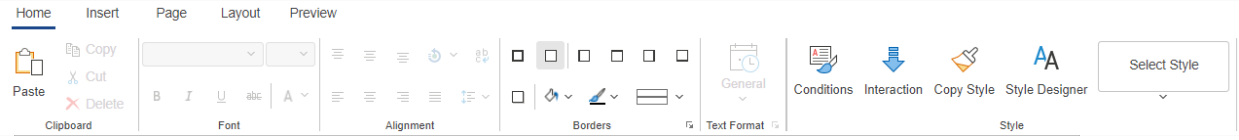
- "today",
- "yesterday",
- "tomorrow",
- "last7days",
- "last30days",
- "last90days",
- "last180days",
- "last360days",
- "next7days",
- "next30days",
- "next90days",
- "next180days",
- "next360days",
- "thishour",
- "last1hour",
- "last2hour",
- "thisandlast1hour",
- "thisandlast2hour",
- "next1hour",
- "next2hour",
- "thisandnext1hour",
- "thisandnext2hour",
- "thismonth",

- "last1month",
- "last2months",
- "months3ago",
- "next1month",
- "next2months",
- "thisandnext1month",
- "thisandlast1month",
- "thisquarter",
- "last1quarter",
- "last2quarter",
- "next1quarter",
- "next2quarter",
- "thisandnext1quarter",
- "thisandnext3quarter",
- "thisandlast1quarter",
- "thisandlast3quarter",
- "quarter4ago",
- "thisweek",
- "last1week",
- "thisyear",
- "last1year",
- "last2year",
- "thisandlast1year",
- "thisandlast2year",
- "next1year",
- "next2year",
- "thisandnext1year",
- "thisandnext2year",
- "year2ago"

Adding report styles

> **Note**
>
> When creating reports that are intended to be used through a number of views (the way that, for example, Reporting Standard Reports are designed), it is also expected that users should have the possibility to apply various premade style sets to the views.
>
> In order to do so, the names of the report styles styles applied to the individual report elements need to match the names of the corresponding styles in all the style sets to be used with views made from a report. Even if style settings of an element within the original base report are modified, the style set applied through a view will override those settings.
>
> In other words, **all the styles intended for the same element** (e.g., Heading 1) **must always have the same name** across all style sets and collections to ensure full functionality and faster switching between styles in report views.

Report styles are added to report elements through the **Style** section of the **Home** tab in the Report Designer.



The options available here are object-dependent and may not always be available. You need to select a report element to be able to assign any of these options to it, with the exception of Style Designer, which is available with or without selecting an element.

The following options are available in the Style section:

- **Conditions**: Apply a condition to the defined data column. A new pop-up opens in which you can add data-related conditions to the chosen elements, such as the text changing color after the data passes a certain value, or a variety of other options.
- **Interaction**: Add an interaction option, such as e.g. adding a tooltip that is shown on hover, through the pop-up window to the selected report element.
- **Copy Style**: Select a report element, and then use this feature to copy the selected element's report style to other elements by clicking them with the **Copy Style** tool turned on, which is indicated with  on your mouse cursor.
- **Style Designer**: In this pop-up window, you can define report styles and style sets and collections for your report. This feature and its functionalities are the same as when creating view styles, a process which is described in more detail in *Styles on page 96*.
- **Select Style**: From the dropdown list of report style sets and collections defined for your report, choose the style you want to apply to a selected report element. Only the styles applicable to the selected element are shown. Alternatively, you can click a collection to apply to the whole report; you will be prompted to confirm this choice in a pop-up window. Click **Yes** to proceed.

Report views

The reports you create may be comprehensive and contain a large number of options, KPIs and other metrics that maybe will not always all be needed at the same time. For example, if your paginated report has 10 columns, but you only want to show call center managers 7 of them, you would typically have to create a copy of the original report and then remove the 3 extra columns. However, creating separate reports to accommodate each (small) change in the content of a report may quickly become difficult to maintain.

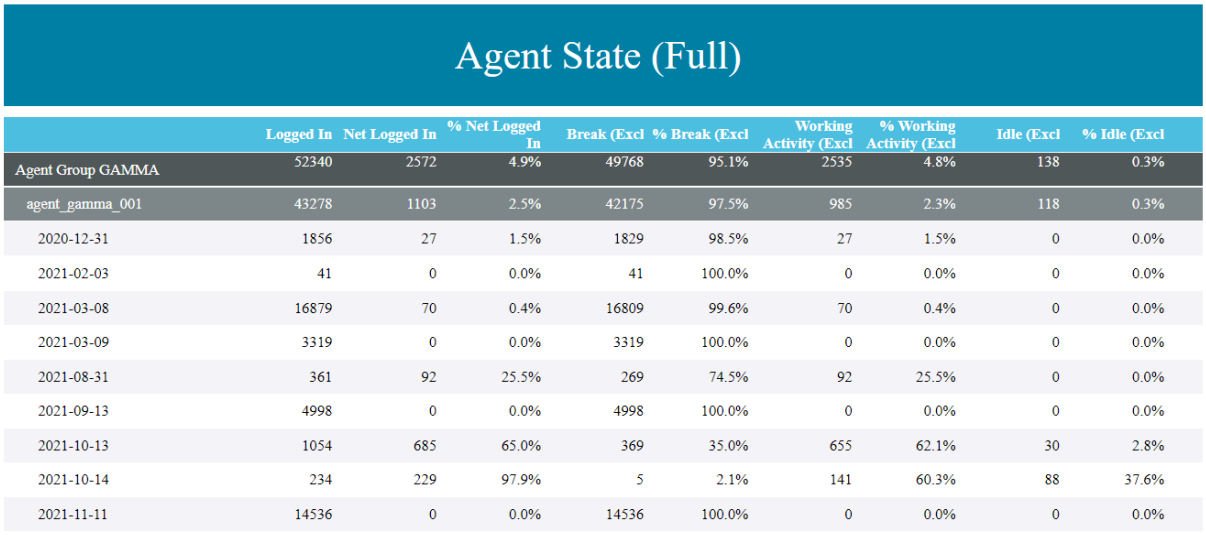
This is why, for reports that contain a lot of data and are not intended to be used in their full form with all users, reports can instead be modified to show only the metrics needed for a certain user profile, while still preserving all the data and metrics within the report in the background. You can do this with the **Report Views feature**, which is a powerful tool used to facilitate the way users interact with reports, allowing them to focus only on the most relevant information at a time, as opposed to everything the report contains. With this feature, you can also control the way a report is displayed, what the report page size is, how the fields are resized etc.

A report view (as opposed to a full report) is indicated with the view icon, as can be seen below:

From a user perspective, in the Reports tab of Reporting, individual report views function the same way reports normally do.

Multiple views can be made for the same report, depending on the purpose, audience, or other motivation – for example, a contact center manager and supervisor may be interested in different levels of detail in their reports. In such cases, the manager may have more use of a higher-level report, while a supervisor would benefit from more specific, detailed reports. Examples of differences in report views are illustrated in the screenshots below.

