# Formulas

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## Adding Formulas to an Object Type

# Overview

A Formula uses numeric and variable values (e.g., select lists, numeric or date fields, or workflow states) to generate Incident Severity, Estimated Damage, or Incident Likelihood. Formulas are added to an Object Type through a Relationship or Reference.

A formula appears on a form as a number, label (e.g., Low, Medium, High), numbers and labels, gauge, or as a formula card.

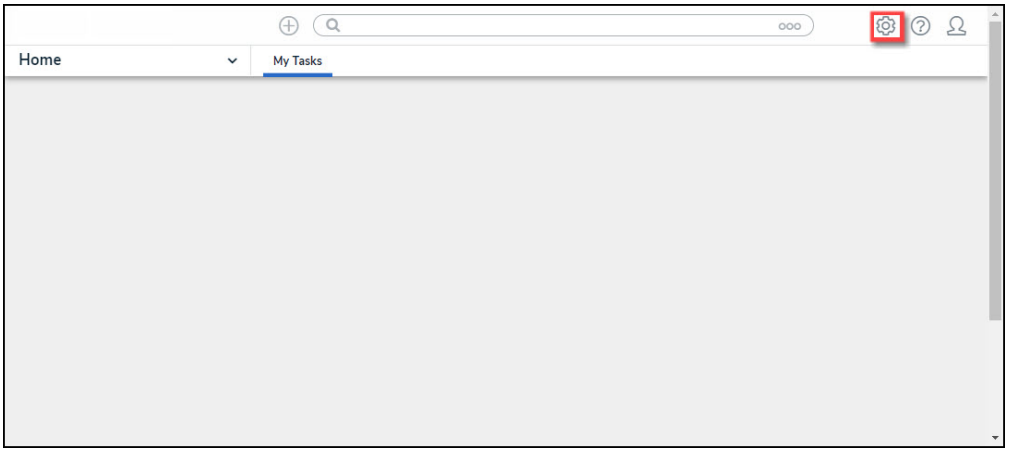
## Related Information/Setup

For more information on formulas, see the following articles:

- Formulas Overview
- Variables, Operators & Functions
- Time Functions
- Null Values in Formulas
- Formula Examples
- Formulas on Forms

## Navigation

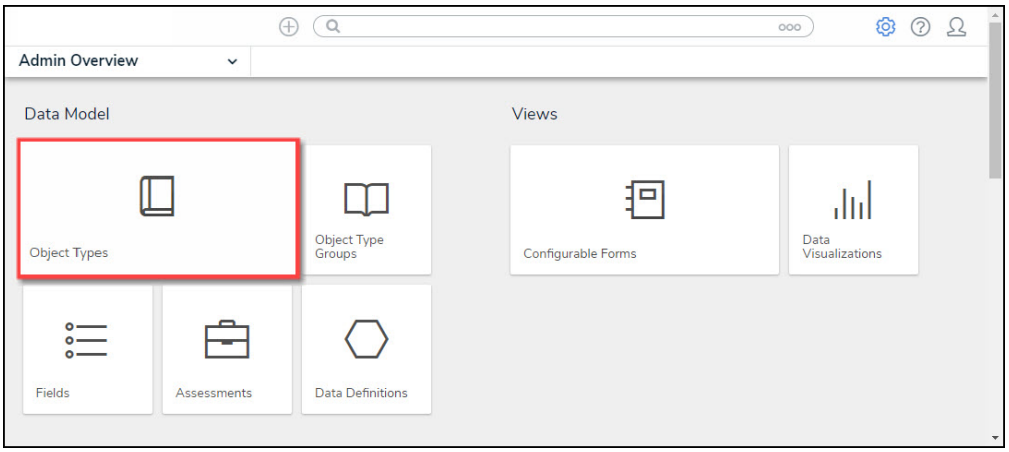
1. From the ***Home*** screen, click the **Administration** icon.




