

# ADMINISTRATORS GUIDE

## THORAPPS REFLEX REPORTING

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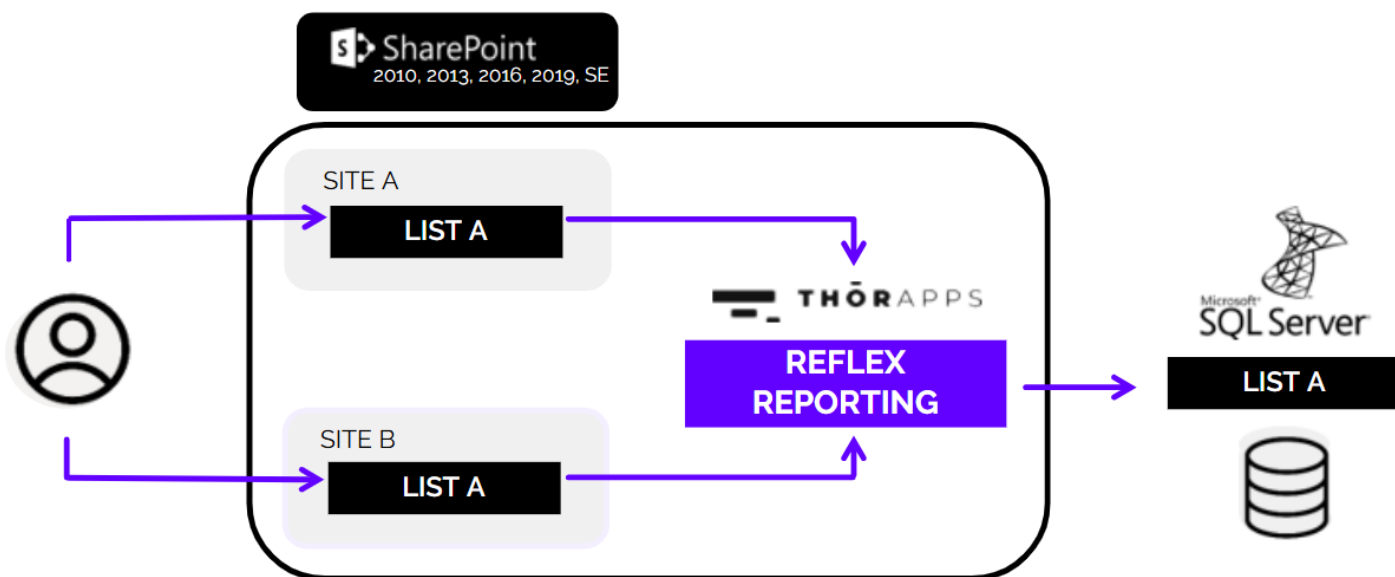
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## What is Reflex Reporting?

Reflex Reporting is a tool from ThorApps used to extract SharePoint list and library data, in real-time, into a dedicated reporting database. It collates the items from similarly structured lists or libraries from across multiple sites and site collections into dedicated reporting tables within the reporting database. This vastly improves the performance and flexibility of reporting on content stored across SharePoint and provides a “Best Practise” method to access the content in real-time without compromising Microsoft support of your SharePoint farm.



Reflex Reporting is a SharePoint on-premises application and supports SharePoint 2010 through to SharePoint SE (Subscription Edition).

If you're after similar features for SharePoint Online, please see our SharePoint Online App "ListSync" on our web site ([www.thorapps.com](http://www.thorapps.com)).

## Overview

This document describes the prerequisites and actions required to install ThorApps Reflex Reporting into a SharePoint farm. The steps and requirements are the same in both SharePoint 2016, 2019 and SE. If you're after our versions compatible with earlier versions of SharePoint, please contact us.

To ensure you have the latest version of this guide, please download it from...

<https://docs.thorapps.com/Downloads/OP/ReflexReporting/ThorApps Administration Guide - Reflex Reporting.pdf>

The high-level steps are:

- Download Reflex Reporting media (if not already done)
- Upload ThorApps Licence Manager and Reflex Reporting package files (.wsp)
- Deploy ThorApps Licence Manager and Reflex Reporting
- Configure Reflex Reporting databases (auto created)
- (Optional) Configure Reflex Reporting databases (manually created)

## Prerequisites

To follow this guide, you will need:

- A SharePoint farm (2016 or higher)
- Administrator level understanding of SharePoint terminology and navigation
- SharePoint Farm Administrator rights (the account should have SharePoint configuration database write access)
- Console access (either direct or remote) to the server hosting SharePoint Central Administration
- Permission to run SharePoint PowerShell commands on the server hosting SharePoint Central Administration

**NOTE:** When starting SharePoint Central Administration (CA), its required to do so from the Windows Start menu. This opens CA in an elevated mode and provides functionality that is not available (or does not work) when just opened via a standard web browser session.

## Installation

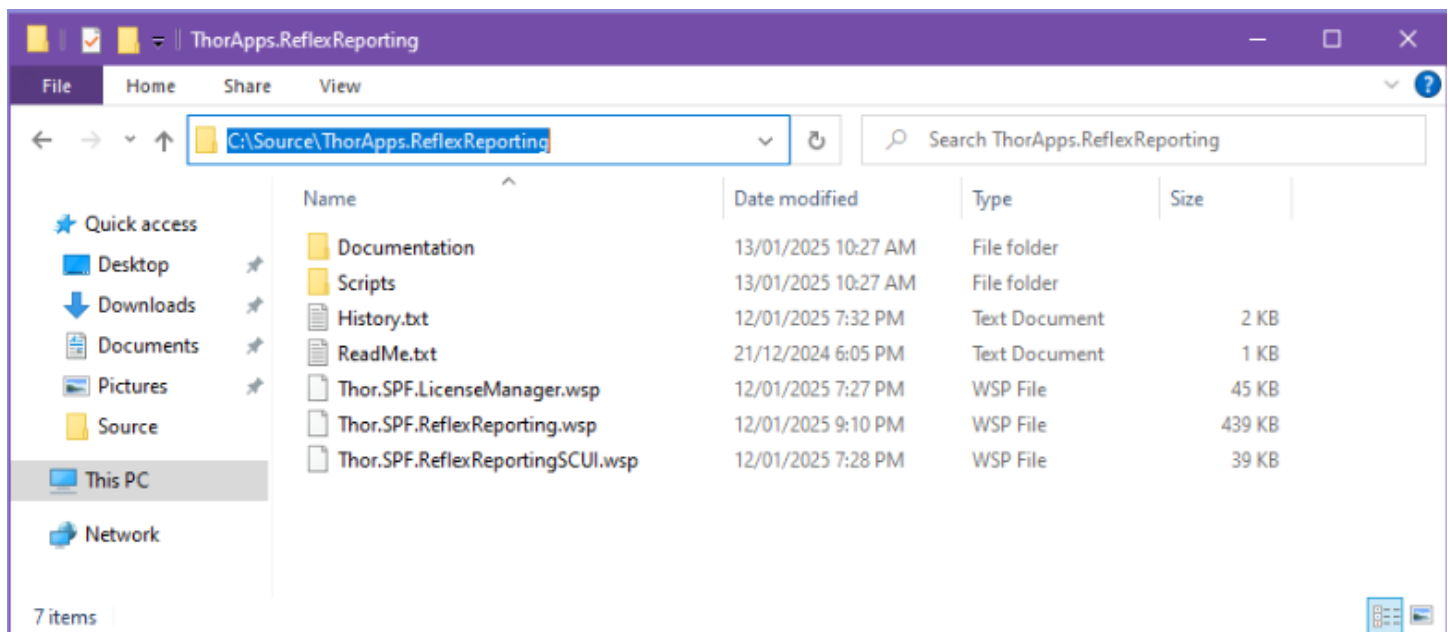
The following step's use a single stand-alone SharePoint 2019 server (called "TADEVSPSE01"). If you're installing into a multi-server SharePoint farm, you only need to run these steps on (one of) the server(s) hosting SharePoint Central Administration.

## Download Reflex Reporting

If you haven't already done so, download the latest Reflex Reporting 2016+ installation package from the ThorApps support and downloads site:

<https://docs.thorapps.com/Downloads/ThorApps.ReflexReporting.zip>

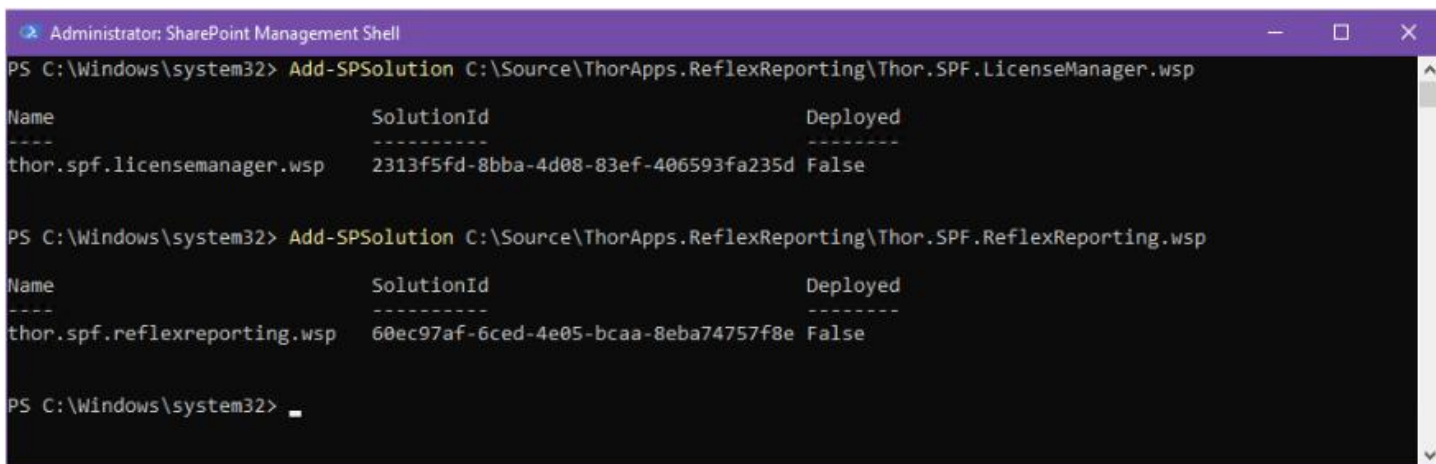
Copy the zip file to the server hosting SharePoint Central Administration and extract the contents to a local drive (This documentation is using C:\Source).



## Upload Package Files

At minimum, you will need to upload the 2 wsp packages, Thor.SPF.LicenseManager.wsp and Thor.SPF.ReflexReporting.wsp.

To upload the wsp packages to SharePoint, open a SharePoint PowerShell console as an Administrator and execute the command "Add-SPSolution" for each package.



```
Administrator: SharePoint Management Shell
PS C:\Windows\system32> Add-SPSolution C:\Source\ThorApps.ReflexReporting\Thor.SPF.LicenseManager.wsp

Name                SolutionId           Deployed
----                -
thor.spf.licensemanager.wsp  2313f5fd-8bba-4d08-83ef-406593fa235d False

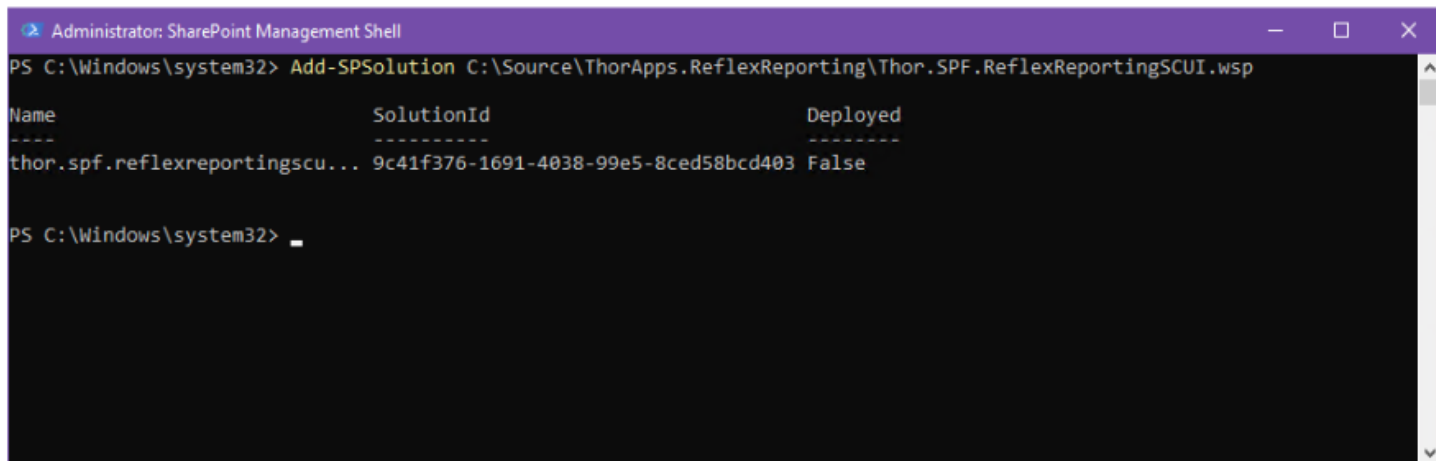
PS C:\Windows\system32> Add-SPSolution C:\Source\ThorApps.ReflexReporting\Thor.SPF.ReflexReporting.wsp

Name                SolutionId           Deployed
----                -
thor.spf.reflexreporting.wsp  60ec97af-6ced-4e05-bcaa-8eba74757f8e False

PS C:\Windows\system32> _
```

### [Optional]

Reflex Reporting also provides an optional Site Collection level User Interface. If you need or want to provide site collection administrators with access to manage Reflex Reporting Schemas, you will also need upload this package (Thor.SPF.ReflexReportingSCUI.wsp).



```
Administrator: SharePoint Management Shell
PS C:\Windows\system32> Add-SPSolution C:\Source\ThorApps.ReflexReporting\Thor.SPF.ReflexReportingSCUI.wsp

Name                SolutionId           Deployed
----                -
thor.spf.reflexreportingscu... 9c41f376-1691-4038-99e5-8ced58bcd403 False

PS C:\Windows\system32> _
```

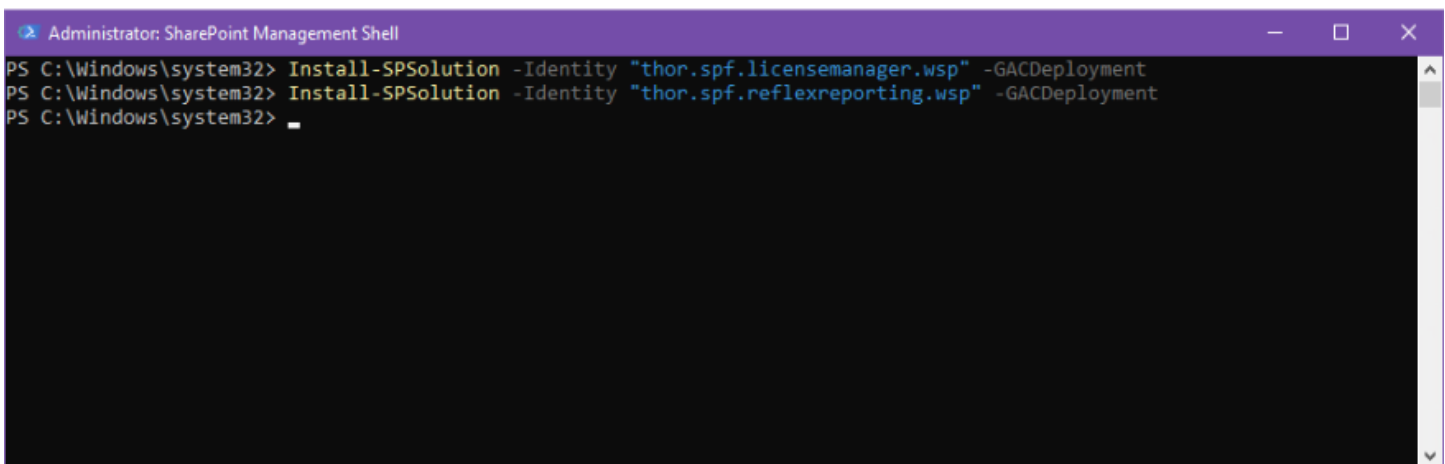


## Deploy Solutions

After uploading the wsp solution packages, you will need to deploy the solutions within SharePoint. This can either be done with the PowerShell command “Install-SPSolution”, or Open SharePoint Central Administration and deploy using the [System Settings]=>[Manage Farm Solutions] page.

### Deploy Using PowerShell

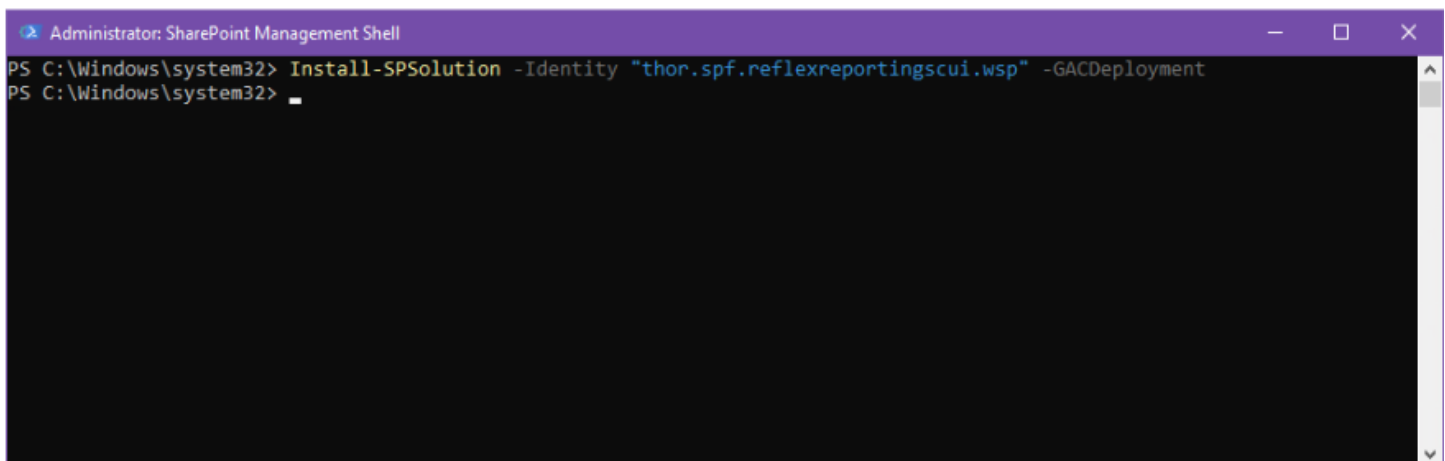
Use the PowerShell command “Install-SPSolution” with the -GACDeployment argument.



```
Administrator: SharePoint Management Shell
PS C:\Windows\system32> Install-SPSolution -Identity "thor.spf.licensemanager.wsp" -GACDeployment
PS C:\Windows\system32> Install-SPSolution -Identity "thor.spf.reflexreporting.wsp" -GACDeployment
PS C:\Windows\system32> _
```

### [Optional]

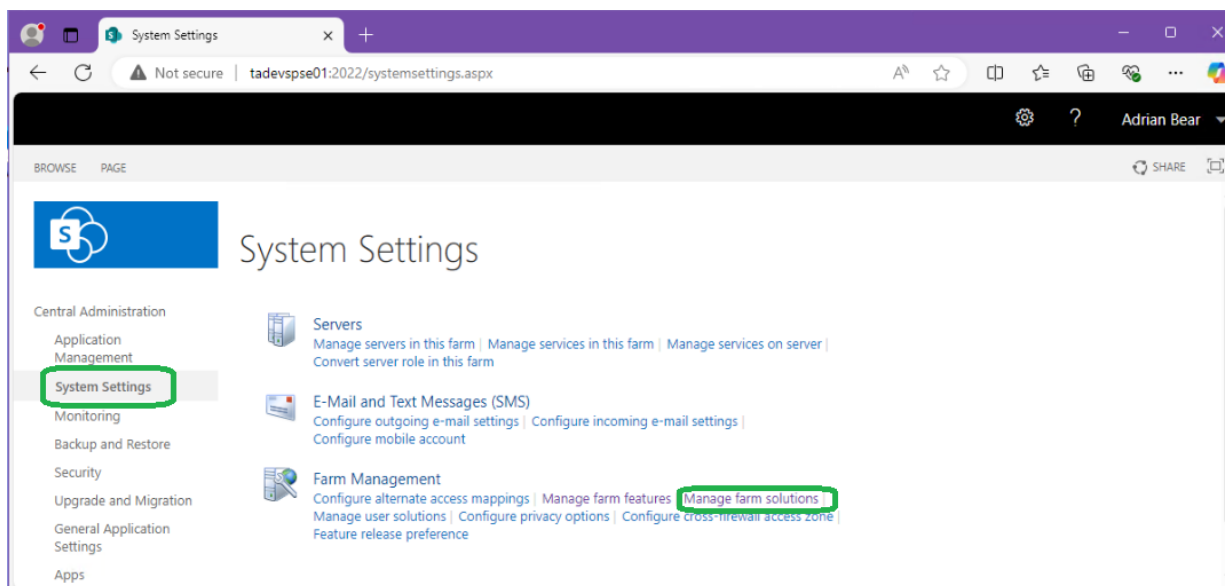
If you uploaded the “Thor.SPF.ReflexReportingSCUI.wsp” package, you’ll also want to deploy it.



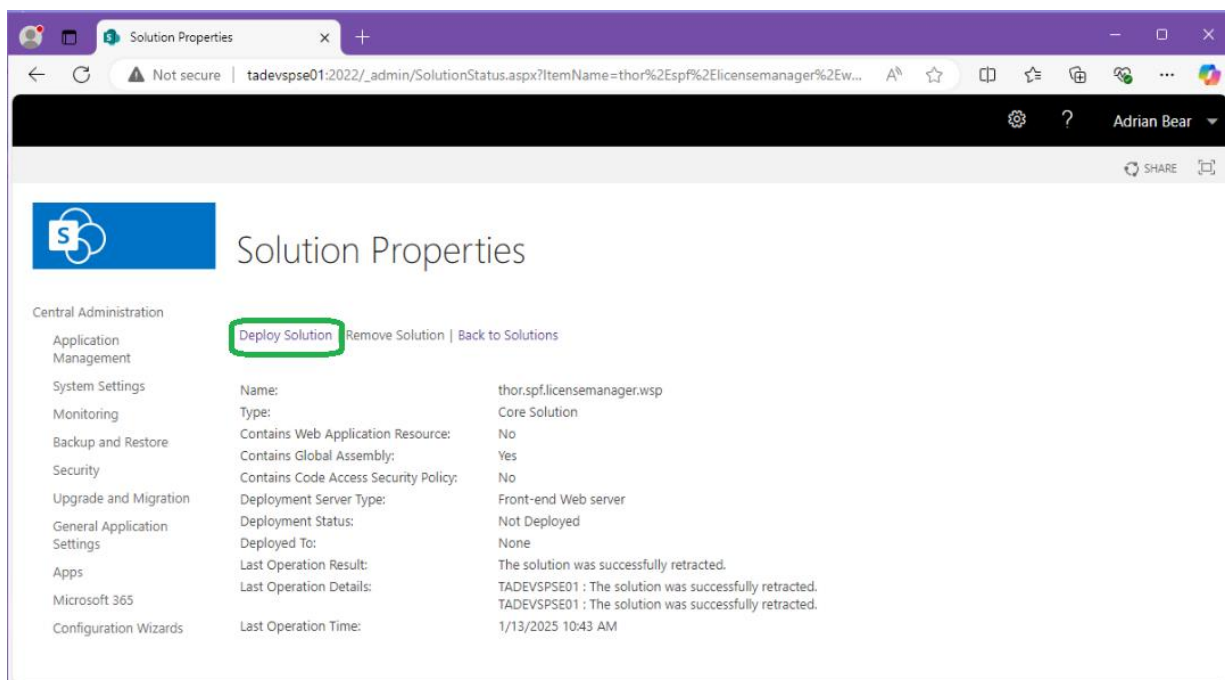
```
Administrator: SharePoint Management Shell
PS C:\Windows\system32> Install-SPSolution -Identity "thor.spf.reflexreportingscui.wsp" -GACDeployment
PS C:\Windows\system32> _
```

## Deploy using SharePoint Central Administration pages

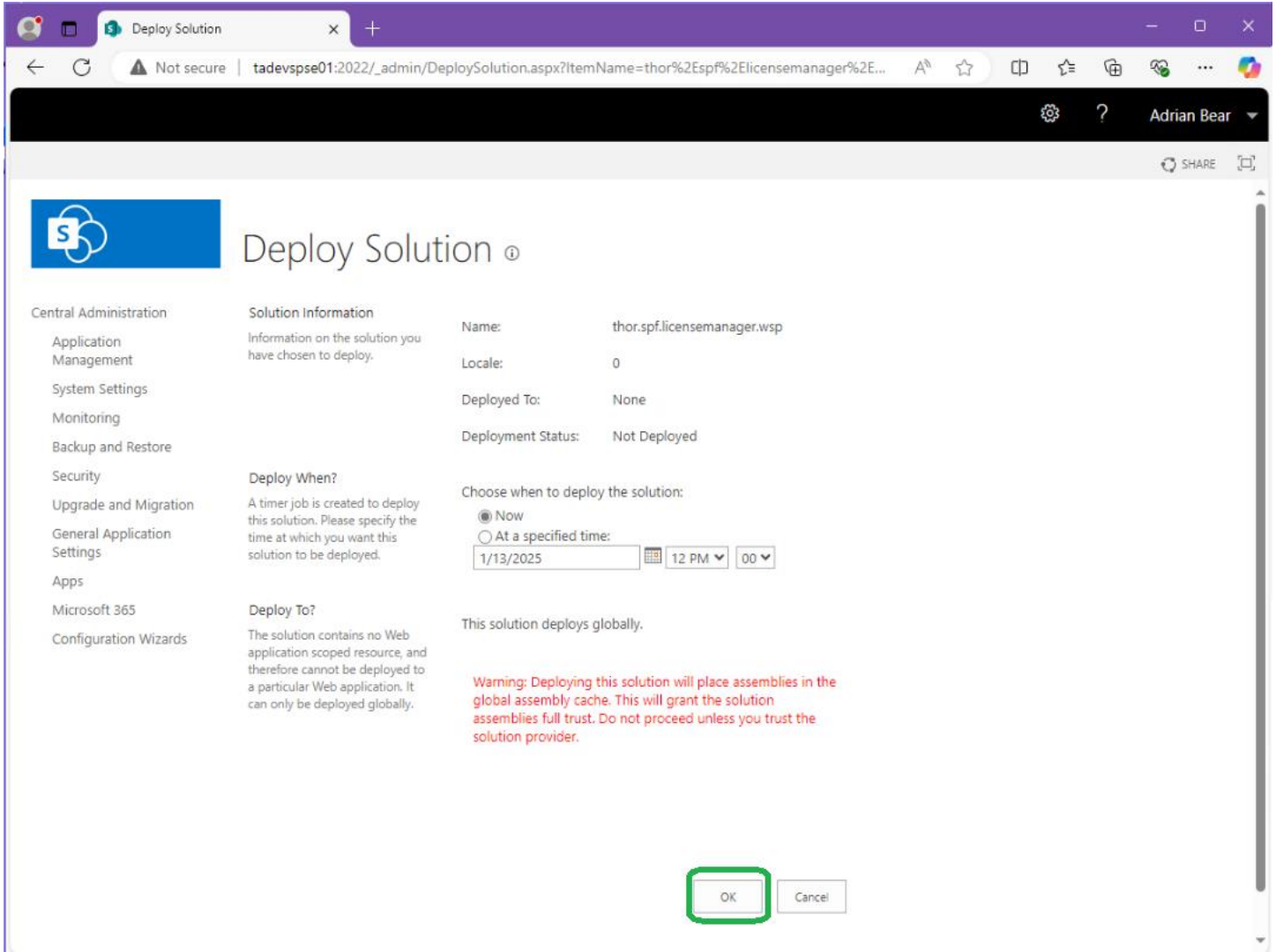
Navigate to [System Settings]=>[Manage farm solutions]



From the list of SharePoint farm solutions displayed, click through each of the ThorApps packages and click “Deploy Solution”.

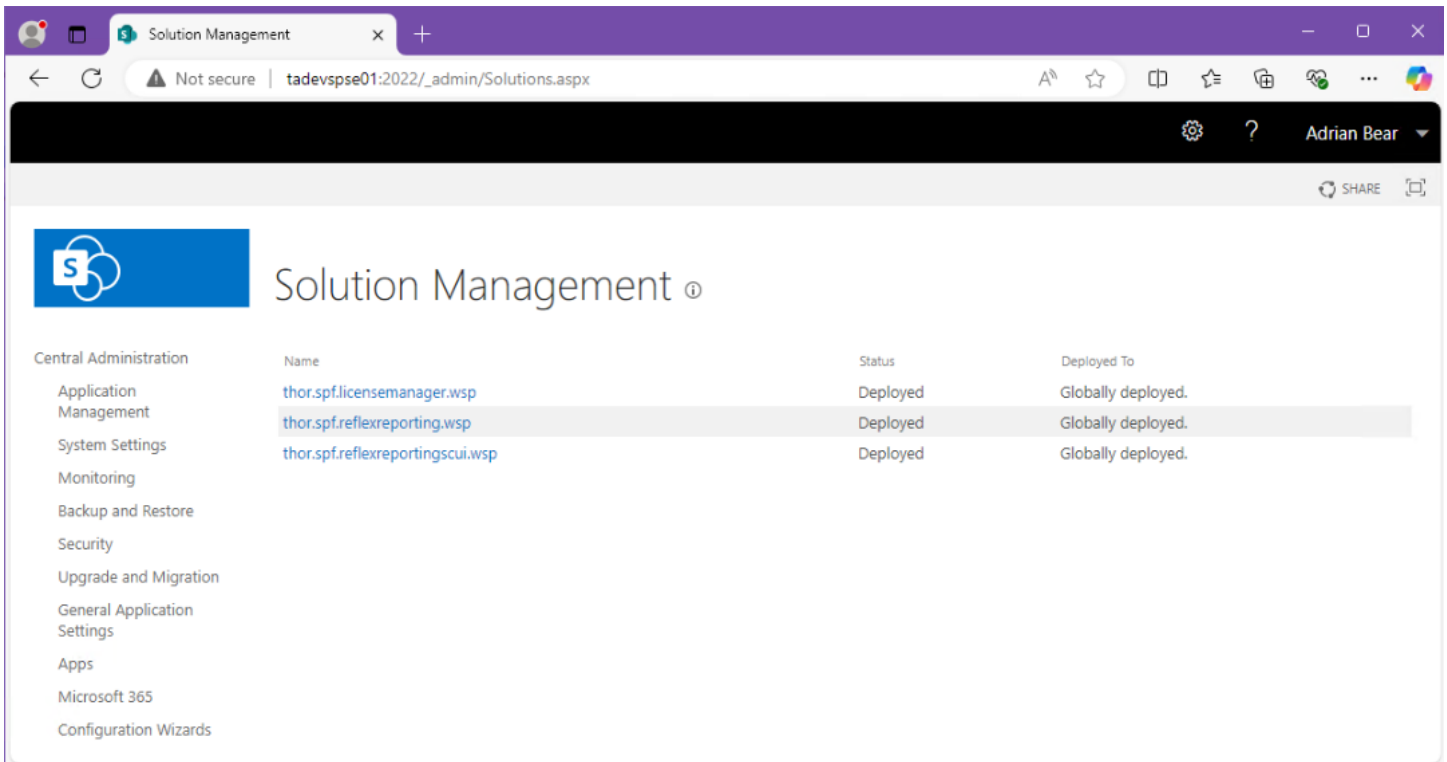


All 3 wsp packages are “global” and do not require any further parameters, just click “OK” to deploy.



After deployment, you can verify the solutions have been deployed, by navigating to

[System Settings]=>[Manage farm solutions] in SharePoint Central Admin and reviewing the list of deployed solutions. Note the Status is “Deployed”.



## Reboot/Restart after install

After installing Reflex Reporting, it's a good idea to reboot all servers in the farm to ensure all services pick up the Reflex Reporting DLL's. If rebooting is undesirable, you will at least need to manually restart IIS and the SharePoint Timer service on each of the SharePoint servers.

## Reflex Reporting Configuration Database Setup

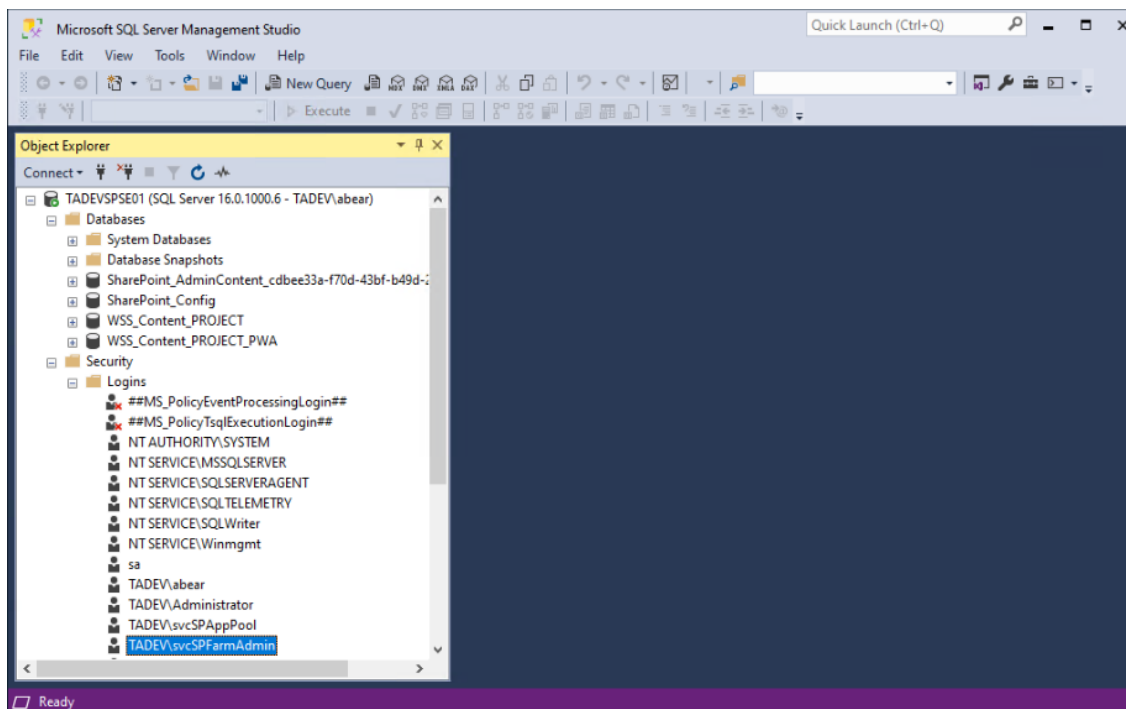
Reflex Reporting uses a Microsoft SQL database to store and manage the “Reporting Schemas” created. This database should be separate from the Reporting data database/s you create in later steps. This database is referred to as the Reflex Reporting “Configuration” or “Schemas” database.

The “Configuration” database can be either created new, using the Reflex Reporting pages or the same pages can be used to “attach” to a new empty database and will provision the required SQL objects within it. If you’re attaching to an empty database, the database must have the SharePoint Farm account (the same account the SharePoint Timer service and the SharePoint Central Administration web application run as) configured as a database owner on the empty database before starting these steps.