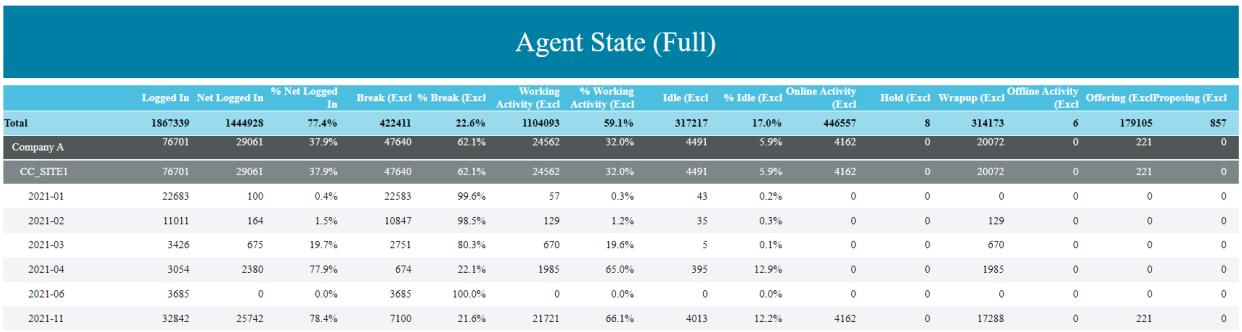
Manager report view example:



Agent State (Full)

	Logged In	Net Logged In	% Net Logged In	Break (Excl	% Break (Excl	Working Activity (Excl	% Working Activity (Excl	Idle (Excl	% Idle (Excl
Agent Group GAMMA	52340	2572	4.9%	49768	95.1%	2535	4.8%	138	0.3%
agent_gamma_001	43278	1103	2.5%	42175	97.5%	985	2.3%	118	0.3%
2020-12-31	1856	27	1.5%	1829	98.5%	27	1.5%	0	0.0%
2021-02-03	41	0	0.0%	41	100.0%	0	0.0%	0	0.0%
2021-03-08	16879	70	0.4%	16809	99.6%	70	0.4%	0	0.0%
2021-03-09	3319	0	0.0%	3319	100.0%	0	0.0%	0	0.0%
2021-08-31	361	92	25.5%	269	74.5%	92	25.5%	0	0.0%
2021-09-13	4998	0	0.0%	4998	100.0%	0	0.0%	0	0.0%
2021-10-13	1054	685	65.0%	369	35.0%	655	62.1%	30	2.8%
2021-10-14	234	229	97.9%	5	2.1%	141	60.3%	88	37.6%
2021-11-11	14536	0	0.0%	14536	100.0%	0	0.0%	0	0.0%

Supervisor report view example:



Agent State (Full)

	Logged In	Net Logged In	% Net Logged In	Break (Excl	% Break (Excl	Working Activity (Excl	% Working Activity (Excl	Idle (Excl	% Idle (Excl	Online Activity (Excl	Hold (Excl	Wrapup (Excl	Offline Activity (Excl	Offering (Excl	Proposing (Excl
Total	**1867339**	**1444928**	**77.4%**	**422411**	**22.6%**	**1104093**	**59.1%**	**317217**	**17.0%**	**446557**	**8**	**314173**	**6**	**179105**	**857**
Company A	76701	29061	37.9%	47640	62.1%	24562	32.0%	4491	5.9%	4162	0	20072	0	221	0
CC_SITE1	76701	29061	37.9%	47640	62.1%	24562	32.0%	4491	5.9%	4162	0	20072	0	221	0
2021-01	22683	100	0.4%	22583	99.6%	57	0.3%	43	0.2%	0	0	0	0	0	0
2021-02	11011	164	1.5%	10847	98.5%	129	1.2%	35	0.3%	0	0	129	0	0	0
2021-03	3426	675	19.7%	2751	80.3%	670	19.6%	5	0.1%	0	0	670	0	0	0
2021-04	3054	2380	77.9%	674	22.1%	1985	65.0%	395	12.9%	0	0	1985	0	0	0
2021-06	3685	0	0.0%	3685	100.0%	0	0.0%	0	0.0%	0	0	0	0	0	0
2021-11	32842	25742	78.4%	7100	21.6%	21721	66.1%	4013	12.2%	4162	0	17288	0	221	0

Creating a report view

A new report view can be made from any report that has been shared with the user. This includes all available sharing levels.

> **Note**
>
> In order to be able to create a report view, the data source of the base report has to be shared with the user, as well (by an Administrator or Data Designer).

To create a new report view, follow these steps:

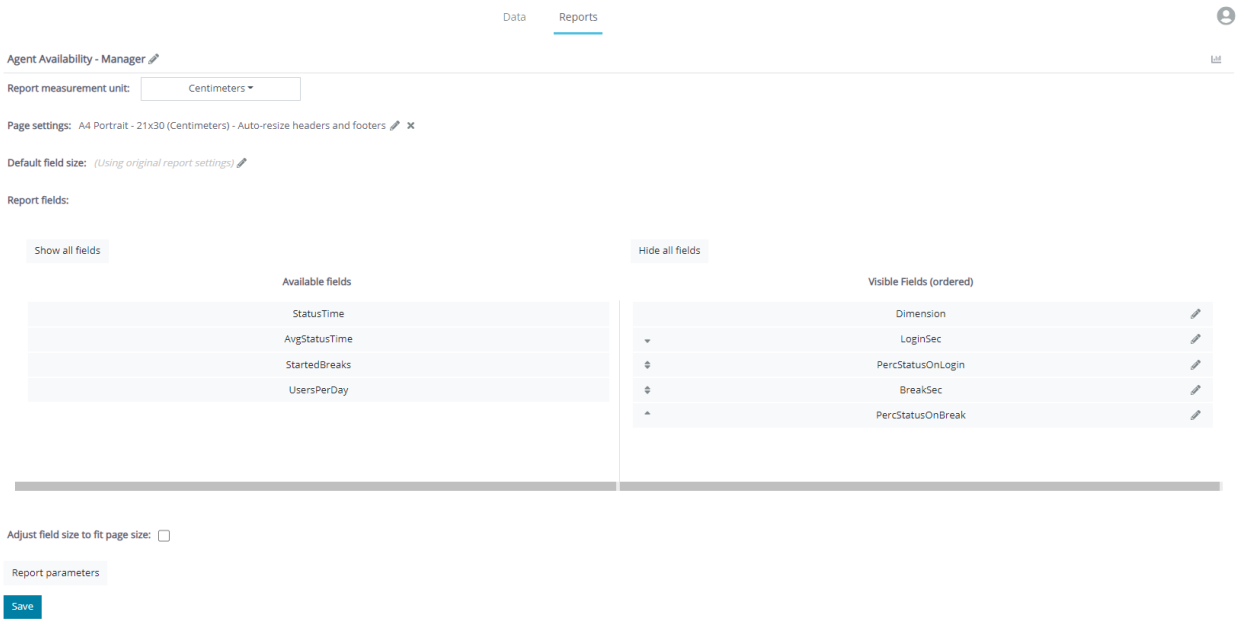
1. In the Reports tab, click **+Create new report view** 

.
2. In the pop-up window, enter the desired report view title in **Report view name**.
3. Click **Select base report**, and then from the dropdown list choose the existing report for which you want to create a new view. You can use the search field for faster access.

