

ADMINISTRATORS GUIDE

THORAPPS REFLEX REPORTING

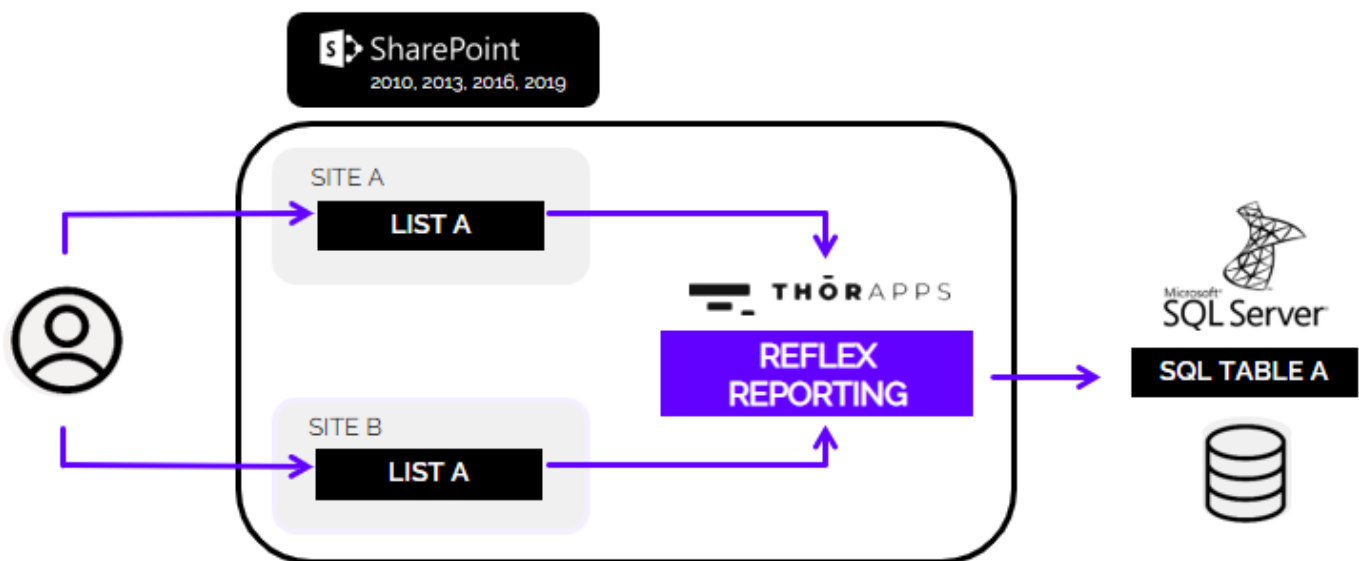
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What is Reflex Reporting?

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 2019 (SharePoint “Subscription” has not been tested yet, but it likely works).

If you’re after similar features for SharePoint online, please see our SharePoint Online Add-in “ListSync” in the SharePoint store, or on our web site (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 and 2019.

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 2016 or SharePoint 2019 farm
- 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 opening a standard web browser session.

Installation

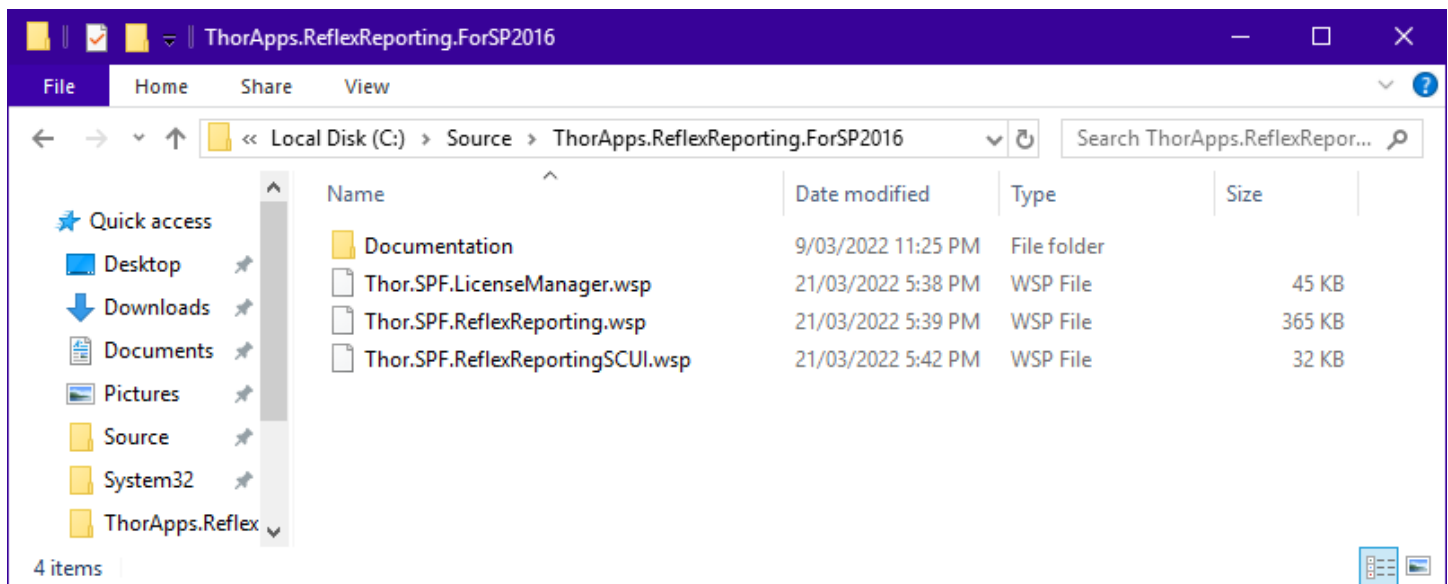
The following step's use a single stand-alone SharePoint 2019 server (called "devsp2019"). If you're installing into a multi-server SharePoint farm, you only need to run these steps on (one of) the server(s) hosting SharePoint Central Administration.

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.For2016.zip>

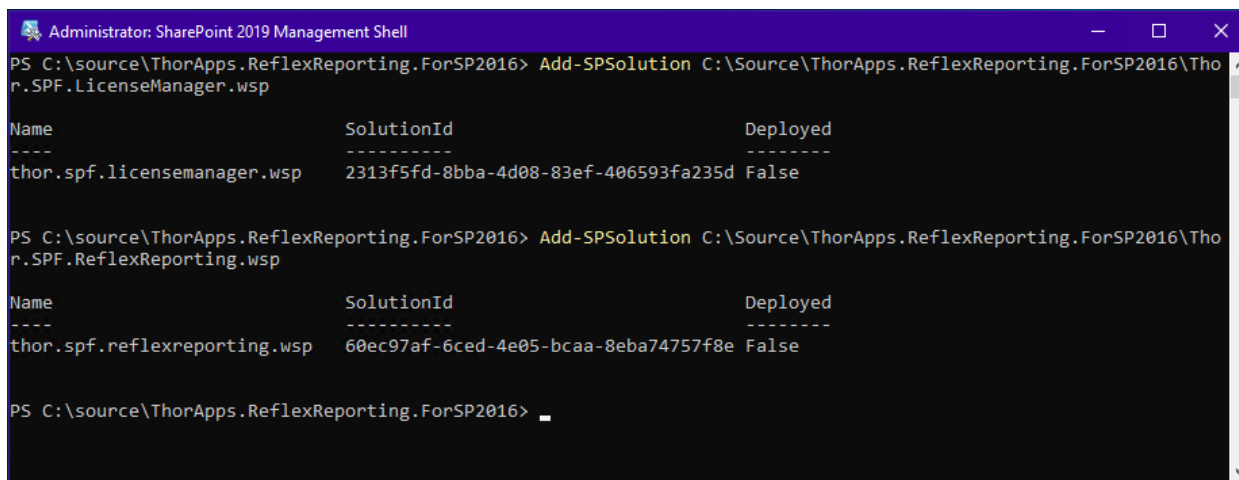
Copy the zip file to the server hosting SharePoint Central Administration and extract the contents to a local drive (This documentation is using C:\Source).



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 2019 Management Shell
PS C:\source\ThorApps.ReflexReporting.ForSP2016> Add-SPSolution C:\Source\ThorApps.ReflexReporting.ForSP2016\Thor.SPF.LicenseManager.wsp

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

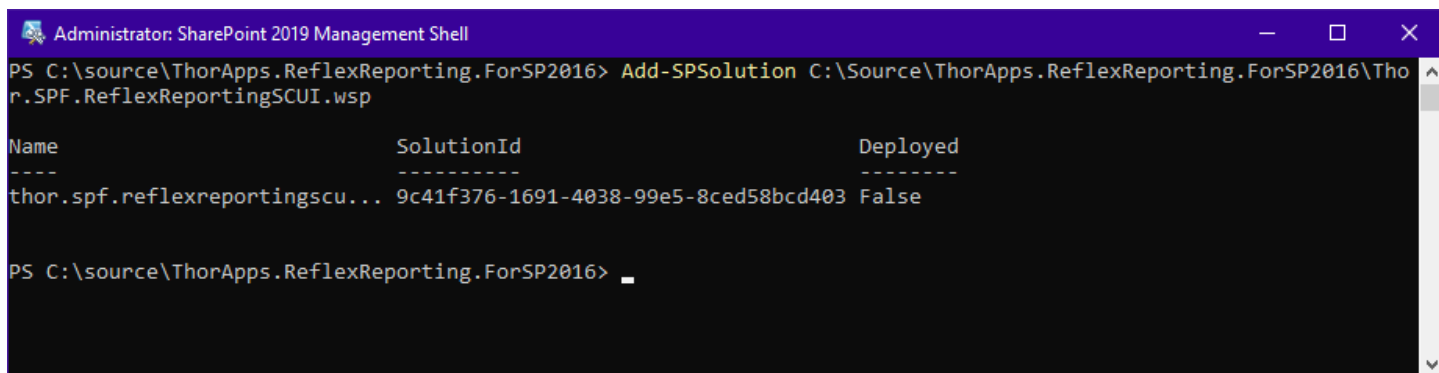
PS C:\source\ThorApps.ReflexReporting.ForSP2016> Add-SPSolution C:\Source\ThorApps.ReflexReporting.ForSP2016\Thor.SPF.ReflexReporting.wsp

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

PS C:\source\ThorApps.ReflexReporting.ForSP2016> _
```

[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 2019 Management Shell
PS C:\source\ThorApps.ReflexReporting.ForSP2016> Add-SPSolution C:\Source\ThorApps.ReflexReporting.ForSP2016\Thor.SPF.ReflexReportingSCUI.wsp

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

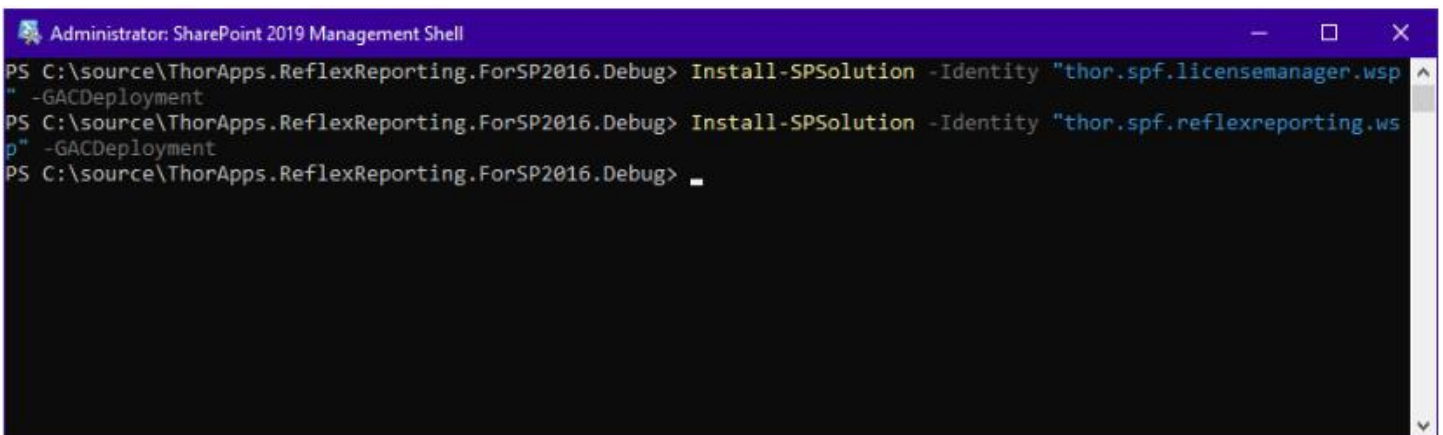
PS C:\source\ThorApps.ReflexReporting.ForSP2016> _
```

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

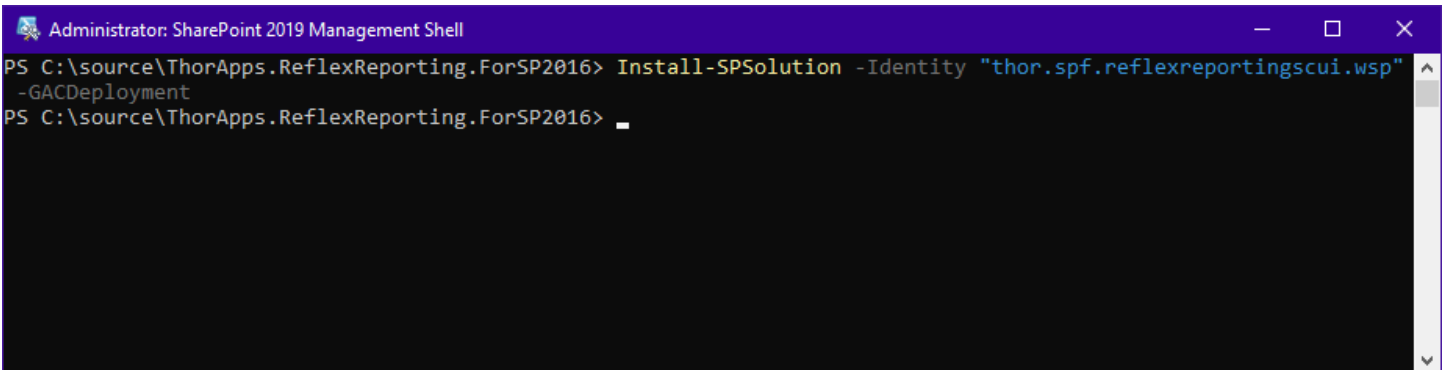
Use the PowerShell command “Install-SPSolution” with the -GACDeployment argument.



```
Administrator: SharePoint 2019 Management Shell
PS C:\source\ThorApps.ReflexReporting.ForSP2016.Debug> Install-SPSolution -Identity "thor.spf.licensemanager.wsp" -GACDeployment
PS C:\source\ThorApps.ReflexReporting.ForSP2016.Debug> Install-SPSolution -Identity "thor.spf.reflexreporting.wsp" -GACDeployment
PS C:\source\ThorApps.ReflexReporting.ForSP2016.Debug>
```

[Optional]

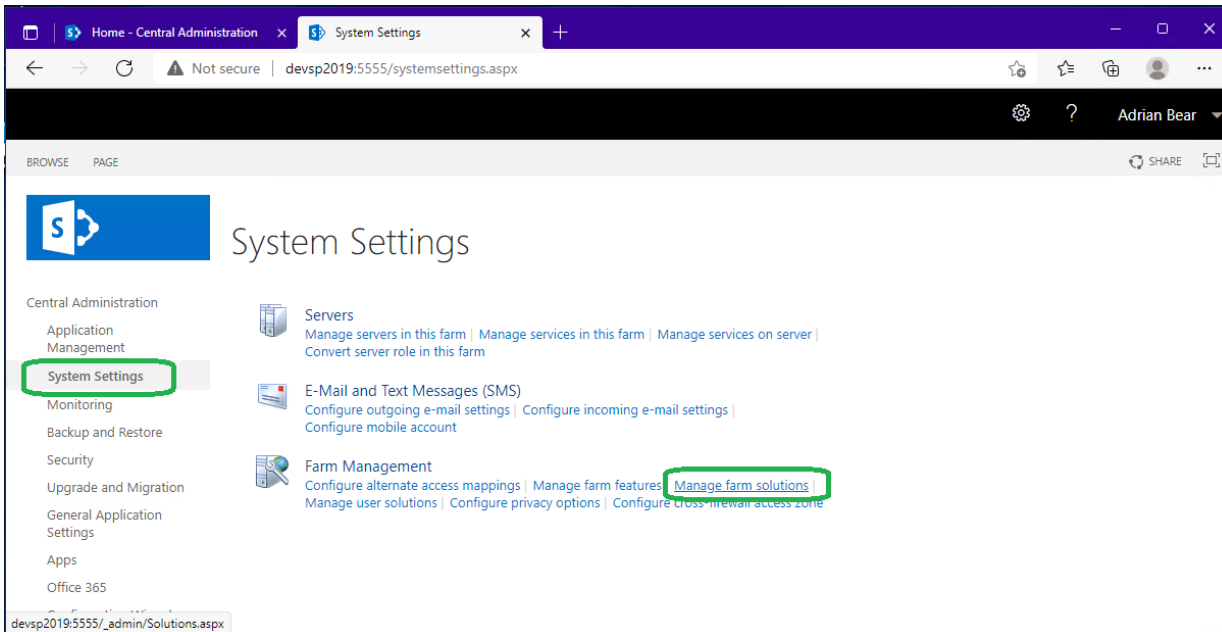
If you uploaded the “Thor.SPF.ReflexReportingSCUI.wsp” package, you’ll also want to deploy it.



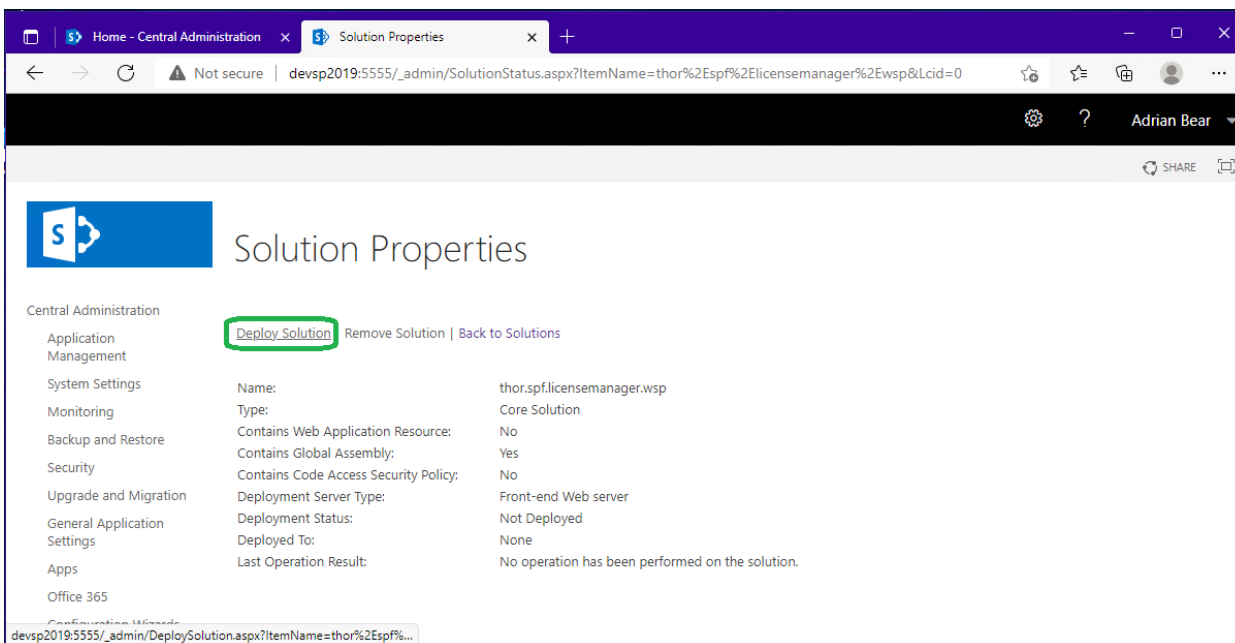
```
Administrator: SharePoint 2019 Management Shell
PS C:\source\ThorApps.ReflexReporting.ForSP2016> Install-SPSolution -Identity "thor.spf.reflexreportingscui.wsp" -GACDeployment
PS C:\source\ThorApps.ReflexReporting.ForSP2016>
```


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".



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

The screenshot shows a web browser window with the URL `devsp2019:5555/_admin/DeploySolution.aspx?ItemN...`. The page title is "Deploy Solution". On the left is a navigation menu with items like "Application Management", "System Settings", "Monitoring", "Backup and Restore", "Security", "Upgrade and Migration", "General Application Settings", "Apps", "Office 365", and "Configuration Wizards".

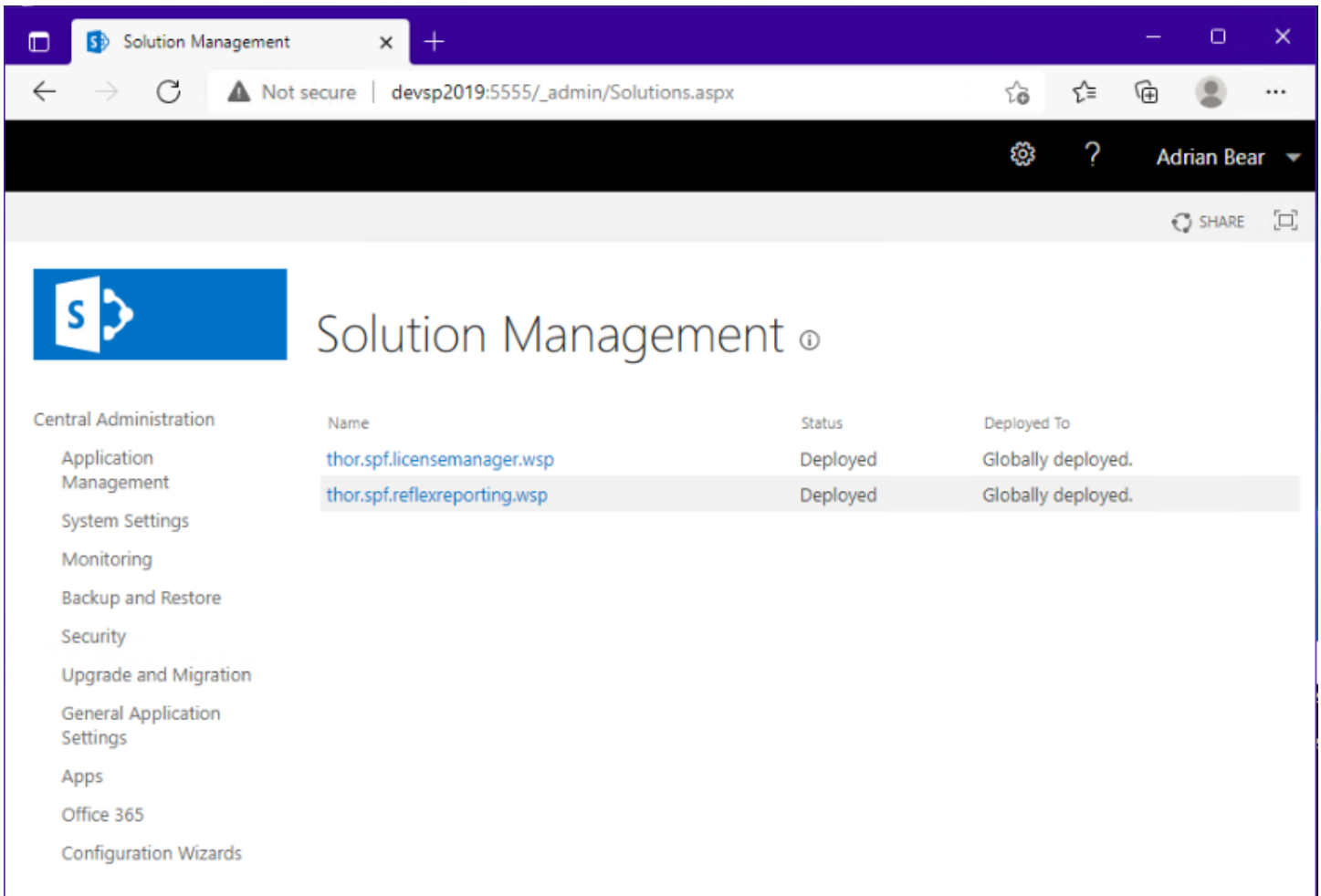
The main content area is divided into sections:

- Solution Information:** Name: thor.spf.licensemanager.wsp, Locale: 0, Deployed To: None, Deployment Status: Not Deployed.
- Deploy When?:** A timer job is created to deploy this solution. Please specify the time at which you want this solution to be deployed. Options: Now, At a specified time: 3/2/2022, 7 PM, 00.
- Deploy To?:** The solution contains no Web application scoped resource, and therefore cannot be deployed to a particular Web application. It can only be deployed globally.

A warning message is displayed: "Warning: Deploying this solution will place assemblies in the global assembly cache. This will grant the solution assemblies full trust. Do not proceed unless you trust the solution provider." At the bottom right, there are "OK" and "Cancel" buttons, with the "OK" button highlighted by a green box.

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 after install

After installing Reflex Reporting, it's a good idea to reboot all servers in the farm to ensure all services pickup the Reflex Reporting DLL's.