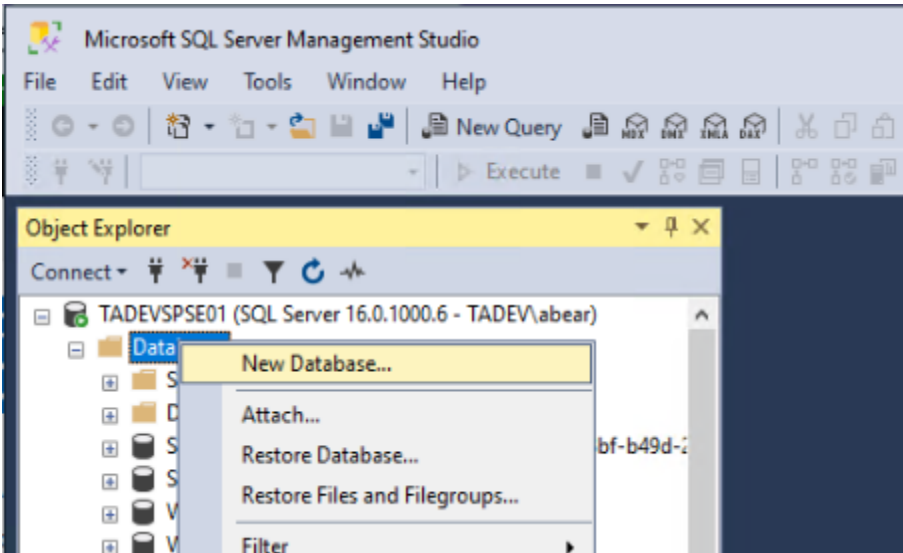
### [Optional] Create a new blank database for Reflex Reporting Configuration

To create a new blank database for the Reflex Reporting configuration, you will need to use SQL Server Management Studio (SSMS).

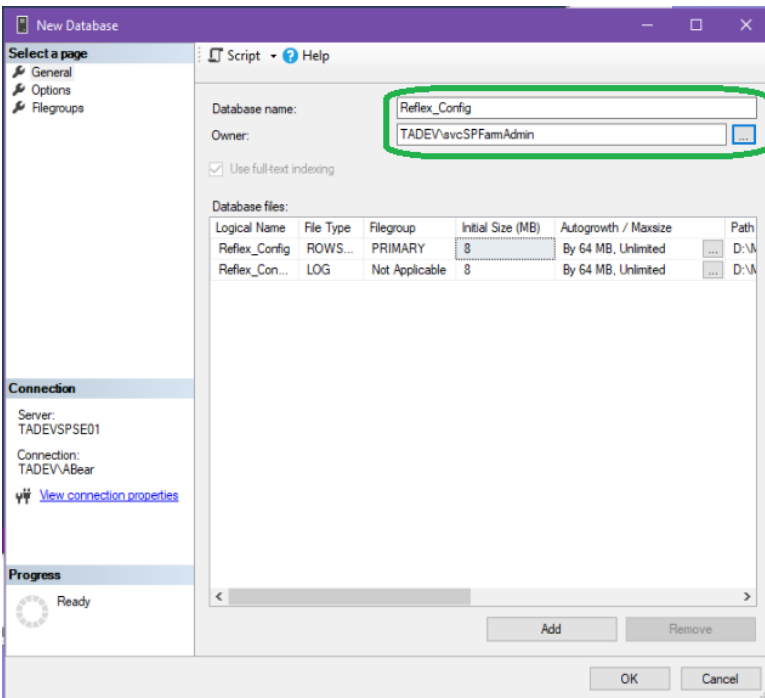
Open SSMS and connect to the server hosting the SharePoint databases. Take note, that the SharePoint Farm account is already configured as a user on this SQL server.



Right click on the [Databases] node in the [Object Explorer] and select “New Database...”



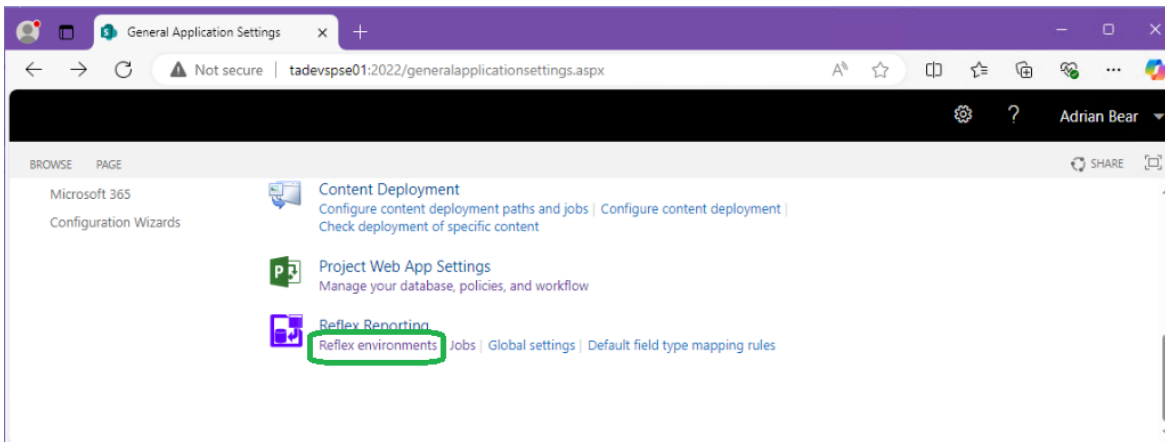
Enter a new “Database name”, set the “Owner” as the SharePoint farm account and click “OK”.



Return to SharePoint Central Administration and follow the next section.

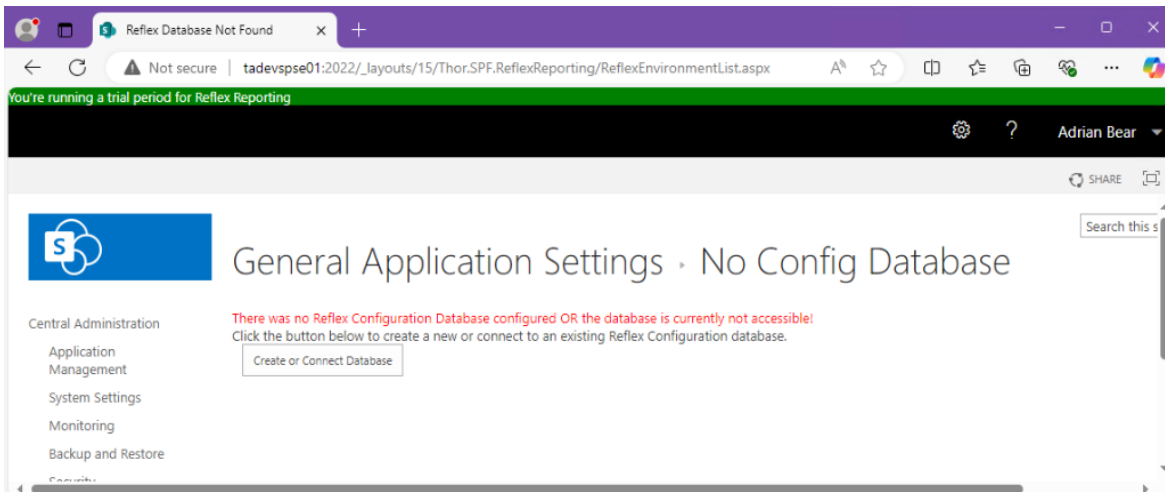
## Create (or attach) a Reflex Reporting Configuration database

From SharePoint Central Administration navigate to [General Application Settings]=>[Reflex environments].

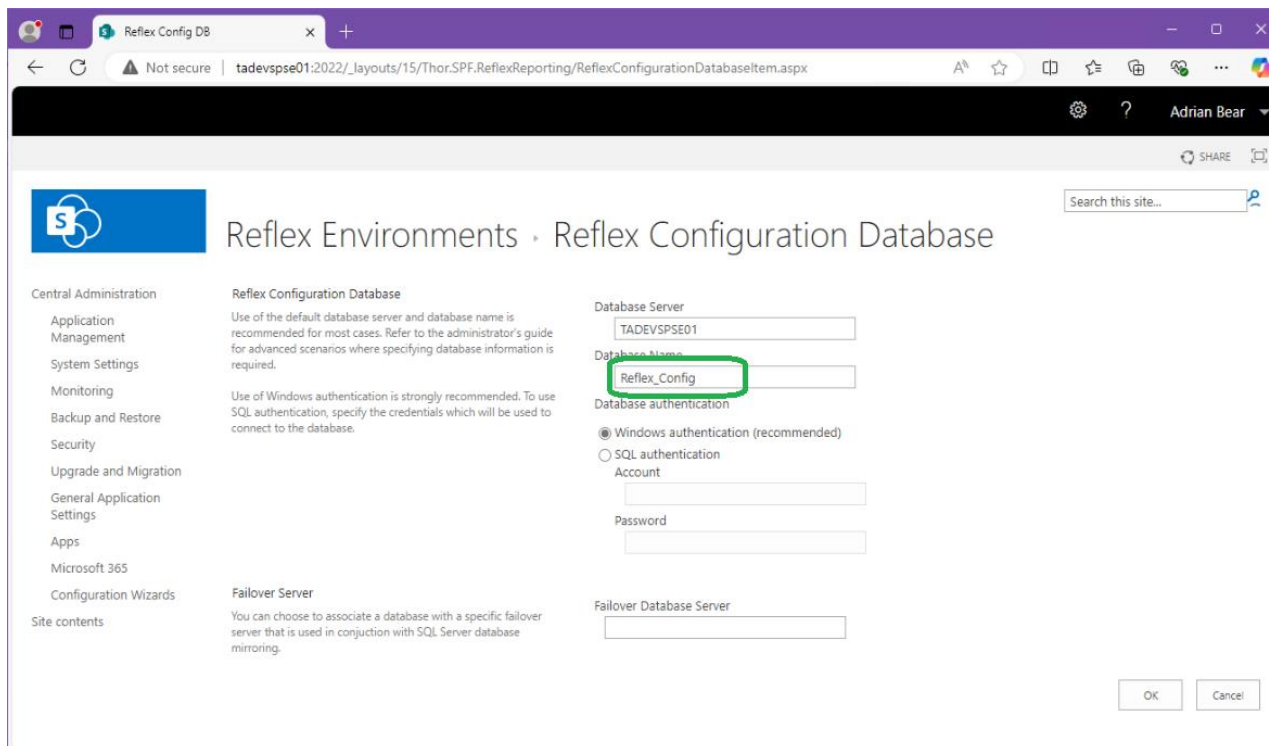


You should be presented with the “No Config Database” page.

Click the “Create or Connect Database” button.

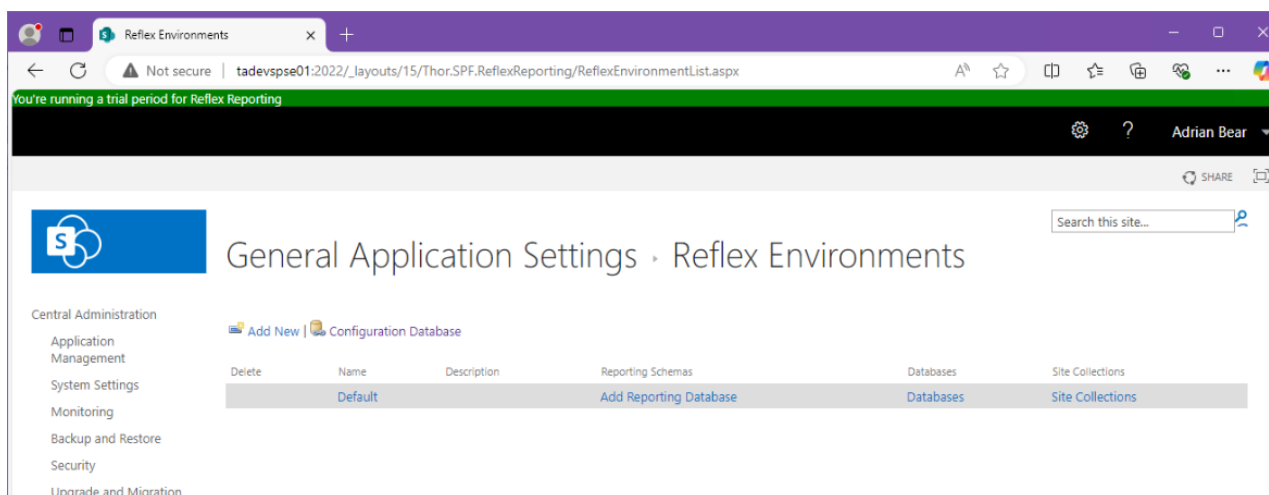


Enter a new database name or the name of a blank database you wish to configure and click “OK”.



This step will take a few minutes while the new database is setup.

Once it is finished it will display the default list of Reflex Environments.





## License Activation

To apply a subscription license or trial extension, please refer to the ThorApps License Manager Guide.

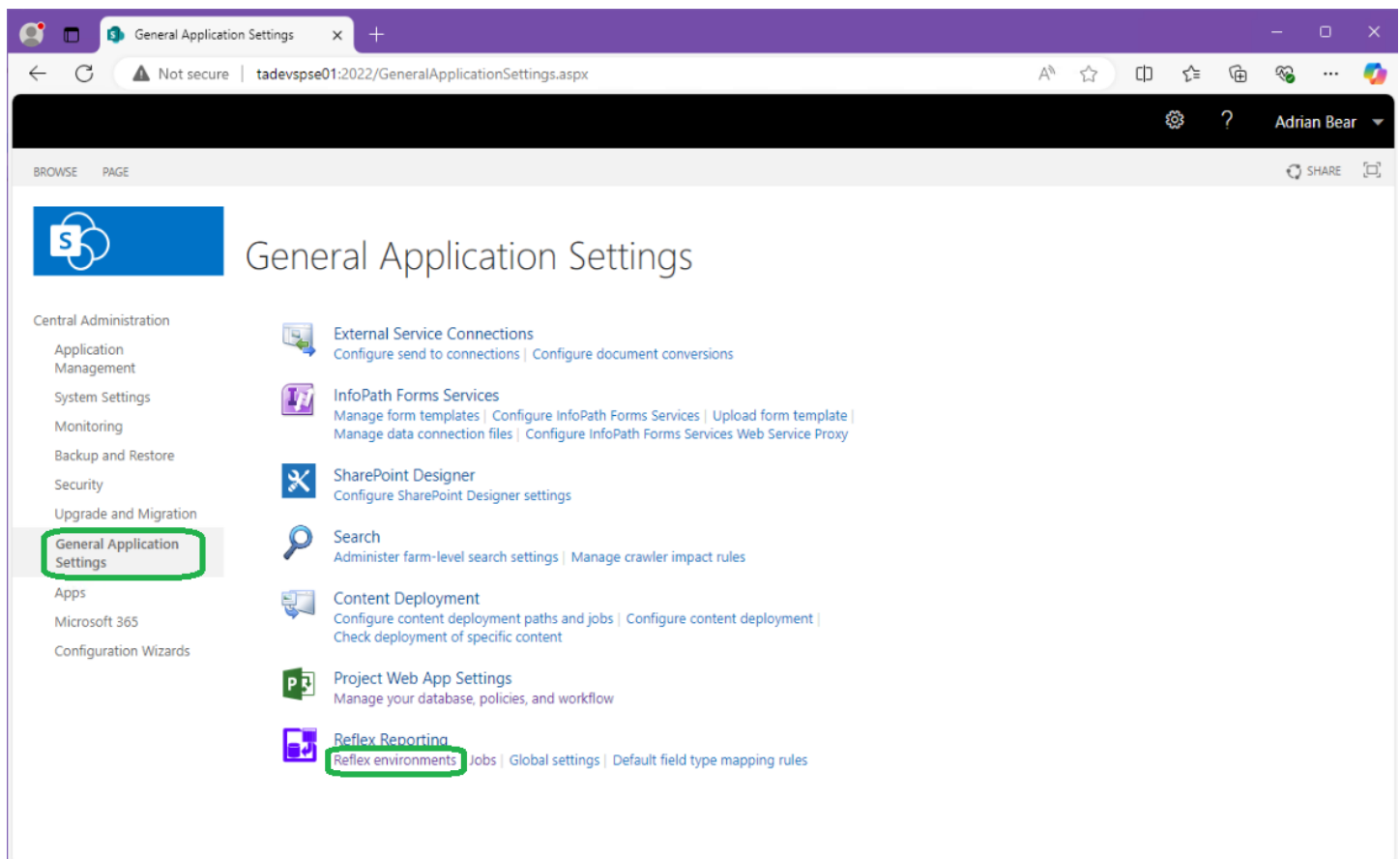
## Configuration

The following sections describe the steps to configure various Reflex Reporting features. The first step must be to configure a Reporting database.

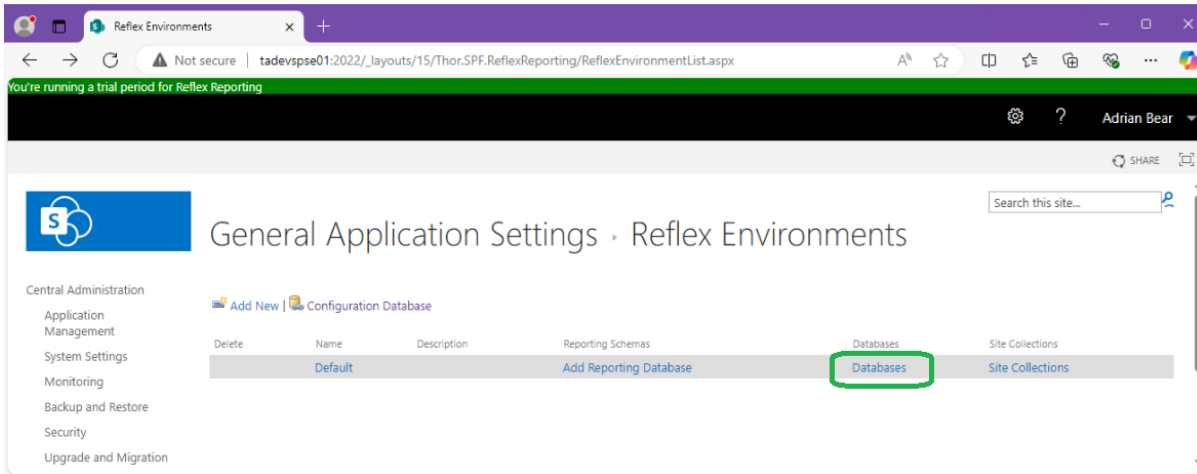
### Create a Reflex Reporting database

Reflex Reporting allows you to setup multiple Reflex environments and multiple reporting databases per environment to store the data for different reporting schemas. This can be used to separate data and access for different areas within your business (i.e., Sales vs Operations) or to separate DEV, TEST and PROD environments within the same SharePoint farm.

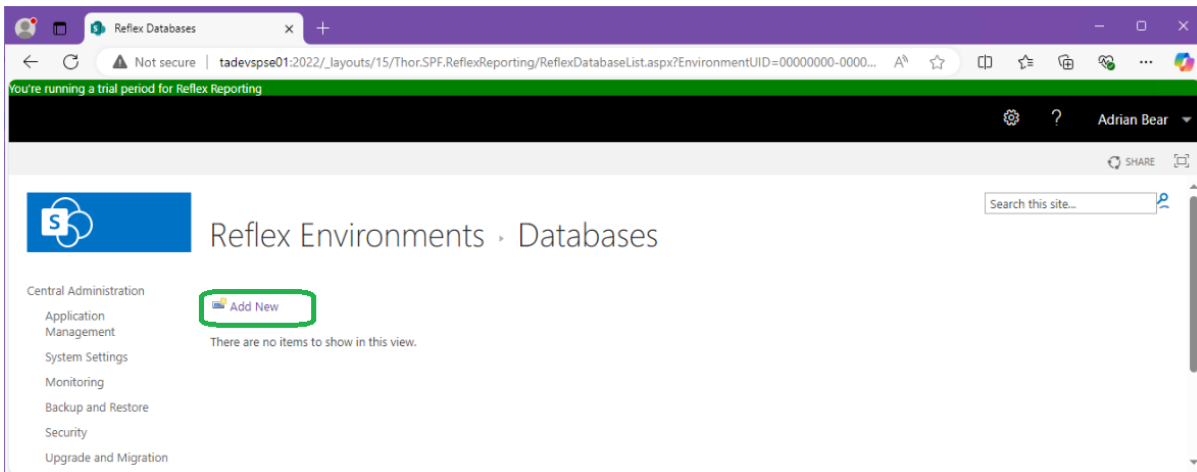
From SharePoint Central Admin, navigate to [General Application Settings]=>[Reflex environments]



On the “Default” Reflex environment row, click “Databases”.



On the Reflex database page click “Add New”.



Enter a "Display Name" and a "Database Name" and click "OK".

Reflex Databases > Database

Display Name

Display Name  
Default

Environment

Environment  
Default

Reflex Reporting Database

Use of the default database server and database name is recommended for most cases. Refer to the administrator's guide for advanced scenarios where specifying database information is required.

Database Server  
TADEVSPSE01

Database Name  
Reflex\_PWA

Database authentication

Windows authentication (recommended)  
 SQL authentication

Account

Password

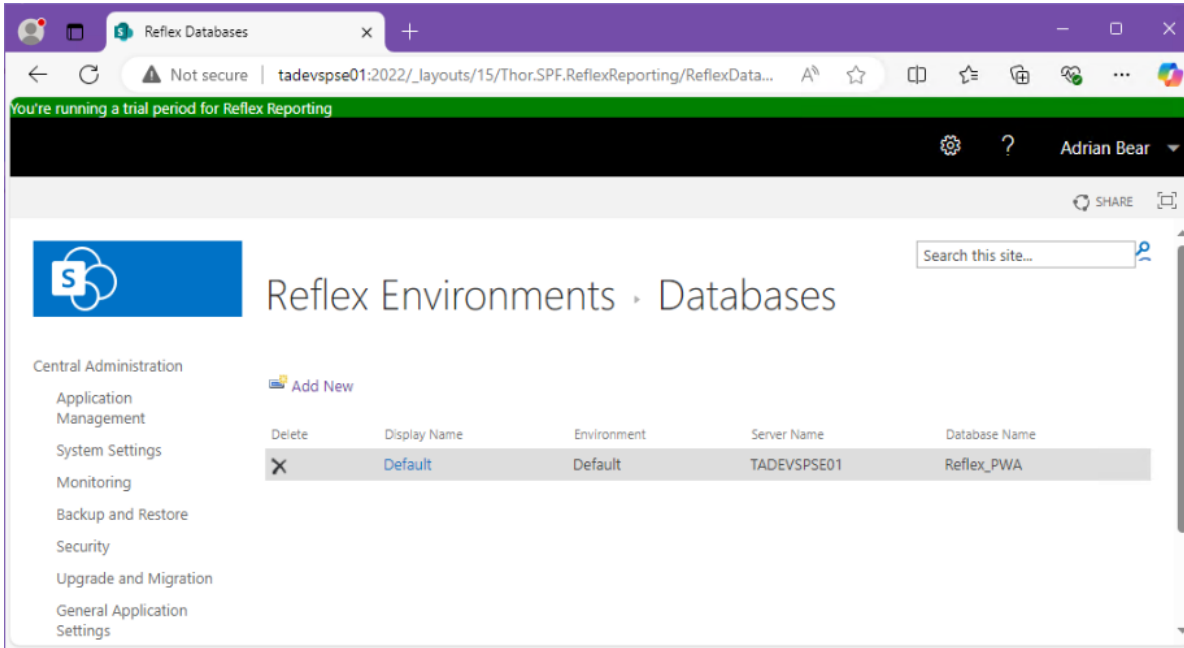
Failover Server

You can choose to associate a database with a specific failover server that is used in conjunction with SQL Server database mirroring.

Failover Database Server

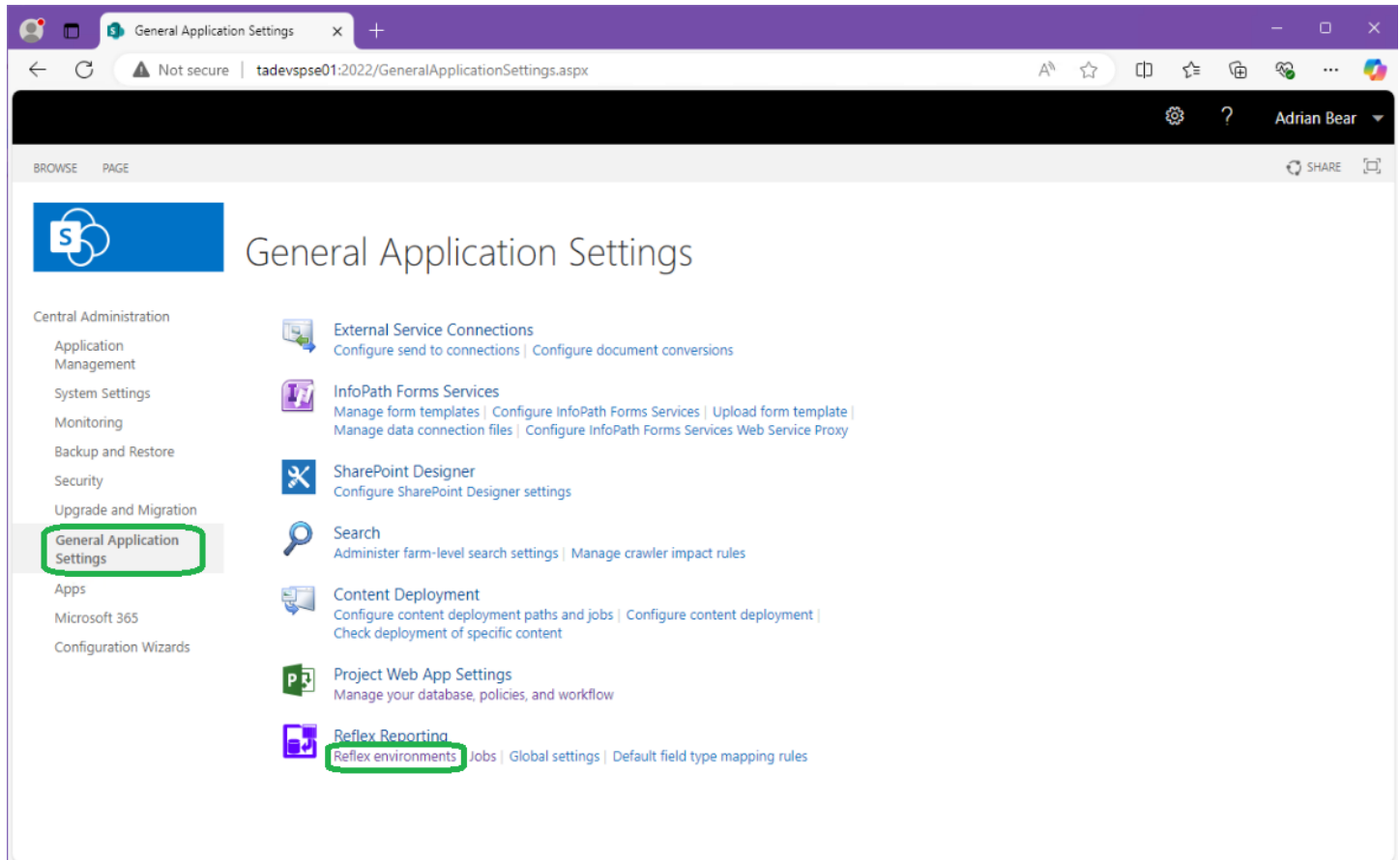
OK Cancel

You will then be returned to the list of Reflex Reporting databases, which now contains your new reporting database.



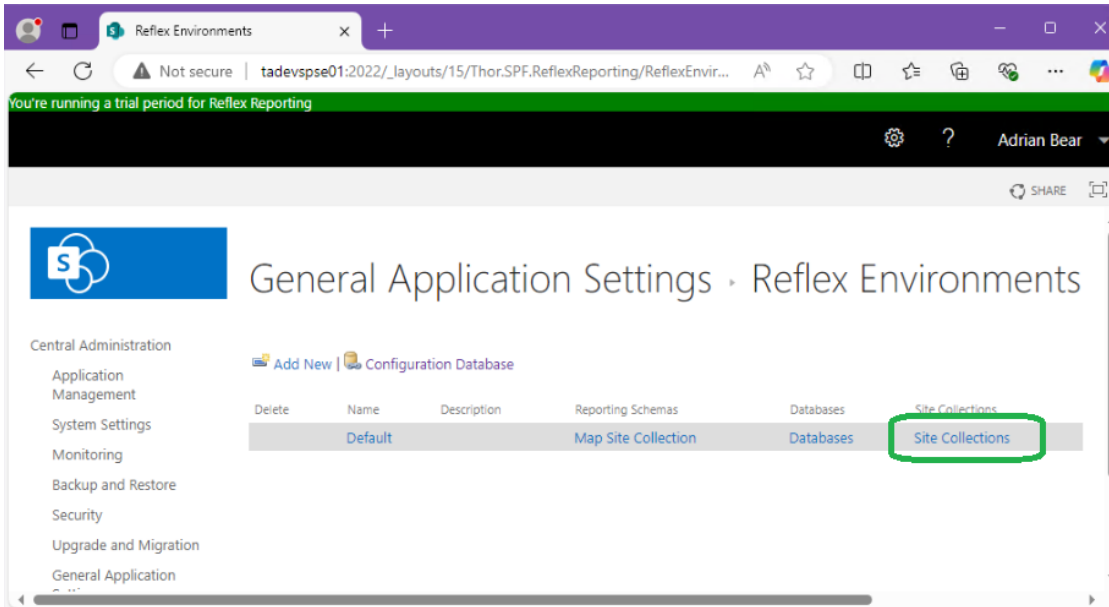
## Map a Site Collection

From SharePoint Central Admin, navigate to [General Application Settings]=>[Reflex environments]

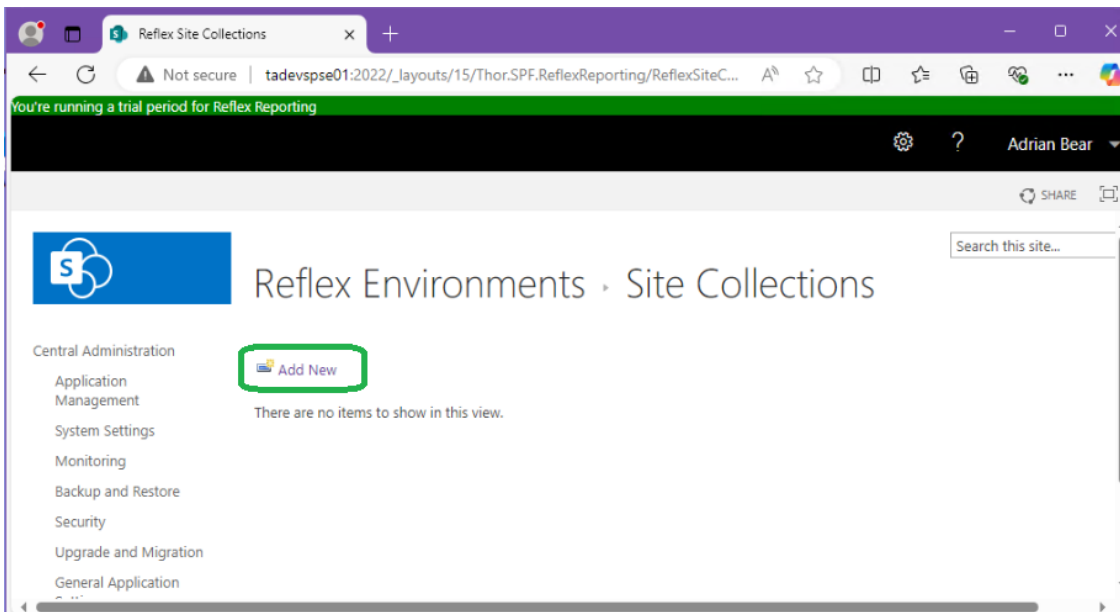


The screenshot shows the SharePoint Central Administration interface. The browser address bar displays the URL `tadevps01:2022/GeneralApplicationSettings.aspx`. The page title is "General Application Settings". On the left-hand side, a navigation menu lists various administrative categories, with "General Application Settings" highlighted by a green box. The main content area lists several configuration options, each with an icon and a brief description. The "Reflex Reporting" option is highlighted with a green box, and its sub-link "Reflex environments" is also highlighted with a green box. Other options include External Service Connections, InfoPath Forms Services, SharePoint Designer, Search, Content Deployment, and Project Web App Settings.

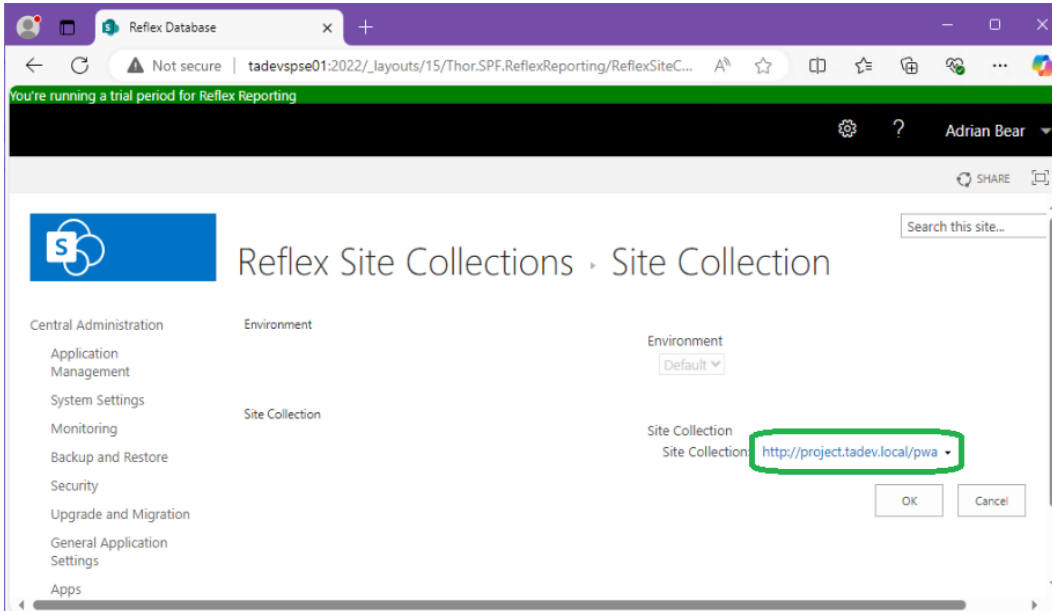
On the “Default” Reflex environment row, click “Site Collections”.



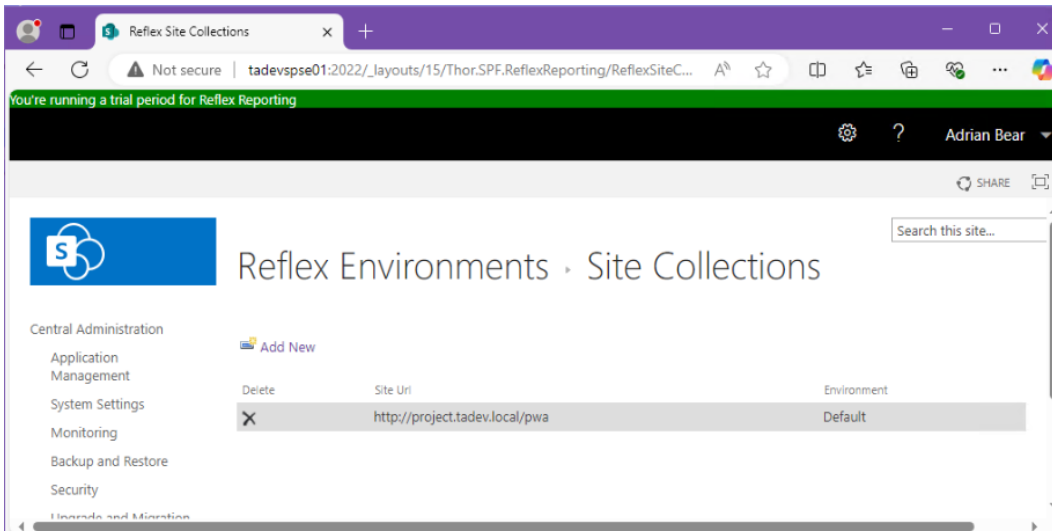
On the Reflex environment Site Collections page click “Add New”.



On the Reflex Site Collection page, use the Site Collection picker to select a Site Collection to map to this Reflex environment and click “OK”.



After clicking “OK” you will be returned to the list of Site Collections mapped to this Reflex environment.



You can now configure Reporting Schemas and list/library mappings to populate the database/s for this Reflex environment.



## Management User Interfaces

Reflex Reporting provides two alternate user interfaces for managing Reporting Schemas and list data reflection. The default is the interface built into SharePoint Central Administration and is described in the following sections.

The alternate interface is optional and requires you to install the “thor.spf.reflectreportingscui.wsp” package in previous steps. It provides Site Collection Administrators the facility to manage reporting schemas and list data reflection from within a site collection’s site settings menus.

