



## PowerStages User Guidance

Muhammet Atalay

# Table of Contents

I.	<b>Introduction</b> .....	2
II.	<b>Staged Entity</b> .....	3
III.	<b>Condition</b> .....	6
IV.	<b>Rule</b> .....	10
	Display Rule .....	10
	Button Rule .....	16
	Stage Flow Rule .....	18
V.	<b>Distribution List</b> .....	21
VI.	<b>Decisions</b> .....	25
VII.	<b>Custom Entity Configuration</b> .....	26
VIII.	<b>Troubleshooting</b> .....	34

## Introduction

---

PowerStages is a vertical solution for Dynamics 365 Customer Engagement (Legacy Name: Microsoft CRM) to implement operational rules and conditions to custom entities.

User can define submit, approve, reject operations per user or team with notifications and displaying fields through PowerStages. The solution sends document over given flows for verification or processing.

Stages can be built up only through Status Reason (StatusCode) of the custom entity so in order to send the document from Stage A to Stage B, Stage A and Stage B must be defined in Status Reason (StatusCode) of selected entity.

This document intends to help user to configure PowerStages properly.



*A User which has System Administrator Role at the tenant must import the PowerStages solution*

## Staged Entity

Main entity for the PowerStages. Staged Entity keeps custom entities to be used by PowerStages for form operations.



*Custom Entity must be configured for “Business process flows”, “Activities” and “Queues” from Entity Information Form as seen Figure 4 below*

*Form of the custom entity must contain State Code (StateCode) and Status Reason (StatusCode) fields so Please add them to the custom entity from beforehand.*

*Tip: You can consider adding those fields to Header or Footer of the form.*

*Custom Entity must be configured as described in “Custom Entity Configuration” section below.*

1. Open Dynamics 365 organization where PowerStages is installed
2. Click Power Stages from Area section in the menu left.

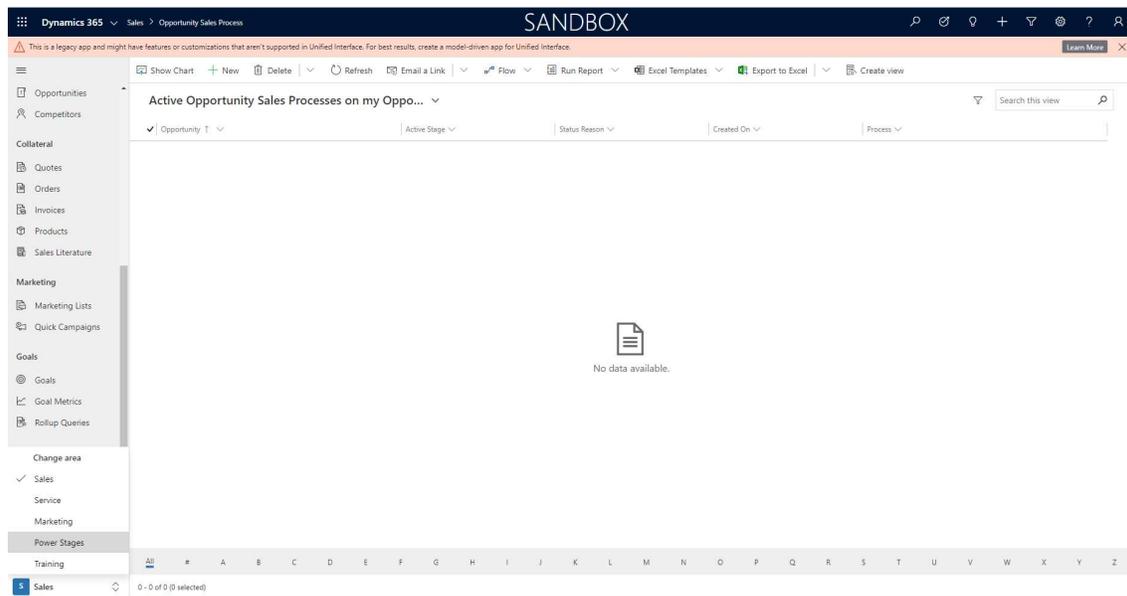


Figure 1- Changing area to Power Stages

3. Click “+ New” button from the menu top of the page

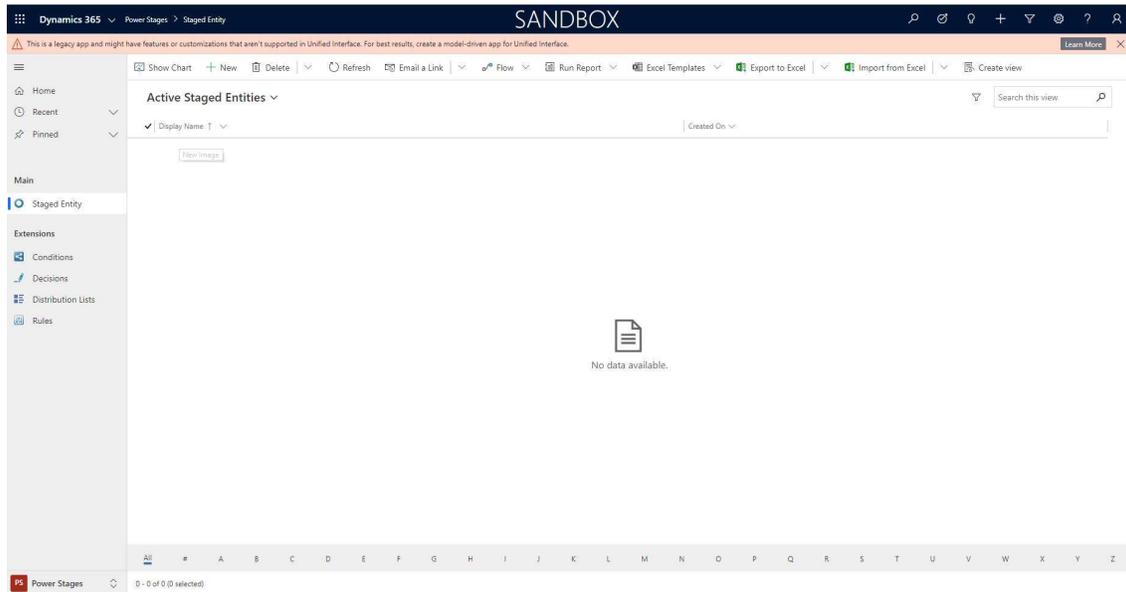


Figure 2- Opening New Staged Entity from the Menu

4. Choose the custom entity from entity lists which you want to convert into a form. PowerStages fills necessary fields to complete all configurations.

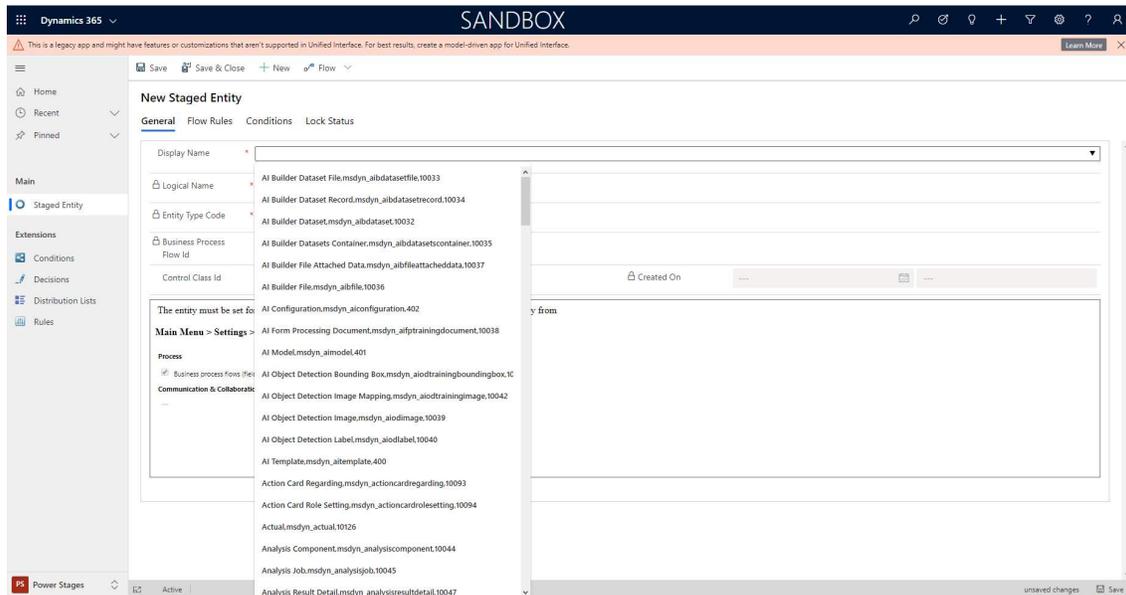


Figure 3- Search Custom Entity

 Custom Entity must be configured for “Business process flows”, “Activities” and “Queues” from Entity Information Form as seen Figure 4 below

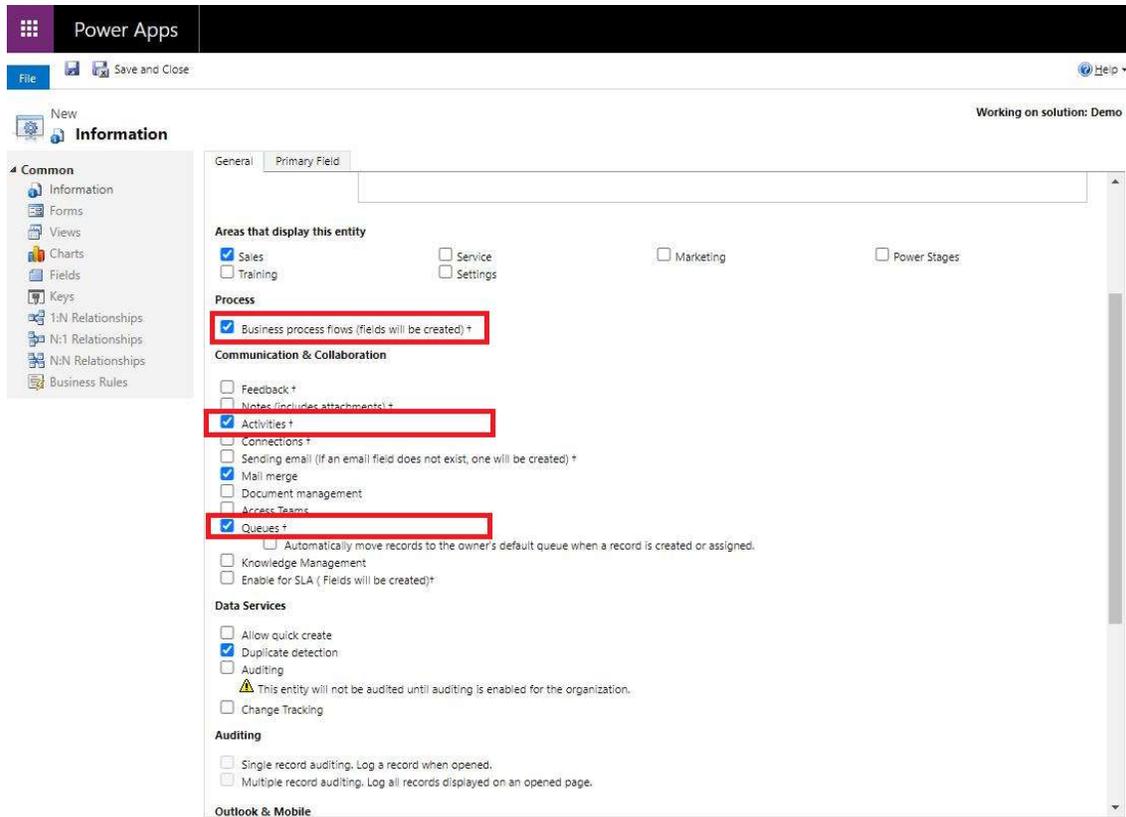


Figure 4- Minimum Custom Entity Information Settings for PowerStages

5. Click Save&Close.

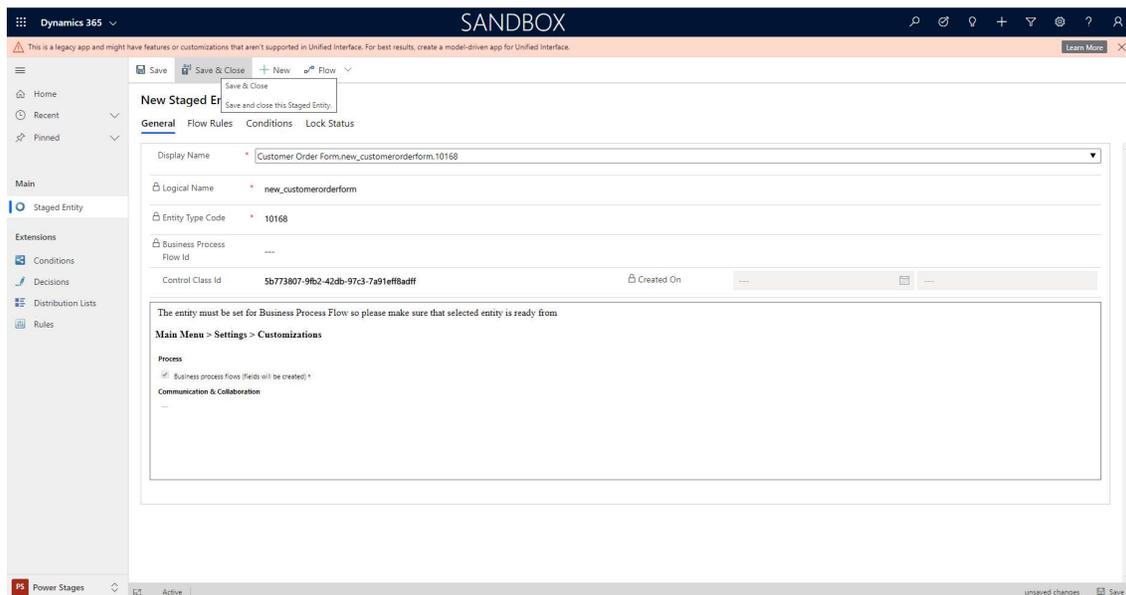


Figure 5- Save&Close

6. PowerStages will ask for a confirmation about Business Process Flow creation for the selected entity. Click Ok to accept and close the form. Cancel will terminate the operation thus; Custom entity will not be operable for PowerStages.

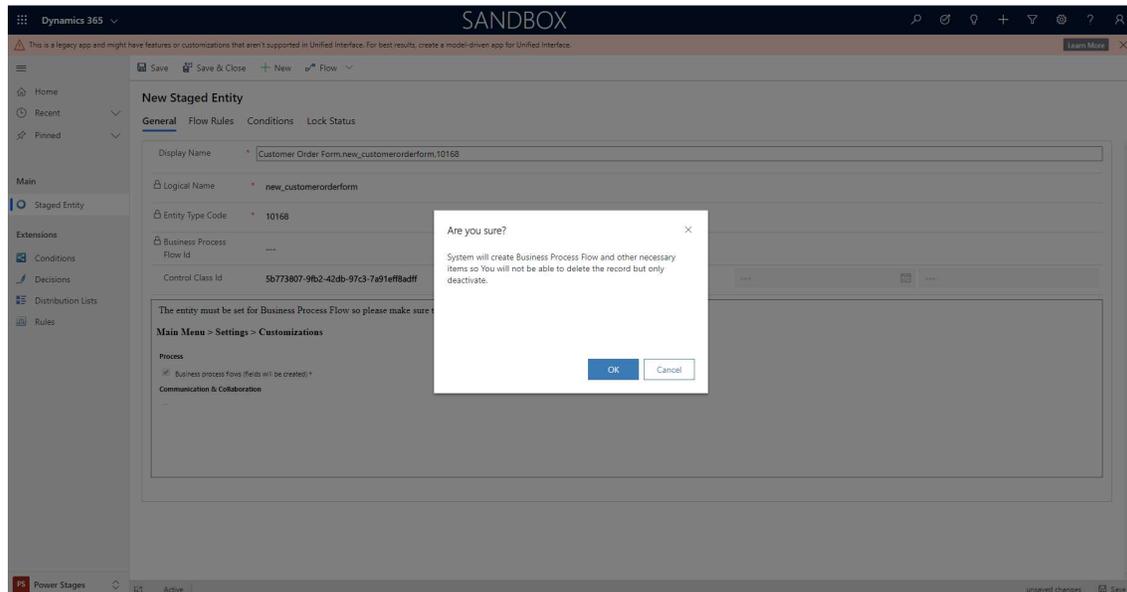


Figure 6-BPF Confirmation

## Condition

It classifies rules to be implemented for certain team/user. Although, Stage Flow Rules are not bound to the condition, it is indirectly bound to rules under the condition so if you want to bind one Stage Flow Rule to a condition, you should create at least one Display Rule under the selected condition with the same Status Reason in "from" field at Stage Flow Rule.