Reflex Reporting Configuration Database Setup

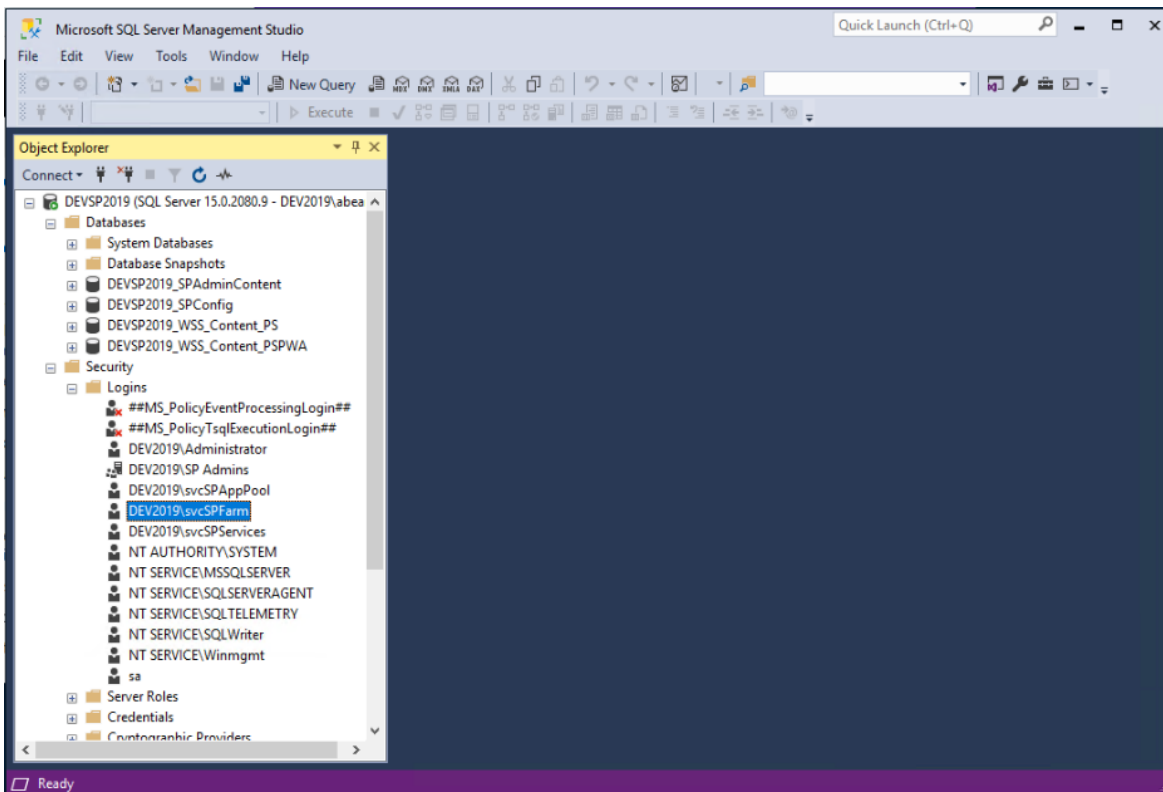
Reflex Reporting uses a Microsoft SQL database to store and manage the “Reporting Schemas” created. This database should be separate from the Reporting database you create in later steps, but can be re-used as a reporting if you desire. This database is referred to as either the Reflex Reporting “Configuration” or “Schemas” database.

The “Configuration” database can be either be 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 configured as a database owner on the empty database before starting these steps.

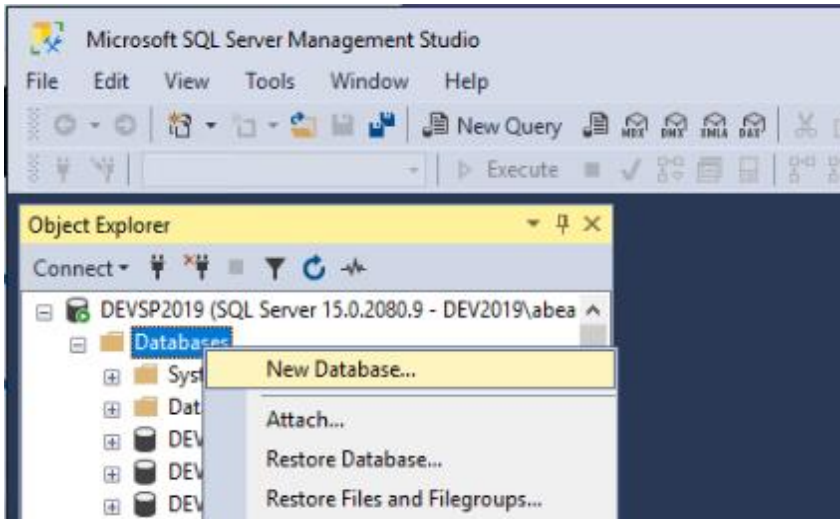
[Optional] Create a new blank database for Reflex Reporting Configuration

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

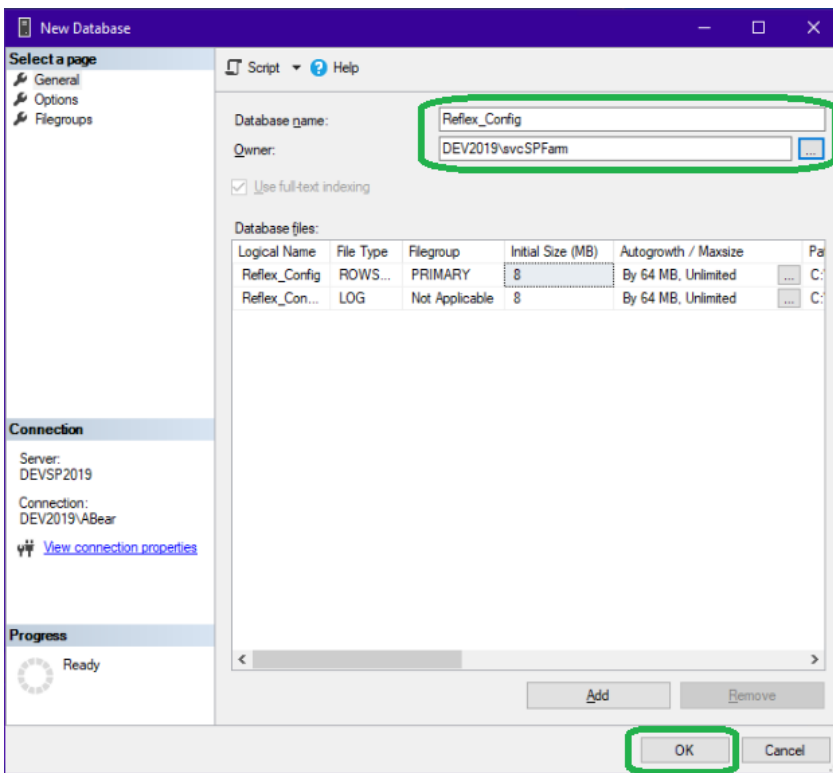
Open SSMS and connect to the server hosting the SharePoint databases. Take note, that the SharePoint Farm account is already configured as a user on this SQL server.



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

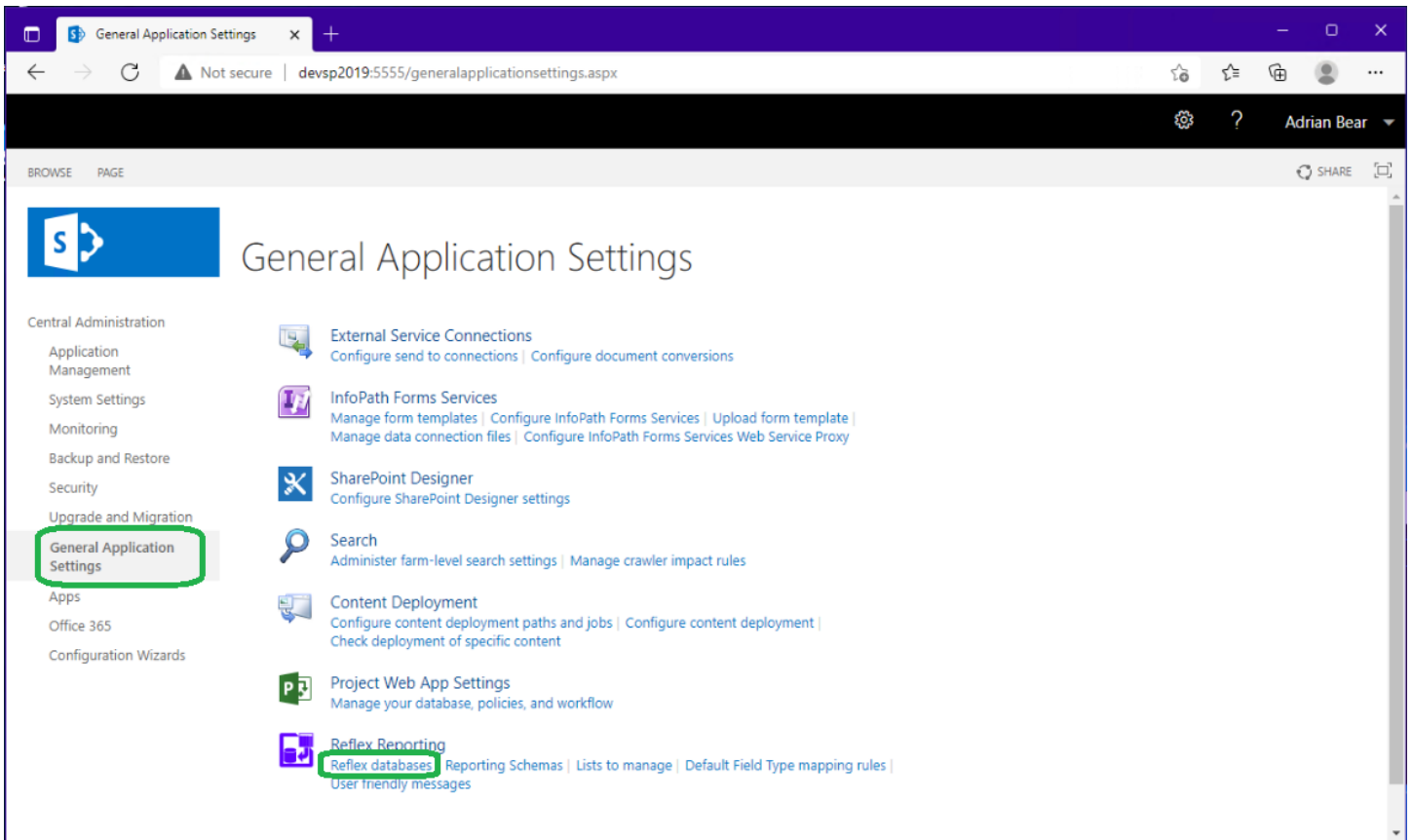


Enter a new “Database name”, set the “Owner” as the SharePoint farm account and click “OK”.



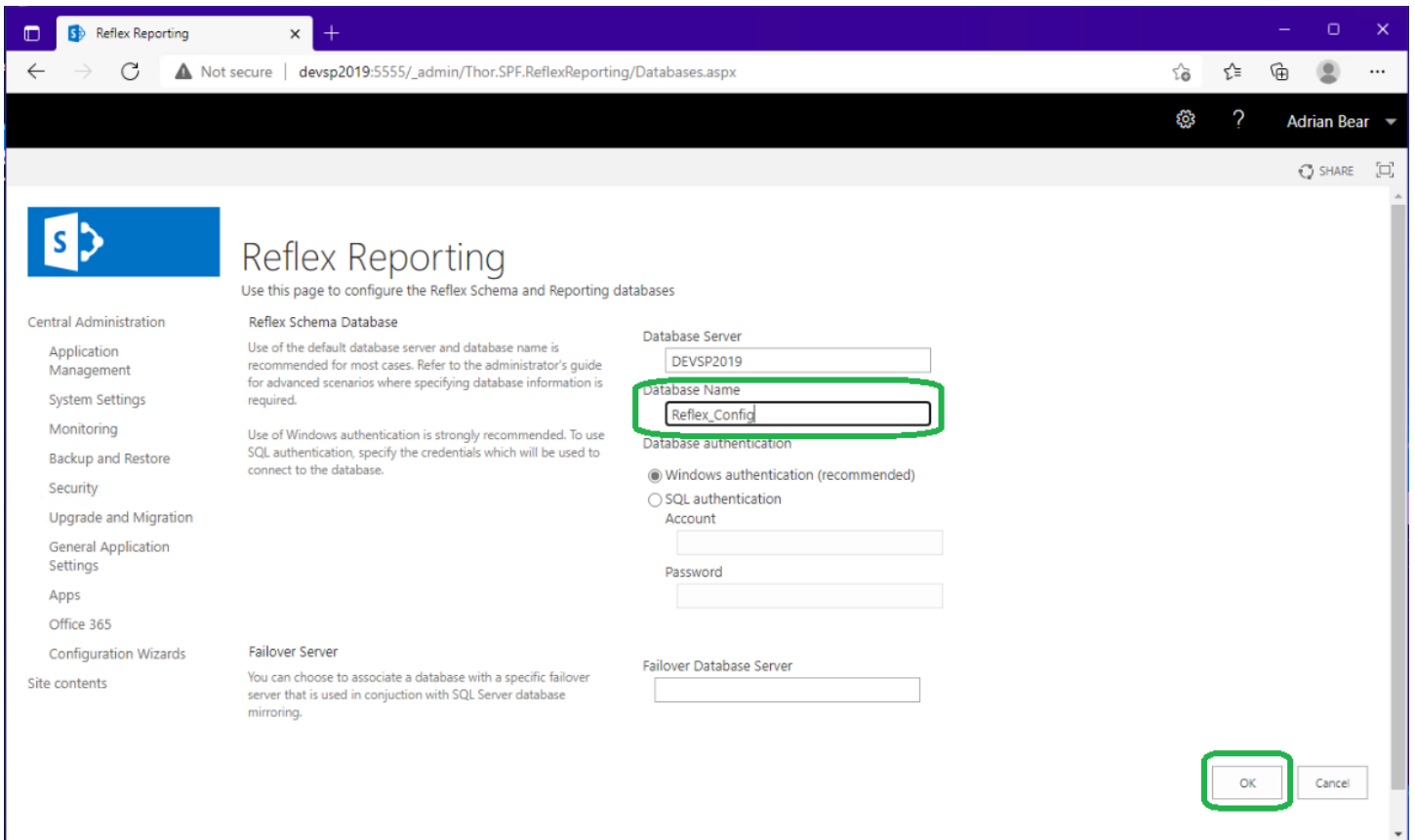
Return to SharePoint Central Administration and follow the next section.

Create (or attach) a Reflex Reporting Configuration database
From SharePoint Central Administration navigate to [General Application Settings]=>[Reflex
Databases].



Normally this page will display the list of Reporting databases, but when there is no configuration database setup, this page will prompt you to configure the Reflex Reporting configuration database.

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



The screenshot shows a web browser window with the URL `devsp2019:5555/_admin/Thor.SPF.ReflexReporting/Databases.aspx`. The page title is "Reflex Reporting" and the subtitle is "Use this page to configure the Reflex Schema and Reporting databases".

On the left, there is a navigation menu with the following items: Central Administration, Application Management, System Settings, Monitoring, Backup and Restore, Security, Upgrade and Migration, General Application Settings, Apps, Office 365, Configuration Wizards, and Site contents.

The main content area is titled "Reflex Schema Database" and contains the following sections:

- Reflex Schema 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." This section includes a "Database Server" field with the value "DEVSP2019" and a "Database Name" field with the value "Reflex_Config".
- Database authentication:** Includes radio buttons for "Windows authentication (recommended)" (selected) and "SQL authentication". Below are "Account" and "Password" input fields.
- Failover Server:** "You can choose to associate a database with a specific failover server that is used in conjunction with SQL Server database mirroring." This section includes a "Failover Database Server" input field.

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

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

Once it is finished it will display the normal, but empty, list of Reporting databases.

License Activation

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

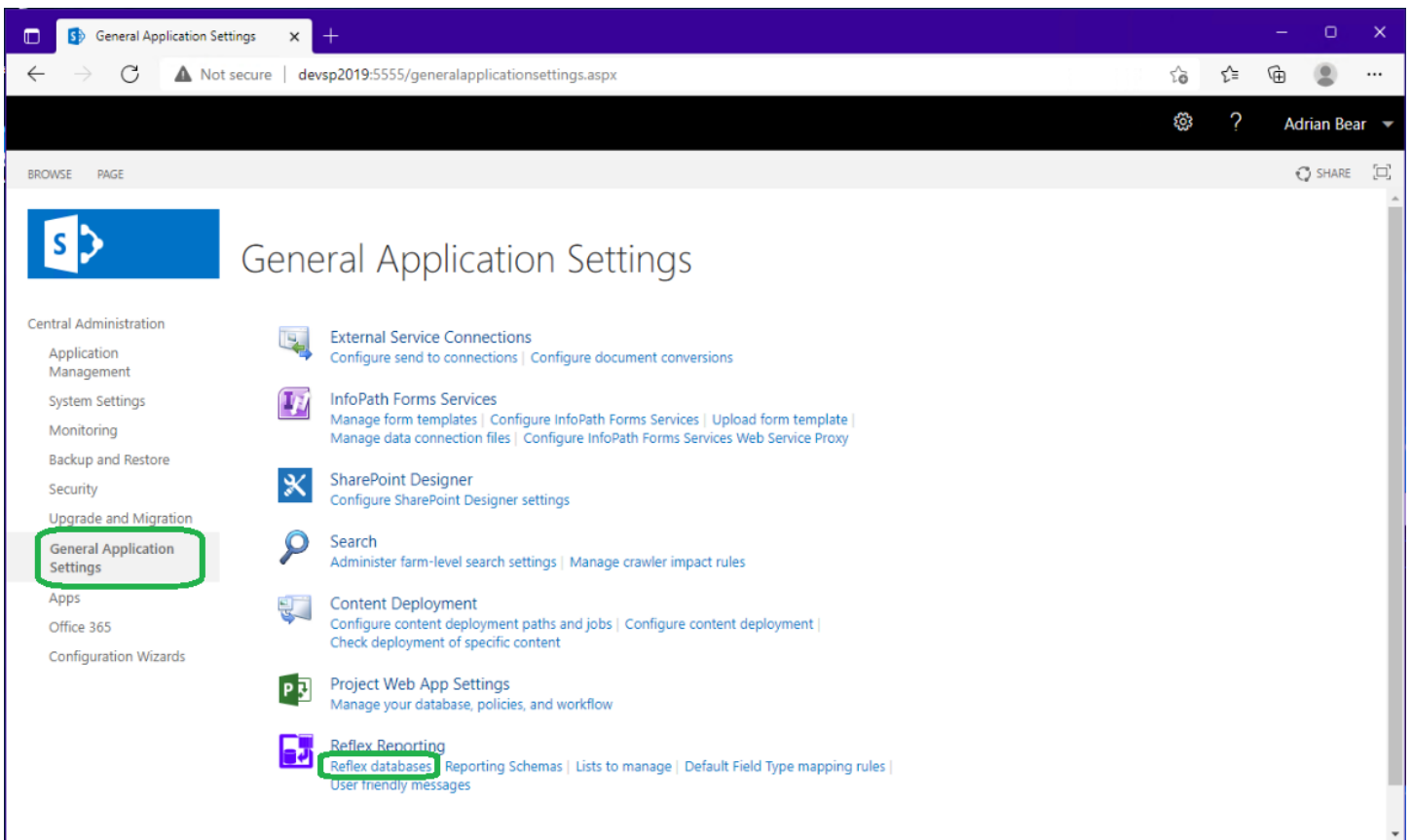
Configuration

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

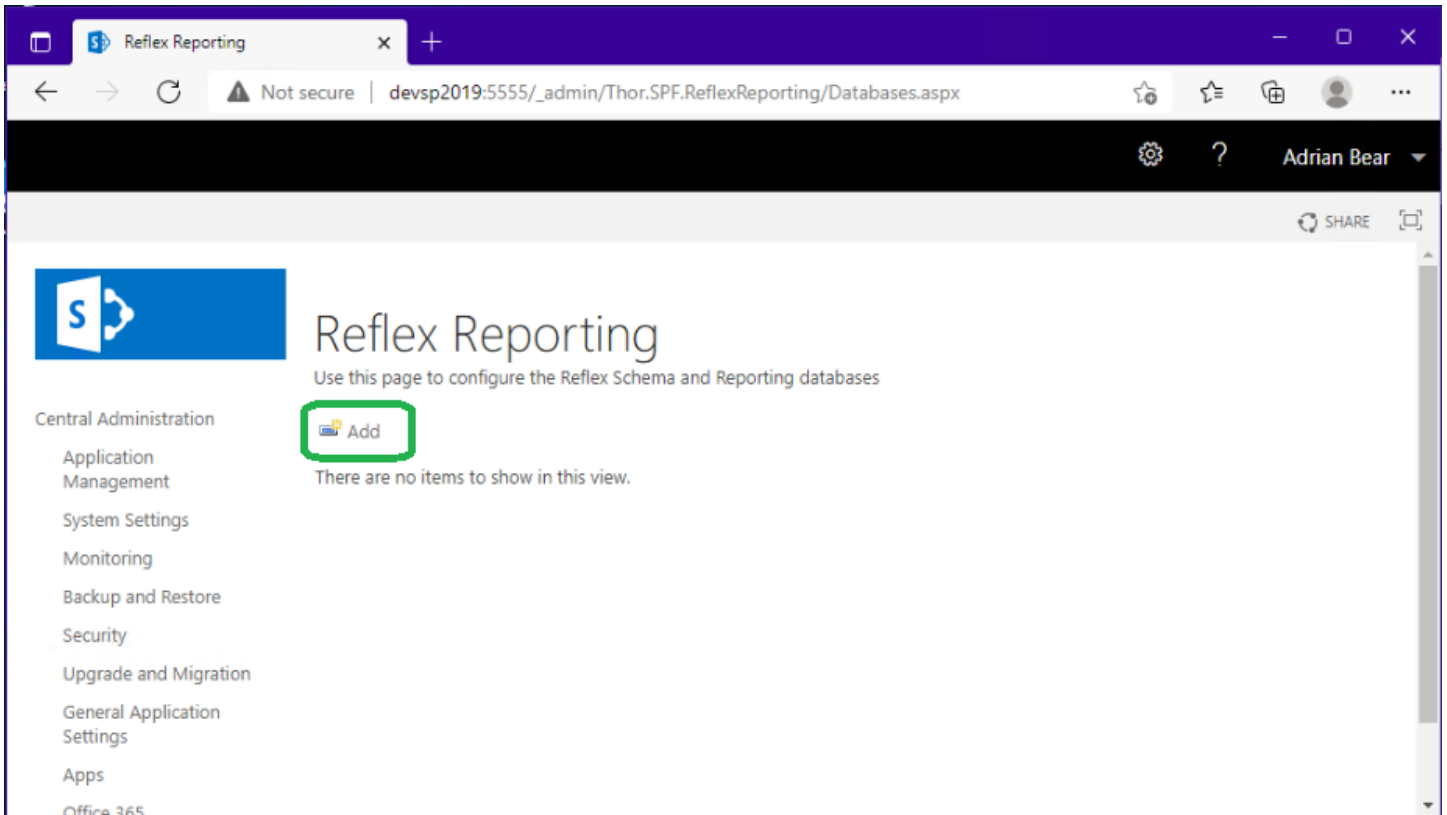
Create a Reflex Reporting database

Reflex Reporting allows you to setup multiple reporting databases 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).

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



If no reporting databases have been configured, you will be prompted to confirm the Reflex “Configuration” database settings. Simply click “OK” to proceed through to the (empty) list of Reporting databases and click the “Add” button.



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

Reflex Reporting

Use this page to define a Data database for Reflex Reporting. You will be able to use store List Data Tables in this database.

Reflex Reporting Database
Stores the Data extracted from SharePoint lists.

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.

Reflex Reporting Database
Use of Windows authentication is strongly recommended. To use SQL authentication, specify the credentials which will be used to connect to the database.

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

Display Name: Default

Database Server: DEVSP2019

Database Name: Reflex_ReportingData

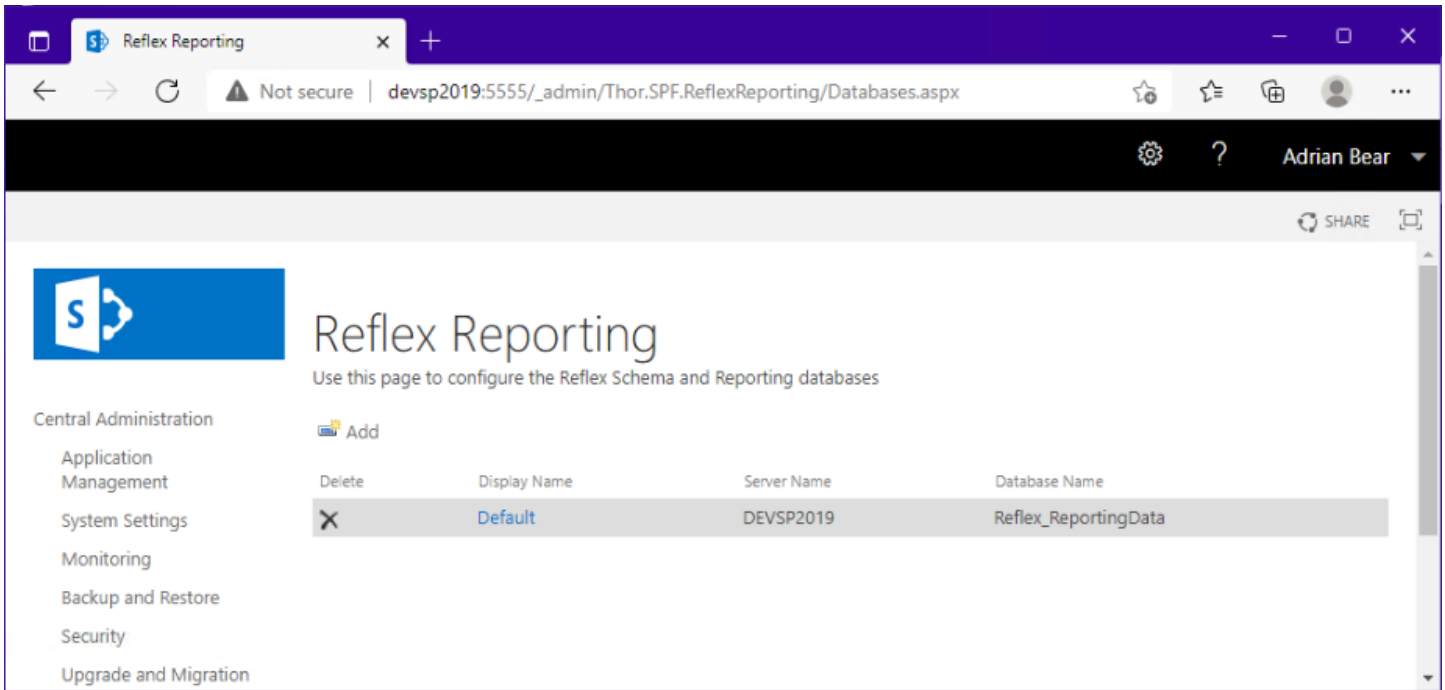
Database authentication:
 Windows authentication (recommended)
 SQL authentication

Account: [Empty field]
Password: [Empty field]

Failover Database Server: [Empty field]

OK Cancel

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



You can now configure Reporting Schemas and list/library mappings to populate this database.

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 the facility to manage reporting schemas and list data reflection from with 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**”.