> **Note**
>
> The base report can later be changed if needed by opening the view and clicking the base report in the middle section of the top menu of the report view. From there, you can choose a different base report from the dropdown list.

4. Click **Create report view** to finish the creation process. A new window opens.
5. In the Report View Editor, define the settings for your new report view as described in the sections below.
6. Once you have finished setting up the report view, make sure to click **Save** to preserve the changes, and then click **View Report** in the upper right corner of the window to open the report view, set up any necessary filters and/or settings, and finally generate the new report view.

You can see an example of the Report View Editor below:



> **Note**
>
> The upcoming sections focus on report view settings you can customize. However, if you leave some of the settings undefined, where possible, the default report settings (defined by the Report Designer in the original report) will be used.

Report view name

Click to edit the report view name. You can modify this setting at any time, but it is recommended to retain a resemblance to the original report title for clarity. This name is shown in the Reports tab and pane.

Report view title

Click  to edit the report view title. You can modify this setting at any time, but it is recommended to retain a resemblance to the original report title for clarity. This title is shown on top of the report view.

Report view description

Click  to edit the report view description. The report view description is shown in the Details, in the top menu of a report view. If left unedited, the default report description of the base report is used.

Report measurement unit

In this section, you can define which unit of measurement you want to use in your report. Click the dropdown menu and then click the unit you want to use.

When you change the unit of measurement, all existing measures are converted to the equivalent value in the new unit, thereby preserving all the previously entered sizes.

Page settings

Clicking  in this section opens a new window. Here, you can modify the settings described below:

- **Paper size**: Choose a predefined paper size, or enter a custom page width and height (in centimeters).
- **Page orientation**: Choose a landscape or portrait page orientation.
- **Auto scaled**: If this checkbox is selected, the report view headings and footers will be automatically resized to fit the new size of the report view. If it is cleared, they will stay the default size, as defined in the original report.

Click **Apply settings** to save your new report view settings. Once you've applied any changes, they will be shown in this section of the Report View Editor.

Fields default resize

Clicking  in this section opens a new window. In this pop-up window, you can choose if you want to use a fixed width value or relative width scaling of the size of all the fields (columns) in the report view. A default value is set when creating the (original) report, but it may be modified here for the report view. You can modify the following settings:

- **Use width scaling**: If this checkbox is selected, enter the relative width scaling percentage in **Width scaling coefficient (%)**. This means that the width of each field will be scaled to the entered percentage of the default full size.
- **Fixed width value**: Available if **Use width scaling** is cleared; enter the report view fixed field width value (in centimeters). This means that the width of each field is going to be the specified size in centimeters.

Click **Apply settings** to save your new report view settings. Once you've applied any changes, they will be shown in this section of the Report View Editor.

Report fields

> **Note**
> If you do not have proper access levels to the base report, you will not be able to see or use this section.

In this section of the Report View Editor, you can define which fields from the original report will be used in the report view. Two columns are available:

- **Available Fields**: The fields that are available in the original report. The fields that remain in this column are not shown in the report view.
- **Visible Fields (ordered)**: Fields you've chosen to display in the report view, ordered in the way you want to display them. Fields shown top to bottom here will be shown left to right in the report view.

> **Note**
> If available and properly set up in your data source, field labels and their translations are shown in the Report View Designer. If not available, the default name of the value in your database is shown.

Move the fields you want to use in the report view from Available Fields to Visible Fields. Similarly, if you want to remove a field from the report view, drag it back to Available Fields.

To change the order of the visible fields in the report view, drag them to the position you want to use them in. The top-most fields in this section are the left-most fields in the report view table.

> **Note**
> Dimension fields are always visualized first in a report and their position in the report cannot be changed by dragging them below other fields, or dragging other fields above the Dimensions.

Additionally, you can also change the individual width settings for each field. To do so, click  in the right-hand part of the field you want to edit, and then apply the needed settings in the pop-up window, as described in *Fields default resize on the previous page*. These settings will refer **only to the individual field** you edit, and not the report view as a whole.

> **Note**
> If you define the individual width of a field, the settings defined in *Fields default resize on the previous page*

Adjust field size to fit page size

If you select this checkbox, all field sizes will be adjusted to best fit the page size you use for this report view. In case any individual field settings are changed, settings will be preserved and adjusted to fit the page size, while preserving the set up field size ratios.

If left cleared, all the fields will use the default report size, or whichever size modifications are applied to the report view or its individual fields, as described in the previous sections of this document.

Report parameters

In this pop-up window, you can set up the default, background and hidden filters and settings for your report view.

> **Note**
>
> If you do not have proper access levels to the base report, you will not be able to see or use this section.

All the parameters available in the original report are shown. In this window, you do not need to set the mandatory filters and settings to be able to confirm the changes, but users will still have to set the mandatory parameters when generating the report view. You can do the following:

- **Background parameters**: Next to each filter and setting, there is a checkbox. If you select it, you set that filter or setting as a background parameter. Once you set up a background parameter, when users want to set up a filter or setting and they choose their options from a dropdown list, they will only be able to choose from the options you select in this window. None of the dropdown options that you do not select in this window will be available to the users of the report view. Additionally, any filters or settings you set up in this window will also be loaded as the default filters and settings for this report view. Users may need to apply some of the filters (for example, if not all mandatory filters are set up in this window), but they can also change the filters and settings on their own if needed, among the filters and settings available to them.
- **Hidden parameters**: If you set any filter or setting as a background parameter, a second checkbox appears next to it. Selecting this checkbox too will make a background parameter a hidden parameter, as well. This means that the parameter will automatically be applied to the filter view. Furthermore, it will be hidden from Viewers, and they will not be able to change it or interact with it in any way. This will also hide the parameter from the Filters and Settings Sumup section of a report, as described in the *Reporting Standard Reports Guide*.

> **Note**
>
> If a filter or setting is a single-select item (e.g. data grouping levels only let Viewers choose one option from the dropdown list), in the context of background filters, you can select multiple options to be shown to the Viewer, but they will still be able to only choose one of them to generate the report.

> **Caution**
>
> - If any of the default, background or hidden filters and settings are part of Viewer-defined bookmarks or default filters and settings, the bookmarks or default filters and settings will be applied normally. However, for example, if a user has a bookmark that contains filters which are now hidden or removed via background filters, and are therefore unavailable to the user, the removed filters will not be used in the bookmark. Instead, the selection will default to the first filter for that value from the list of available ones.
> - Make sure to keep in mind which, if any, filters are **dependent** filters when using them as background or hidden filters, so as to avoid issues when using the report view.
> - For example, you might set up background filter values for a mandatory filter that is dependent on another filter. In this case, the background filter values of may end up being removed as options for the viewer due to a filter dependency, which will result in the user being unable to select any value for a mandatory filter, and will therefore not be able to submit and generate the report. For more information about dependent filters, see *Report views*.

Select style

From a list of available styles, choose which style set to apply to the report view. The style set will be applied to all elements in the report (that have the appropriate style-related settings). This setting has higher priority than the style settings of the original report.

