OpenAir

Business Intelligence Connector

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OpenAir Business Intelligence Connector Overview

OpenAir Business Intelligence Connector gives you point and click access to OpenAir from existing reporting, business intelligence (BI), workflow, and integration applications.

The connector lets you publish OpenAir reports and list views to a data feed in an OData/JSON format, which is a standard format that can be consumed by BI tools such as Microsoft Excel, Microsoft Power BI, Tableau and many other applications.

You can connect your preferred tools to OpenAir and access OpenAir data in real-time without the need to write any code. Each OpenAir report or list view published using OpenAir Business Intelligence Connector act as a custom query against the source OpenAir data. You can refresh the data on-demand from your BI tools.

The following help topics give an overview of the OpenAir Business Intelligence Connector:

- Features —OpenAir BI Connector Features
- Benefits — Benefits of OpenAir BI Connector
- Getting Started — Getting Started with OpenAir BI Connector
- Technology — OpenAir OData Service
- Access Control — OpenAir BI Connector Role Permissions and Data Access Privileges
- Requirements and Limits — BI Connector Requirements and Limits

The following help topics provide detailed procedures for:

- Publishing Reports to the OpenAir OData Service
- Publishing List Views to the OpenAir OData Service
- Connecting BI Tools to Your OpenAir OData Feed
- OpenAir Business Intelligence Connector Advanced Functions

Note: OpenAir Business Intelligence Connector is a licensed add-on. To enable this feature, contact your OpenAir account manager.

OpenAir BI Connector Features

OpenAir Business Intelligence (BI) Connector lets you:

- **Publish reports to the OpenAir OData service** — From within the Reports application in OpenAir, you can publish your saved reports and give others access to your published report from the OpenAir OData feed. You can refresh your published reports manually or you can schedule the publication of your reports to refresh your OpenAir OData feed data automatically on a daily, weekly or monthly basis. See Publishing Reports to the OpenAir OData Service.
- **Publish list views to the OpenAir OData service** — You can publish your list views to the OpenAir OData service using any of your saved list view configurations. You can make the published list view available to all authorised employees. Your published list view data is updated in real-time. Employees accessing a published list view from the OpenAir OData feed see the same data they see when they are accessing the list view in OpenAir at any given time. See Publishing List Views to the OpenAir OData Service.

Note: OpenAir Business Intelligence Connector supports all major list views from the Expenses, Invoices, Projects, Purchases, Resources, Timesheets and Workspaces applications. The following list views are currently supported:

- **Expenses** — Expense reports, Authorizations, Alerts
- **Invoices** — Invoices, Charges
- **Projects** — Bookings, Projects, Tasks, Issues, Billing Rules, Billing Transactions, Recognition Rules, Recognition Transactions, Alerts
- **Purchases** — Purchase requests, Purchase Orders, Fulfillment, Fulfillments
- **Resources** — Resources, Bookings, Alerts
- **Timesheets** — Timesheets, Time entries, Time off requests, Leave accrual, Alerts
- **Workspaces** — Workspaces, Discussions, Documents, Alerts
- **Administration**:
  - **Global Settings** — Contacts, Customers, Job codes

- **Connect your BI tools to your OpenAir OData feed** — You can connect any BI tool or any other application supporting OData V4/JSON to your OpenAir OData feed. You can use your preferred BI tools to analyze, visualize and report on your OpenAir data. You can configure your business intelligence tools to refresh automatically and get the latest data from your OpenAir OData feed to ensure your dashboards and reports are always up-to-date. See Connecting BI Tools to Your OpenAir OData Feed.
- **Read published report data or read up-to-date list view data in your OpenAir form and scheduled scripts** — You can use four OpenAir user scripting functions to read your published report and published list view data. These functions give you access to the same information available when you use Business Intelligence tools to access your OpenAir OData feed. See Reading OpenAir OData Resource Data in Your OpenAir Form and Scheduled Scripts.
- **Export published report data to NetSuite** — You can use OpenAir NetSuite Connector to export your OpenAir published report data to custom records in NetSuite. After you export your OpenAir published report data to NetSuite, you can create reports and dashboards in NetSuite to gain visibility into KPIs such as profitability and revenue forecast, combining NetSuite and OpenAir data. See Exporting OpenAir Published Report Data to NetSuite.
- (For developers) **Read OpenAir OData resource data in your applications** — You can request data using the HTTP GET method and process the response in your applications. See Consuming OpenAir OData Resource Data in Your Applications

Benefits of OpenAir BI Connector

OpenAir Business Intelligence Connector lets you do more with your OpenAir data. It extends OpenAir's native reporting capabilities and lets you access your OpenAir data easily from other applications, including most Business Intelligence tools. You can then combine OpenAir data with information from other systems in your existing BI tools to create sophisticated reports.

OpenAir Business Intelligence Connector has the following advantages over other methods you can use to work with your OpenAir data in your preferred BI tools:

- **Automation** — Schedule your OpenAir reports to run and update your OpenAir OData feed data at regular interval (minimum interval is one time a day). Your published list view data is updated in real-time. You can configure the applications connecting to your OpenAir OData feed to refresh automatically. OpenAir Business Intelligence Connector cuts out the need to export your report or list view data as CSV files and import the data in other systems over and over again.
- **Security** — The OpenAir OData service follows the same security best practice as OpenAir. All data is encrypted in transport using the industry standard transport layer security (TLS) protocol. Your published report and list view data is stored securely on OpenAir servers. You can remove published resources from the OpenAir OData service at any time. You must enter your OpenAir login details to access published resources from your OpenAir OData feed. You can only access published resources from the OpenAir OData service if OpenAir Business Intelligence Connector is enabled for your account and if you have the relevant role permissions. Data access in the OpenAir OData feed follow the same privileges and restrictions as in OpenAir. Administrators can control employees access to the OpenAir Business Intelligence Connector features by role permission.
- **Portability** — Publishing and accessing data to and from the OpenAir OData service preserves the original data types, whereas data exported as a CSV file is saved as text, even if the values were numbers in OpenAir.
- **Simplicity** — Connect BI tools to your OpenAir data in real-time without the need to write any code. Most modern BI tools can connect to external data sources and use wizards to guide you through the data connection. Follow the vendor documentation for the product you want to connect to your OpenAir OData feed. Little maintenance effort is required, if any, after your tools are connected to the OpenAir OData feed.

OpenAir Business Intelligence Connector also extends the capability of OpenAir's user scripting feature by letting you access your report and list view data in forms and scheduled scripts. You can use published list view like custom queries — this makes a sophisticated level of search and sorting available before you start processing the data in your scripts.

Getting Started with OpenAir BI Connector

The following steps give an overview of the typical workflow working with OpenAir Business Intelligence Connector:

- To publish resources to your OpenAir OData feed
- To consume resources from your OpenAir OData feed from your Business Intelligence tools or in your OpenAir form and scheduled scripts.

1. Working with reports:
    a. **Create and save a report** in the OpenAir Reports application. Include all the data you want to have access to from your BI tools.

    > **Note:** If the report has collapsible levels — for example, a Customer column under which different projects roll up under — the published report data will not include the data for the sub-categories (for example, projects) if the parent level (for example, the customer) is collapsed. In the OpenAir report, click **show all** to include all sub-categories in the published data, and **hide all** to exclude all sub-categories and only include the totals for the main level.

    b. [Optional] **Share the report** with other employees in your company.

c. **Publish the report** to the OpenAir OData service manually — See Publishing Your Reports Manually to the OpenAir OData Service

d. [Optional] **Share the published report** — Choose whether you want the other employees you shared the report with to have access. to the published report in the OpenAir OData feed. See Sharing Published Reports With Other Employees in Your Company.

e. **Refresh the published report automatically** — Schedule the report to be published every day, week or month if you want your published report data to refresh regularly and your OpenAir OData feed to be updated automatically. See Configuring OpenAir to Publish Reports Automatically and Refresh Published Reports Periodically.

2. Working with list views:

a. **Customize your list view** — Go to a supported list view in OpenAir. Customize the columns, sort order and column filters for your list view. Use published list views like custom queries and refine the data you want to have access to from your BI tools, or in your OpenAir form and scheduled scripts.

b. **Publish your list view as private or public** — Edit your saved list view configuration properties and publish the list view to the OpenAir OData service. Choose whether you want other employees in your company to have access to the published list view in the OpenAir OData feed. The published list view data in your OpenAir OData feed will be updated in real-time. See Publishing List Views to the OpenAir OData Service.

3. Working with your OpenAir data in your BI tools:

a. **Connect to your OpenAir OData feed** — In your BI tools, connect your BI document to data resources (reports or list views) in your OpenAir OData feed. See Connecting BI Tools to Your OpenAir OData Feed.

b. **Shape and transform your imported data** — Some tools let you transform the imported data before it is displayed in the BI tool itself. You can rename or re-order your columns, for example or sort and refine it further to suit your purpose.

c. **Refresh the data automatically** — Configure your BI tool to refresh automatically and get the latest data from your OpenAir OData feed as often as needed. Most BI tools offer the option to refresh the data every time you open the document and at regular interval while you work with your data.

d. **Build your dashboards and reports** — Use the full capability of your BI tools to build and distribute your dashboards and reports.

Important: The number of requests you can send to the OpenAir OData service is limited. To review your usage and the limits set for your account, go to Administration > Global Settings > Account > OData limits. For more information, see BI Connector Requirements and Limits

Note: Remember the difference between the different type of resources:

- Published list views give you access to your OpenAir data in real-time.
- Published reports are a snapshot of your OpenAir data at the time of publication. It is equivalent to running a report and exporting the report to a CSV file.

4. Working with your published report and list view data in your OpenAir form and scheduled scripts. See Reading OpenAir OData Resource Data in Your OpenAir Form and Scheduled Scripts.

Note: Accessing data from your OpenAir OData feed using OpenAir user scripting functions does not use any of your allocated OData requests.

OpenAir OData Service

OpenAir Business Intelligence Connector uses the OData standard to make your published OpenAir resources available as a data source which you can import into BI tools applications supporting OData v4/ JSON.

The Open Data Protocol — or OData — is an ISO/IEC approved and widely supported standard which allows the exchange of data between applications. Most BI tools, including Microsoft Excel, support OData either natively or with the aid of a plug-in.

Note: OASIS Open Data Protocol (OData) TC gives the following overview:

The OASIS OData TC works to simplify the querying and sharing of data across disparate applications and multiple stakeholders for re-use in the enterprise, Cloud, and mobile devices. A REST-based protocol, OData builds on HTTP, AtomPub, and JSON using URIs to address and access data feed resources. It enables information to be accessed from a variety of sources including (but not limited to) relational databases, file systems, content management systems, and traditional Web sites. OData provides a way to break down data silos and increase the shared value of data by creating an ecosystem in which data consumers can interoperate with data producers in a way that is far more powerful than currently possible, enabling more applications to make sense of a broader set of data. Every producer and consumer of data that participates in this ecosystem increases its overall value.

For more information about OData, see the OData website.

OpenAir OData service designates the software technology supporting OpenAir Business Intelligence Connector's features. It works as a repository for published OpenAir resources and as the connection point which can be used to load OpenAir data into compatible applications.

OpenAir OData feed designates the particular collection of published resources you have access to in the OpenAir OData service. For information about connecting to your OpenAir OData feed, see Your OpenAir OData Feed URL and Connection Details.

You can use your OpenAir OData feed URL and connection details to:

- Connect to your OpenAir OData feed resource from your BI tools or other compatible applications — see Connecting BI Tools to Your OpenAir OData Feed.
- View OpenAir OData feed resource data directly in your web browser. The browser displays your resource data as a JSON object — see Viewing Your OpenAir OData Resource Data in a Web Browser.
- (For developers) Request OpenAir OData feed resource data in your applications using the HTTP GET method. The OpenAir OData service returns the response as a JSON object — see Consuming OpenAir OData Resource Data in Your Applications.

OpenAir BI Connector Role Permissions and Data Access Privileges

Role Permissions

You must be an administrator or have the relevant role permissions to publish resources to the OpenAir OData resource.

To access your OpenAir OData feed resource data or import it into your BI tools, you must enter your OpenAir login details. You cannot access the OpenAir OData service if you use a Single Sign-on form to access OpenAir. Your OpenAir OData feed only includes the resources you published and the list views published by others as public resources.

Administrators control who can publish reports and list views to the OpenAir OData service with the following role permissions:

- **Publish reports**
- **Enable publishing of shared reports to OData service with recipient's permission**
- **Enable publishing of shared reports to OData service with owner's permissions**
- **Publish List View via OData**

The **Publish reports** role permission lets you:

- Publish the reports you own (reports listed in Reports > Saved reports > My reports).
- Publish the reports others have shared with you and published to the OpenAir OData service.
- Access published reports in your OpenAir Odata feed (published reports you own and published reports others have shared with you).

The **Enable publishing of shared reports to OData service with recipient's permissions** and **Enable publishing of shared reports to OData service with owner's permissions** role permission let you:

- Publish the reports you have shared with others in the OpenAir Reports application, share the published reports with them and:
  - Restrict the data they can see when accessing the published report from the OpenAir OData service according to their data access privileges in OpenAir (**Share with recipient's permission**).
  - Allow them to see the same data you can see even if they do not have access to that data in OpenAir (**Share with owner's permission**).

The **Publish List View via OData** role permission lets you:

- Publish list views to the OpenAir OData Service with the following options:
  - Publish as a private — Only you can access the published list view from the OpenAir OData service
  - Publish as a public — All employees in your OpenAir account with the relevant data access privileges can access the published list view from the OpenAir OData service.

Data Access Privileges

The information you can see when accessing your OpenAir OData feed resource data or importing it into your BI tools is the same information you can see if you access the resource in OpenAir. The OpenAir

OData service respects your active filter set in OpenAir. Filter sets define what data you have permission to view in OpenAir and they are assigned by your account administrators.

A report owner may share a published report with you and give you permission to see the same data they see for that particular report. For more information, see Data Access Privilege Schemes for Published Reports.

BI Connector Requirements and Limits

Requirements

- The BI tools and other applications you connect to OpenAir Business Intelligence Connector must support **OData v4/JSON**.
- Authentication using SAML Single Sign-on is not supported. Users must **sign in using their OpenAir company ID, user ID and password** to access their OpenAir OData feed.
- You must have access to the **OpenAir Reports application** to create and publish reports.
- The **Save list view configuration** feature must be enabled for your account to publish list views.
- You must use a **secure URL scheme** (`https://`) to access the OpenAir OData services from a BI tool, web browser or any other application. OpenAir uses the industry standard Transport Layer Security (TLS) protocol to encrypt communication between the OpenAir server and the client application, and to ensure the security of the data transferred. Attempting to connect to the OpenAir OData service using a URL scheme that is not secure (`http://`) will return an error (Unable to connect).

BI Connector Limits

- Access to your OpenAir OData feed resource data is **read-only**.
- Publishing reports according to a schedule follows the limits of the report scheduler in the OpenAir Reports application. The minimum scheduled refresh interval for your published reports is 24 hours. However, you can publish or refresh the report manually at any time.
- Authentication using SAML Single Sign-on is not supported. Users signing into OpenAir using SAML Single Sign-on will not be able to access OpenAir OData resources from BI tools, web browsers and other applications.
- The OpenAir OData service is subject to request limits — see BI Connector Requirements and Limits.
- The OpenAir OData service only supports the HTTP `GET` method — see Consuming OpenAir OData Resource Data in Your Applications.
- The OpenAir OData service only supports the `$top` and `$skip` query parameters — See OData Query Options for more details.

OData Request Limits

The OpenAir OData service is subject to the following usage limits for each account.