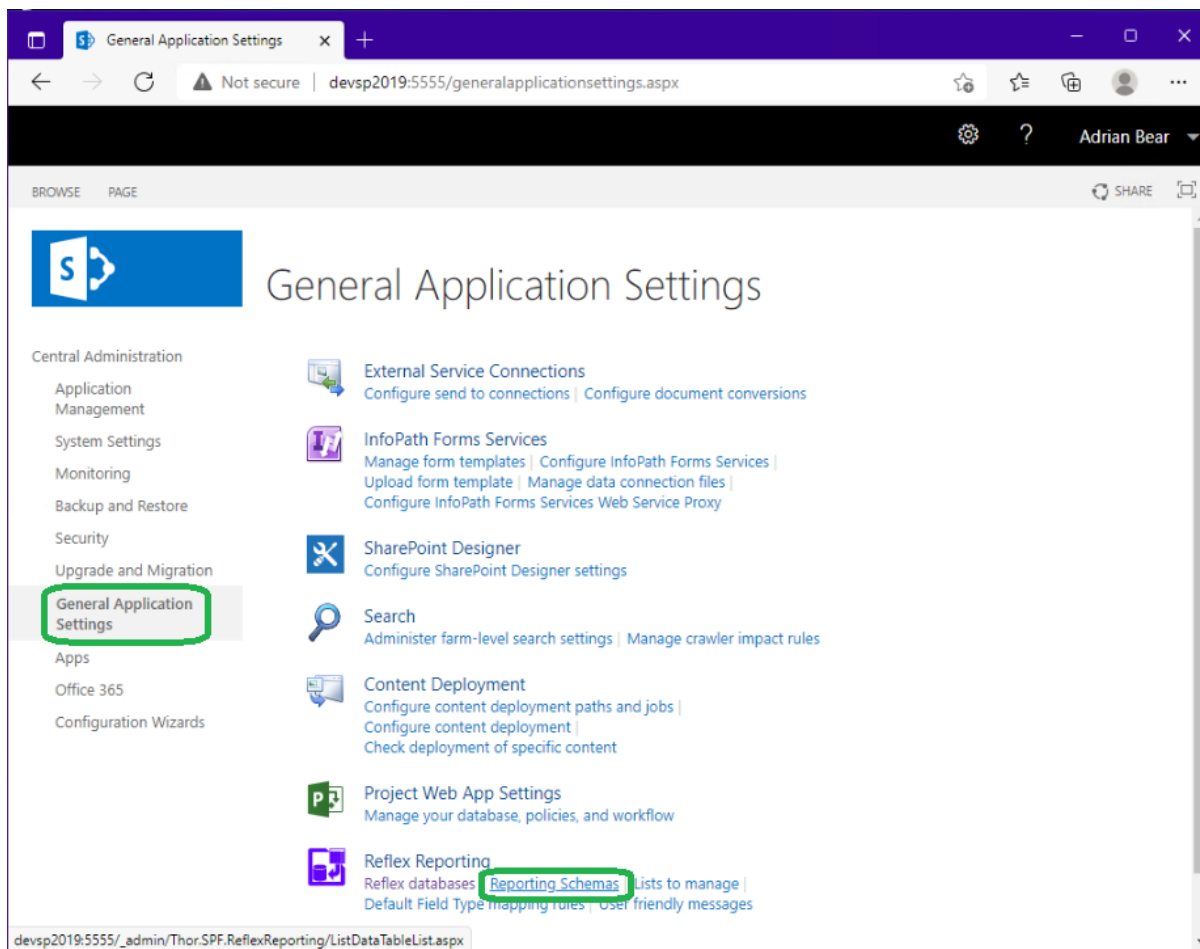
Reporting Schemas (Central Admin)

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 any custom indexes you may have added to it.

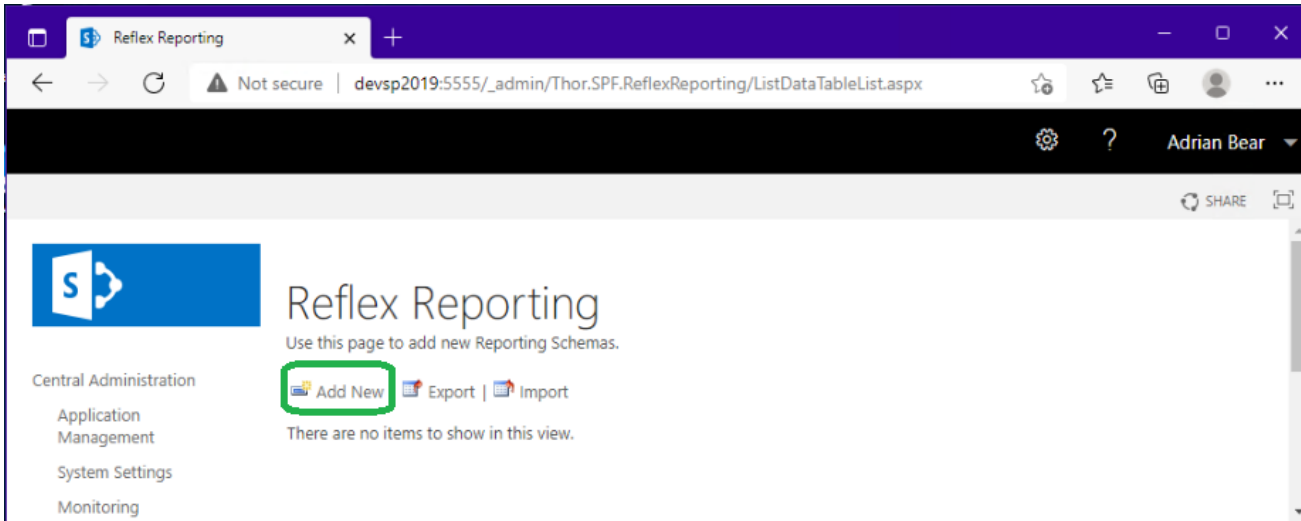
Reporting schemas are made up of a set of mapped fields (SQL fields to SharePoint List or Library fields). The fastest way to create a new reporting schema is to source the fields from a pre-existing SharePoint List (or Library).

Create a new Reporting Schema

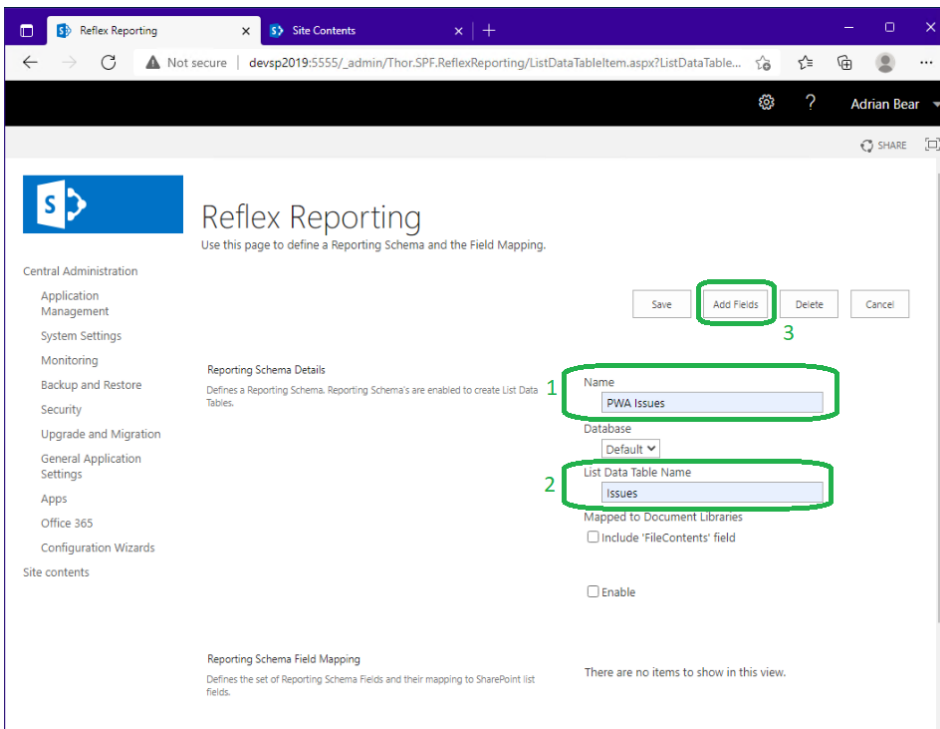
From SharePoint Central Administration, navigate to [General Application Settings]=>[Reporting Schemas].



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

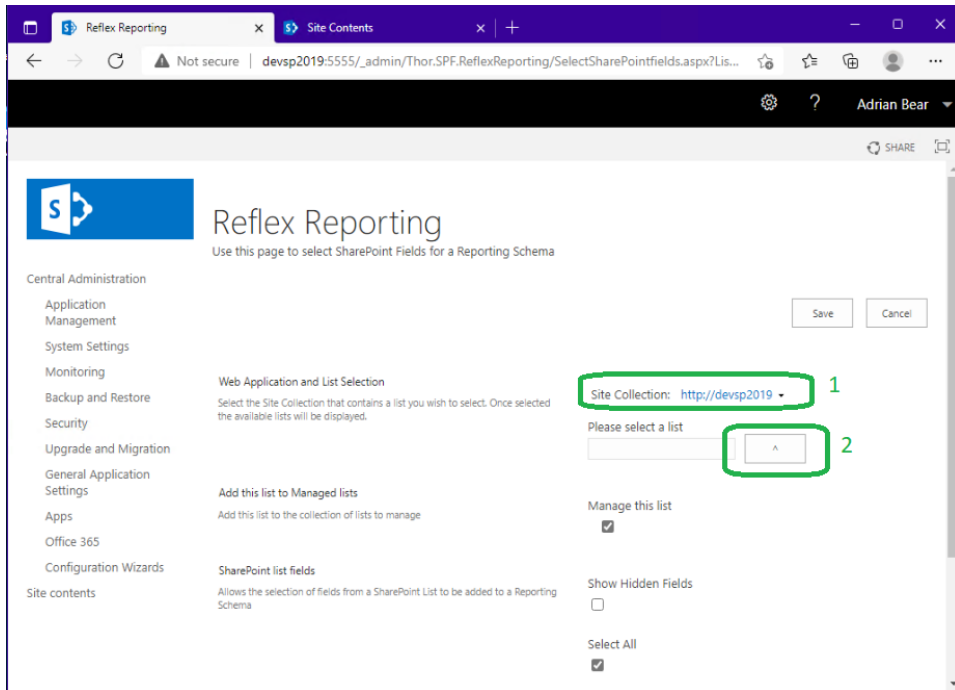


Enter a Name (this is the display name), a “List Data Table Name” (this will be used as the SQL table name) and click “Add Fields”.



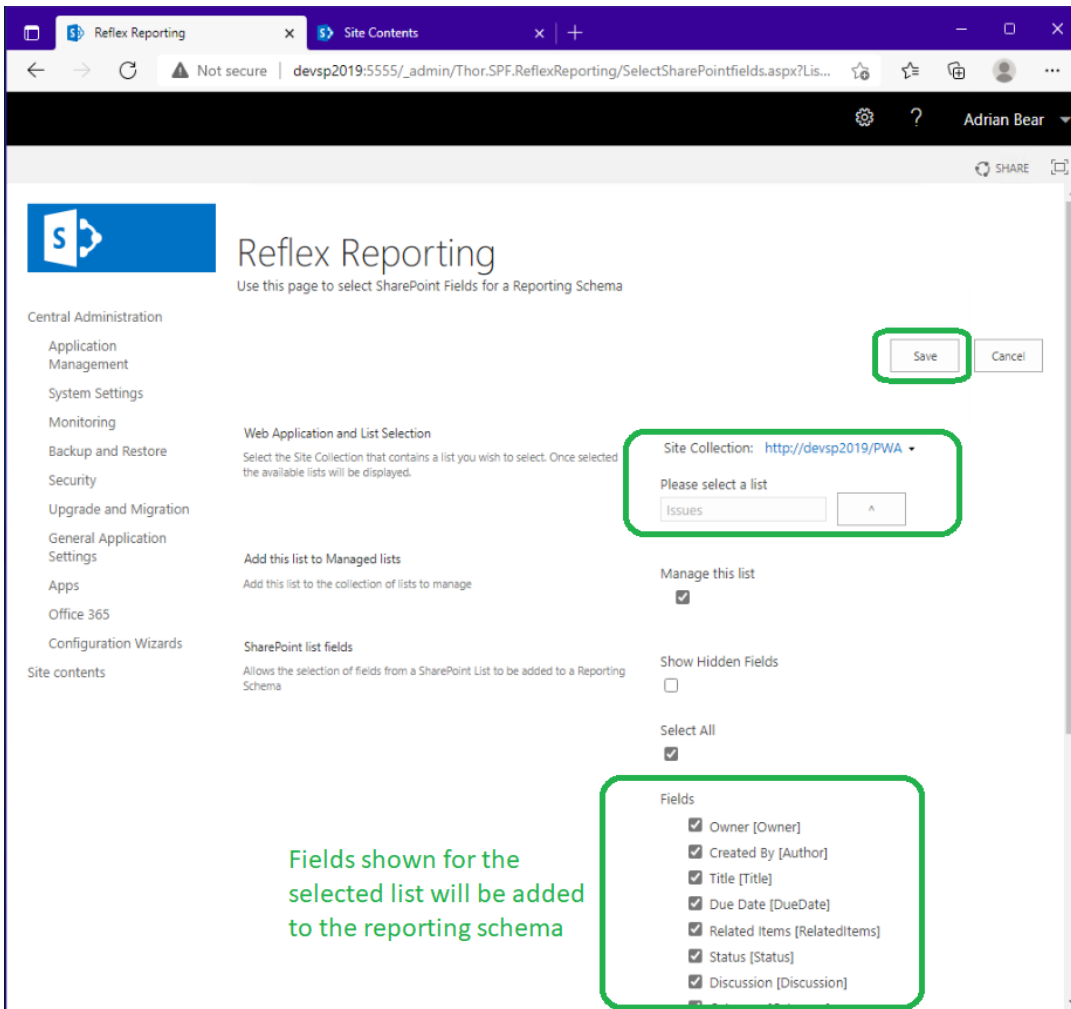
The “Add Fields” button takes you to a page to select a SharePoint List (or library) instance. The selected list instance will be used automatically generate the fields for the reporting schema.

Select a site collection that contains a list you want to extract report data from and then select the list from the List lookup.



Once you have selected a list, the “fields” section will be populated, and you can click “Save”.

If there are fields you do NOT want as part of your reporting schema, you can uncheck them here before clicking “Save”.



After clicking “Save” you will be returned to the Reporting Schema page. Here you can review the reporting schema fields before clicking “Enable”. Once enabled, the reporting schema design will be locked, and the SQL table created. The list instance used to select the fields for mapping will automatically have the Reflex Event Receivers added and the list instance mapped to the reporting schema. A job will have been created to reflect that list instances data into the SQL table (this may take a few minutes to run).

**** NOTE:** Only the list instance used to create the reporting schema has been configured. You still need to do some extra steps to sync/reflect the other list instances of a similar design in other sites. This is done through the “Lists to Manage” menu.

Reflex Reporting

Use this page to define a Reporting Schema and the Field Mapping.

Central Administration

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

Reporting Schema Details

Defines a Reporting Schema. Reporting Schema's are enabled to create List Data Tables.

Name: PWA Issues

Database: Default

List Data Table Name: Issues

Mapped to Document Libraries

Include 'FileContents' field

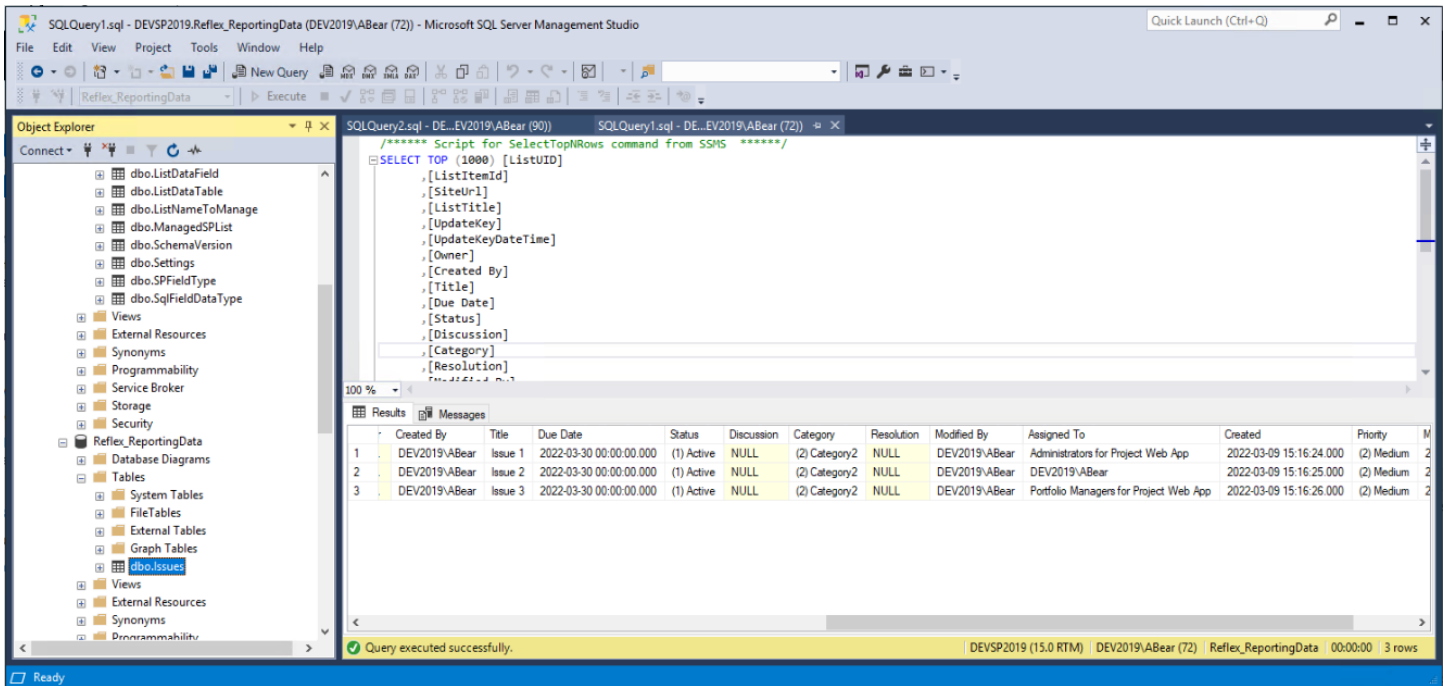
Enable

Reporting Schema Field Mapping

Defines the set of Reporting Schema Fields and their mapping to SharePoint list fields.

| Delete | Field Name | Field Type | SharePoint Field Name | SharePoint Field Type |
|--------|------------|--------------|-----------------------|------------------------|
| | Owner | varchar(255) | Owner | Person or Group |
| | Created By | varchar(255) | Author | Person or Group |
| | Title | varchar(255) | Title | Single line of text |
| | Due Date | datetime | DueDate | Date and Time |
| | Status | varchar(255) | Status | Choice |
| | Discussion | ntext | Discussion | Multiple lines of text |
| | Category | varchar(255) | Category | Choice |

If at this point you open SQL Server Management Studio (SSMS) and Open the Reflex Reporting database, you will now 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 next step is to review the automatically created mapping entry (in the section [Lists to Manage]) and add event receivers so that all list instances with the same Title in the site collection will be “hooked up” and processed.

Edit a Reporting Schema

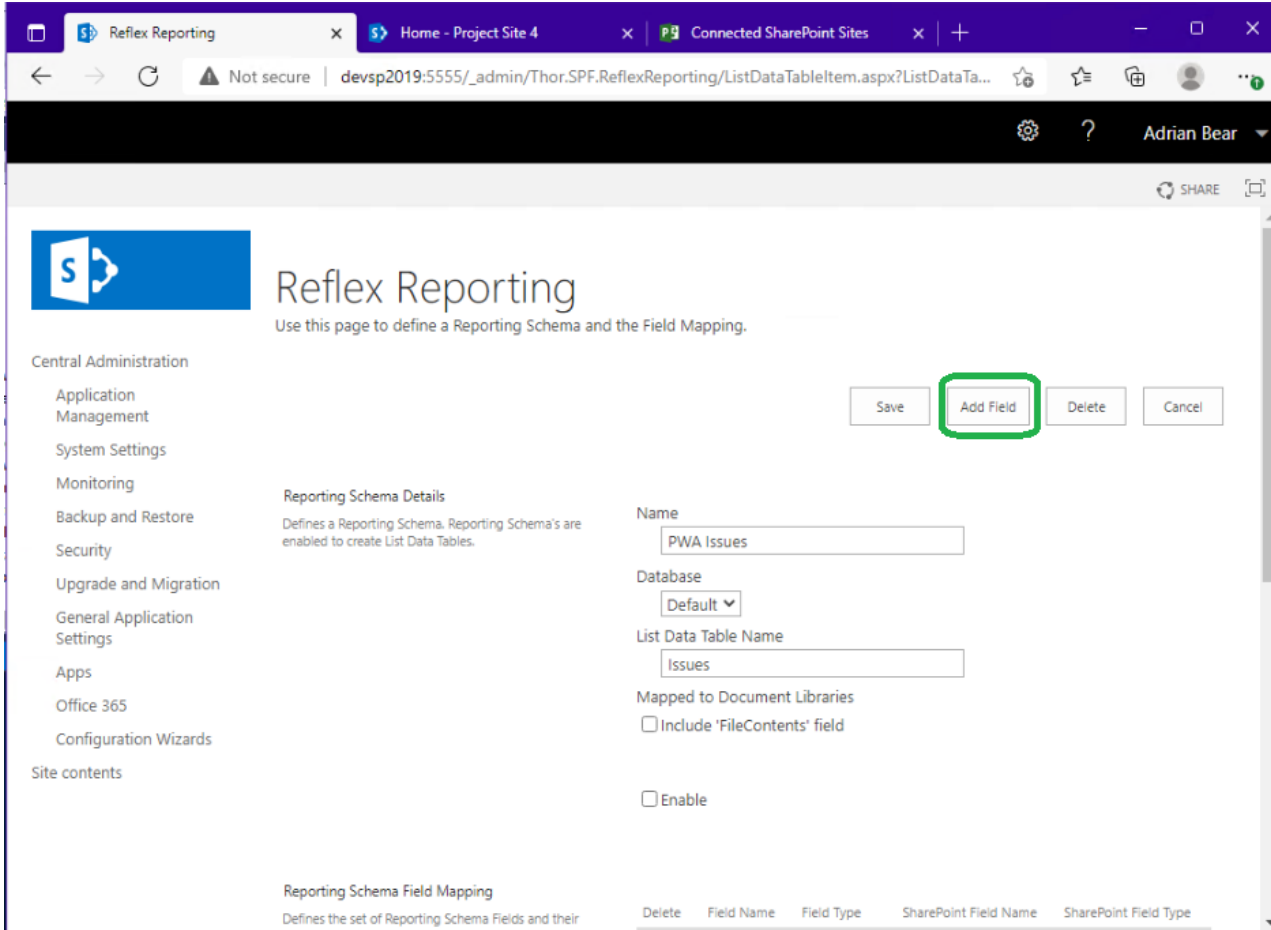
To edit a reporting schema, you must first "disable" it.

**** NOTE **** Disabling a reporting schema WILL DROP its related SQL table from the reporting data. 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.

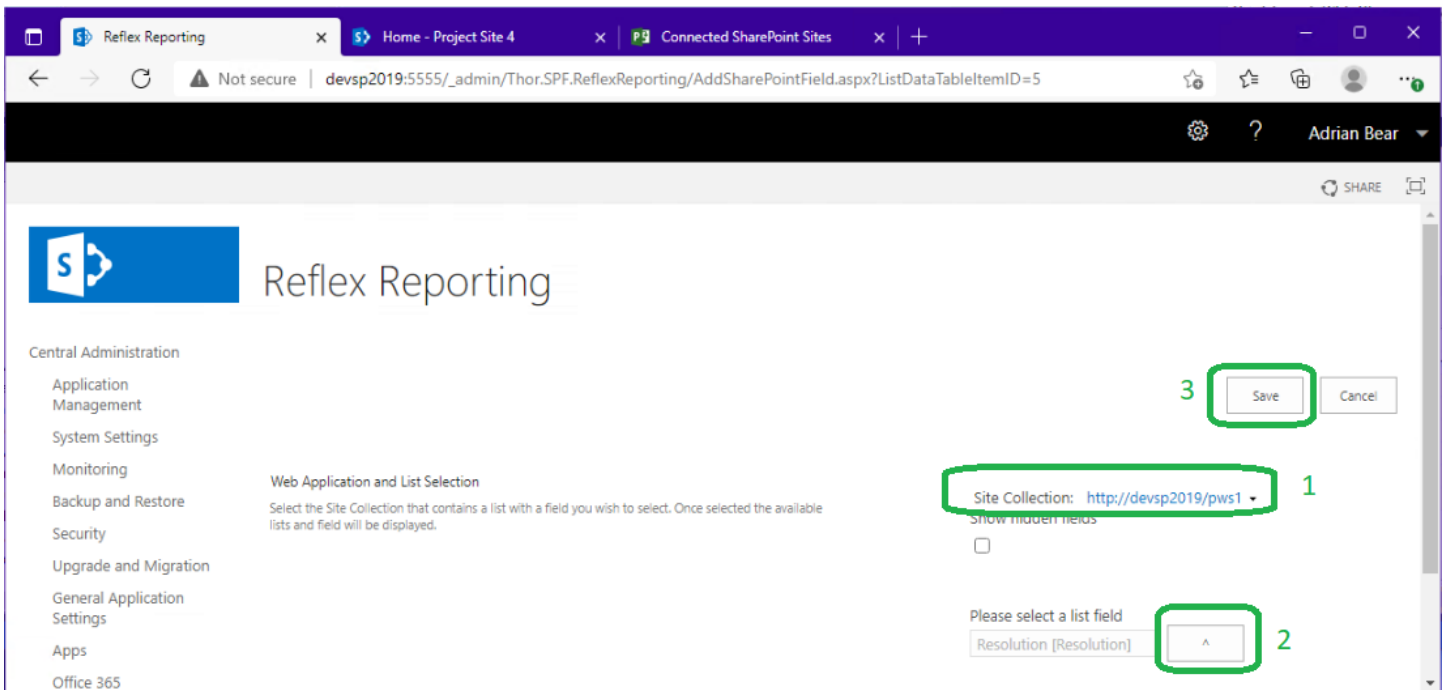
From SharePoint Central Administration navigate to [General Application Settings]=>[Reporting Schemas] and click the reporting schema you want to edit. Then uncheck the "Enable" box.