*Administration Icon*

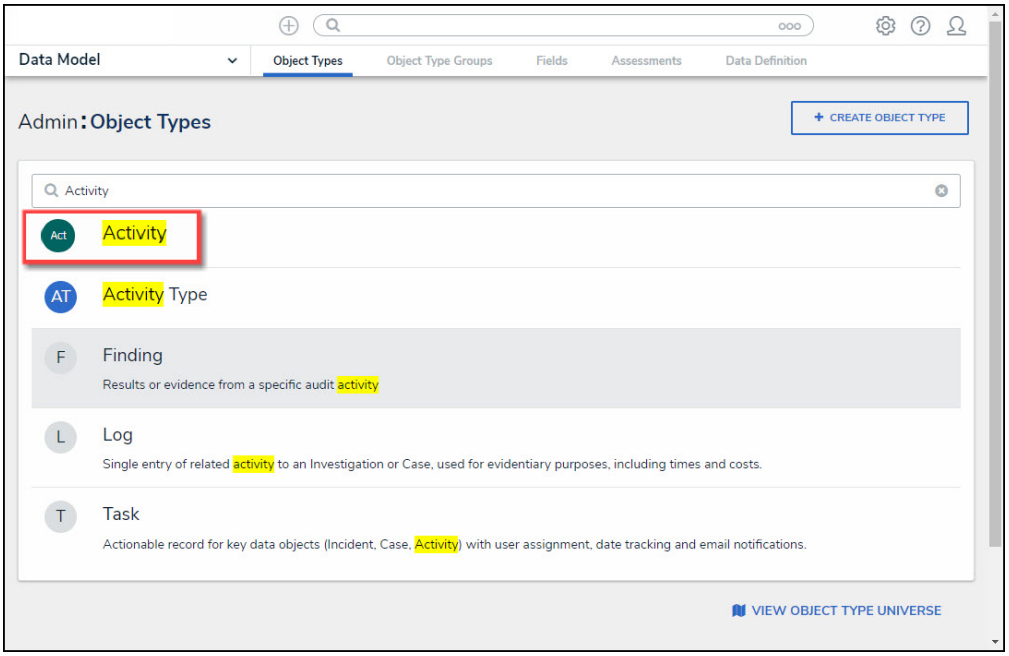
2. From the ***Admin Overview*** screen, click the **Object Types** tile on the ***Data Models***

section.