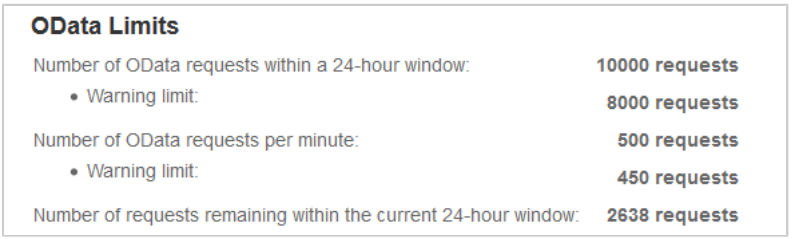
Limit Type	Default Limit
Number of OData requests within a 24–hour window	10,000 requests (a maximum of 10,000,000 rows of data)

Limit Type	Default Limit
	OpenAir issues a warning if you reach 8,000 requests
Number of OData requests per minute	500 requests (a maximum of 500,000 rows of data) OpenAir issues a warning if you reach 450 requests

- The OData usage limits apply to the **number of read requests**. Publishing resources to the OpenAir OData service does not count toward your OData request limits.
- Each access to any one published resource from the OpenAir OData service uses **at least one request**. Every time you load data from a published resource into your BI tool or in a wizard preview screen and every time you refresh the data counts as at least one request.
- **Each request is limited to 1000 rows of data**. Accessing a published resource with anything between 1 and 1000 rows of data uses one request. Accessing a published resource with more than 1000 rows of data uses 1 request for each 1000 rows or part therein — for example, accessing a published resource with 4001 rows of data would use 5 requests.

> **Note:** If you load published resources containing a high number of rows into your BI tool, your BI tool should send automatically as many requests as necessary to the OpenAir OData service and as allowed by your usage limits and retrieve all the data seamlessly from your OpenAir OData feed resource. Most applications supporting OData v4/ JSON should support combined requests.
>
> Application developers can process the response from the OpenAir OData service and page through large OData resources using the supported OData query parameters. See OpenAir Business Intelligence Connector Advanced Functions.

- The OData request limits are **independent of any other data limits**.
- Accessing data from your OpenAir OData feed using OpenAir user scripting functions does not use any of your allocated OData requests.
- OpenAir sends a warning email to the account administrator if a warning has been issued during the day (one warning email per day).
- Administrators and users with the **View OData limits** role permission can **view OData limits and usage for your account** in the Administration module (Administration > Global Settings > Account > OData limits). The OData Limits page shows the maximum number of requests allowed for your account as well as the number of requests remaining in the current 24-hour window.



Tip: To ensure you stay within the OData requests limits for your account:

- **Disable previews in your BI tools**. BI tools send an OData request to display a preview for each resource.
- **Refresh your data sparingly in your BI tools**. Every data refresh uses as many OData requests as necessary to import all rows of data for each connected OData resource being refreshed. Most BI tools let you configure refresh settings and have options to refresh all data connections or only one data connection at a time.
- **Only import the data you need**. Refine the configuration of the reports and list views you want to publish to import only the data you need to access from your BI tools. Filter your data in OpenAir and not in your BI tools or your applications to minimise the amount of request used with each import or refresh.

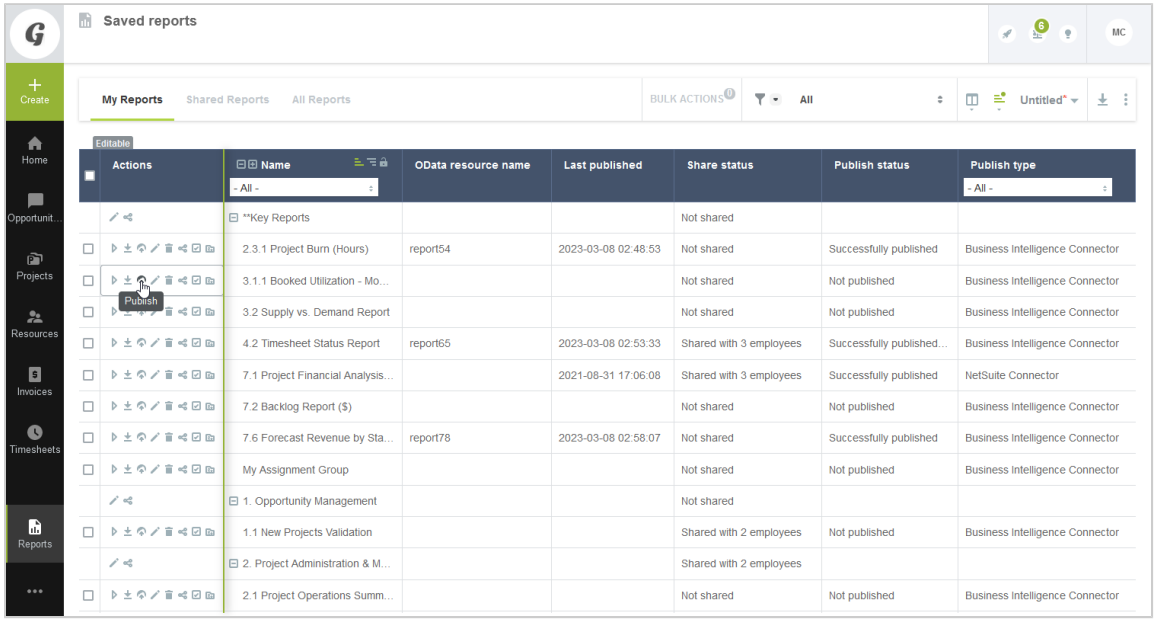
Note: To adjust the OData request limits set for your account, contact your OpenAir account manager or OpenAir Customer Support.

Publishing Reports to the OpenAir OData Service

The OpenAir Business Intelligence (BI) Connector lets you publish reports to the OpenAir OData service and make the report data available for import into any BI tools supporting OData V4, for import into NetSuite using OpenAir NetSuite Connector, or for use with your form and scheduled scripts in OpenAir. You can specify a scope of use for the reports your publish. See

You can publish reports and manage your published reports from within the Reports application in OpenAir by going Reports > Saved reports. From there, you can:

- Publish your report data to the OpenAir OData service — See Publishing Your Reports Manually to the OpenAir OData Service.
- Configure OpenAir to publish your report data and refresh your published report data automatically according to a schedule — See Configuring OpenAir to Publish Reports Automatically and Refresh Published Reports Periodically.
- Share your published reports with other employees in your company — See Sharing Published Reports With Other Employees in Your Company.
- Publish reports others have shared with you and published with recipient's permission — See Publishing Reports Others Have Shared with You.
- View the publication status and the OData resource name of your reports — See Verifying the Publication Status of your Reports.
- Remove your published reports from the OpenAir OData service — See Deleting Published Reports from the OpenAir OData Service.



Tip: To see all the information you need straight from the Saved reports list view, add the following columns to your list view: **OData resource name**, **Publish status**, **Last published** and **Shared status**. You can save this list view configuration for later use.

Published Report Scope of Use

When publishing a report manually to the OpenAir OData Service or configuring OpenAir to publish or refresh a report automatically according to a defined schedule, you can choose a scope of use. The following options are available.

- **Business Intelligence Connector** - The published report data is available from your OpenAir OData feed and to be consumed by any business intelligence tools or other applications connecting to your OpenAir OData feed. The published report data is also available from your OpenAir form and scheduled scripts. See Connecting BI Tools to Your OpenAir OData Feed and Consuming OpenAir OData Resource Data in Your Applications
- **NetSuite Connector** — The published report data is available for export to NetSuite using a custom export workflow. The published report data is also available from your OpenAir form and scheduled scripts but it is not available from your OpenAir OData feed. See Exporting OpenAir Published Report Data to NetSuite.

  Important: The following guidelines apply when publishing a report for export to NetSuite using NetSuite Connector:

  - The owner of the report must be the same account administrator as the dedicated **Integration user** selected on NetSuite Connector Credentials tab.
  - The published report cannot be shared with others. Use the default **Do not share** permission setting. If you select a different permission setting, it will be reset automatically to **Do not share** when publishing the report.
  - The published report scope of use (**Publish type**) cannot be changed if the report was previously published for use with OpenAir NetSuite Connector and a custom integration workflow to export the published report data exists.
- **User Scripting** — The published report data is available only from your OpenAir form and scheduled scripts. See Reading OpenAir OData Resource Data in Your OpenAir Form and Scheduled Scripts.

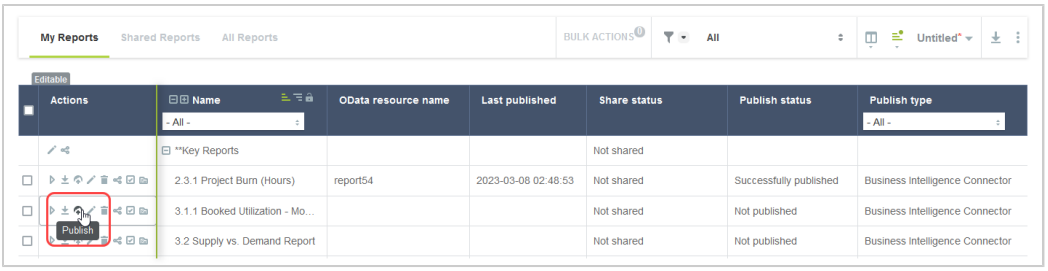
Publishing Your Reports Manually to the OpenAir OData Service

You can publish your saved reports to the OpenAir OData service if the **OpenAir Business Intelligence Connector** feature is enabled for your account and if you have the **Publish reports** role permission.

Note: Publishing a report manually to the OpenAir OData service is equivalent to running that report and exporting the report data as a CSV file. It take a snapshot of your data at the time of publication.

To publish a report to the OpenAir OData service:

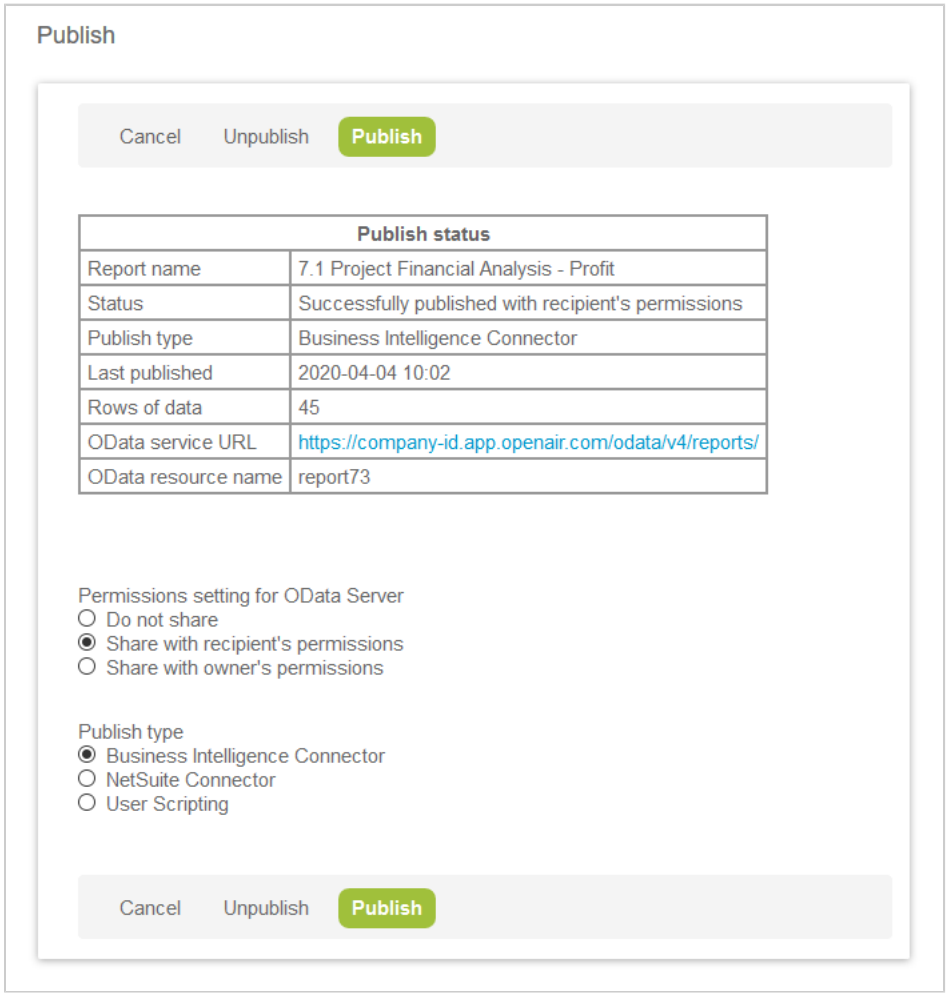
1. Go to Reports > Saved reports > My reports. This list view displays the reports you own.



2. Click the publish icon in the **Action** column for the report you want to publish. The Publish screen appears.

Note: Review the following guidelines:

- Review the current publication status of your report. Publishing the report will overwrite the last published version of the same report.
- The **OData resource name** indicates the type of resource (report, in this case) and the internal ID for that resource. You will need the report ID to identify the report when connecting your BI tool to your OpenAir OData feed. The OData resource name is allocated by OpenAir Business Intelligence Connector and cannot be changed. It is not available if the report was published for use with OpenAir NetSuite Connector.
- The published report scope of use (**Publish type**) cannot be changed if the report was previously published for use with OpenAir NetSuite Connector and a custom integration workflow to export the published report data exists.



3. If your role permissions allow you to share your published reports with others, and if you are publishing a shared report, choose a **Permission setting for OData Server**. The option you choose determines whether others have access to your published reports in the OpenAir OData

service and what data they can see. For more information about sharing permissions, see Sharing Published Reports With Other Employees in Your Company.

Important: The permission setting default to **Do not share** every time you publish a report. If you share the published report with others and want to continue to do so, you must select a permission setting every time you publish the report.

4. Choose a **Publish type**. The option you choose determines whether the published report data is available for use with business intelligence tools connected to your OpenAir OData feed, or for export to NetSuite using OpenAir NetSuite Connector, or exclusively for use with OpenAir User Scripting. See Published Report Scope of Use.
5. Click **Publish**. A confirmation message and the publication status information are displayed on the screen.

The report was successfully published

Publish status	
Report name	7.1 Project Financial Analysis - Profit
Status	Successfully published with recipient's permissions
Publish type	Business Intelligence Connector
Last published	2021-10-01 03:53
Rows of data	45
OData service URL	https://company-id.app.openair.com/odata/v4/reports/
OData resource name	report73

Note: **OData resource name** indicates the type of resource (report, in this case) and the internal ID for that resource. You will need the report ID to identify the report when connecting your BI tool to your OpenAir OData feed. The OData resource name is allocated by OpenAir Business Intelligence Connector and cannot be changed.

Last published shows the date and time when the report publication completed and the published report data became available in your OpenAir OData feed.

Important: The following guidelines apply when publishing a report for export to NetSuite using NetSuite Connector:

- The owner of the report must be the same account administrator as the dedicated **Integration user** selected on NetSuite Connector Credentials tab.
- The published report cannot be shared with others. Use the default **Do not share** permission setting. If you select a different permission setting, it will be reset automatically to **Do not share** when publishing the report.
- The published report scope of use (**Publish type**) cannot be changed if the report was previously published for use with OpenAir NetSuite Connector and a custom integration workflow to export the published report data exists.