Click **Remove custom style** to revert to the original report style settings.

> **Note**
>
> In order for styles to be applied properly to all relevant elements of the report and all its views, the original base report needs to be set up in an adequate manner. If any issues regarding styles and their application arise, contact the Report Designer.

Individual styles and style sets can be modified in the Styles tab, as described in *Styles on the next page*.

Styles

In the **Styles** tab of Reporting, you can define style sets and collections to use in your assets, such as report views.

Once a style is created, it can be applied to report views, or exported and used separately for reports. This allows you to create specific styles for different needs, which you can then quickly apply to assets without having to modify all the individual elements by hand.

The styles can be created, modified, deleted, and imported and exported. When a style is changed within the **Styles** tabs, these changes are also automatically shown in all the assets that the style was applied to, which means that you do not need to make the changes in the various assets manually.

> **Note**
>
> When styles and style sets are created in the Styles tab of Reporting, they are referred to view styles, as they are primarily intended to be used with report views. Similarly, if they are created within a report, in the Report Designer (which means they are not available for all users and for views), they are referred to as report styles.

Read more about the various functionalities of styles in Reporting, as well as how to use them, in the upcoming sections of this document.

Styles tab

To work with view styles in Reporting, navigate to the tabs in the upper central section of the Reporting window and click **Styles**. This opens the Styles tab.

The following becomes available:

- A list of all available view styles, in form of a table:
  - Information about the name and owner of the style is shown.
  - Each row has additional options, allowing you to **Edit** or **Delete** existing styles.
- A search bar, facilitating the navigation through available styles. Searches are done by style title.
- The **+ Create new style** button.

Creating a new style

To create a new view style in Reporting, do the following:

1. Click **Create new style** in the **Styles** tab. A new pop-up opens.
2. Enter the name in the style name field.
3. Click **Create style**. A new window opens where you can start creating the view style elements within your set. This window consists of the following:

- **Style title**: Located in the top-left part of the screen. Click **Edit** to modify the title of the style.
- **Top toolbar**: This section contains basic editing options, such as **Save**.
- **Properties pane**: A pane containing the properties of each individual element style that you add to the style set. Here you can set up, edit and see the properties for each style. The properties vary based on what kind of style you are working with (e.g., for a component, a chart, a map, etc.).
- **Style Designer**: In this section of the window, you create and organize the individual style elements for your style set.

4. To create a new view style element, in the Style Designer section, click **Add Style**. Alternatively, if you have not created any styles yet, click anywhere inside the Style Designer space and proceed to the next step.
5. In the dropdown menu, click the element you want to create a style for.
6. In the **Properties** pane, set up all the relevant properties to suit your needs. The individual properties vary based on the report element you are creating the style for. If the style you want to edit is not already selected (and its properties not opened), click it in the list in the Style Designer to see and modify its properties.
7. If needed, use any of the options available in the style designer toolbar. Find out more about this in *Style designer toolbar below*.
8. Repeat the previous three steps as many times as necessary to create all the needed style elements.
9. Once you have set everything up, click **Save** to save your changes. Your style set can now be used with report views, as described in *Select style on page 94*.

Style designer toolbar

The style designer toolbar offers some additional features that can be used to further enhance your use of styles in Reporting.

The following options are available:

- **Add Style**: Add an individual new style, as described in *Creating a new style on the previous page*.
- **Actions**: The following actions apply to all the styles in the currently open style set:
  - **Open**: Load an .sts file from your machine to import a premade style set.
  - **Save As**: Save the current style set as an .sts file on your machine. This file can then be shared with Reporting users that have access to the Styles feature.
  - **Create Style Collection**: Create a new collection in your style set. This feature creates a predefined set of styles for certain report elements, such as charts or various level headings. This also creates a new folder for the collection. Multiple collections can be created within the same style set. In the **Create Style Collection** pop-up window, adjust the collection settings to your needs. Individual styles from the

collection can later on be modified as needed.

- **Delete**: Delete the currently selected individual style or collection folder.

  > **Caution**
  >
  > The action of deleting a style component or collection folder is permanent and cannot be undone.

- **Get Style from Selected Components**: Primarily used by Report Designers in the Report Designer tool when creating base reports and adding individual report elements; this feature is used to select a pre-styled component and to turn its properties into a style that can then be applied to other report elements.

  > **Note**
  >
  > To get a style from a selected component in the report designer interface, you first need to click the component from which you want to get the style, then click **Style Designer**, and then click **Get Style from Selected Components**. If you open the Style Designer without having selected a component beforehand, this option will not be available.

- **Filter and Sort**: Filter through the various kinds of styles, or sort them in ascending or descending order.
- **Search**: Search the available styles for quicker use. The search is done by style name only.

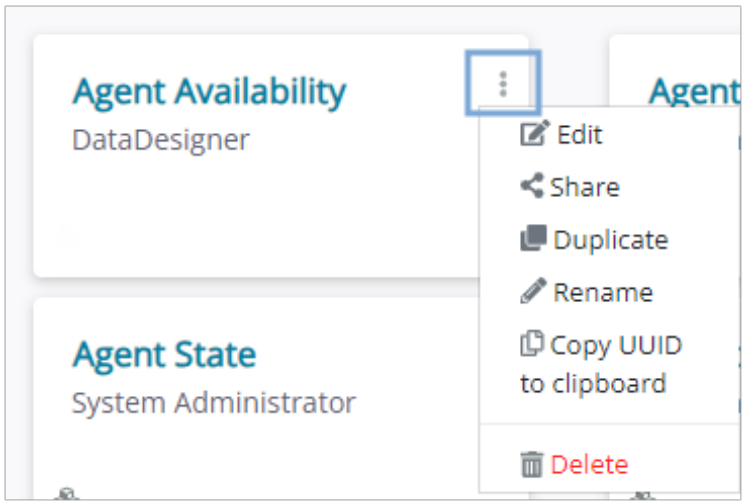
> **Note**
>
> In order for styles to work properly, all elements of a report that you want to apply styles to need to be given a style in the Report Designer. Report elements without an assigned style will not have any style applied to them in report views.
>
> The name of the styles assigned to the individual elements in the Report Designer need to be the same as the names in any other style you may want to use e.g. for report views.
>
> In other words, you need to ensure that **all the styles intended for the same element** (e.g., Heading 1) **always have the same name** across all style sets to ensure full functionality and faster switching between styles.

Report and report view sharing

The sharing option lets the **owner** of the asset grant access to other users or groups of the Reporting instance.