The screenshot displays the 'Reflex Reporting' configuration page in SharePoint Central Administration. The page title is 'Reflex Reporting' with the subtitle 'Use this page to define a Reporting Schema and the Field Mapping.' The left sidebar shows the navigation menu with 'General Application Settings' selected. The main content area is divided into 'Reporting Schema Details' and 'Reporting Schema Field Mapping'. In the 'Reporting Schema Details' section, the 'Name' field is 'PWA Issues', the 'Database' is 'Default', and the 'List Data Table Name' is 'Issues'. The 'Mapped to Document Libraries' section has an unchecked checkbox for 'Include 'FileContents' field'. The 'Enable' checkbox is checked and highlighted with a green box. A 'Cancel' button is located in the top right corner of the main content area.

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



The reporting schema “Add Field” page allows you to select a field from any list in any site from any site collection, but it’s a really good idea to pick the field from a list 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.



Click “Save”.

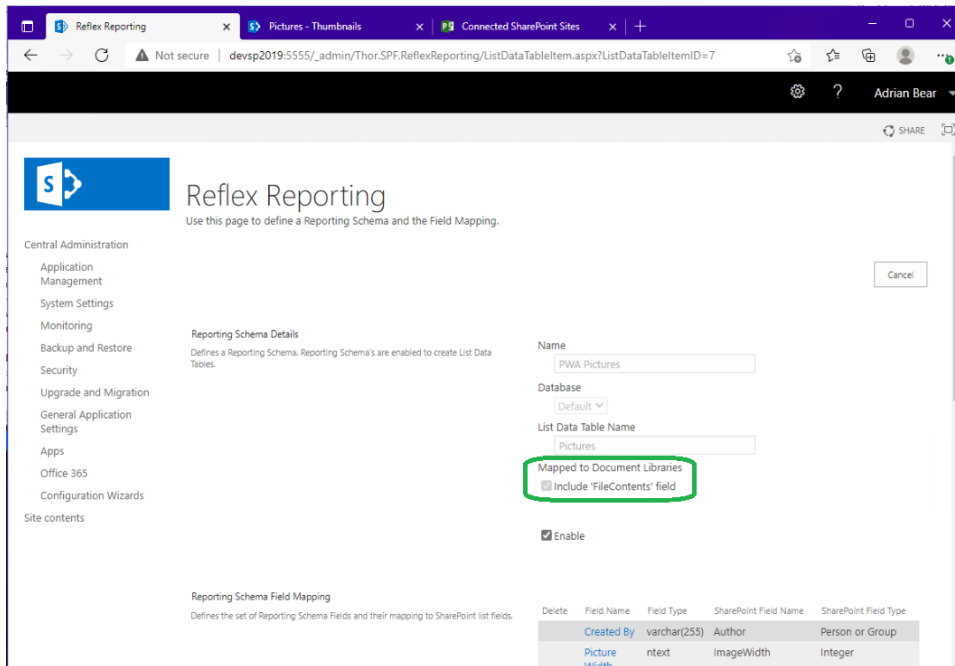
Once you have added the new field, you will be returned to the reporting schema edit page. Here you can click “Enable” to re-create the SQL table.

**** Note **** Because the SQL table was dropped, there will be no data. You can either wait for the daily timer job to re-sync all the data into the SQL table or you can manually kick off the daily job immediately (see the section [Trigger a Full Sync (Process All)]).

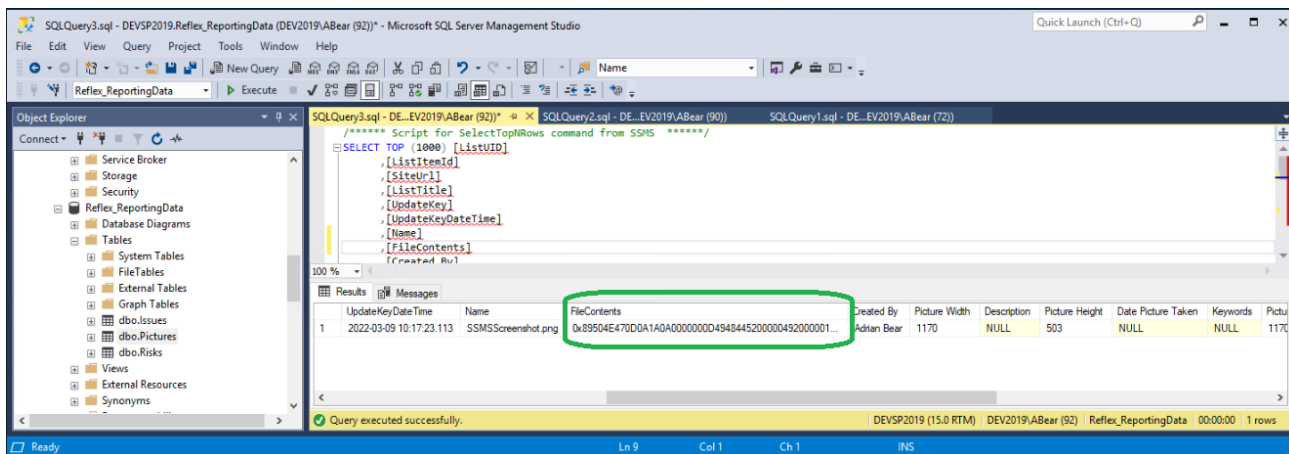
Reflecting Document/Picture Libraries

Reflex Reporting supports the reflection of document libraries. This is most helpful when Pictures you want to use in reporting 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 "Mapped to Document Libraries" in the reporting schema. This will add a binary data field to the SQL table called "FileContents".



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



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 (List to Manage)
3. The Reflex Reporting event receivers attached to the list

Make sure any new sites are created from a site template, that includes the Reflex Reporting Event Receivers attached the required lists. Otherwise, the content from new sites will not be reflected into SQL.

Reflex Jobs

Many tasks in Reflex Reporting are processed through background jobs. The progress of jobs can be monitored in the Reflex Reporting configuration database in a table called "dbo.Jobs". Do not edit the content of this table, but you may view it just to check that jobs are processing. Keep in mind jobs are processed by one-time SharePoint timer jobs and may take up to 5 minutes to start. Jobs will trigger child jobs, so the list of jobs may grow. Reflex reporting automatically manages this table and will clean-up old jobs by deleting them.

Lists to Manage

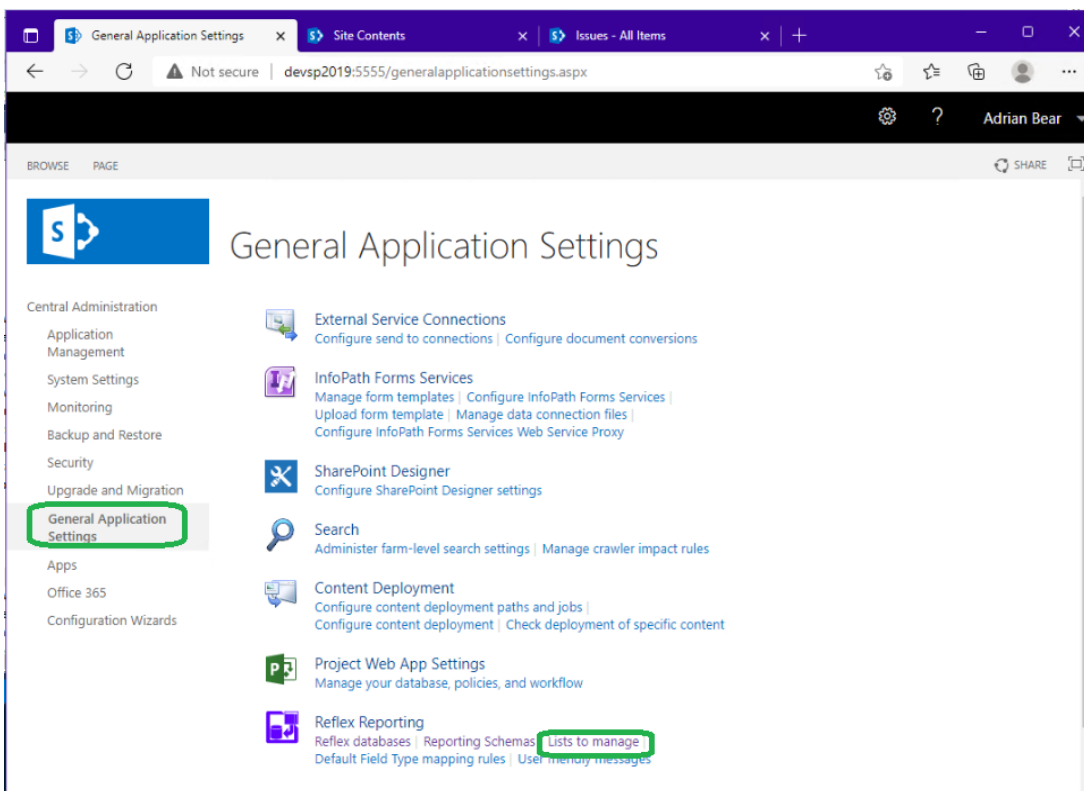
The “Lists to Manage” pages allow you to manage the mappings between reporting schemas, site collections and lists (by Title). It also provides a mechanism to add the Reflex Reporting event receivers to list instances.

In the last step, an entry in “Lists to Manage” was created by default for the list used to create the reporting schema, however, this only added the event receivers to that single list instance.

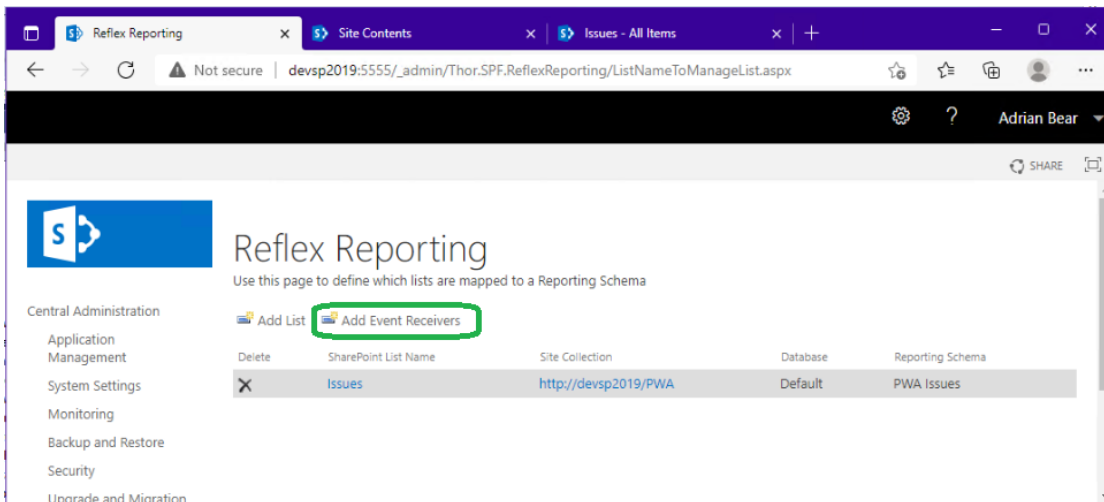
To reflect the items from all list instances with that same title in the site collection, requires you to also add the add the Reflex Reporting Event Receivers to the list instances.

Add Event Receivers

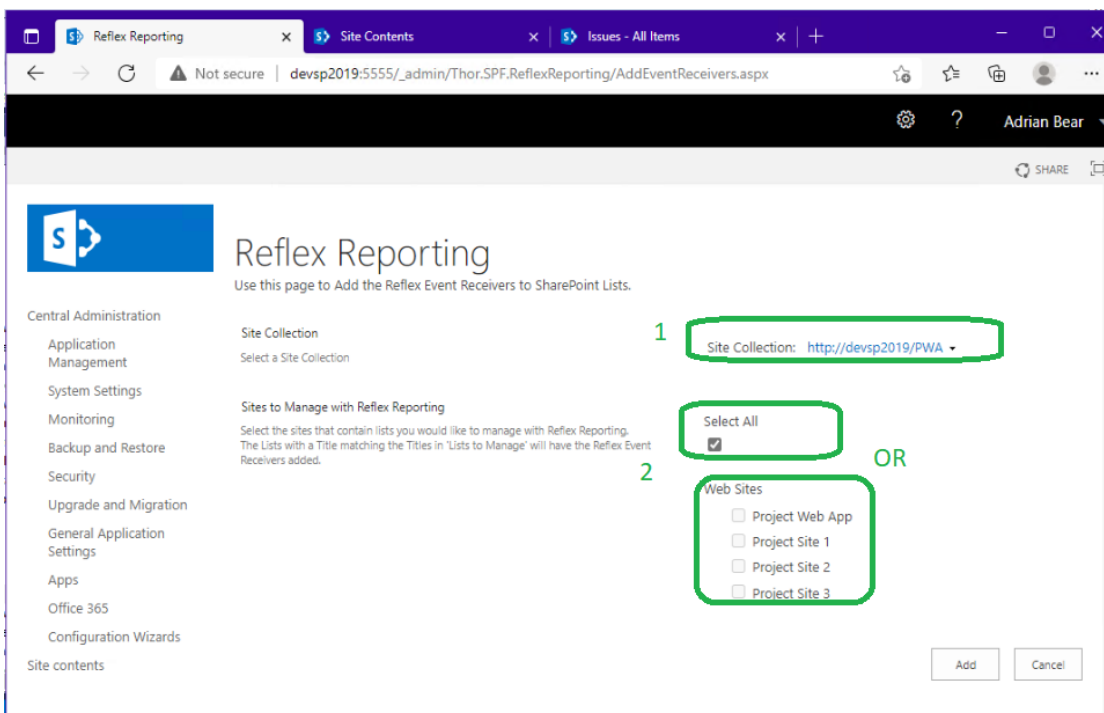
To add the event receivers to the mapped lists in a site collection, from SharePoint Central Administration, navigate to [General Application Settings]=>[Lists to Manage]



Within the “Lists to Manage” page, click the “Add Event Receivers” button.



On the “Add event receivers” page, select the site collection and sites that contain the lists you want to add the event receivers to and click “Add”.



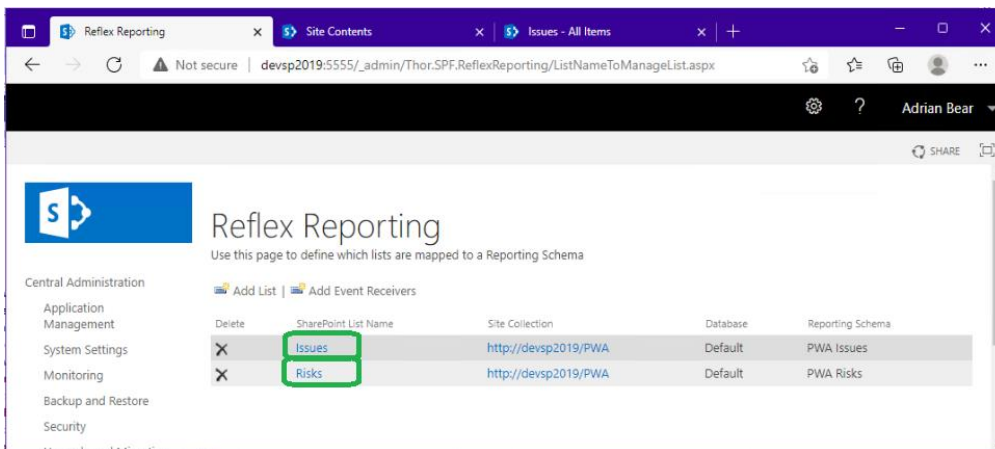
This will cycle through each of the selected sites and add the event receivers. If there are lots of sites, it may take a few minutes.

While this will have added the event receivers to the lists, it will not have kicked off a job to reflect the list items. So, after adding event receivers, you need to click through each list title and kick off a “Process Now”.

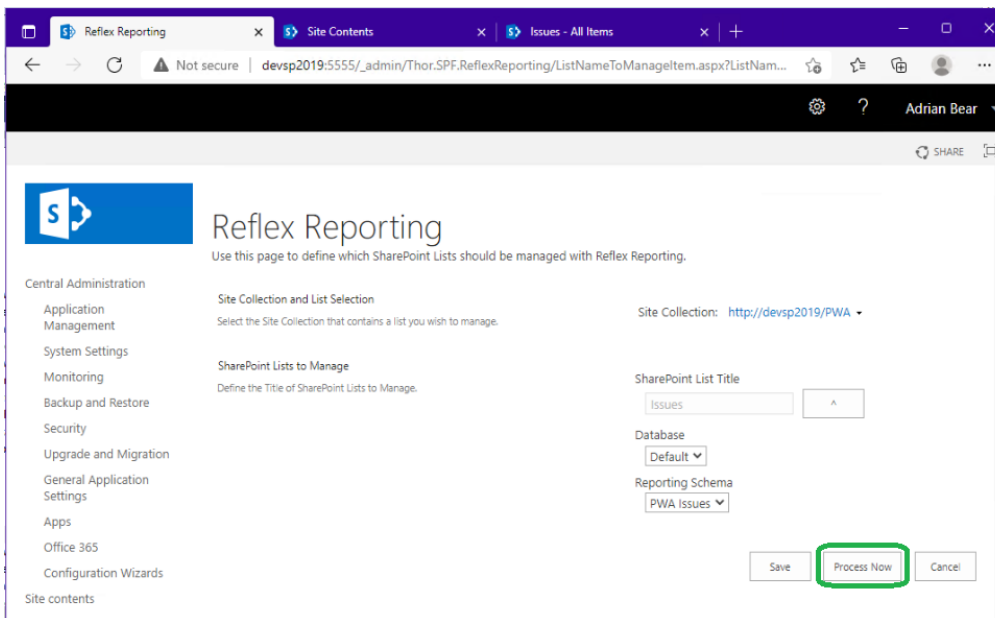
Manually trigger a sync/reflect job for lists

From SharePoint Central Administration navigate to [General Application Settings]=>[Lists to Manage].

For each mapping to process, click the “List Title”.

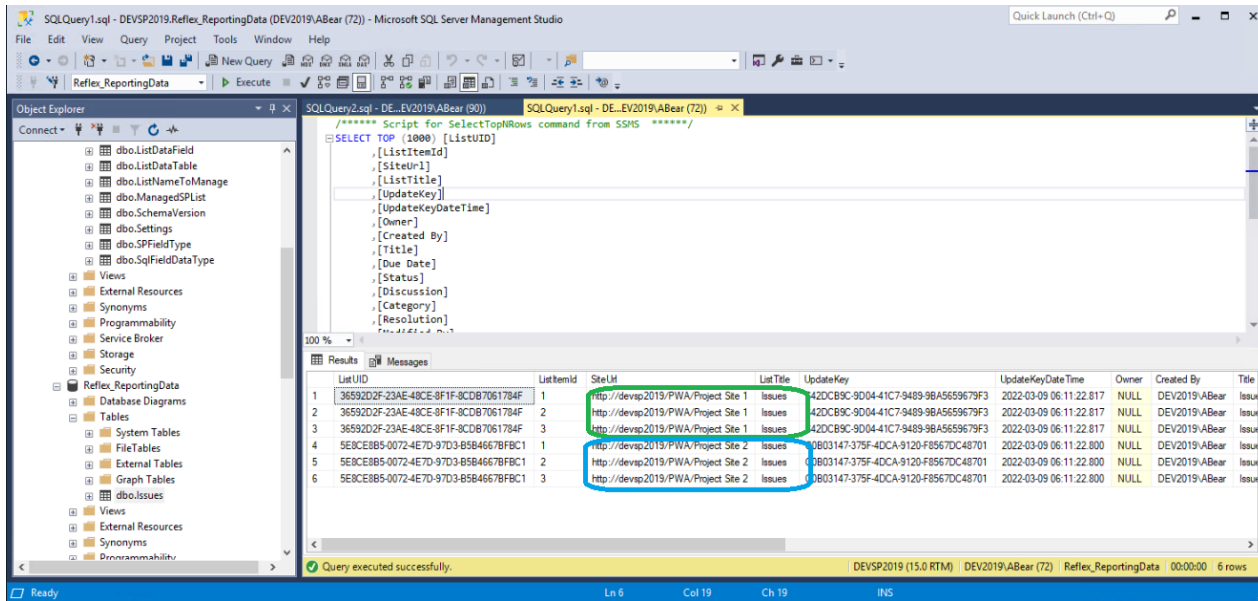


On the List mapping page, click “Process Now”.



This will kick off a background job to sync/reflect the mapped list's items into SQL.

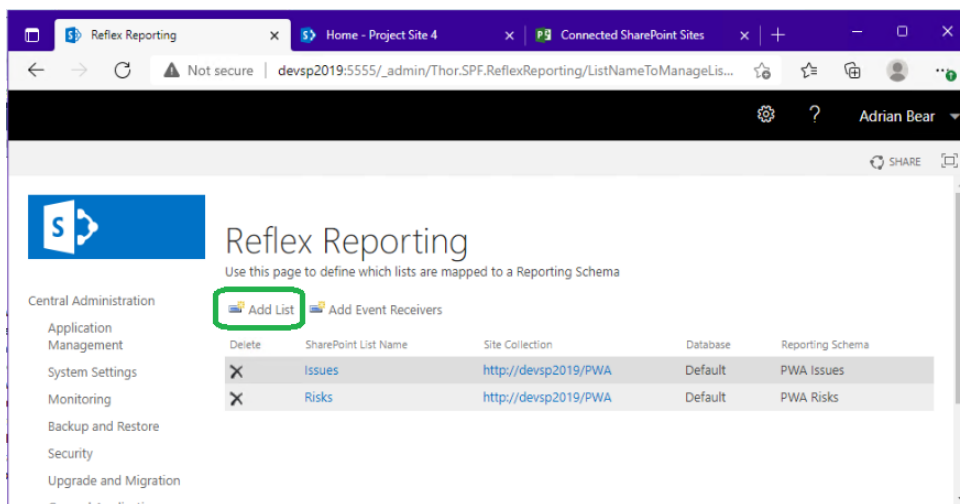
Once the background job to sync/reflect list items has finished, you should see the list item data from multiple sites in your SQL tables.



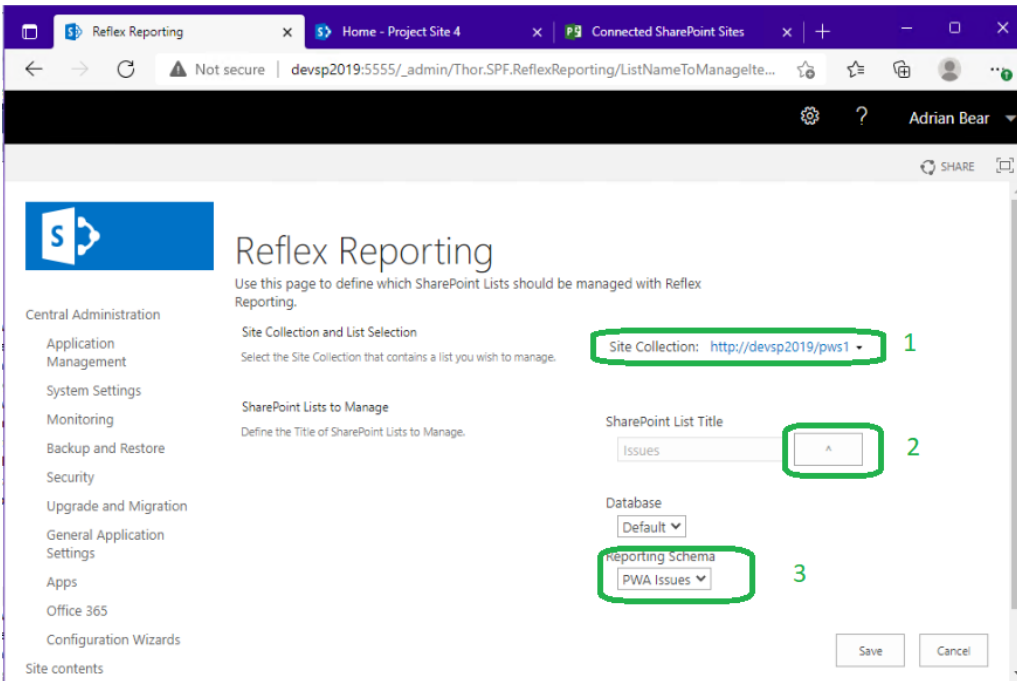
Mapping additional site collections

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 the “Lists to Manage” page.

From SharePoint Central Administration navigate to [General Application Settings]=>[Lists to Manager] and click “Add List”.

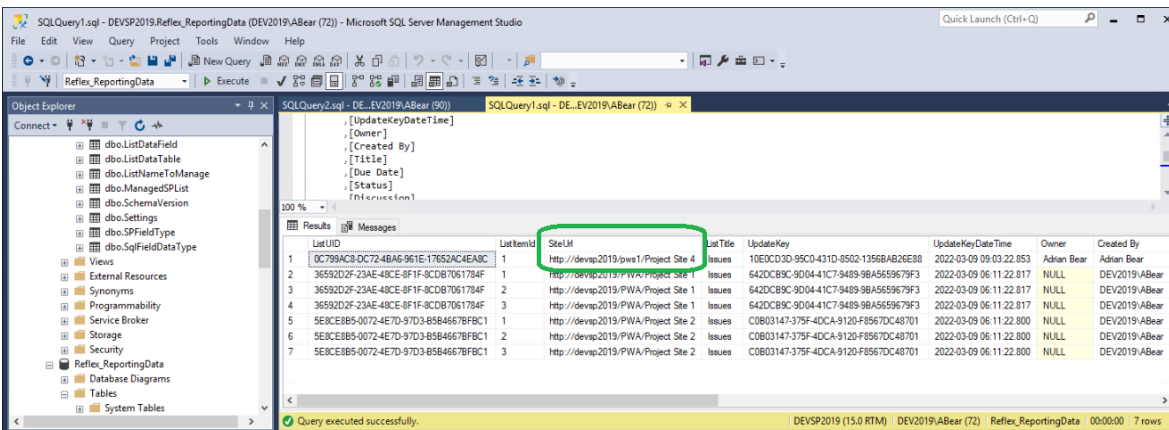


On the Lists to Manage, Add List page, select the alternate Site Collection, pick your List and the reporting schema you want to map the list title to.



Click "Save".