Configuring OpenAir to Publish Reports Automatically and Refresh Published Reports Periodically

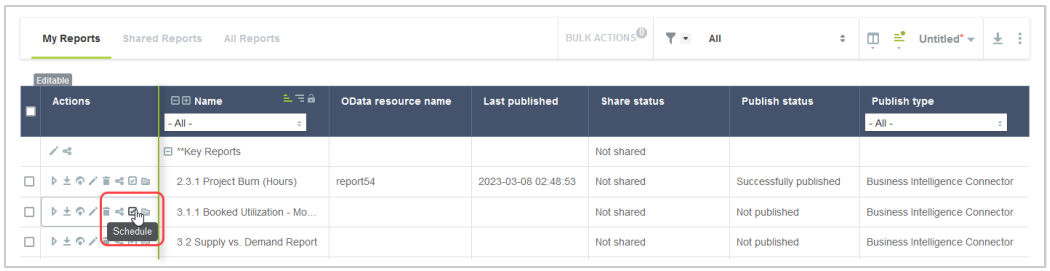
If the **OpenAir Business Intelligence Connector** feature is enabled for your account and if you have the **Publish reports** role permission, you can use the Schedule feature in the OpenAir Reports application to publish your reports automatically at regular intervals. Publishing your reports automatically on a daily, weekly or monthly basis will refresh the report data available from the OpenAir OData service.

You can configure OpenAir to refresh each published report automatically twice on the same day, and specify the times for each refresh. This option is only available if the OpenAir Business Intelligence Connector feature is enabled for your account, and only for reports published to the OpenAir OData service.

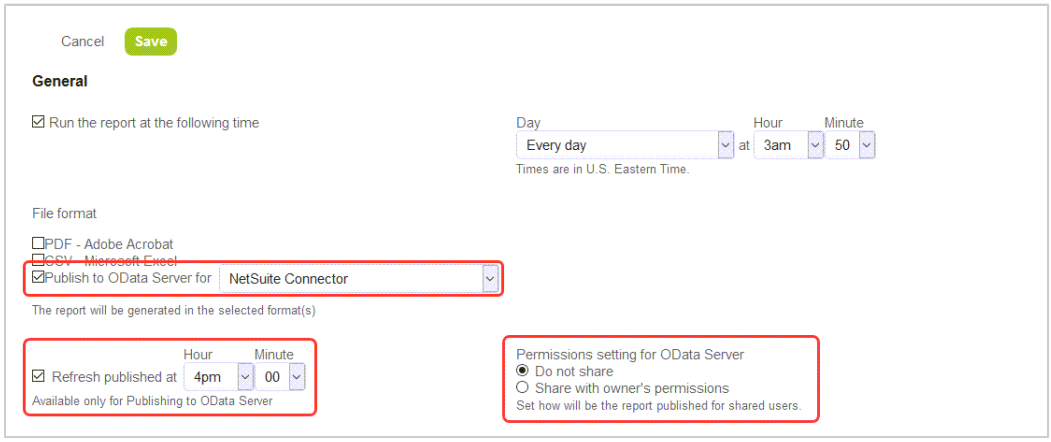
If your BI tools connect to the OpenAir OData service and are configured to refresh automatically, the data you see in these tools will be refreshed according to the same schedule. For more information, see Connecting BI Tools to Your OpenAir OData Feed.

To configure OpenAir to publish a report automatically and periodically to the OpenAir OData service:

1. Go to Reports > Saved reports > My reports.



2. Click the schedule icon in the **Action** column for the report you want to publish. The Schedule report form appears.

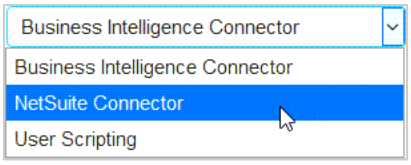


3. In the General section of the Schedule Report form:

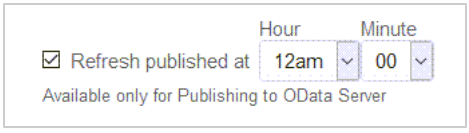
   a. Check the **Run the report at the following time** box.

   b. Select a **Day** and time to set the frequency of publication. The publication schedule can be set to run everyday, or on a specific day of the week or month.

   c. Check the **Publish to OData Server** box and select the scope if use for the published report from the dropdown options. The option you select determines whether the published report data is available for use with business intelligence tools connected to your OpenAir OData feed, or for export to NetSuite using OpenAir NetSuite Connector, or exclusively for use with OpenAir User Scripting. See Published Report Scope of Use.



   d. You can refresh published reports twice on the same day. To do so, check the **Refresh at** box and select a second publication time for your report.



   e. If your role permissions allow you to share your published reports with owner's permissions, and if you are publishing a shared report, choose a **Permission setting for OData Server**. The option you choose determines whether others have access to your published report data in the OpenAir OData service. For more information about sharing permissions, see Sharing Published Reports With Other Employees in Your Company.

> **Important:** When publishing a report for export to NetSuite using NetSuite Connector, the leading practice is to keep the default **Do not share** permission setting. The owner of the report must be the account administrator managing the NetSuite Connector configuration.

4. Click **Save**.

Sharing Published Reports With Other Employees in Your Company

The OpenAir Reports application lets you share your reports with other employees in your company. With the OpenAir Business Intelligence Connector, you can also publish the reports you shared with them and give these same employees access to your published report data. This functionality is available only if the **Publish Shared Reports using OpenAir BI Connector** feature is enabled for your account and if you have the relevant role permissions.

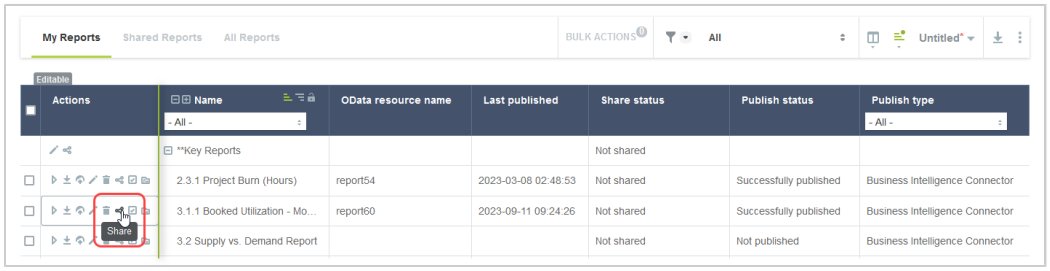
When you publish a report or configure a schedule to publish a report automatically, you can select a data access privilege scheme for your published report — see Data Access Privilege Schemes for Published Reports.

After you share a published report with others, you can manage who has access to your published report by editing the list of employees you share the report with— see Managing Access to Your Shared Published Reports.

If you delete the report or remove the published report from the OpenAir OData feed, the employees you shared the report with will no longer have access to the published report data from the OpenAir OData service — see Deleting Published Reports from the OpenAir OData Service.

To share a published report with other employees in your company:

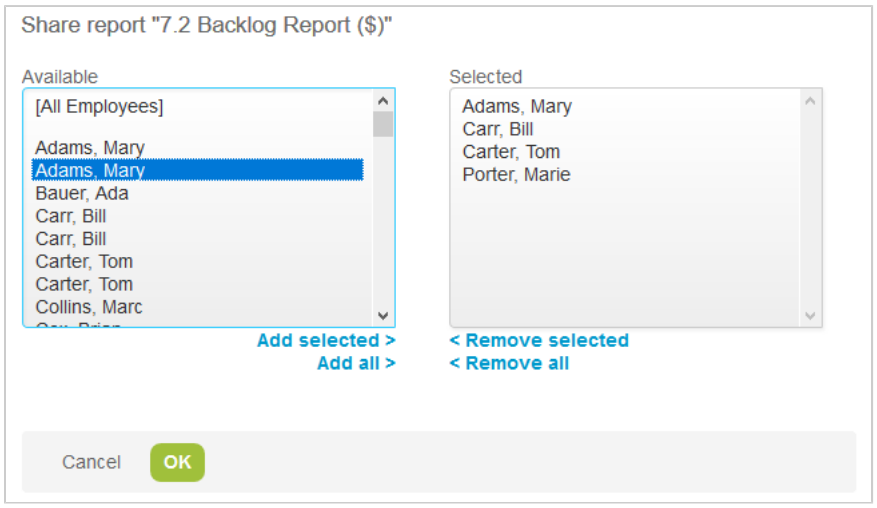
1. Go to Reports > Saved reports > My reports.



2. Click the share icon in the **Action** column corresponding to your report. The Share report dialog appears.

> **Note:** To give other employees access to published report data, you must first share the report with these same employees.

3. Add the employees you want to share the report with to the **Selected** column.



4. Click **OK** then click the **Click here** link to close the confirmation dialog and refresh the saved reports list view.
5. Publish the report or schedule the report publication and select the appropriate data access privilege scheme for your published report. See Data Access Privilege Schemes for Published Reports.

   For more information about publishing reports, see Publishing Reports to the OpenAir OData Service.

   For more information about scheduling report publication, see Configuring OpenAir to Publish Reports Automatically and Refresh Published Reports Periodically.

Data Access Privilege Schemes for Published Reports

There are three data access privilege schemes for published reports:

- **Do not share** — Only you can access your published report. This is the default option.
- **Share with recipient's permission** — The employees you shared the report with in the OpenAir Reports application will be able to access the published report in their OpenAir OData feed after they publish the shared report. When they load the published report in a BI tool or view it in a browser, they will only see the data they have access to in OpenAir. This option is equivalent to each recipient saving and publishing a copy of the shared report.

  > **Note:** This option is only available if you have the **Enable publishing of shared reports to OData service with recipient's permissions** role permission.
  >
  > After you share a published report with recipient's permission, each recipient needs to publish this report before they can access the published report data in the OpenAir OData service. Recipients must have the **Publish Reports** role permission to publish the shared report for themselves and access the published report data in the OpenAir OData service.

- **Share with owner's permission** — The employees you shared the report with in the OpenAir Reports application can access the published report immediately in their OpenAir OData feed. When they load the published report in a BI tool or view it in a browser, they will see the same data you see, even if they do not normally have access to that data in OpenAir. This option is equivalent to the owner exporting the report as a PDF document or CSV file and emailing it to the recipients.

Warning: Use this option with caution. You may give recipients access to data which they are not entitled to view. Remember that if your share a published report with owner's permission, the employees you shared the report with have access to the published report immediately in their OpenAir OData feed.

Note: This option is only available if you have the **Enable publishing of shared reports to OData service with owner's permissions** role permission.

After you share a published report with owner's permission, the employees you shared the published report will automatically have access to the published report data in the OpenAir OData service. Recipients must have either the **Download Reports** or the **Publish Reports** role permission to access the published report data in the OpenAir OData service.

Tip: To change the data access privileges for the employees you share the report with, publish the report again and select a different permission setting. This will also update the published report data.

Managing Access to Your Shared Published Reports

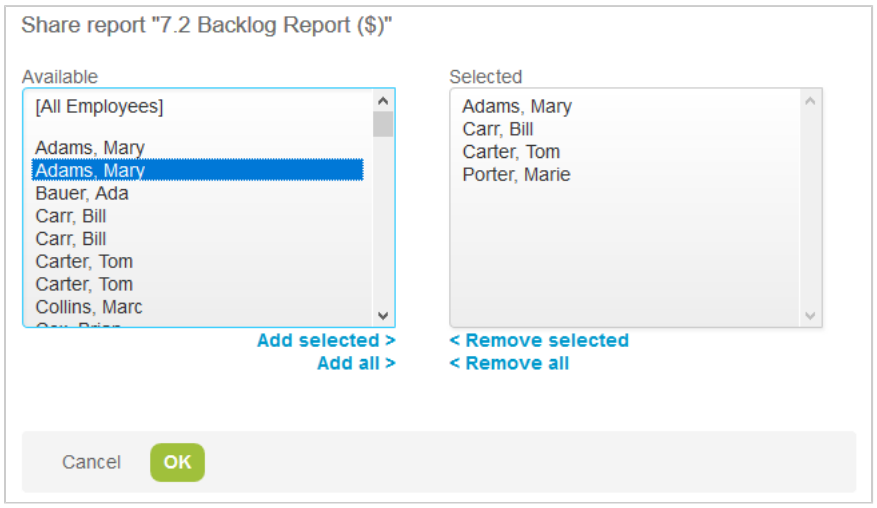
You can manage who has access to the reports you published by managing who has access to the report.

Tip: To stop sharing the published report altogether, publish the report again and select the **Do not Share** permission setting. This will update the published report data and change the data access privileges for the employees you share the report with.

Important: If you share published a report with recipient's permission and a recipient published the shared report, they will still be able to access the published report in their OpenAir OData feed. However, they will no longer be able to publish the shared report and update the published report data.

To manage who has access to your published reports from the OpenAir OData service:

1. In OpenAir, go to Reports > Saved reports > My reports.
2. Click the share icon for your published shared report. The Share report dialog appears.
3. To give an employee access to your published report, add the employee to the Selected column. To remove an employee's access to your published report, remove the employee from the Selected column.



4. Click **OK** then click the **Click here** link to close the confirmation dialog and refresh the saved reports list view.

Publishing Reports Others Have Shared with You

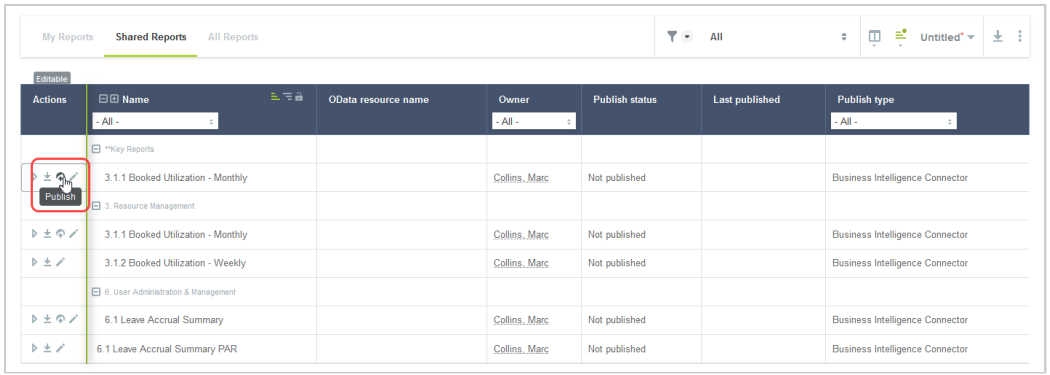
If other employees have shared a published report with you with recipient's permission, you must publish this report before you can access the published report data from the OpenAir OData service.

Note: You must have the **Publish reports** role permission to publish the reports you own or the reports others have shared with you.

If the report owner deletes the report or removes the published report from the OpenAir OData feed, you will no longer be able to access the published report data from the OpenAir OData service.

To publish a shared report to the OpenAir OData service:

1. Go to Reports > Saved reports > Shared reports. This list view displays the reports others have shared with you.



2. Click the publish icon in the **Action** column for the report you want to publish. The Publish screen appears.

> **Note:** Review the current publication status of your report. Publishing the report will overwrite the last published version of the same report.

3. Click **Publish**. A confirmation message and the publication status information are displayed on the screen.

The report was successfully published

Publish status	
Report name	7.1 Project Financial Analysis - Profit
Status	Successfully published with recipient's permissions
Publish type	Business Intelligence Connector
Last published	2021-10-01 03:53
Rows of data	45
OData service URL	https://company-id.app.openair.com/odata/v4/reports/
OData resource name	report73

> **Note:** **OData resource name** indicates the type of resource (report, in this case) and the internal ID for that resource. You will need the report ID to identify the report when connecting your BI tool to your OpenAir OData feed. The OData resource name is allocated by OpenAir Business Intelligence Connector and cannot be changed.
>
> **Last published** shows the date and time when the report publication completed and the published report data became available in your OpenAir OData feed.