It is located in the options menu for all owned reports or report views in the **Reports** tab. To share an asset with other users, do the following:

1. Click **Options** of an owned report or view tile.
2. Click **Share** in the dropdown menu.



3. In the **Search user or group** search box, enter the group name or individual user name or email address.
4. Click the user or group you want to share the asset with.
5. Select one of the following sharing options from the dropdown list:

- **Can view**: The user or group gains permission to view the asset, but cannot change the asset or share it with others in any way. This is the only option for Viewers, but can be assigned to other user roles, as well.
- **Can read**: The user or group gains permission to open, generate and view the asset as a Viewer would, but cannot edit the report or view directly. Designer and Power Viewer users can duplicate assets shared with the "Can read" permission level and are the owners of the duplicate asset, enabling them to edit the duplicate.
- **Can create view**: For reports - the user or group gains permission to create report views based on the shared report, but they cannot see the report in the **Reports** tab and they cannot duplicate or edit it. For example, a Power Viewer can benefit from this access level as they would still be able to create views from the shared base report, but since they cannot interact with reports directly (other than as Viewers), they would not have a report tile they could not interact with in their Reports tab.
- **Can edit**: The user (or group) can use, edit and duplicate the report or report view, but not share it with other users. Available only for Designer roles. This applies to users of a group the report or view was shared with; if there are, e.g., Viewers in such a group, they will not be able to edit the asset, as this action goes beyond their role access level; they will still only be able to read it.
- **Make owner**: Ownership of the report or report view is transferred to the user. Current owner loses all access rights to the asset. Available for Designer roles and Administrators.

> **Caution**
>
> Transferring ownership cannot be undone by the original owner. It can be reversed only by the new owner or the tenant Administrator or System Administrator.

Existing sharing settings for each user or group can be modified (dropdown list) or deleted ( ).

Bulk asset sharing

If you use the tabular view  , you can share and unshare the assets in bulk. To do so, follow these steps:

1. Select one or more assets in the table.
2. Click **Share** or **Unshare**.
3. Search for the user(s) or group you want to share or unshare the asset for.
4. For sharing, choose the access level you want to grant to the user(s) or group. The same rules apply as described in the section above. For unsharing, click  next to the user(s) or group you want to remove access from.
5. When done with the changes, click **Share** or **Unshare** to shave your changes.

> **Note**
>
> - You need to have the relevant access level to an asset to be able to perform all of these actions. If you select any assets for which you do not have the needed access level (such as being the owner), you will not be able to perform the needed action for those assets. A warning message is shown in this case. If there are any assets left among the selected that you have the relevant access level for, you can proceed with the action for these assets only.
> - Hover over  in the top part of the pop-up window to see which assets you are working with if multiple are selected.

Report and report view export and import

It is possible to export and import reports and report views in the **Reports** tab of Reporting. With this feature you can, for example, share assets with other users or create backups of your assets.

Asset export

Using the tabular view  , you can export individual assets or assets in bulk. To do so, follow these steps:

1. Select one or more assets in the table.
2. Click **Export**. All the assets to be exported are listed in this window.
3. Select **Include Universal ID** to include the unique ID of the selected asset in the exported data.

> **Note**
>
> The Universal ID is a unique string ID assigned to an individual asset within the Reporting instance. It is used to update an existing asset in the system with its versions created or modified outside the current system. Such a modified asset can be imported into the system to seamlessly replace an existing one via the Universal ID.

4. To confirm, click **Export**. The assets are bundled in a single file that is then downloaded to the default browser download folder, and can be accessed using the file browser.

In this interface, you can also do the following:

- **Select reports**: When this checkbox is selected, only reports are shown in the list.
- **Select report views**: When this checkbox is selected, only report views are shown in the list.
- **Show only selected items**: Filter the list to show only selected items.
- **Search**: Search through the assets. The search is performed by the name column values.

Report and view import

To import reports into Reporting, you must do the following:

1. Click **Import** 

at the top-right of the **Reports** tab window to start the importing procedure.

2. Choose the format for the report file. Older Reporting versions use the *.mrt* format, while newer versions use the *.ebimodels* format. The format should correspond to the file that is being imported.

3. In the file browser, navigate to the file location and select the file you want to import. A pop-up window opens:

- A warning states that the reports about to be imported are not connected to data models. Imported reports will not be functional until the corresponding data models are connected with them after import. In order to be able to connect a report with a data model, the model needs to first be shared with you. Refer to a Data Designer for more information.
- The window also lists all the reports that will be imported.

4. Select **Replace existing report by Universal ID** to update existing reports or views in Reporting with the same universal ID. Leave cleared if you want to import a separate report. For more information on the Universal ID, see *Report and report view export and import on the previous page*.
5. Optionally, you can choose which folder to place the report or report view in at import. You can skip this step by leaving the checkboxes cleared and clicking **Confirm**.
6. Click **Confirm** to finish the importing process. The reports contained in the file are imported and added to the **Reports** list in the **Reports** tab.

> **Note**
>
> - When importing report views, if a base report (used to create the view) with a corresponding Report ID is available in the system, the view will connect to it automatically and will be ready for use on import. If no base report with a corresponding ID is available, you will need to connect the view with the relevant report for it to function.
> - If an imported asset has the same name as another object in Reporting, and is not used to update the existing object through replacing an existing report or view via Universal ID, the object is then renamed to signify it is a copy, e.g., Report (1).

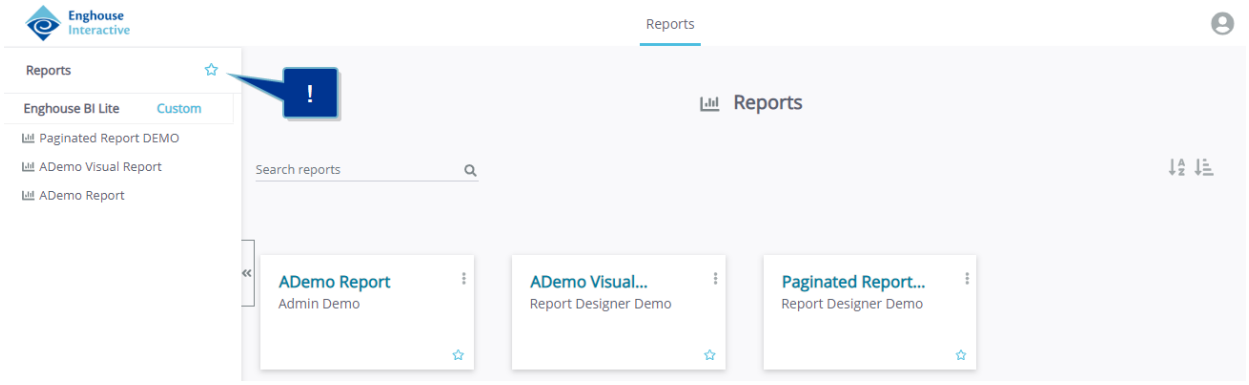
Favorites

If the **Reports** list contains many different assets, the **Favorites** functionality facilitates finding reports that are used more often.

You can add an asset to your Favorites in the pane to the left, or in a tile in the main window. On hover over an asset, a disabled (grayed out) star icon is displayed. When clicked, the related report is added to the favorites list, and is from that moment on marked with an enabled (blue) star icon. This indicates that these assets are marked as **Favorites**.

The left pane and main window can then be filtered for favorites by clicking the star next to the list title in the pane.

In the example below, only the reports marked as favorite are displayed in the list and as tiles in the main window.



Automated report delivery

One of the options available to all users of Reporting is the automated report delivery. This gives users the option to automatically receive reports in their chosen format. The **Subscribe** option allows for scheduling report delivery over these distribution channels:

- **Email**
- **FTP/SFTP** server.