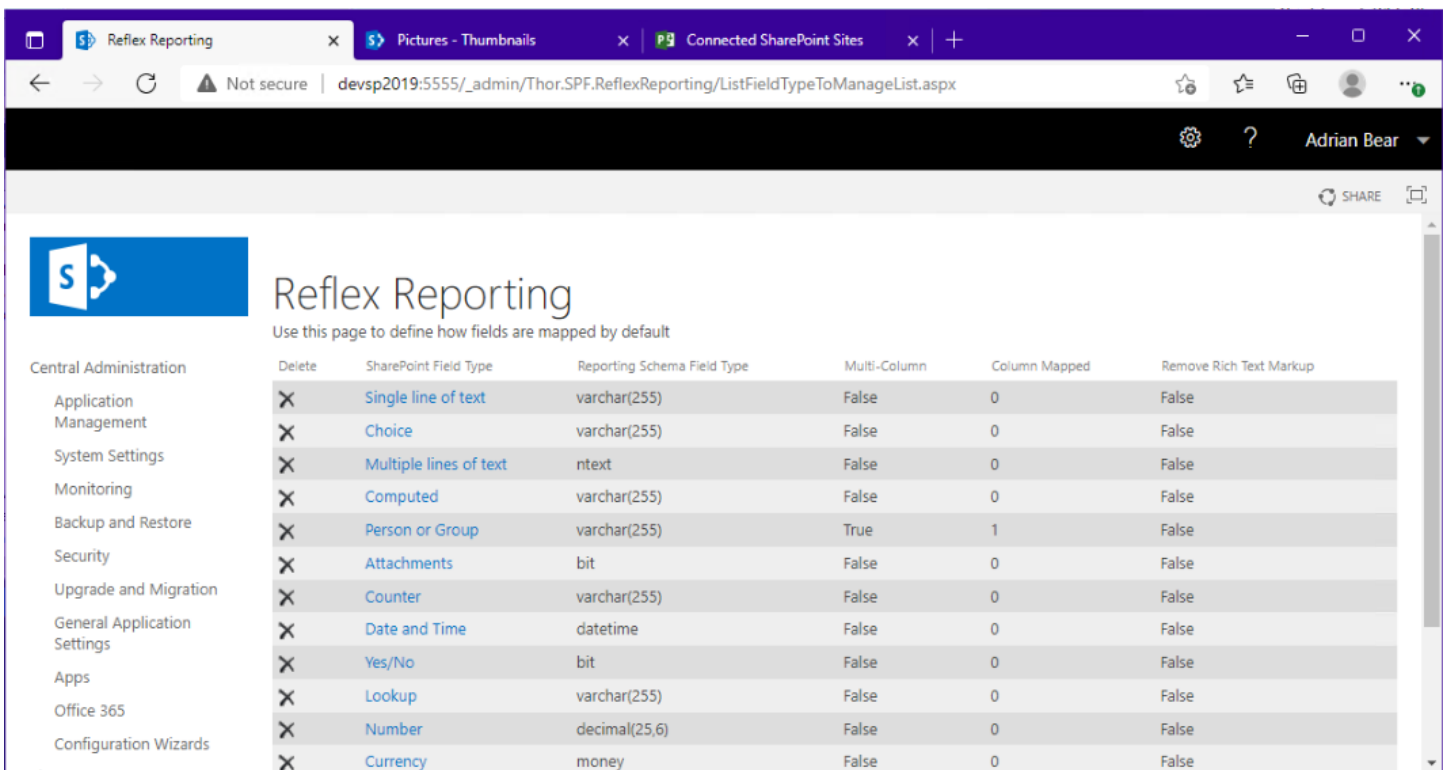
**** Note**** Adding a new list mapping, does not add event receivers or trigger the list to be synced/reflected. You need to again click "Add Event Receivers", wait for that to finish, and click into the new list mapping again to "Process Now". Once the sync/reflection job has completed, you will be able to see the data in SQL.



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 defaults can be changed or added to.

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



| Delete | SharePoint Field Type | Reporting Schema Field Type | Multi-Column | Column Mapped | Remove Rich Text Markup |
|--------|------------------------|-----------------------------|--------------|---------------|-------------------------|
| X | Single line of text | varchar(255) | False | 0 | False |
| X | Choice | varchar(255) | False | 0 | False |
| X | Multiple lines of text | ntext | False | 0 | False |
| X | Computed | varchar(255) | False | 0 | False |
| X | Person or Group | varchar(255) | True | 1 | False |
| X | Attachments | bit | False | 0 | False |
| X | Counter | varchar(255) | False | 0 | False |
| X | Date and Time | datetime | False | 0 | False |
| X | Yes/No | bit | False | 0 | False |
| X | Lookup | varchar(255) | False | 0 | False |
| X | Number | decimal(25,6) | False | 0 | False |
| X | Currency | money | False | 0 | False |

User Friendly Messages (Deprecated Feature)

User friendly messages is a deprecated feature, please refrain from using it. It is provided only for backward compatibility.

User friendly messages, allow 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.

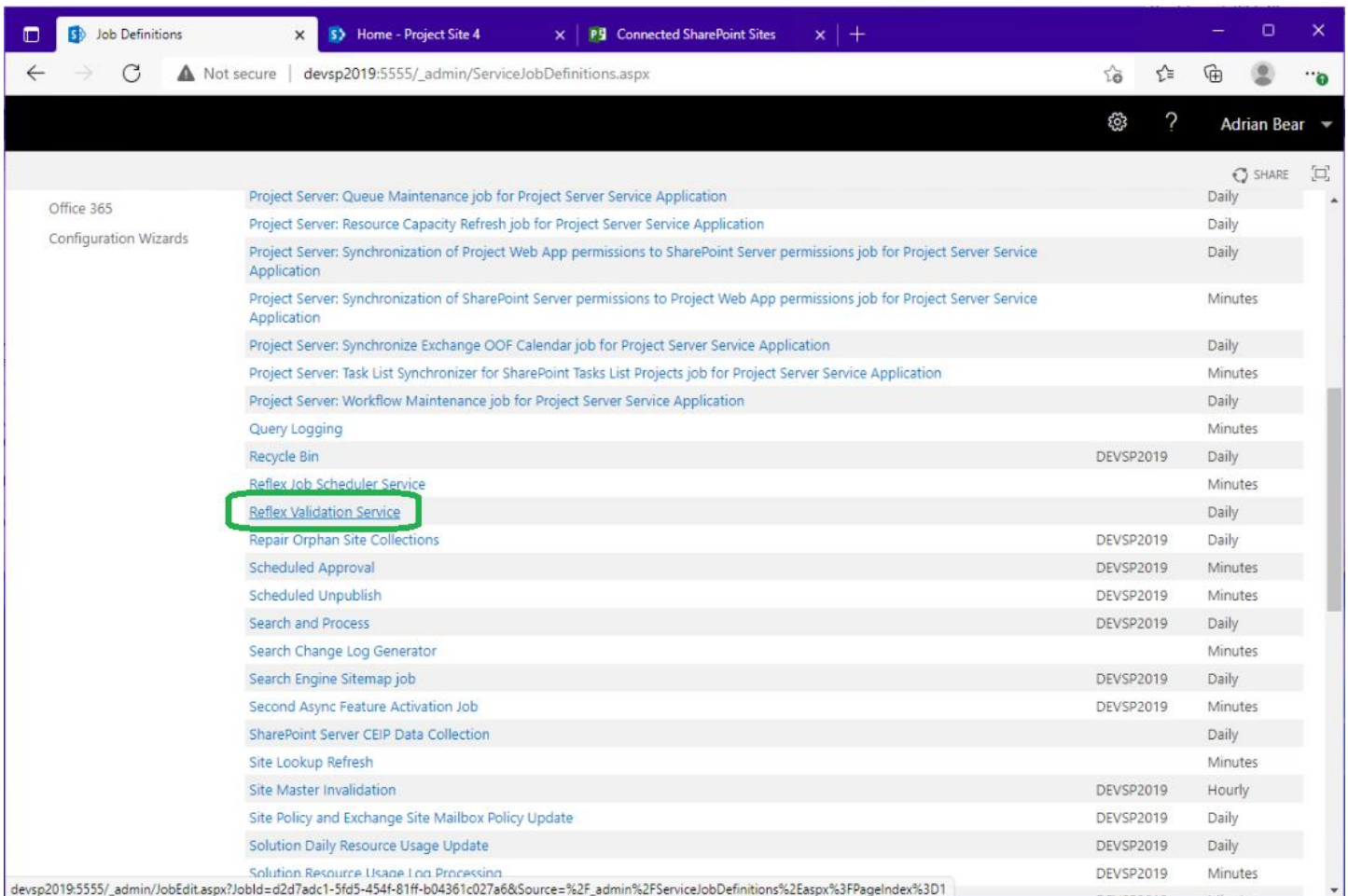
SharePoint is better now and there are better ways to achieve this.

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.

After some maintenance tasks, reporting tables maybe left 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).

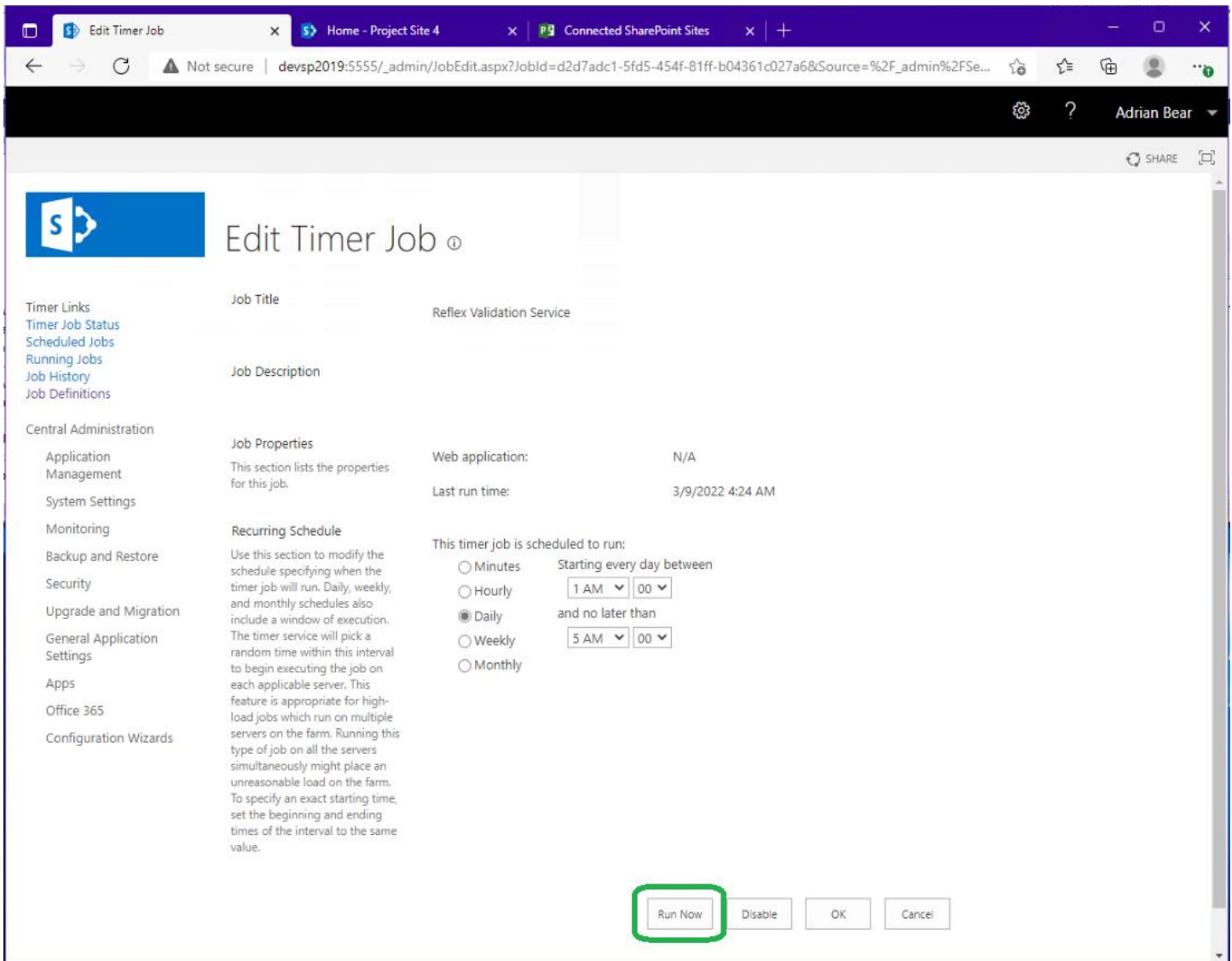


The screenshot shows the SharePoint Job Definitions page in a browser window. The page title is "Job Definitions" and the URL is "devsp2019:5555/_admin/Service/JobDefinitions.aspx". The page displays a list of jobs with columns for job name, frequency, and status. The job "Reflex Validation Service" is highlighted with a red box. Other jobs include "Project Server: Queue Maintenance job for Project Server Service Application", "Project Server: Resource Capacity Refresh job for Project Server Service Application", "Project Server: Synchronization of Project Web App permissions to SharePoint Server permissions job for Project Server Service Application", "Project Server: Synchronization of SharePoint Server permissions to Project Web App permissions job for Project Server Service Application", "Project Server: Synchronize Exchange OOF Calendar job for Project Server Service Application", "Project Server: Task List Synchronizer for SharePoint Tasks List Projects job for Project Server Service Application", "Project Server: Workflow Maintenance job for Project Server Service Application", "Query Logging", "Recycle Bin", "Reflex Job Scheduler Service", "Repair Orphan Site Collections", "Scheduled Approval", "Scheduled Unpublish", "Search and Process", "Search Change Log Generator", "Search Engine Sitemap job", "Second Async Feature Activation Job", "SharePoint Server CEIP Data Collection", "Site Lookup Refresh", "Site Master Invalidation", "Site Policy and Exchange Site Mailbox Policy Update", "Solution Daily Resource Usage Update", and "Solution Resource Usage Processing".

| Job Name | Frequency | Status |
|--|-------------------|--------|
| 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 | |
| Reflex Validation Service | 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 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 will add too much load to your SharePoint servers. It should run after business hours.



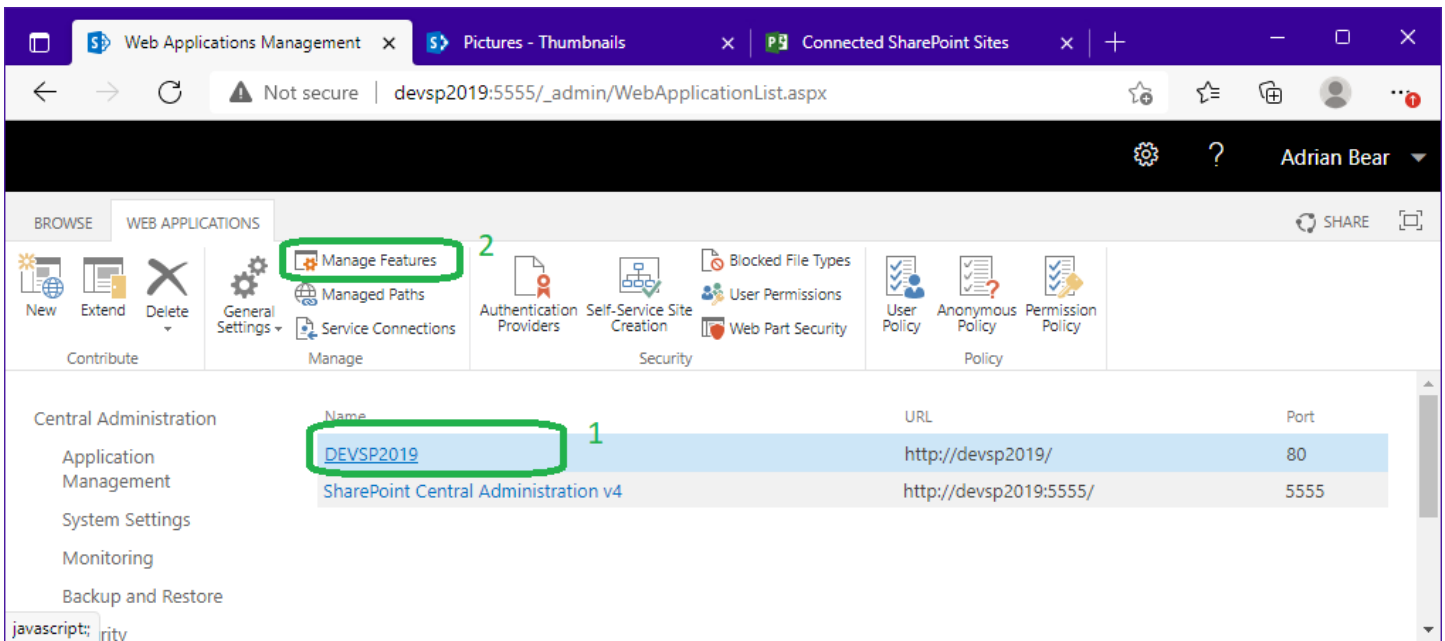
This service will spawn Reflex Reporting Jobs, which in turn use One-time SharePoint Timer jobs to execute tasks (like reflecting all data from a list in a site). You may have to wait quite some time for all data to sync, depending on how much data you have. But even in large deployments, it should complete 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).

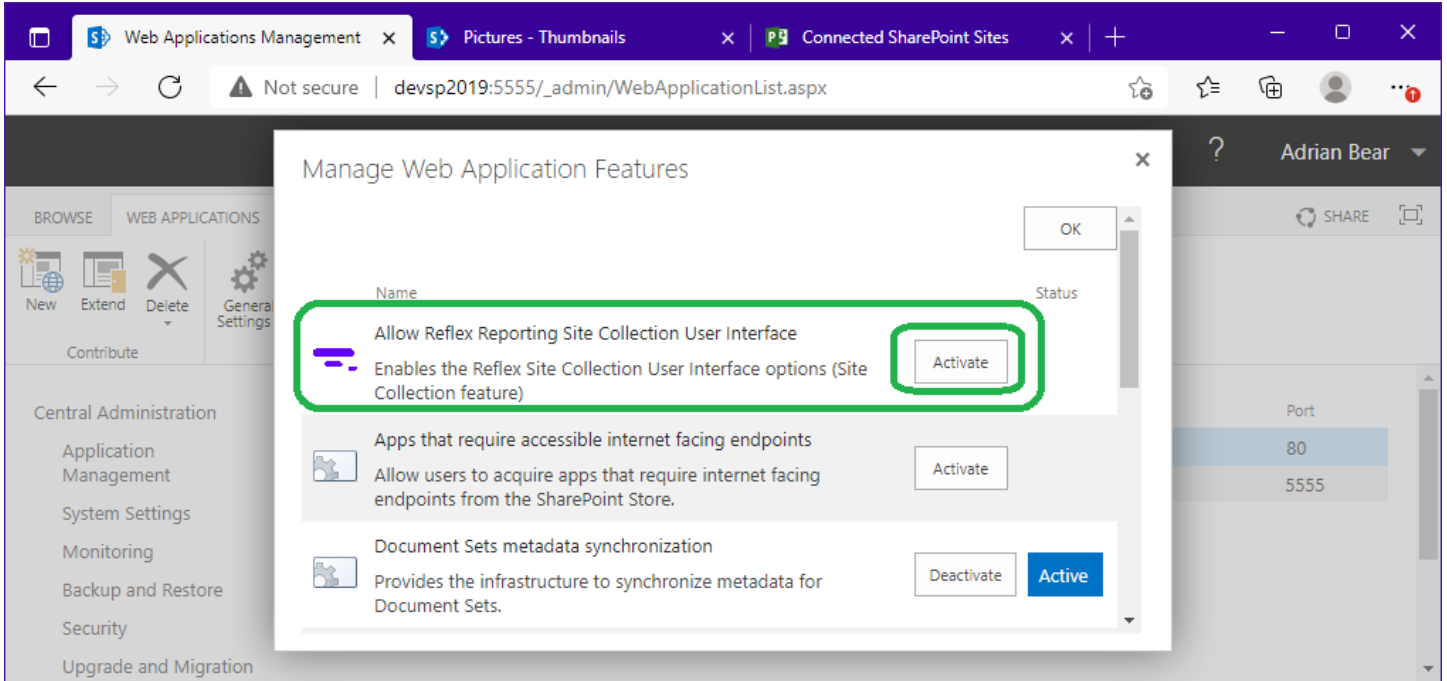
Reflex Reporting SCUI Activation

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.



From the ribbon menu click “Manage features”.

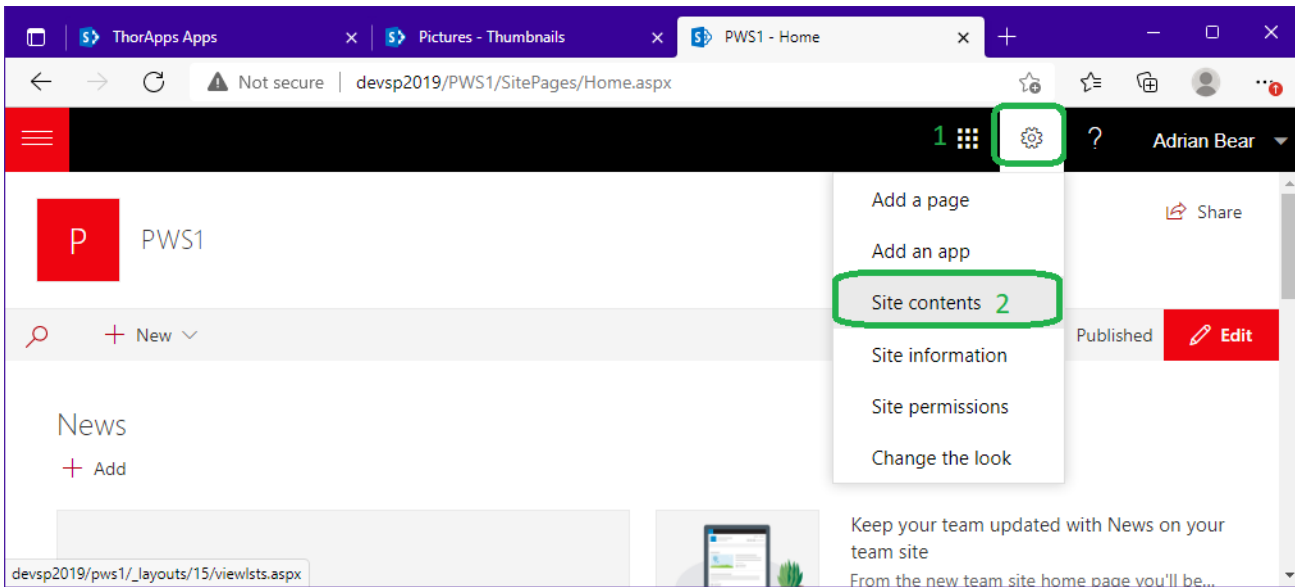
Click “Activate” on the feature “Allow Reflex Reporting Site Collection User Interface”.



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.

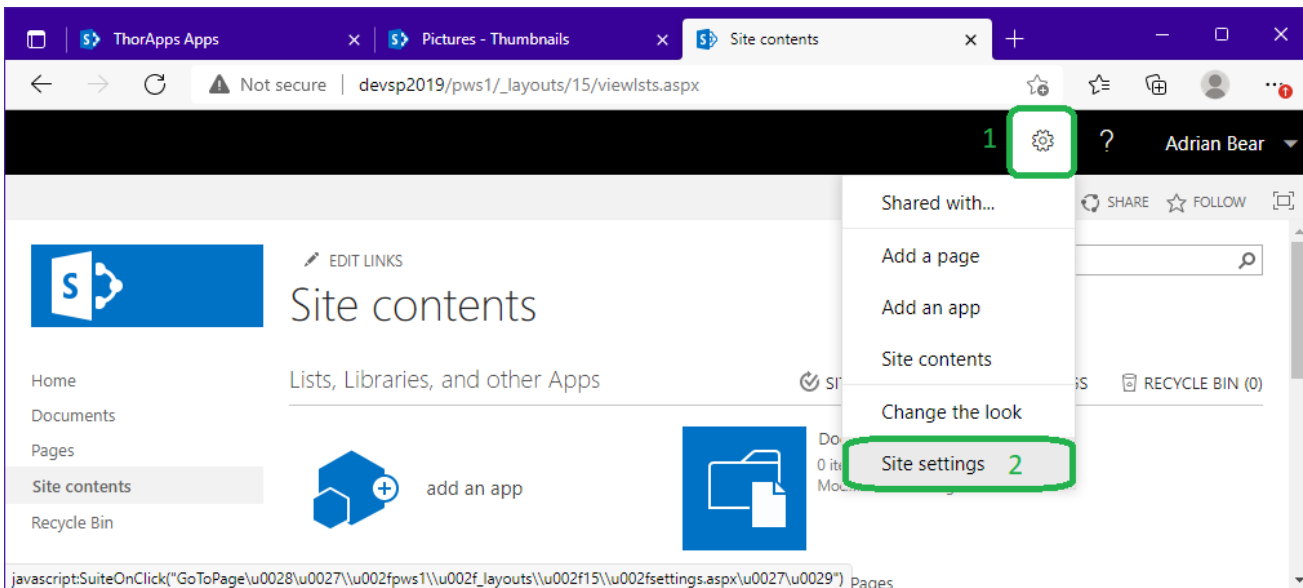
Depending on your version of SharePoint and the template used to provision root site of the site collection, the page may look different to the following screenshot.

From the Page banner click the [COG] and select “Site contents”.