Verifying the Publication Status of your Reports

You can view the publication status of your reports from the list views:

- To view the publication status of the reports you own, go to Reports > Saved reports > My reports
- To view the publication status of the reports others have shared with you, go to Reports > Saved reports > My reports

A summary of the publication status is displayed when you publish a resource to the OpenAir OData service so you can:

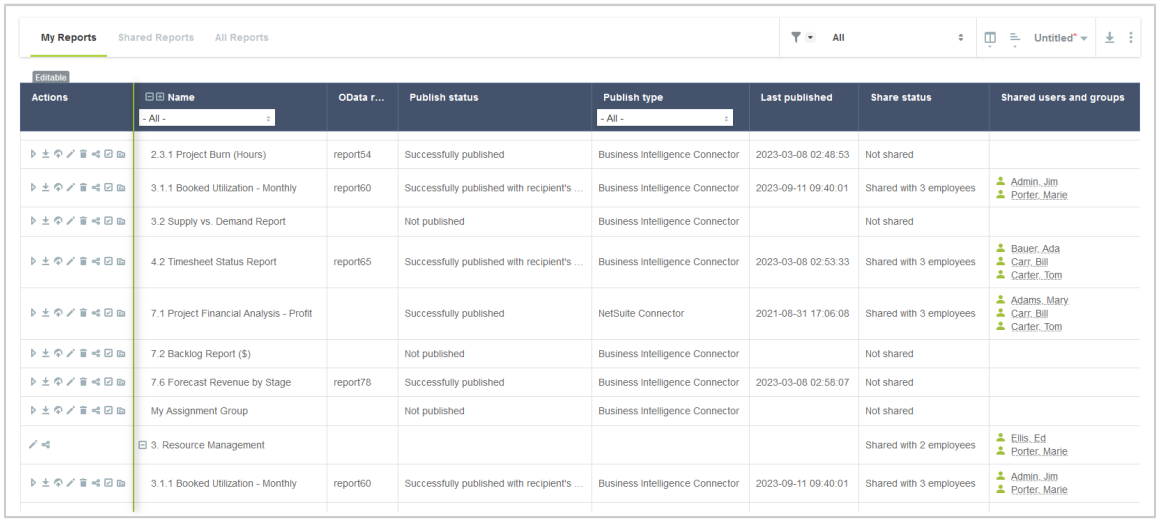
- Review the current publication status of your report. Publishing the report will overwrite the last published version of the same report.
- Get confirmation that you report was published successfully.

To see all the information you need straight from the Saved reports list view at any time, add the following columns to your list view and save the list view configuration for later use (if the feature is enabled for your account).

- **OData resource name** — Use the OData resource name to access the published report in your OpenAir OData feed.

> **Note:** **OData resource name** indicates the type of resource (report, in this case) and the internal ID for that resource. You will need the report ID to identify the report when connecting your BI tool to your OpenAir OData feed. The OData resource name is allocated by OpenAir Business Intelligence Connector and cannot be changed. It is not available if the report was published for use with OpenAir NetSuite Connector.

- **Share status** (only in Reports > Saved reports > My reports) — Shows whether you have shared this report and how many employees you have shared this report with.
- **Shared users** (only in Reports > Saved reports > My reports) —The employees you have shared the report with.
- **Publish status** — Shows whether you have published the report and what permissions you have shared it with, if applicable.
- **Publish type** — Shows the scope of use for your published report. See Published Report Scope of Use.
- **Last published** — The date and time when the last report publication or refresh completed and when the published report data became available in your OpenAir OData feed. The time stamp is updated whether the report was published manually or automatically (scheduled publication).
- **Owner** (only in Reports > Saved reports > Shared reports) — The name of the user who owns the report and shared it with you.



Deleting Published Reports from the OpenAir OData Service

There are two ways to delete published report data from the OpenAir OData service:

- You can delete only the published report data.
- You can delete both your saved report and your published report data.

After you delete a published report, no one will be able to access the published report data from the OpenAir OData service. Deleting a published report also deletes the published report data for the other employees you shared the published report with.

Note: Any published report data cached in your BI tool will still be available for use after you delete the report or the published report data. However, you will not be able to update this data.

To delete only the published report data:

1. Go to Reports > Saved reports > My reports or Reports > Saved reports > Shared reports.
2. Click the publish icon in the **Action** column for the report.
3. Click **Unpublish**.

Note: Reports published for use with OpenAir NetSuite Connector cannot be unpublished if a custom integration workflow to export the published report data exists.

To delete both your saved report and your published report data:

1. Go to Reports > Saved reports > My reports.
2. Click the Delete icon next to the report you want to delete. A confirmation dialog appears.
3. Click **OK**. Your report will no longer be available in OpenAir and the corresponding published report data will no longer be available from the OpenAir OData service.

Publishing List Views to the OpenAir OData Service

OpenAir Business Intelligence Connector lets you publish list views to the OpenAir OData service. You can then access your OpenAir list view data in real-time from any business intelligence (BI) tools supporting OData v4/JSON.

The published list view data is updated in real-time and available instantly to your connected BI tools. If your BI tools are configured to refresh automatically, the data you see in these tools will synchronize with the list view data in OpenAir during every refresh. For more information, see Connecting BI Tools to Your OpenAir OData Feed.

By default, your published list views are private — only you can access the published list view data from the OpenAir OData service. You can make your published list views available to all active employees. Employees accessing list views published as public from their OpenAir OData feed will have access to the same data they normally have access to in OpenAir. Data access privileges are set by account administrators using filter sets and the same filter sets apply to both OpenAir and the OpenAir OData service.

You can view and manage the list views published to the OData service. See Managing Published List Views.

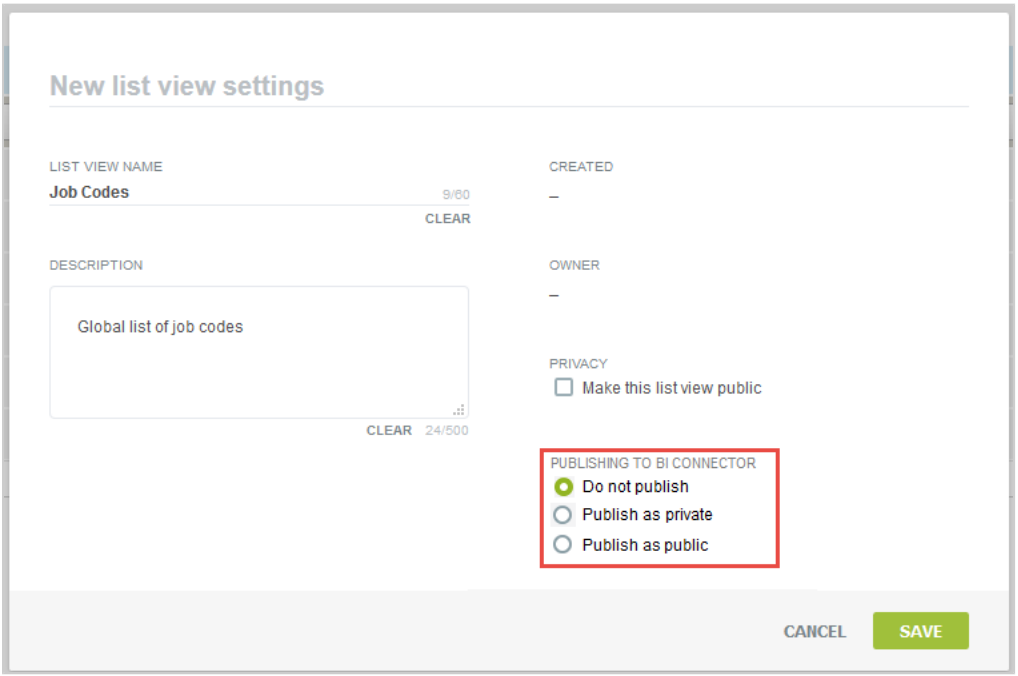
Note: OpenAir Business Intelligence Connector supports all major list views from the Expenses, Invoices, Projects, Purchases, Resources, Timesheets and Workspaces applications. The following list views are currently supported:

- **Expenses** — Expense reports, Authorizations, Alerts
- **Invoices** — Invoices, Charges
- **Projects** — Bookings, Projects, Tasks, Issues, Alerts
- **Purchases** — Purchase requests, Purchase orders, Fulfillment, Fulfillments
- **Resources** — Resources, Bookings, Alerts
- **Timesheets** — Timesheets, Time entries, Time off requests, Leave accrual, Alerts
- **Workspaces** — Workspaces, Discussions, Documents, Alerts
- **Administration**:
  - **Global Settings** — Contacts, Customers, Job codes

To publish a list view to the OpenAir OData Service:

1. Go to the list view you want to publish.
2. Select one of your saved list view configurations or create a new one based on the active configuration. For more information about list view configurations, see OpenAir Administrator Guide.

3. Click **Edit properties** in the List View Configurations panel, or click **Save as ...** if you are creating a new list view configuration.
4. In the Edit list view settings (or New list view settings) form, select one of the available options under **PUBLISHING TO BI CONNECTOR**:
   - **Do not publish** — the list view will not be published (this is the default setting).
   - **Publish as private** — the list view will be published, but only the user publishing it can access the data.
   - **Publish as public** — the list view will be published and available for any user to access. This option respects role permissions and rules for data access, so users can only see data which their role allows them to see.



5. Click **Save**.
6. You can connect your BI tools to the OpenAir OData feed and work with your list view data from your BI tools. See Connecting BI Tools to Your OpenAir OData Feed.

Managing Published List Views

You can view and manage the list views you published to the OData service. Administrators and users with the **View and modify all saved list views** role permission can view and manage all published list views on the account from the Administration module.

When OpenAir Business Intelligence Connector is enabled for your account, the Manage list view settings screen shows the following columns:

- **Publish status** — Shows whether the list view is published as a private resource (available to the saved list view owner only), as a public resource (available to all users), or not at all.
- **Last published** — The date and time when the list view configuration was last saved.
- **OData resource name** — Use the OData resource name to access the published list view in your OpenAir OData feed.

Other list view configuration properties provide additional details about the published list view including **Owner** which shows the name of the employee who published the list view.

You can delete a list view configuration. If you delete a list view configuration, the published list view data will no longer be available from the OpenAir OData service.

To manage the list views you published:

1. Go to the list view.
2. Click **Manage saved list views** from the List View Configurations panel. The "Manage list view settings" popup displays the list of configurations you saved for this list view.

   To delete a list view configuration and the associated published list view, click the delete icon in the Actions column.

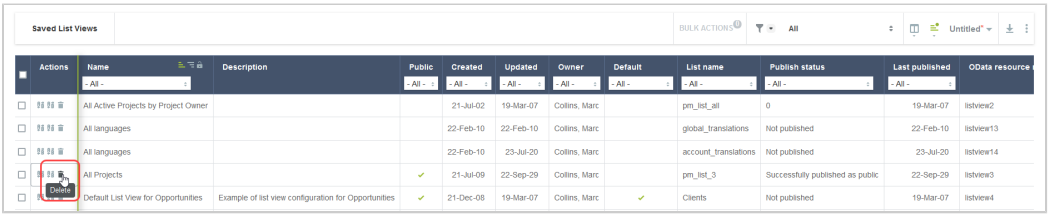
> **Note:** If you have no saved configurations for this list view, the **Manage saved list views** option is disabled.

To manage all published list views on the account:

1. Go to Administration > Global Settings > Organization > Saved List Views.

   The Manage list view settings screen appears. It lists all the list views published by all users across your OpenAir account.

   To delete a list view configuration and the associated published list view, click the delete icon in the Actions column.



Connecting BI Tools to Your OpenAir OData Feed

You can connect any business intelligence (BI) tool or any other application supporting OData v4/JSON to your OpenAir OData feed. After you connect your application to the OpenAir OData feed, you will have access to the list view or report data that you published or that others shared with you.

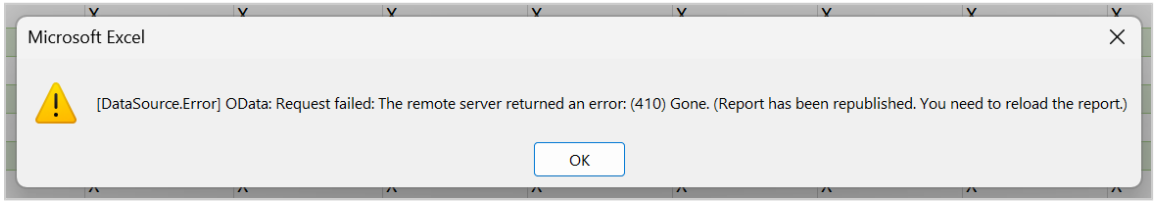
Note: You must have either the **Download Reports** or the **Publish Reports** role permission to access published reports in the OpenAir OData service. Accessing list views published as public in the OpenAir OData service does not require specific role permissions.

Many applications support OData v4. Check the vendor documentation for specific information about connecting your Business intelligence product to an OData feed. This section describes how to connect the following applications to your OpenAir Data feed:

- **Microsoft Excel** — see Importing Data from Your OpenAir OData Feed to Microsoft Excel.
- **Microsoft Power BI** — see Importing Data from Your OpenAir OData Feed to Microsoft Power BI Desktop.

You will need to provide the URL for your OpenAir OData feed as well as your login information. See Your OpenAir OData Feed URL and Connection Details.

If a published report is refreshed while your BI tool is reading or paging through that published report, the OpenAir OData feed returns a `410 Gone` HTTP status error with the message "`Report has been republished. You need to reload the report.`". Whether and how the message is displayed depends on the BI tool you use to consume the published report data.



For information about specifications that your BI tool must meet to use the OpenAir Business Intelligence Connector, see Requirements.

Your OpenAir OData Feed URL and Connection Details

To connect a business intelligence tool or any other application to your OpenAir OData feed, you will need the following details:

- **The location of the resource collection or the resource** you want to access in your OpenAir OData feed. The URL contains the domain for your OpenAir account followed by the path to the OData resource or resource collection. The resource collection is either all your published reports or all your published list views. A resource is a specific published report or published list view. To form the URL for a specific resource, add the OData resource name `<resource-name>` — for example `report53` or `listview64` at the end of the URL for the resource collection.

Important: Some Business Intelligence product do not support links to OData resource collections. For example, to import your published OpenAir data into Tableau, you must use the URL for a specific resource.

URL for your OData report collection	`https://<account-domain>/odata/v4/reports/`
URL for a specific OData report	`https://<account-domain>/odata/v4/reports/<resource-name>`
URL for your OData list view collection	`https://<account-domain>/odata/v4/listviews/`
URL for a specific OData list view	`https://<account-domain>/odata/v4/listviews/<resource-name>`

Note: The URL for OpenAir services includes the domain name for your OpenAir account `<account-domain>`. For more information about your account-specific domain name, see the help topic Use Account-Specific Domain.

- Your OpenAir OData feed **User name** and **Password**:

User Name	The user name contains your OpenAir Company ID and User ID, separated by a back slash (\): `<CompanyID>\<UserID>` (for example, honeycomb\mcollins)
Password	Your OpenAir password

Importing Data from Your OpenAir OData Feed to Microsoft Excel

The steps described in this topic are provided for illustration purposes only. Refer to the vendor documentation for detailed instructions about connecting Microsoft Excel with an OData feed. In Excel 2016 for Windows and later versions, you can use Get & Transform (Power Query) to connect to an OData feed and perform advanced queries. See Import data from external data sources (Power Query) on the Microsoft website for more information .

Use the following steps to connect Microsoft Excel 2016, Excel 2019 or Excel for Office 365 for Windows with data from your OpenAir OData feed.