1. Open Dynamics 365 organization where PowerStages is installed
2. Click Power Stages from Area section in the menu left.



*Do not make direct call through Condition menu item to create a condition.*

3. Go to “Conditions” section
4. Click “+ New” to the condition.

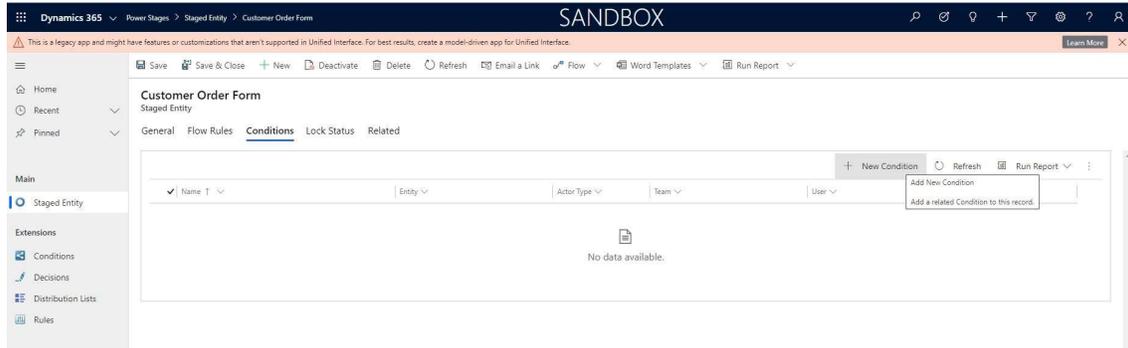


Figure 7- New Condition Record Creation

5. Condition Form opens

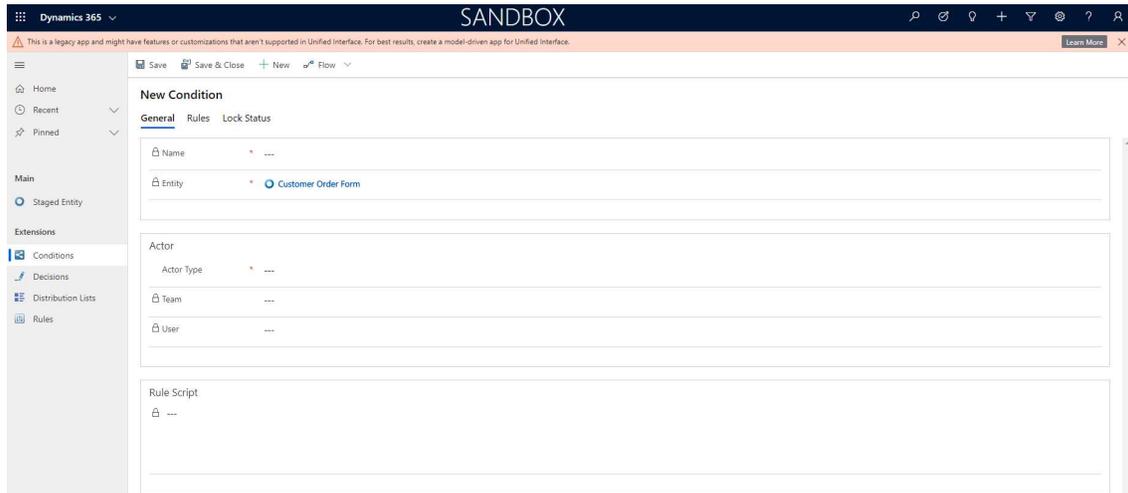


Figure 8- New Condition Form

- Choose Actor Type whether to state to whom will rules to be applied.

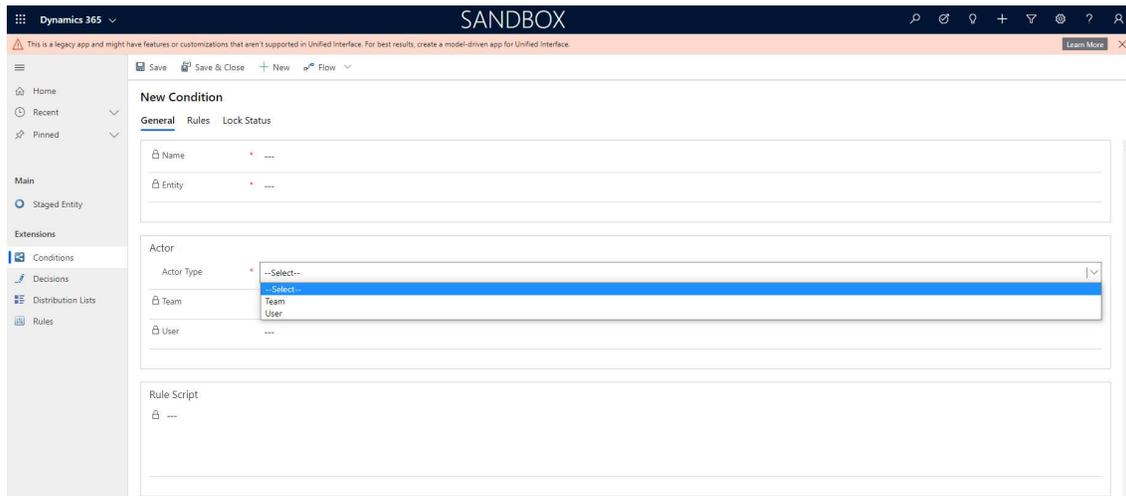


Figure 9- Actor Type Selection

- If Actor Type is Team, Team field will be editable and mandatory. Choose a team to be considered for all rules underneath.

**Reminder:**  
 Team must have necessary privilege to access custom entity (at least Read)  
 User must be ready to send or receive email if there is an E-Mail type notification for the user (see Distribution List section below).  
 Team must have necessary privilege to queue (at least read), if there is an queue type notification for the team (see Distribution List section below).

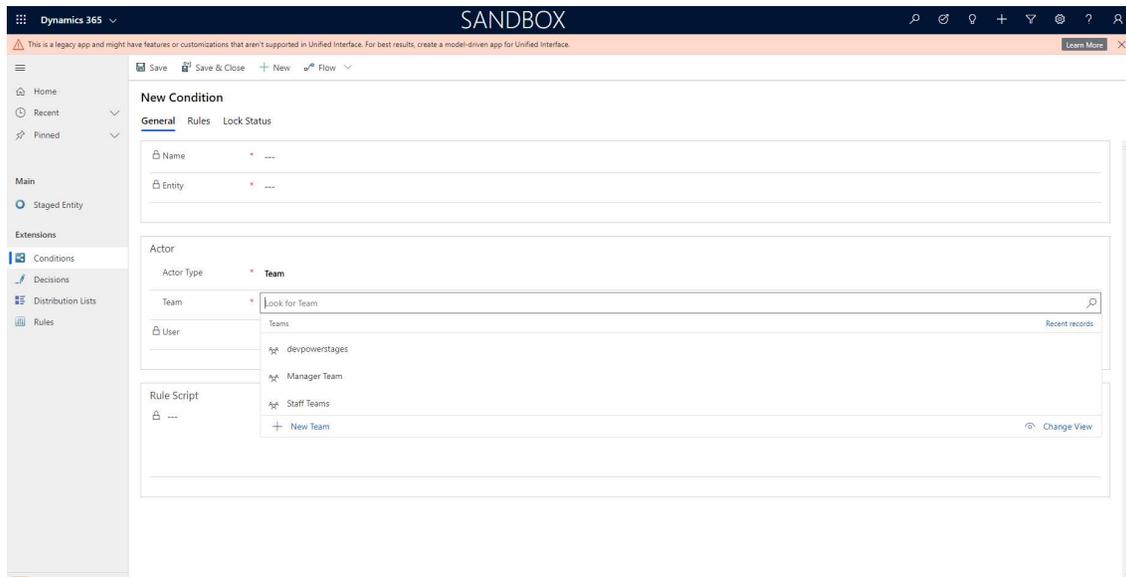


Figure 10- Team Lookup

- b. If Actor Type is User, User field will be editable and mandatory. Choose a user to be considered for all rules underneath.
7. Click Save (if you continue with Rule Creation below) or Save&Close

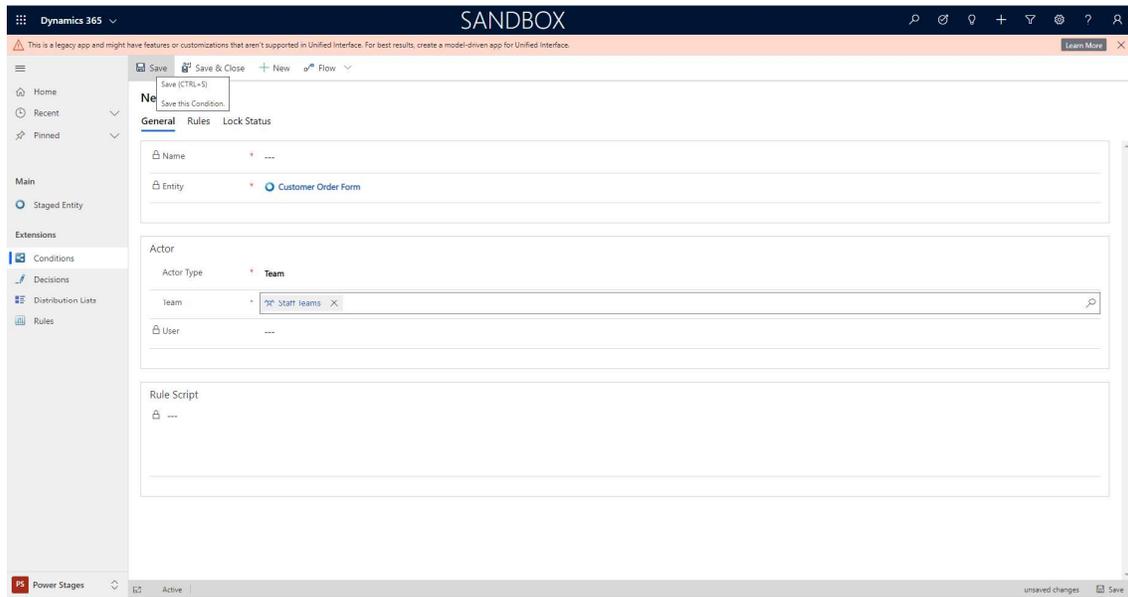


Figure 11- Save Condition

# Rule

Rule defines PowerStages objects to be used for operations. It can be a Display Rule, Stage Flow Rule and Button Rule.

## Display Rule

 There must have at least one Display Rule for a user in order to open the form.

1. Go to Rules section from Condition as described above then click “+ New Rule” from the Grid View.

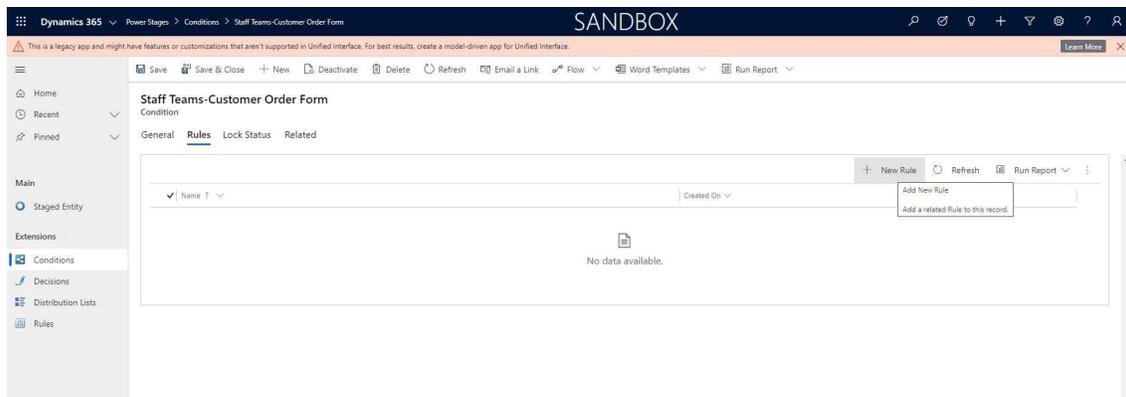


Figure 12- New Rule Creation

2. Rule form will open.
3. Select “Display Rule” from Type field.

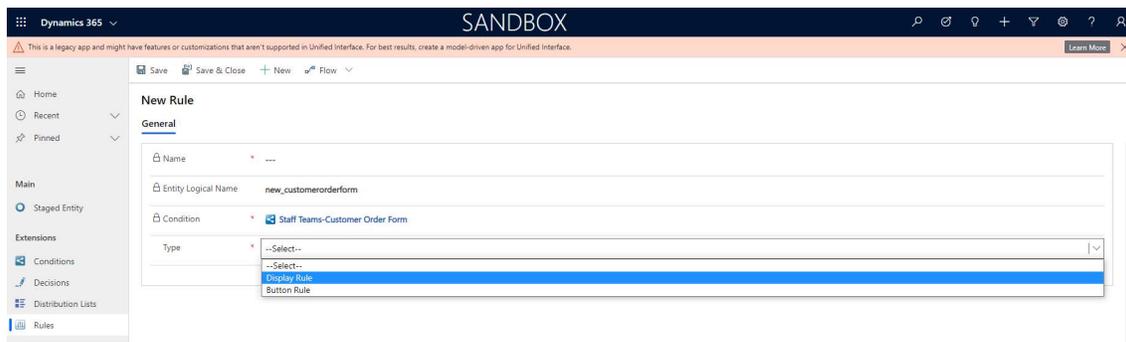


Figure 13- New Form of General Section

4. Record Status field and Display Rule Tab will be appeared.

- Click Record Status. PowerStages will display all valid values. Choose one item that will be used by Display Rule.

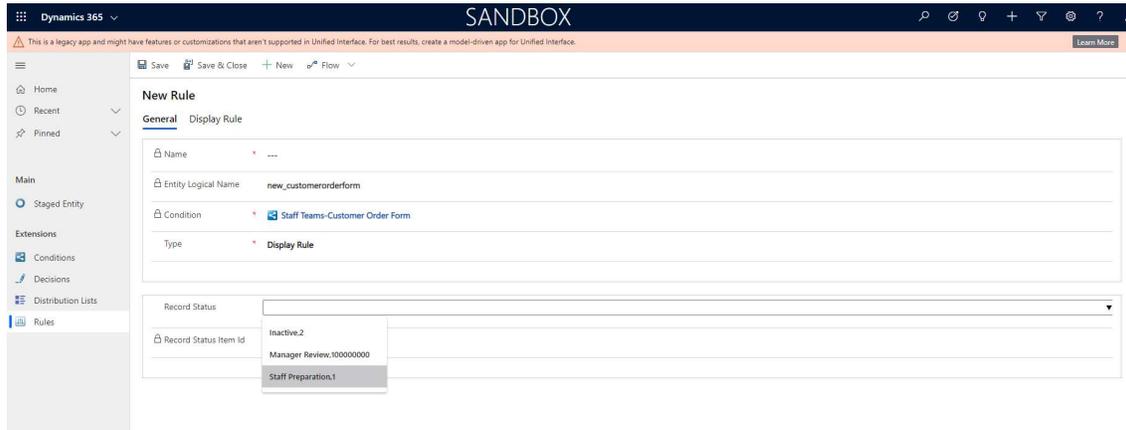


Figure 14- Record Status Selection

**i** *How to read Condition – Display Rule – Record Status.*

*Display Rule will be applied to an actor under condition for the record status that matches the selection so*

*According to Figure 4; Display Rule will be valid for a user whose member of “Staff Teams” and a record which’s status is “Staff Preparation”*

- Go to Display Rule tab then choose the proper value.