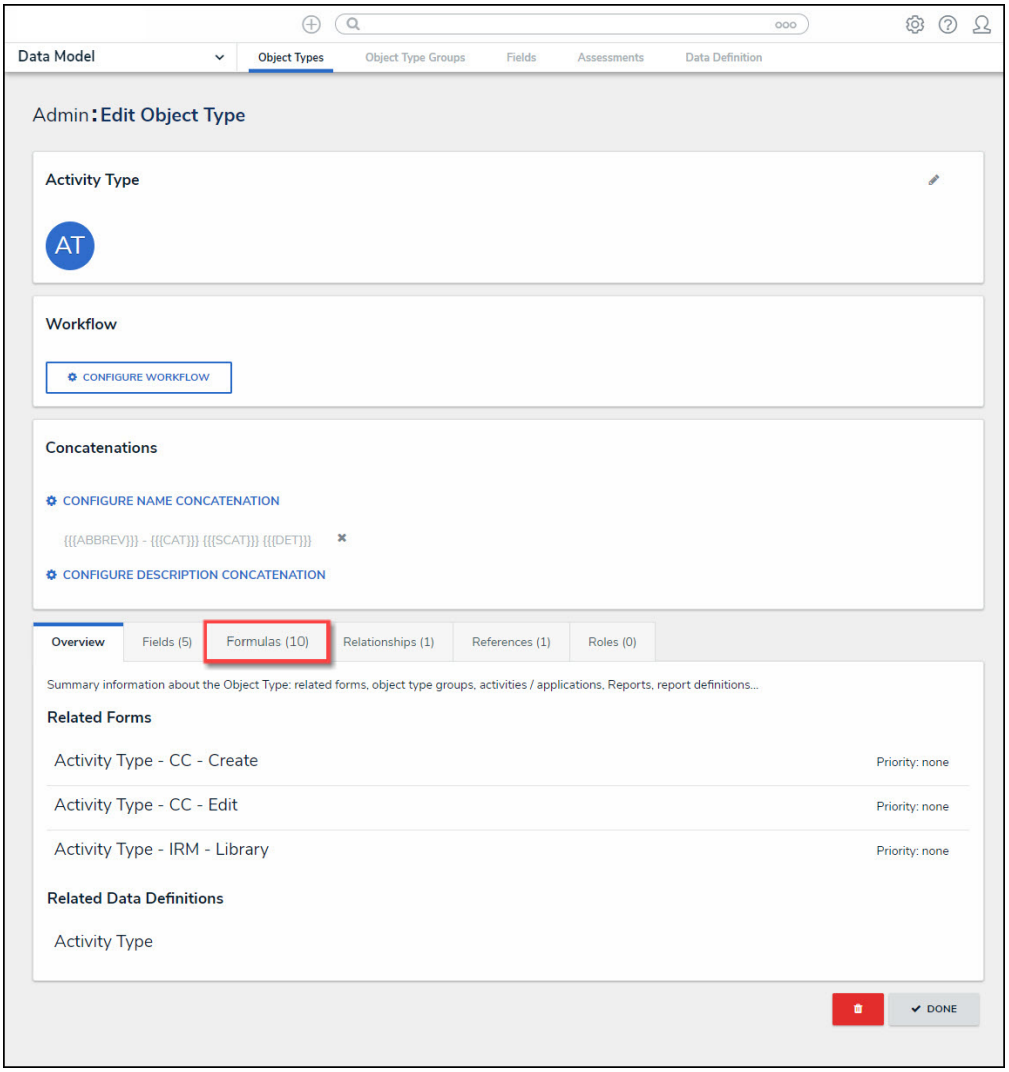

*Object Types Tile*

3. From the ***Object Types*** screen, enter an **Object Type Name** in the **Search** field to narrow down the Object Types list.
4. Click the **Object Type's Name** you want to edit.