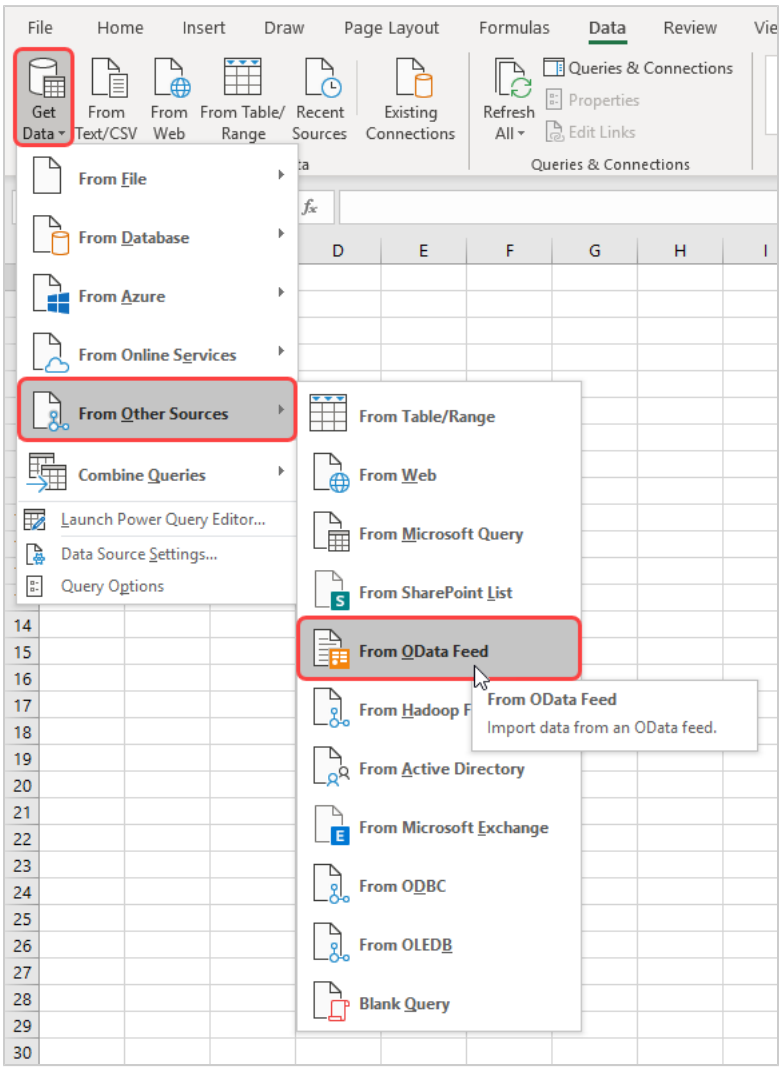
Note: Other versions of Microsoft Excel may not support this functionality natively . In particular:

- **Microsoft Excel for Mac** — You must install an Open Database Connectivity (ODBC) driver for OData to import data from an OData feed into Excel for Mac. See ODBC drivers that are compatible with Excel for Mac on the Microsoft website or search "ODBC driver for OData for Mac" for information about available third-party plug-ins.
- **Microsoft Excel 2013 for Windows** — You must activate the Power Query add-in to connect to external data sources. See Import data from external data sources (Power Query) on the Microsoft website for more information .

To import data from your OpenAir OData to Microsoft Excel for Windows:

1. In Microsoft Excel, click the **Data** tab.
2. Do one of the following
   a. In Microsoft Excel 2019 for Windows or later versions:

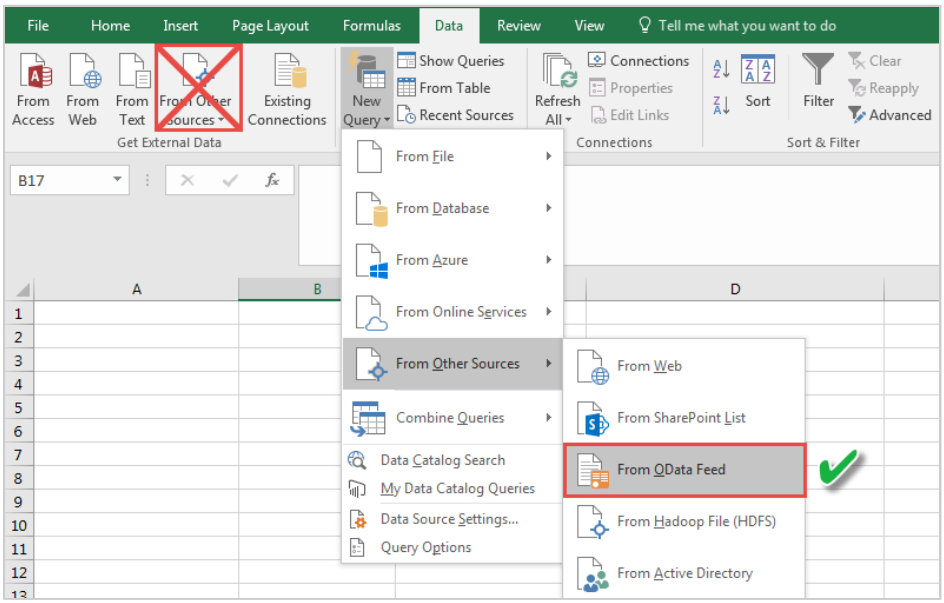
      Click **Get Data**, then point to **From Other Sources** and click **From OData Feed**. If you don't see the **Get Data** button, then click **New Query**, then point to **From Other Sources** and click **From OData Feed**.



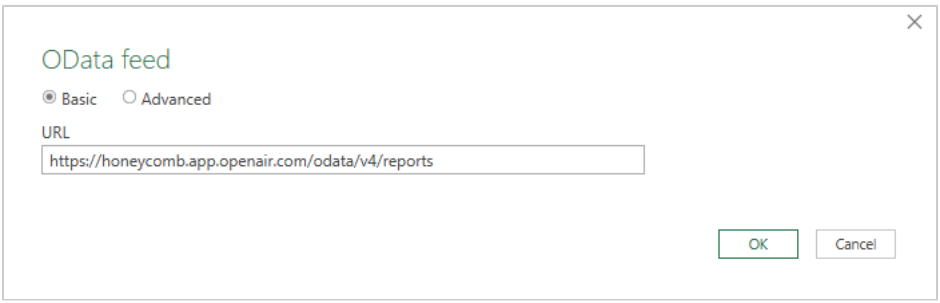
b. In Microsoft Excel 2016 for Windows:

   Click **New Query**, then point to **From Other Sources** and click **From OData Feed**.

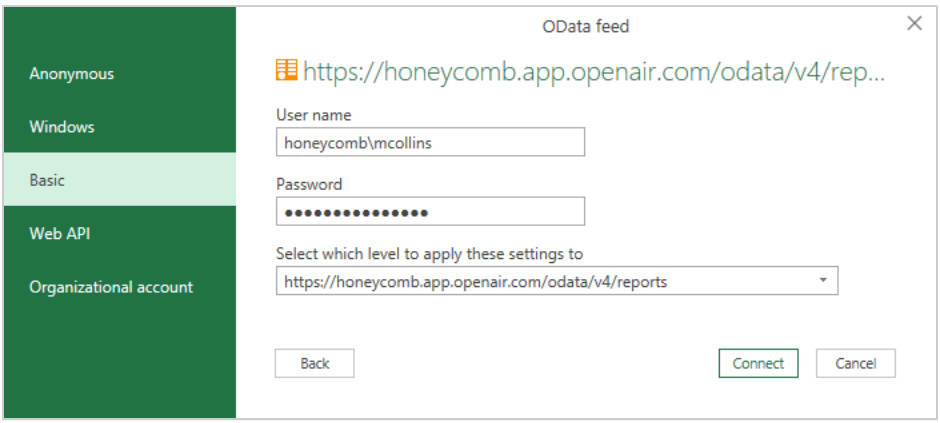
Note: You cannot import your data using the **From Other Sources** option in the **Get External Data** group in Microsoft Excel 2016 for Windows.



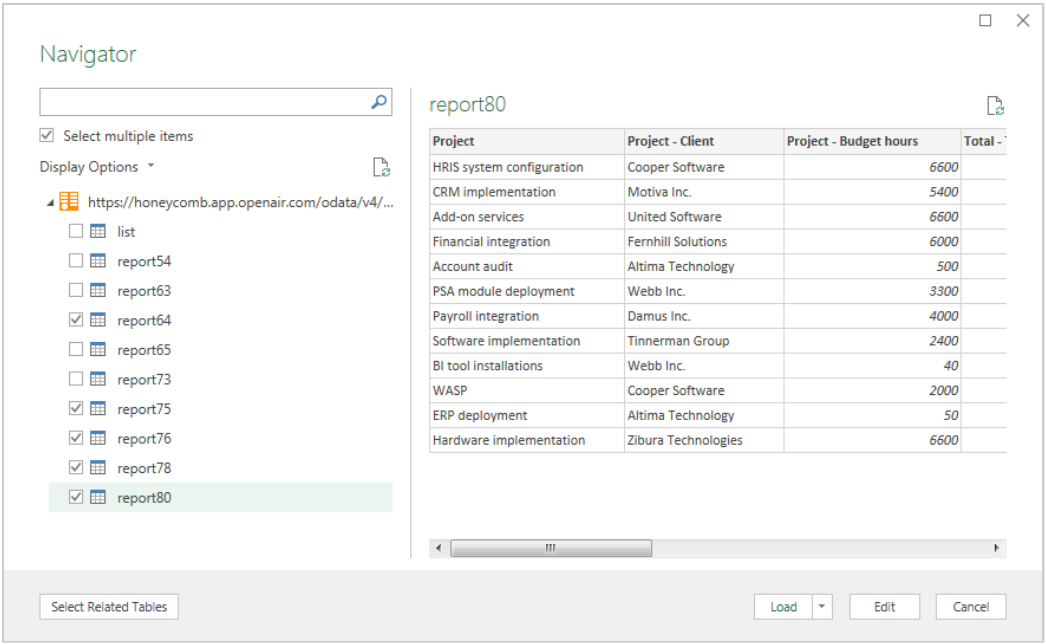
3. In the OData feed popup window, select **Basic** from the radio button options box, and enter the **URL** for the reports or list views resource collections in your OpenAir OData feed — for more information about your OpenAir OData feed URL, see Your OpenAir OData Feed URL and Connection Details.



4. Click **OK**.
5. In the OData feed popup window In the OData feed window:
   a. Click **Basic**.
   b. Enter your OpenAir OData feed **User name**. Remember, your OpenAir OData feed user name contains your OpenAir Company ID and User ID, separated by a back slash: `<CompanyID>\<UserID>`
   c. Enter your OpenAir **Password**.
   d. Keep the default option for **Select which level to apply your login settings to** or select one of the dropdown options.



6. Click **Connect**. The Navigator popup window appears.
7. The Navigator popup window lists the published reports or list views available in your OpenAir OData feed by their OData resource names.
   - Select the resource name for the published report or list view you want to import. A preview of the selected resource data appears in the right pane of the Navigator window.
   - To load multiple resources in your Excel workbook , check the **Select multiple items** box then check the box next to the resources you want to import.



> **Tip:** Disable previews in the Navigator popup window to reduce the number of OData requests being made to retrieve these previews. Preview requests count toward the OData request limits allowed for your account. See BI Connector Requirements and Limits. To disable the preview click **Display Options** in the Navigator popup window and clear the **Enable data previews** option.

8. Click **Transform Data** (or **Edit** depending on the Excel version). The **Power Query Editor** appears. You can use the Excel Power Query Editor to shape and transform the report or list view data. See Shape data (Power Query) and Edit query step settings (Power Query) on the Microsoft website for more information.

Tip: Rename, remove and reorder columns or filter, sort and reorder your data using the Power Query Editor instead of transforming your report or list view data in the spreadsheet. The Get & Transform (Power Query) functionality in Excel lets you apply the same changes to your data every time you refresh your queries and connections. Changes made directly in the spreadsheet will be lost when refreshing the queries and connections.

Note: If you are loading multiple resources into your Excel workbook, Excel creates a separate query for each resource you selected. The queries are listed in the Queries pane on the left of the Power Query Editor window. Click a query to select it for editing, shape and transform your data, and repeat for other queries. See View and Manage Queries in a Workbook (Power Query) on the Microsoft website for more information.

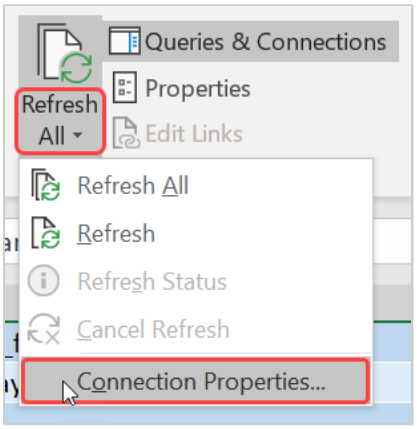
You can edit your queries at any time. Click **Queries & Connections** in the Data tab to view the list of queries. Double click any query listed in the Queries & Connections pane on the right to open it for editing in the Power Query Editor.

9. Click **Close & Load** (or **Apply & Close** depending on the Excel version). The transformed data loads in the Excel spreadsheet.

Note: If you are loading multiple resources into your Excel workbook, Excel loads your data into as many separate sheets as there are queries.

10. (Optional) Configure Excel to refresh your data as required:

    a. On the Excel Data tab, click the Refresh All dropdown and click **Connection Properties ...**. The Query Properties popup window appears.

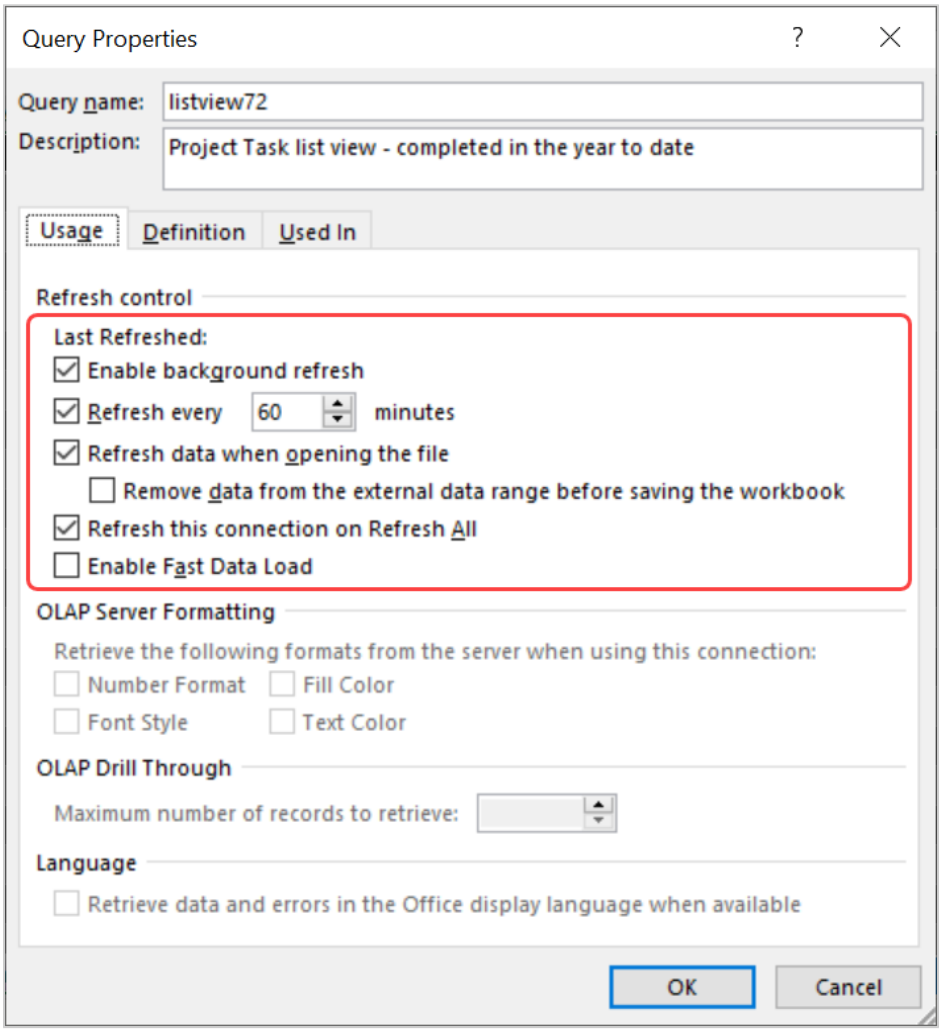


Note: If you are loading multiple resources into your Excel workbook, click **Queries & Connections** to view the list of queries. The queries are l. Right click any query listed in the Queries & Connections pane and click **Properties ...** to configure its properties.

    b. Check the refresh options as required. You can configure Excel to refresh your data using any of the following options:

- Refresh the data automatically at regular intervals. You can specify the refresh interval in minutes.
- Refresh the data automatically when opening the Excel workbook.