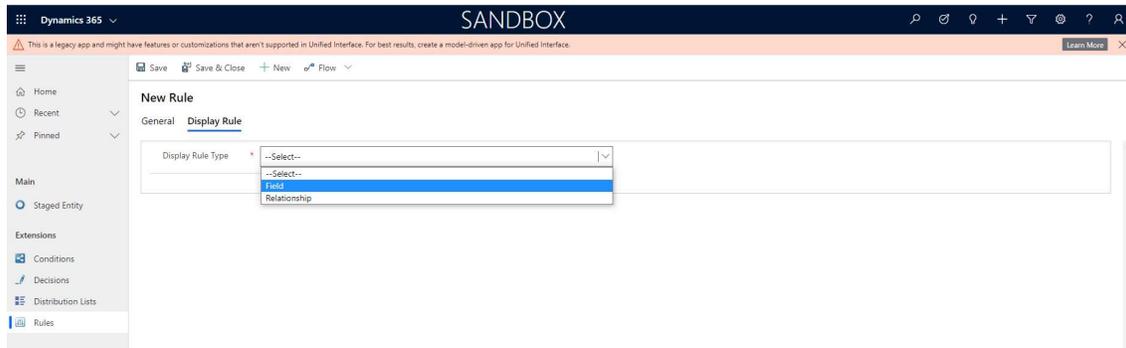


Figure 15- Display Rule Type Selection

## 7. Field

- a. If you choose Field for the Display Rule Type, regarding fields will be displayed. Choose a value from Field. PowerStages lists all valid fields of the custom entity where is stated in Staged Entity

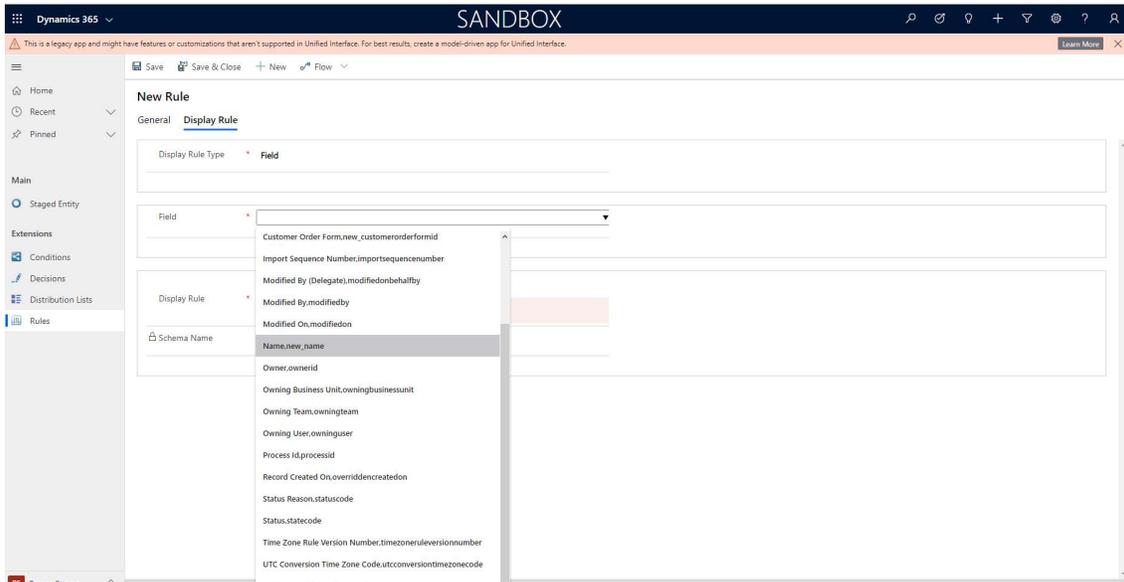


Figure 16- Field Selection for Field type in Display Rule

- b. Choose a rule.

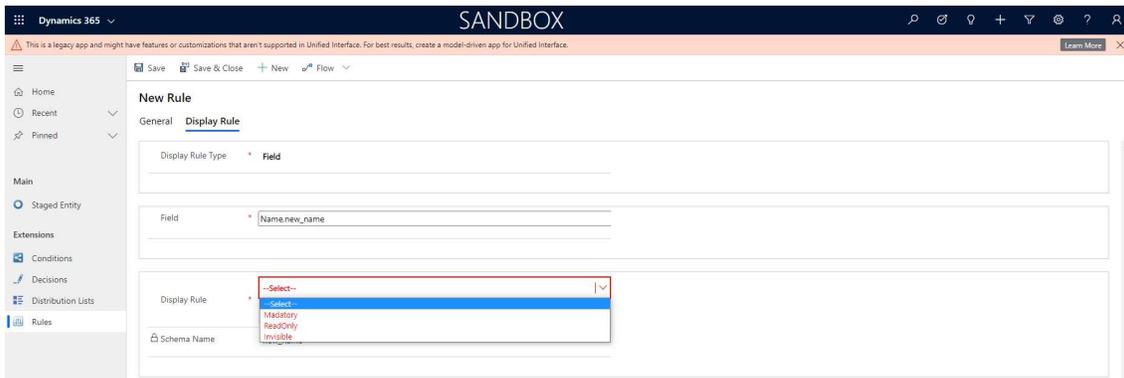


Figure 17- Display Rule

c. Click Save&Close to complete

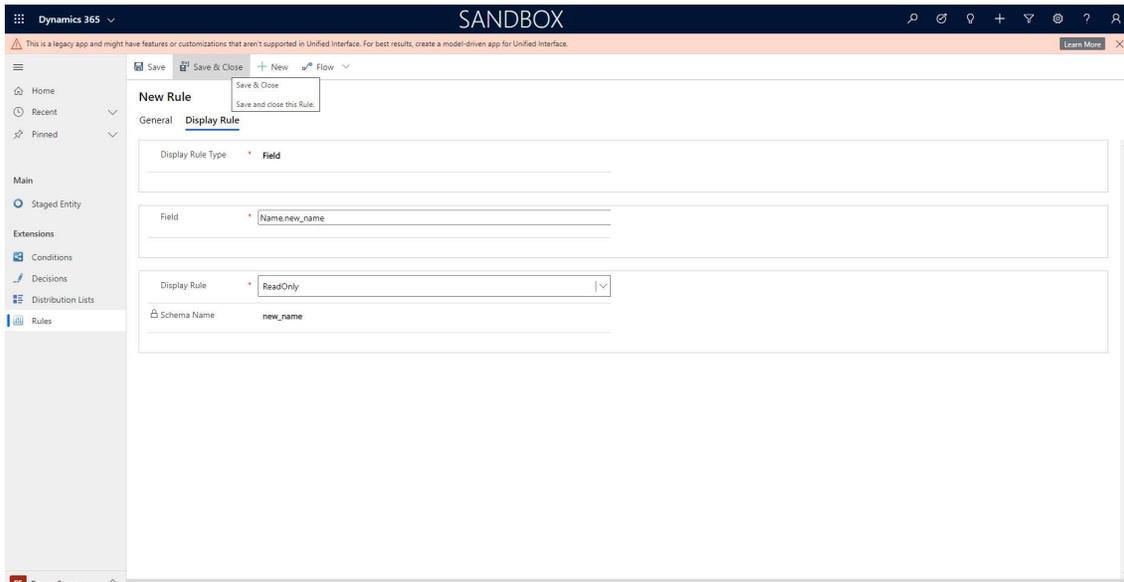


Figure 18- Save&Close to Field type Display Rule

## 8. Relationship

It defines relationship dependencies for the record in order to submit, reject or approve. If the record meets the rule, PowerStages allows to the form for sending next stage or back to previous stage or deactivating form.

- a. If you choose Relationship in Display Rule Type, regarding fields will be displayed. Choose a value from Display Rule Relationship Type.

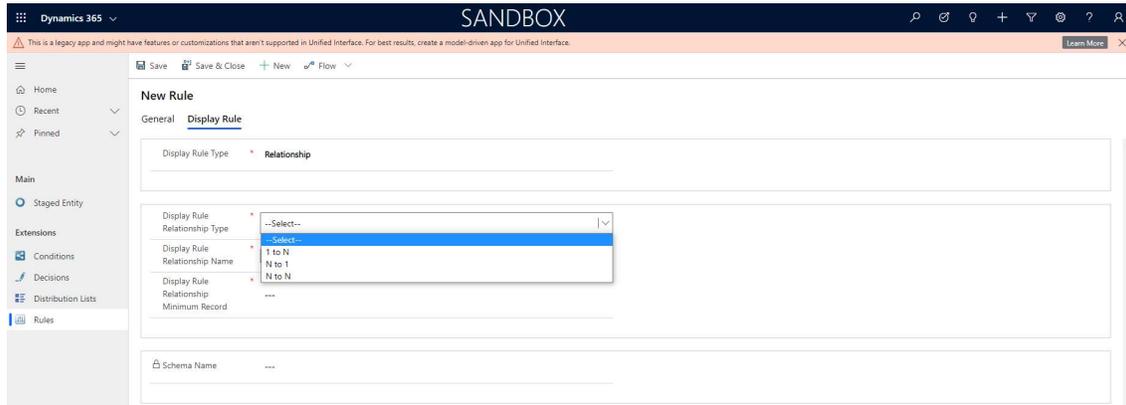


Figure 19- Relationship Type

- b. Choose Relation from the list in Display Rule Relationship Name. PowerStages lists all relations of the custom entity based on Relationship Type (1-N, N-1, N-N).

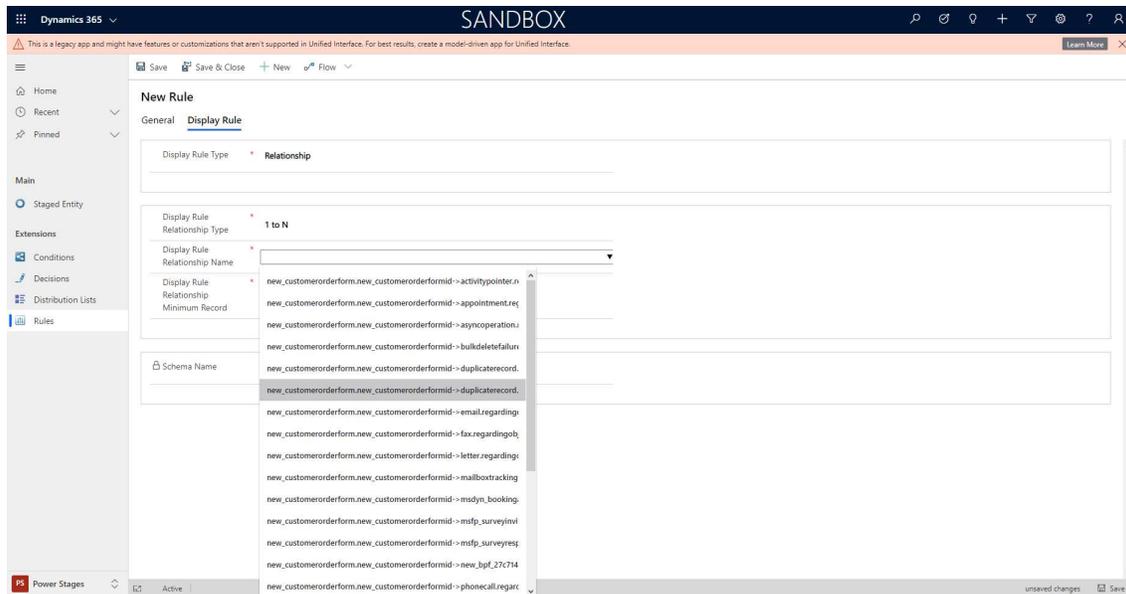


Figure 20- Relation selection

- c. Set a number to Display Rule Relationship minimum record. PowerStages does not allow to start any operations unless Related entity record's count of the form is exceeded to given number.