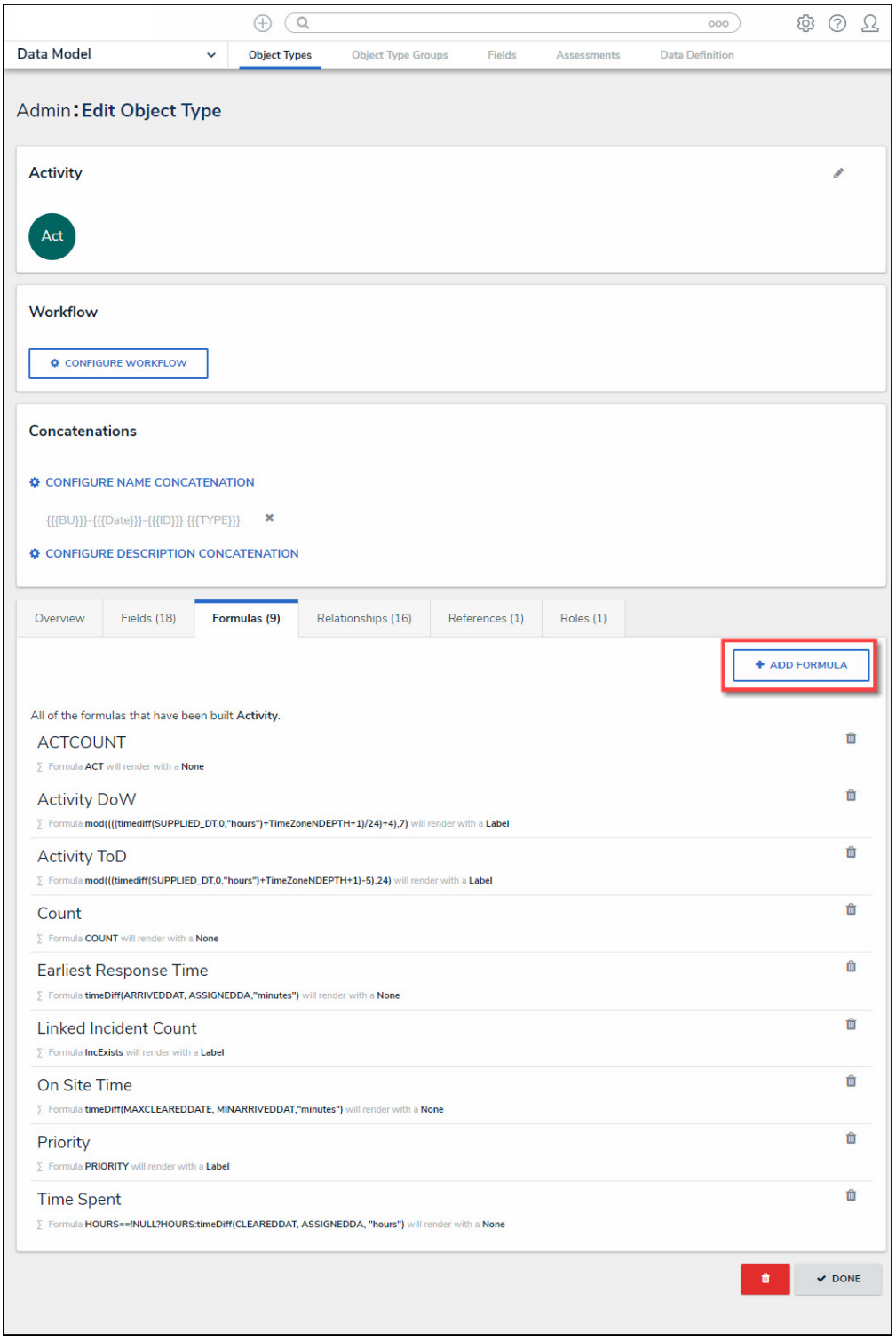

*Click the Object Type's Name*

5. From the ***Edit Object Type*** screen, scroll down and select the ***Formulas*** tab.




*Formulas Tab*

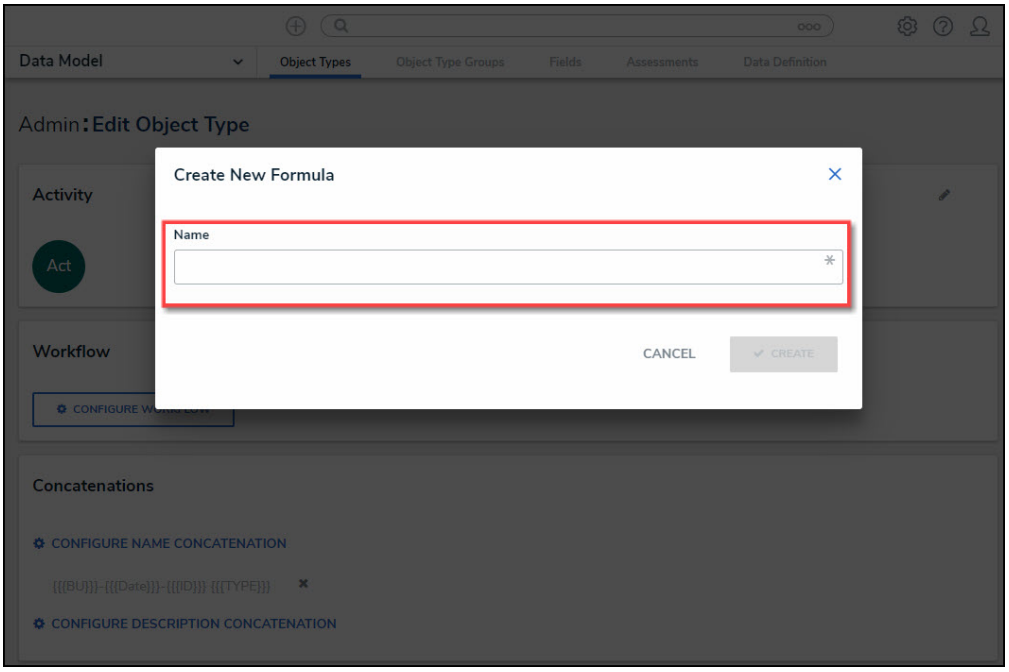
6. From the ***Formulas*** tab, click on the **+ Add Formula** button.




*Add Formula Button*

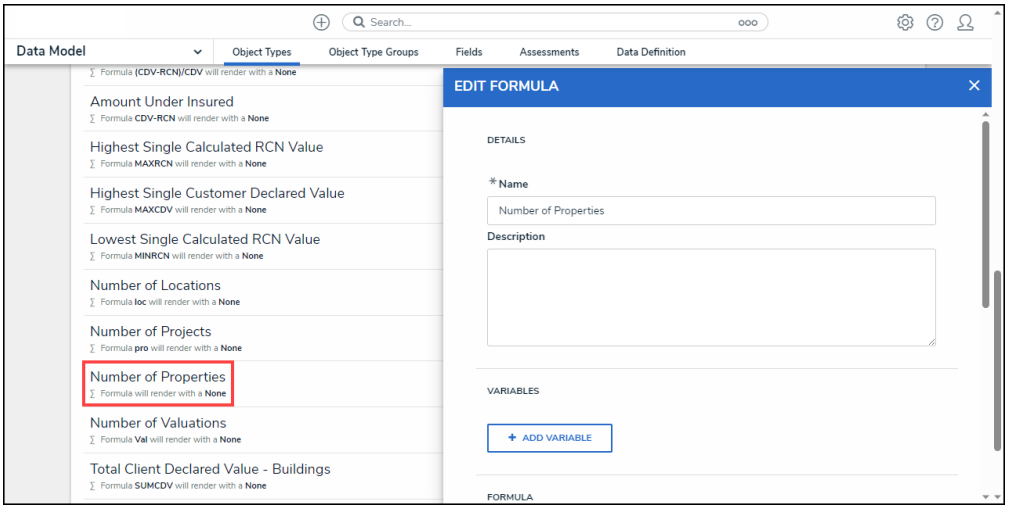
# Adding a Formula to an Object Type

1. From the ***Create New Formula*** screen, enter a formula name in the **Name** field (e.g., Estimated Vehicle Damage).