- Refresh the data manually by clicking **Refresh All** in the Data tab.



Note: Microsoft Excel caches data from external data sources. You must refresh the data manually or configure the data connection to refresh the data automatically to get the latest data from your OpenAir OData resource.

In the Excel Data tab, click **Refresh All** to get the latest data from your OpenAir OData feed and other sources in the entire workbook or click **Refresh** to get the latest data only from the OData resource associated with the worksheet you are currently viewing.

Important: Every data refresh triggers a new request to the OpenAir OData service. Use automatic or manual data refresh sparingly to ensure you stay within the OData requests limits for your account. See BI Connector Requirements and Limits.

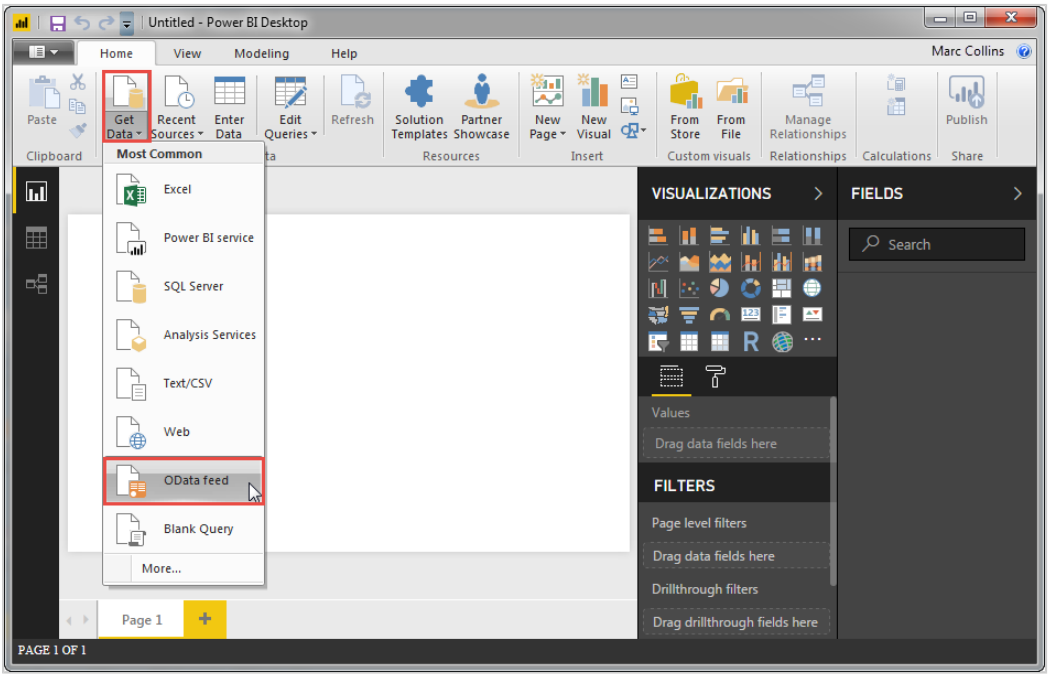
Importing Data from Your OpenAir OData Feed to Microsoft Power BI Desktop

The steps described in this topic are provided for illustration purposes only. Refer to the vendor documentation for detailed instructions about connecting Microsoft Power BI with an OData feed. The

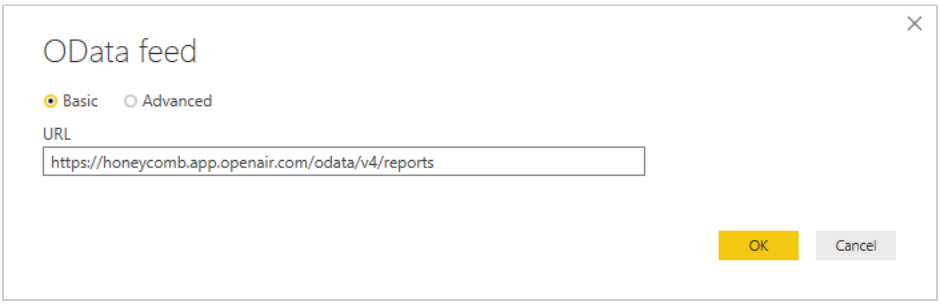
following section provides steps to connect Microsoft Power BI Desktop version 2.51 (64–bit) to your OpenAir OData feed. Other versions of Microsoft Power BI may not support this functionality.

To import data from your OpenAir OData feed to Microsoft Power BI Desktop:

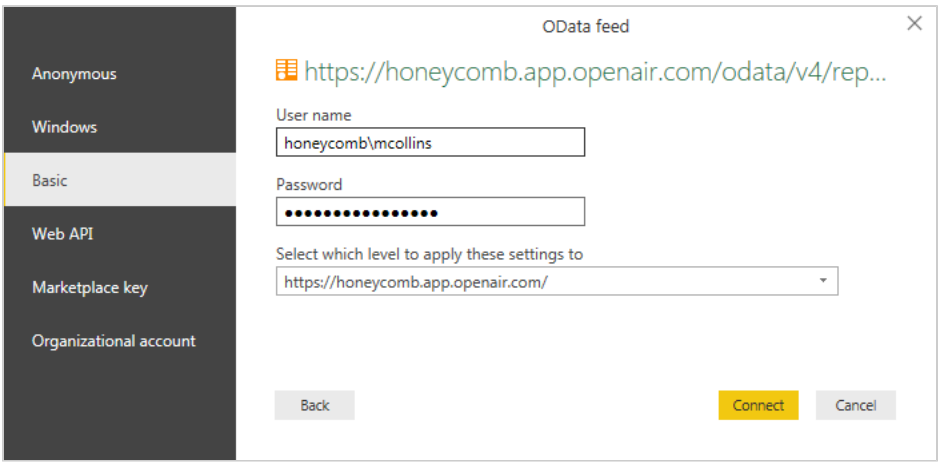
1. In Microsoft Power BI, click the **Home** tab.
2. Click **Get Data** then **OData Feed**.



3. In the OData feed popup window, select **Basic** from the radio button options box, and enter the **URL** for the reports or list views resource collections in your OpenAir OData feed — for more information about your OpenAir OData feed URL, see Your OpenAir OData Feed URL and Connection Details.



4. Click **OK**.
5. In the OData feed popup window:
   a. Click **Basic**.
   b. Enter your OpenAir OData feed **User name**. Remember, your OpenAir OData feed user name contains your OpenAir Company ID and User ID, separated by a back slash: `<CompanyID>\<UserID>`
   c. Enter your OpenAir **Password**.
   d. Keep the default option for **Select which level to apply your login settings to** or select one of the dropdown options.



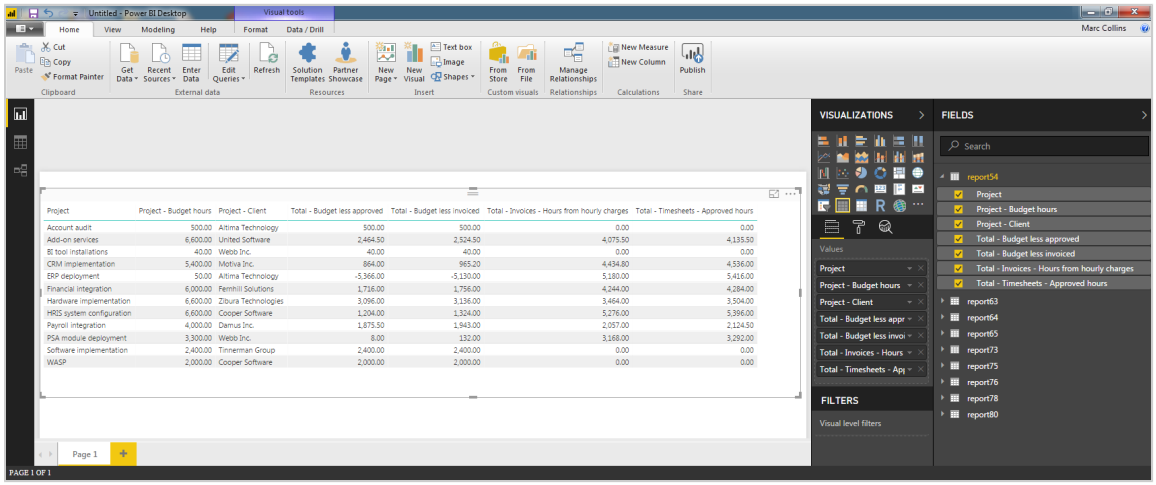
6. Click **Connect**.
7. The Navigator lists the published reports or list views available in your OpenAir Odata feed by their OData resource names.
   - Select the resource name for the published report or list view you want to import. A preview of the selected resource data appears in the right pane of the Navigator window.
   - To load multiple resources, check the **Select multiple items** box then check the box next to the resources you want to import.

> **Tip:** Disable previews in the Navigator popup window to reduce the number of OData requests being made to retrieve these previews. Preview requests count toward the OData request limits allowed for your account. See BI Connector Requirements and Limits. To disable the preview click **Display Options** in the Navigator popup window and clear the **Enable data previews** option.

8. Click **Load**. Microsoft Power BI Desktop will load all the selected resources.
9. Use the **Fields** toolbar to access the data for the OpenAir reports or list views you imported. Click on a resource name to work to select which fields you would like to include in your Power BI Desktop reports.

Note: Microsoft Power BI Desktop caches data from external data sources. You must refresh the data manually or configure the data connection to refresh the data automatically to get the latest data from your OpenAir OData resource.

Click the **More options** icon to the right of a report name or field and click **Refresh data** to get the latest data from your OpenAir OData feed.



OpenAir Business Intelligence Connector Advanced Functions

You can use the following advanced functions to get more out of your OpenAir report and list view data after you publish your reports and list views to the OpenAir OData service.

- Viewing Your OpenAir OData Resource Data in a Web Browser
- OData Query Options
- Reading OpenAir OData Resource Data in Your OpenAir Form and Scheduled Scripts
- Exporting OpenAir Published Report Data to NetSuite
- Consuming OpenAir OData Resource Data in Your Applications
- Replace Non-Alphanumeric Characters with Underscores in Column Headers and Metadata

Viewing Your OpenAir OData Resource Data in a Web Browser

The published resource data in your OpenAir OData feed is available as a JSON string. JSON (JavaScript Object Notation) is a lightweight data-interchange format which is self-describing and easy to understand.

You can enter the URL to your OpenAir OData resource in the address bar of your browser and read your published OpenAir data in your web browser.

To view your OpenAir OData resource data in a web browser:

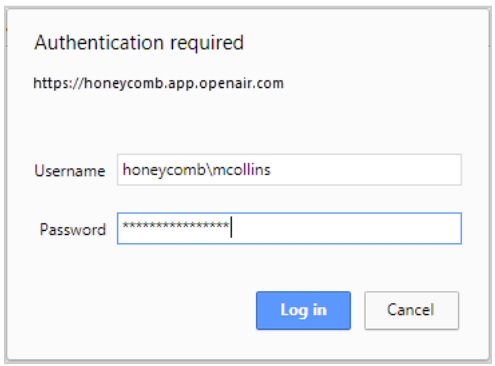
1. Enter the URL for the OData resource you want to access. The Authentication required popup window appears.

   Note: For more information about OData resources URLs, see Your OpenAir OData Feed URL and Connection Details. For example, to access the data for the published report with **OData resource name** `report54`, use the following URL:

   `https://<account-domain>/odata/v4/reports/report54`

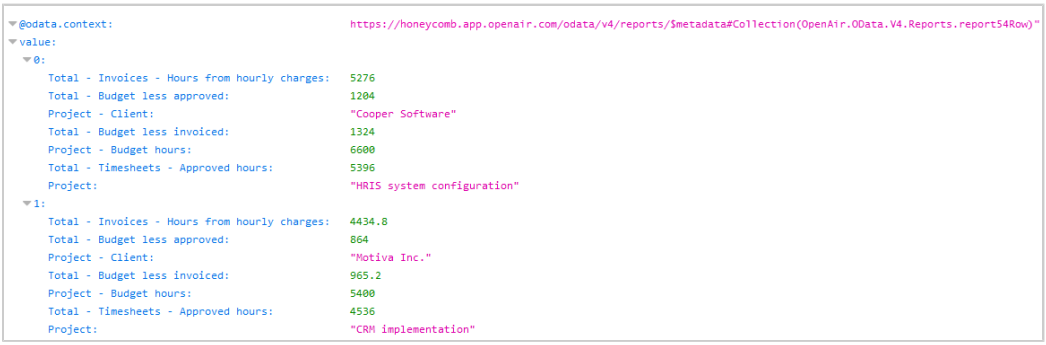
2. Enter your OpenAir OData feed **User name** and your OpenAir password, then click **Log in**.

   Note: Remember, your OpenAir OData feed user name contains your OpenAir Company ID and User ID, separated by a back slash: `<CompanyID>\<UserID>`



3. Your data appears as a JSON string in your browser. For more information about the JSON object and its properties, see OData Response.

> **Tip:** You can use a browser extension to change the way your browser displays the JSON string. Instead of displaying the JSON string as plain text, your browser will display the JSON in a way that is much easier to read. Search for "JSON viewer" browser extensions. Refer to your browser documentation for information about adding browser extensions.



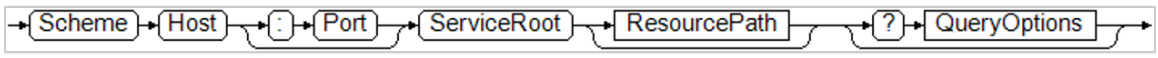
If a published report is refreshed while you are reading or paging through the published report in your browser, the OpenAir OData feed returns a `410 Gone` HTTP status error with the message `"Report has been republished. You need to reload the report."`.

OData Query Options

The OpenAir OData feed lets you use the following query options to return the information you need:

- `$filter` — See $filter Query Options
- `$select` — See $select Query Option
- `$skip` — See $top and $skip Query Options
- `$top` — See $top and $skip Query Options

Add the query options as query string parameters at the end of the URL for the OpenAir OData resource you want to access. To append query options to the end of the OData resource URL, add a question mark `?` followed by query option and value pairs `<$option>=<value>` separated by an ampersand `&`.



$filter Query Options

You can add the `$filter` query option at the end of the OData resource URL to return only results that match the filter expression specified.

Add the `$filter` query option at the end of the OData resource URL to return only results that match the filter expression specified.

`https://<account-domain>/odata/v4/reports/report279?$filter=<expression>`, where `<expression>` is a logical expression. The operators and functions supported for use with the filter query option are listed in the following tables.