If you’d prefer to use the SCUI (site collection user interface), you should skip the next few sections and review the section “**Site Collection User Interface**”.

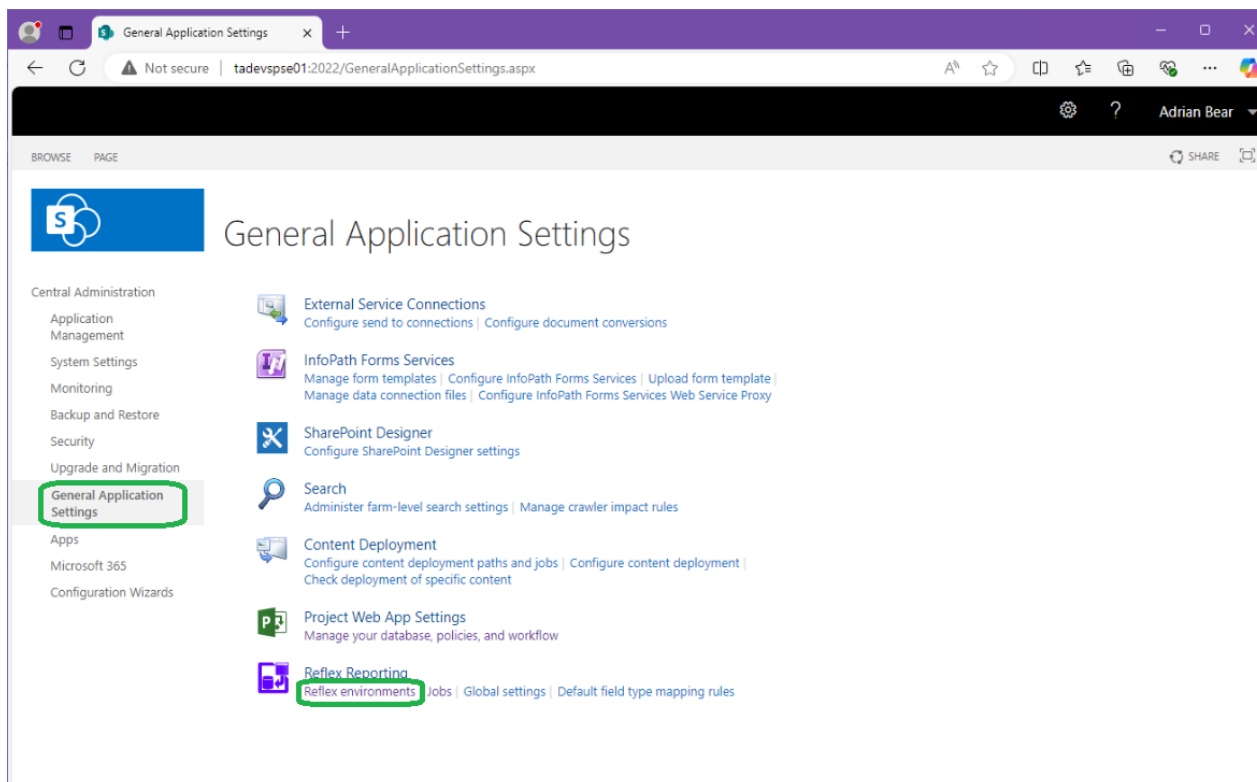
## Reporting Schemas (Central Admin)

In Reflex Reporting a “Reporting Schema” is a design for a SQL table. Each reporting schema is associated with a reporting database, in which, it will create a SQL table when the reporting schema is enabled. If the reporting schema is disabled, the SQL table is **DROPPED** from the associated reporting database, along with the data and any custom indexes you may have added to it.

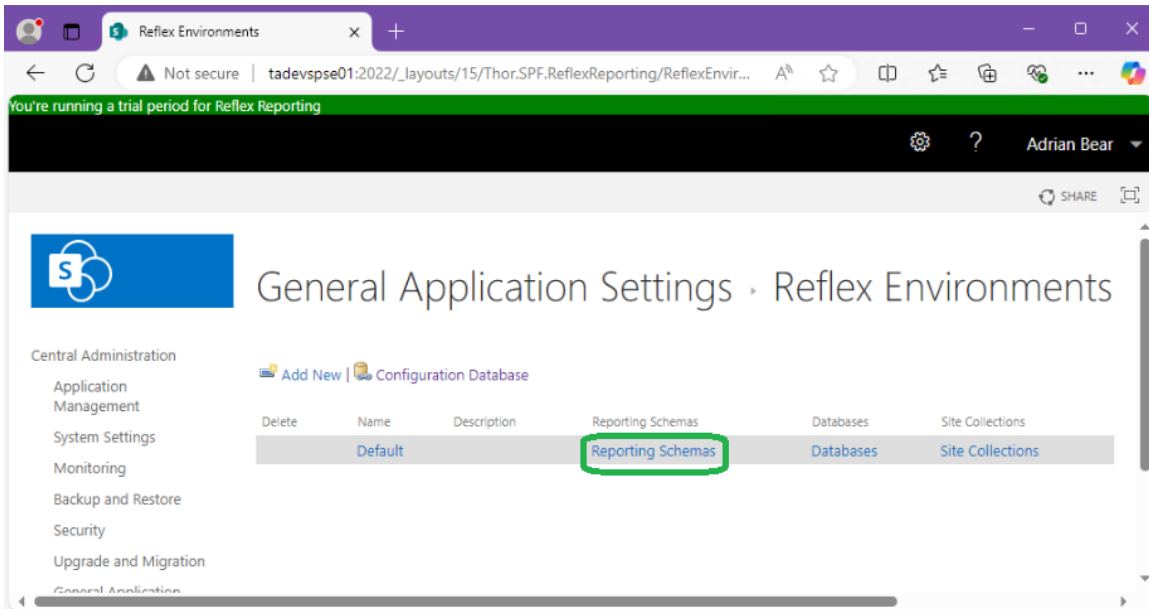
Reporting schemas are made up of a set of mapped fields (SQL fields to SharePoint List or Library fields). The fastest way to create a new reporting schema is to source the fields from a pre-existing SharePoint List (or Library).

### Create a new Reporting Schema

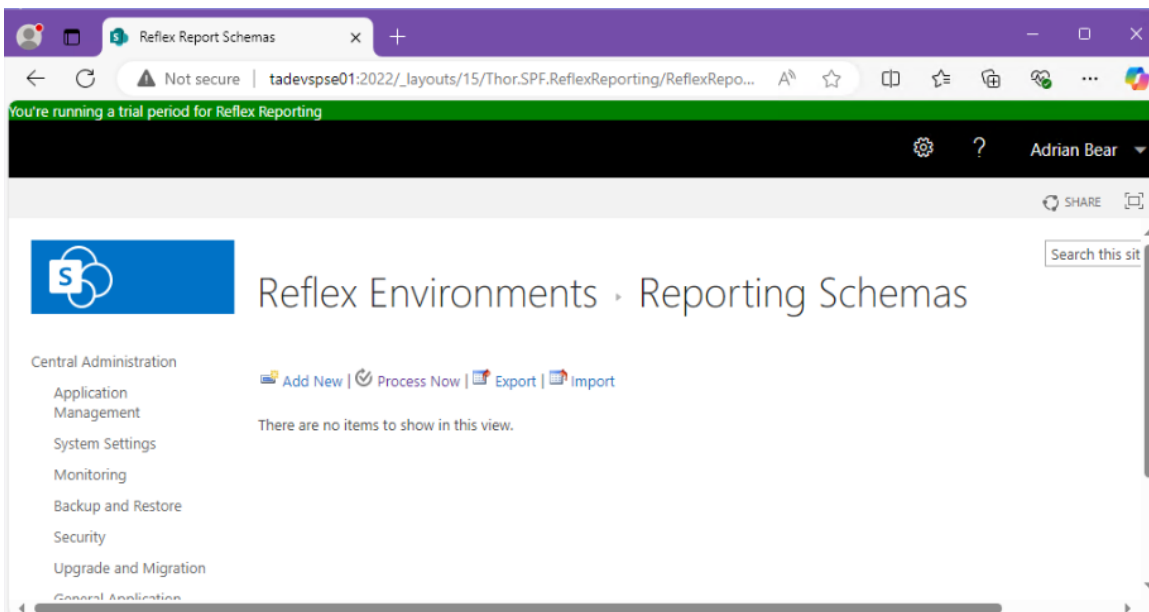
From SharePoint Central Administration, navigate to [General Application Settings]=>[Reflex environments].



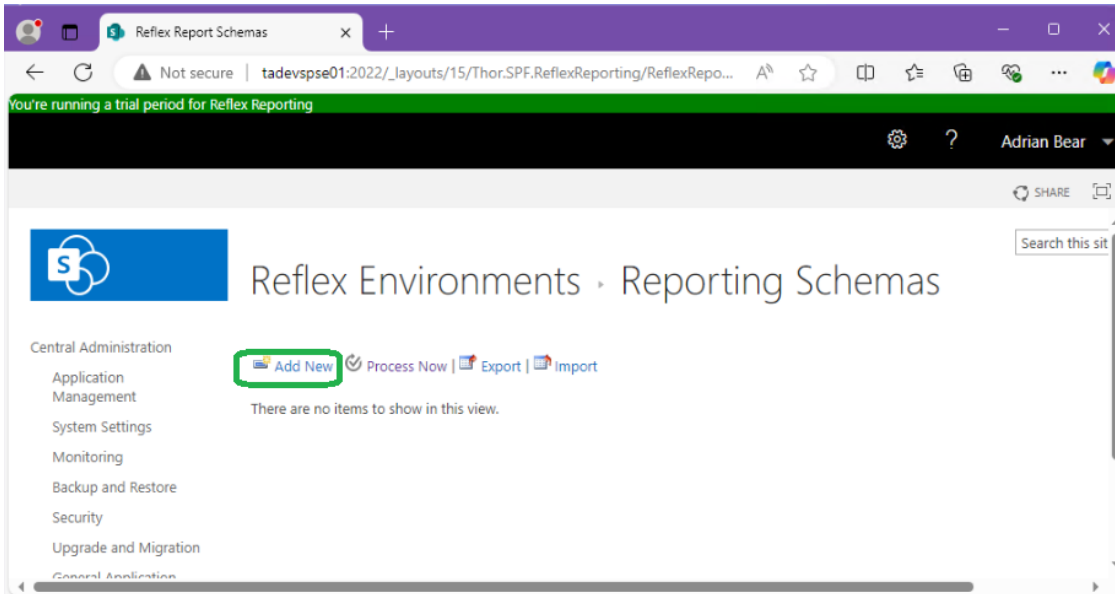
From the Reflex environments page click “Reporting Schemas” on the Reflex environment row you want to create reporting schema in.



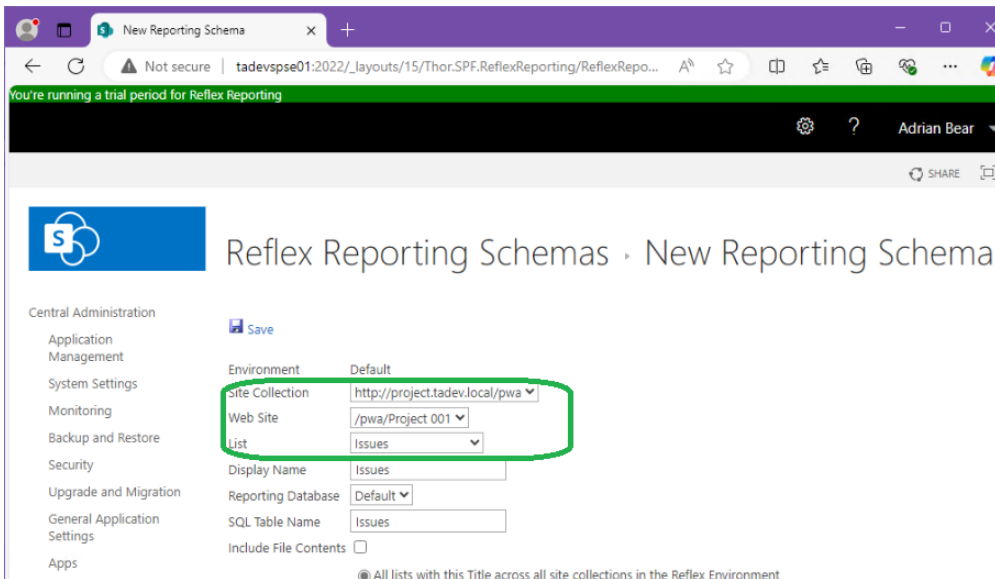
This will display the list of “Reporting Schemas” that exist within the Reflex environment. If you’ve just setup, this list will be empty.



On the list of Reporting Schemas, click “Add New”.

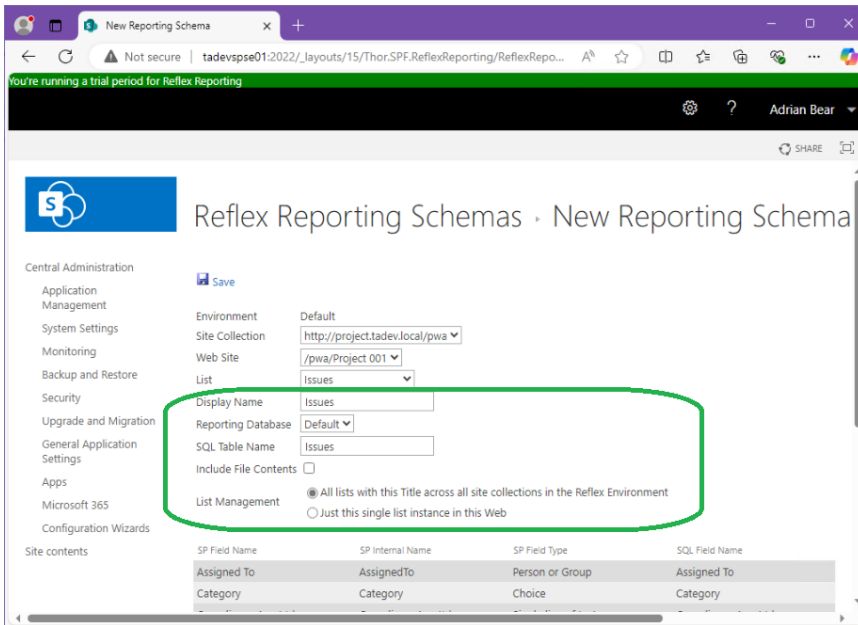


Select the “Site Collection”, “Web Site” and “List” to use as a source for the new Reporting Schema.



This will automatically select defaults for “Display Name”, “SQL Table Name” and the fields to map.

On this page you can overwrite the default “Display Name”, “SQL Table Name” and select a reporting database. You can also select to include File Contents for a Document Library and how you want this reporting schema mapped (to a single list instance or to multiple lists by list Title).



Once your happy with the values click “Save” to create a “disabled” reporting schema.

From this “Reporting Schema” edit page, you can manage fields, the list mappings, delete the reporting schema or “Enable”.

Click “Enable” and then “OK” on the confirmation popup window to enable it. Reflex reporting will create the SQL table in the database immediately and then start processing list items from the mapped list instances in a background job.

Reflex Reporting Schemas - Reporting Schema

Environment: Default  
Display Name: Issues  
Reporting Database: Default  
SQL Table Name [dbo]: Issues  
Include File Contents:   
Mapping Type: By list titles across Environment  
Enabled:

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
<input type="checkbox"/>	Assigned To	varchar(255)	AssignedTo	Person or Group
<input type="checkbox"/>	Category	varchar(255)	Category	Choice
<input type="checkbox"/>	Compliance Asset Id	varchar(255)	ComplianceAssetId	Single line of text
<input type="checkbox"/>	Created	datetime	Created	Date and Time
<input type="checkbox"/>	Created By	varchar(255)	Author	Person or Group
<input type="checkbox"/>	Discussion	nvarchar(max)	Discussion	Multiple lines of text
<input type="checkbox"/>	Due Date	datetime	DueDate	Date and Time
<input type="checkbox"/>	Modified	datetime	Modified	Date and Time
<input type="checkbox"/>	Modified By	varchar(255)	Editor	Person or Group
<input type="checkbox"/>	Owner	varchar(255)	Owner	Person or Group
<input type="checkbox"/>	Priority	varchar(255)	Priority	Choice
<input type="checkbox"/>	Related Items	nvarchar(max)	RelatedItems	Related Items
<input type="checkbox"/>	Resolution	nvarchar(max)	Resolution	Multiple lines of text
<input type="checkbox"/>	Status	varchar(255)	Status	Choice
<input type="checkbox"/>	Title	varchar(255)	Title	Single line of text

After enabling a reporting schema you are presented with the Locked view of the reporting schema. From this page, you can (later) manually force a list data sync job (“Process Now”) and manage the list mappings to this reporting schema.

Clicking the “Enabled” check box, will disable the reporting schema (and DROP the SQL table).

**Don't do this now.**

The screenshot shows a web browser window with the URL `tadevpspe01:2022/_layouts/15/Thor.SPF.ReflexReporting/ReflexRepo...`. The page title is "Reflex Reporting Schemas · Reporting Schema". The user is identified as "Adrian Bear".

On the left is a navigation menu with categories: Central Administration, Apps, Microsoft 365, and Site contents. The main content area has tabs for "Mapping Rules", "Mapped List Instances", and "Process Now".

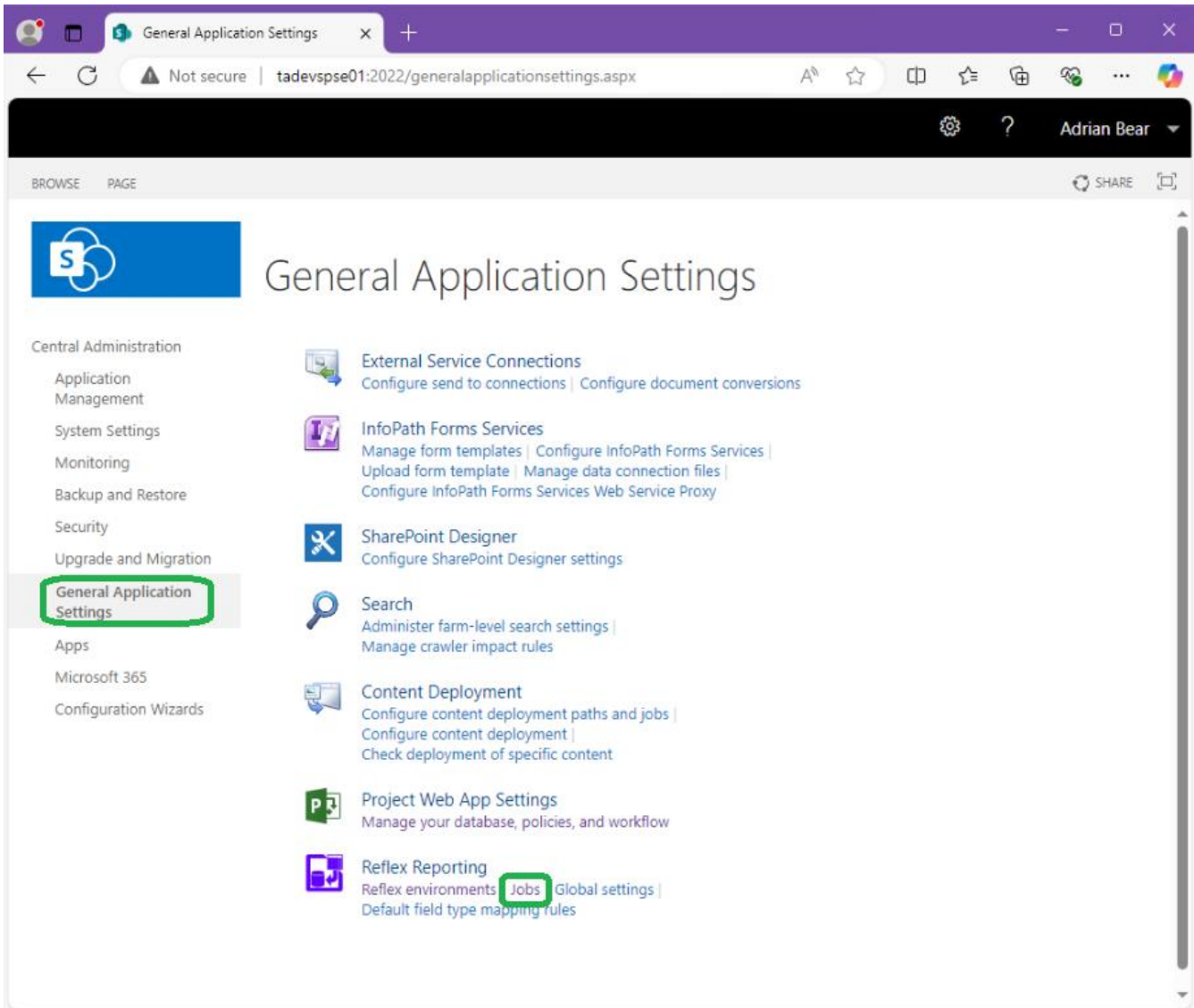
Configuration details for the reporting schema:

- Environment: Default
- Display Name: Issues
- Reporting Database: Default
- SQL Table Name [dbo]: Issues
- Include File Contents:
- Mapping Type: By list titles across Environment
- Enabled:

Below the configuration is a table of field mappings:

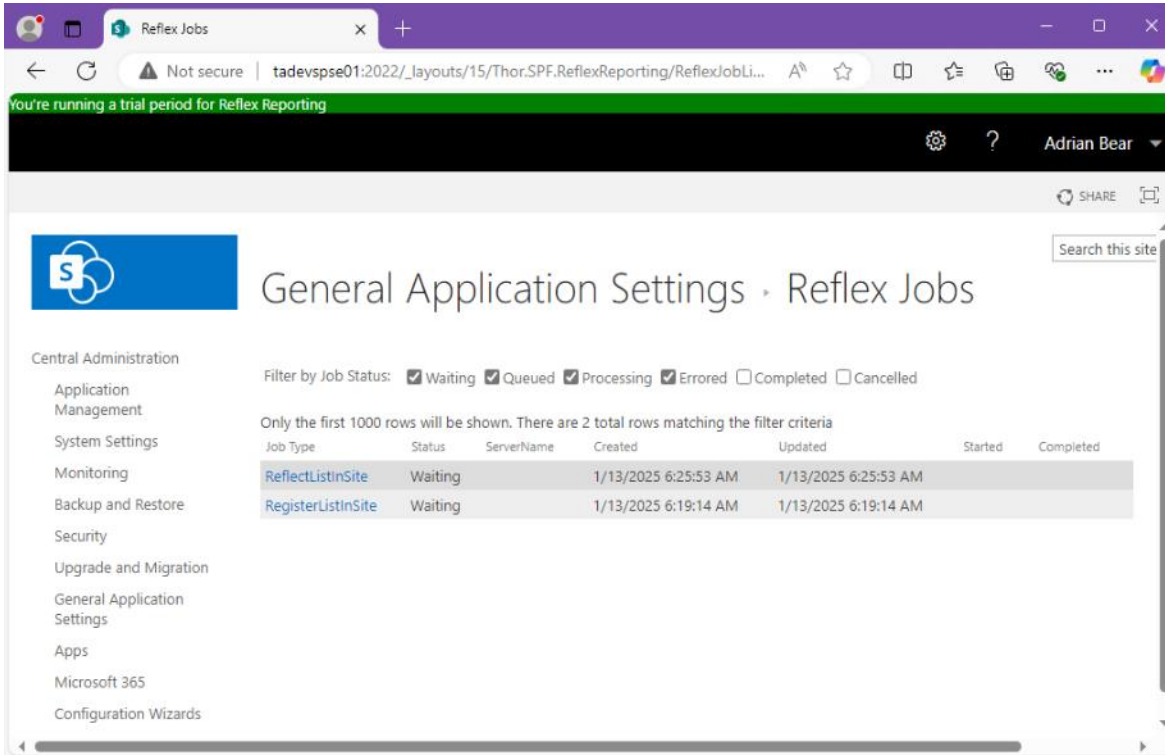
Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetid	Single line of text
	Created	datetime	Created	Date and Time
	Created By	varchar(255)	Author	Person or Group
	Discussion	nvarchar(max)	Discussion	Multiple lines of text
	Due Date	datetime	DueDate	Date and Time
	Modified	datetime	Modified	Date and Time
	Modified By	varchar(255)	Editor	Person or Group
	Owner	varchar(255)	Owner	Person or Group
	Priority	varchar(255)	Priority	Choice
	Related Items	nvarchar(max)	RelatedItems	Related Items
	Resolution	nvarchar(max)	Resolution	Multiple lines of text
	Status	varchar(255)	Status	Choice
	Title	varchar(255)	Title	Single line of text

After enabling a reporting schema, you can monitor the background jobs in the Reflex Jobs list. From SharePoint Central Administration, navigate to [General Application Settings]=>[Jobs].





On the Reflex jobs list page, you can monitor the background job processing. I usually just keep clicking the “Cancelled” check box to refresh the page.



The screenshot shows a web browser window with the URL `tadevpspe01:2022/_layouts/15/Thor.SPF.ReflexReporting/ReflexJobLi...`. The page title is "General Application Settings - Reflex Jobs". A navigation menu on the left includes "Central Administration", "Application Management", "System Settings", "Monitoring", "Backup and Restore", "Security", "Upgrade and Migration", "General Application Settings", "Apps", "Microsoft 365", and "Configuration Wizards". The main content area has a filter for "Job Status" with checkboxes for "Waiting", "Queued", "Processing", "Errored", "Completed", and "Cancelled". Below the filter, a message states "Only the first 1000 rows will be shown. There are 2 total rows matching the filter criteria". A table displays the following data:

Job Type	Status	ServerName	Created	Updated	Started	Completed
<a href="#">ReflectListInSite</a>	Waiting		1/13/2025 6:25:53 AM	1/13/2025 6:25:53 AM		
<a href="#">RegisterListInSite</a>	Waiting		1/13/2025 6:19:14 AM	1/13/2025 6:19:14 AM		

[OPTIONAL]

Once the jobs are processed, if you have access to it, you could open SQL Server Management Studio (SSMS) and Open the Reflex Reporting database, to find the SQL table created and (if you have wait just a few minutes) the table populated with the data from list instance that has been mapped.

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the database structure for 'TADEVSPSE01'. The main window displays a query result table with the following data:

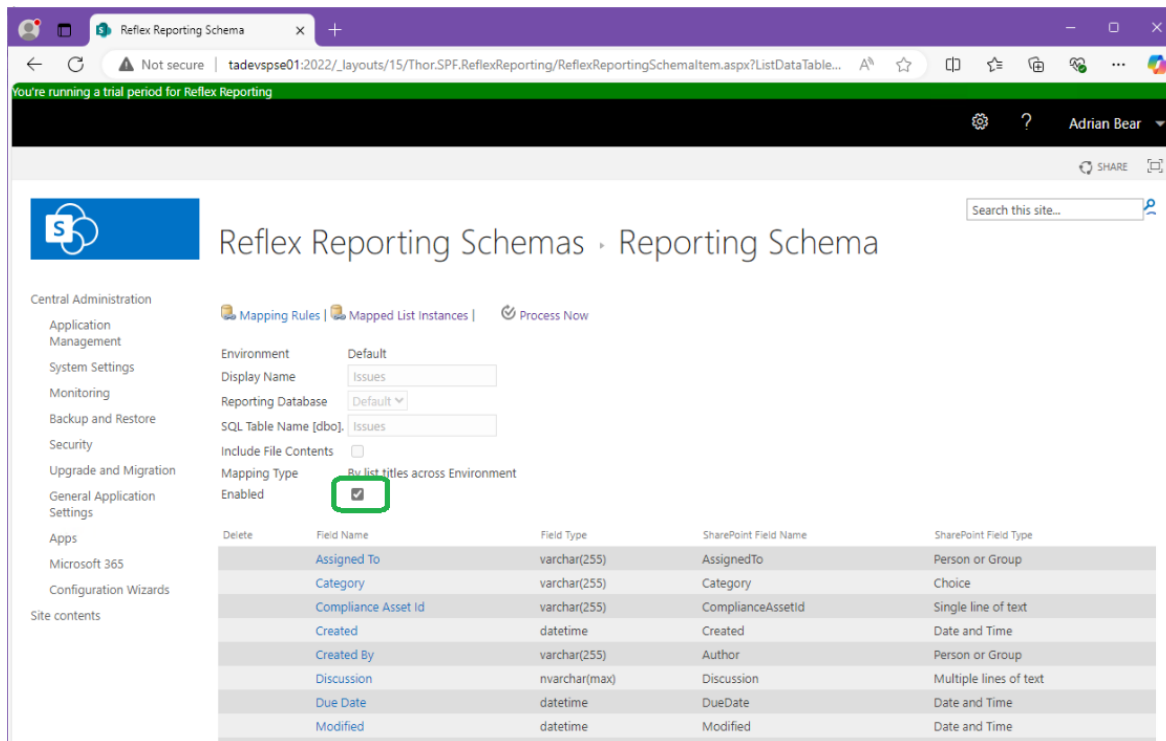
ItemId	ListItemId	SiteUrl	ListTitle	UpdateKey	UpdateKey/DateTime	Assigned To	Category	Compliance Asset Id	Created	
1	5887C	1	http://project.tadev.local/pwa/Project 003	Issues	280FD710-0DE6-4EF2-9408-8F3A3AC09DA1	2025-01-13 06:35:07.937	NULL	(2) Category2	NULL	2025-01-12 18:11
2	5887C	2	http://project.tadev.local/pwa/Project 003	Issues	280FD710-0DE6-4EF2-9408-8F3A3AC09DA1	2025-01-13 06:35:07.937	NULL	(2) Category2	NULL	2025-01-12 18:11
3	5887C	3	http://project.tadev.local/pwa/Project 003	Issues	280FD710-0DE6-4EF2-9408-8F3A3AC09DA1	2025-01-13 06:35:07.937	NULL	(2) Category2	NULL	2025-01-12 18:11
4	189735	1	http://project.tadev.local/pwa/Project 002	Issues	47D06643-D480-4B60-9AD2-B9F4DFC126C3	2025-01-13 06:35:07.937	NULL	(2) Category2	NULL	2025-01-12 18:10
5	189735	2	http://project.tadev.local/pwa/Project 002	Issues	47D06643-D480-4B60-9AD2-B9F4DFC126C3	2025-01-13 06:35:07.937	NULL	(2) Category2	NULL	2025-01-12 18:10
6	189735	3	http://project.tadev.local/pwa/Project 002	Issues	47D06643-D480-4B60-9AD2-B9F4DFC126C3	2025-01-13 06:35:07.937	NULL	(2) Category2	NULL	2025-01-12 18:10
7	495EF	1	http://project.tadev.local/pwa/Project 001	Issues	4D02B9A3-4A67-4973-B63D-969EA799033A	2025-01-13 06:35:07.903	TADEV\ABear	(2) Category2	NULL	2025-01-12 18:10

## Edit a Reporting Schema

To edit a reporting schema, you must first “disable” it.

**\*\* NOTE \*\*** Disabling a reporting schema WILL DROP its related SQL table from the reporting database. This is by design to ensure that all records in the reporting tables are valid during any reporting. So, you will need to issue reporting outage period notifications to your users.

From SharePoint Central Administration navigate to [General Application Settings]=>[Reflex environments]=>[Reporting Schemas] and click the reporting schema you want to edit. Then uncheck the "Enable" box in click “OK” on the confirmation popup.



The screenshot shows the 'Reflex Reporting Schemas - Reporting Schema' page in SharePoint Central Administration. The 'Enabled' checkbox is checked and highlighted with a red box. Below it is a table of field mappings.

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetId	Single line of text
	Created	datetime	Created	Date and Time
	Created By	varchar(255)	Author	Person or Group
	Discussion	nvarchar(max)	Discussion	Multiple lines of text
	Due Date	datetime	DueDate	Date and Time
	Modified	datetime	Modified	Date and Time

## Removing Fields

While the reporting schema is disabled, you will be able to click a “Remove Field” button.

Click the “remove field” button next to a field and then click “OK” on the confirmation popup.

The screenshot shows the 'Reflex Reporting Schemas - Reporting Schema' configuration page. The configuration includes:

- Environment: Default
- Display Name: Issues
- Reporting Database: Default
- SQL Table Name [dbo]: Issues
- Include File Contents:
- Mapping Type: By list titles across Environment
- Enabled:

Below the configuration is a table of fields:

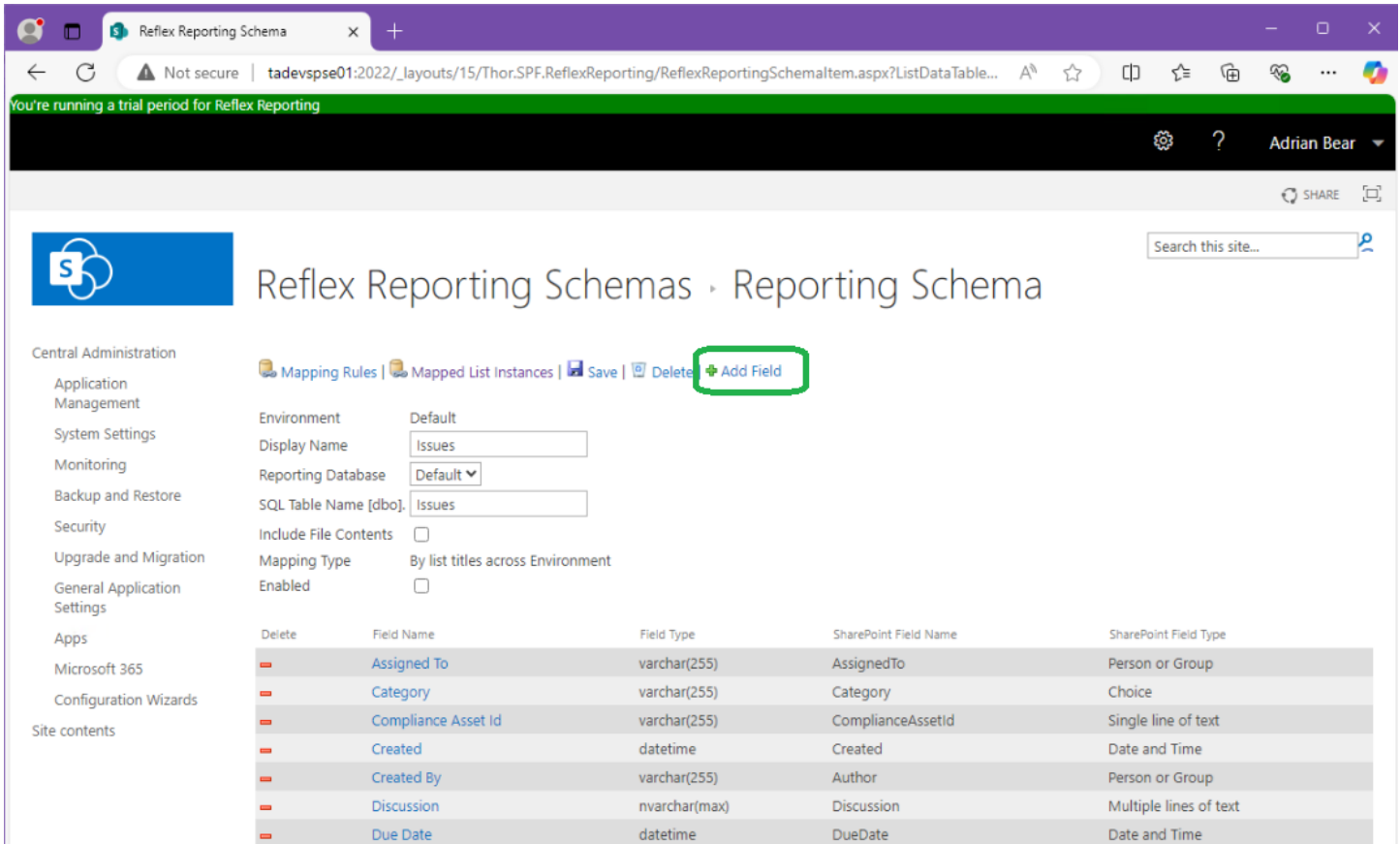
Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetId	Single line of text
	Created	datetime	Created	Date and Time
	Created By	varchar(255)	Author	Person or Group
	Discussion	nvarchar(max)	Discussion	Multiple lines of text
	Due Date	datetime	DueDate	Date and Time

The 'Compliance Asset Id' row is highlighted with a red box around the delete icon and a green circle around the field name. A green 'eg' label is placed to the left of the red box.