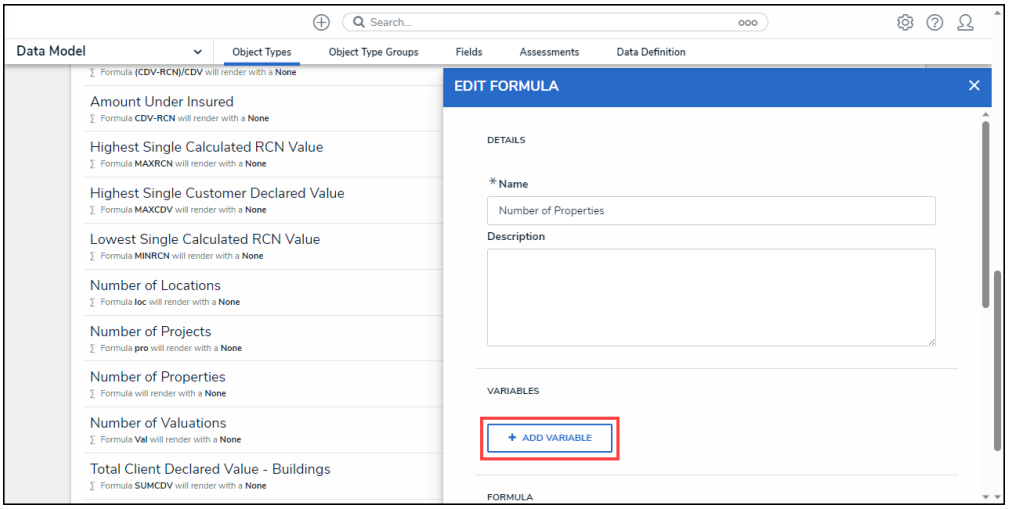

*Name Field*

2. Click the **Create** button.
3. The ***Formulas*** tab will appear, listing the newly created formula.
4. Click the new formula to open the **Edit Formula** pop-up.




*Edit Formula Pop-up*

5. **(Optional)** Enter a description documenting the Formulas internal use in the **Description** field.
6. From the ***Variables*** section, Click the **+ Add Variable** button.

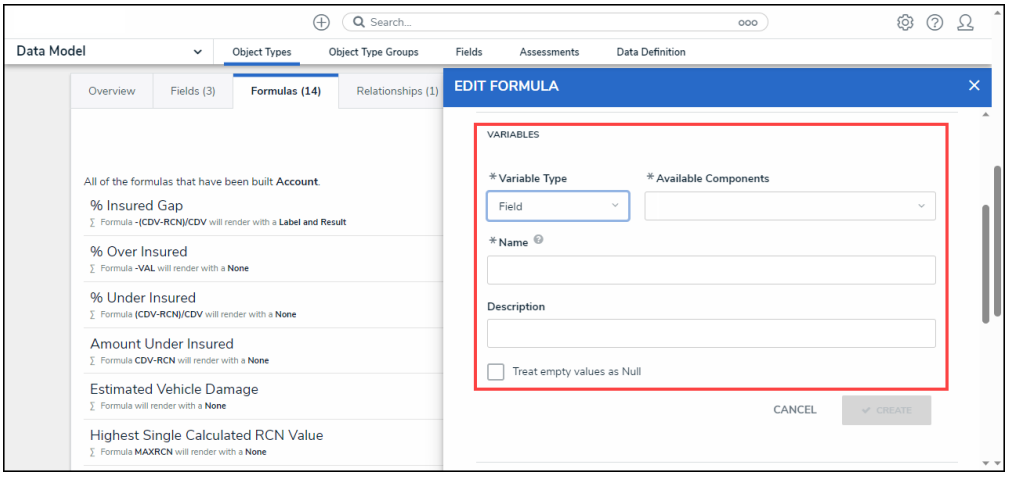



*+ Add Variable Button*

7. From the ***Variables*** section, select a **Variable Type** from the drop-down list. A **Variable** is a value in which the formula calculations are performed.

- **Field:** After selecting the **Field** variable, the following field will appear:
  - **Available Components:** Select a field or formula from the **Available Components** drop-down field adding it directly to the Object Type.