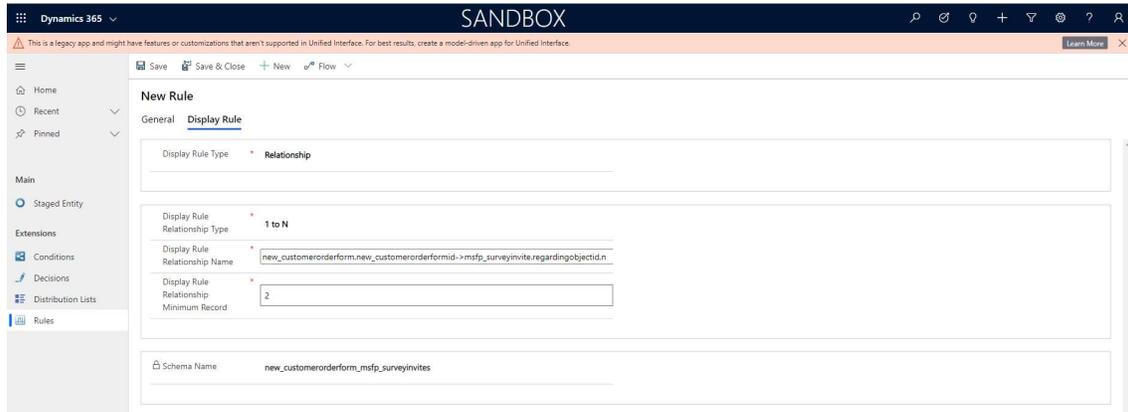


Figure 21- set minimum records that must be exists for the related entity

- d. Click Save&Close to complete

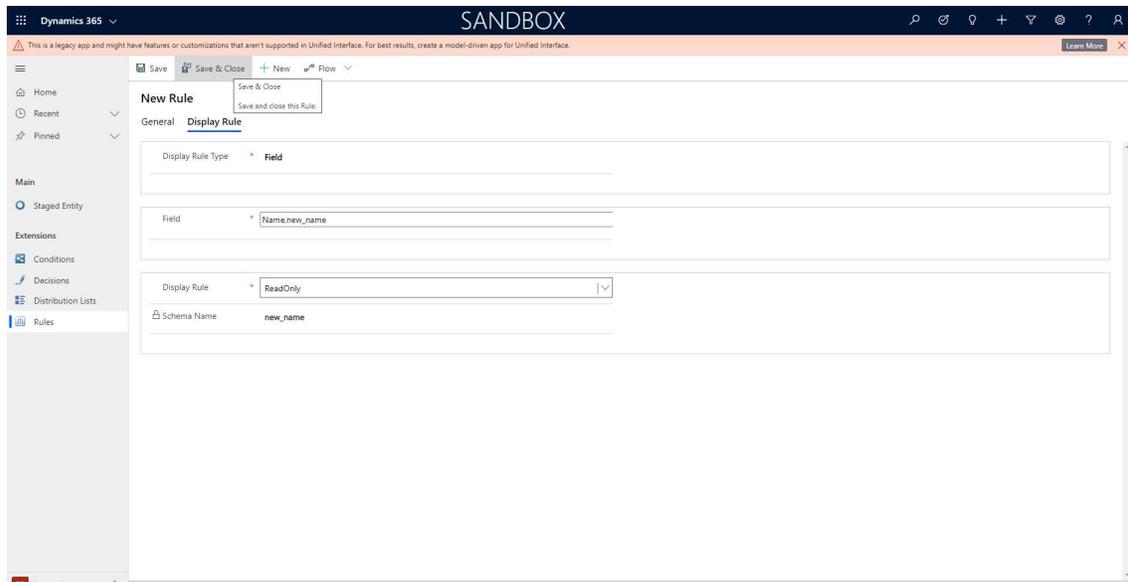


Figure 22- Save&Close to Relationship type Display Rule

## Button Rule

1. Go to Rules section from Condition as described above then click “+ New Rule” from the Grid.

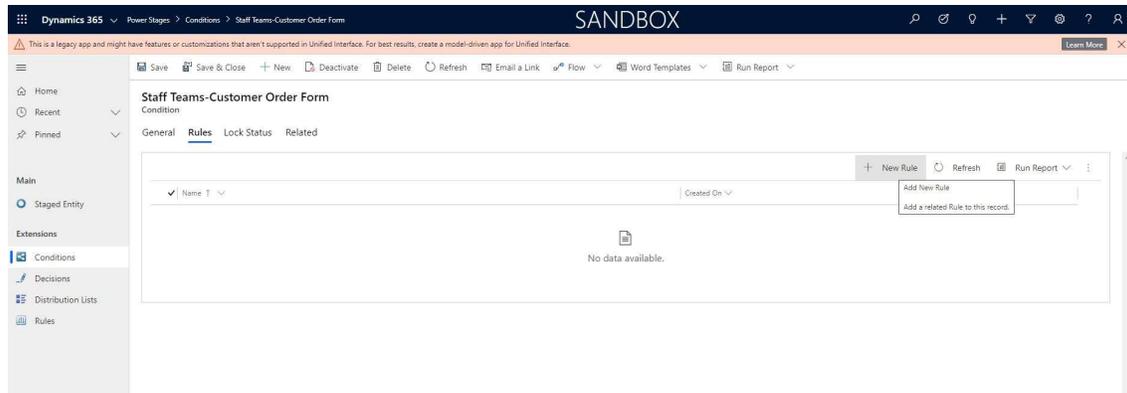


Figure 23- New Rule Creation

2. Rule form will open.
3. Select “Button Rule” from Type field.

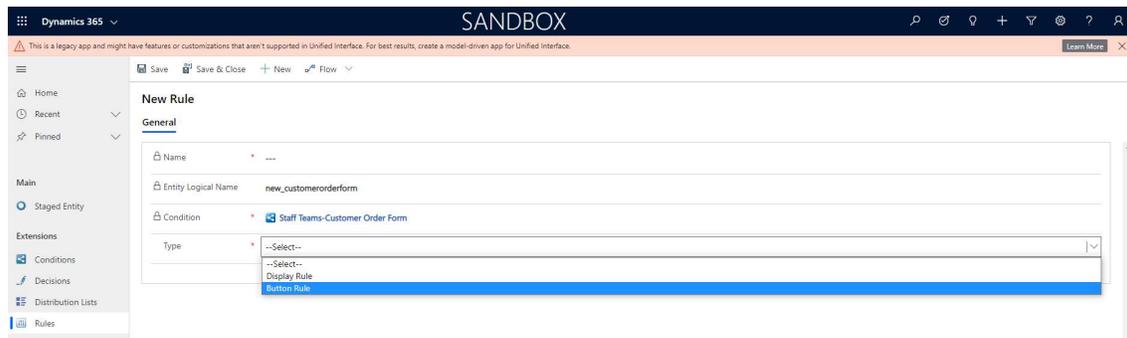


Figure 24- Button Rule Type Selection

4. PowerStages is going to ask a verification. Click Ok to continue, Otherwise, It is not allowed to create Button Rule.

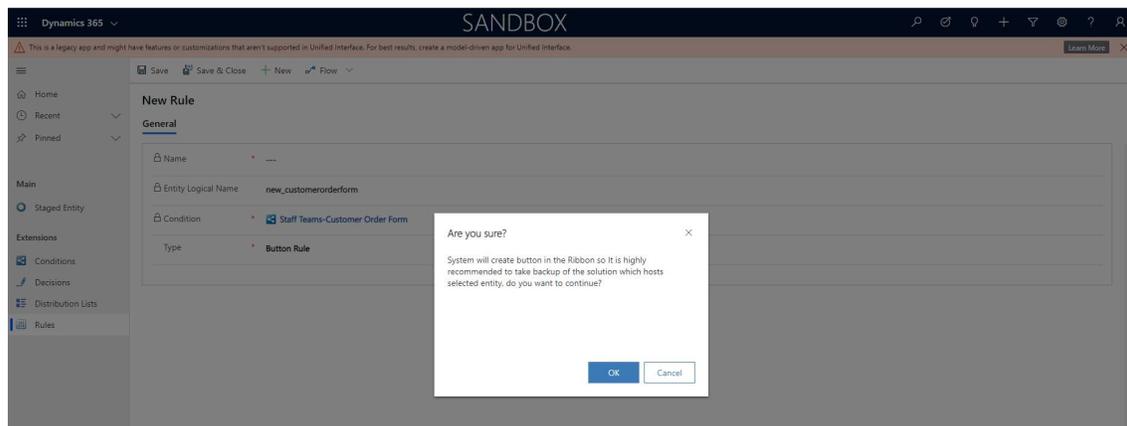


Figure 25- Button Rule Verification

- Record Status field and Button Rule Tab will be appeared.
- Click Record Status. PowerStages will display all valid values. Choose one item that will be used by Button Rule.

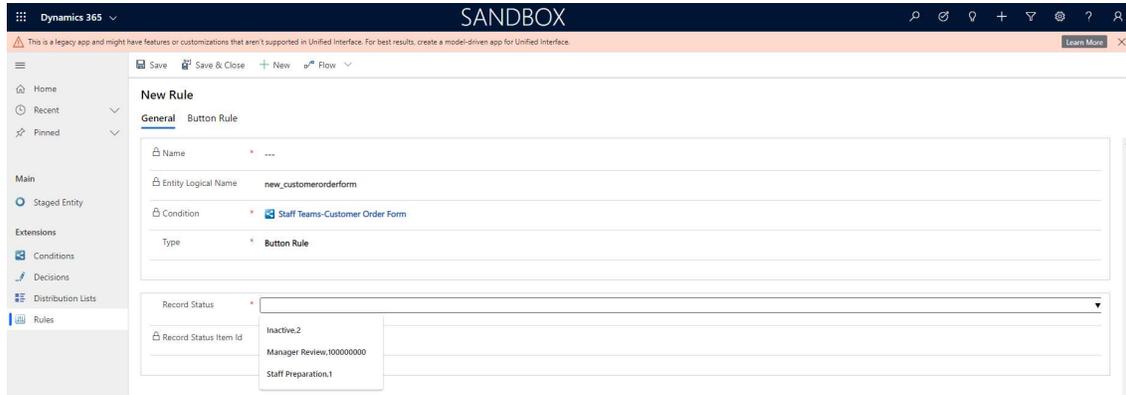


Figure 26- Record Status Selection

- Go to Button Rule then select a value that will be set to the form for given Record Status (Stages) and selected User or Type (under Condition).

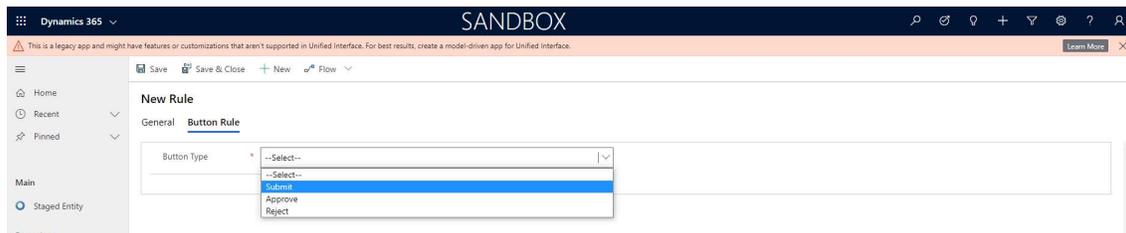


Figure 27- Button Type Selection

- Click Save&Close

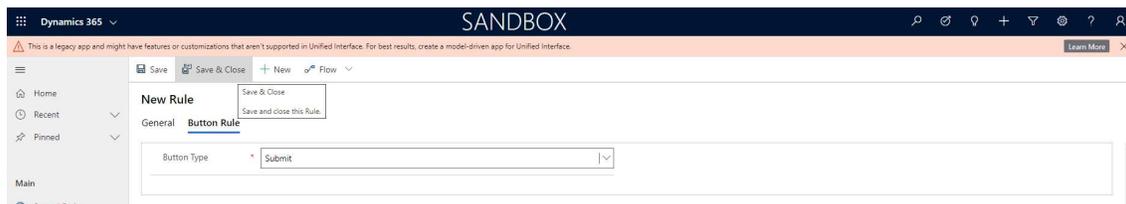


Figure 28- Save&Close

**i** PowerStages is going to modify Ribbon in Dynamics CRM so There may have performance degradation during the operation.  
It is recommended to create a button out of peak time or business hours.

- Check Lock Status in the Condition to see if the button creation has been completed or not.

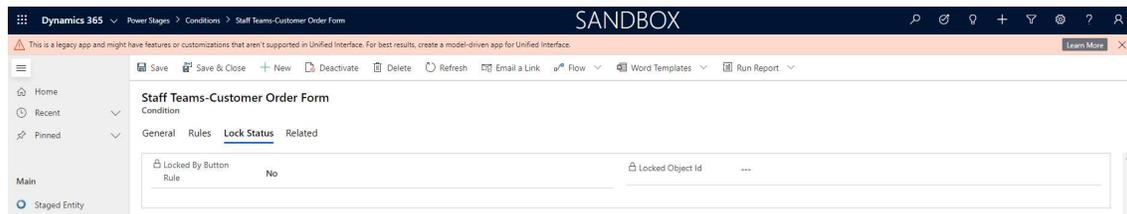


Figure 29- Lock Status

## Stage Flow Rule

It creates stages for the form to flow.

- Click Power Stages from Area section in the menu left.
- Open the record where Stage Flow Rule will be created.
- Go to Stage Flow Rule tab

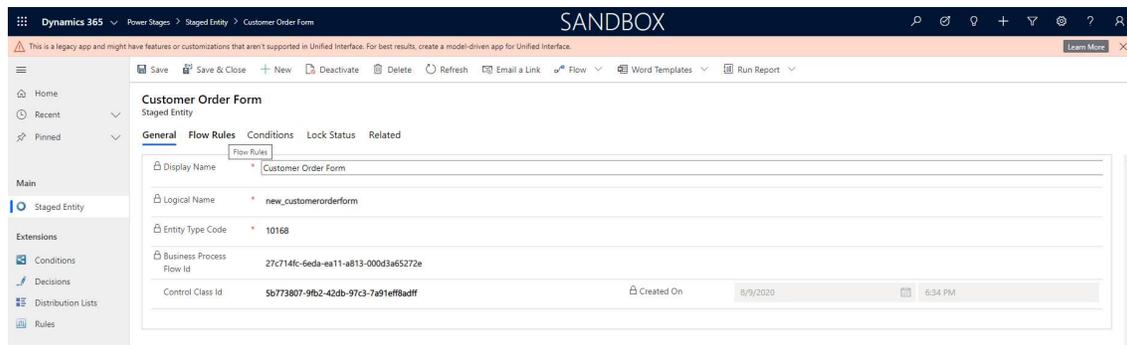


Figure 30- Flow Rules Tab

- Click "+ New Rule"

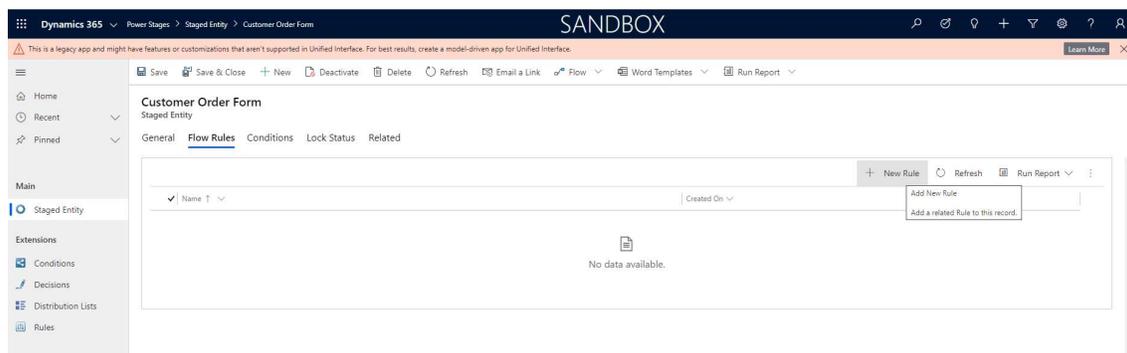


Figure 31- Click "+ New" for Stage Flow Creation

5. PowerStages will open the form itself then go to “Stage Flow Rule” tab



Figure 32- Stage Flow Rule Main Form Page

6. Choose “From” and “To”. PowerStages prepares valid Record Status for the custom entity and displays them in the lists.

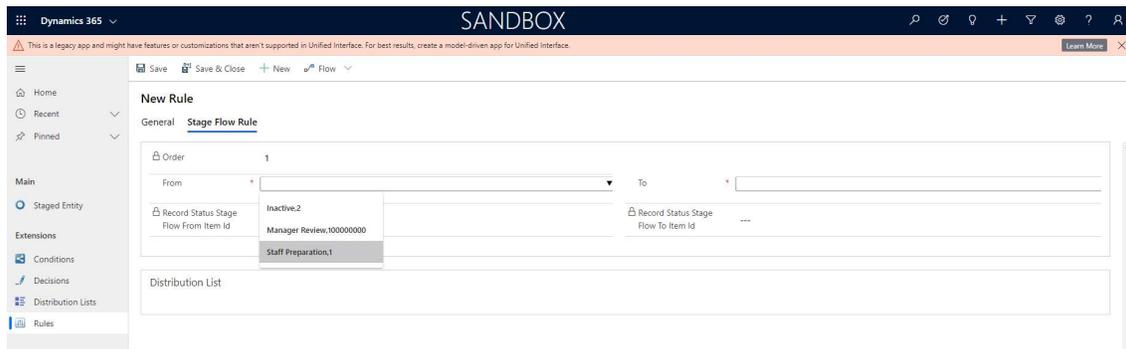


Figure 33- From Selection

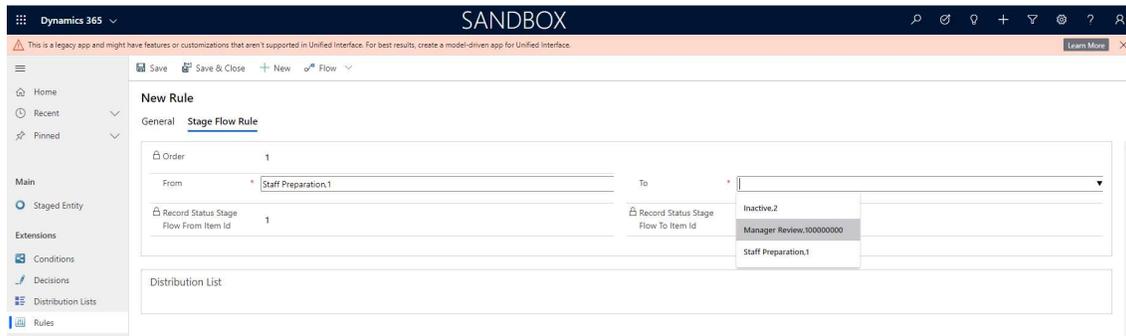


Figure 34- To Selection

7. Save the form to continue with Distribution List definition.

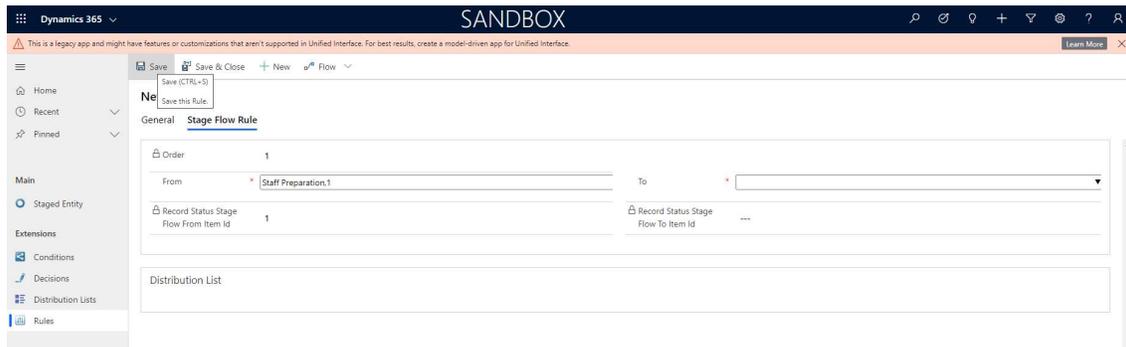


Figure 35- Save the Stage Flow Rule

**i** There must have at least one submit type button rule under condition for the Staged Entity in order to send form from "From" to "To".

8. Click "+ New Distribution List" to create a record for the Flow Stage Rule.

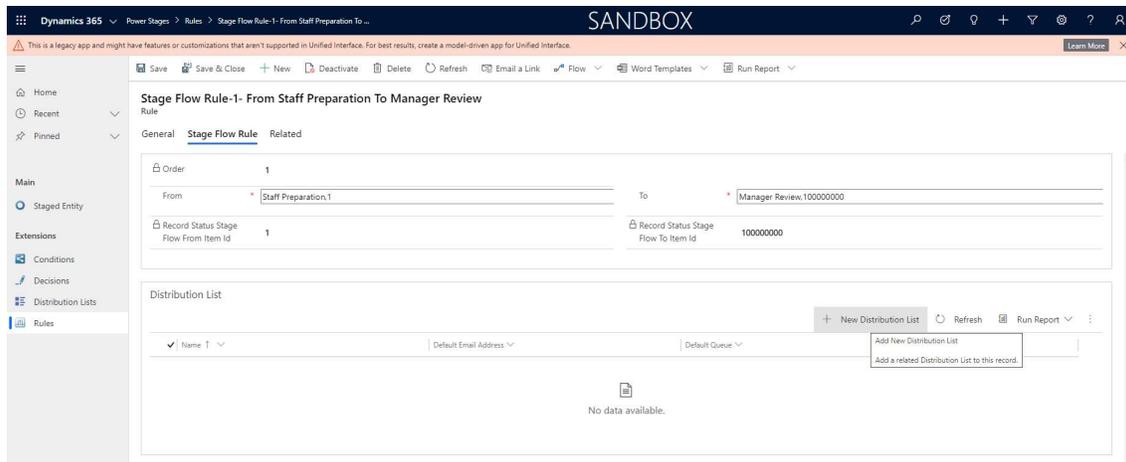


Figure 36- Distribution List Creation

# Distribution List

It is notification and keeps parties who are going to get E-Mail or Item in their Queue when an operation executes.