## Adding Fields

While the reporting schema is disabled, you will be able to click the “Add Field” button.

Click the “Add Field” button now.



Reflex Reporting Schemas - Reporting Schema

Central Administration

- Application Management
- System Settings
- Monitoring
- Backup and Restore
- Security
- Upgrade and Migration
- General Application Settings
- Apps
- Microsoft 365
- Configuration Wizards
- Site contents

Mapping Rules | Mapped List Instances | Save | Delete | **Add Field**

Environment: Default

Display Name: Issues

Reporting Database: Default

SQL Table Name [dbo]: Issues

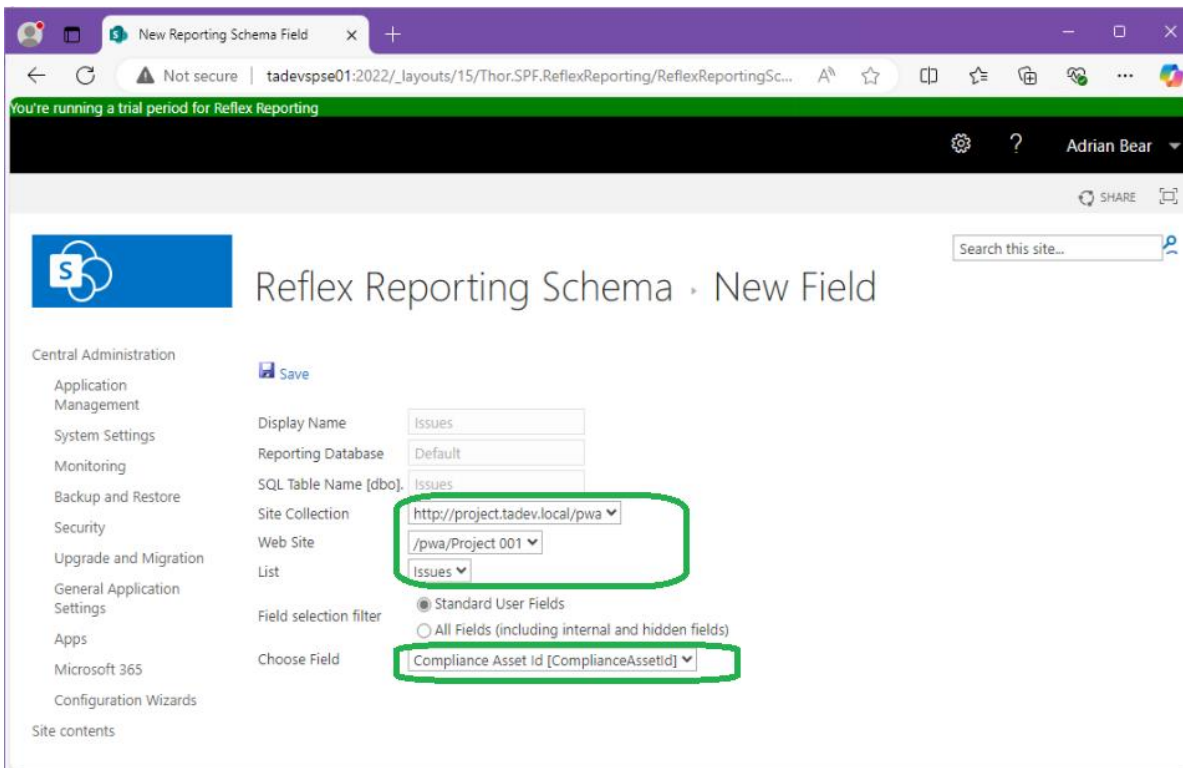
Include File Contents:

Mapping Type: By list titles across Environment

Enabled:

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetId	Single line of text
	Created	datetime	Created	Date and Time
	Created By	varchar(255)	Author	Person or Group
	Discussion	nvarchar(max)	Discussion	Multiple lines of text
	Due Date	datetime	DueDate	Date and Time

The reporting schema “Add Field” page allows you to select a field from any list in any site from any (mapped) site collection, but it’s a really good idea to pick the field from a list instance that is mapped to the reporting schema. If you pick a field from a list that is not mapped, the schema will not match the lists mapped and data sync/reflection will fail.



Select the field removed in the previous step and Click “Save” to add it back to the reporting schema.

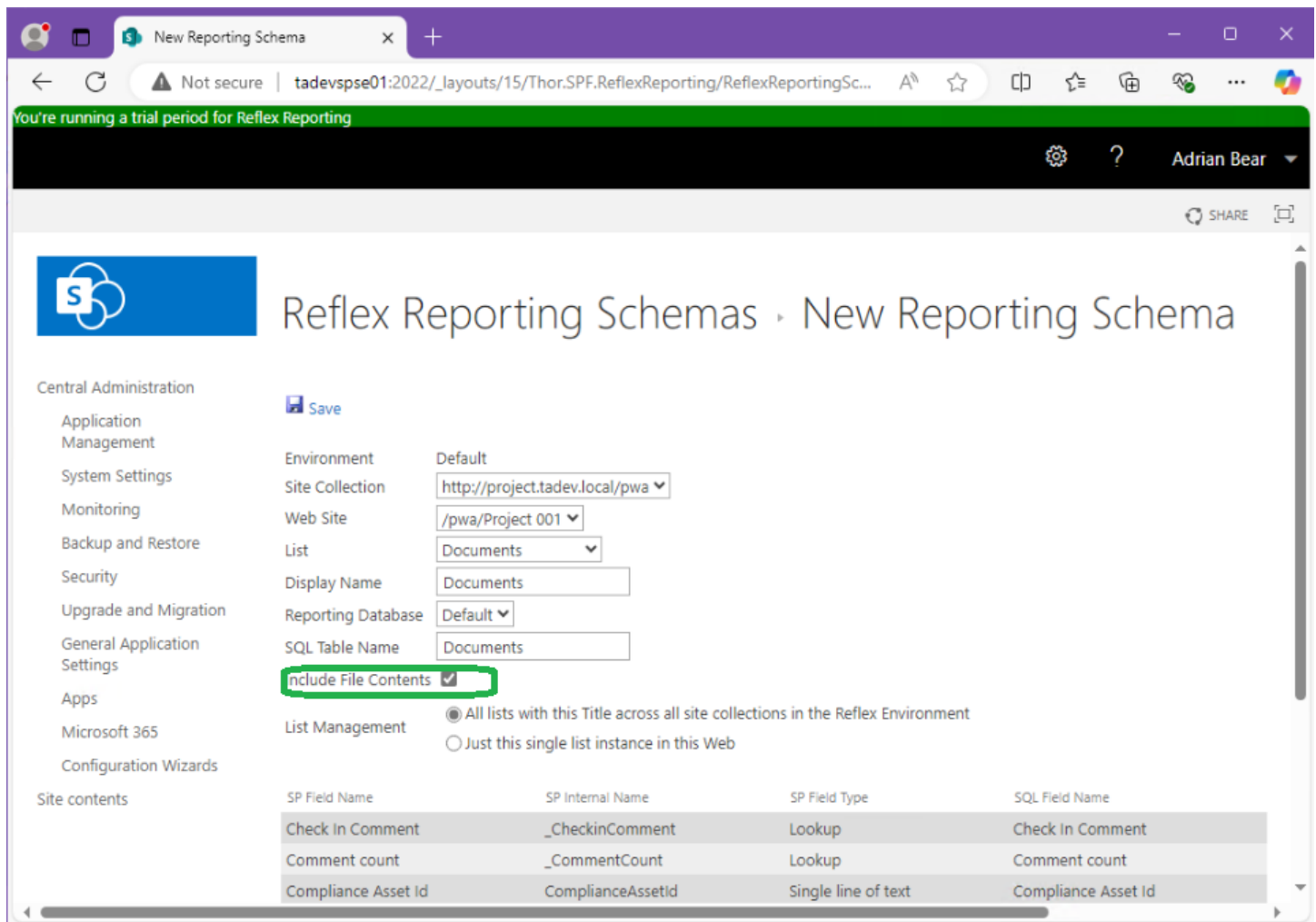
Once you have added the new field, you will be returned to the reporting schema edit page. Here you can click “Enable” (and “OK” on the confirmation popup) to re-create the SQL table.

**\*\* Note \*\*** Because the SQL table was dropped, there will initially be no data, but a background job will also have been kicked off to sync all the data. Depending on how many list instances are mapped this may take a while to complete.

## Reflecting Document/Picture Libraries

Reflex Reporting supports the reflection of document libraries. This is most helpful when Pictures you want to use in reports are stored in a SharePoint picture library.

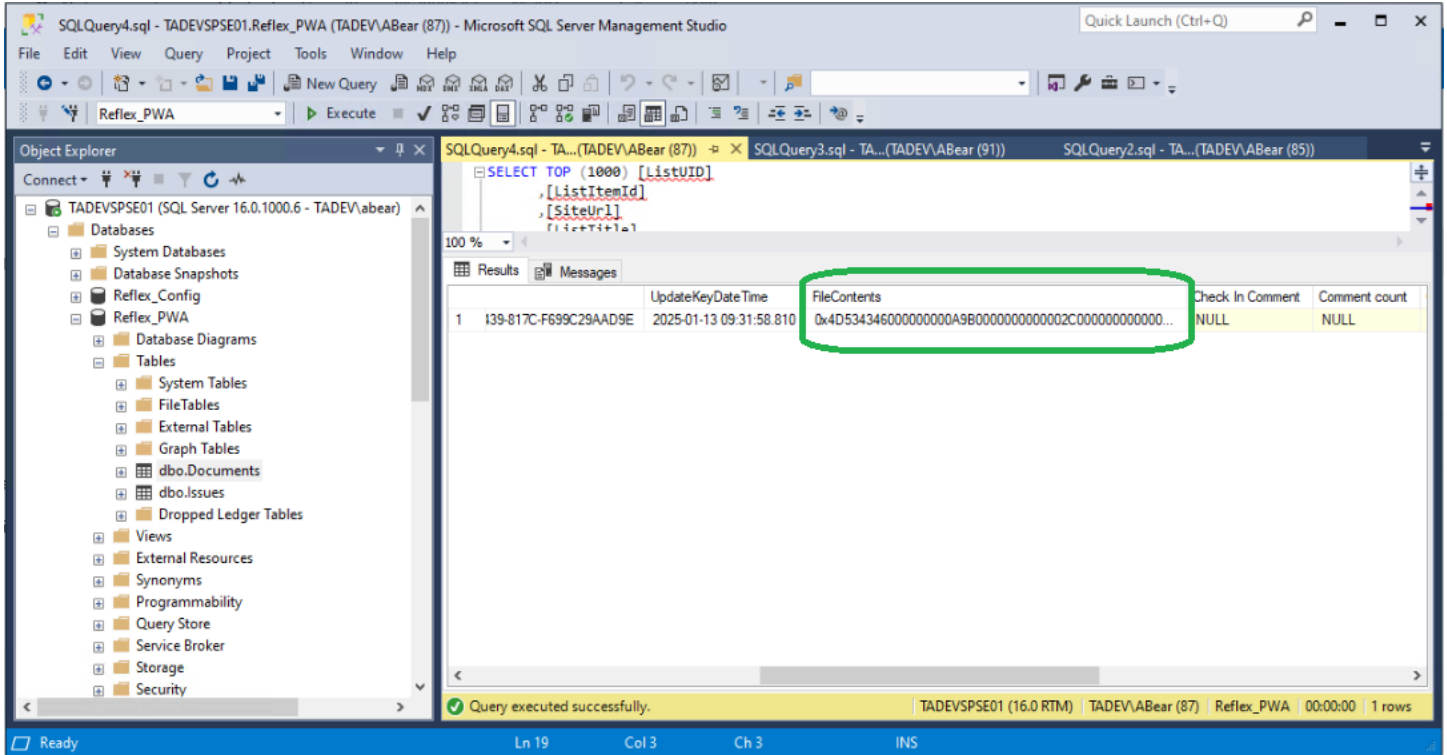
To reflect the binary data of a document (or a Picture) stored in a Document Library, simply check the box “Include File Contents” in the reporting schema. This will add a binary data field to the SQL table called “FileContents”.



The screenshot shows the 'New Reporting Schema' configuration page in Reflex Reporting. The 'Include File Contents' checkbox is checked and highlighted with a green box. Below the form is a table of Site contents.

SP Field Name	SP Internal Name	SP Field Type	SQL Field Name
Check In Comment	_CheckinComment	Lookup	Check In Comment
Comment count	_CommentCount	Lookup	Comment count
Compliance Asset Id	ComplianceAssetId	Single line of text	Compliance Asset Id

In SQL Server Management Studio (SSMS) document blobs/binary fields look like this.





## Mapping lists by Title

Reflex Reporting provides the facility to automatically map lists from across multiple site collections into a single SQL table. This is managed through “Mapping rules”, but you can create the first default mapping rule on the “New Reporting Schema” page by selecting the List Management “All lists with this Title across all site collections in the Reflex Environment” radio button.

Reflex Reporting Schemas · New Reporting Schema

Central Administration

- Application Management
- System Settings
- Monitoring
- Backup and Restore
- Security
- Upgrade and Migration
- General Application Settings
- Apps
- Microsoft 365
- Configuration Wizards

Site contents

Save

Environment: Default

Site Collection:

Web Site:

List:

Display Name:

Reporting Database:

SQL Table Name:

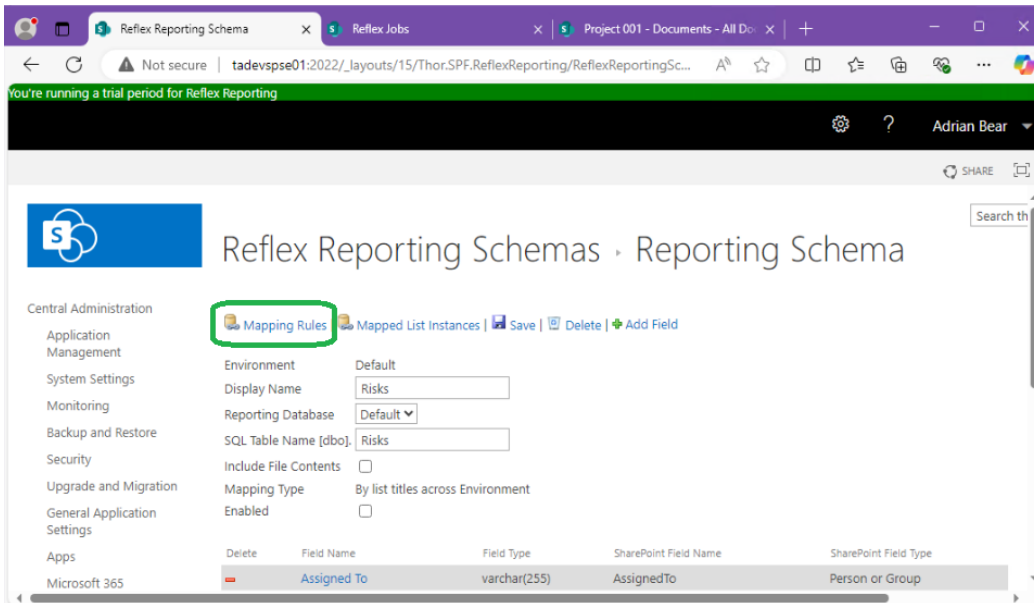
Include File Contents:

List Management

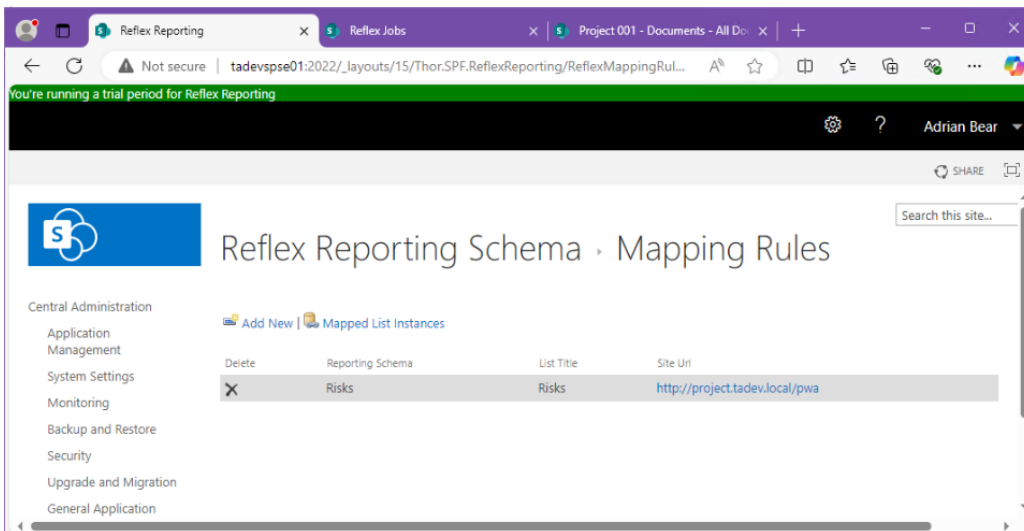
- All lists with this Title across all site collections in the Reflex Environment
- Just this single list instance in this Web

SP Field Name	SP Internal Name	SP Field Type	SQL Field Name
Assigned To	AssignedTo	Person or Group	Assigned To
Category	Category	Choice	Category
Compliance Asset Id	ComplianceAssetId	Single line of text	Compliance Asset Id
Contingency Plan	Contingency_x0020_plan	Multiple lines of text	Contingency Plan

When the Reporting Schema is saved, the rule can be accessed via the “Mapping Rules” button on the Reporting Schema page.



Any list that exists in any subsite of the site collection (“Site Url”) with a title matching the “List Title” will be mapped to the “Reporting Schema”.



Mapping rules, result in the creation of “Mapped List Instances” and after a list is mapped its Title can be changed, and the list will still be mapped as “Mapped List Instances” are mapped by List ID.

## Mapping a single List instance

Single list instances are useful where a list exists in a single site only, often this is at the root of a site collection.

To map a single list instance from the “New Reporting Schema” page, select the List Management “Just this single list instance in this Web” radio button.

Central Administration

- Application Management
- System Settings
- Monitoring
- Backup and Restore
- Security
- Upgrade and Migration
- General Application Settings
- Apps
- Microsoft 365
- Configuration Wizards

Site contents

Save

Environment: Default

Site Collection:

Web Site:

List:

Display Name:

Reporting Database:

SQL Table Name:

Include File Contents:

List Management

All lists with this Title across all site collections in the Reflex Environment

Just this single list instance in this Web

SP Field Name	SP Internal Name	SP Field Type	SQL Field Name
Compliance Asset Id	ComplianceAssetId	Single line of text	Compliance Asset Id
Created	Created	Date and Time	Created
Created By	Author	Person or Group	Created By

When the Reporting Schema is saved, the list mapping can be accessed via the “Mapped List Instances” button on the Reporting Schema page.

Reflex Reporting Schemas · Reporting Schema

Mapping Rules **Mapped List Instances** Save Delete Add Field

Environment: Default  
Display Name: Project Ideas  
Reporting Database: Default  
SQL Table Name [dbo]: Project Ideas  
Include File Contents:   
Mapping Type: Specific list instances  
Enabled:

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Compliance Asset id	varchar(255)	ComplianceAssetid	Single line of text
	Created	datetime	Created	Date and Time
	Created By	varchar(255)	Author	Person or Group
	Modified	datetime	Modified	Date and Time
	Modified By	varchar(255)	Editor	Person or Group
	Title	varchar(255)	Title	Single line of text

Reflex Reporting Schema · Mapped List Instances

Add New Mapping Rules

Delete	Reporting Schema	List Title	Site Url	Has Errors	Enabled
	Project Ideas	Project Ideas	http://project.tadev.local/pwa	No	Yes

## Troubleshooting

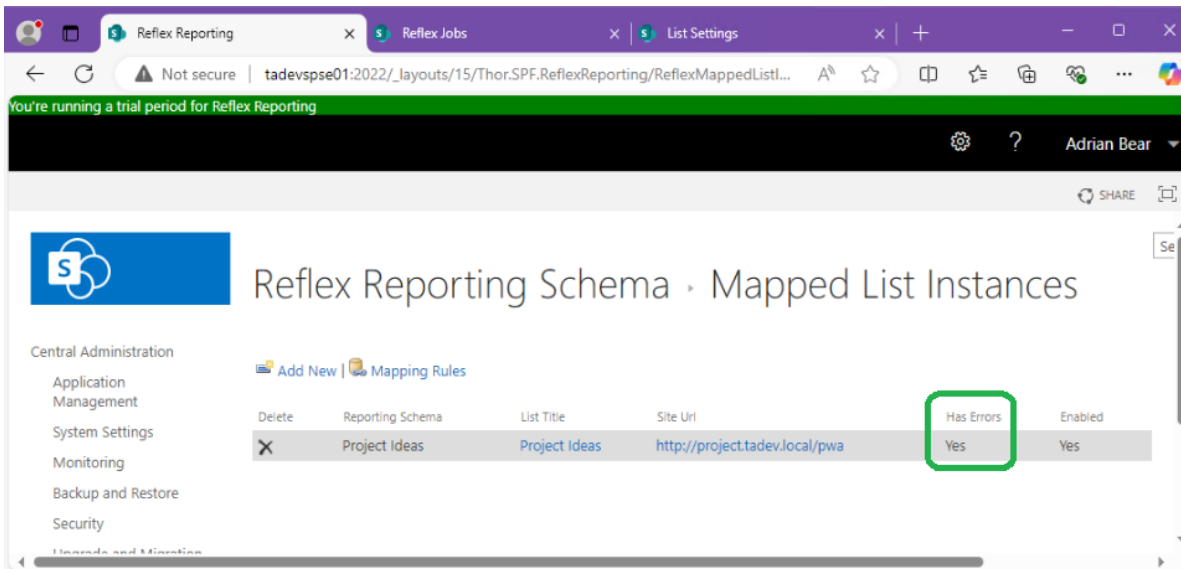
It's important to remember there are 3 key elements required for Reflex Reporting to reflect a lists item's, in real-time, into a SQL table.

1. A Reporting Schema that matches the list fields
2. A List Instance mapping (either a matching Mapping rule or a Mapped List instance)
3. The Reflex Reporting event receivers attached to the list

## Identifying List sync errors

The Mapped List Instance page can be used to identify any sync'ing errors in background jobs.

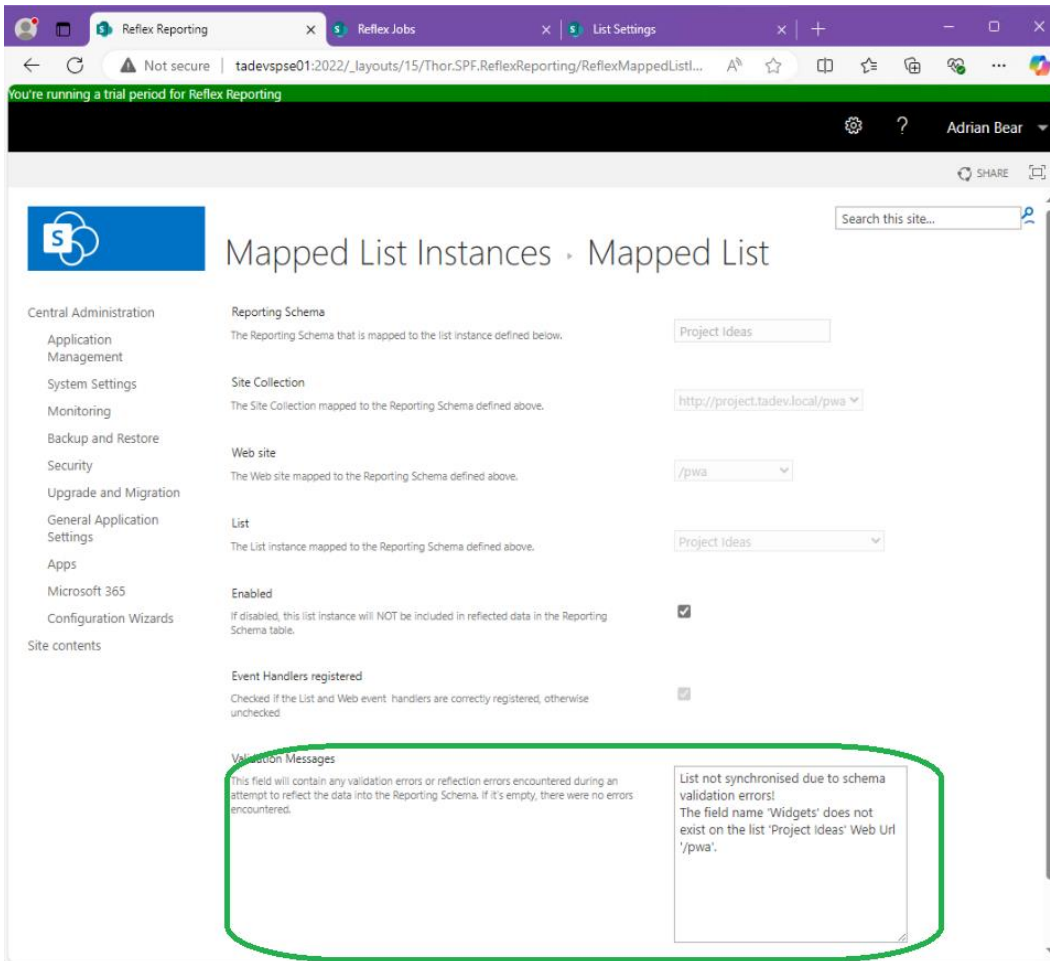
By clicking the "List Title" field, the list mapping will open and if there have been any errors, the error will be shown.



The screenshot shows a web browser window with three tabs: 'Reflex Reporting', 'Reflex Jobs', and 'List Settings'. The address bar shows a URL starting with 'tadevps01:2022/\_layouts/15/Thor.SPF.ReflexReporting/ReflexMappedList...'. A green banner at the top of the page reads 'You're running a trial period for Reflex Reporting'. The user's name 'Adrian Bear' is visible in the top right. The main content area is titled 'Reflex Reporting Schema · Mapped List Instances'. On the left is a 'Central Administration' sidebar with links for Application Management, System Settings, Monitoring, Backup and Restore, and Security. The main area contains a table with columns: Delete, Reporting Schema, List Title, Site Uri, Has Errors, and Enabled. A row is visible with 'Project Ideas' in the 'List Title' column and 'Yes' in the 'Has Errors' column. The 'Has Errors' cell is highlighted with a green box.

Delete	Reporting Schema	List Title	Site Uri	Has Errors	Enabled
X		Project Ideas	http://project.tadev.local/pwa	Yes	Yes

2 common errors are “Sync lock” errors, which are actually just warnings and can be ignored (they are caused by multiple sync jobs trying to sync the same list instance at the same time) and “missing field” errors. The second error is caused when mapped lists have missing fields.



## Adding Event Handlers to Lists

The Mapped List instances page also checks if the Reflex Reporting event handlers have been attached to the mapped list. Event handlers are usually attached automatically in the background via jobs, but if by chance a mapped list does not have the event handlers attached a button will appear next to the “Event Handlers register” check box that allows you to manually register them.

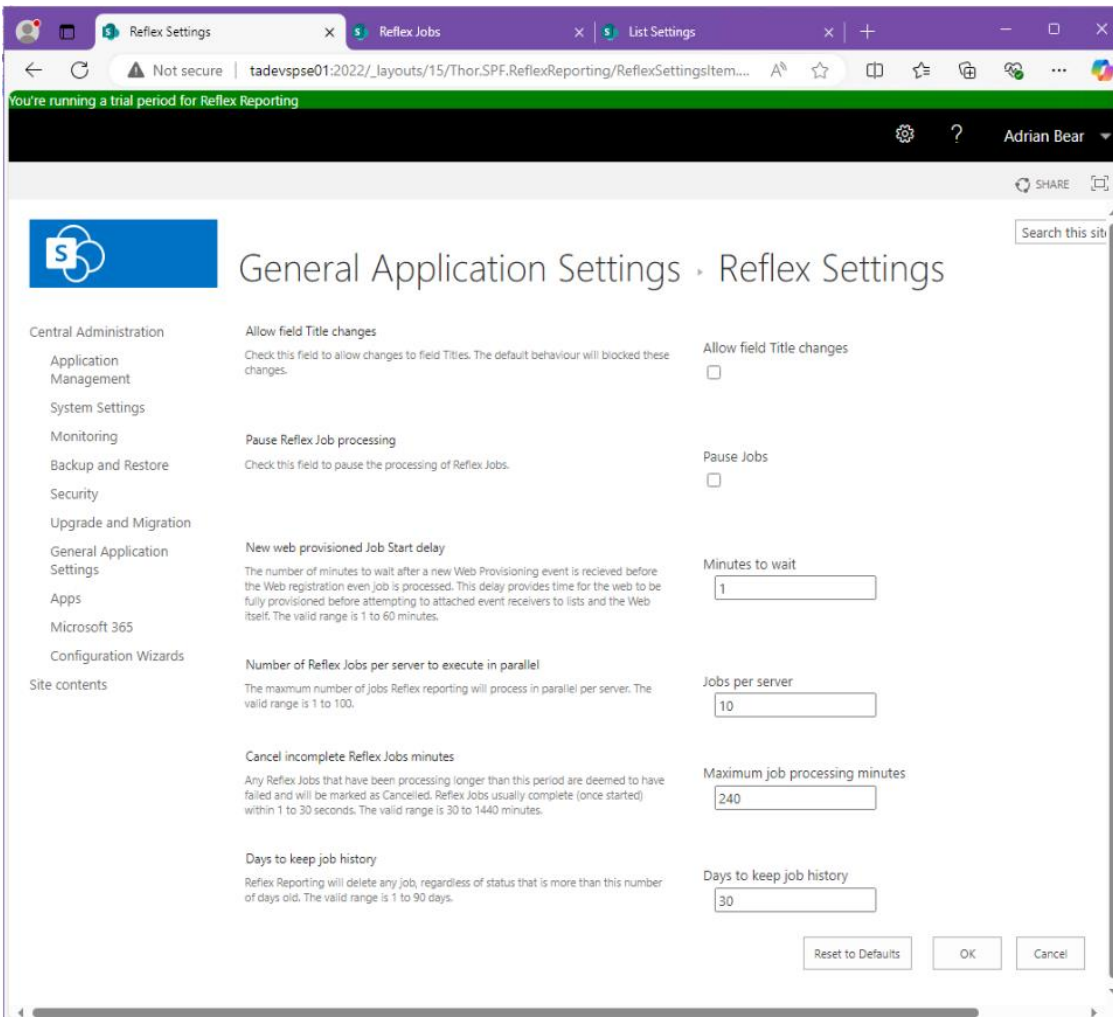
## Reflex Jobs

Many tasks in Reflex Reporting are processed through background jobs. Jobs will trigger child jobs, so the list of jobs may grow and shrink as they are processed. Reflex reporting automatically manages this list and will clean-up old jobs by deleting them.

## Global Settings

From SharePoint Central Administration, navigate to [General Application Settings]=>[Global settings].

This page provides an interface to control job processing and the behaviour of validating list changes.

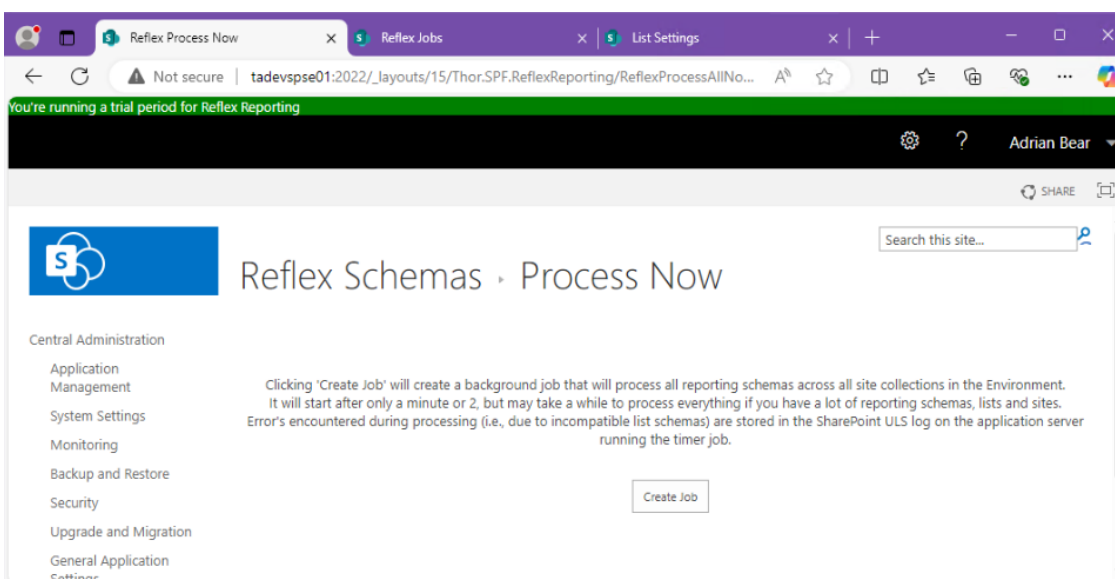
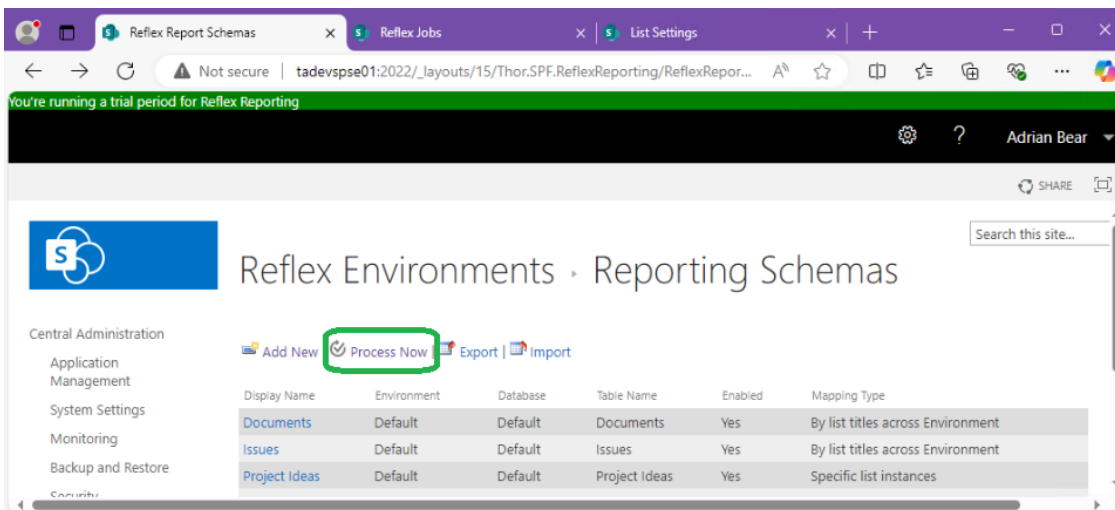


## Manually trigger a sync/reflection job for lists

There are 2 types of “Process Now” jobs that will invoke list sync operations.