> ***Note:***
> *Fields can be added to formulas after they are added to an Object Type or if they are associated through a relationship or reference. Only numeric fields, date fields, and select lists with numeric values are accepted. For more information, see the Fields article.*

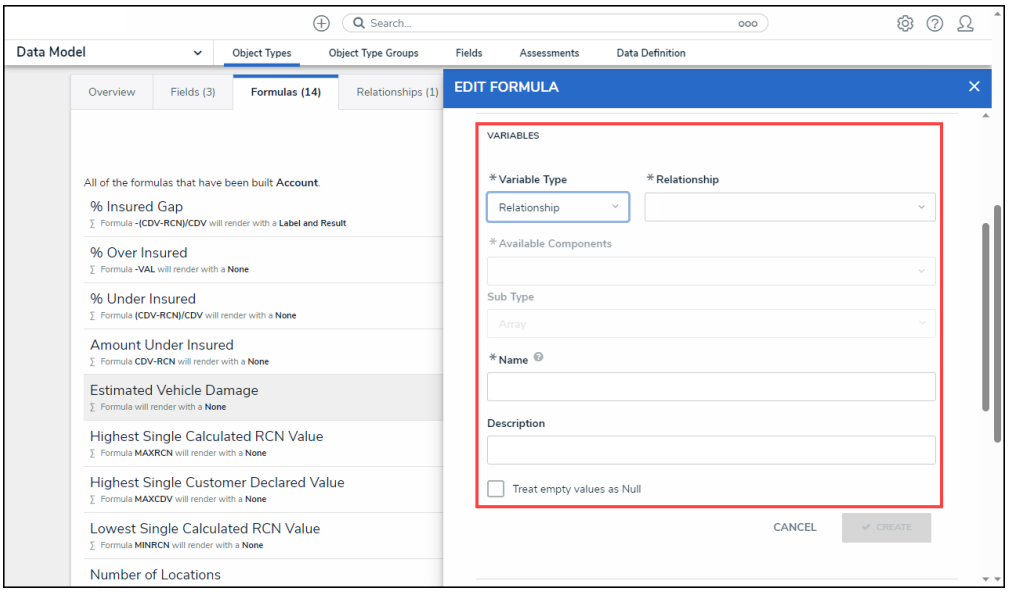



*Variable Type = Field*

- **Relationship:** After selecting the **Relationship** variable, the following fields will appear:
  - **Relationship:** Select the Object Type **Relationship** from the drop-down list.

Relationships connect two or more objects. The user must add a Relationship to an Object Type to appear on the Relationship drop-down list. See the Add Relationships to an Object Type article for further information on adding a Relationship to an Object Type.

- **Available Components:** Select a field or formula from the **Available Components** drop-down field adding it directly to the Object Type.
- **Sub Type:** Select a **Sub Type** from the drop-down list. Subtypes specify how the data from multiple objects are compiled, calculated, and displayed. For more information on Subtypes, see the Sub Type Table in the Variables, Operations, & Functions article.
    - **Array:** Creates a set of values from the variable.
    - **Sum:** Calculates a total from the variable's set of values and returns a single number. Select list variables cannot use Sum Sub Types.
    - **Count:** The number of times a variable has been added to an object.
    - **Average:** Calculates an average number from the variable's set of values. Select list variables cannot use Average Sub Types.
    - **Every:** Checks if the variable contains a value on the objects in the relationship/reference.
    - **Min:** Calculates the lowest number from the variable's set of values. Select list variables cannot use Min Sub Types.
    - **Max:** Calculates the highest number from the variable's set of values. Select list variables cannot use Max Sub Types.