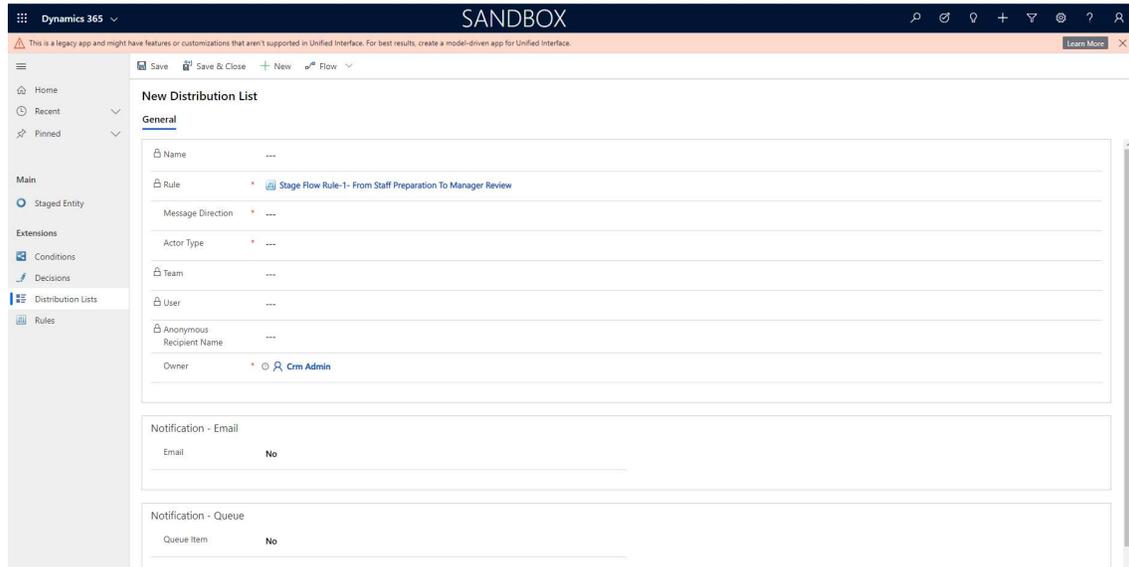


Figure 37- Distribution List Main Form

Distribution List can be accessed only through Stage Flow Rule under Entity Staged as describe above.

1. Choose direction when notification is triggered.
  - a. Next Stage via Submit Button
  - b. Previous Stage via Reject Button
  - c. Closure via Approve Button

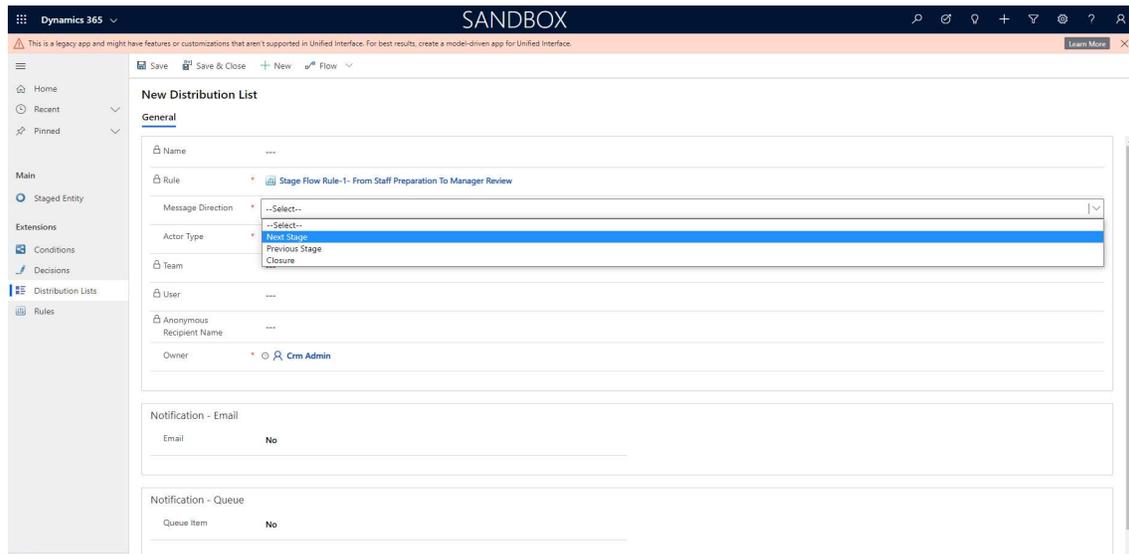


Figure 38- Message Direction

2. Choose Actor Type
  - a. Team
  - b. User
  - c. Anonymous (only email can be defined)

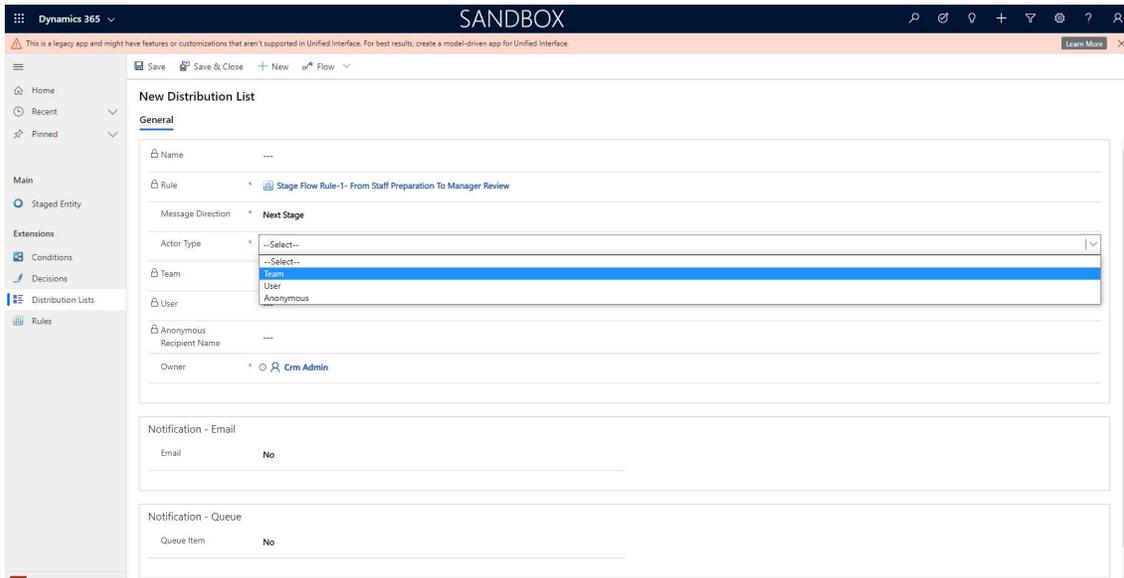


Figure 39- Actor Type

3. Team, User or Anonymous Recipient Name will be enabled according to the selection in Actor Type so choose an item for Team and User but text name for the Anonymous Recipient Name.

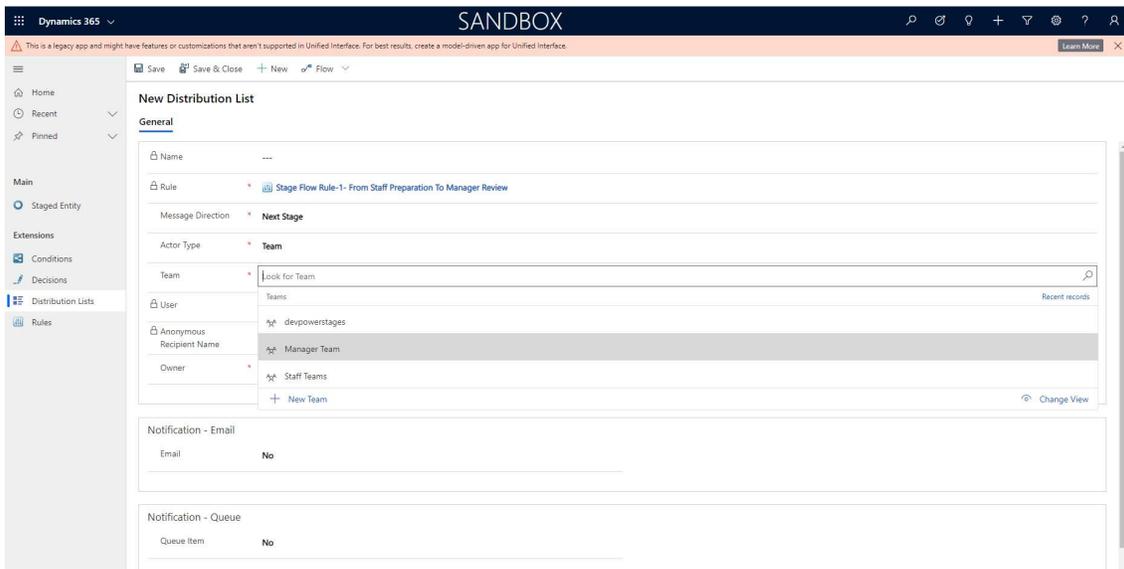


Figure 40- Team Type Recipient Definition

4. You can set up either Email or Queue or Both to configure notification for the actor type.
  - a. If you want to set up Email, Choose Yes to Email under Notification – Email section

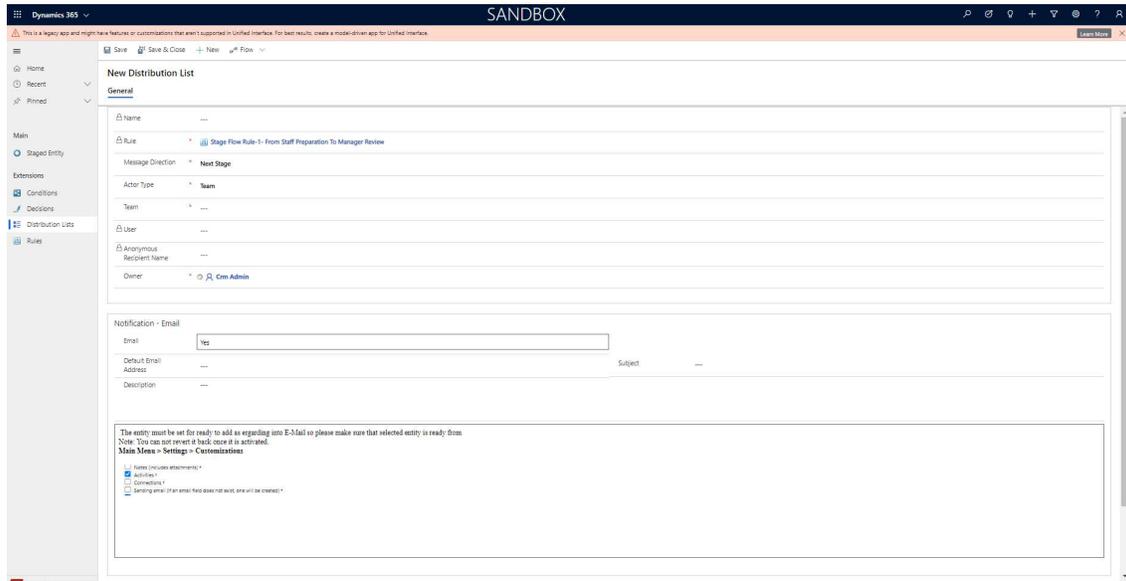


Figure 41- Email Notification

- i. Choose an email address for default delivery. If you do not fill the field, PowerStages will use Email address of user (each member if Actor Type is Team) in the organization.
- ii. You can set Email subject or leave empty for default
- iii. You can also set a message for the Email to be sent. Default message will be sent in Email body to recipient if you leave it empty.

 User or Users under the team must be configured properly to send or receive emails in the Dynamics 365 Tenant.

b. If you want to set up Email, Choose Yes to Email under Notification – Queue section

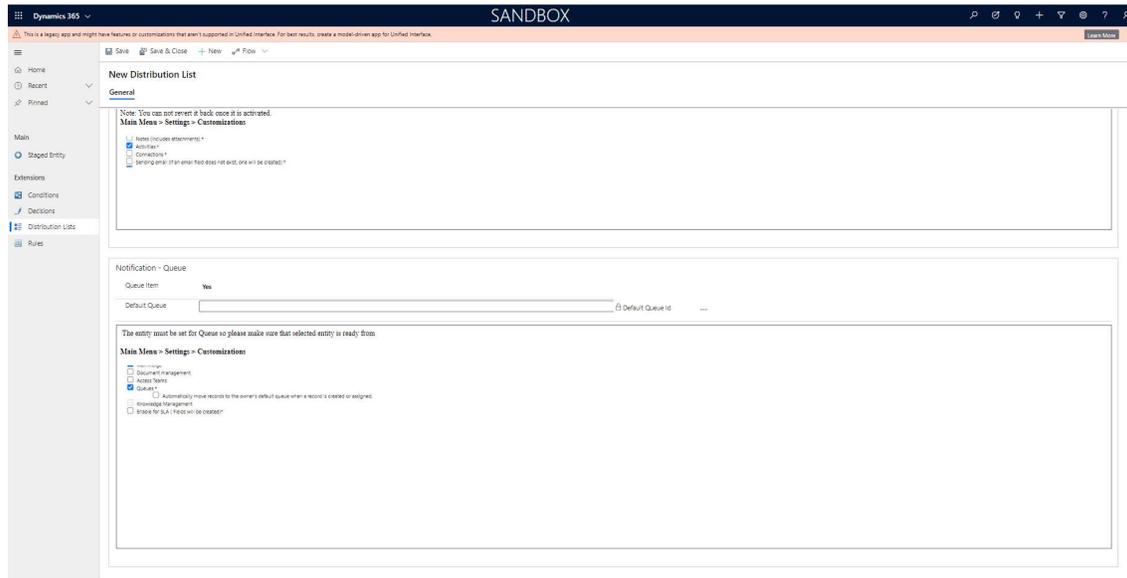


Figure 42- Queue Notification

i. Choose a queue for the Actor Type. Form will be sent to the selection, once Submit or Reject buttons are clicked accordingly. If you do not fill the field, PowerStages will use default queue of the Actor Type.

 PowerStages displays available queue based on the selection in Team or User field.