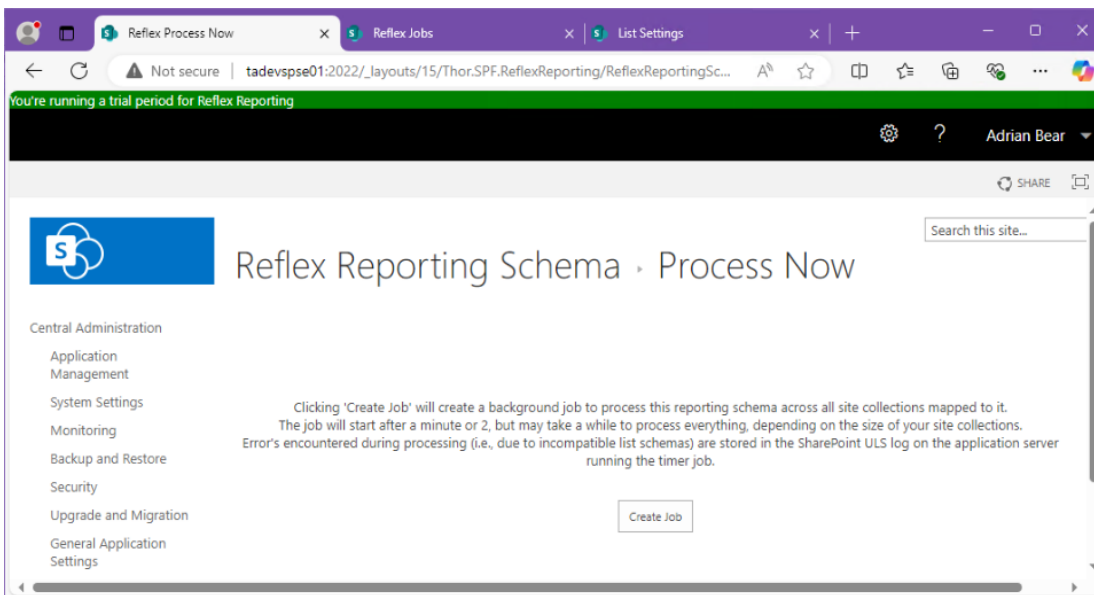
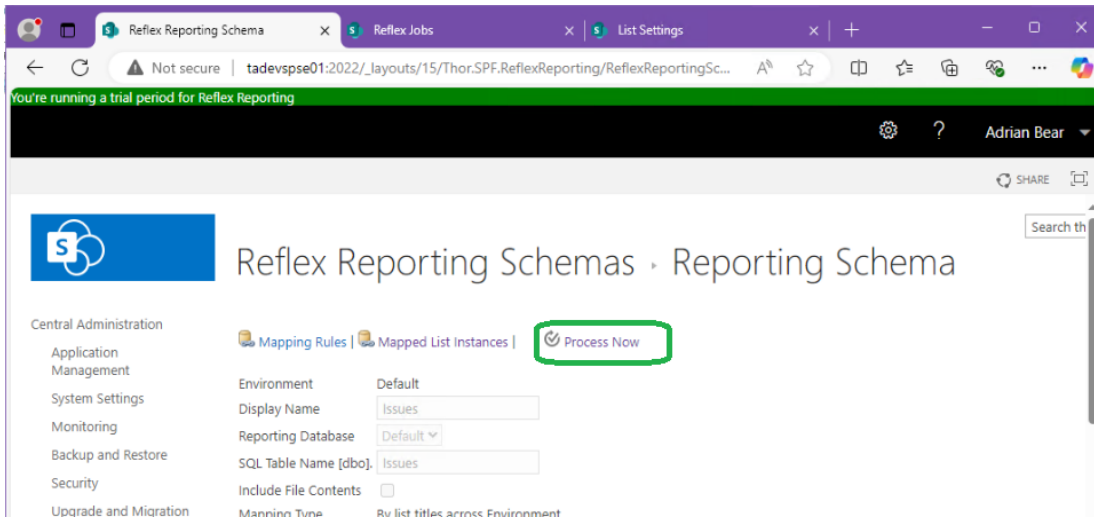
The first is from the “Reporting Schemas” list page and the second is on the individual “Reporting Schema” page.

The “Process Now” button in the “Reporting Schemas” page (navigate to [General Application Settings]=>[Reflex environments]) will create a background job to sync all reporting schemas in the Reflex Environment.





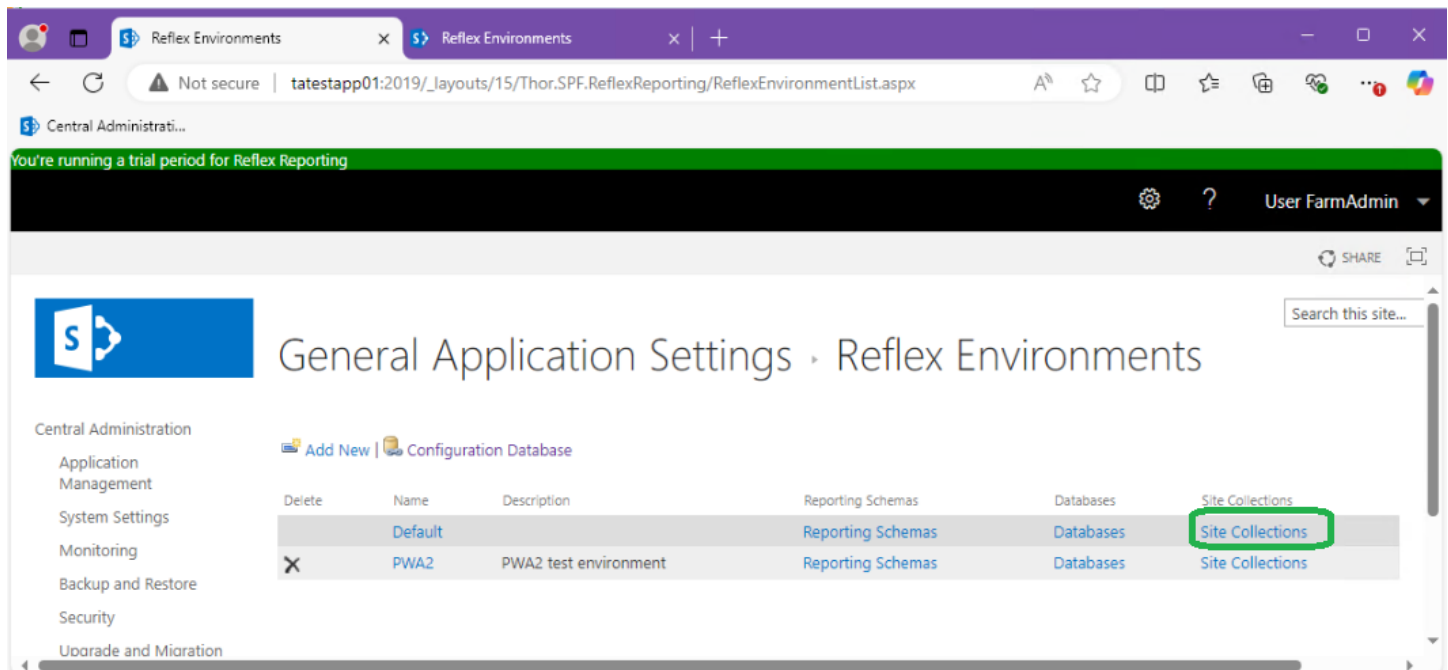
The "Process Now" button in a "Reporting Schema" page (navigate to [General Application Settings]=>[Reflex environments]=>[Reporting Schemas]=>["A Schema Name"]) will create a background job to sync only that Reporting Schema.



## Mapping additional site collections

You may have common list structures spread across multiple site collections in your SharePoint farm. Reflex Reporting allows you to map these common lists from across site collections into a single reporting table by adding site collections to a Reflex environment.

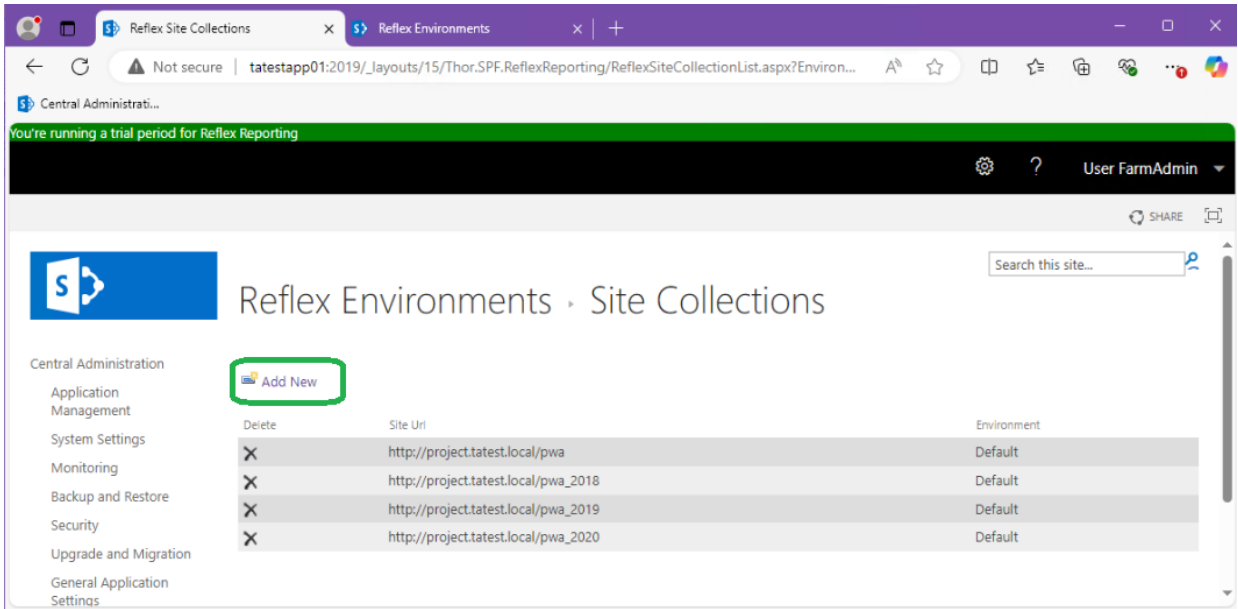
From SharePoint Central Administration navigate to [General Application Settings]=>[Reflex environments] and click "Site Collections" on the relevant Reflex Environment row.



The screenshot shows the SharePoint Central Administration interface for Reflex Environments. The page title is "General Application Settings · Reflex Environments". A navigation pane on the left lists various administrative tasks. The main content area shows a table of Reflex Environments. The "Site Collections" column for the "PWA2" environment is highlighted with a red box.

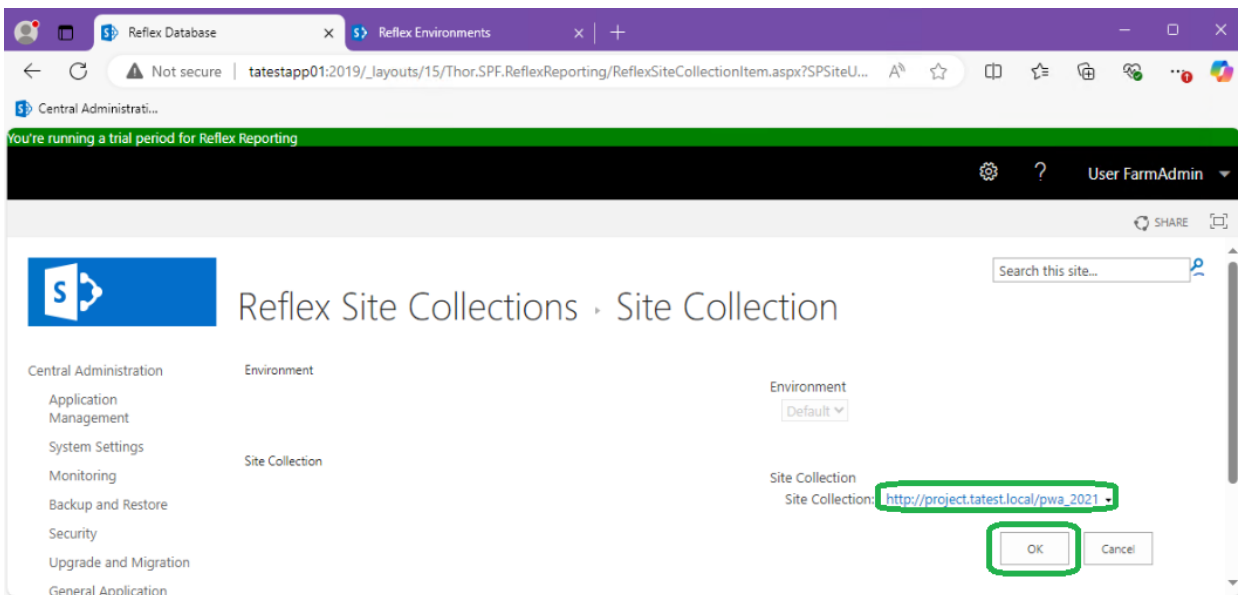
Delete	Name	Description	Reporting Schemas	Databases	Site Collections
	<a href="#">Default</a>		<a href="#">Reporting Schemas</a>	<a href="#">Databases</a>	<a href="#">Site Collections</a>
<a href="#">X</a>	PWA2	PWA2 test environment	<a href="#">Reporting Schemas</a>	<a href="#">Databases</a>	<a href="#">Site Collections</a>

Click "Add New" in the Site Collections page



Use the site collection picker to select a Site Collection to add to the Reflex environment and click "OK".

**\*Note**, you cannot add a site collection that is already mapped to another reflex environment.



Adding a site collection to a Reflex Environment, will automatically copy the List mapping rules from the existing site collections and create a set for the new site collection. Reflex will then post background jobs to register and sync the lists that match the new mapping rules for the new site collection.

## Default Field Type Mapping Rules

Reflex reporting comes with a default set of mapping rules, that determine (among other properties) the SQL field type to use for a given SharePoint field type. These are only the defaults and generally, you should change field type mappings at the field mapping level within a reporting schema. But the system defaults can be changed.

If Reflex encounters a new field type it has never seen before, it will automatically create a new default that maps to an nvarchar(max) SQL data type.

To change the defaults, from SharePoint Central Administration navigate to [General Application Settings]=>[Default Field Type mapping rules].

Delete	SharePoint Field Type	SQL Field Type	Is Multi-Column	Field Column Mapped	Strip HTML
X	Single line of text	varchar(255)	False	0	No
X	Choice	varchar(255)	False	0	No
X	Multiple lines of text	nvarchar(max)	False	0	No
X	Computed	varchar(255)	False	0	No
X	Person or Group	varchar(255)	True	1	No
X	Attachments	bit	False	0	No
X	Counter	varchar(255)	False	0	No
X	Date and Time	datetime	False	0	No
X	Yes/No	bit	False	0	No
X	Lookup	varchar(255)	False	0	No
X	Number	decimal(25,6)	False	0	No
X	Currency	money	False	0	No
X	Hyperlink or Picture	varchar(255)	False	0	No
X	Calculated	varchar(255)	False	0	No
X	Geolocation	nvarchar(max)	False	0	No
X	All Day Event	nvarchar(max)	False	0	No
X	Recurrence	nvarchar(max)	False	0	No
X	Resources	nvarchar(max)	False	0	No
X	Free/Busy	nvarchar(max)	False	0	No
X	Check Double Booking	nvarchar(max)	False	0	No

## User Friendly Messages (Deprecated Feature)

User friendly messages is a deprecated feature, and user interface has been removed. It is only provided under the covers for backward compatibility.

User friendly messages, allowed you to provide a “friendly” error message to the end user of a SharePoint list if the list is mapped to a reporting schema with a SQL table that has custom SQL constraints added. The idea was to provide advanced item validation rules that could not be implemented in previous versions of SharePoint.

SharePoint is better now and there are better ways to achieve this (i.e. field validation within list settings pages).

## Trigger a Full Sync (Process All)

Reflex Reporting provides real-time reporting through hooking the SharePoint event handlers, but also provides a daily validation service job that re-processes all reporting schemas and lists.

Its plausible that after some unknown SharePoint support or maintenance task, Reflex reporting tables maybe not be fully synchronised and you may not wish to wait for daily validation service to populate these tables. In this case, you can manually kick off the validation service to start the full validation and sync process immediately.

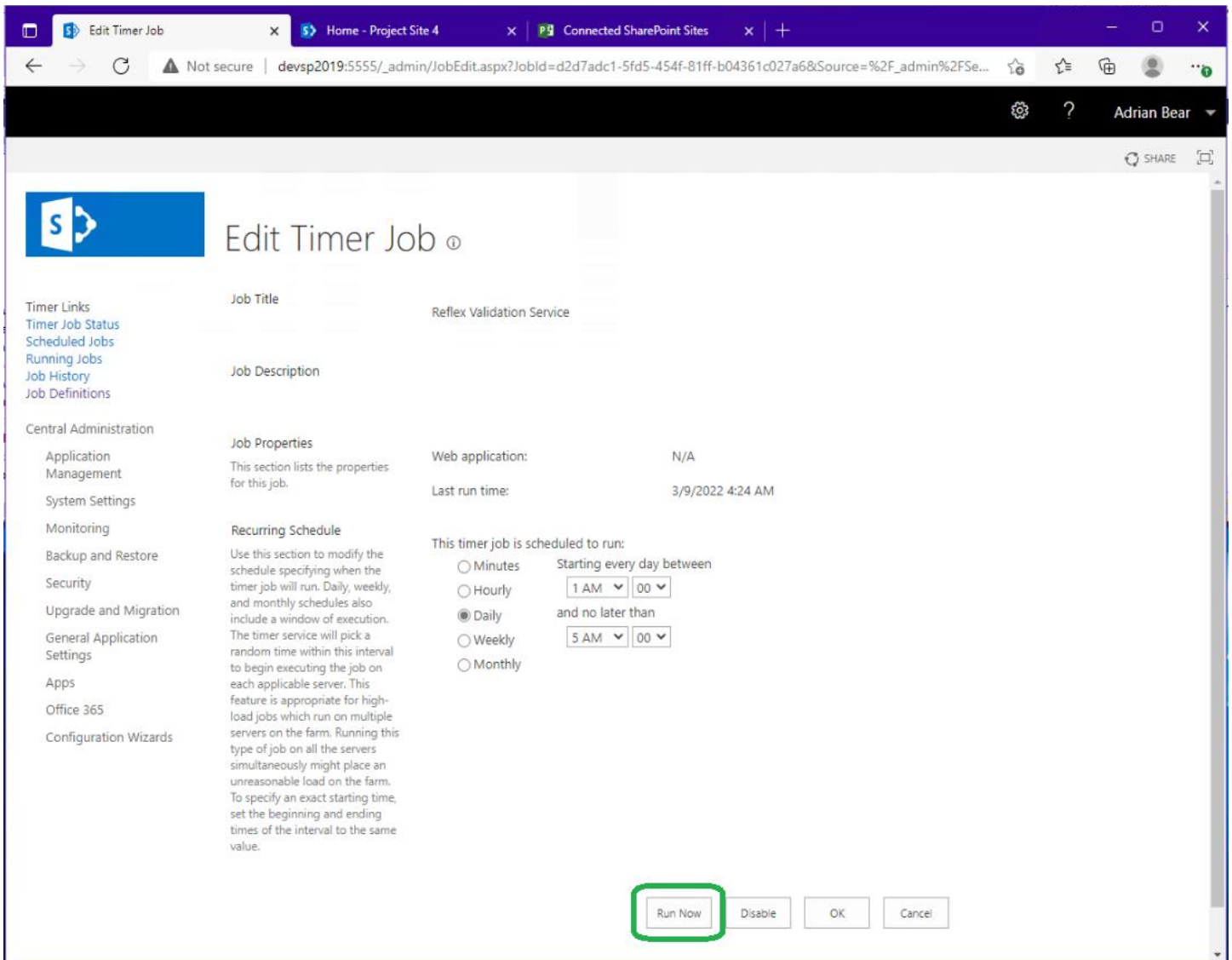
From SharePoint Central Administration navigate to [Monitoring]=>[Review Job Definitions] and search for the “Reflex validation service” job (it will likely be on the second or third page of jobs).

The screenshot shows the 'Job Definitions' page in SharePoint Central Administration. The page lists various scheduled jobs. The 'Reflex Validation Service' job is highlighted with a red box. The job is scheduled to run daily. The page also shows a navigation pane on the left with 'Office 365' and 'Configuration Wizards' sections. The user 'Adrian Bear' is logged in.

Job Name	Frequency
Project Server: Queue Maintenance job for Project Server Service Application	Daily
Project Server: Resource Capacity Refresh job for Project Server Service Application	Daily
Project Server: Synchronization of Project Web App permissions to SharePoint Server permissions job for Project Server Service Application	Daily
Project Server: Synchronization of SharePoint Server permissions to Project Web App permissions job for Project Server Service Application	Minutes
Project Server: Synchronize Exchange OOF Calendar job for Project Server Service Application	Daily
Project Server: Task List Synchronizer for SharePoint Tasks List Projects job for Project Server Service Application	Minutes
Project Server: Workflow Maintenance job for Project Server Service Application	Daily
Query Logging	Minutes
Recycle Bin	DEVSP2019 Daily
Reflex Job Scheduler Service	Minutes
<b>Reflex Validation Service</b>	Daily
Repair Orphan Site Collections	DEVSP2019 Daily
Scheduled Approval	DEVSP2019 Minutes
Scheduled Unpublish	DEVSP2019 Minutes
Search and Process	DEVSP2019 Daily
Search Change Log Generator	Minutes
Search Engine Sitemap job	DEVSP2019 Daily
Second Async Feature Activation Job	DEVSP2019 Minutes
SharePoint Server CEIP Data Collection	Daily
Site Lookup Refresh	Minutes
Site Master Invalidation	DEVSP2019 Hourly
Site Policy and Exchange Site Mailbox Policy Update	DEVSP2019 Daily
Solution Daily Resource Usage Update	DEVSP2019 Daily
Solution Resource Usage Log Processing	DEVSP2019 Minutes

Click into the job and click “Run Now”.

**\*\* NOTE \*\*** Do **NOT** make this job run more frequently than once per day. It can add too much load to your SharePoint servers for large environments. It should run after business hours.



This service will spawn Reflex Reporting Jobs, which in turn can spawn more jobs to execute. Depending on the size of your environment you may have to wait quite some time for all data to sync. But even in large deployments, it should complete in less than 2 to 3 hours. Jobs run in parallel across all SharePoint application servers.

## Site Collection User Interface (SCUI)

The site collection user interface for reflex reporting is an optional component. If installed, it must also be activated both at the Web Application level (in SharePoint Central Administration by a Farm Administrator) and at the site collection level (by a Site Collection Administrator).

### Reflex Reporting SCUI Activation

From SharePoint Central Administration, navigate to [Application Management]=>[Manage web applications] and select the web application you'd like to enable the site collection user interface in.

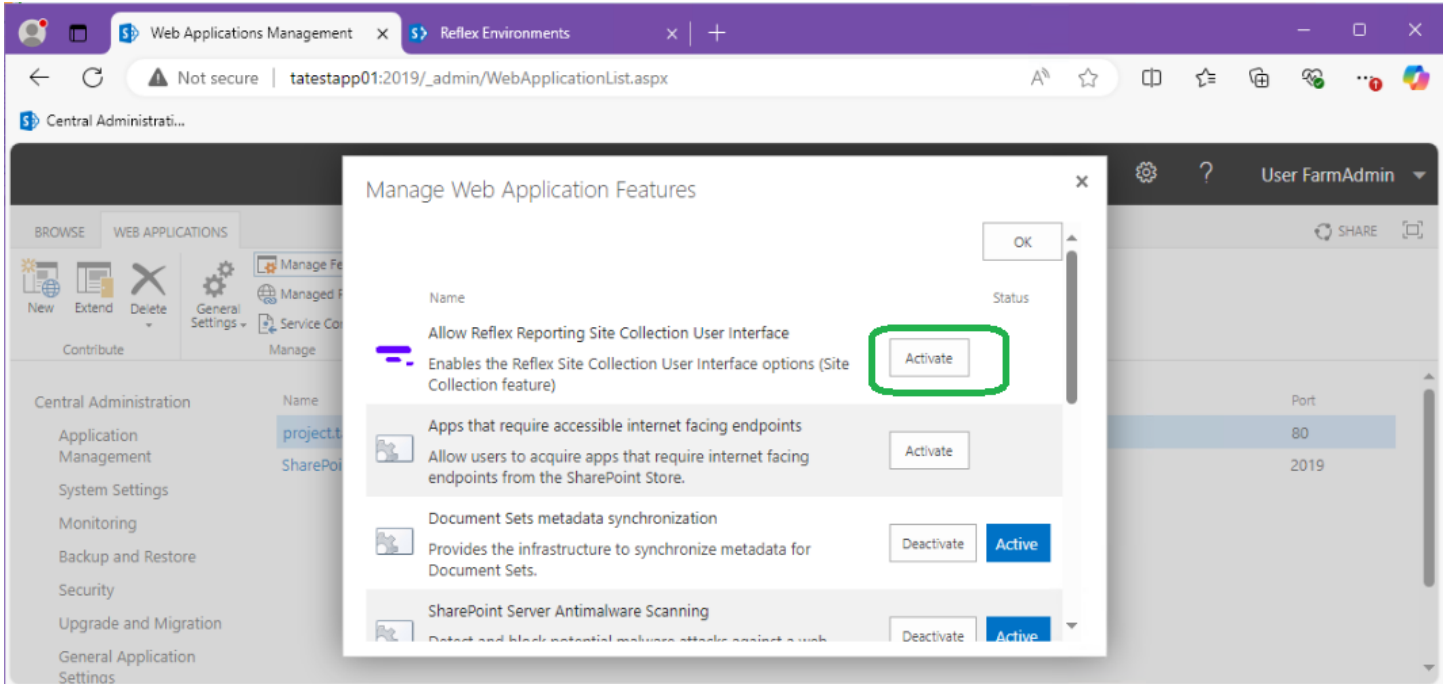
The screenshot shows the SharePoint Central Administration interface. The browser address bar indicates the URL is `tatestapp01:2019/_admin/WebApplicationList.aspx`. The ribbon menu is set to 'WEB APPLICATIONS', and the 'Manage Features' button is highlighted with a green box and the number '2'. Below the ribbon, a table lists web applications. The first row, 'project.tatest.local - 80', is selected and highlighted in blue, with a green box around the name and the number '1' next to it. The table has columns for Name, URL, and Port.

Name	URL	Port
project.tatest.local - 80	http://project.tatest.local/	80
SharePoint Central Administration v4	http://tatestapp01:2019/	2019

From the ribbon menu click "Manage features".



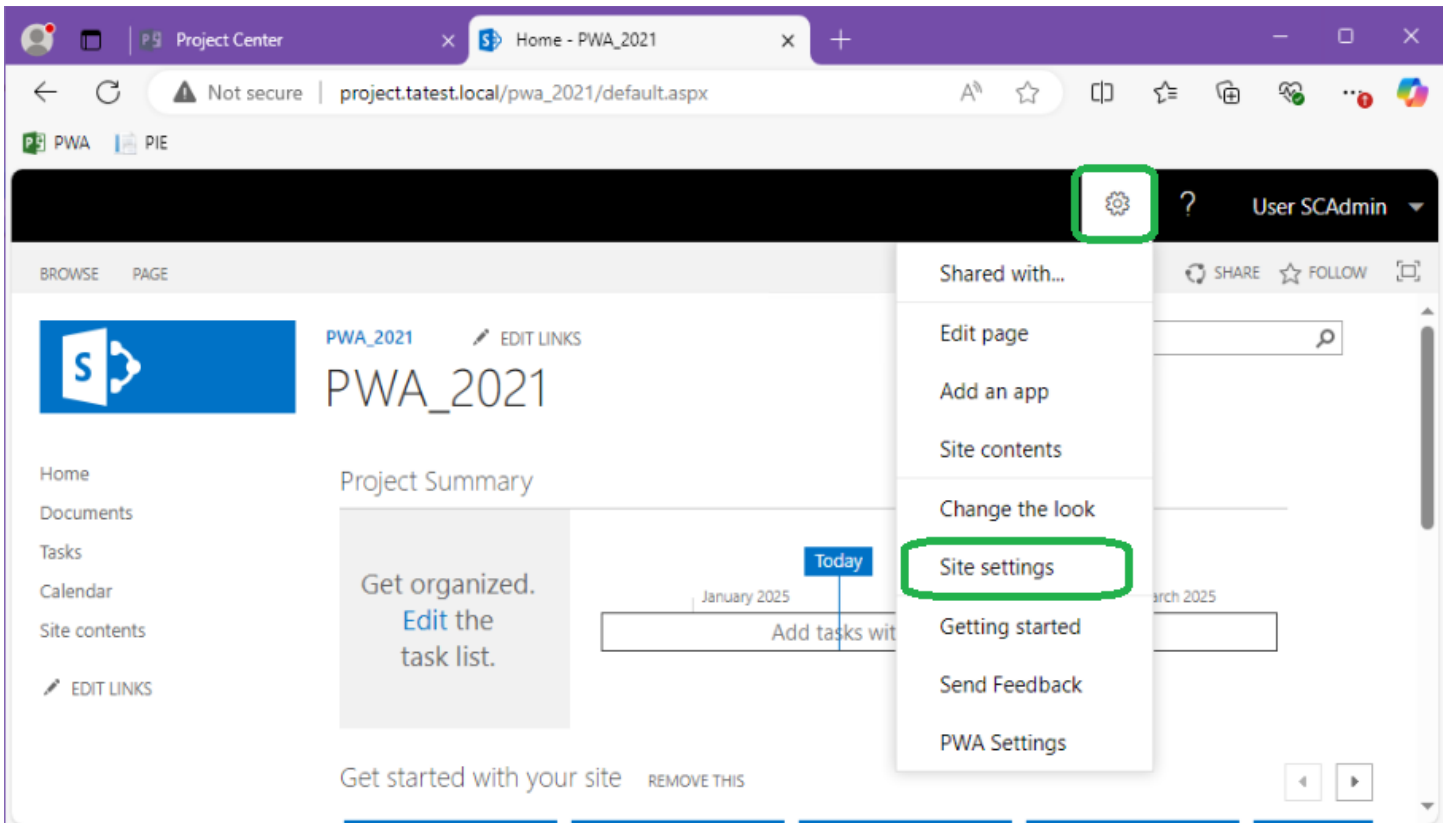
Click “Activate” on the feature “Allow Reflex Reporting Site Collection User Interface”.



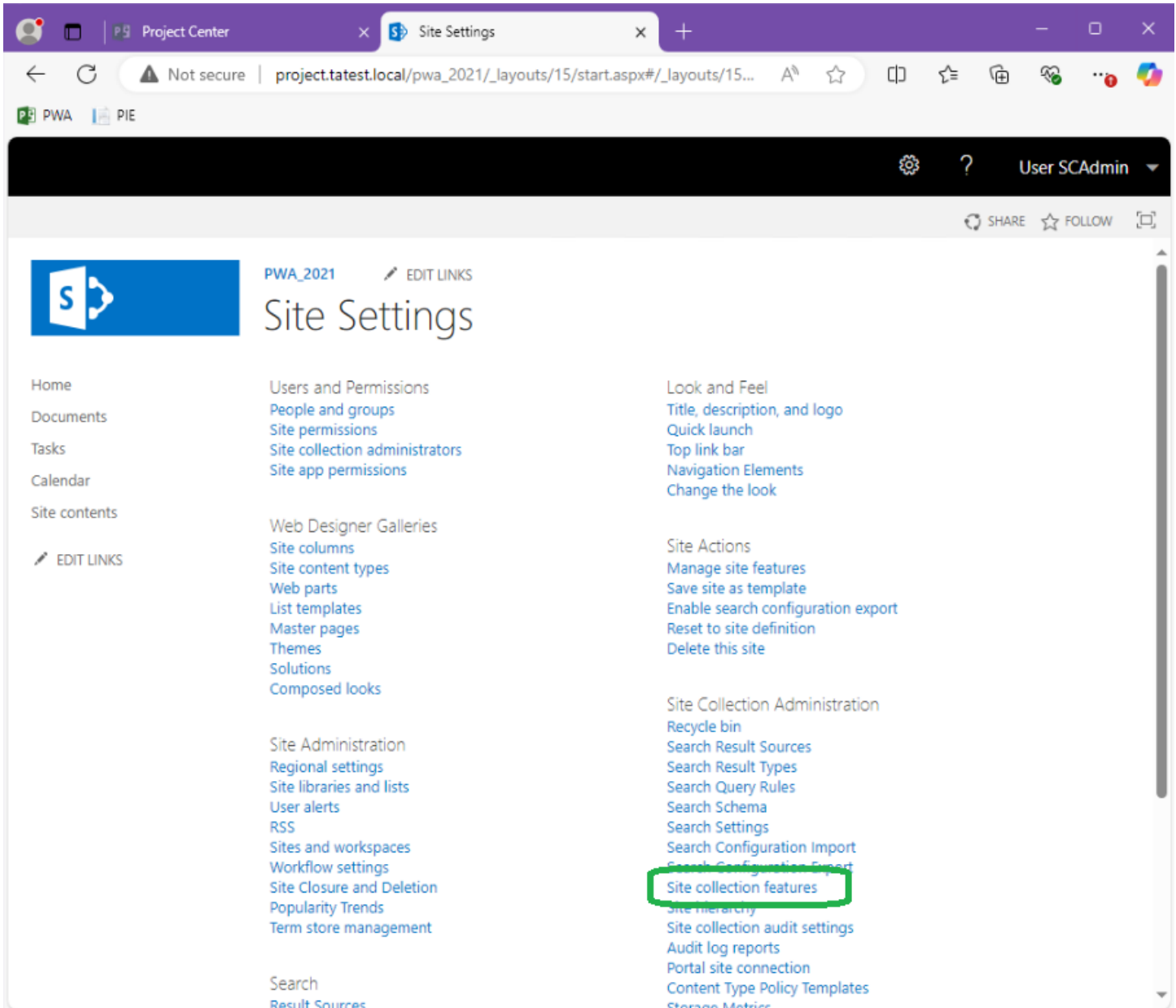
You can now close SharePoint Central Administration and open the root site of the site collection you want to enable the Reflex Reporting SCUI in.

Depending on your version of SharePoint and the template used to provision the root site of the site collection, the page may look different to the following screenshot.

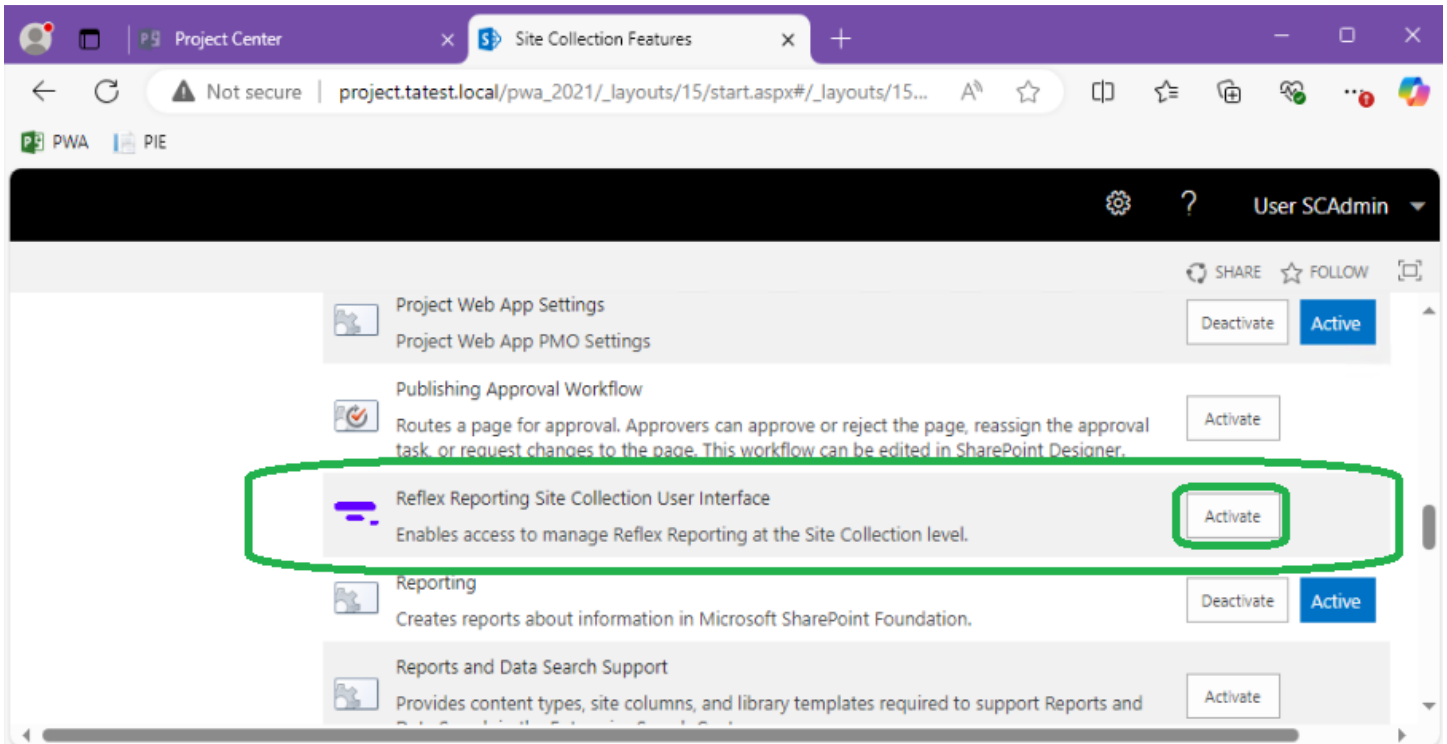
From the Page banner click the [COG] and select "Site Settings".