Setting up automatic reporting

To set up automatic reporting, you must do the following:

1. In the **Reports** list on the left side of the window, or on a report tile in the **Reports** tab, click the options for the report you want to subscribe to. In the dropdown menu, click **Subscribe**. A new window opens.
2. OR in the top menu of your report, in the upper right corner, click **Subscribe**  . A new window opens.
3. If there are no predefined schedules, create your own by clicking **New Schedule**. If there are preexisting subscriptions that you want to edit, modify their settings as described below.

> **Note**
> All of the required schedule settings and parameters need to be entered correctly for you to be able to save the schedule. In case any of the schedule sections are not set up correctly, a warning is given to let you know which section has an error that is preventing you from saving the schedule. For example, if a mandatory filter is not entered, you will not be able to save the schedule until the mandatory filter is set up.

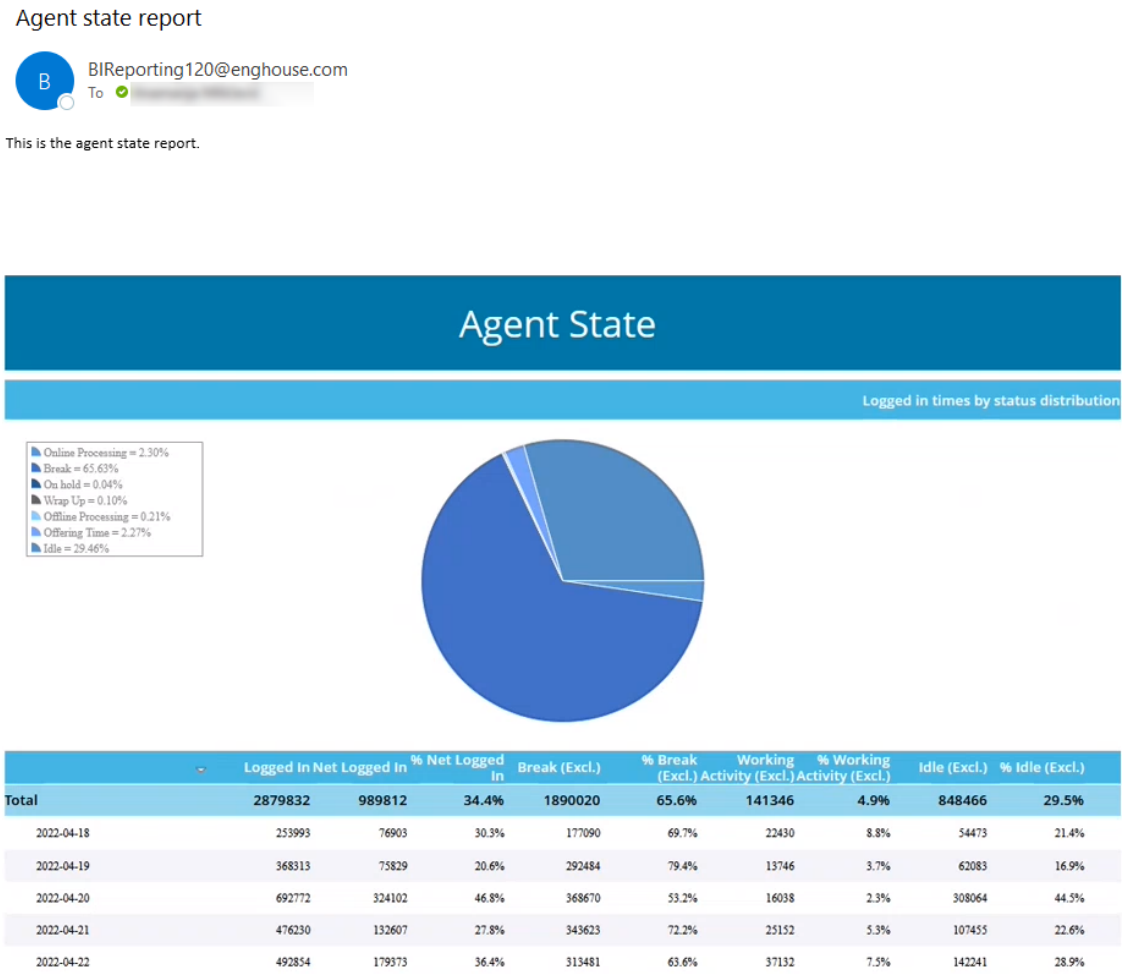
4. Enter or edit the necessary data:

- The schedule can be set to certain days of the week and at a certain time of day. Choose your preferred settings in the **Schedule days** dropdown menu, and enter the time manually in **Schedule times** or click the clock in the corner of the field to open a dropdown menu. The available time format is AM/PM.
- Click on the Filter icon to set up the report filtering options. The **Filter** option allows setting report parameters (filters and settings) that will be applied to report generation when preparing for a delivery.

> **Note**
> These parameters depend on the design of the related report and may not always be required or available.

- Click on the mail icon to choose a **Distribution** channel for report delivery. For additional information, see *Distribution settings on page 106*. Click **Confirm** to save your settings or **Back to scheduling** to return to the previous window.

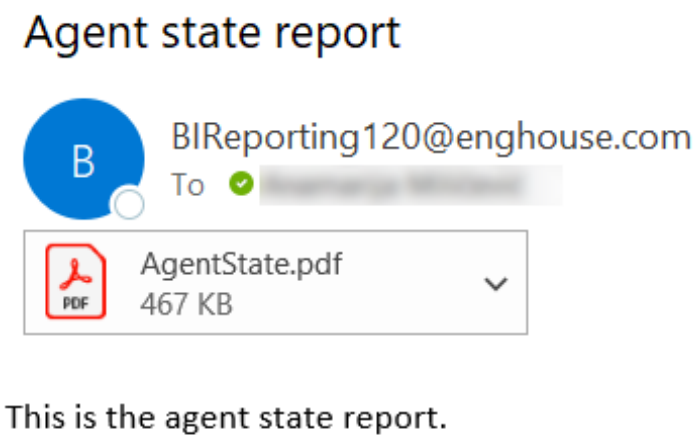
- Choose the report format from the **Format** dropdown menu:
  - **Email report**:If the report is delivered in the body of the email, there is no file attached to the email and the report contents are delivered as text organized in a table (via HTML). The email body text message provided in the **Email settings** (see *Distribution settings on page 106*) is included at beginning of the email, above the report.