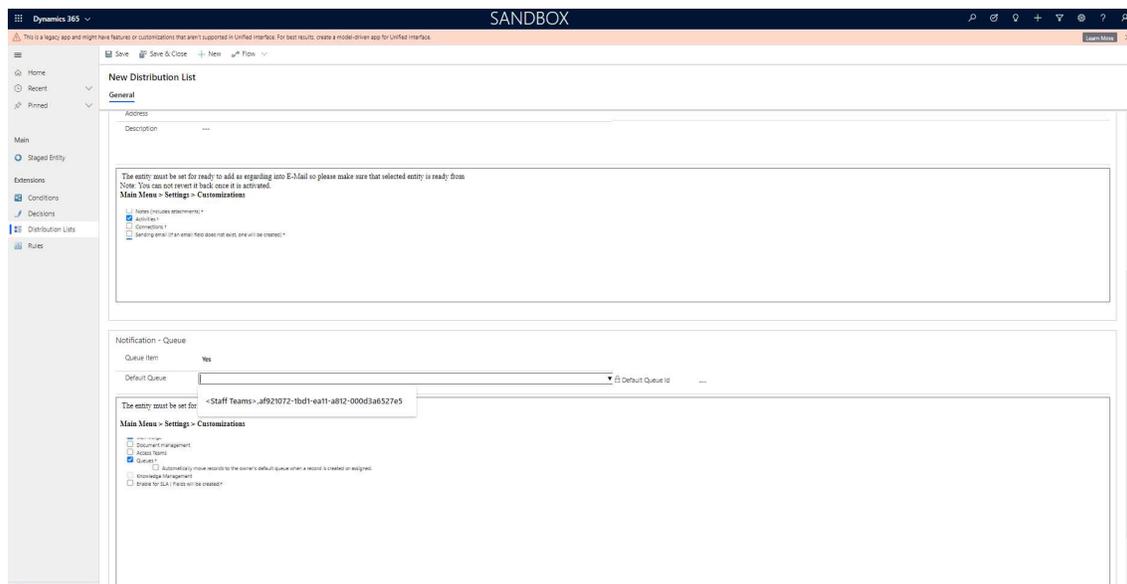


Figure 43- PowerStages lists all available queue to be used in the Distribution List

# Decisions

It keeps logs of the Submit, Reject and Approve operations. You can reach the entity from PowerStages Area in the menu right

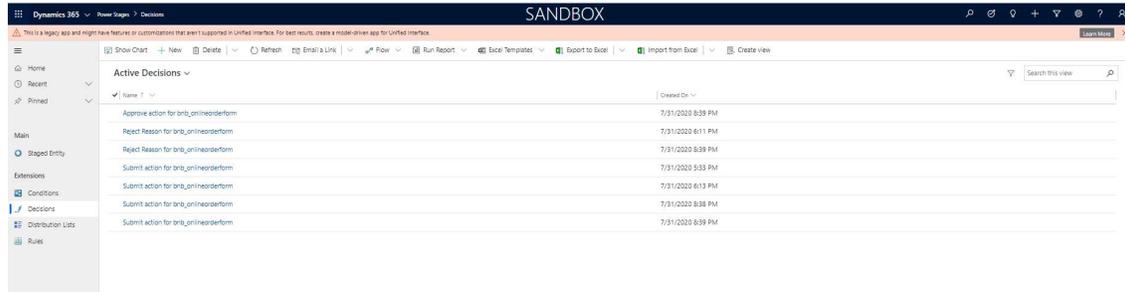


Figure 44- List view of Decisions

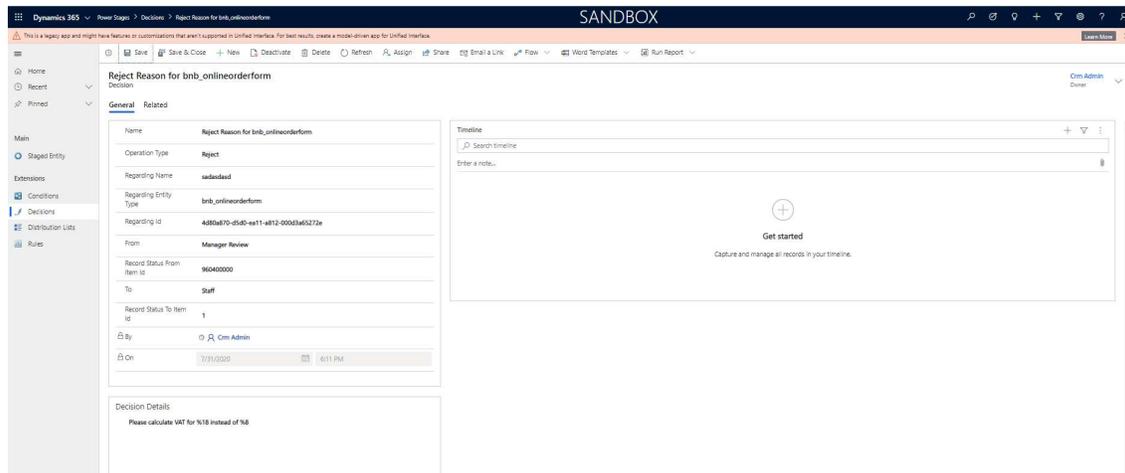


Figure 45- Decision Record Main Form View

 Administrator should consider a solution to display records under decisions to the user if needs or make a report for managers or even leave as is for only monitoring.

# Custom Entity Configuration

The entity which is going to be used by PowerStages, must be configured below.

**i** Make sure that default value of the Status Reason (StatusCode) for the custom entity, is exactly same with the "From" field in the very first Stage Flow Rule (Order is 1), See Figure 46.