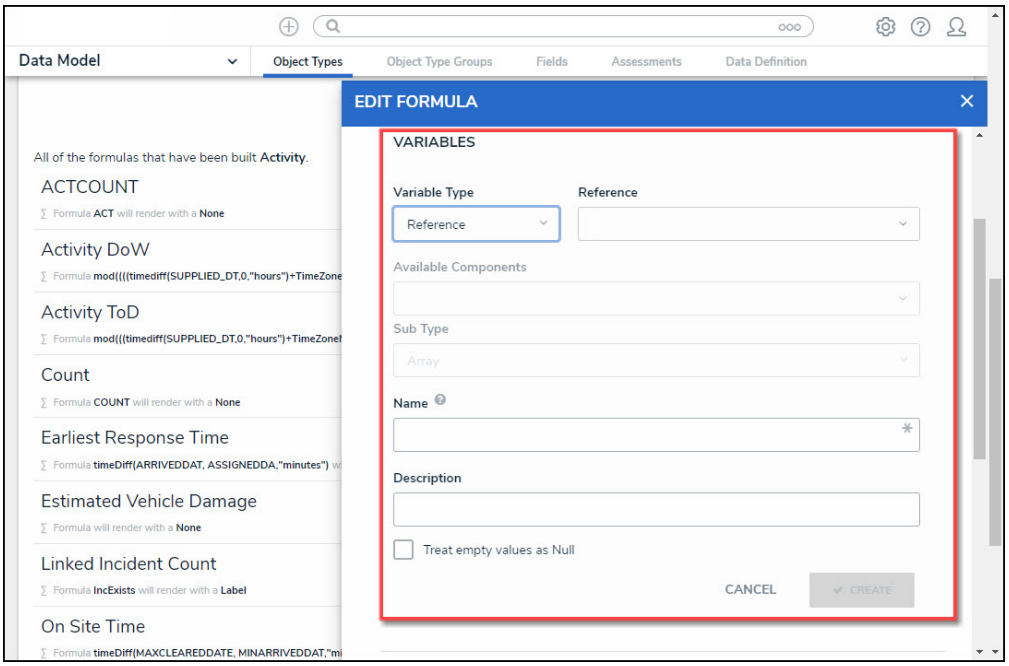



*Variable Type = Relationship*

- **Reference:** After selecting the **Reference** variable, the following fields will appear:
    - **Reference:** Select the Object Type **Reference** from the drop-down list.

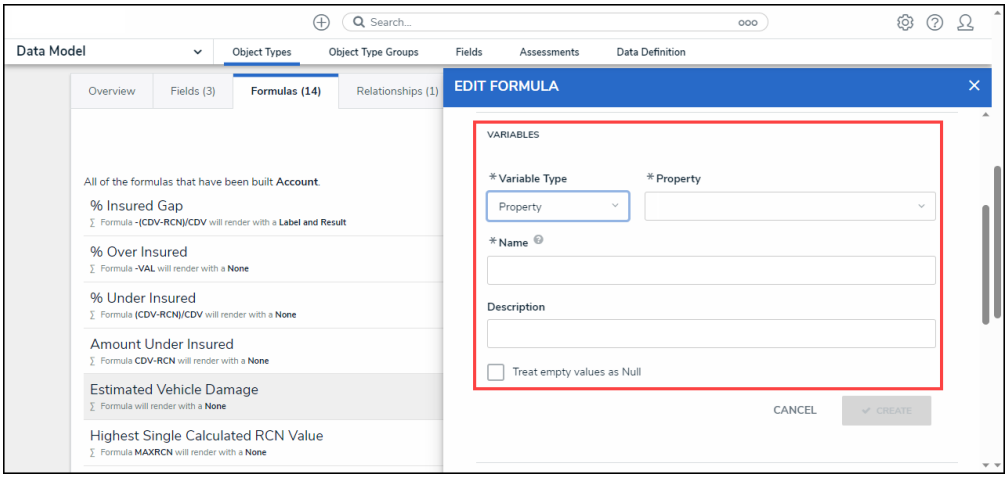
References indicate that an object is connected to another object through a relationship. References are automatically created when a relationship is created.  For further information on adding a Relationship to an Object Type, see the Add References to an Object Type article.

- **Available Components:** Select a field or formula from the **Available Components** drop-down field adding it directly to the Object Type.
- **Sub Type:** Select a **Sub Type** from the drop-down list. Subtypes specify how the data from multiple objects are compiled, calculated, and displayed.




*Variable Type = Reference*

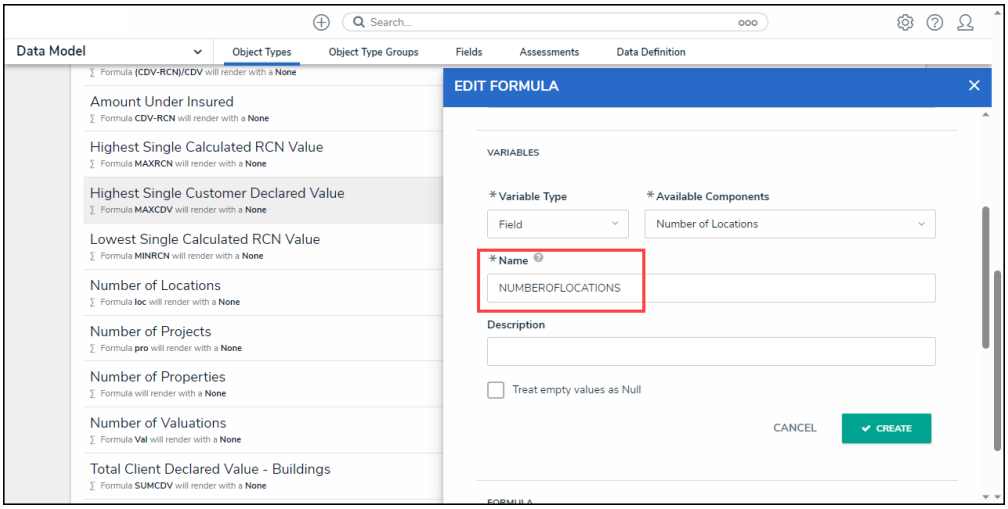
- **Property:** After selecting the **Property** variable, the following field will appear:
  - **Property:** Select a **Property** type from the drop-down list:
    - **Is Submitter Confidential:** This property type creates a formula that compares the number of confidential submissions against the number of not confidential submissions for customers that use the **Confidential Reporting Portal**.