	Logged In	Net Logged In	% Net Logged In	Break (Excl.)	% Break (Excl.)	Working Activity (Excl.)	% Working Activity (Excl.)	Idle (Excl.)	% Idle (Excl.)
Total	**2879832**	**989812**	**34.4%**	**1890020**	**65.6%**	**141346**	**4.9%**	**848466**	**29.5%**
2022-04-18	253993	76903	30.3%	177090	69.7%	22430	8.8%	54473	21.4%
2022-04-19	368313	75829	20.6%	292484	79.4%	13746	3.7%	62083	16.9%
2022-04-20	692772	324102	46.8%	368670	53.2%	16038	2.3%	308064	44.5%
2022-04-21	476230	132607	27.8%	343623	72.2%	25152	5.3%	107455	22.6%
2022-04-22	492854	179373	36.4%	313481	63.6%	37132	7.5%	142241	28.9%

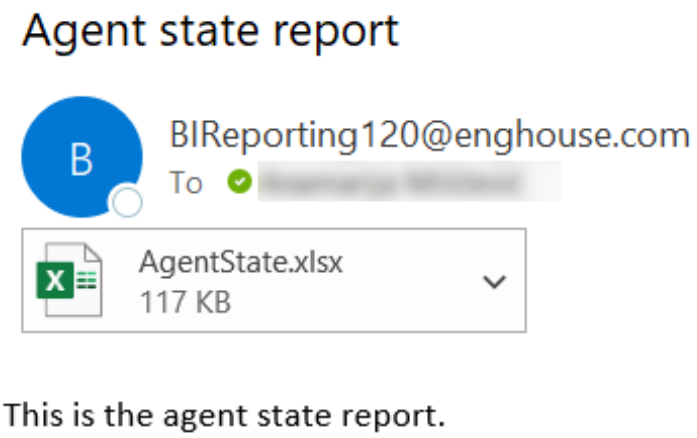
  - **Pdf attachment**: If the report is delivered as a PDF attachment, a file is provided as an attachment of your email which you can then store on your computer. There is no additional email body text other than the message provided in the **Email settings** (see *Distribution settings on page 106*).

    Select the **Compress Attachment** checkbox to compress the attached file.



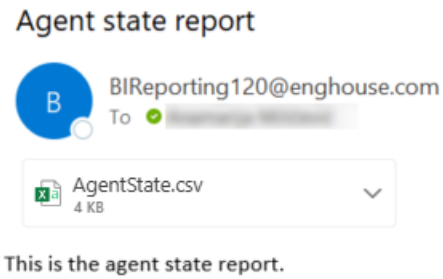
- **Excel attachment**: If the report is delivered as an Excel attachment, a file is provided as an attachment of your email which you can then store on your computer. There are several export settings to choose from:
    - **Type**: Choose the type of file the report is converted into.
    - **Image Resolution**: Used to change DPI (image property PPI - Pixels Per Inch). Increasing the number of pixels per inch is increases the quality of the image and the size of the finished file.
    - **Image Quality**: Change the image quality. The higher the quality, the bigger the size of the finished file.
    - **Bands Filter**: This parameter enables you to specify which report bands are exported. The following options are available:
        - **All Bands**: All the bands present in the rendered report are exported.
        - **Data Only**: Only the Data band is exported.
        - **Data and Headers**: Only the Data band and the related Header bands are exported.
        - **Data and Headers/Footers**: Only the Data band and the related Header and Footer bands are exported.
    - **Use One Page Header and Footer**: Select the checkbox to use only the first header and footer.
    - **Export Each Page to Sheet**: Select the checkbox to export each page to sheet.
    - **Export Page Breaks**: Select the checkbox to export page breaks.
    - **Compress Attachment**: Select the checkbox to compress the attached file.

  There is no additional email body text other than the message provided in the **Email settings** (see *Distribution settings on the next page*).



- **CSV attachment**: If the report is delivered as a CSV attachment, a file is provided as an attachment of your email which you can then store on your computer. There is no additional email body text other than the message provided in the **Email settings** (see *Distribution settings below*).

  Select the **Compress Attachment** checkbox to compress the attached file.



5. When all the needed data is entered, click **Save** to continue.

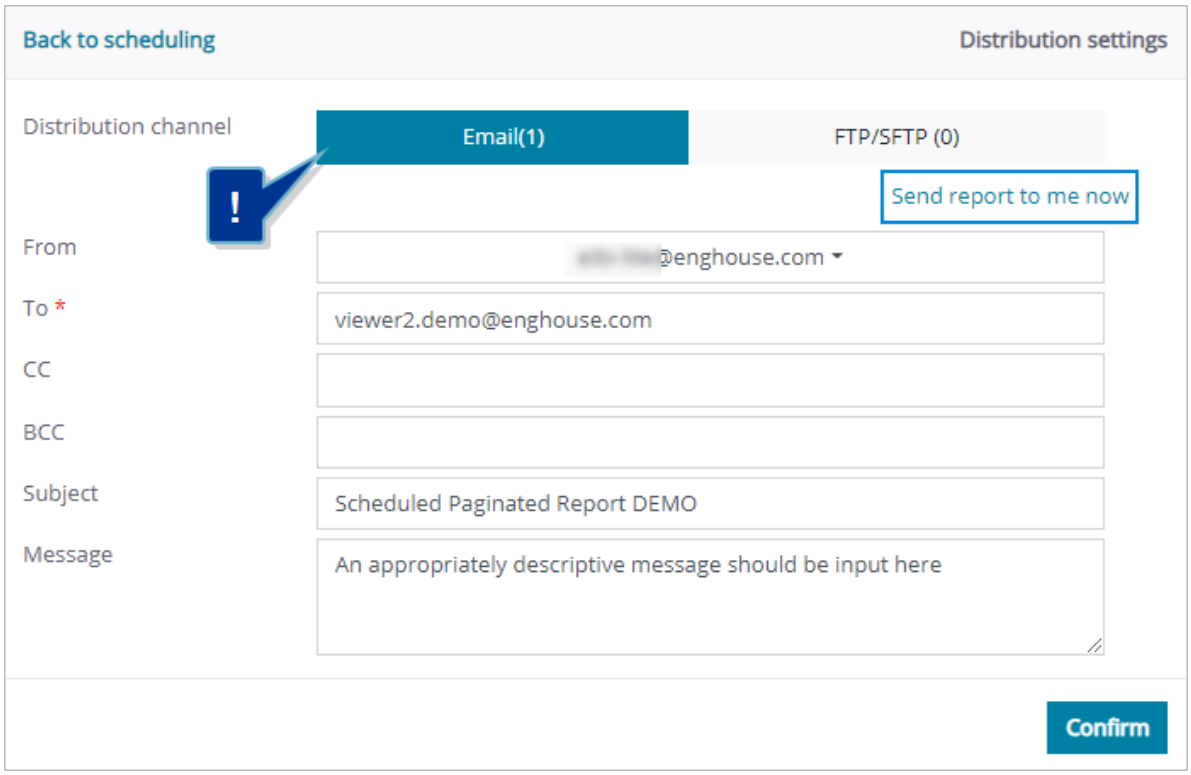
To create another schedule for the same report, follow the same procedure. To delete an existing schedule, click **Delete** at the right end of that schedule's row.

Distribution settings

Email

It is possible to schedule automated report delivery to a list of one or more email recipients.

The **Distribution** channel parameters define the sender of the email (**From**), the list of recipients (**To**, **CC** and **BCC**), as well as the subject of the scheduled report email (**Subject**) and the mail body text (**Message**).



> **Note**
> The list of available senders is edited by the Administrator and Viewers can only select from among the predefined senders.

The **Send report to me now** link instantly sends the report to the user's email address. This is a good way to check if all the other settings in this window are set up as planned before sending the report to others.