From the Site collections, site settings page click “Site collection features”.

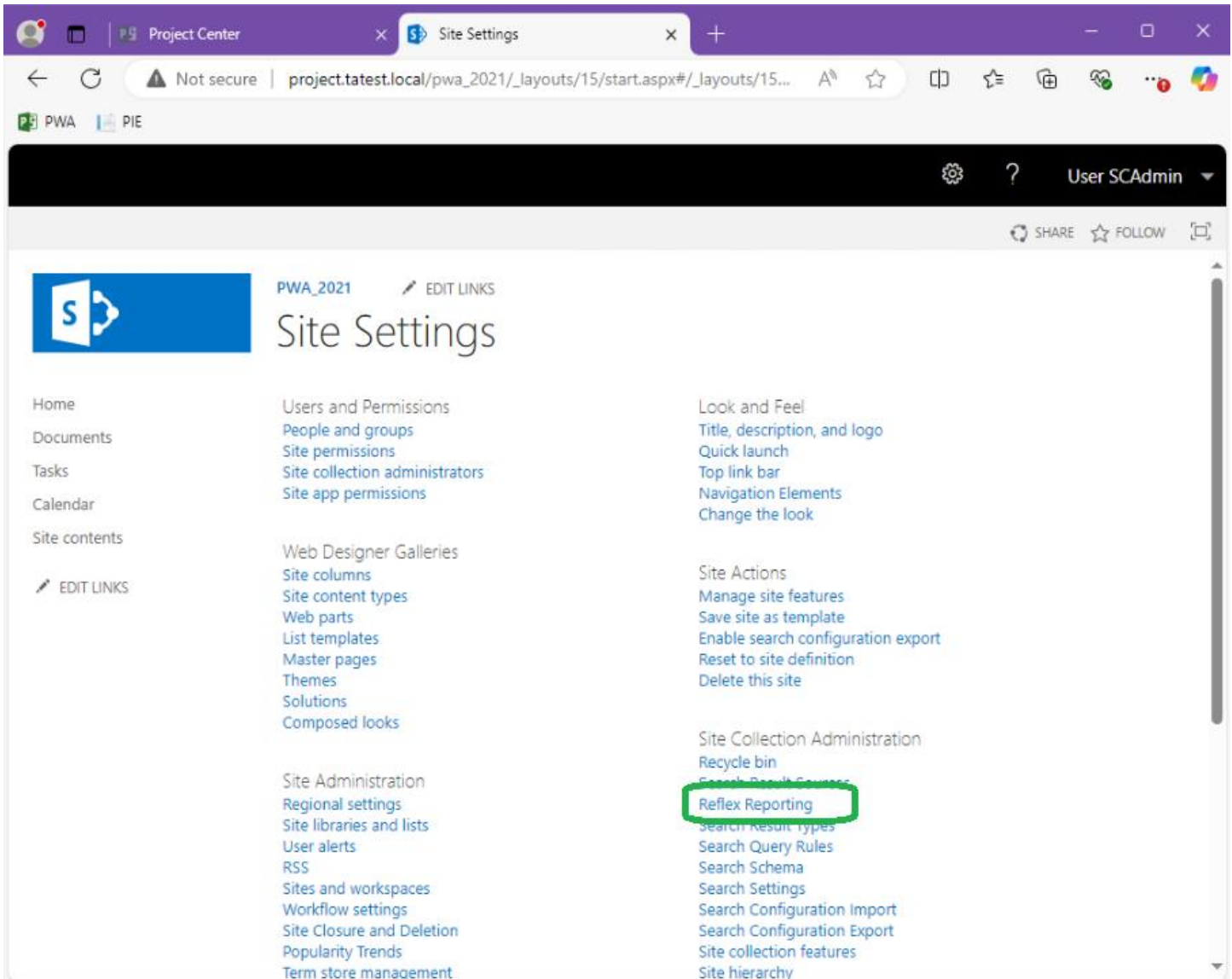


From the list of site collection features, scroll down until you find “Reflex Reporting Site Collection User Interface” and click “Activate”.



**Note:** If you get an error here about a dependant Web Application feature not being activated, it's likely you have not Activated the “Reflex Reporting Site Collection User Interface” Web Application feature first defined in the previous steps.

Once the Site collection feature “Reflex Reporting Site Collection User Interface” is activated, return to the Site Settings menu and locate the new “Reflex Reporting” menu option under “Site Collection Administration”.



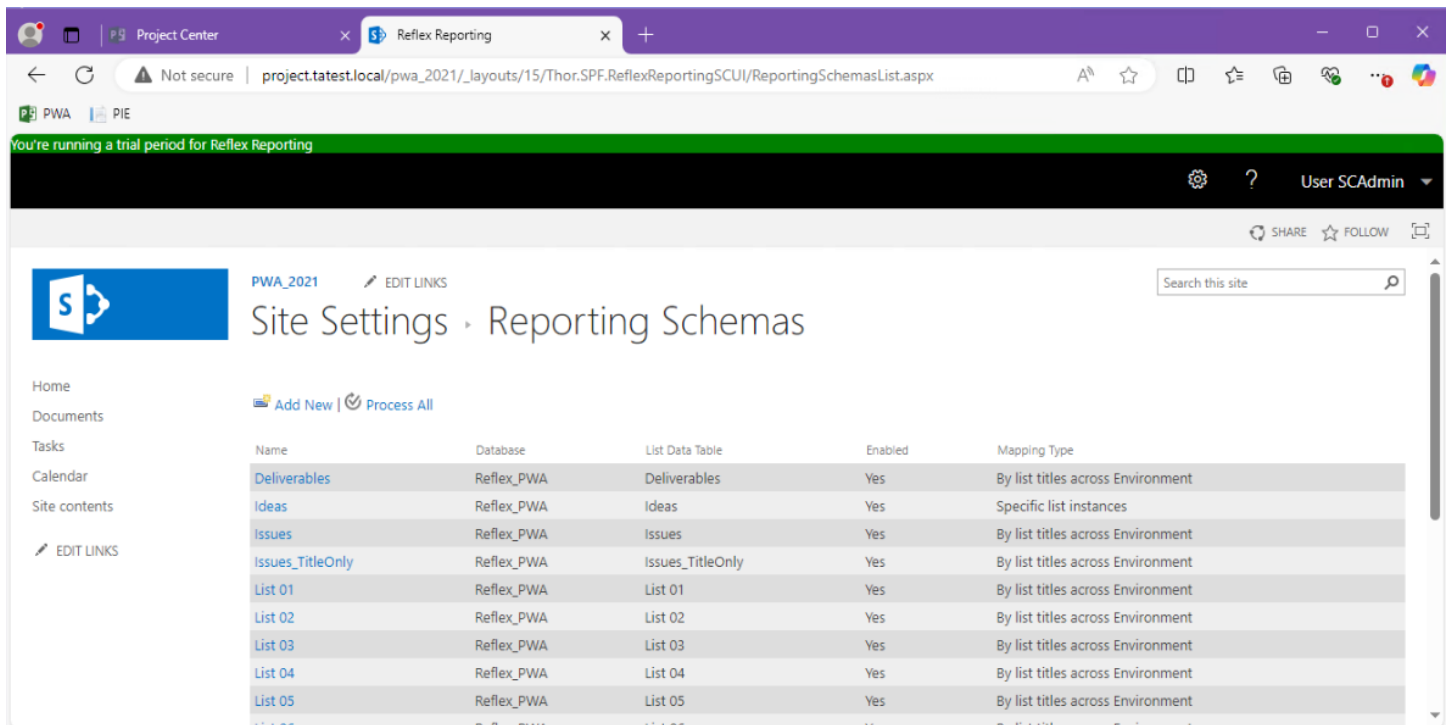
## Reporting Schemas (Site Collection User Interface)

The Reflex Reporting SCUI, provides a subset of the features provided in the Central Administration interface. The SCUI does not provide the ability to create (or delete) reporting databases, nor map site collections to a Reflex environment. Therefore, you **MUST** use the Central Administration interface to create reporting databases and map this site collection, before the SCUI can be used. This is by design. Reflex environments, site collection mappings and Reporting databases should only be created by SharePoint Farm Administrator's. If you have been following this guide from the beginning, this step has already been completed. If not, please refer to the previous sections.

To access the Reflex Reporting SCUI, you must be a Site Collection Administrator.

Changes made in the Central Administration UI are reflected in the Site Collection UI and vice versa.

Open the Reflex Reporting SCUI by clicking the Site Collection, Site Settings menu "Reflex Reporting" described in the previous section. The first page shows the list of Reporting Schemas (if any have been created).

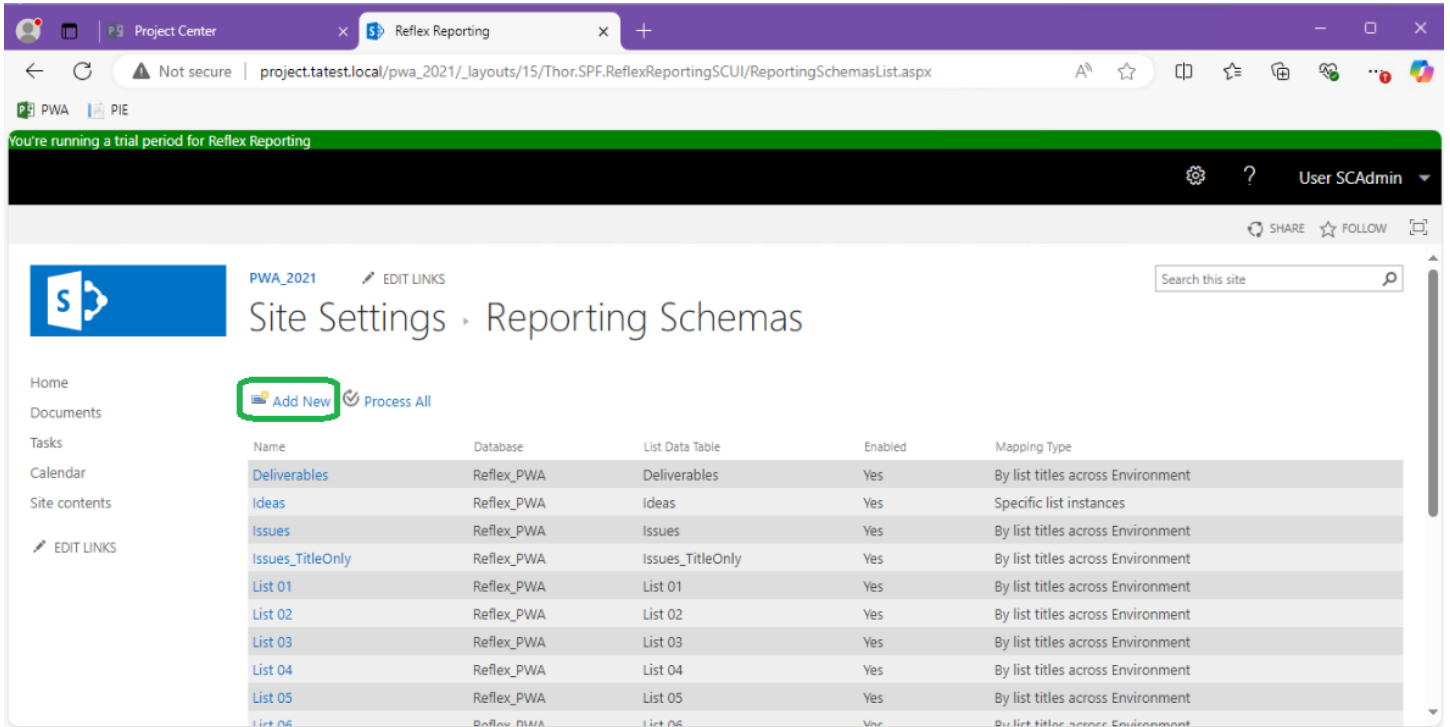


The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReportingSchemasList.aspx`. The page title is "Site Settings > Reporting Schemas" for the site "PWA\_2021". A table lists the following Reporting Schemas:

Name	Database	List Data Table	Enabled	Mapping Type
Deliverables	Reflex_PWA	Deliverables	Yes	By list titles across Environment
Ideas	Reflex_PWA	Ideas	Yes	Specific list instances
Issues	Reflex_PWA	Issues	Yes	By list titles across Environment
Issues_TitleOnly	Reflex_PWA	Issues_TitleOnly	Yes	By list titles across Environment
List 01	Reflex_PWA	List 01	Yes	By list titles across Environment
List 02	Reflex_PWA	List 02	Yes	By list titles across Environment
List 03	Reflex_PWA	List 03	Yes	By list titles across Environment
List 04	Reflex_PWA	List 04	Yes	By list titles across Environment
List 05	Reflex_PWA	List 05	Yes	By list titles across Environment
List 06	Reflex_PWA	List 06	Yes	By list titles across Environment

## Add a New Reporting Schema

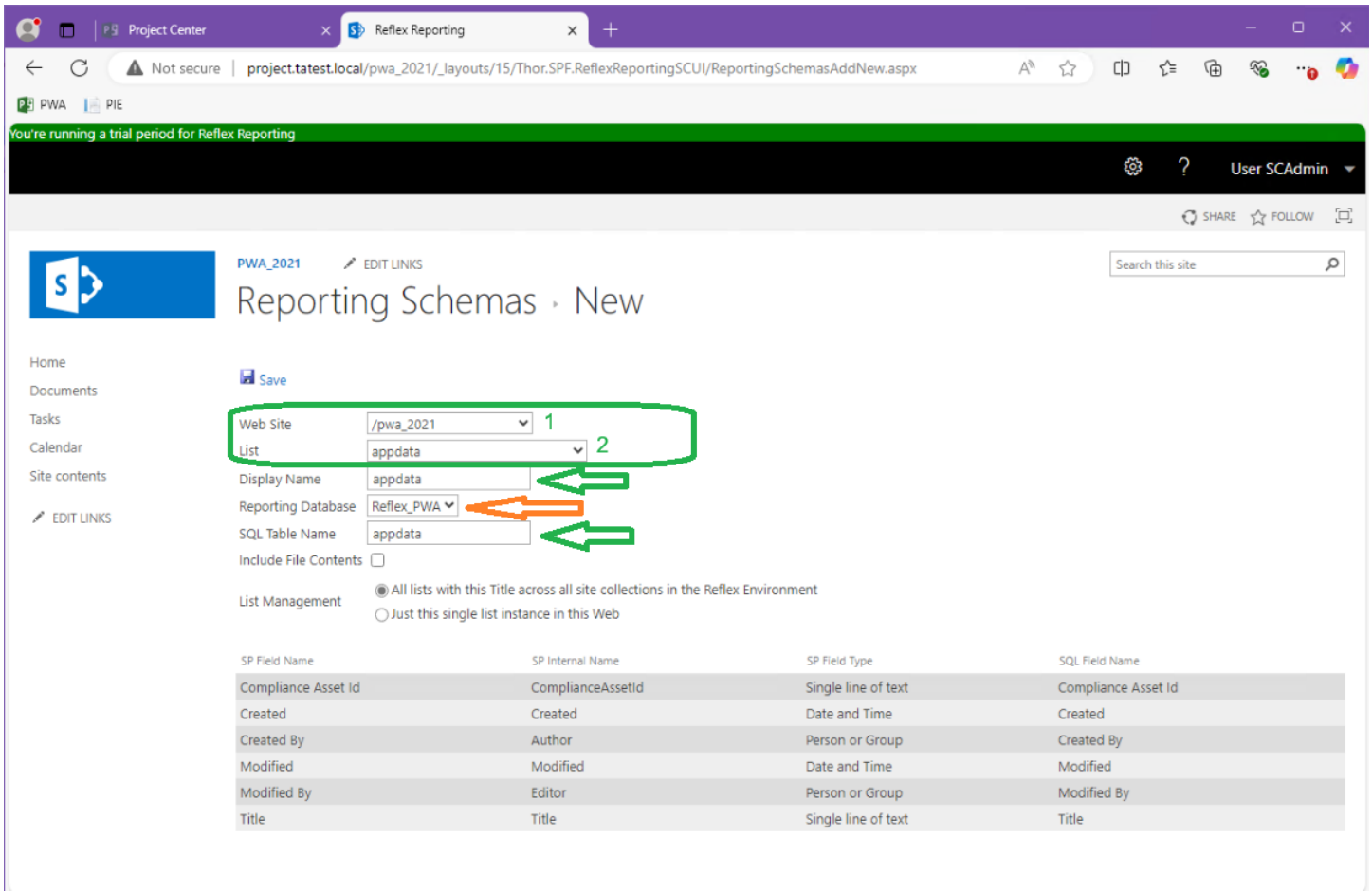
To add a new Reporting Schema, click “Add New” on the Reporting Schemas page.



The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReportingSchemasList.aspx`. The page title is "Site Settings · Reporting Schemas". A navigation menu on the left includes Home, Documents, Tasks, Calendar, and Site contents. The main content area features a table of reporting schemas. A red box highlights the "Add New" button, which is located next to a "Process All" button. The table lists various schemas such as Deliverables, Ideas, Issues, and several List items, each with columns for Name, Database, List Data Table, Enabled status, and Mapping Type.

Name	Database	List Data Table	Enabled	Mapping Type
<a href="#">Deliverables</a>	Reflex_PWA	Deliverables	Yes	By list titles across Environment
<a href="#">Ideas</a>	Reflex_PWA	Ideas	Yes	Specific list instances
<a href="#">Issues</a>	Reflex_PWA	Issues	Yes	By list titles across Environment
<a href="#">Issues_TitleOnly</a>	Reflex_PWA	Issues_TitleOnly	Yes	By list titles across Environment
<a href="#">List 01</a>	Reflex_PWA	List 01	Yes	By list titles across Environment
<a href="#">List 02</a>	Reflex_PWA	List 02	Yes	By list titles across Environment
<a href="#">List 03</a>	Reflex_PWA	List 03	Yes	By list titles across Environment
<a href="#">List 04</a>	Reflex_PWA	List 04	Yes	By list titles across Environment
<a href="#">List 05</a>	Reflex_PWA	List 05	Yes	By list titles across Environment
<a href="#">List 06</a>	Reflex_PWA	List 06	Yes	By list titles across Environment

On the new reporting schema page, select a web site (or subsite) and list to use as a source for generating the reporting schema. Selecting a list will provide default values for the display name and the SQL Table Name fields, but these can be overwritten.



If multiple databases are defined for the Reflex environment this site collection is mapped to, you should also select the “Reporting Database” to choose which reporting database the reporting schema will create a SQL table in.

The “Include File Contents” checkbox is used when a “Document Library” is selected and you wish to extract the binary contents of the document (i.e., most useful for picture libraries).

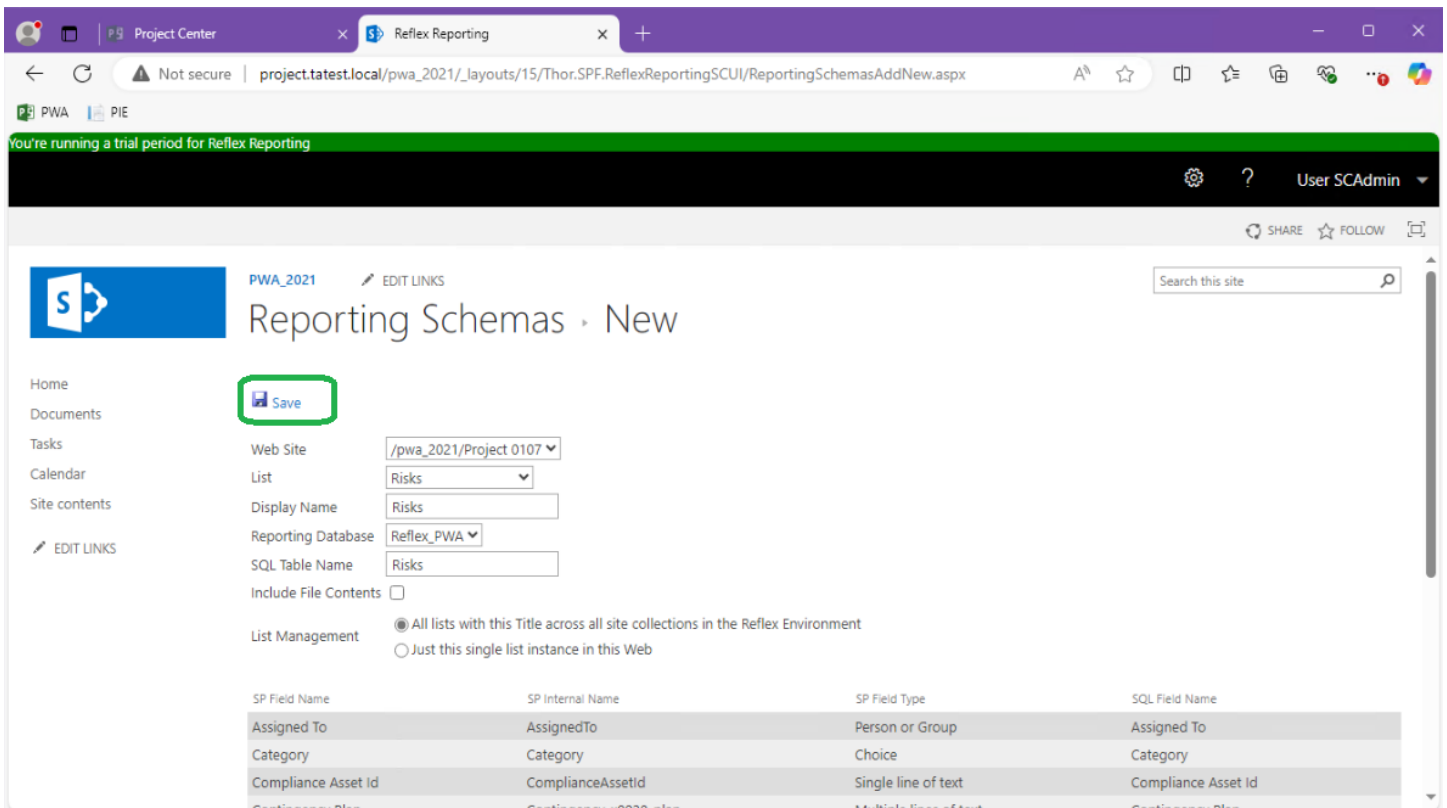
The “List Management” field is controls whether to automatically create a list mapping or a create a list mapping rule when you click “Save”. Selecting “All lists with this Title across all site collections in the Reflex Environment” will create a mapping rule with the selected list Title for each site collection in the reflex environment. This is the most common use case.



If you select “Just this single list instance in this web”, a mapping will be created only for the list instance selected. No other list will be mapped to the reporting schema and no mapping rule will be created.

The table at the bottom of the page shows the default list of fields that will be mapped. You do not have the opportunity to change these fields yet, but you can on the next page.

Click “Save”.

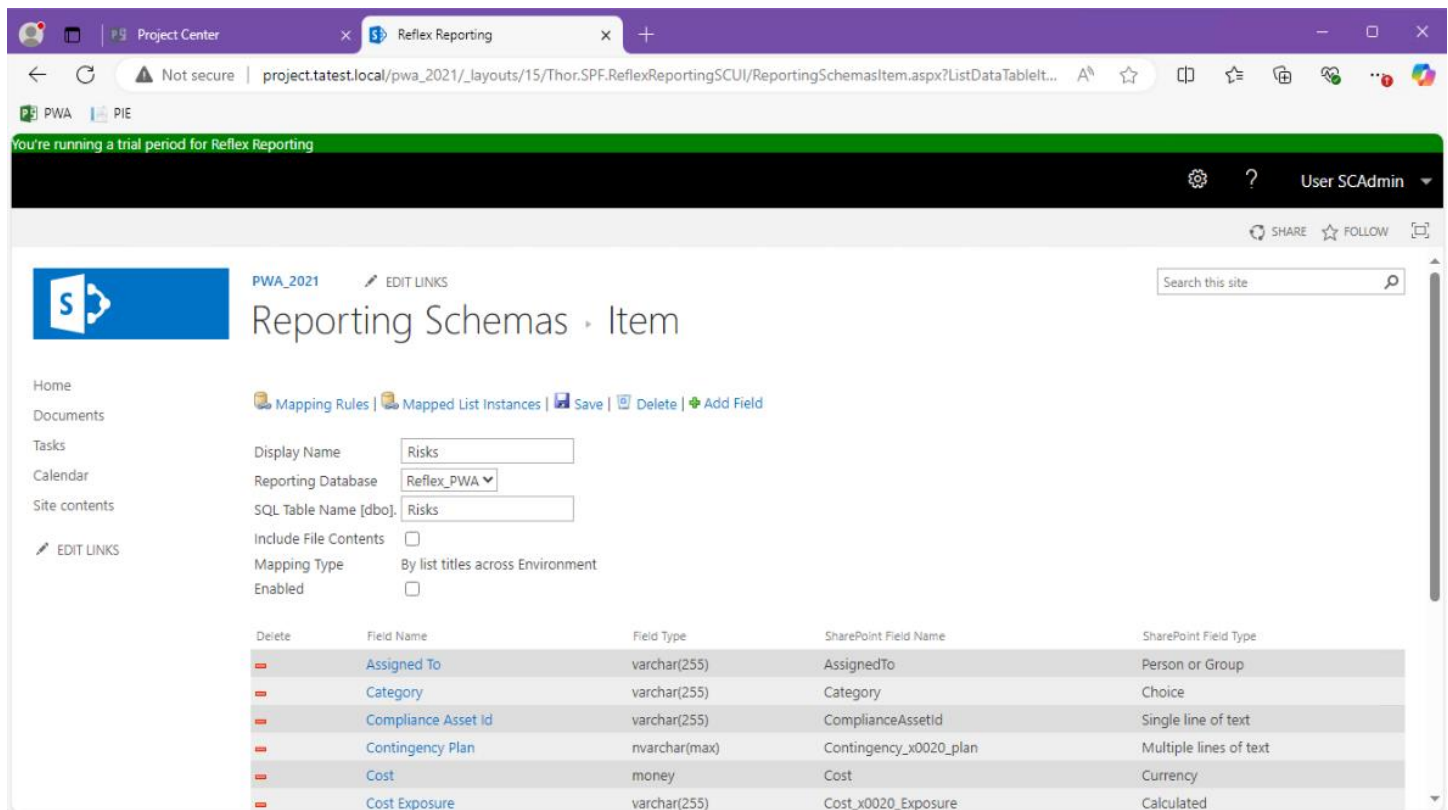


**NOTE:** Saving the new Reporting Schema, will **NOT** enable it.

## Edit a Reporting Schema

You can access the Reporting Schema edit page, either after creating a new Reporting Schema, or by clicking a Reporting Schema name in the Reporting Schemas list page.

**WARNING:** A new reporting schema is created in a disabled state, ready for you to edit it, but an existing Reporting Schema may be “Enabled” already and therefore “Locked”. If you “Disable” (uncheck the enable box), **it will DROP the related SQL table** from a reporting database. This **will break any report** attached to it.



The screenshot shows the 'Reporting Schemas · Item' edit page. The configuration is as follows:

- Display Name: Risks
- Reporting Database: Reflex\_PWA
- SQL Table Name [dbo.]: Risks
- Include File Contents:
- Mapping Type: By list titles across Environment
- Enabled:

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetid	Single line of text
	Contingency Plan	nvarchar(max)	Contingency_x0020_plan	Multiple lines of text
	Cost	money	Cost	Currency
	Cost Exposure	varchar(255)	Cost_x0020_Exposure	Calculated

From the Reporting Schema edit page, you can remove fields (with the red minus icon), add fields (with the green plus button), delete the Reporting Schema entirely or save it.

## Enable a Reporting Schema

Once you're happy with your Reporting Schema design, you need to "Enable" it. Clicking the "Enable" checkbox, will ...

1. Save the Reporting Schema in its current state
2. Lock the Reporting Schema from edit
3. Create a SQL Table in a Reporting Database
4. Automatically trigger a "Process Now" background job (or set of jobs) to sync/reflect the mapped list data into the SQL table

Click "Enable" now and then OK on the confirmation dialog.

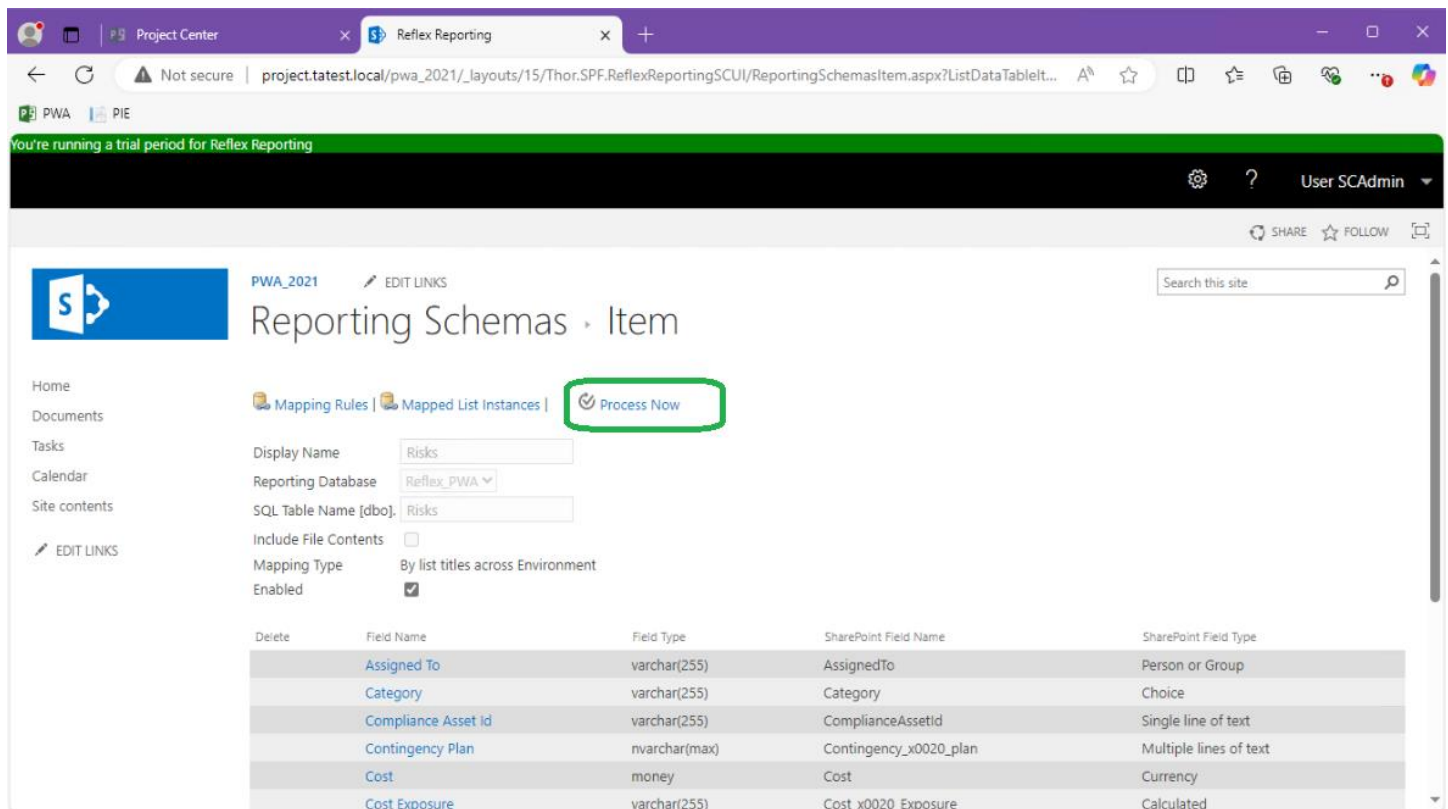
Wait a few minutes for the background jobs to get underway before checking the SQL table for data.

The screenshot shows the 'Reporting Schemas · Item' page in Project Center. The page includes a navigation sidebar on the left with options like Home, Documents, Tasks, Calendar, and Site contents. The main content area shows the configuration for a Reporting Schema named 'Risks'. The 'Enabled' checkbox is highlighted with a green box. Below the configuration, there is a table of mapped fields.

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetId	Single line of text
	Contingency Plan	nvarchar(max)	Contingency_x0020_plan	Multiple lines of text
	Cost	money	Cost	Currency
	Cost Exposure	varchar(255)	Cost_x0020_Exposure	Calculated

## Process Now

On a locked (enabled) Reporting Schema page a “Process Now” button is available. This button can be used to manually trigger the background jobs to resync/reflect all list instance data mapped to the Reporting Schema. Please do **NOT** click it repeatedly, it will only create more jobs and take longer to process.

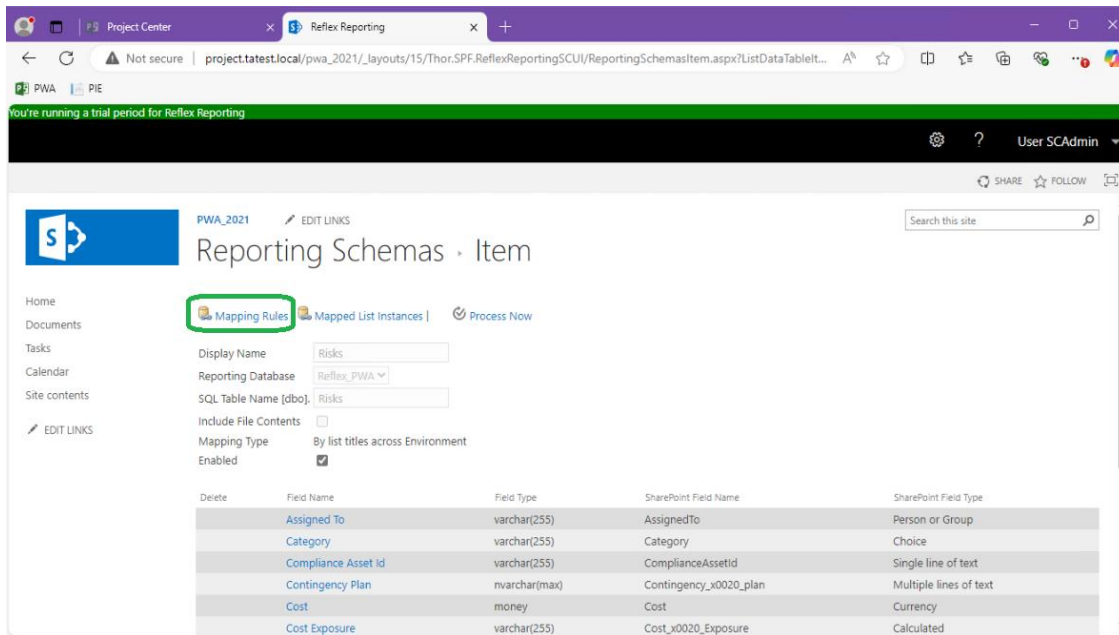


The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReportingSchemasItem.aspx?ListDataTable...`. The page title is "Reporting Schemas · Item". The "Process Now" button is highlighted with a green box. Below the button, there are form fields for "Display Name" (Risks), "Reporting Database" (Reflex\_PWA), "SQL Table Name [dbo]" (Risks), "Include File Contents" (unchecked), "Mapping Type" (By list titles across Environment), and "Enabled" (checked). A table below lists the mapped fields:

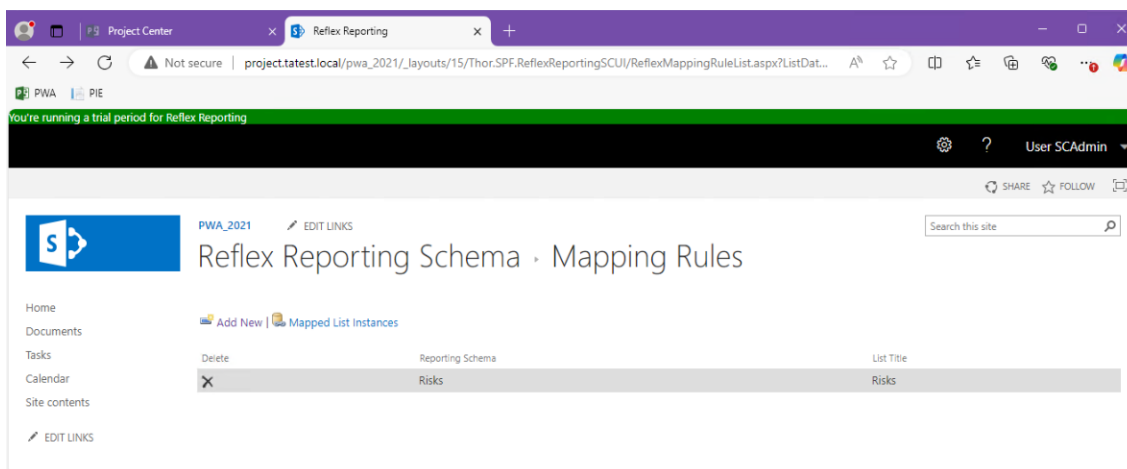
Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	Assigned To	varchar(255)	AssignedTo	Person or Group
	Category	varchar(255)	Category	Choice
	Compliance Asset Id	varchar(255)	ComplianceAssetId	Single line of text
	Contingency Plan	nvarchar(max)	Contingency_x0020_plan	Multiple lines of text
	Cost	money	Cost	Currency
	Cost Exposure	varchar(255)	Cost_x0020_Exposure	Calculated

## Mapping Rules

The disabled reporting schema lets you define Mapping Rules to map the reporting schema to a list Title across site collections within the Reflex Environment.