- **Comparison Operators** — The syntax for comparison operators is `<column> <operator> <value>`, where:
  - `<column>` is the column name
  - `<operator>` is the comparison operator
  - `<value>` is the comparison value

Operator	Description	Example
`eq`	Equals	The following example requests all expense receipts owned by employees whose name is 'Smith'. `https://<account-domain>/odata/v4/reports/report279?$filter=Name eq 'Smith'`
`ne`	Not equal	The following example requests all The following example requests all expense receipts owned by employees whose name is not 'Smith'. `https://<account-domain>/odata/v4/reports/report279?$filter=Name ne 'Smith'`
`gt`	Greater than	The following example requests all expense receipts with a total value greater than 1000. `https://<account-domain>/odata/v4/reports/report279?$filter=Total gt 1000`
`ge`	Greater than or equal	The following example requests all expense receipts with a total value greater than or equal to 1000. `https://<account-domain>/odata/v4/reports/report279?$filter=Total ge 1000`
`lt`	Less than	The following example requests all expense receipts with a total value less than 1000. `https://<account-domain>/odata/v4/reports/report279?$filter=Total lt 1000`
`le`	Less than or equal	The following example requests all expense receipts with a total value less than or equal to 1000. `https://<account-domain>/odata/v4/reports/report279?$filter=Total le 1000`

- **String Comparison Functions** — The syntax for string comparison functions is `<function>(<column>,<string>)`, where:
  - `<function>` is the comparison function
  - `<column>` is the column name
  - `<string>` is the comparison string between single quotation marks

Function	Description	Example
`startswith(<column>,<string>)`	Starts with	The following example requests all expense receipts associated with projects with a name that starts with 'Hardware impl'. `https://<account-domain>/odata/v4/reports/report279?$filter=startswith(Project_Name,'Hardware impl')`

Function	Description	Example
`endswith(<column>,<string>)`	Ends with	The following example requests all expense receipts associated with projects with a name that ends with 'ware implementation'. `https://<account-domain>/odata/v4/reports/report279?$filter=endswith(Project_Name,'ware implementation')`
`contains(<column>,<string>)`	Contains	The following example requests all expense receipts associated with projects with a name that contains 'software'. `https://<account-domain>/odata/v4/reports/report279?$filter=contains(Project_Name,'software')`

- **Logical and Precedence Grouping Operators**

Operator	Description	Example
`not`	Logical not	The following example requests all expense receipts associated with projects with a name that does not contain 'software'. `https://<account-domain>/odata/v4/reports/report279?$filter=not contains(Project_Name,'software')`
`and`	Logical and	The following example requests all expense receipts owned by employees whose name is 'Smith' and with a total value greater than or equal to 1000. `https://<account-domain>/odata/v4/reports/report279?$filter=Name eq 'Smith' and Total ge 1000`
`or`	Logical or	The following example requests all expense receipts owned by employees whose name is not 'Smith' or with a total value less than or equal to 1000. `https://<account-domain>/odata/v4/reports/report279?$filter=Name ne 'Smith' or Total le 1000`
`()`	Precedence grouping	The following example requests all expense receipts owned by employees whose name is 'Smith' and with a total value either greater than or equal to 1000 or less than 500. `https://<account-domain>/odata/v4/reports/report279?$filter=Name eq 'Smith' and (Total ge 1000 or Total lt 500)`

Important: Review the following guidelines:

- The query string parameter must be all lower case. If you add `$Filter=<expression>`, for example, the filter option will be ignored and all data will be returned.
- The query string parameter must be immediately followed by an equal sign with no space in between. Adding `$filter =<expression>` will return an error.
- Column names are case sensitive.
- Column names cannot include spaces. You should enable the Replace Non-Alphanumeric Characters with Underscores in Column Titles and Metadata optional feature.
- All string values in the logical expression must be between single quotation marks.
- String values in the logical expression are case insensitive. The same results will be returned whether you add `$Filter= Name eq 'Smith'` or `$Filter= Name eq 'smith'`.

$select Query Option

Use select and filter expressions in OData requests to return only the information you need.

You can add the `$select` query option at the end of the OData resource URL to return only the columns specified.

`https://<account-domain>/odata/v4/reports/report279?$select=<columns>`, where `<columns>` is a comma separated list of column names.

Example 1. $select

The following URL returns only the Name and Total columns from `report279`.

```
https://<account-domain>/odata/v4/reports/report279?$select= Name, Total
```

Important: Review the following guidelines:

- The query string parameter must be all lower case. If you add `$Select= Name, Total`, for example, the select option will be ignored and all columns will be returned.
- The query string parameter must be immediately followed by an equal sign with no space in between. Adding `$select = Name, Total` will return an error.
- Column names are case sensitive.
- Column names cannot include spaces. You should enable the Replace Non-Alphanumeric Characters with Underscores in Column Titles and Metadata optional feature.
- It is not possible to specify the column order in the data returned using the `$select` parameter. Columns are always returned in the same default order, independently of the order of columns listed in the OData request.

$top and $skip Query Options

You can add the `$top` and `$skip` query options at the end of the OData resource URL to return to return specific numbers of records.

- Use `$top` to specify how many records to return.
- Use `$skip` to specify the number of records to ignore (or to skip) before returning records.

Example 2. $top and $skip

The following URL returns up to 20 records from `report279`. It skips the first 10 records and returns the next 20 records.

```
https://<account-domain>/odata/v4/reports/report279?$skip=10&$top=20
```

Important: Review the following guidelines:

- The query string parameter must be all lower case. If you add `$Top=10`, for example, the top option will be ignored and the maximum number of rows will be returned.
- The query string parameter must be immediately followed by an equal sign with no space in between. Adding `$top =10` will return an error.

Reading OpenAir OData Resource Data in Your OpenAir Form and Scheduled Scripts

You can access your published report and list view data in your OpenAir form and scheduled scripts using the following functions:

- Read the list of published list views and reports available to the user running the script using `NSOA.listview.list()` and `NSOA.report.list()`.

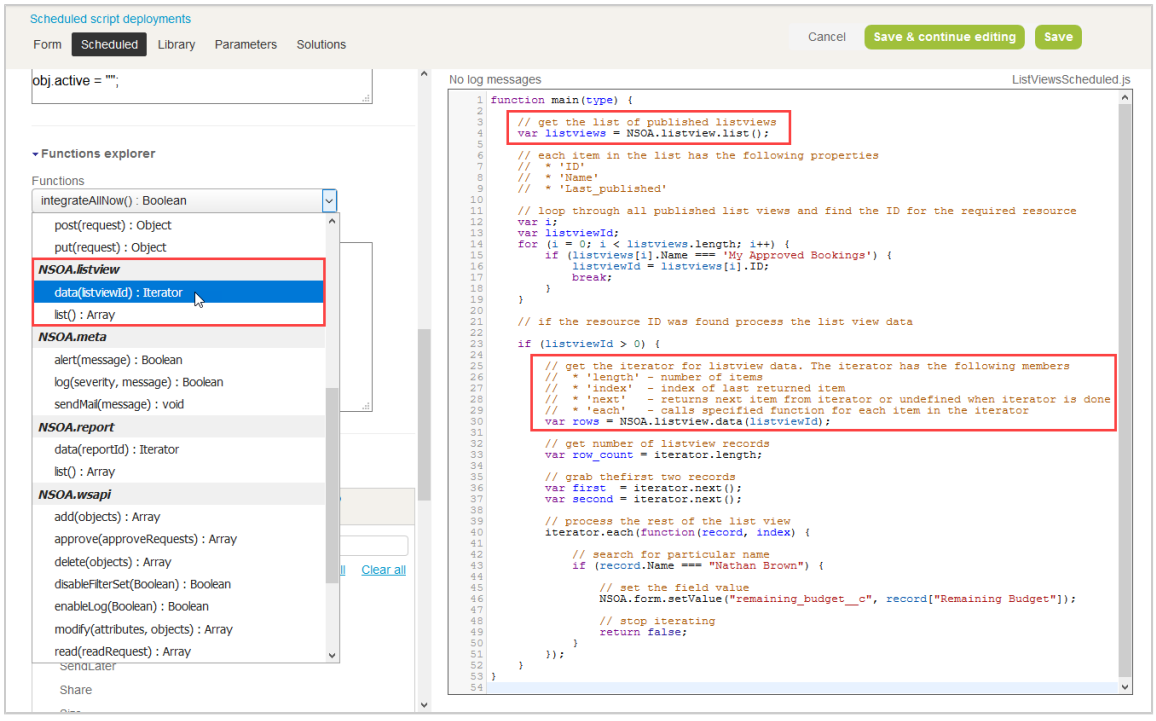
- Read the published list view or report data available to the user running the script using `NSOA.listview.data(listviewId)` and `NSOA.report.data(reportId)`

User scripting support for reading OpenAir OData resource data has the following benefits:

- The `NSOA.listview` and `NSOA.report` functions give you access to the same information available when you use BI tools to access your OpenAir OData feed.
- Reading OpenAir OData resource data using the `NSOA.listview` and `NSOA.report` functions does not use any of your OData request entitlement — see OData Request Limits
- You can read data from all published reports in your user scripts. You can also publish reports exclusively for use in your user scripts. When using the `NSOA.report.list()` user scripting function to read the list of published reports, each item in the list has the property `PublishType` — The scope of use specified for the published report.
- You can use published list views like custom queries and read the latest list view data in your OpenAir form and scheduled scripts. The data read by your scripts is the same as the data you can see in your list view at any given time.

For more information, see the OpenAir User Scripting Guide.

Important: Both form and scheduled scripts support the `NSOA.listview.data(listviewId)` function. However, the number of items you can process in form scripts is restricted by their execution time limit. The function is best suited for reading published list view data in scheduled scripts, which allow up to 1 hour of JS runtime.



Exporting OpenAir Published Report Data to NetSuite

You can export your OpenAir published report data to custom records in NetSuite using OpenAir NetSuite Connector. To do so:

1. Publish OpenAir reports to the OpenAir OData service with a view to export your OpenAir report data to NetSuite. See Published Report Scope of Use.
2. Configure OpenAir to refresh your published report data according to a defined schedule. See Configuring OpenAir to Publish Reports Automatically and Refresh Published Reports Periodically.

> **Important:** The following guidelines apply when publishing a report for export to NetSuite using NetSuite Connector:
>
> - The owner of the report must be the same account administrator as the dedicated **Integration user** selected on NetSuite Connector Credentials tab.
> - The published report cannot be shared with others. Use the default **Do not share** permission setting. If you select a different permission setting, it will be reset automatically to **Do not share** when publishing the report.
> - The published report scope of use (**Publish type**) cannot be changed if the report was previously published for use with OpenAir NetSuite Connector and a custom integration workflow to export the published report data exists.

3. Create a custom export workflow to export data from your OpenAir published report to a custom record type in NetSuite. You can map your OpenAir Published report data to NetSuite custom record fields and define filters to export exactly what you need. See OpenAir NetSuite Connector Guide.
4. Add this custom export workflow to workflow groups and include them in your scheduled integration runs. See OpenAir NetSuite Connector Guide.

After you export your OpenAir published report data to NetSuite, you can create reports and dashboards in NetSuite to gain visibility into KPIs such as profitability and revenue forecast, combining NetSuite and OpenAir data.

Consuming OpenAir OData Resource Data in Your Applications

Developers can request OpenAir OData resource data and process the response from the OpenAir OData service in their applications.

There are two types of information available from the OData service:

- The metadata (OData EDMX XML schema v 4.0) describes the collection data types and bears information about the order of fields for each entity (resource or list of resources).
- The data itself (JSON) provides the raw data as a JSON string.

Applications consuming resources from the OpenAir OData service should consume the data and the metadata jointly.

Note: The OpenAir OData service only supports the HTTP GET method.

GET Request

Send a GET request to the OpenAir OData service method.

- The GET request URL uses one of the following formats:
  - To access the collection of resources: `https://<account-domain>/odata/v4/<collection>`
  - To access the resource collection metadata: `https://<account-domain>/odata/v4/<collection>/$metadata`
  - To access the list of resources in the collection: `https://<account-domain>/odata/v4/<collection>/list`
  - To access a resource: `https://<account-domain>/odata/v4/<collection>/<resource>`

  Where:
  - `<account-domain>` is the account-specific domain name for the OpenAir account. For more information about your account-specific domain name, see the help topic Use Account-Specific Domain.
  - `<collection>` depends on the type of resource you are requesting: `reports` or `listviews`.
  - `<resource>` is the OData resource name of the resource you are requesting.

  For more information, see Your OpenAir OData Feed URL and Connection Details.
- The request must include an Authentication header using the HTTP Basic authentication scheme.
  - Use the following format: `<CompanyID>\<UserID>:<Password>`.
  - The string value is Base64 encoded.
- (Optional) Use query options to page through the resource data. The OpenAir OData service supports the query options `$skip` and `$top` either in the request body or as query string parameters in the request URL. For more information see OData Query Options.

Example of GET request:

The following examples accesses rows 501 to 750 of the published list view `listview12` from the authenticated user's OpenAir OData feed.

```
GET /odata/v4/listviews/listview12 HTTP/1.1
Host: honeycomb.app.openair.com
Authorization: Basic ZG9jc191aTRfZGVtb1xtY29sbGluczpUaGlzIGlzYSB2ZXJ5IGxvbmcgcGFzc3dvcmQgeW91IHdvdWxkIG5ldmVyZ3Vlc3M=
Content-Type: application/x-www-form-urlencoded

$top=250&$skip=500
```

OData Response

If you request a collection, a resource or the list of resources, the OpenAir OData service returns the response as a JSON string with the properties described in the following table.

JSON object properties	Description
`@odata.context`	The URL for the collection metadata. The metadata is provided in XML format for the entire resource collection using the OData EDMX XML schema v 4.0 (http://docs.oasis-open.org/odata/ns/edmx). When requesting a specific entity (a resource or the list of resources in the collection), the metadata URL points to that entity. For example:

JSON object properties	Description

	■ If requesting the list of resources in the collection, the response includes the following metadata URL:
	`https://honeycomb.app.openair.com/odata/v4/listviews/$metadata`
	■ If requesting a specific resource, the metadata URL points to the metadata for the requested resource:
	`https://honeycomb.app.openair.com/odata/v4/listviews/$metadata#Collection(OpenAir.OData.V4.ListViews.listview12Row)`
	For each entity, the metadata includes the list of fields — or Properties — listed in the same order as they appear in the published OpenAir report or list view configuration. Each Property as the following attributes:
	■ `Name` — the field name.
	■ `Type` — the data type e.g `Edm.Double` for double decimal, `Edm.String` for string, `Edm.Date` for date.

`value`	An array of objects. ■ If requesting the collection, each object correspond to an entity in the collection (either a resource or the list of resources). The objects in the `value` array have the following properties: □ `kind` — The value of this property is always `EntitySet`. □ `name` — The OData resource name. For example, `listview12` or `list` (for the list of resources). □ `url` — The relative url path for the OData resource. It is always the same as `name`. □ `title` — The resource title in OpenAir. ■ If requesting the list of resources, each object corresponds to a resource in the collection. The objects in the `value` array have the following properties: □ `Last Published` — The timestamp when the report or list view was last published. □ `PublishType` — The scope of use specified for the published report. □ `ID` — The published report or list view configuration OData resource ID. □ `Rows` — The number of rows of datain the published report (for Reports only). □ `Name` — The name of the report or list view configuration. ■ If requesting a specific resource, each object corresponds to a row of data in the resource. The objects properties correspond to the field names or the report or list view column headings. ⚠ **Important:** The object properties or columns in the `value` array are given in their default order. The order of columns as they appear in the OpenAir report or list view configuration is specified in the metadata. The data types for each column is also provided in the metadata.
`@odata.count`	The number of rows in the OpenAir OData feed entity (either a resource or the list of resources).
`@odata.nextLink`	The request URL to use to obtain the next rows of resource data, if the resource data continues beyond the last row return in the `value` array.