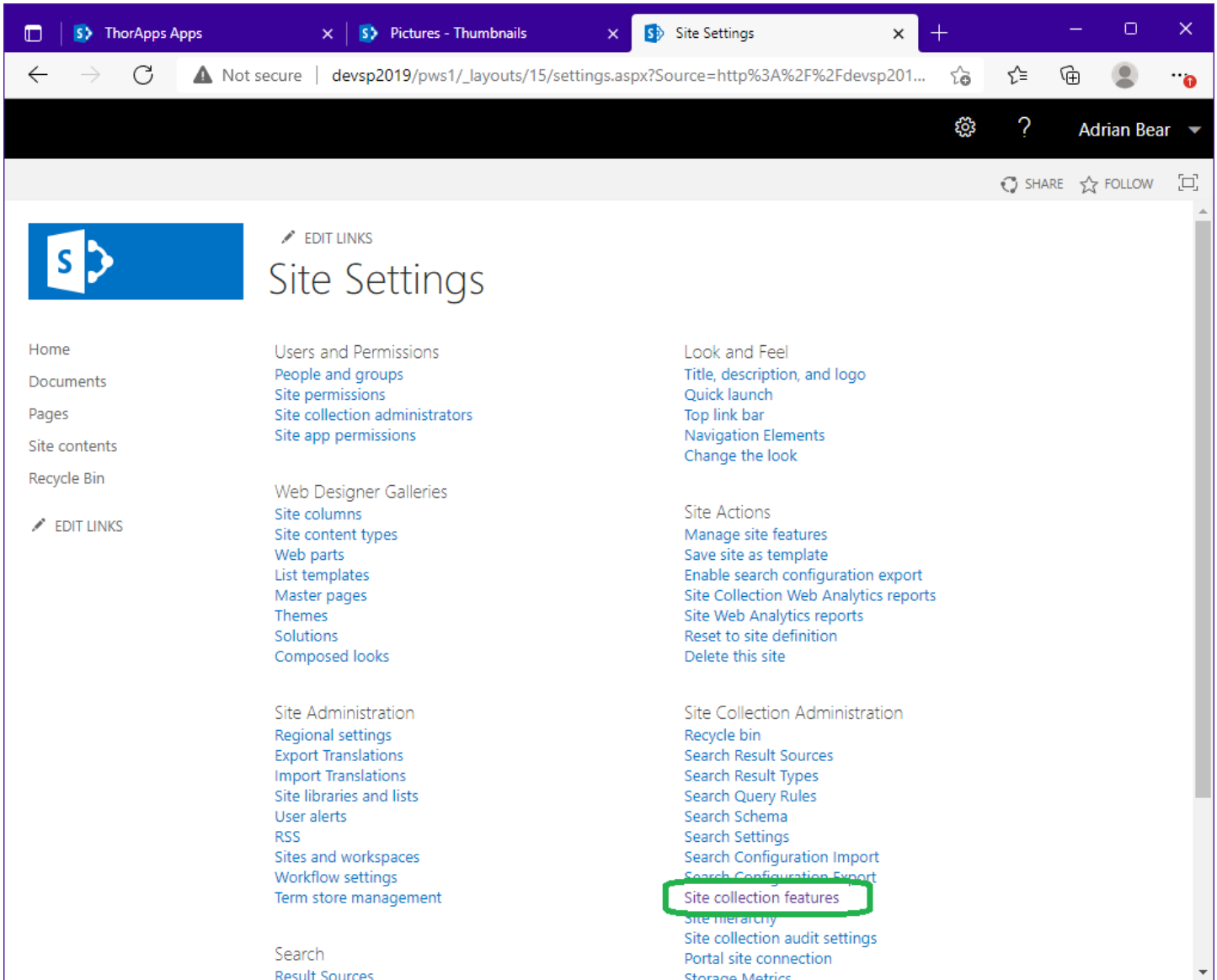


From the Site Contents page, you can again click the [COG] and select “Site Settings”.

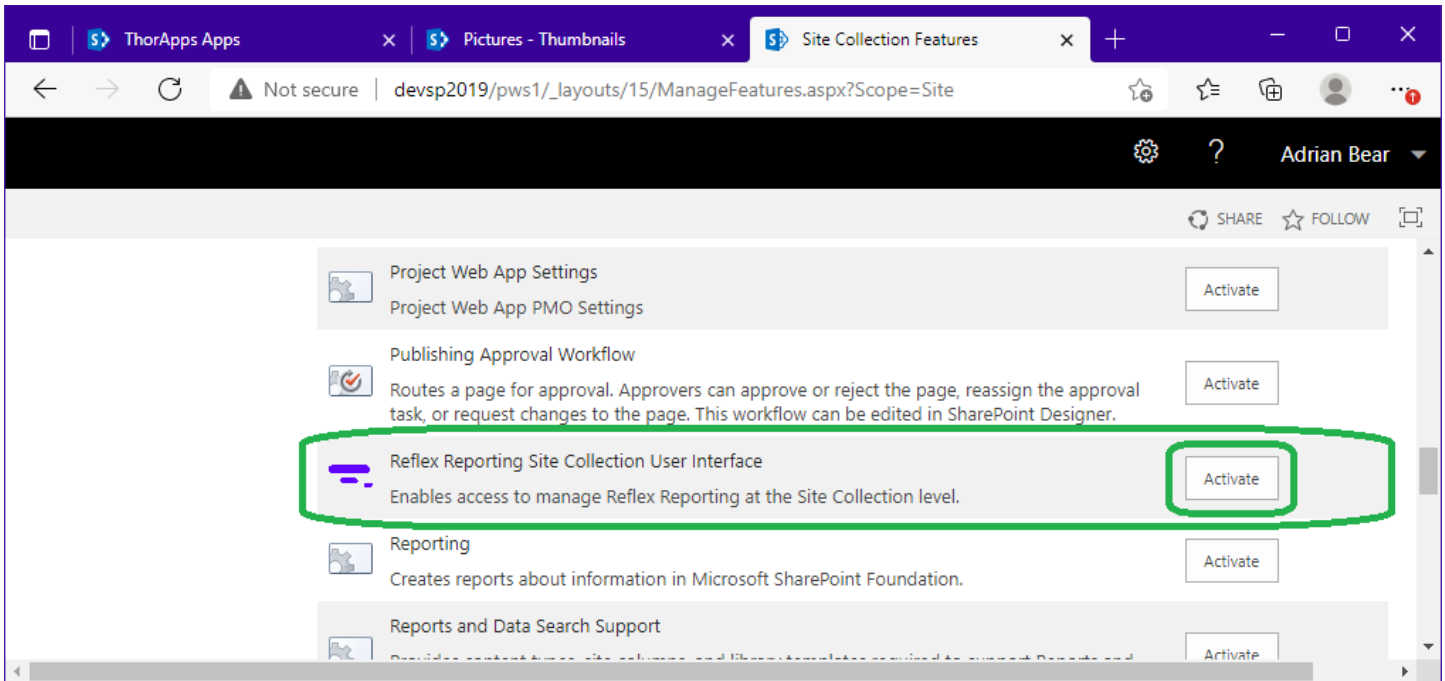
(There are other shorter ways, but these steps work on all current versions of SharePoint).



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

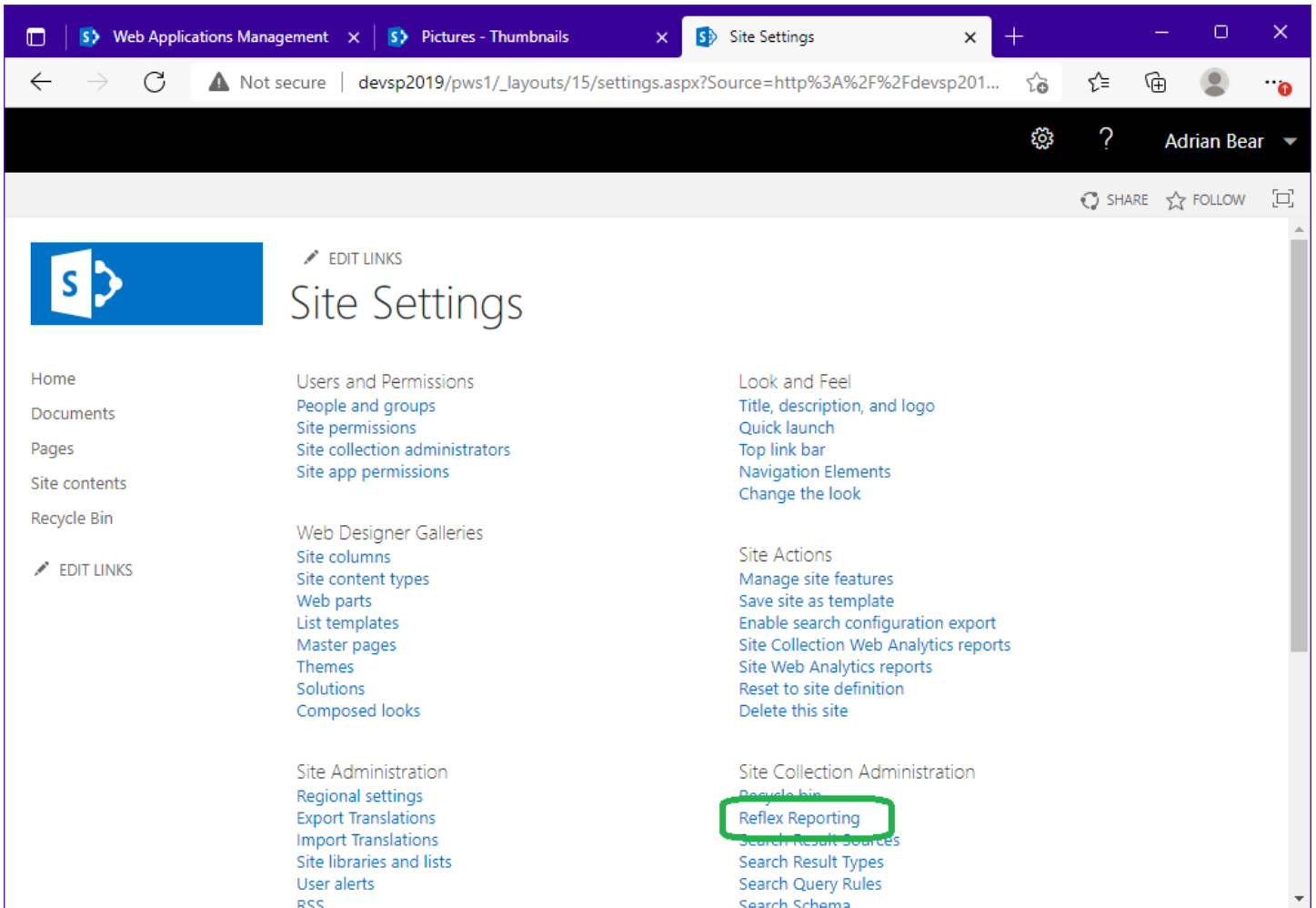


From the list of site collection features, scroll down until you find “Reflex Reporting Site Collection User Interface” and click “Activate”.



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.

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”.



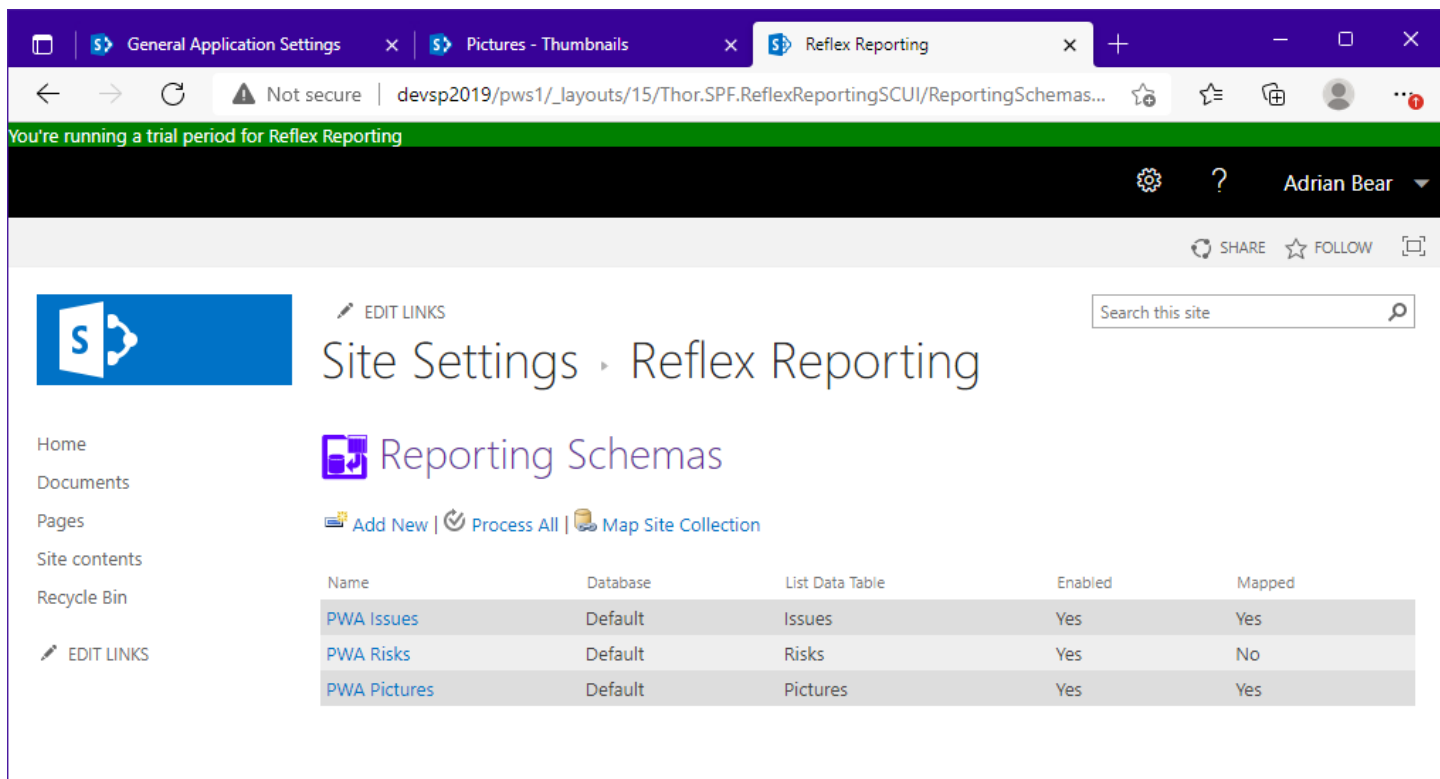
Reporting Schemas (Site Collection User Interface)

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. Therefore, you MUST use the Central Administration interface to create reporting databases, before the SCUI can be used. This is by design. 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, to create a Reporting Database, please refer to the previous section "**Create a Reflex Reporting database**".

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).

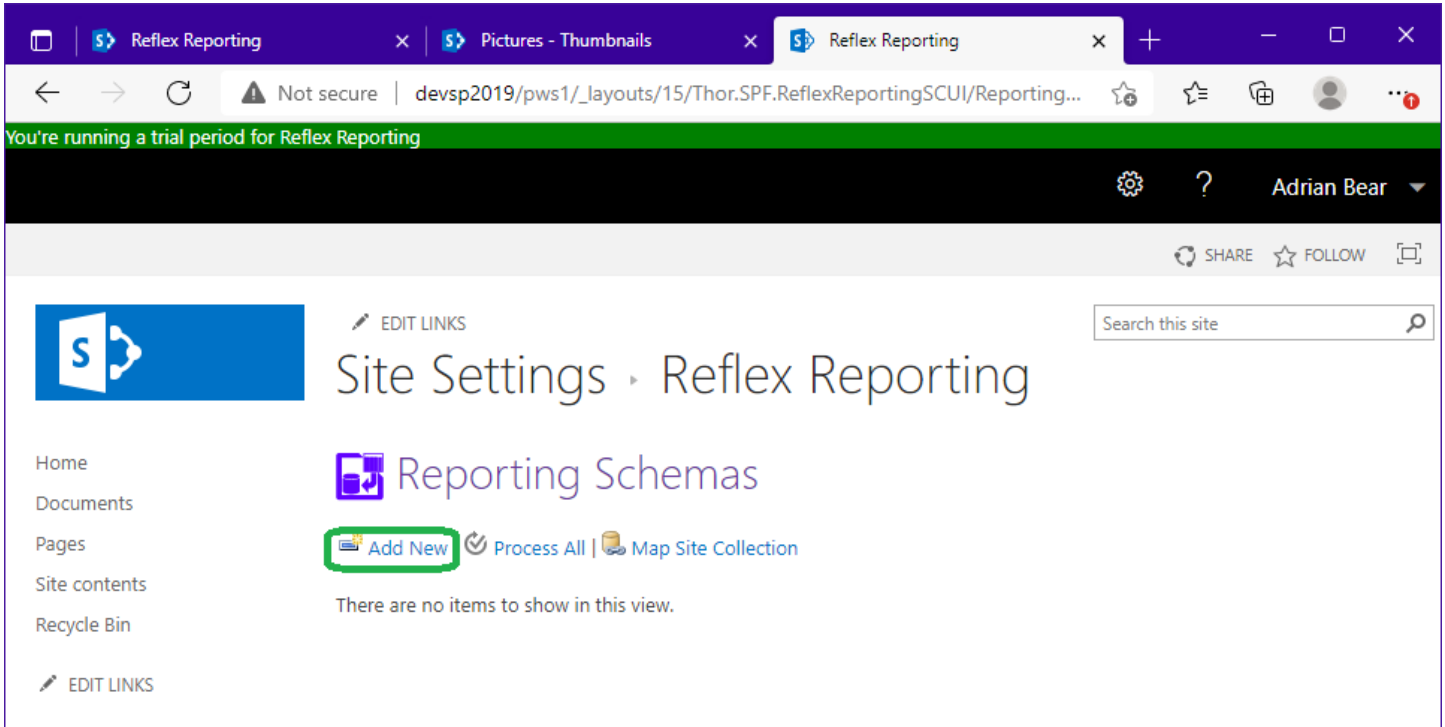


The screenshot displays the SharePoint Site Settings interface for Reflex Reporting. The page title is "Site Settings - Reflex Reporting" and the main heading is "Reporting Schemas". There are buttons for "Add New", "Process All", and "Map Site Collection". A table lists the following reporting schemas:

| Name | Database | List Data Table | Enabled | Mapped |
|------------------------------|----------|-----------------|---------|--------|
| PWA Issues | Default | Issues | Yes | Yes |
| PWA Risks | Default | Risks | Yes | No |
| PWA Pictures | Default | Pictures | Yes | Yes |

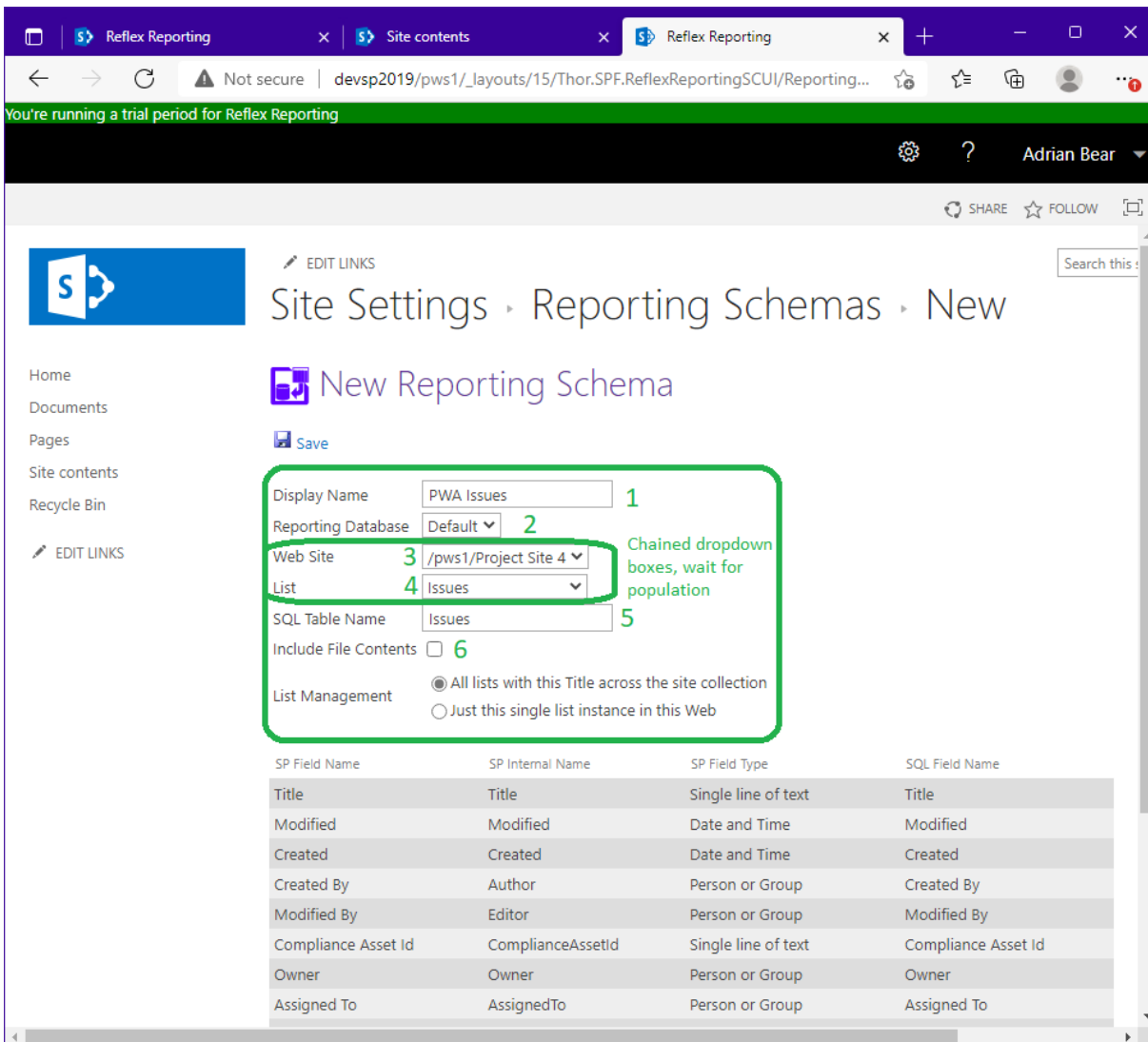
Add a New Reporting Schema

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



The screenshot shows a web browser window with three tabs: 'Reflex Reporting', 'Pictures - Thumbnails', and 'Reflex Reporting'. The address bar shows the URL 'devsp2019/pws1/_layouts/15/Thor.SPF.ReflexReportingSCUI/Reporting...'. A green banner at the top of the page reads 'You're running a trial period for Reflex Reporting'. The user is logged in as 'Adrian Bear'. The page title is 'Site Settings - Reflex Reporting'. The main content area is titled 'Reporting Schemas' and features three buttons: 'Add New' (highlighted with a red box), 'Process All', and 'Map Site Collection'. Below the buttons, it states 'There are no items to show in this view.' A sidebar on the left contains navigation links: Home, Documents, Pages, Site contents, and Recycle Bin. A search bar is located in the top right corner of the page content.

On the new reporting schema page, enter (at minimum) a “Display Name” for the reporting schema and choose the list used to source fields. Note, the “Web Site” and “List” dropdown boxes are chained together, so after selecting a “Web Site” you need to wait for it to populate the “List” dropdown.



The “Reporting Database” allows you to choose which reporting database the reporting schema will create a SQL table in.

The “SQL Table Name” field is defaulted based on the list name selected, but you can change it.

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).

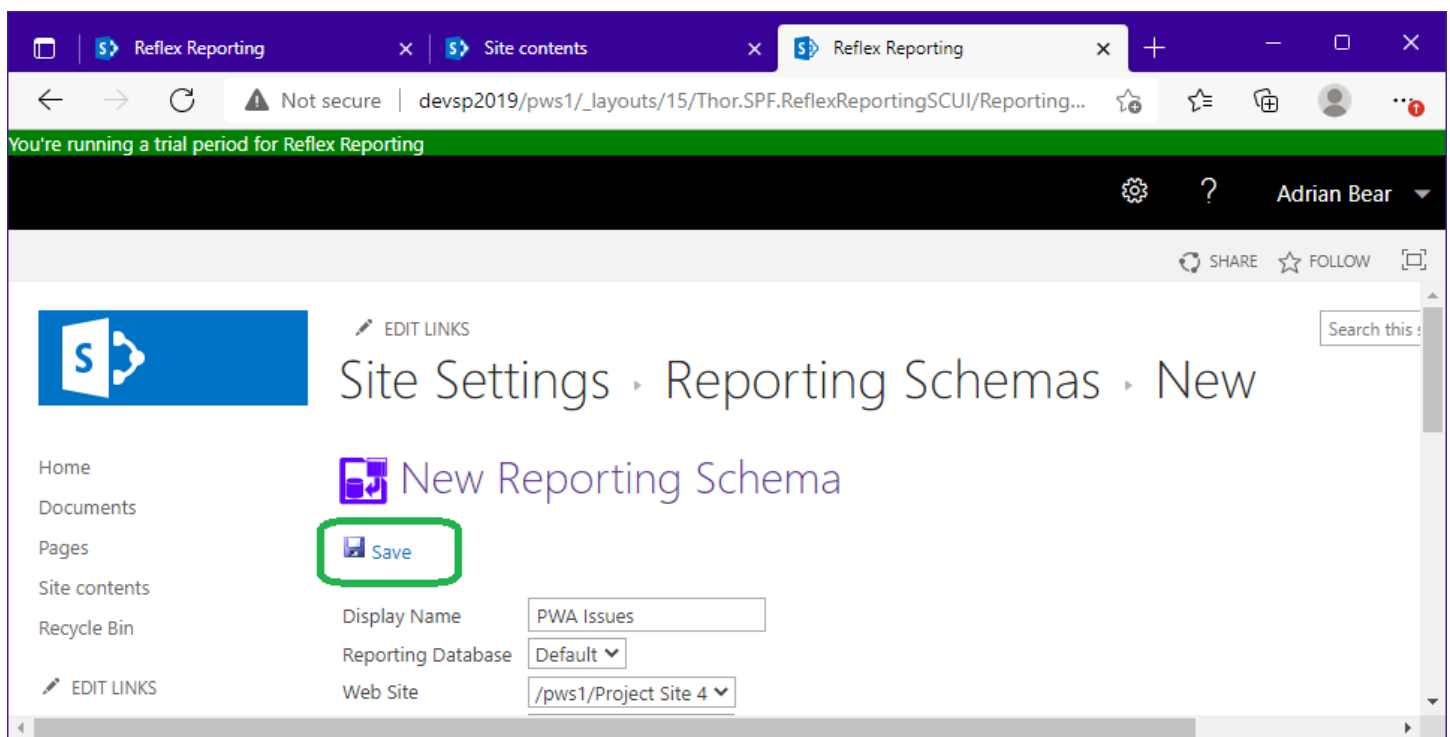
The “List Management” field is not a property of the “Reporting Schema” itself, but controls how to automatically create list mappings when you click “Save”.

If you select “All lists with this Title across the site collection”, a mapping will be created for all lists with the same ‘Title’ (or list name) as the selected list for all sites within the site collection, including any new sites that contain a list with the same Title. 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.

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”.