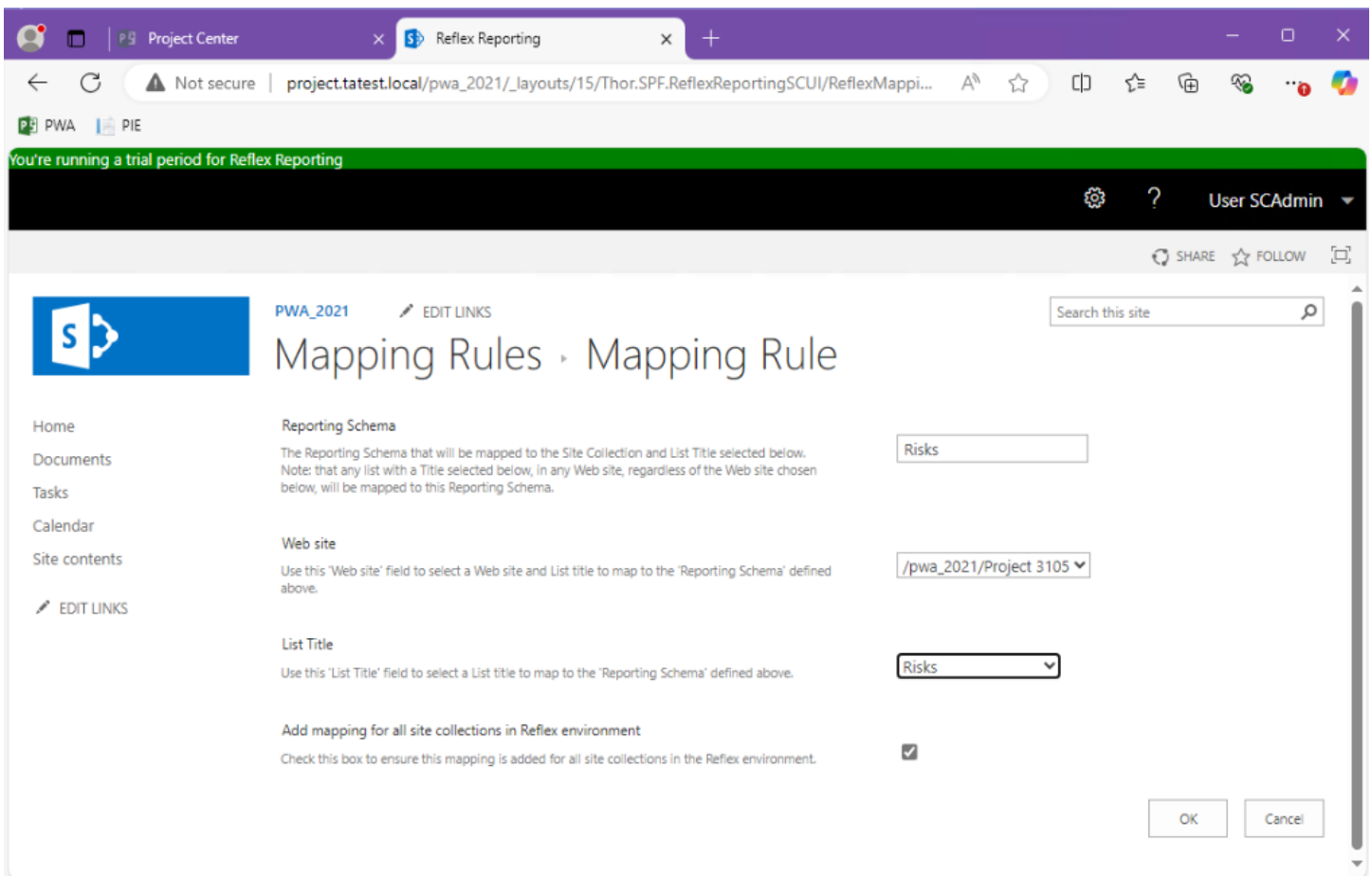


In the Site Collection User Interface, you will only see the rules that relate to this current site collection, but there can be rules for all site collections with the reflex environment.



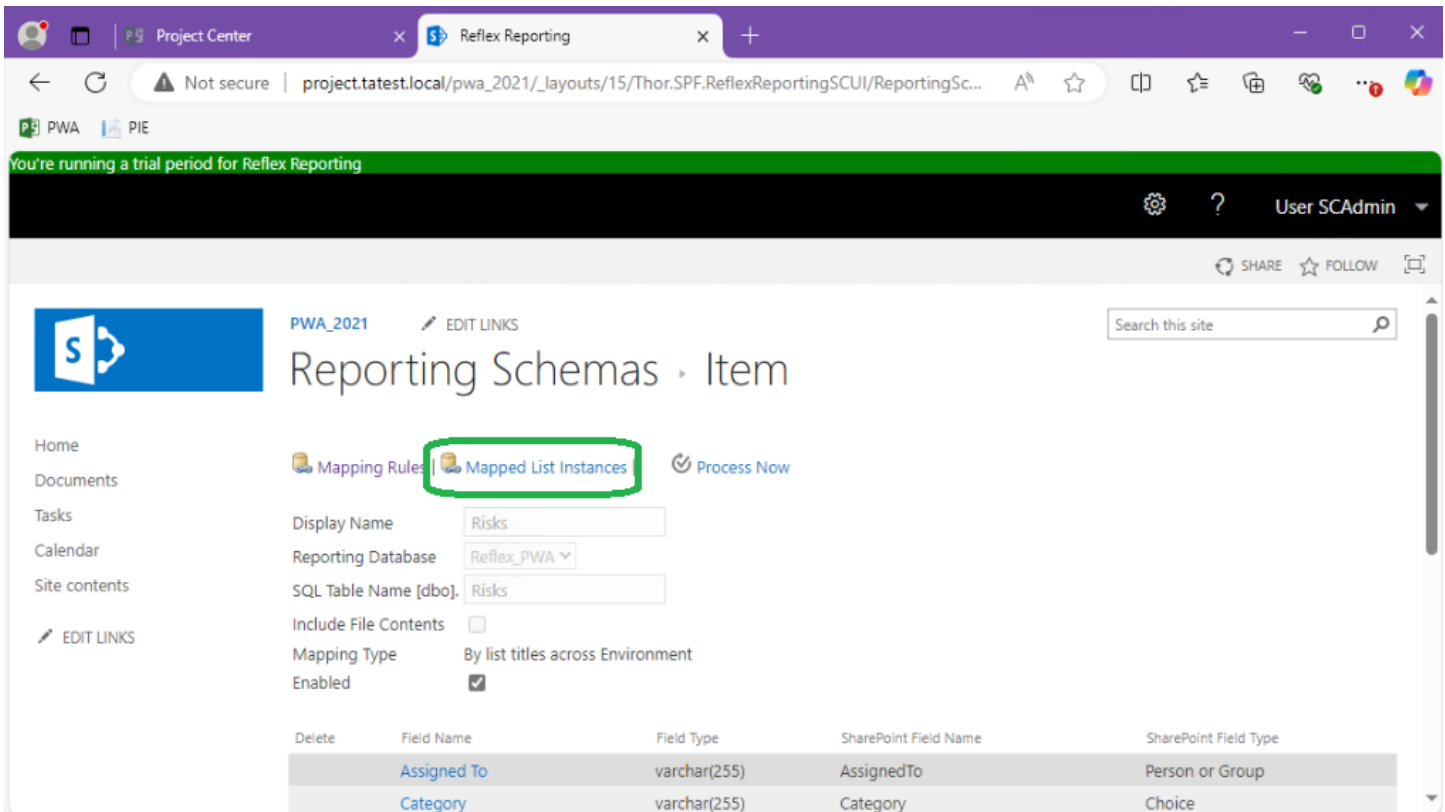
Adding a new mapping rule (via the Add New button), provides you with the ability to map this reporting schema to different list Titles. This is predominantly used in environments where a list may have an old name in some site collections, but a new name in others.

The page allows you to select a sub web site in order to then select a list title. You can also choose if the rule should apply to only this site collection OR all site collections in the Reflex environment.



## Mapped List Instances

From the Reporting Schema page, you can view the list of mapped list instances via the “Mapped List Instances” button.



The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReportingSc...`. The page title is "Reporting Schemas - Item". The "Mapped List Instances" button is highlighted with a green box. Below the button, there are several configuration options for the mapping rule:

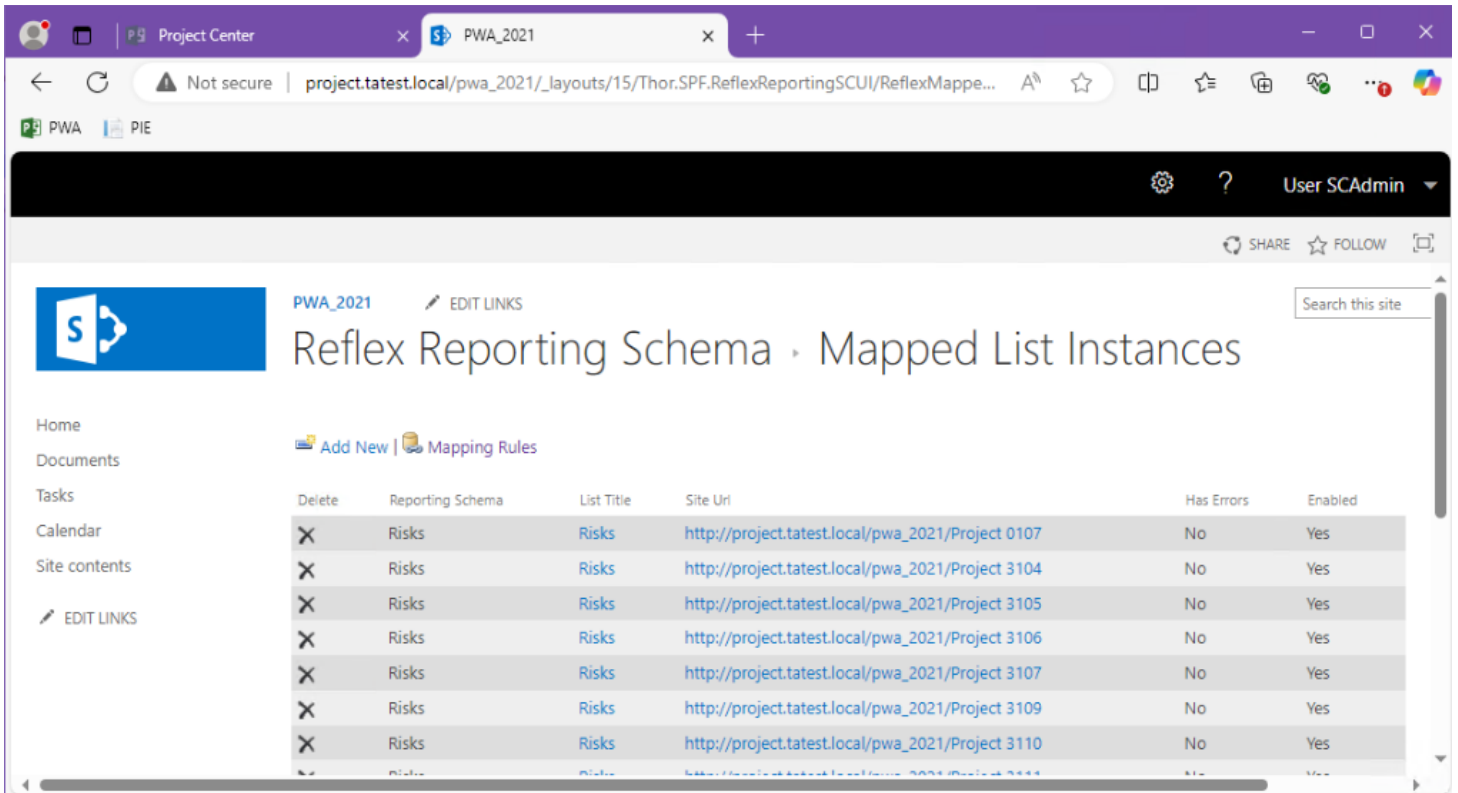
- Display Name: Risks
- Reporting Database: Reflex\_PWA
- SQL Table Name [dbo]: Risks
- Include File Contents:
- Mapping Type: By list titles across Environment
- Enabled:

Below the configuration options, there is a table showing the mapping of fields:

Delete	Field Name	Field Type	SharePoint Field Name	SharePoint Field Type
	<a href="#">Assigned To</a>	varchar(255)	AssignedTo	Person or Group
	<a href="#">Category</a>	varchar(255)	Category	Choice

Keep in mind that mapping rules MAY not have created all mapped list instance registrations yet.

The Mapped List Instances page provides the facility manage the individual list instances mapped to the reporting schema.



The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReflexMappe...`. The page title is "Reflex Reporting Schema - Mapped List Instances". The page includes a navigation sidebar on the left with links for Home, Documents, Tasks, Calendar, and Site contents. The main content area features a table of mapped list instances.

Delete	Reporting Schema	List Title	Site Url	Has Errors	Enabled
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 0107">http://project.tatest.local/pwa_2021/Project 0107</a>	No	Yes
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 3104">http://project.tatest.local/pwa_2021/Project 3104</a>	No	Yes
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 3105">http://project.tatest.local/pwa_2021/Project 3105</a>	No	Yes
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 3106">http://project.tatest.local/pwa_2021/Project 3106</a>	No	Yes
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 3107">http://project.tatest.local/pwa_2021/Project 3107</a>	No	Yes
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 3109">http://project.tatest.local/pwa_2021/Project 3109</a>	No	Yes
X	Risks	Risks	<a href="http://project.tatest.local/pwa_2021/Project 3110">http://project.tatest.local/pwa_2021/Project 3110</a>	No	Yes

Clicking the List Title opens the Mapped List Instance item.



The Mapped List Instance page allows you to ...

- Uncheck the “Enabled” box to exclude the list (and its data) from sync operations.
- View sync errors (only visible if any exist)
- View if the Reflex event handlers are attached to the list instance
- Attach the Reflex event handlers if they are not attached

The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReflexMappe...`. The page title is "Mapped List Instances" and the sub-page is "Mapped List". The user is logged in as "User SCAdmin".

The main content area displays the following configuration options:

- Reporting Schema:** The Reporting Schema that is mapped to the list instance defined below. Value: Risks
- Web site:** The Web site mapped to the Reporting Schema defined above. Value: /pwa\_2021/Project 3104
- List:** The List Instance mapped to the Reporting Schema defined above. Value: Risks
- Enabled:** If disabled, this list instance will NOT be included in reflected data in the Reporting Schema table.
- Event Handlers registered:** Checked if the List and Web event handlers are correctly registered, otherwise unchecked.

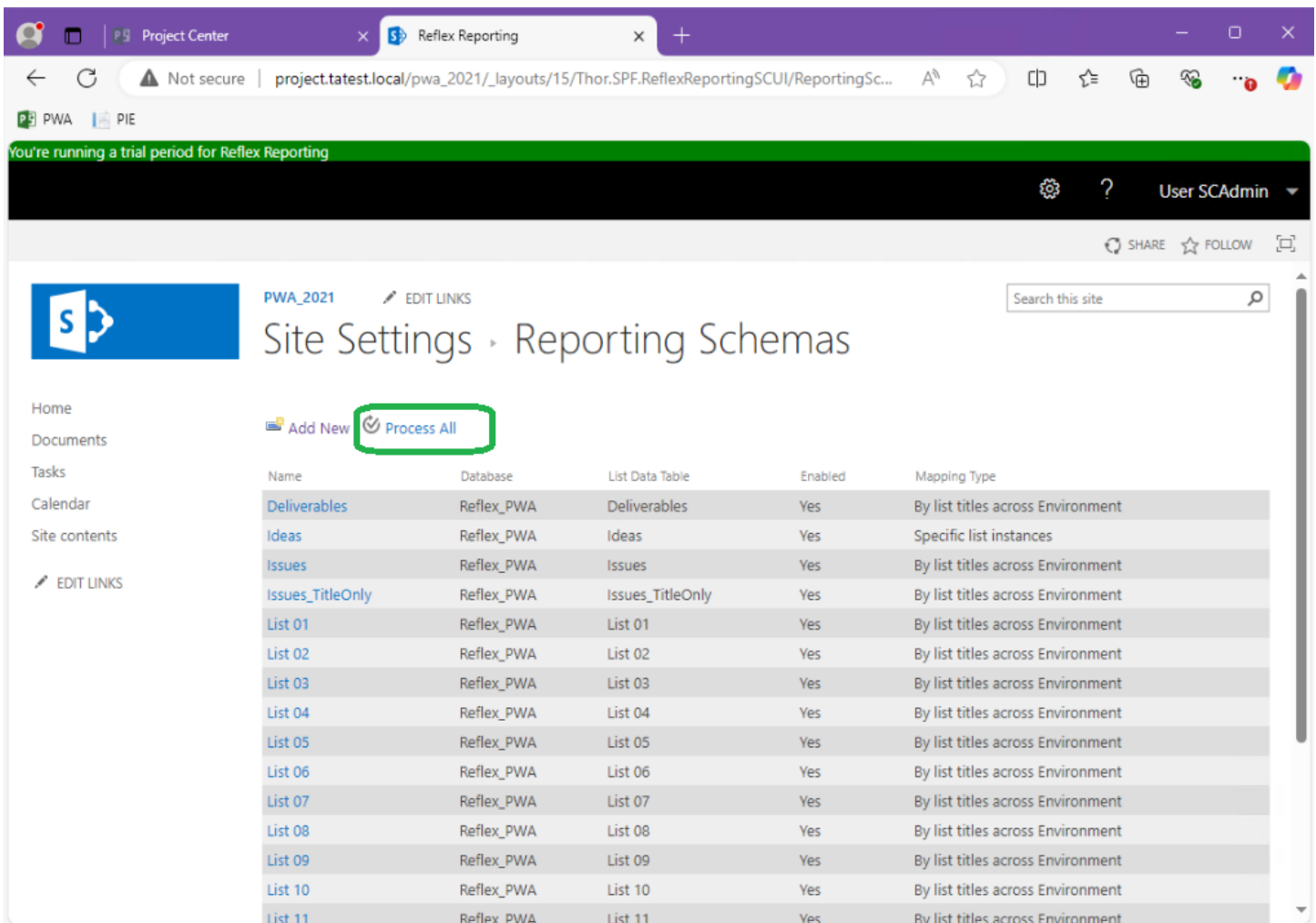
At the bottom right, there are "OK" and "Cancel" buttons.

## Process All

The “Reporting Schemas” page has a “Process All” button. This button is used to manually trigger a resync/reflect of all Reporting Schema’s across all site collections in the Reflex environment for this site collection is mapped to.

This is helpful when Reflex Reporting has been installed into an environment with existing content that has not yet been extracted and you don’t want to wait for the nightly sync service.

**Do not** repeatedly “Process All”. It will create duplicate jobs in the background and just slow the process down.



The screenshot shows a web browser window with the URL `project.tatest.local/pwa_2021/_layouts/15/Thor.SPF.ReflexReportingSCUI/ReportingSc...`. The page title is "Site Settings - Reporting Schemas". A green banner at the top indicates a trial period for Reflex Reporting. The user is identified as "User SCAAdmin". The page features a navigation menu on the left and a search bar at the top right. The main content area includes an "Add New" button and a "Process All" button, which is highlighted with a green box. Below these buttons is a table of reporting schemas.

Name	Database	List Data Table	Enabled	Mapping Type
Deliverables	Reflex_PWA	Deliverables	Yes	By list titles across Environment
Ideas	Reflex_PWA	Ideas	Yes	Specific list instances
Issues	Reflex_PWA	Issues	Yes	By list titles across Environment
Issues_TitleOnly	Reflex_PWA	Issues_TitleOnly	Yes	By list titles across Environment
List 01	Reflex_PWA	List 01	Yes	By list titles across Environment
List 02	Reflex_PWA	List 02	Yes	By list titles across Environment
List 03	Reflex_PWA	List 03	Yes	By list titles across Environment
List 04	Reflex_PWA	List 04	Yes	By list titles across Environment
List 05	Reflex_PWA	List 05	Yes	By list titles across Environment
List 06	Reflex_PWA	List 06	Yes	By list titles across Environment
List 07	Reflex_PWA	List 07	Yes	By list titles across Environment
List 08	Reflex_PWA	List 08	Yes	By list titles across Environment
List 09	Reflex_PWA	List 09	Yes	By list titles across Environment
List 10	Reflex_PWA	List 10	Yes	By list titles across Environment
List 11	Reflex_PWA	List 11	Yes	By list titles across Environment

## Uninstall/Rollback

Removing or rolling back a Reflex Reporting installation has several steps depending on what stage of install and deployment you reached before deciding to remove or rollback.

In general, the removal process is just the reverse of installation process.

1. Deactivate the site collection feature in all site collections it has been activated in.
2. Deactivate the web application feature in all web applications it has been activated in.
3. Deactivate the farm feature.
4. Retract the farm solutions (if installed).
5. Remove the farm solutions (if installed).
6. Delete all Reflex Reporting config/schema and reporting databases.
7. Run the supplied PowerShell script to remove the Reflex Reporting event handlers from list and web instances in all site collections that were configured.
8. Optional, Retract and remove the ThorApps License Manager

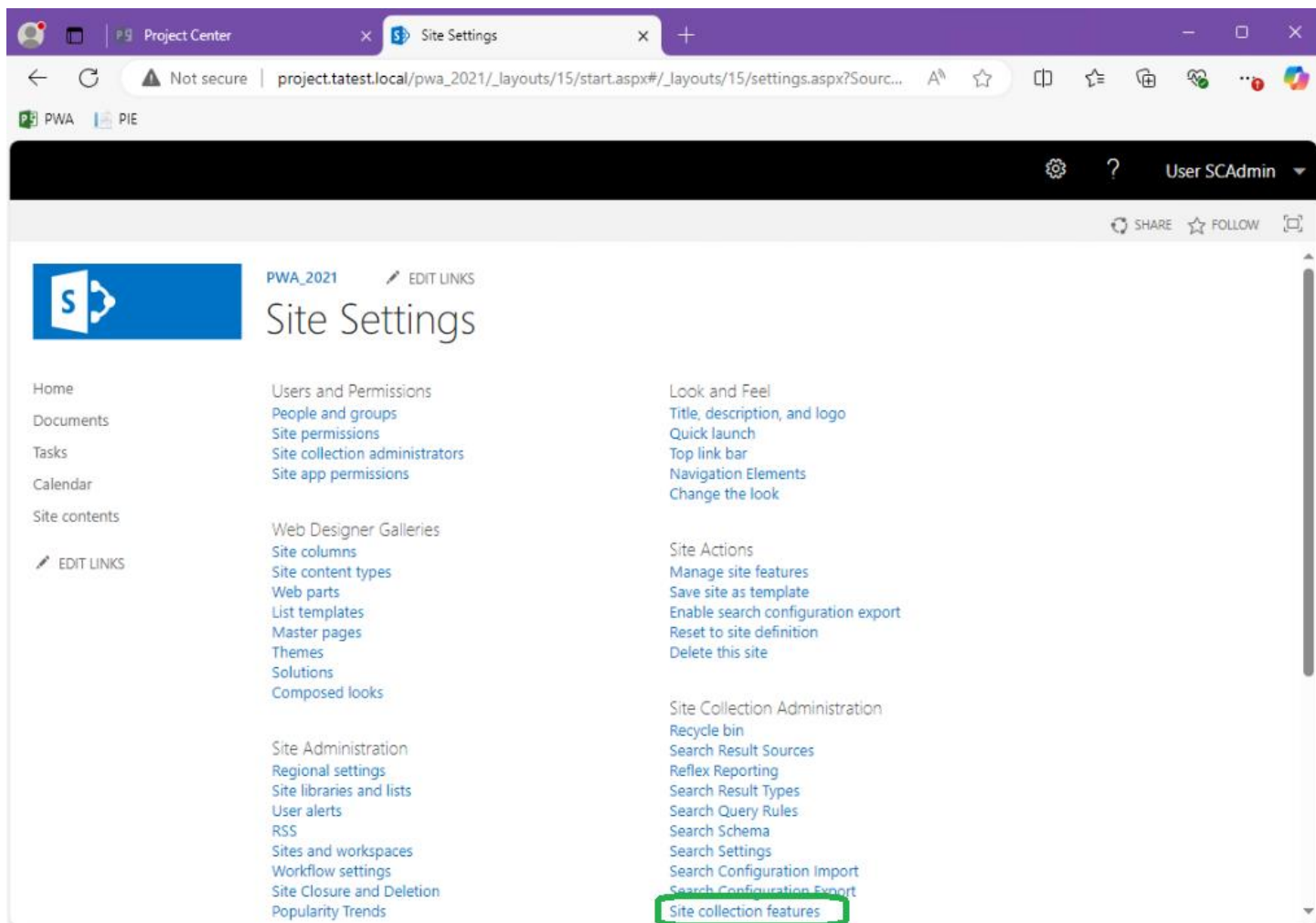
### Important notes before starting removal:

1. If other ThorApps products are installed, **do not** remove the ThorApps License Manager. If you need to remove the License Manager as part of a full remove/rollback, please ensure all other ThorApps Products are removed, before removing the ThorApps License Manager.
2. Reflex Reporting Web features (i.e., not site collection features) are used to add event receivers to specific sites. Deactivating them does not remove the event receivers and therefore it is not required to go through every sub-site to deactivate these features.  
The event receivers are removed via the PowerShell script (in step 7 above) if required.
3. **Before** starting the removal process for Reflex Reporting, make sure you know the names and locations of the SQL databases used by Reflex Reporting. These can be found in the Reflex Reporting databases list under SharePoint Central Administration=>[General Application Settings]=>[Reflex environments]=>[Databases] and [Reflex environments]=>[Configuration Database]

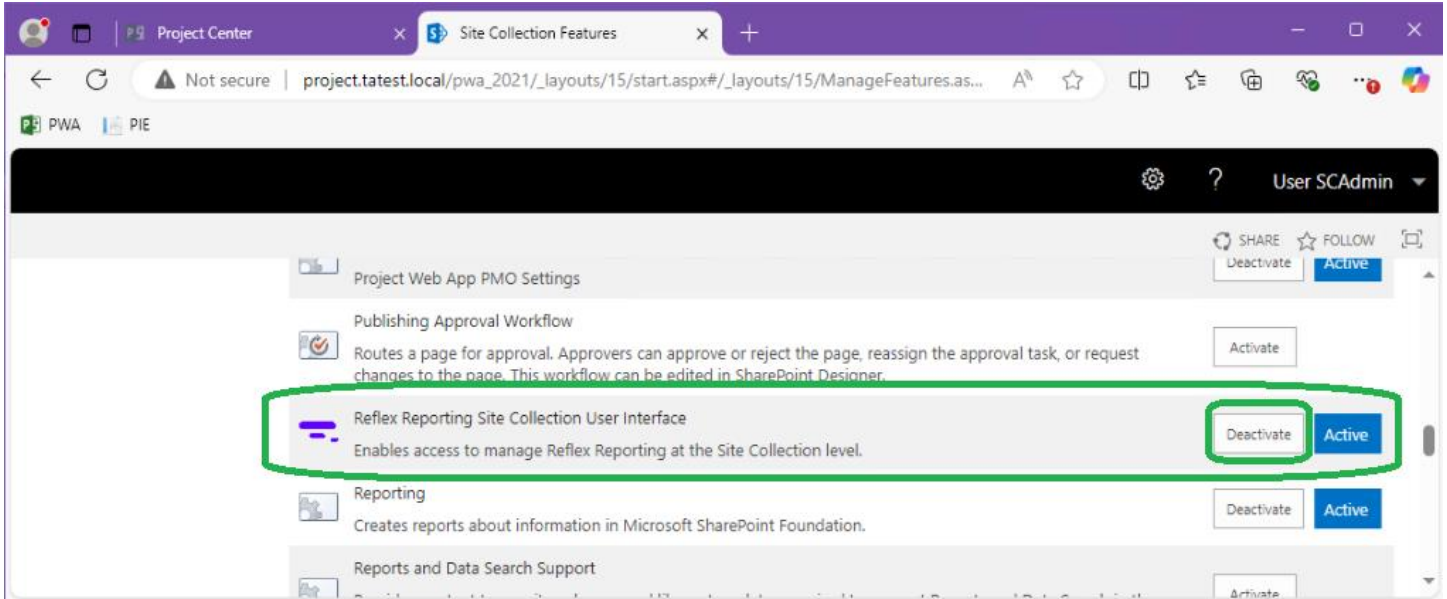
## Deactivate Site Collection feature

If you have installed the Site Collection User Interface, you'll need to deactivate the site collection level feature to remove the site settings menu item for Reflex Reporting. Note, this step is NOT required if the site collection user interface solution was never installed and activated.

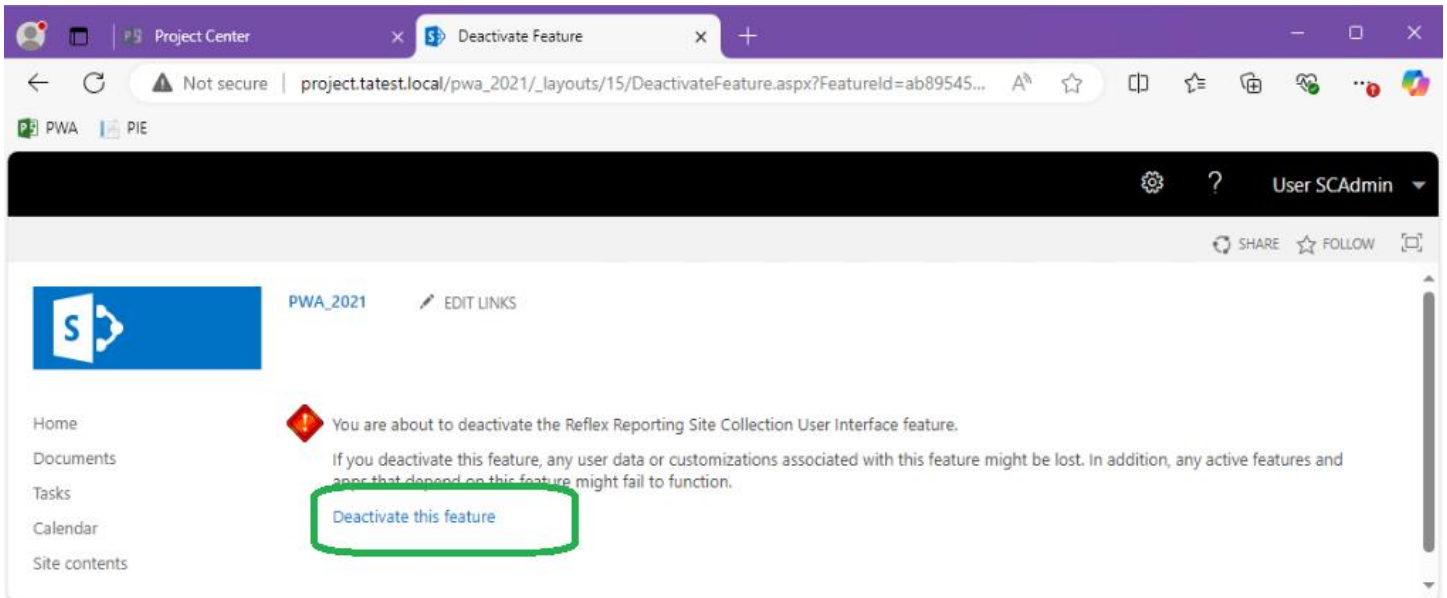
From the site collections, site settings page click "Site collection features".



Scroll down to find the feature “Reflex Reporting Site Collection User Interface” and click “Deactivate”.



You'll be prompted to confirm the deactivation. Click “Deactivate this feature”.



## Deactivate Web Application feature

If the site collection user interface for was installed, you will also need to deactivate the web application feature.

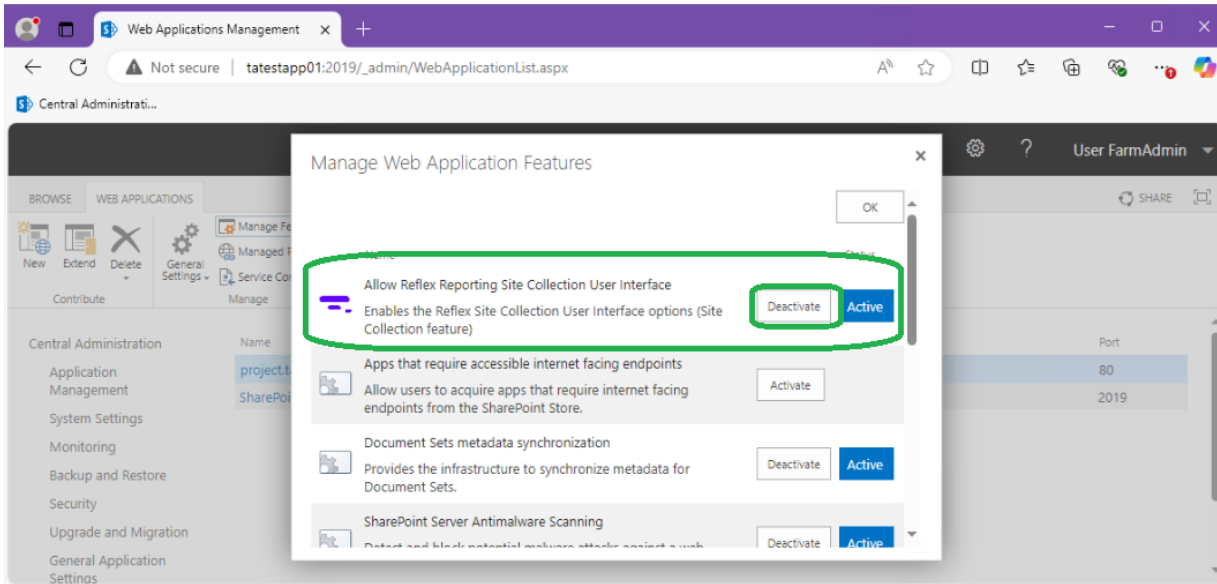
From SharePoint Central Administration, navigate to [Application Management]=> [Manage we applications] and select the web application you enabled the site collection user interface in and click “Manage Features”.

The screenshot shows the SharePoint Central Administration interface. The browser address bar indicates the URL is `tatestapp01:2019/_admin/WebApplicationList.aspx`. The page title is "Web Applications Management". The user is logged in as "User FarmAdmin".