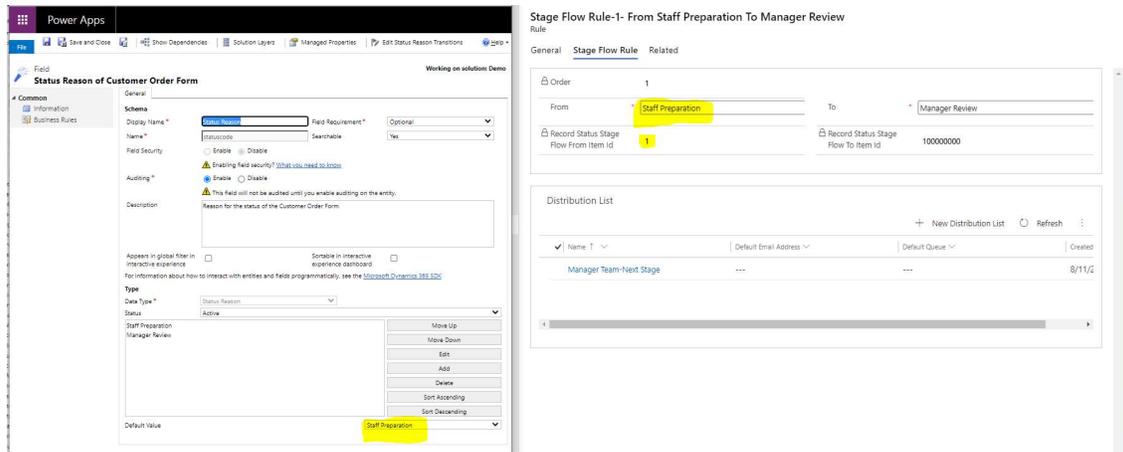


Figure 46- Default Value Status Reason Dependency with the first Stage Rule

**i** Custom entity which is used in the screenshots below, is built for an example.

1. Open custom entity form design which is defined in Staged Entity then choose “Form Properties” from the menu.

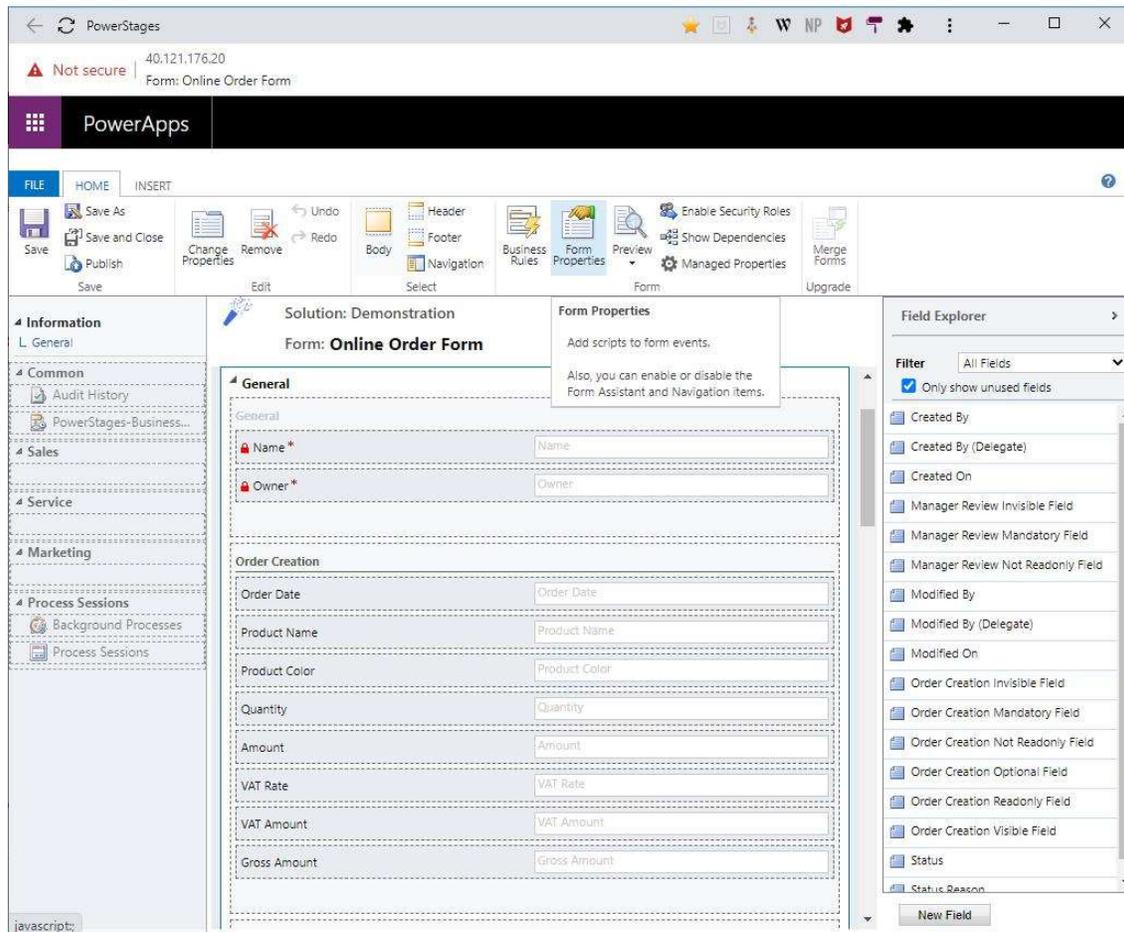


Figure 47- Custom Entity Main Form Design

2. Click "+ Add" from "Form Properties" pop-up window.

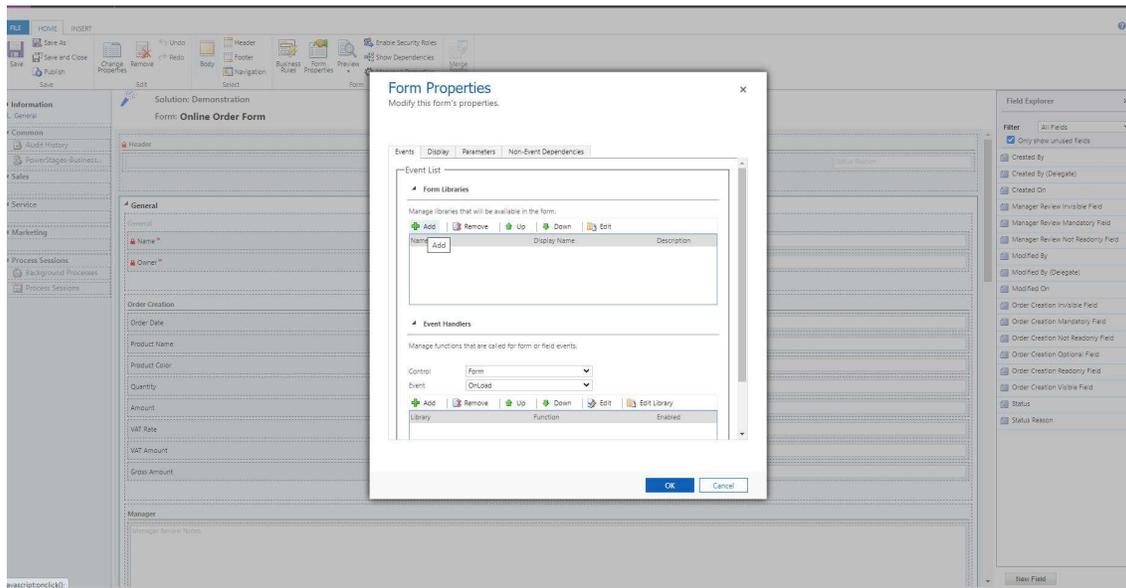


Figure 48- Form Properties

3. Look for Process JavaScript file ("bnb\_/stages/js/process") from the list.

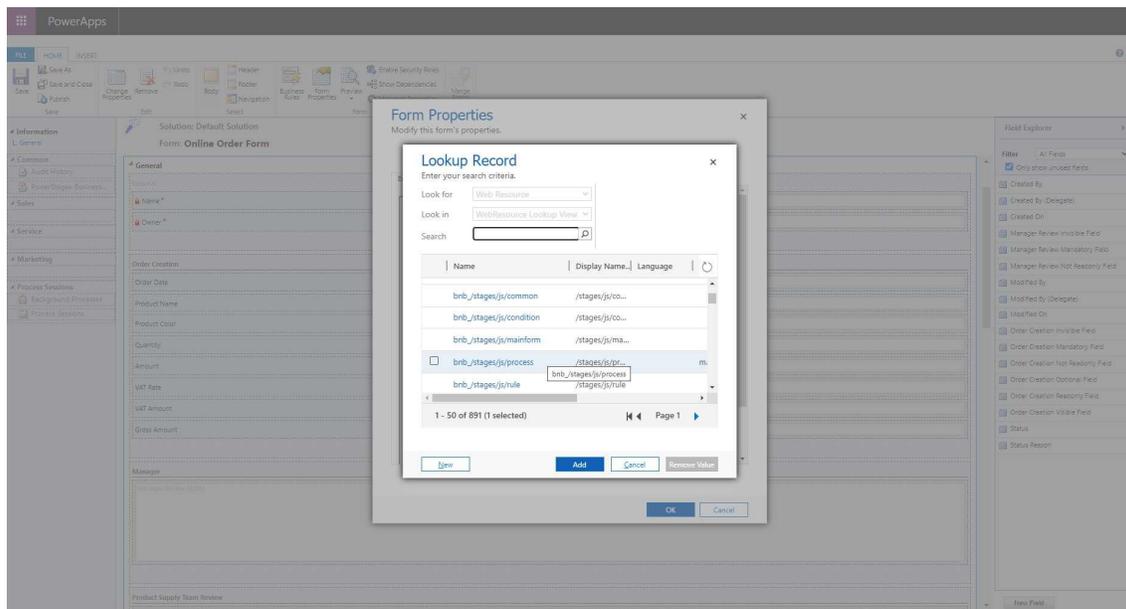


Figure 49- Lookup Record for Process.js

4. Select the “bnb\_/stages/js/process” then click add.

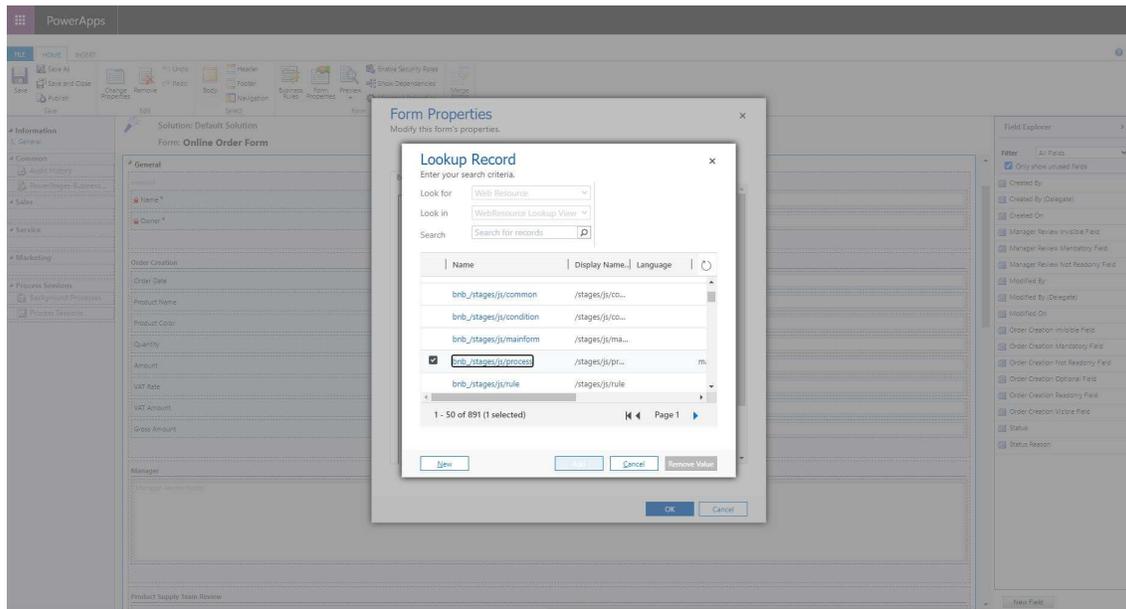


Figure 50- Choosing process.js

5. Click “+ Add” again to add common JavaScript file (It must be ordered in second).

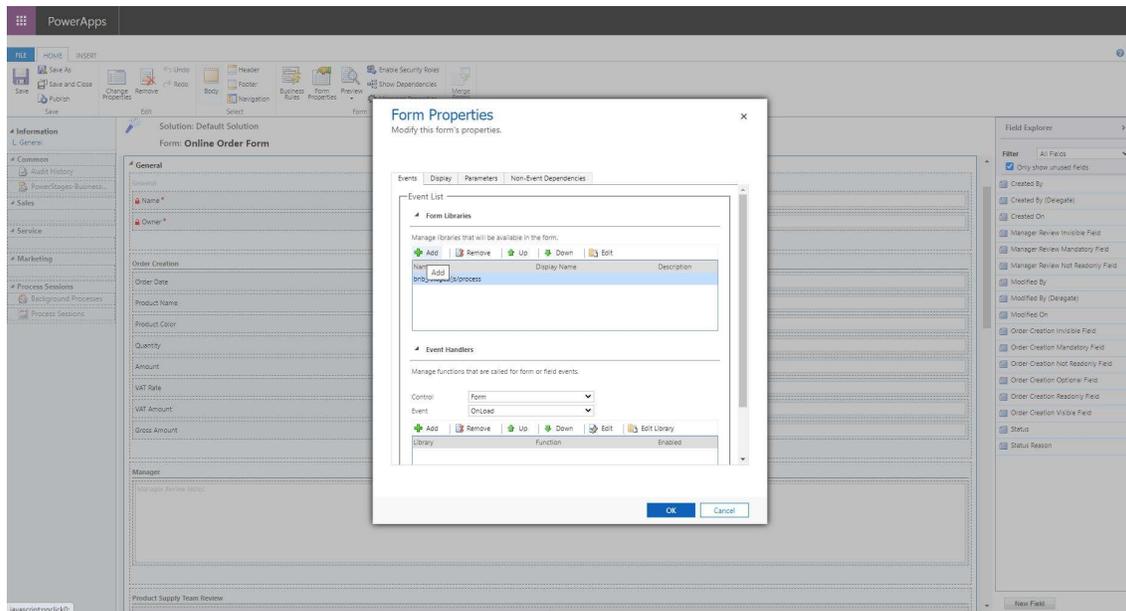


Figure 51- Add Client-script library second time for common.js file

6. Find common JavaScript file (“bnb\_/stages/js/common”) from the look up

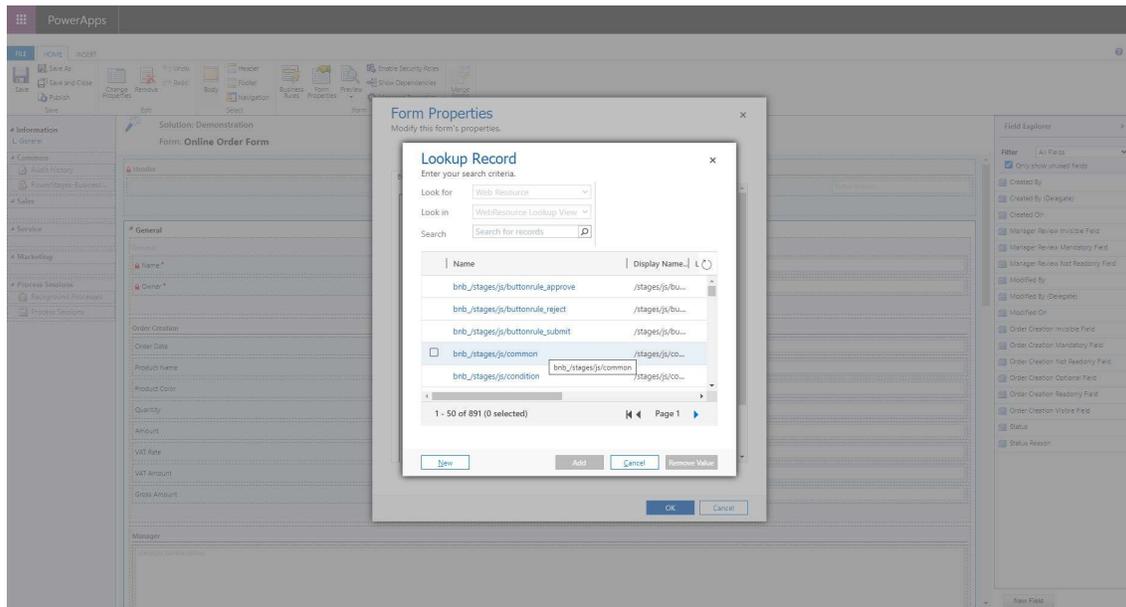


Figure 52- Look for common.js file to add

7. Select “bnb\_/stages/js/common” then click Add

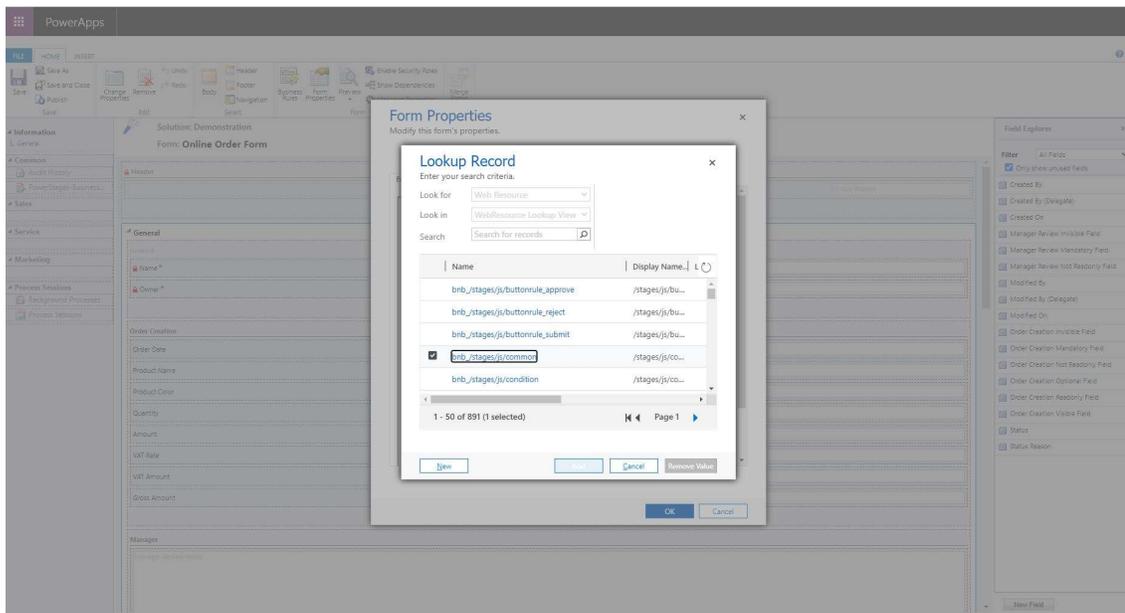


Figure 53- common.js selection

8. Click "+ Add" from "Events Handler" section

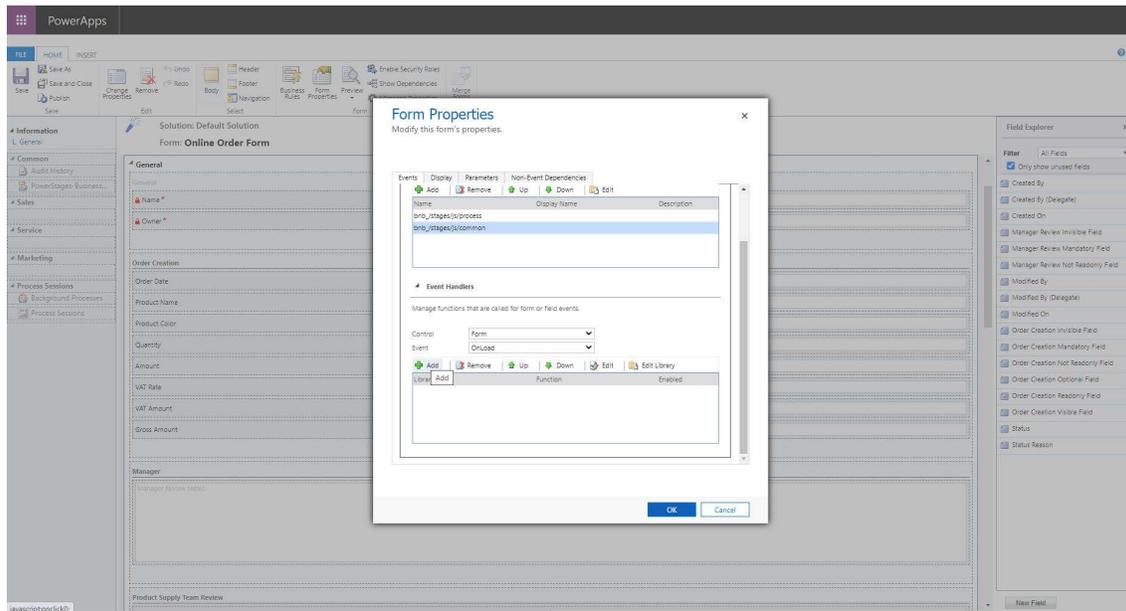


Figure 54- Adding on-load method for PowerStages to the Custom Entity

9. Choose "bnb\_/stages/js/common" from "Library" field

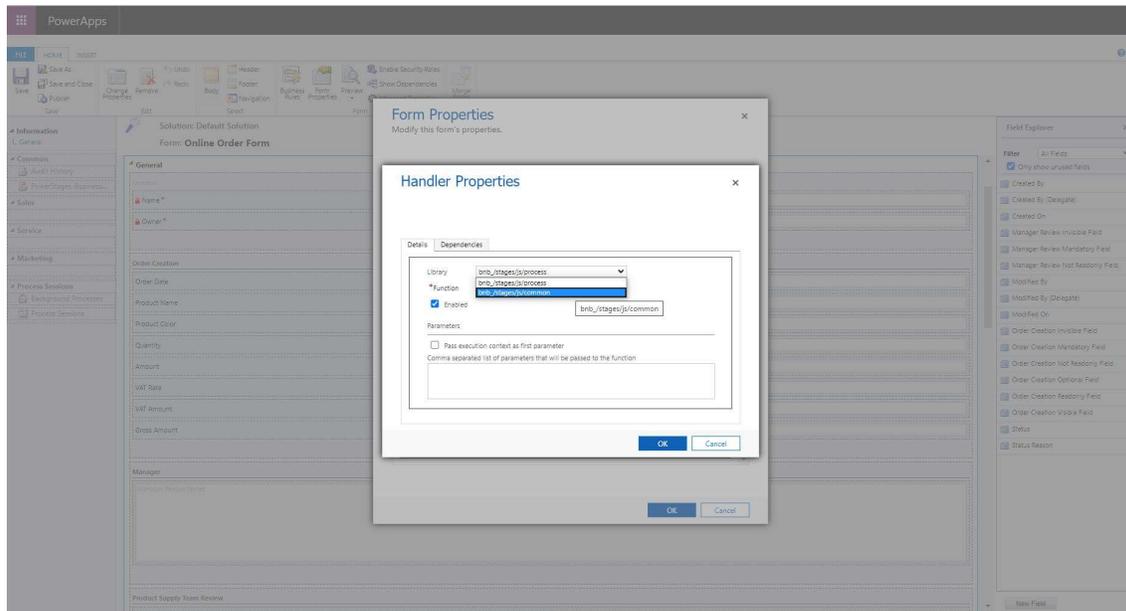


Figure 55- Add library to Event Handler

10. Type `bnb_common_onFormLoad` to the Function and check Pass execution context as first parameter then Click Ok

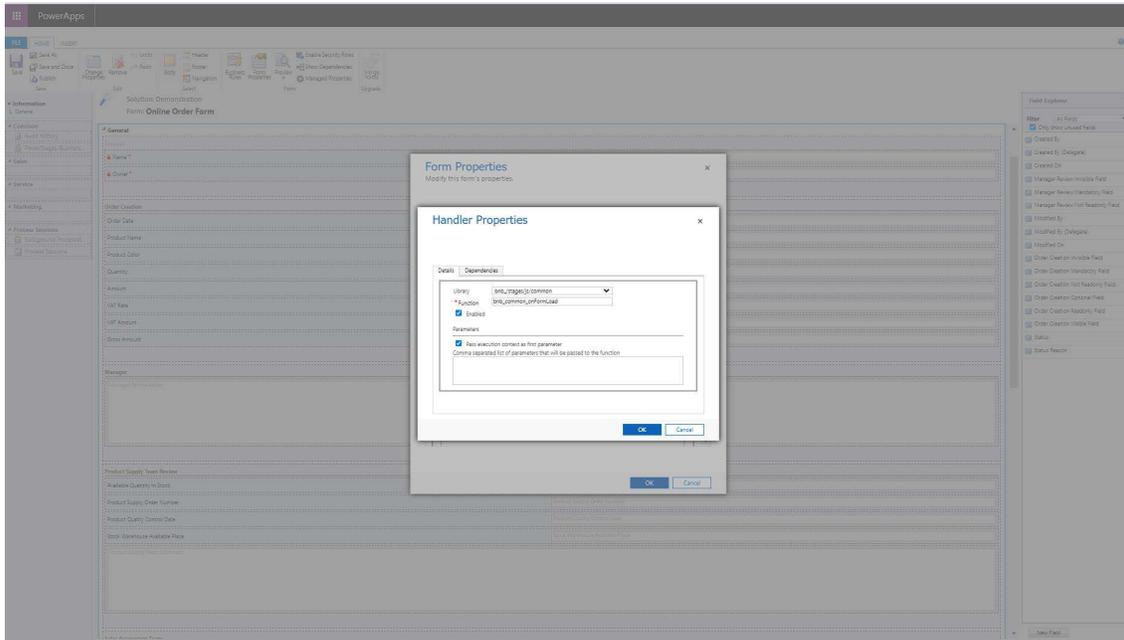


Figure 56- Setting Function Name to be called by the Custom Entity Form

11. Click Ok to close the popup window.

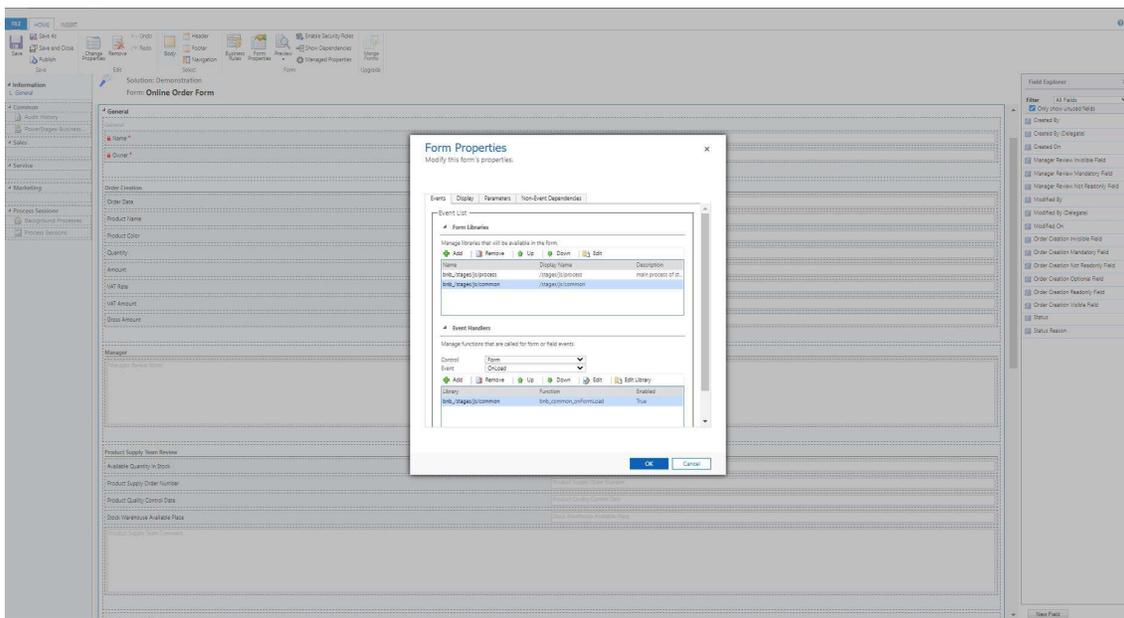


Figure 57- Form Properties

12. Click Save to store the change to the Custom Entity form.

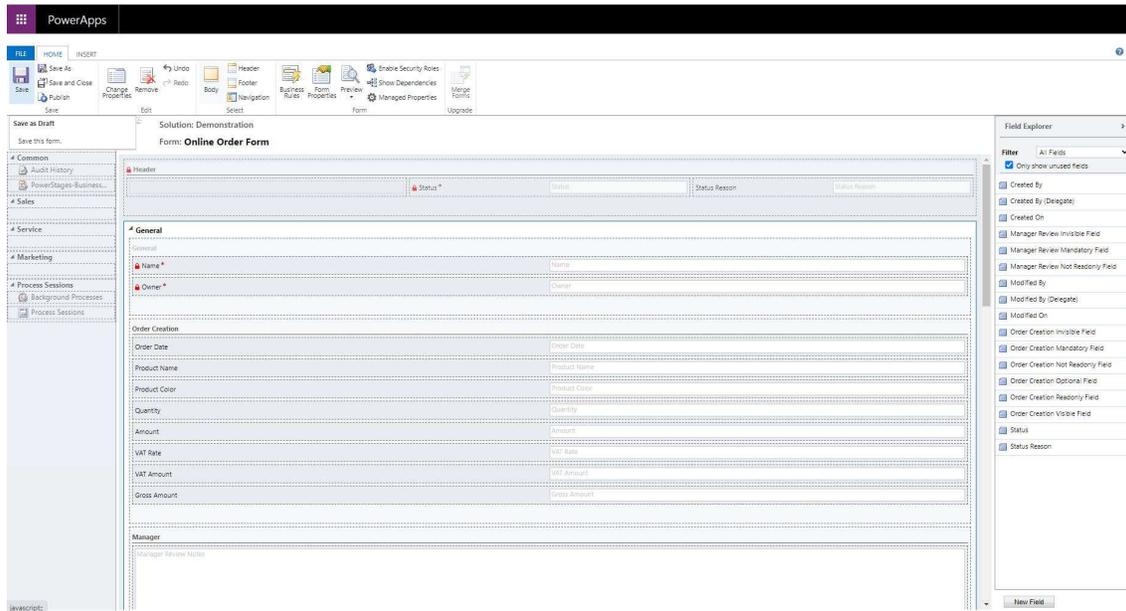


Figure 58- Custom Entity Main Form

13. Click Publish

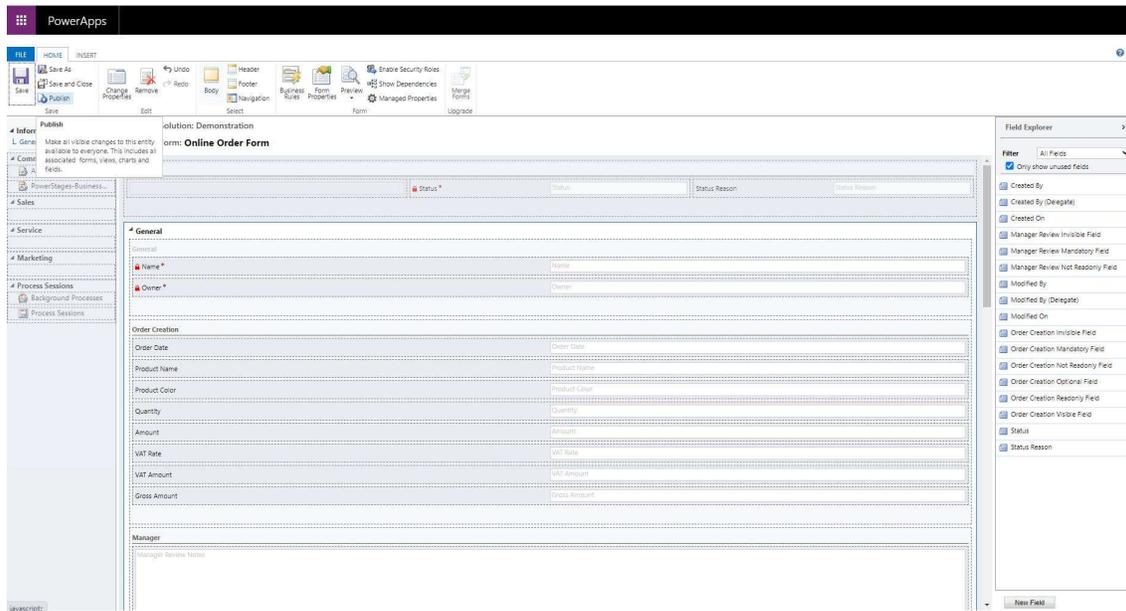


Figure 59- Publishing the Form Design

14. Click Save&Close to close the form design.

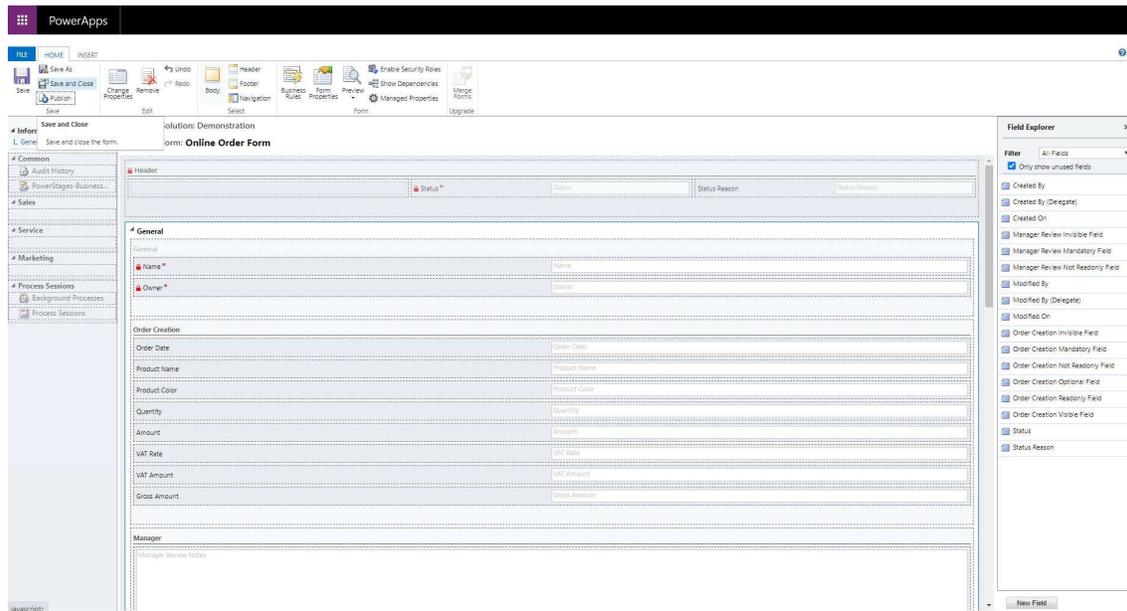


Figure 60- Save&Close the form design.

## Troubleshooting

PowerStages use Plug-In Trace Tool for logging of all backend operations. You can open the out of box Dynamics CRM Plug-In trace section follow instruction below;

1. Activate Plug-In Trace Tool for the organization, if it is off (Default value is off)

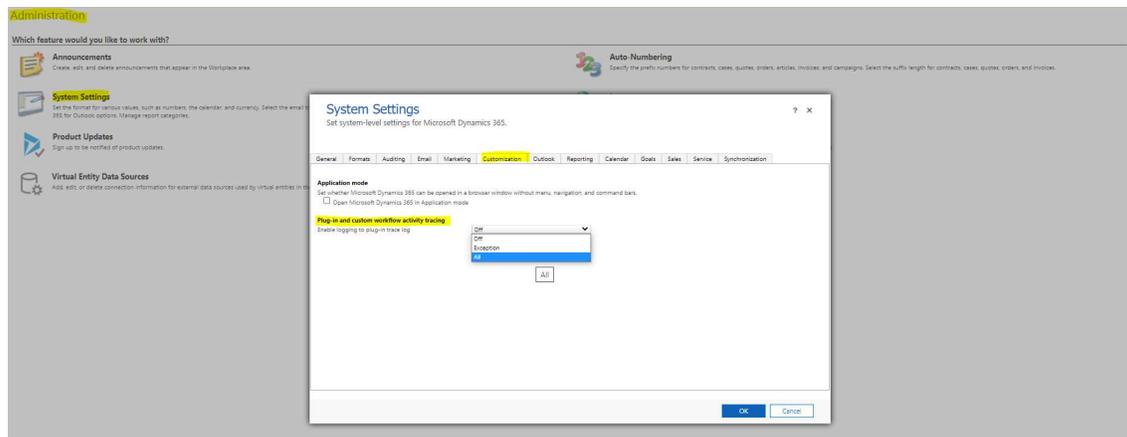


Figure 61- Log Activation

## 2. Go to Advanced Settings

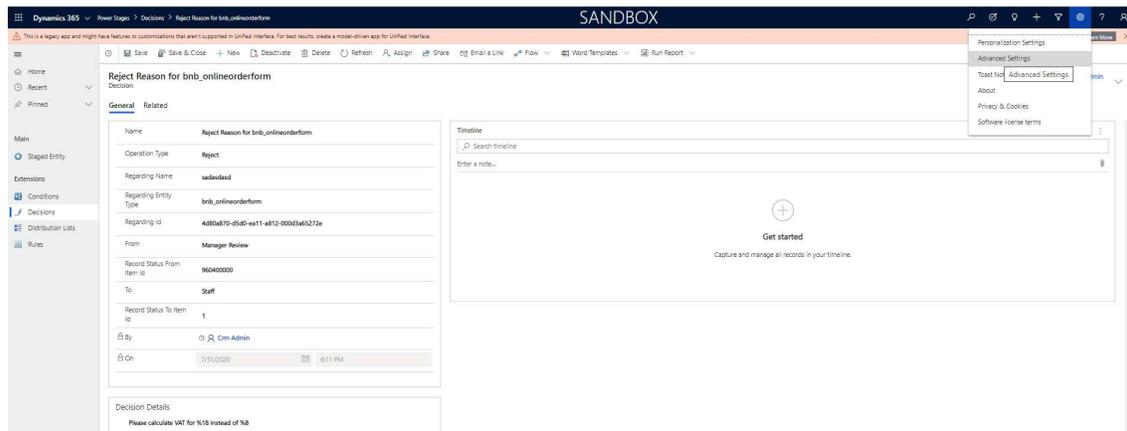


Figure 62- Advance Settings

## 3. New tab will be opened then click Plug-In Trace Tool

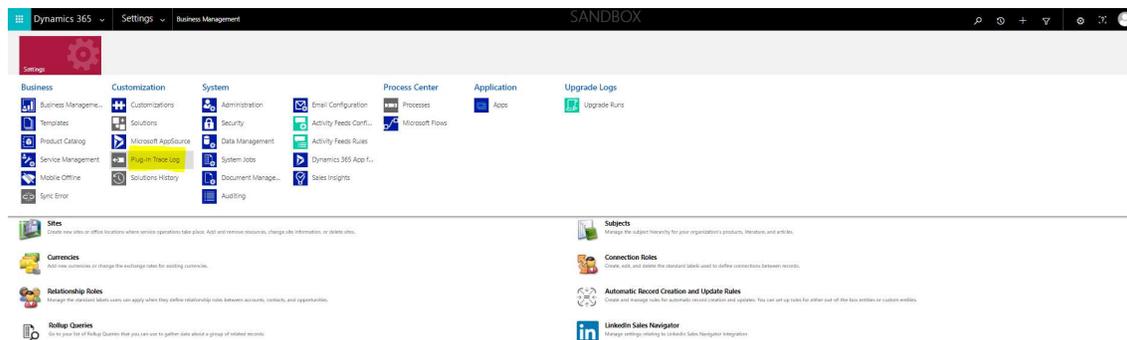


Figure 63- Plug-In Trace Tool Menu Item

## 4. List view will be displayed

Dynamics 365 Settings Plug-in Trace Log SANDBOX

Apps for Dynamics 365 View Dynamics 365 information on the go with apps for your phone, tablet, Outlook, and more! Get Apps for Dynamics 365

All Plug-in Trace Logs

System Creat..	Operation Ty...	Type Name	Message Name	Execution Start Time ↓
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 3:44 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 3:44 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 10:17 AM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/9/2020 6:35 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/9/2020 6:35 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/9/2020 6:34 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/9/2020 6:34 PM

1 - 12 of 12 (0 selected) | All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z | Page 1

Figure 64- Plug-In Trace Tool List View

- Choose one of the to see the details For Example double click to the first one to see details of log for the last operation since it is ordered by “Execution Start Date”.