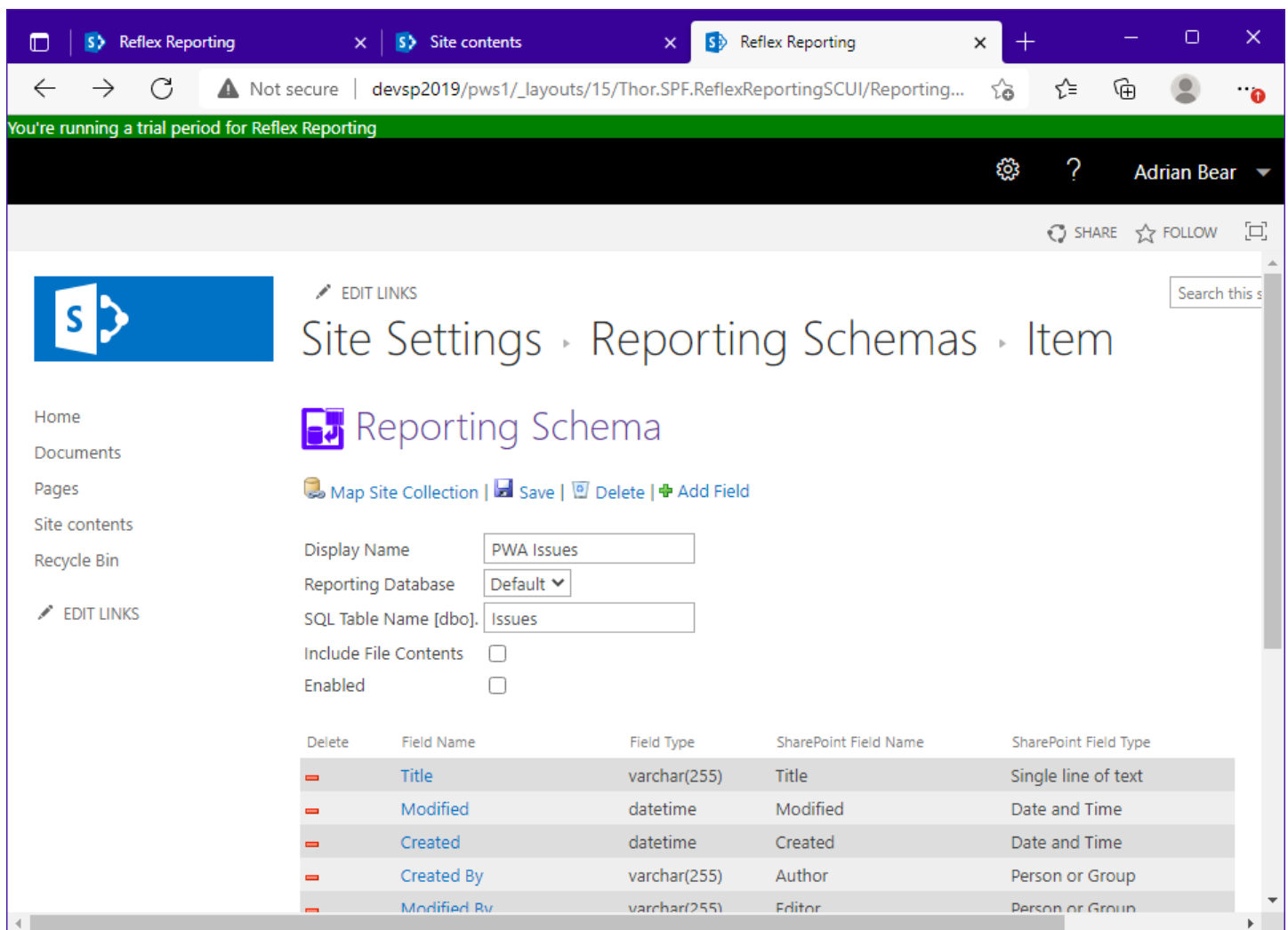


NOTE: Saving the new Reporting Schema, will **NOT** enable it.

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.



Site Settings » Reporting Schemas » Item

Reporting Schema

Map Site Collection | Save | Delete | Add Field

Display Name: PWA Issues

Reporting Database: Default

SQL Table Name [dbo.]: Issues

Include File Contents:

Enabled:

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

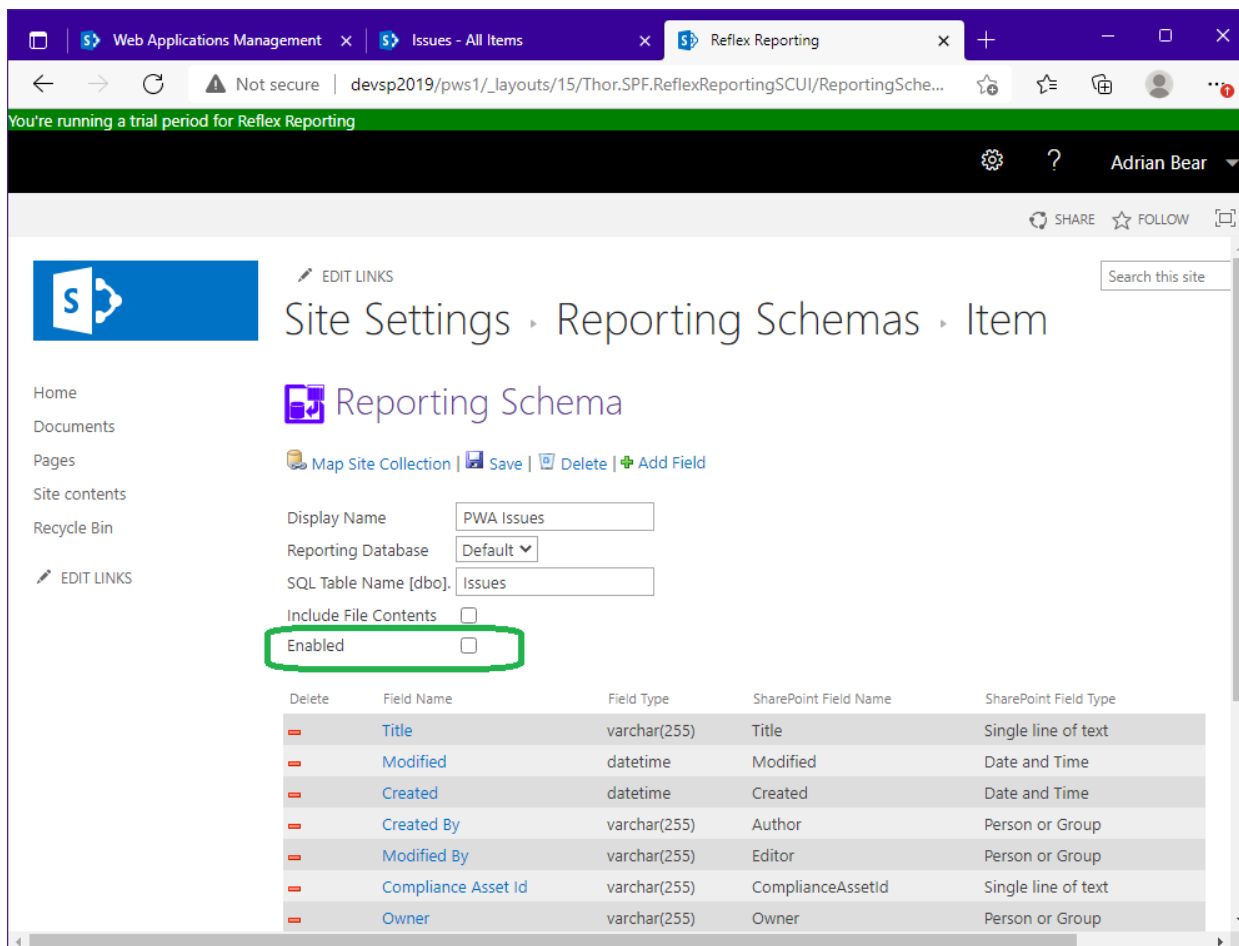
From the Reporting Schema edit page, you can remove fields (with the red minus icon), add fields (with the green plus button), delete the Reporting Schema entirely or save it.

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 wait a few minutes for the background jobs to get underway.



The screenshot shows the SharePoint Reporting Schemas configuration page. The 'Enabled' checkbox is highlighted with a green box. The page displays the following configuration details:

- Display Name: PWA Issues
- Reporting Database: Default
- SQL Table Name [dbo]: Issues
- Include File Contents:
- Enabled:

| Delete | Field Name | Field Type | SharePoint Field Name | SharePoint Field Type |
|--------------------------|---------------------|--------------|-----------------------|-----------------------|
| <input type="checkbox"/> | Title | varchar(255) | Title | Single line of text |
| <input type="checkbox"/> | Modified | datetime | Modified | Date and Time |
| <input type="checkbox"/> | Created | datetime | Created | Date and Time |
| <input type="checkbox"/> | Created By | varchar(255) | Author | Person or Group |
| <input type="checkbox"/> | Modified By | varchar(255) | Editor | Person or Group |
| <input type="checkbox"/> | Compliance Asset Id | varchar(255) | ComplianceAssetId | Single line of text |
| <input type="checkbox"/> | Owner | varchar(255) | Owner | Person or Group |

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.

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. 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.

Map Site Collection

The “Reporting Schema” page (editable or not) has a “Map Site Collection” button. This button is used when the Reporting Schema is not mapped to any list in the current site collection. Usually, it’s already been mapped to another site collection. By clicking the “Map Site Collection” button, an existing site collection mapping is used to create a similar mapping for the current site collection.

The “Reporting Schemas” page also has a “Map Site Collection” button that performs the same function, except for all Reporting Schemas.

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

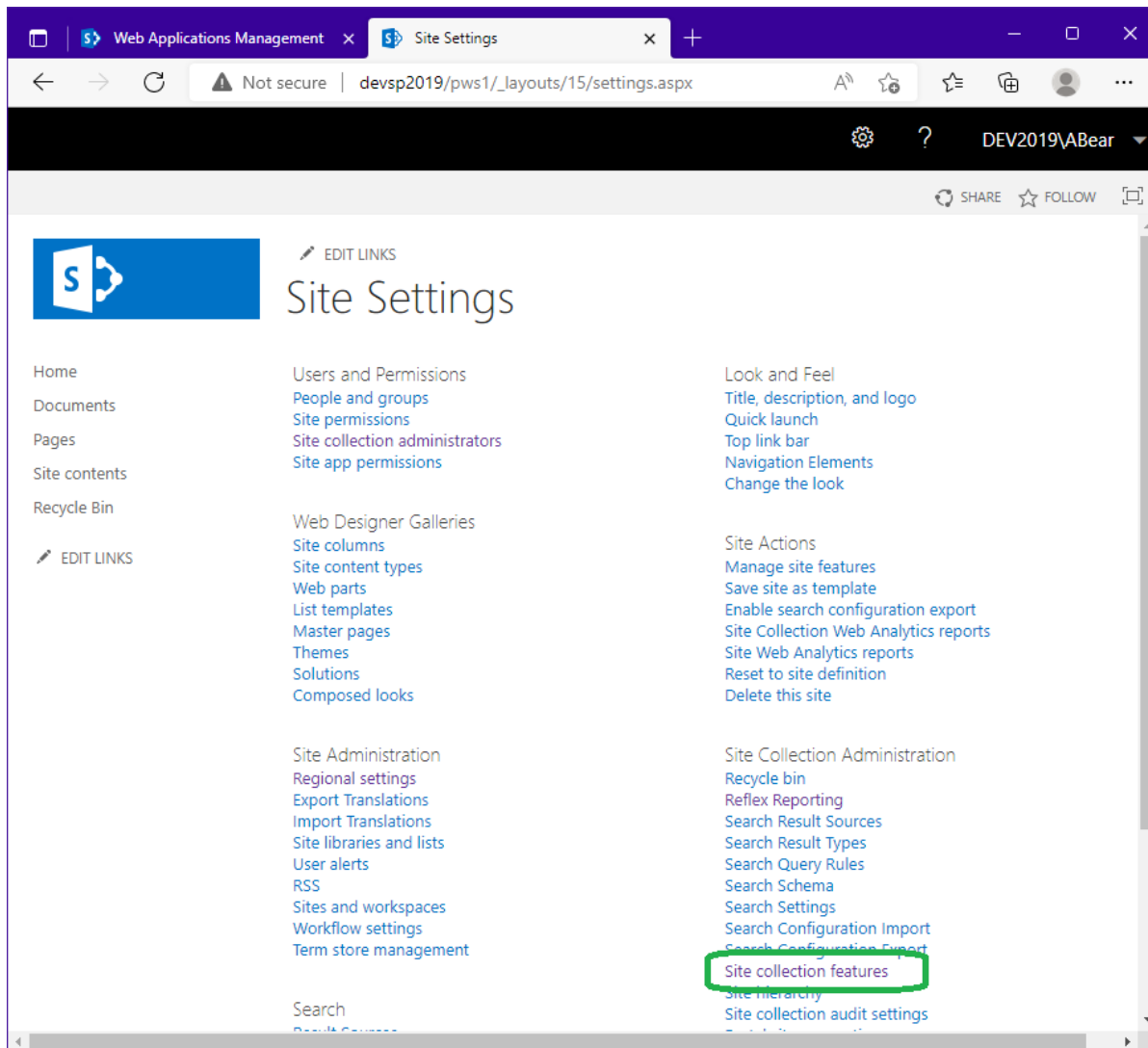
Important notes before starting removal:

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 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 databases]

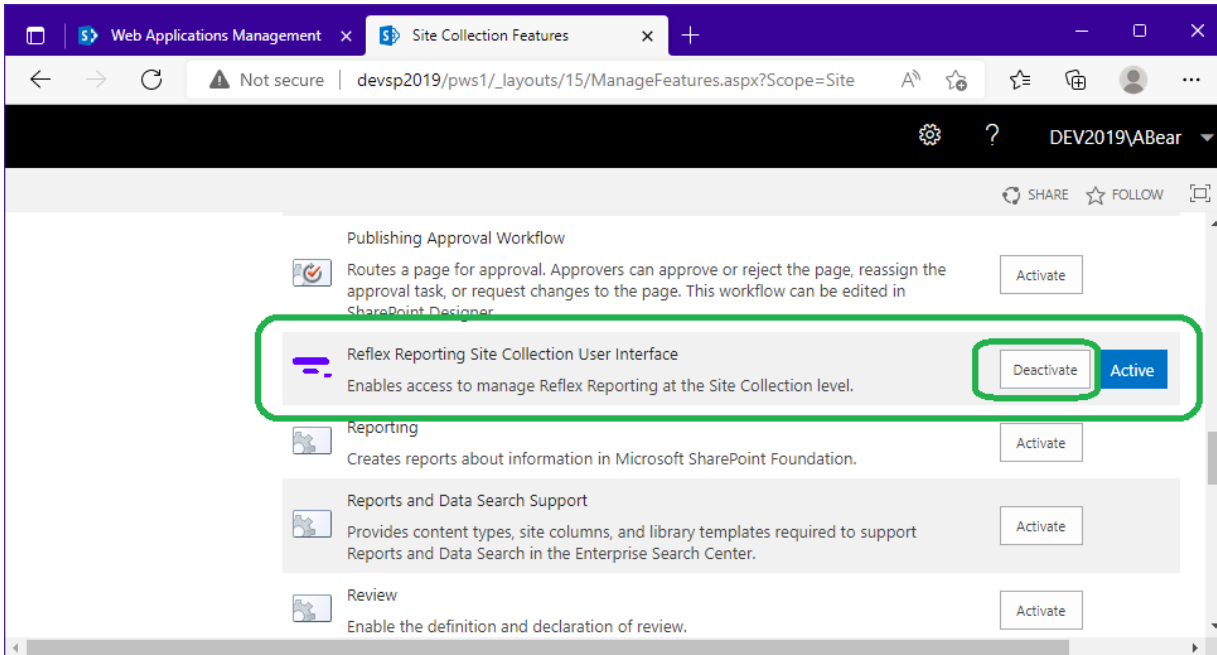
Deactivate Site Collection feature

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.

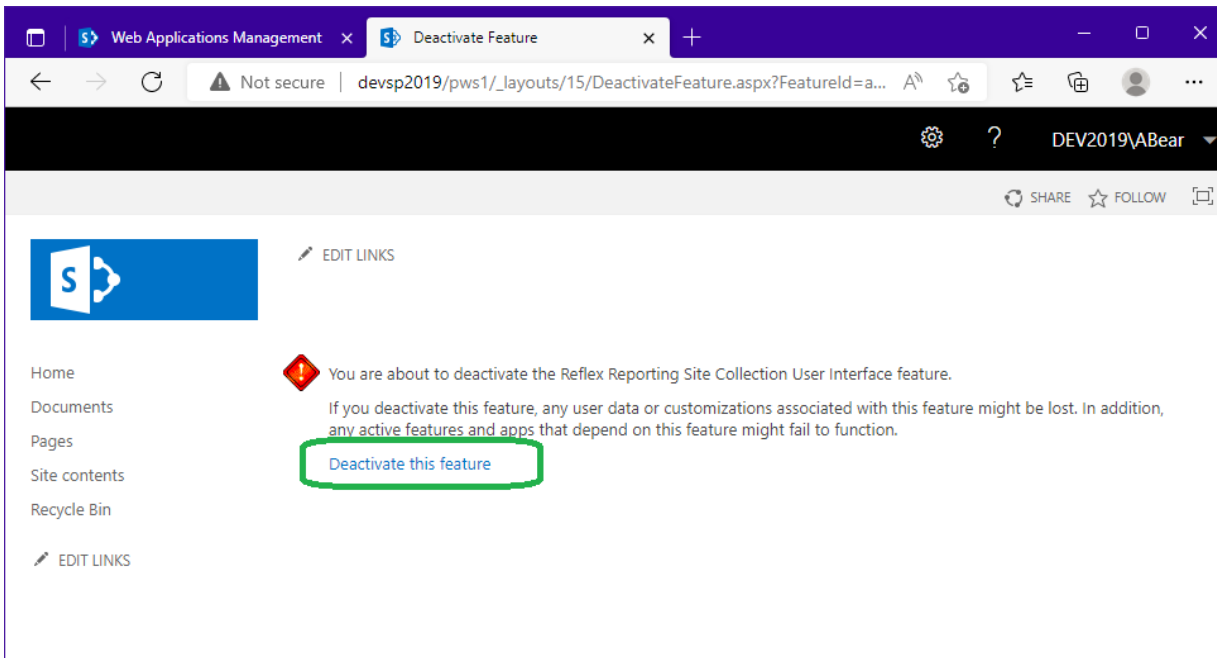
From the site collections, site settings page click "Site collection features".



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

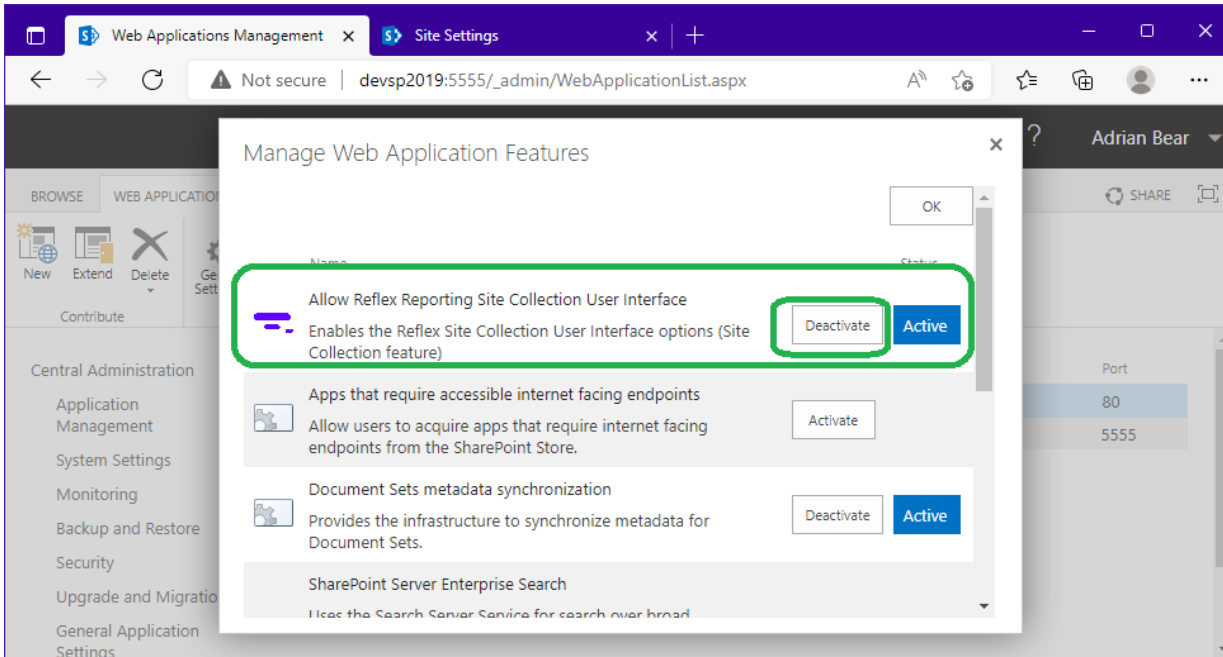
If the site collection user interface for was installed, you will also need to deactivate the web application feature.

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”.

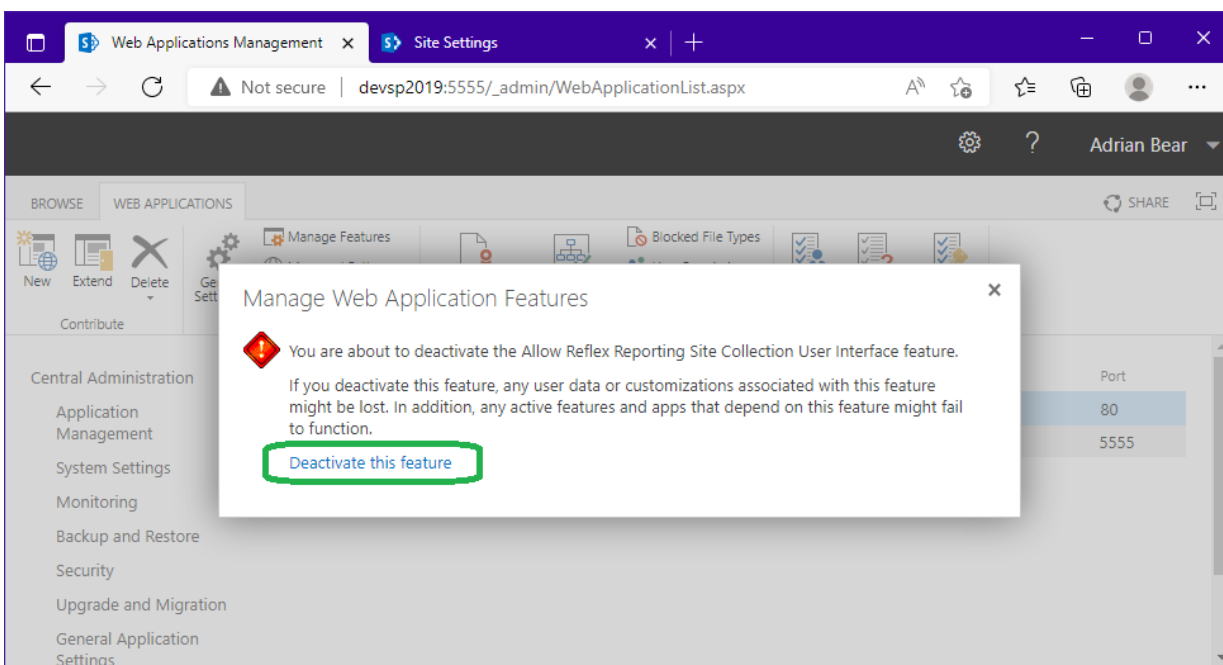
The screenshot shows the SharePoint Central Administration interface. The browser address bar indicates the URL is `devsp2019:5555/_admin/WebApplicationList.aspx`. The user is identified as Adrian Bear. The 'WEB APPLICATIONS' section is active, showing a list of web applications. The 'Manage Features' button is highlighted with a green circle and the number '2'. The 'DEVSP2019' web application is selected in the table, also highlighted with a green circle and the number '1'.

| Name | URL | Port |
|--------------------------------------|------------------------|------|
| DEVSP2019 | http://devsp2019/ | 80 |
| SharePoint Central Administration v4 | http://devsp2019:5555/ | 5555 |

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

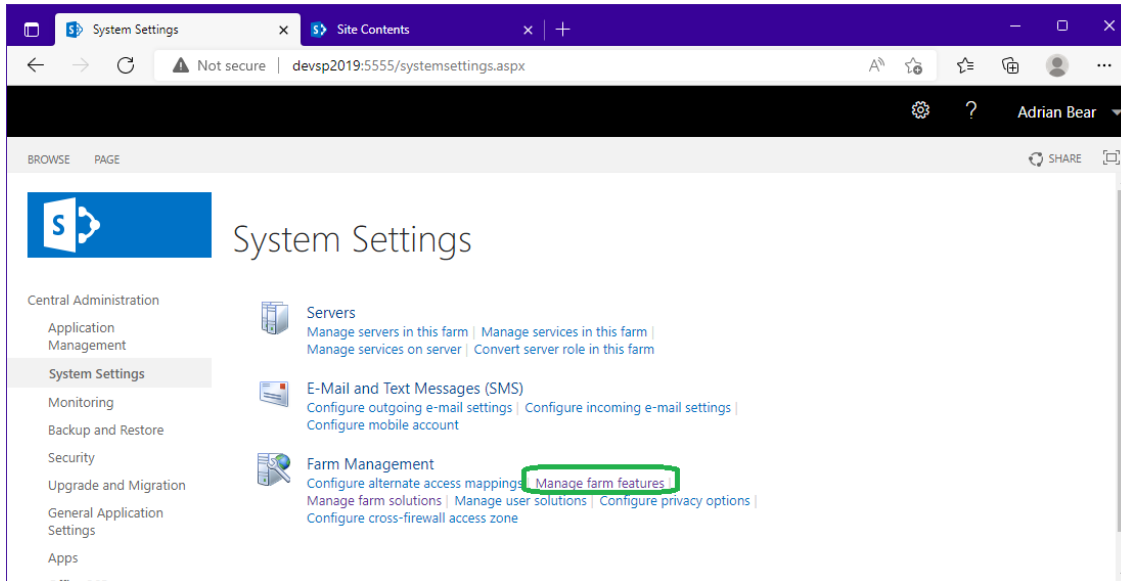


On the confirmation dialog click “Deactivate this feature”.