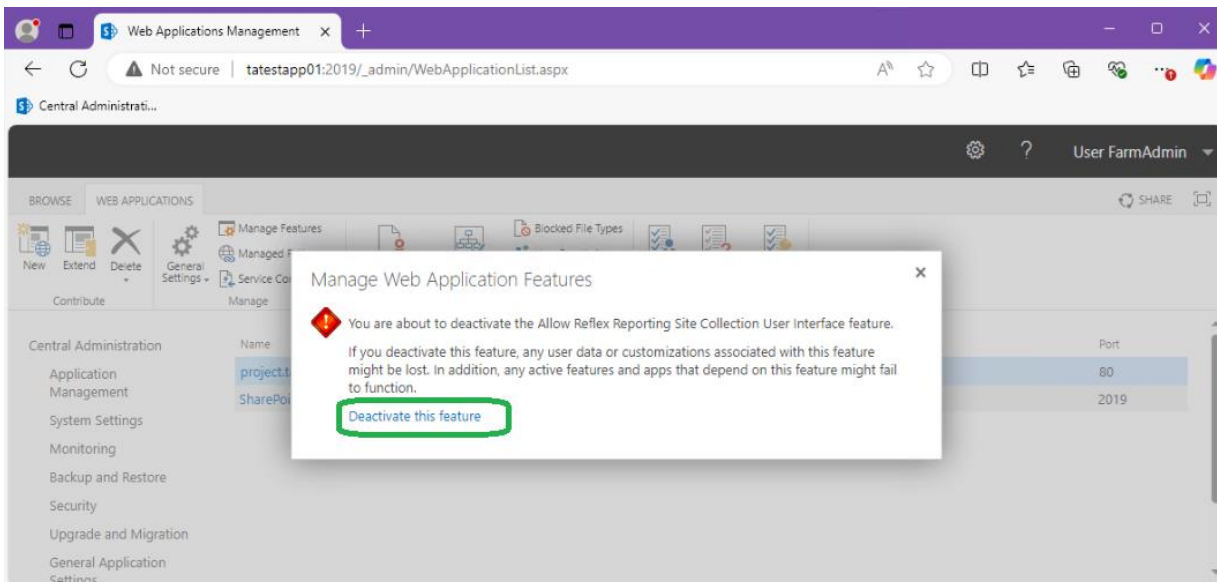
The "WEB APPLICATIONS" section is active, showing a list of web applications. The "Manage Features" button is highlighted with a green circle and a "2" next to it. The table below shows the following web applications:

Name	URL	Port
project.tatest.local - 80	http://project.tatest.local/	80
SharePoint Central Administration v4	http://tatestapp01:2019/	2019

Locate the feature “Allow Reflex Reporting Site Collection User Interface” and click “Deactivate”.

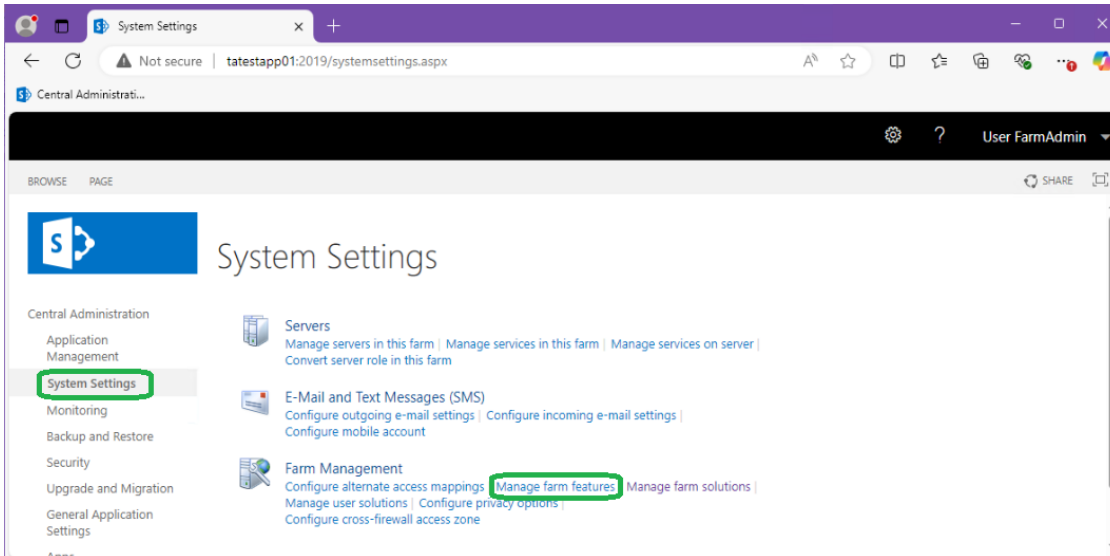


On the confirmation dialog click “Deactivate this feature”.

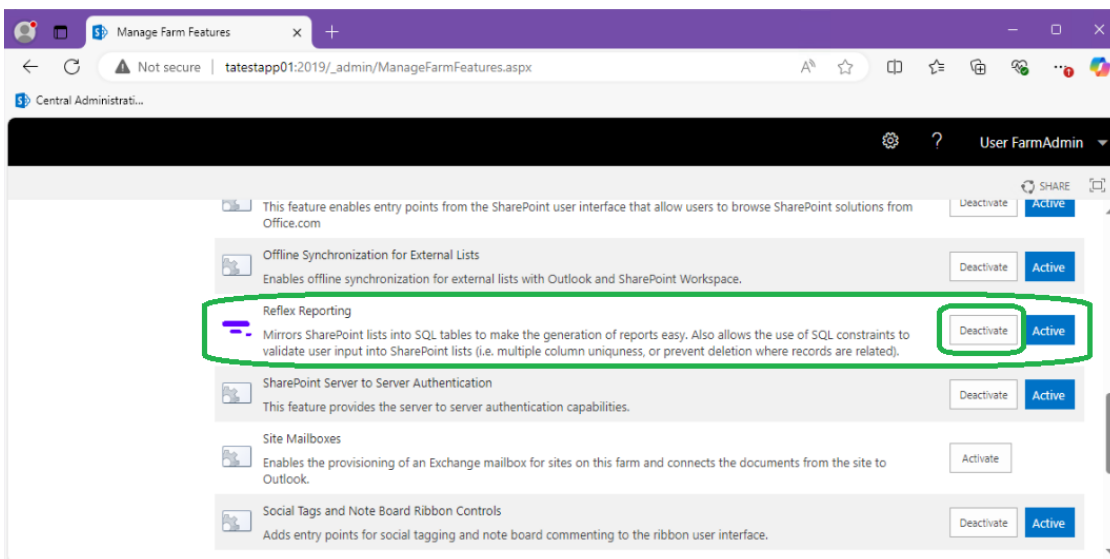


## Deactivate Farm feature

When installing Reflex Reporting, a SharePoint farm feature is automatically activated. You need to deactivate this feature by navigating to SharePoint Central Administration=>[System Settings]>[Manage farm features]

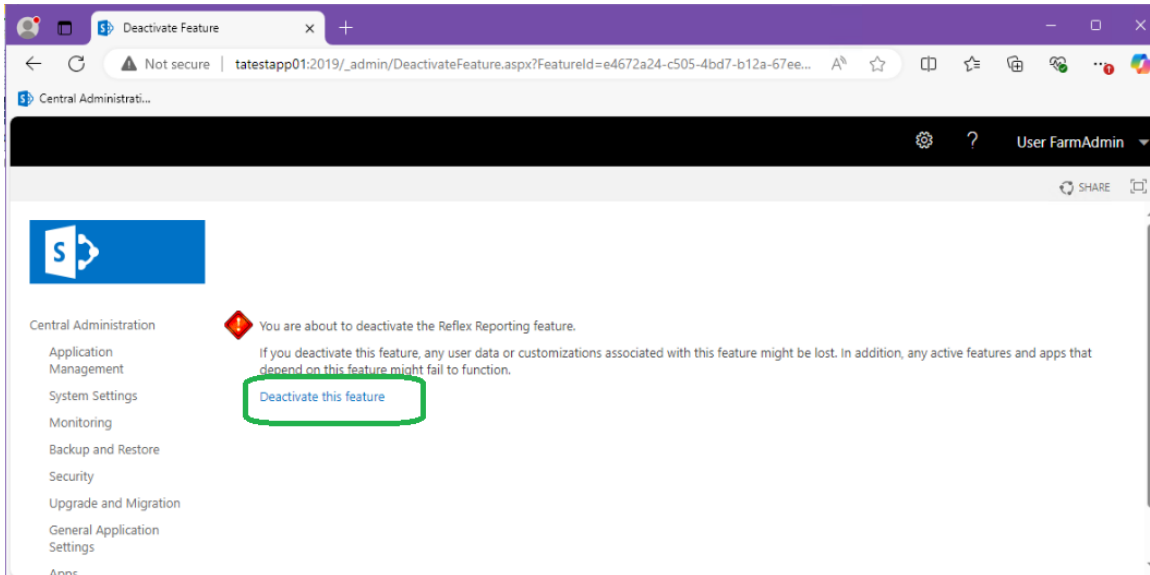


Scroll through and find the feature "Reflex Reporting" and click "Deactivate".





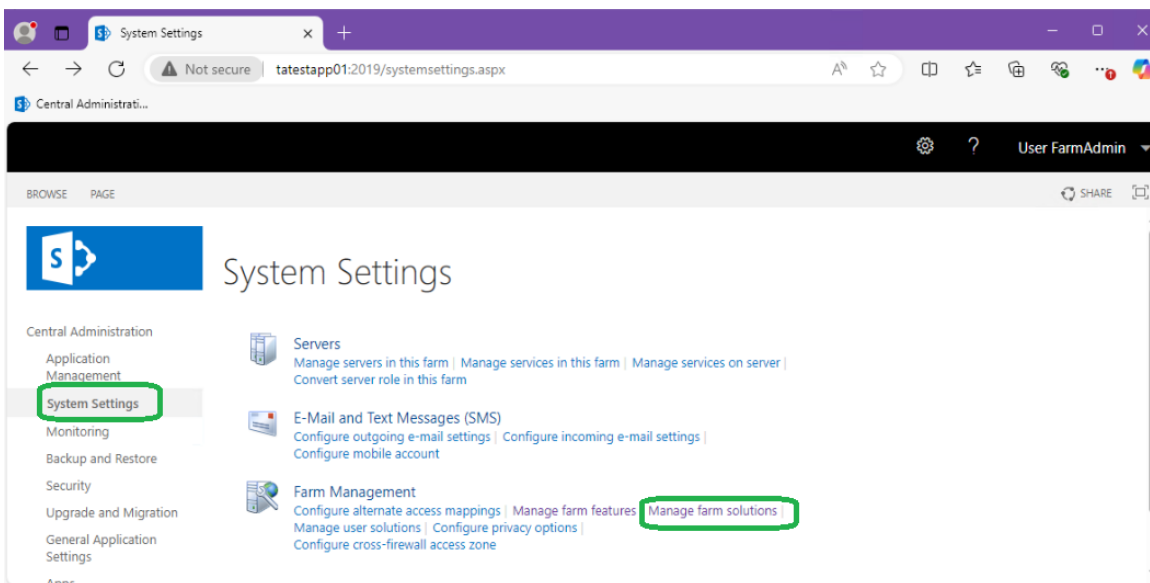
On the confirmation dialog click “Deactivate this feature”.



This will remove the Reflex Reporting menu items from SharePoint Central Administration.

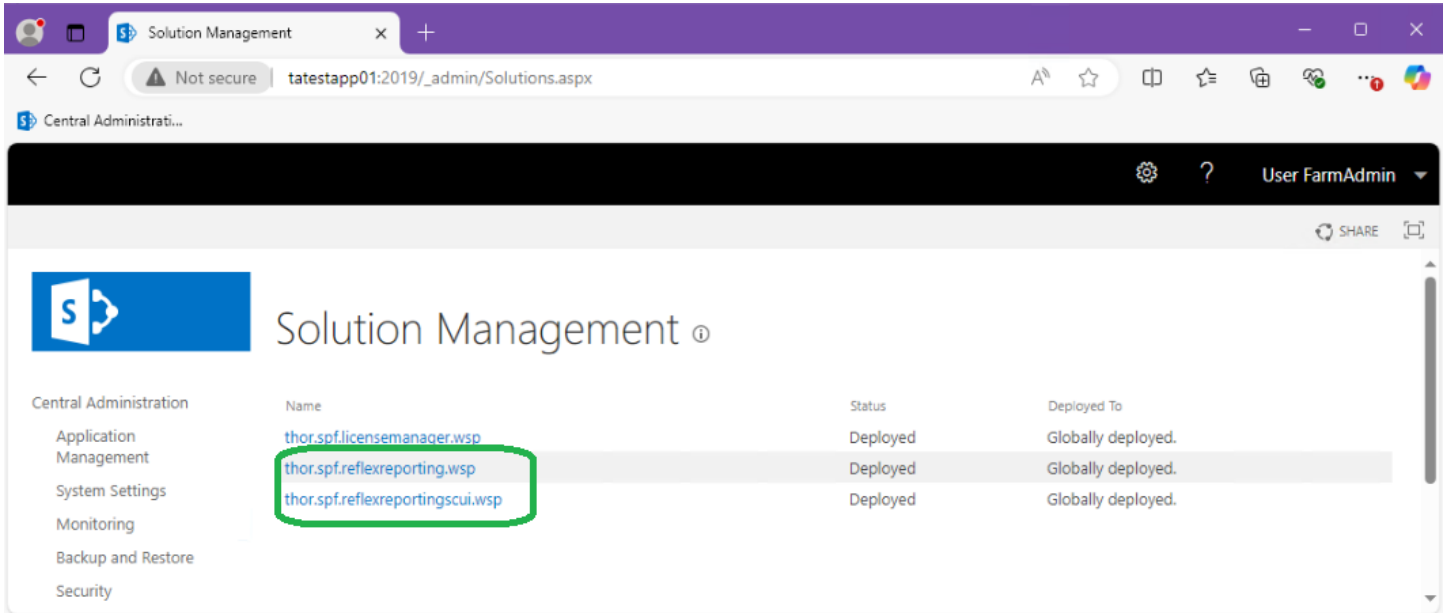
## Retract Farm solution

From SharePoint Central Administration navigate to [System Settings]=>[Manage farm solutions].

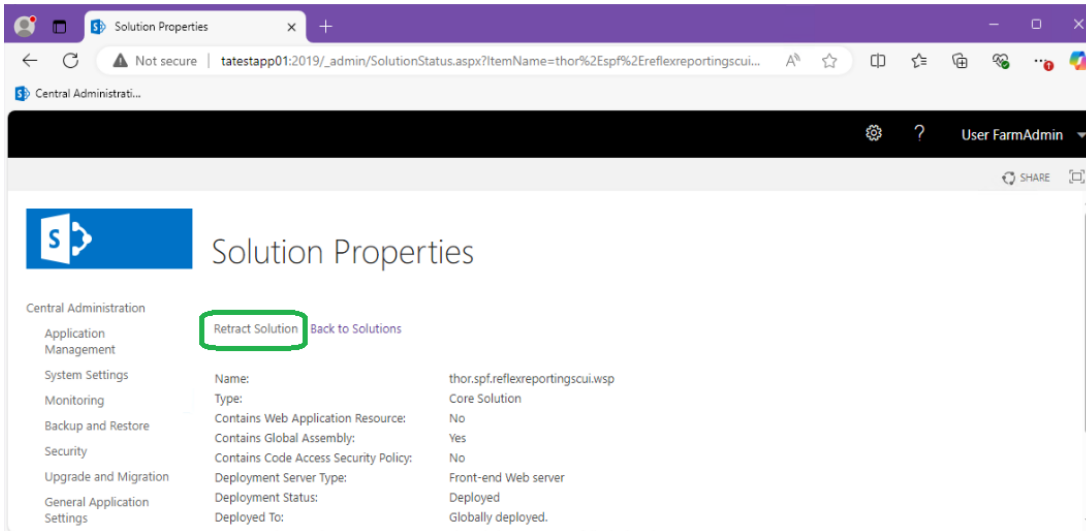


This next step needs to be repeated for both “thor.spf.reflexreporting.wsp” and “thor.spf.reflexreportingscui.wsp”, if the latter is installed. If “thor.spf.reflexreportingscui.wsp” is installed, start with it first.

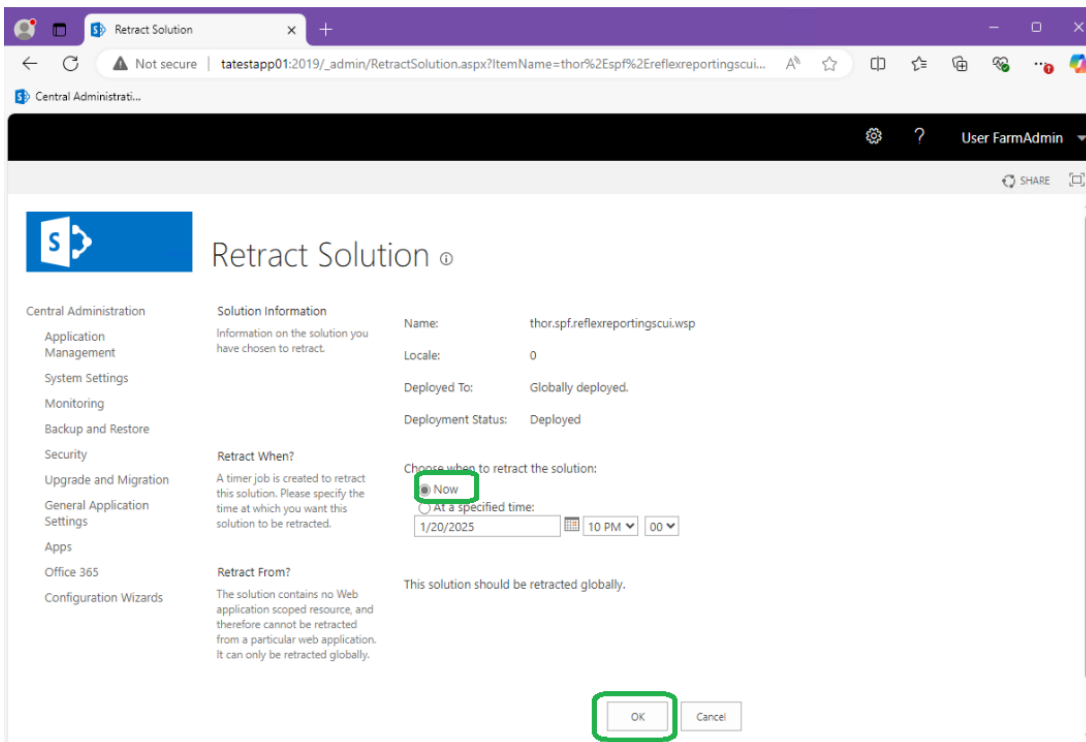
Click the name of a Reflex Reporting wsp solution.



Click "Retract Solution".



On the schedule retraction dialog scroll to the bottom and click "OK".

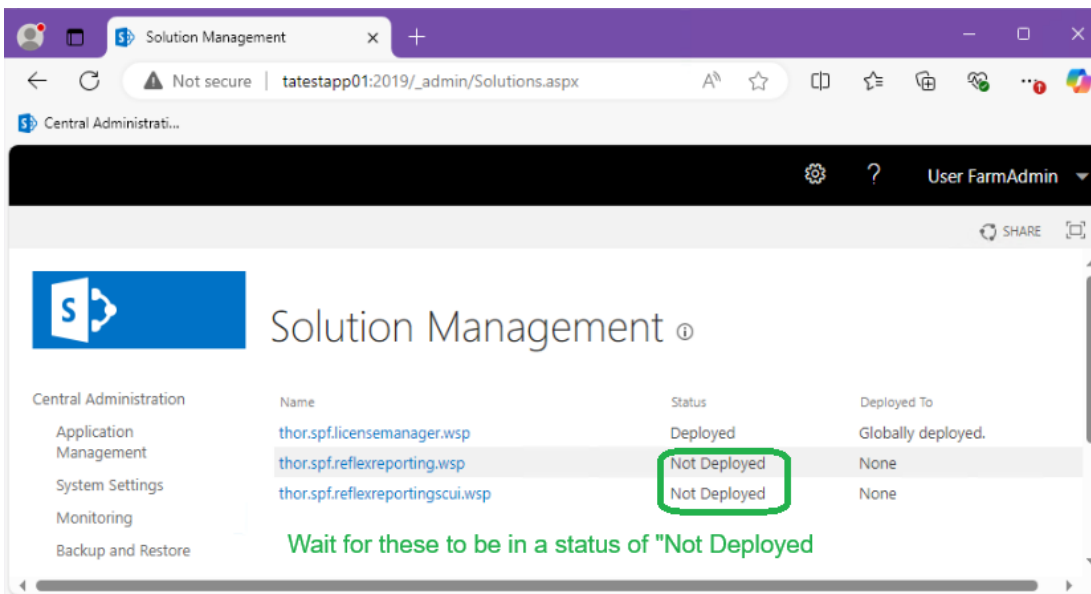


Repeat for "thor.spf.reflexreporting.wsp" and wait for both jobs to complete.

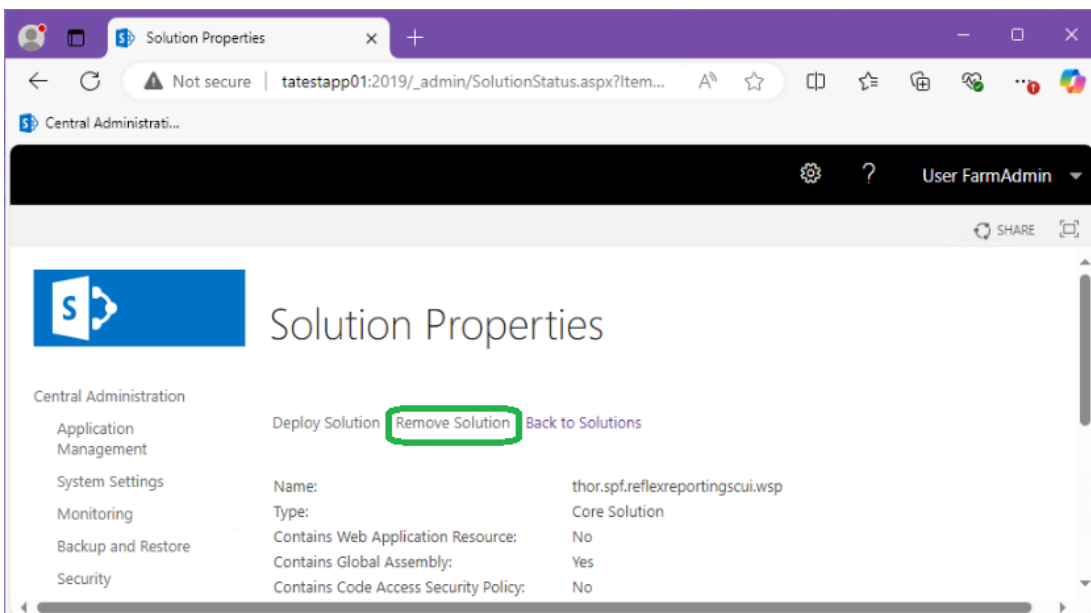
## Remove Farm Solution

This next step also needs to be repeated for both “thor.spf.reflexreporting.wsp” and “thor.spf.reflexreportingscui.wsp”. The order of removal is not important for this step.

From the Solution Management page, click the Name of a reflex reporting solution.

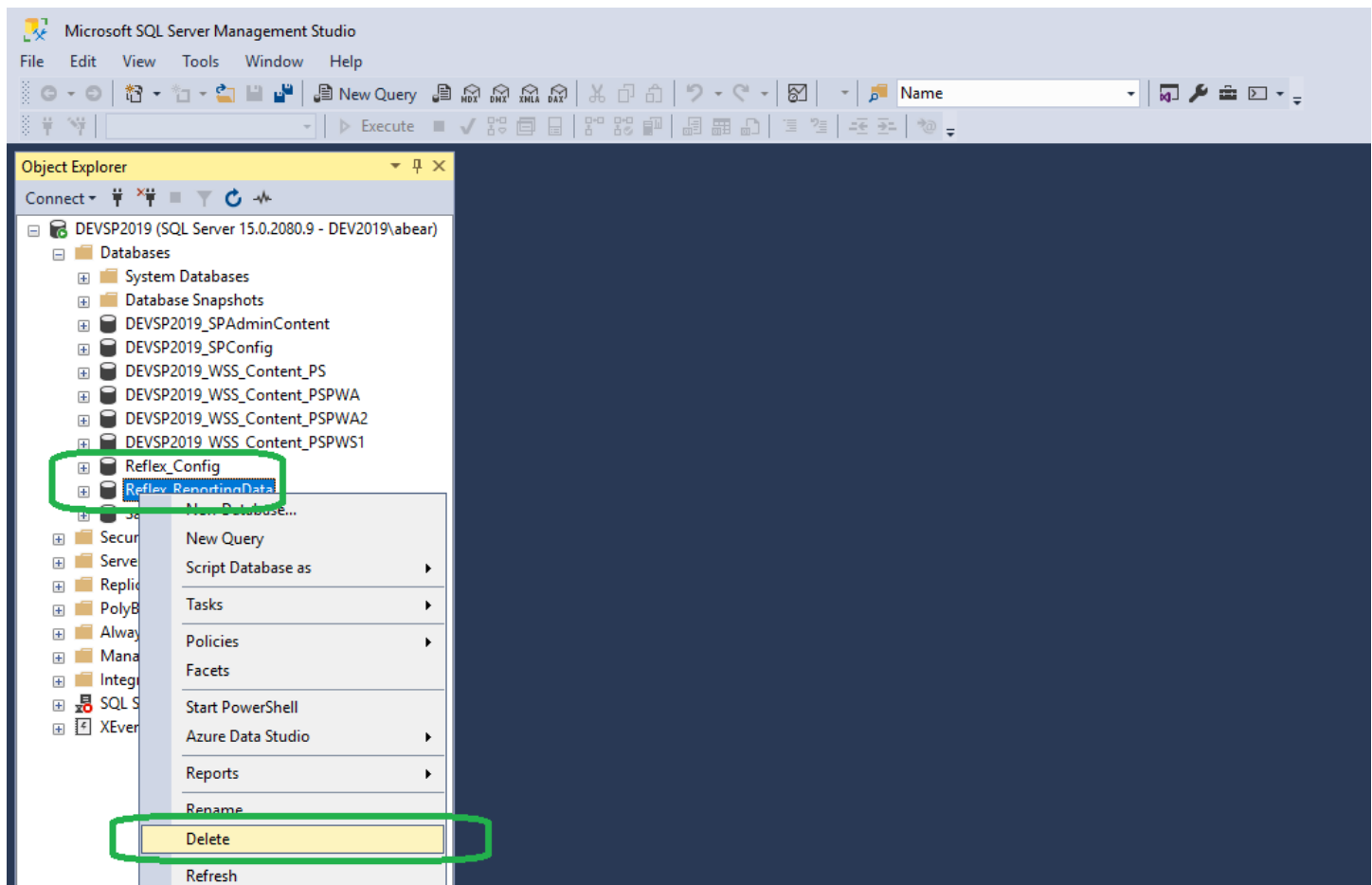


Click “Remove Solution”.



## Delete Databases

When removing Reflex Reporting from SharePoint, any databases created will not be removed. Therefore, you need to remove them manually. We recommend using SQL Server Management Studio (SSMS) from anywhere that has access, with any account that has access, to delete the list of databases you identified before starting the removal process.

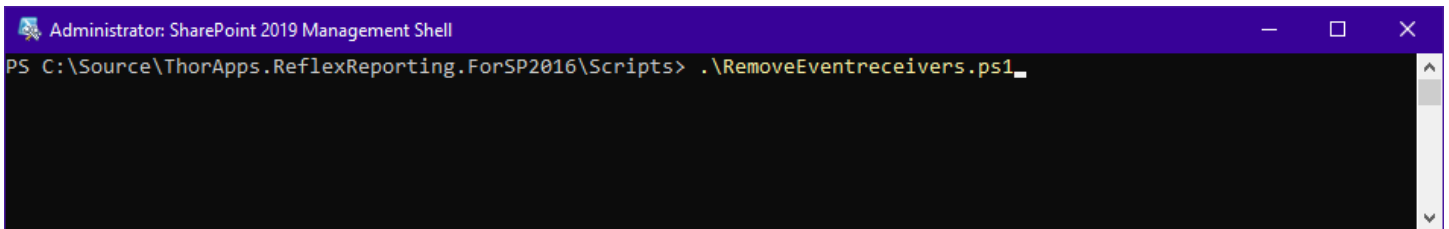


## Remove Event Receivers

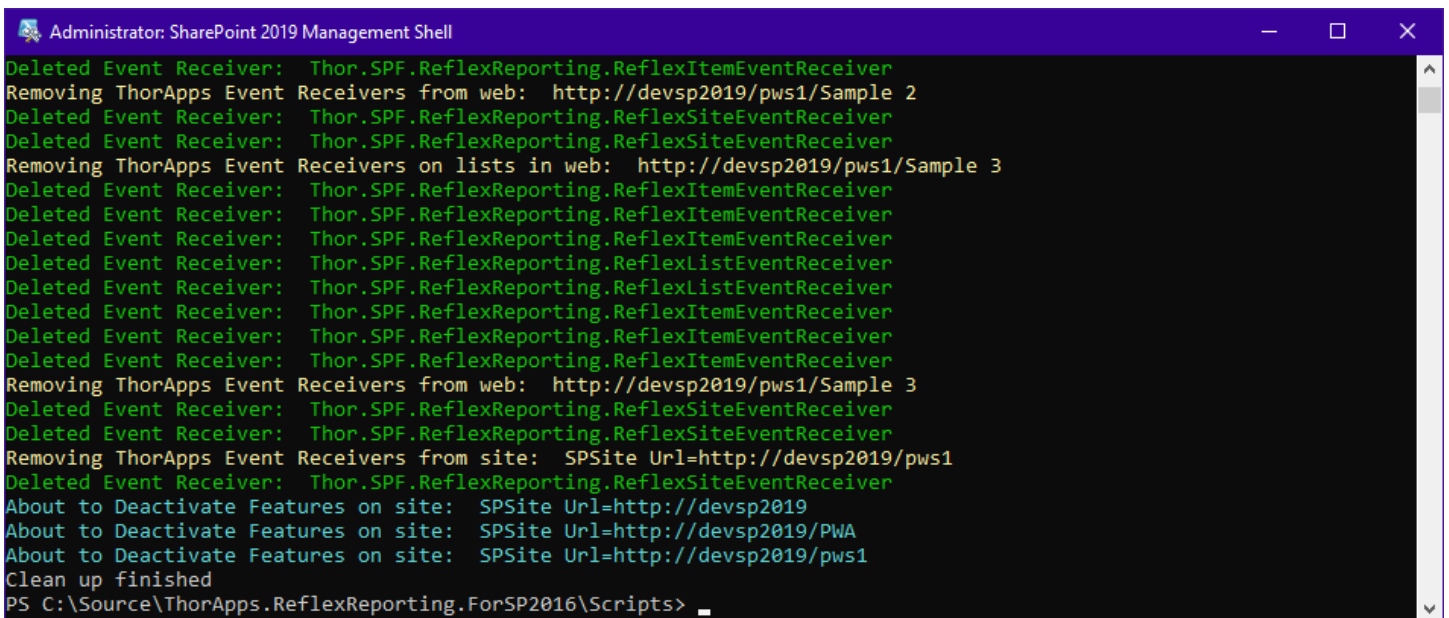
The final step is run a PowerShell script to clean up any event receivers registered by Reflex Reporting.

The Reflex Reporting installation package (now) includes a “scripts” folder with the script to run. If your installation package does not include a “scripts” folder, you can download the package again from <https://docs.thorapps.com/Downloads/ThorApps.ReflexReporting.zip>

On the server running SharePoint Central Administration, open a SharePoint PowerShell console, navigate to the Reflex Reporting installation script folder and execute the script “RemoveEventreceivers.ps1”.



```
Administrator: SharePoint 2019 Management Shell
PS C:\Source\ThorApps.ReflexReporting.ForSP2016\Scripts> .\RemoveEventreceivers.ps1
```



```
Administrator: SharePoint 2019 Management Shell
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Removing ThorApps Event Receivers from web: http://devsp2019/pws1/Sample 2
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexSiteEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexSiteEventReceiver
Removing ThorApps Event Receivers on lists in web: http://devsp2019/pws1/Sample 3
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexListEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexListEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexItemEventReceiver
Removing ThorApps Event Receivers from web: http://devsp2019/pws1/Sample 3
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexSiteEventReceiver
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexSiteEventReceiver
Removing ThorApps Event Receivers from site: SPSite Url=http://devsp2019/pws1
Deleted Event Receiver: Thor.SPF.ReflexReporting.ReflexSiteEventReceiver
About to Deactivate Features on site: SPSite Url=http://devsp2019
About to Deactivate Features on site: SPSite Url=http://devsp2019/PWA
About to Deactivate Features on site: SPSite Url=http://devsp2019/pws1
Clean up finished
PS C:\Source\ThorApps.ReflexReporting.ForSP2016\Scripts>
```

## (Optional) Remove ThorApps License Manager

**Note:** Do not remove the ThorApps License Manager if other ThorApps products are installed.

To remove the ThorApps License Manager repeat the steps described above and ...

1. Remove the SharePoint farm feature “ThorApps License Manager”
2. Retract the solution “thor.spf.licensemanager.wsp”
3. Remove the solution “thor.spf.licensemanager.wsp”

## In-Place Upgrades

### Overview

You can perform “in-place” upgrades of Reflex Reporting for new versions within the same SharePoint Platform (i.e., upgrades of Reflex Reporting, not upgrades of SharePoint e.g., 2016 to 2019).

When performing an “In-place” upgrade of Reflex Reporting, you only need to retract and remove the existing farm solutions (WSP’s) and then upload and deploy the new solutions. You do **NOT** need to deactivate Site features or re-create databases, but you will need to re-activate farm and (if applicable) web application features.

**NOTE:** You also need to deactivate and reactivate the “Reflex Reporting” farm feature in SharePoint Central Administration. Don’t forget this step!

Also, if your environment is using the Site Collection level User Interface (SCUI), you will need to Re-Activate the Web Application feature “Allow Reflex Reporting Site Collection User Interface”.

### Backup/Rollback

Before starting an “In-place” upgrade of Reflex Reporting you need to ensure you have a reliable rollback process in the event of an issue. The process needs to cover both types of Reflex database (schema and reporting) and the SharePoint servers themselves for binary changes.

This guide does not cover your backup and rollback procedures, as they are often unique and specific to each organisation, but valid backup and rollback methods can be ...

1. Virtual Machine snapshots (recommended for simplicity)
2. SQL database backups + installers for previous version of Reflex binaries

### In-place upgrade steps

To remove and retract existing ThorApps farm solutions, use the PowerShell Commands or User Interface steps described in the sections “Retract Farm solution” and “Remove Farm Solution”.

To upload and deploy the new ThorApps farm solutions, use the PowerShell Commands or User Interface steps described in the sections “Upload Package Files” and “Deploy Solutions”. Samples of the PowerShell commands can be found in the deployment “Scripts” folder in a text file labelled “SampleCommands.txt”.

When upgrading Reflex Reporting, upgrade all farm solutions currently installed, including...

- Thor.SPF.LicenseManager.wsp



- Thor.SPF.ReflexReporting.wsp
- Thor.SPF.ReflexReportingSCUI.wsp (if used)

See the screenshot below for the sequence of PowerShell Commands to execute.

## PowerShell In-Place upgrade

You can use the User Interface in SharePoint Central Administration as described in the Install and Rollback sections of this document or use SharePoint PowerShell commands.

## Power Cycle (reboot)

To ensure all SharePoint servers pick up the new version, you will need to power cycle all servers with SharePoint installed (i.e., this usually excludes the SQL database server).

Alternatively, you can also just stop and restart IIS and the SharePoint Timer service on each of the servers to avoid a full reboot.

## Deactivate and Re-activate the “Reflex Reporting” Farm Feature

To ensure any database upgrade actions have been applied, De-activate and re-activate the SharePoint Farm level feature “Reflex Reporting”. Re-activating this feature also ensures the version number recorded in the License Manager is updated.

## Re-activate the “Reflex Reporting” Web Application Feature

If you’re also using the Site Collection User Interface features, you will need to re-activate “Reflex Reporting” Web Application Feature for the Web Applications that contain the Site Collections where the feature is used.

## Any Questions?

Please contact our team of specialists at [info@thorapps.com](mailto:info@thorapps.com).