The screenshot shows the Dynamics 365 interface with the 'Plug-in Trace Log' view. The table below represents the data shown in the screenshot:

System Creat...	Operation Ty...	Type Name	Message Name	Execution Start Time ↓
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.↓ BnBTechnologies.Xrm.PowerStages.Plugins.bnb_stagedentity_Async_PostOperation_Update		
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/10/2020 3:45 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 3:44 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 3:44 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/10/2020 10:17 AM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/9/2020 6:35 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Update	8/9/2020 6:35 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/9/2020 6:34 PM
Yes	Plug-in	BnBTechnologies.Xrm.PowerSta...	Create	8/9/2020 6:34 PM

Figure 65- First Item Highlighted

- New form will be appeared.

The screenshot shows the details for a specific operation in the Dynamics 365 Plug-in Trace Log. The details are as follows:

- PLUG-IN TRACE LOG : INFORMATION**
- Type Name:** BnBTechnologies.Xrm.PowerStages.Plugins.bnb\_stagedentity\_Async\_PostOperation\_Update
- Message Name:** Update
- Primary Entity:** bnb\_stagedentity
- Configuration:** ...
- Secure Configuration:** ...
- Persistence Key:** 00000000-0000-0000-0000-000000000000
- Operation Type:** Plug-in
- Plug-in Step Id:** 99b7efb2-9166-ea11-9675-000d3a99ad7f
- Context:**
  - Depth:** 2
  - Mode:** Asynchronous
  - Correlation Id:** 709080a5-20cf-401e-a060-48bb0f19e56a
  - Request Id:** 9c0ffaf21-39a9-476a-ab50-8e7c546b2621
- Execution:**
  - Performance:**
    - Execution Start Time:** 8/10/2020 3:45 PM
    - Execution Duration (ms):** 15
    - Message Block:** Entered BnBTechnologies.Xrm.PowerStages.Plugins.bnb\_stagedentity\_Async\_PostOperation\_Update.Execute(). Correlation id: 709080a5-20cf-401e-a060-48bb0f19e56a. Initiating User: Bda19280-0eea-407c-97aa-694880c0011
    - ExitInfo:** BnBTechnologies.Xrm.PowerStages.Plugins.bnb\_stagedentity\_Async\_PostOperation\_Update.Execute(). Correlation id: 709080a5-20cf-401e-a060-48bb0f19e56a. Initiating User: Bda19280-0eea-407c-97aa-694880c0011
  - Exception Details:** ...

Figure 66- A Sample for a Succeeded Operation

PLUG-IN TRACE LOG : INFORMATION		bnb_powerstagesform.pr	none	Workflow Activity
BnBTechnologies.Xrm.PowerStages.Workflows.FormProcess				
<b>Configuration</b>				
<b>General</b>				
System Created *	Yes			
Type Name	BnBTechnologies.Xrm.PowerStages.Workflows.FormProcess			
Message Name	bnb_powerstagesformprocessingsubmit	Primary Entity	none	
Configuration	..	Secure Configuration	..	
Persistence Key	00000000-0000-0000-0000-000000000000	Operation Type	Workflow Activity	
Plugin Step Id	9401ce04-76bc-ea11-9674-000d3a98ad7f			
<b>Context</b>				
Depth	1	Mode	Synchronous	
Correlation Id	7aa12c01-ee1c-4e83-a10d-c12376816372	Request Id	4db775f3-b6de-477d-9a5c-a8cca1fac7cb	
<b>Execution</b>				
<b>Performance</b>				
Execution Start Time	8/9/2020 11:02 AM	Execution Duration (ms)	133,016	
Message Block	Entered FormProcess.Execute(), Activity Instance Id: 1, Workflow Instance Id: a0c6c109-ecc5-4f8e-ae4c-21b8fd2136d FormProcess.Execute(), Correlation Id: 7aa12c01-ee1c-4e83-a10d-c12376816372, Initiating User: 1a86bb8f-5293-ea11-9665-000d3a98ad7f			
Exception Details	Unhandled Exception: System.ServiceModel.FaultException`1[[Microsoft.Xrm.Sdk.OrganizationServiceFault, Microsoft.Xrm.Sdk, Version=9.0.0.0, Culture=neutral, PublicKeyToken=31bf3856ad364e35]]; Unexpected exception from plug-in (Execute): BnBTechnologies.Xrm.PowerStages.Workflows.FormProcess: System.TimeoutException: Couldn't complete execution of the custom activity BnBTechnologies.Xrm.PowerStages.Workflows.FormProcess plug-in within the 5-minute time limit.Detail			
Read only				

Figure 67- A Sample for a Operation Failure