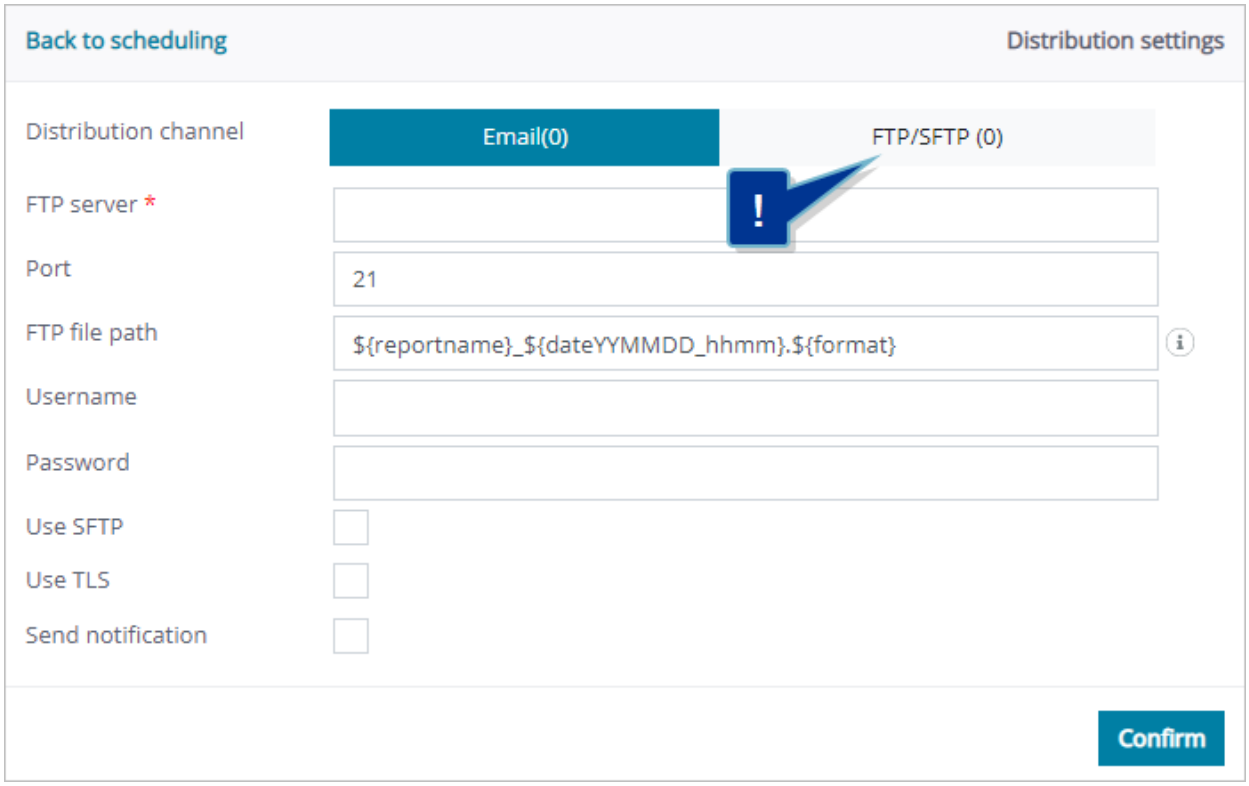
The specific content or format of the email is defined by the **Format** parameter, as described in the previous section.

FTP/SFTP

It is possible to schedule automated report delivery to an FTP or SFTP server. To set this up, fill out the following fields:

- **FTP server**: The required parameter which stands for the location of the file server (i.e. IP address).
- **Port**: Defines the port to be used for server access.
- **FTP file path**: Lets you customize the name of the file to be stored on the server (same as in the previous section).
- **Username**, **Password**: Authentication parameters, if required by the server.
- **Use SFTP**: When checked, removes the *TLS* modifier and defines distribution to an *SFTP* server.

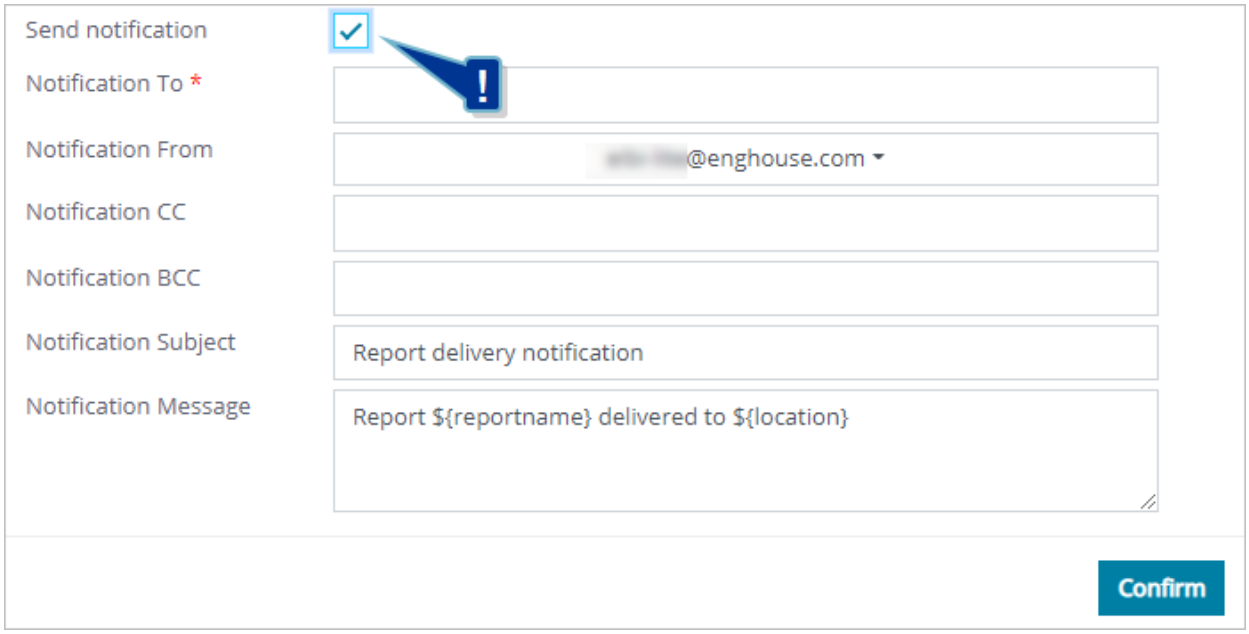
- **Use TLS**: Switches between *FTP* without *TLS* or over *TLS.*
- **Send notification**: Activates an email notification of the delivery, but does not include the generated report itself. The **Distribution settings** window is expanded and new email notification fields appear. See *Send notification below* for more information.



Send notification

In both file server distribution channels (Shared Network File Server and FTP/SFTP), an additional notification delivery option is available. If **Send notification** is checked, it provides access to settings very similar to those for emailing reports. Fill out the necessary fields and click **Confirm** to return to the scheduling window.

> **Note**
>
> **Notification Message** can be formatted in the same way as the **Filename**/**File Path** fields for file servers.


Send notification
Notification To *
Notification From
@enghouse.com
Notification CC
Notification BCC
Notification Subject
Report delivery notification
Notification Message
Report ${reportname} delivered to ${location}
Confirm