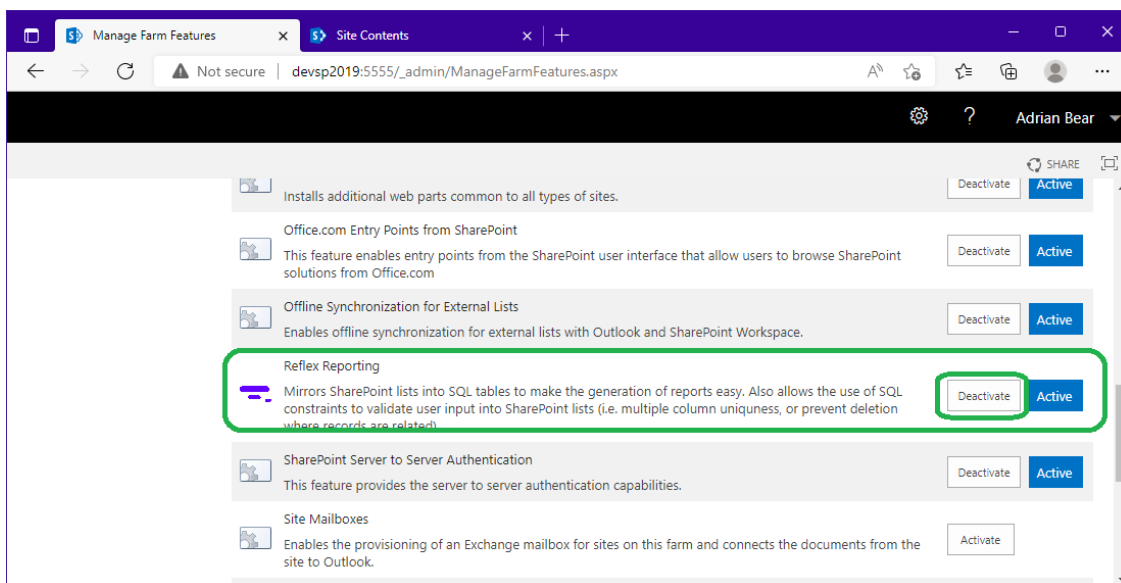


Deactivate Farm feature

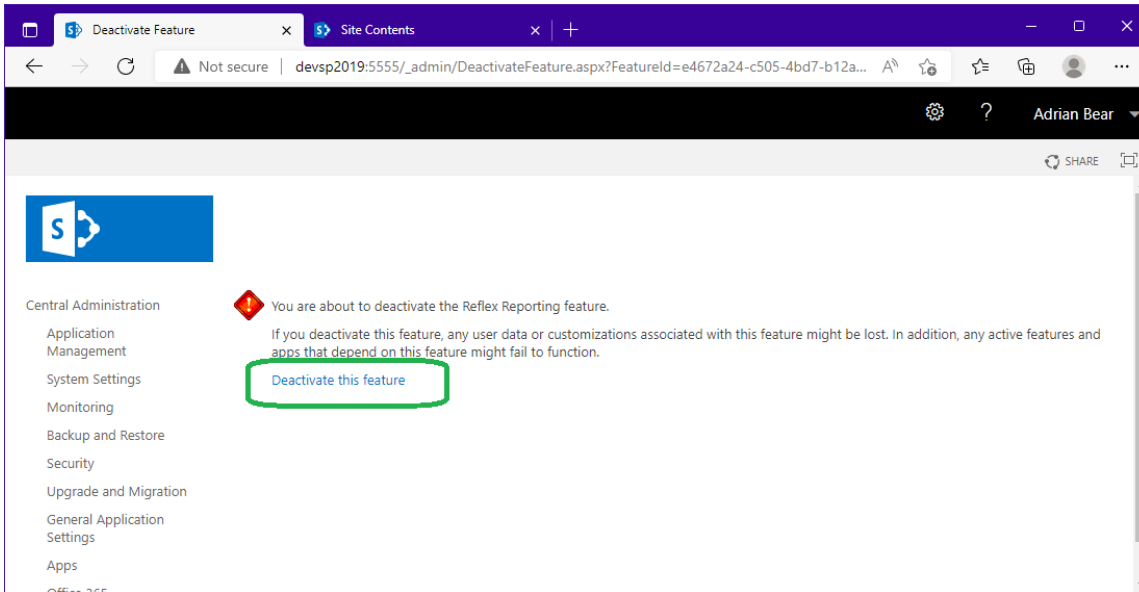
When installing Reflex Reporting, a SharePoint farm feature is automatically activated. You need to deactivate this feature by navigating to SharePoint Central Administration=>[System Settings]=>[Manage farm features]



Scroll through and find the feature “Reflex Reporting” and click “Deactivate”.



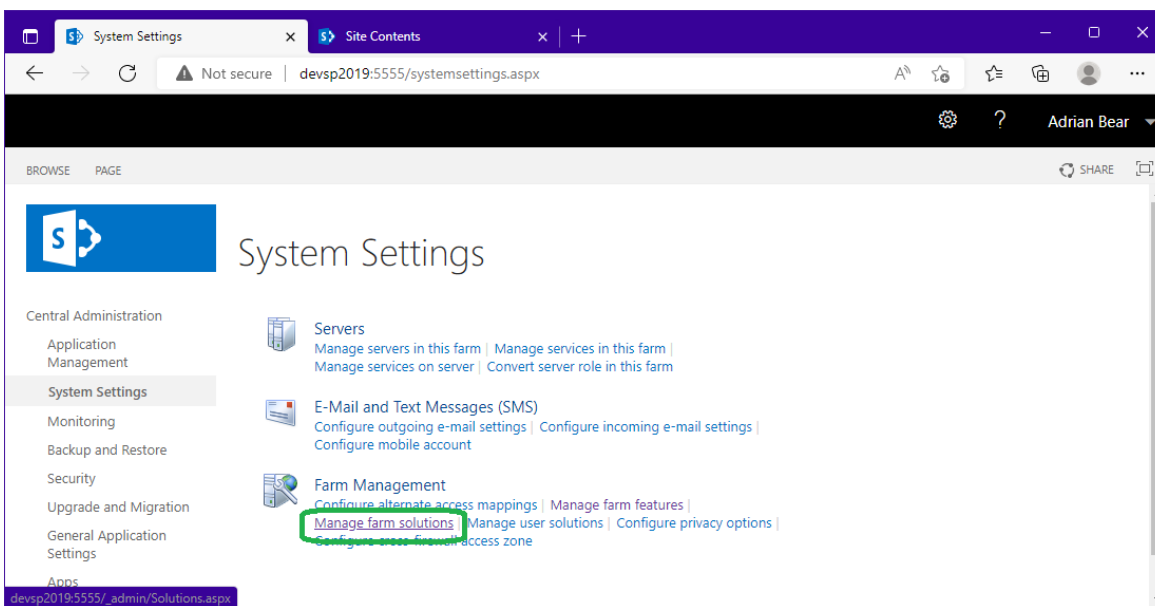
On the confirmation dialog click “Deactivate this feature”.



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

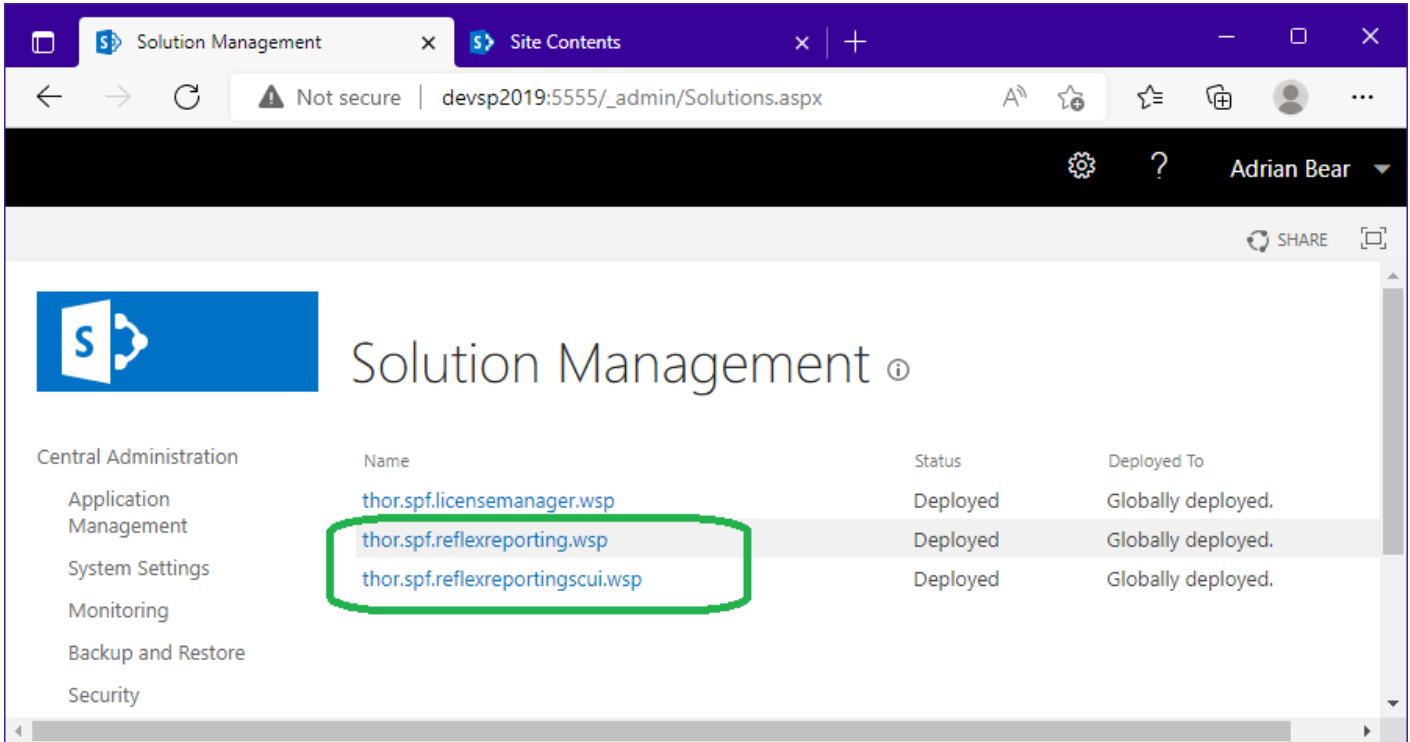
Retract Farm solution

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

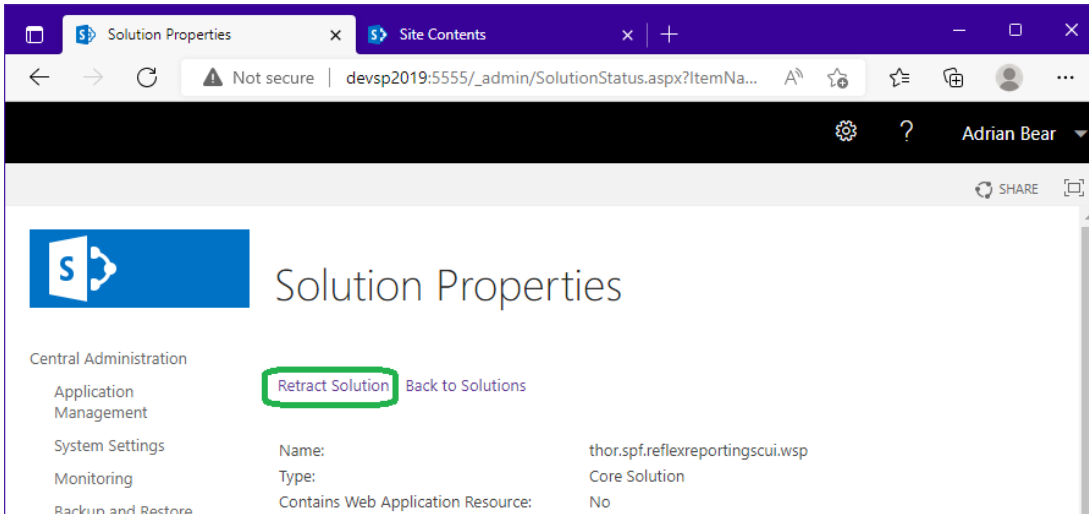


This next step needs to be repeated for both “thor.spf.reflexreporting.wsp” and “thor.spf.reflexreportingscui.wsp”, if the latter is installed. If “thor.spf.reflexreportingscui.wsp” is installed, start with it first.

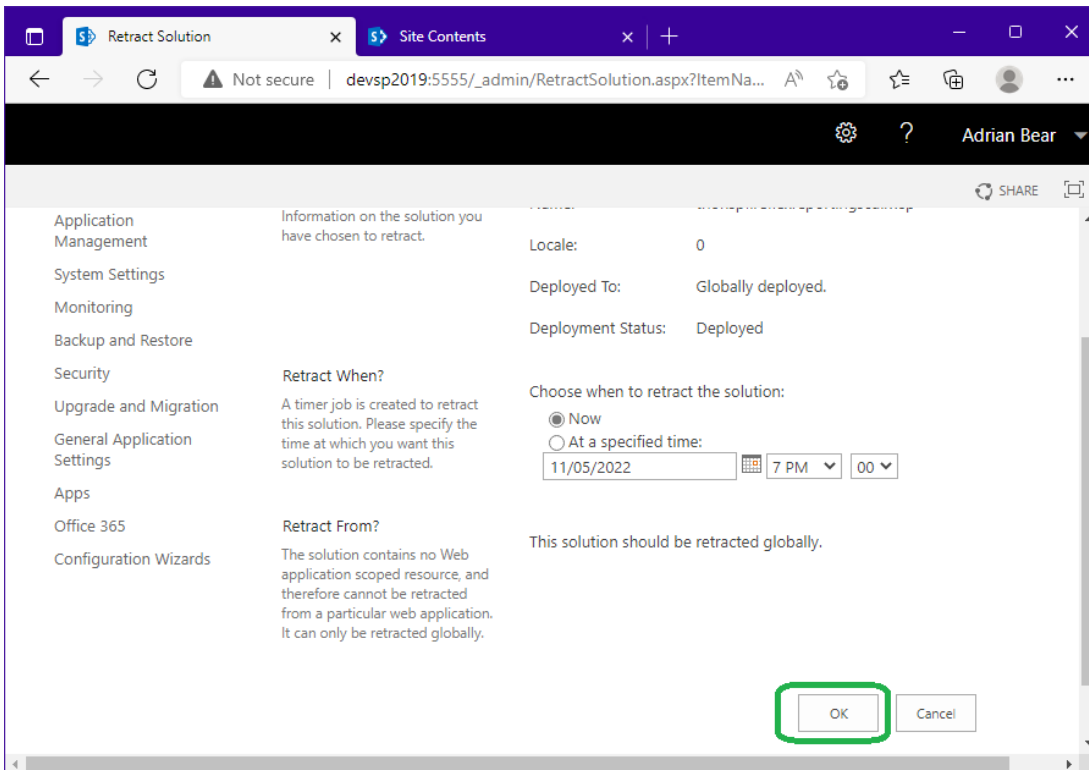
Click the name of a Reflex Reporting wsp solution.



Click "Retract Solution".



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

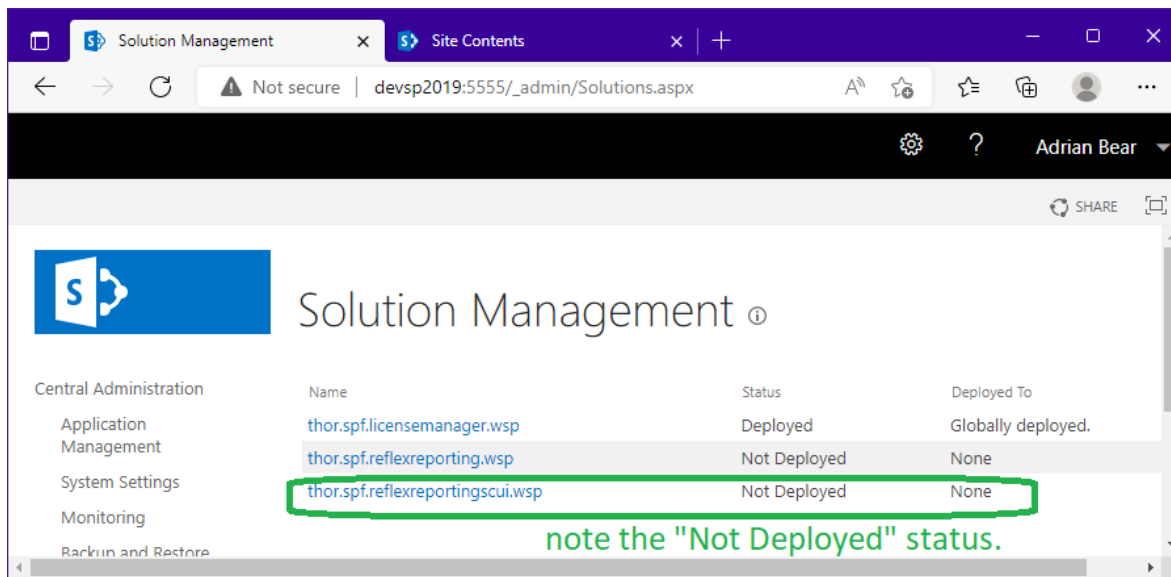


Repeat for "thor.spf.reflexreporting.wsp" and wait for both jobs to complete.

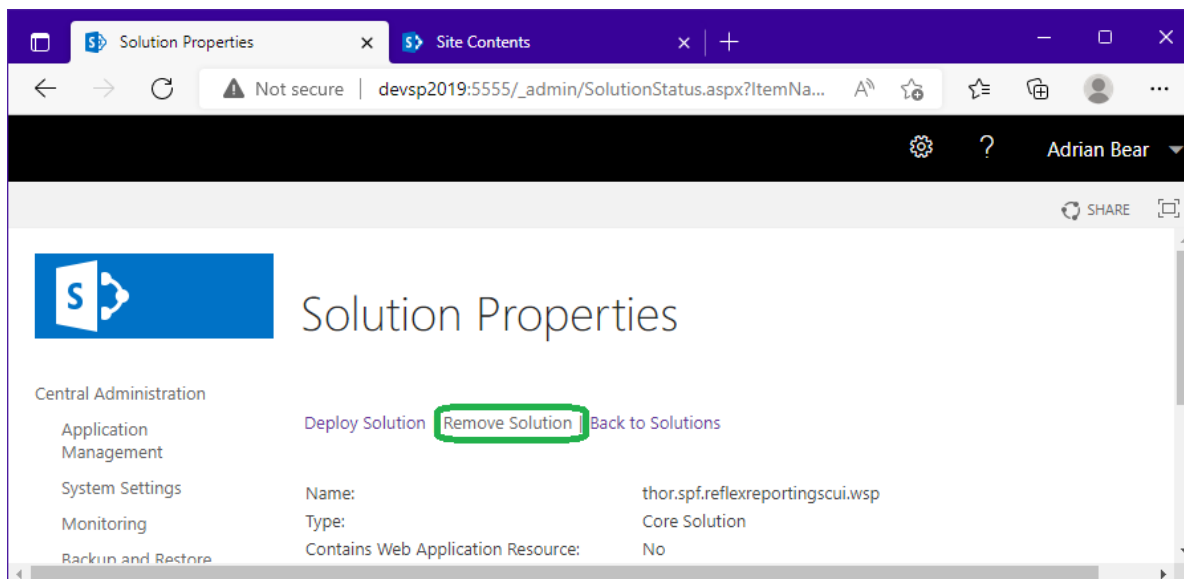
Remove Farm Solution

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.

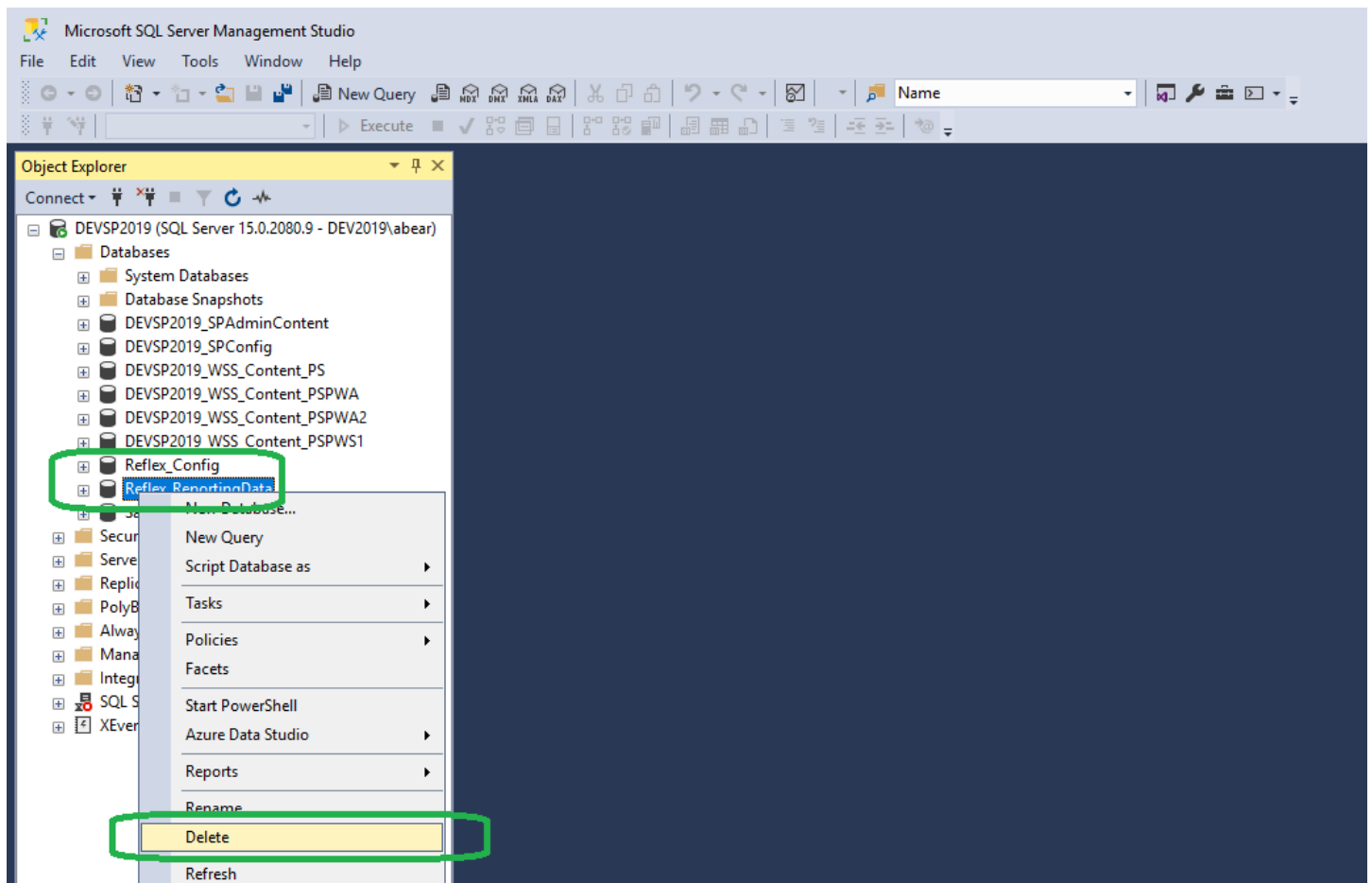


Click “Remove Solution”.



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.

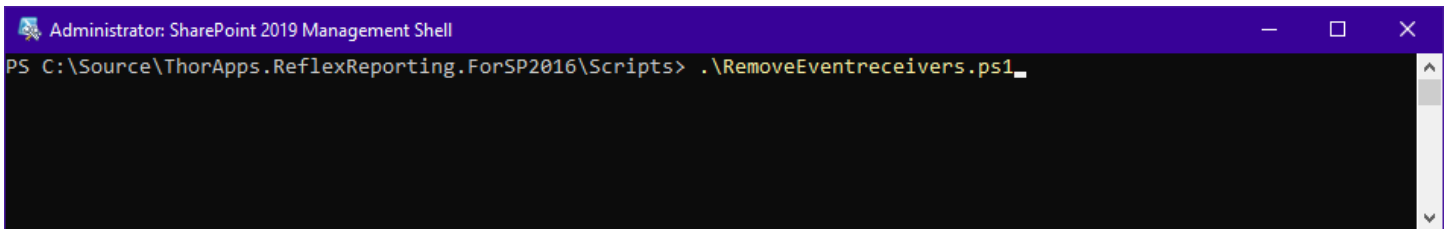


Remove Event Receivers

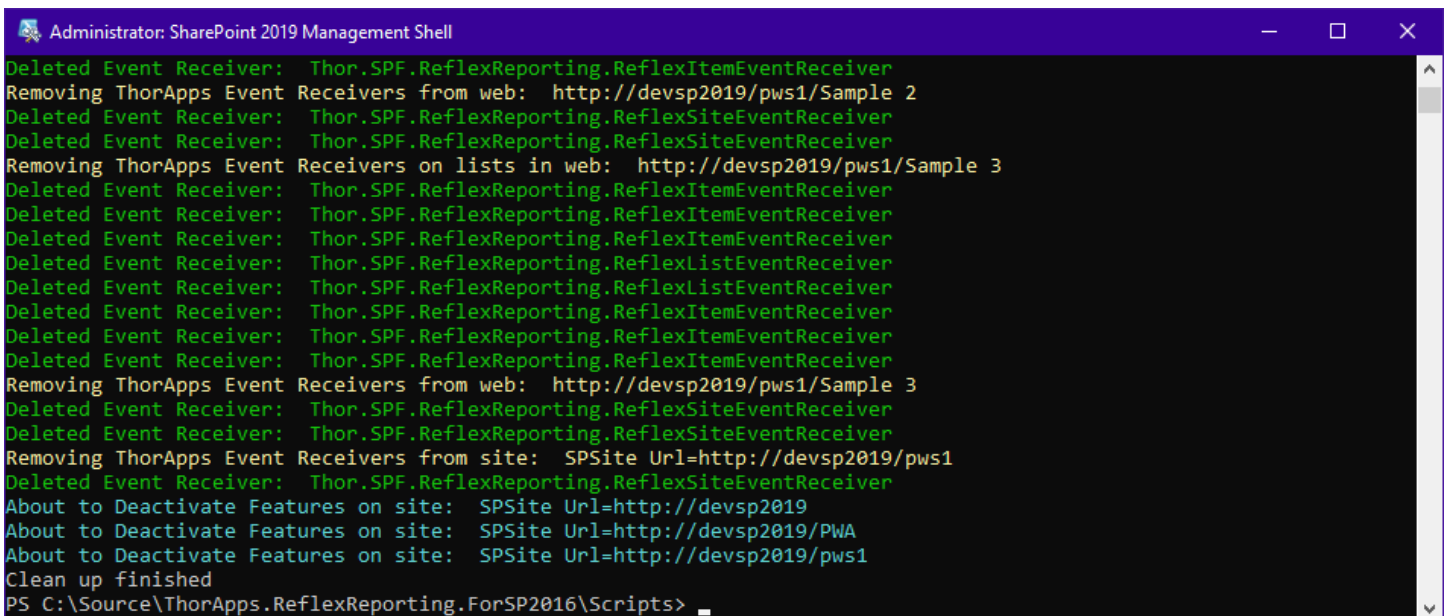
The final step is run a PowerShell script to clean up any event receivers registered by Reflex Reporting.

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.For2016.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

You can perform an “in-place” upgrade 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 features or re-create databases.

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”.

When upgrading Reflex Reporting, upgrade all farm solutions in use, including...

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

Any Questions?

Please contact our team of specialists at info@thorapps.com.