Replace Non-Alphanumeric Characters with Underscores in Column Headers and Metadata

This optional feature replaces all non-alphanumeric characters with underscores in the column headers and the metadata of your OpenAir OData resources. It also replaces space characters in column titles with underscore characters.

To enable this feature, contact OpenAir Customer Support and request the **Replace Non-Alphanumeric Characters with Underscores in Column Titles and Metadata** feature.

report82

User	Leave_accrual_rule	Accrual
Adams, Mary	Corporate sick days	*160*
Carr, Bill	Corporate sick days	*160*
Carter, Tom	Vacation Accrual rule	*316*
Collins, Marc	Vacation Accrual rule >5 years Tenure	*168*
Davis, Judy	Vacation Accrual rule	*316*
Ellis, Ed	Vacation Accrual rule >5 years Tenure	*199*
Foster, Tim	Vacation Accrual rule	*300*
Fox, Rebecca	Vacation Accrual rule	*320*
Garcia, Juan	Vacation Accrual rule	*296*

Note: Other special characters are also replaced with underscores, including: **%?!@:~`+-#$^ &*()ů!§¨|**. Non-latin characters are also replaced with underscores. For examplec **## ###** or **Кири ллица** would also be replaced with underscores.

Frequently Asked Questions About the OpenAir Business Intelligence Connector

What is the OpenAir Business Intelligence Connector?

The OpenAir Business Intelligence Connector is an OData connection point supported by many reporting, business intelligence, workflow, and integration applications. This connection point lets you easily configure any compatible application to use the connection point without the need for programming. OData (Open Data Protocol) is an ISO/IEC approved, OASIS standard. See http://www.odata.org for more details on the OData standard.

What can I do with the OpenAir Business Intelligence Connector?

The OpenAir Business Intelligence Connector enables you to publish the content of your saved reports so they can be read by a compatible application. This provides a convenient way to access data presented by reports including calculated values. You can scheduled reports to automatically publish the data when the report runs.

How secure is the OpenAir Business Intelligence Connector?

The OpenAir Business Intelligence Connector follows OpenAir security best practices. You access the connector using your OpenAir security credentials and can only see the saved reports available to your OpenAir permissions settings. The OpenAir Business Intelligence Connector needs to be enabled to be available. Administrators can control access to the publish feature to users by role permissions.

What applications does the OpenAir Business Intelligence Connector support?

The OpenAir Business Intelligence Connector uses the OData V4/JSON standard and supports any compliant application. Applications that use older versions of the OData standard or do not support JSON may not be able to use the connection point.

Can I use the OpenAir Business Intelligence Connector as an API?

Yes, programmers can write applications that send requests and receive responses as defined in the OData standard. See http://www.odata.org/getting-started/basic-tutorial for more details.

What are the known limitations of the OpenAir Business Intelligence Connector?

- You need to run and publish a report to make the data available.
- Only the $top and $skip system query options are available.
- The Connector does not support OData versions prior to V4 and does not support ATOM.

Troubleshooting the OpenAir Business Intelligence Connector

This chapter will help you to diagnose errors which you might encounter when using the OpenAir Business Intelligence Connector, and offer solutions to help you resolve them.

I can't see a "Publish reports" role permission when I go to Administration > Global Settings > Users > Roles > [Select a role]

The **Publish reports** role permission is only available if your company has purchased the use of the OpenAir Business Intelligence (BI) Connector and OpenAir Customer Support has completed the setup for your BI Connector account.

If you cannot see the **Publish reports** role permission, first contact your OpenAir account manager and ensure that you have purchased access to this feature.

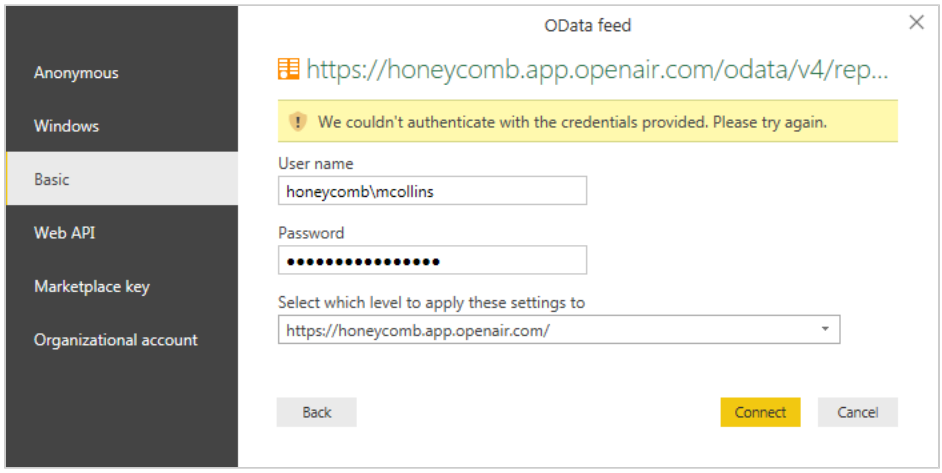
If you have confirmed that your company should have access to this feature, contact OpenAir Customer Support and confirm that they have finished setting up the feature for your account.

There is no "Publish" icon next to my saved reports.

You won't be able to publish reports if your company's administrator hasn't assigned you the **Publish reports** role permission.

Confirm that your company's administrator has assigned you the **Publish reports** role permission.

My business intelligence tool cannot authenticate my credentials.



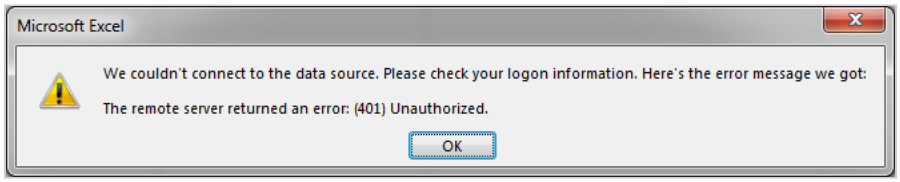
If you receive a message from your business intelligence tool saying that it cannot authenticate your credentials, you may have incorrectly typed your OpenAir OData feed's address, the Company ID and User Name, or password, or are using the wrong credentials for your OData feed.

Confirm that you have entered the correct OpenAir OData feed address, Company ID, User Name, and Password.

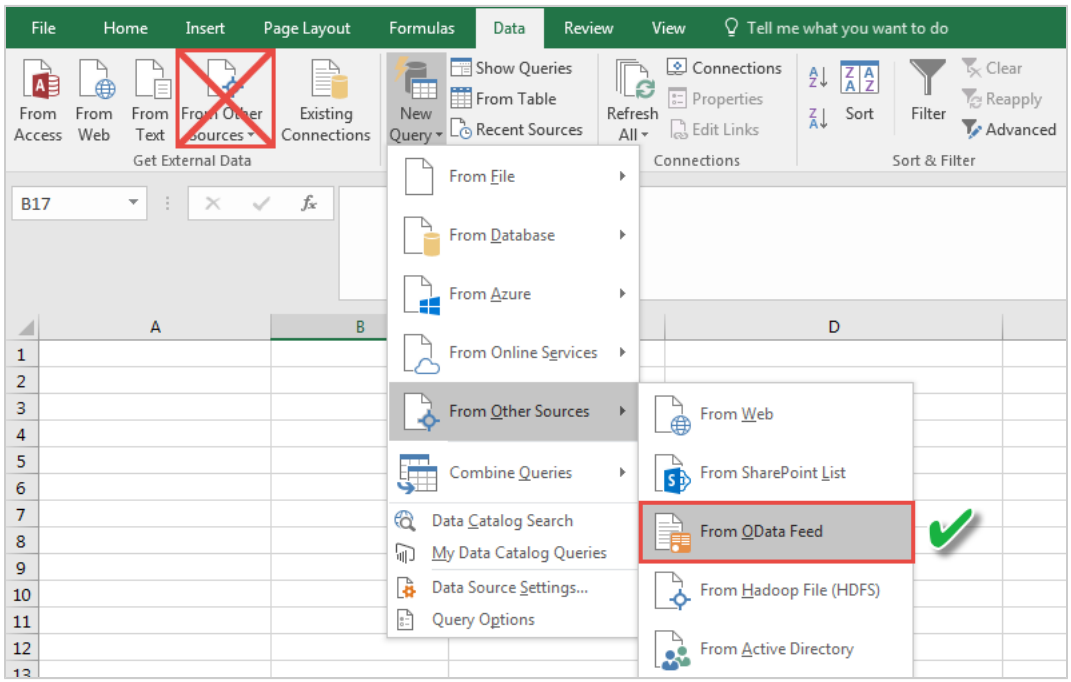
Note: Pay special attention to the slash between the Company ID and User name. You should use a **back slash (\)** and not a forward slash (/) between these two IDs.

My credentials and OpenAir OData feed's address are correct, but I still get an error message from my business intelligence tool.

This problem is known to occur with some versions of Microsoft Excel. It is possible that Excel is trying to connect to your OData feed as a V3 service and not a V4 service, and since V3 services are incompatible with the OpenAir Business Intelligence Connector, you will receive an error.

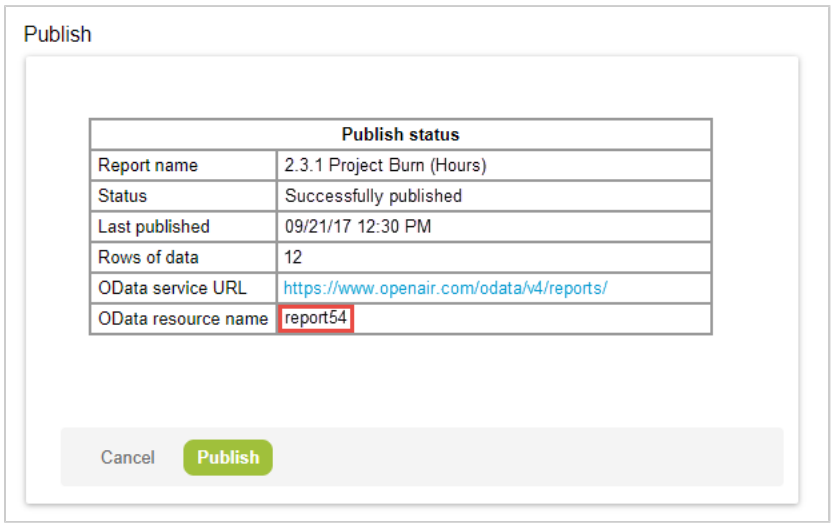


If using Microsoft Excel to connect to your OpenAir OData feed, be sure to select the feed by going to the Data tab, then clicking New Query > From Other Sources > From OData Feed. Selecting any other options for connecting to the feed will result in an error.



My report doesn't appear in the list of published reports in my business intelligence tool.

Each published report has a unique ID number which identifies it. OpenAir provides this report ID in the **OData resource name** field when you publish the report. For example, in the screenshot below, the report ID is **report54**:



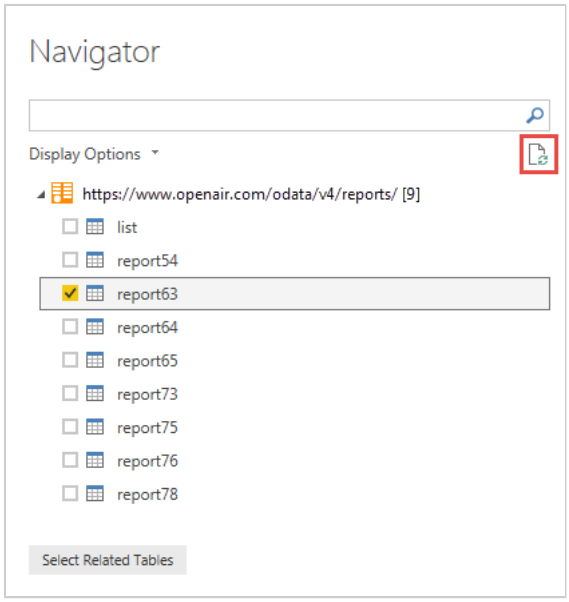
First, confirm that you are looking for the correct report ID. If the report ID is correct, confirm that you have published the report.

If the report is a scheduled report, confirm that it has been published according to its schedule.

My report data appears out of date in my business intelligence tool.

This can occur if your business intelligence tool caches report data.

To be sure that you have the latest report data, use your business intelligence tool's refresh option to pull the latest data.



Report data which I could previously see is now gone.

This can happen if a report you previously loaded was deleted.

To see the report's data, publish the report again and re-load it into your business intelligence tool.

OpenAir Business Intelligence Connector Version History

April 13, 2024

- The OpenAir OData feed returns a `410 Gone` HTTP status error if a published report is refreshed while you are reading or paging through that published report – See Connecting BI Tools to Your OpenAir OData Feed and Viewing Your OpenAir OData Resource Data in a Web Browser.
- The **Last published** timestamp now shows the date and time when the report publication completed and the published report data became available in your OpenAir OData feed. Previously, it showed the time when the publication process started – See Publishing Your Reports Manually to the OpenAir OData Service, Publishing Reports Others Have Shared with You and Verifying the Publication Status of your Reports.

October 7, 2023

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April 15, 2023

- The OData reports storage was changed to resolve a previous column number limitation that prevented the publication of reports with a large number of columns.

October 8, 2022

- Ability to control who can view the OData Limits page by role permission. See OData Request Limits.

April 9, 2022

- Support for `$select` and `$filter` query options to retrieve exactly the information you need from your published OpenAir reports and list views. See OData Query Options.

October 9, 2021

- Ability to choose the scope of use for your published reports , including the ability to publish a report for use with OpenAir NetSuite Connector, or for use with OpenAir User Scripting only. See Published Report Scope of Use.

  See also:

  - Publishing Your Reports Manually to the OpenAir OData Service — Ability to choose scope of use.
  - Configuring OpenAir to Publish Reports Automatically and Refresh Published Reports Periodically — Ability to choose scope of use and select second refresh time on the same day.

  - Reading OpenAir OData Resource Data in Your OpenAir Form and Scheduled Scripts — Ability to read scope of use information and choose publish reports for use with user scripting exclusively.
- Ability to export OpenAir published report data to custom records in NetSuite using OpenAir NetSuite Connector. See Exporting OpenAir Published Report Data to NetSuite.

April 10, 2021

- Support for the following list views:
  - Workspaces module: Discussions, Documents.

  See Publishing List Views to the OpenAir OData Service.

October 10, 2020

- Support for the following list views in the Administration module: Job codes, Customers, Contacts. See Publishing List Views to the OpenAir OData Service.
- Added publication status in the Manage list view settings popup and administration screen. See Managing Published List Views.

April 18, 2020

- Extended list view coverage. See Publishing List Views to the OpenAir OData Service.
- Added OData Limits administration screen. See OData Request Limits.

October 13, 2018

- Added ability to publish list views. See Publishing List Views to the OpenAir OData Service.
- Increased the Per Minute Request Limit to 500 requests per account per minute (up from 70 requests per minute). See BI Connector Requirements and Limits.

April 14, 2018

- Added ability to share published reports with other employees. See Sharing Published Reports With Other Employees in Your Company.
- Added Replace Non-Alphanumeric Characters with Underscores in Column Headers and Metadata.

October 14, 2017

- OpenAir Business Intelligence Connector introduced.
- Added ability to publish saved reports to the OpenAir OData feed.
- Added `$top` and `$skip` query options.
- Added ability to access OpenAir OData feed resource data in a web browser.