*Variable Type = Property*

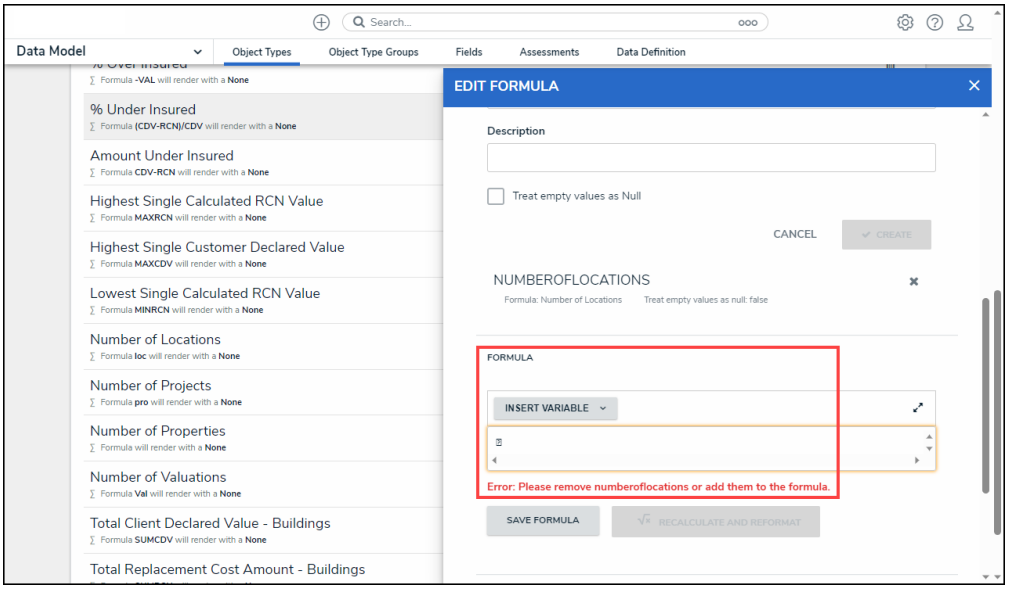
8. The system will automatically populate the **Name** field with the field or formula's unique ID by default.
9. **(Optional)** Enter a Variable name in the **Name** field.

> ***Warning:***
> *Using a function name (Sub Type Name) in the name field will cause an error.*



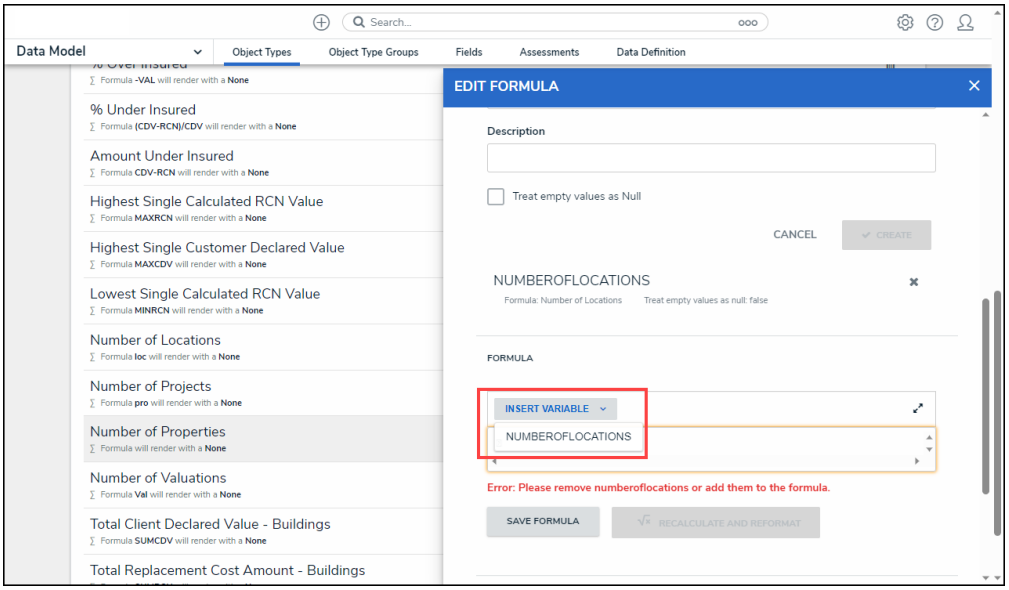

*Variable Name*

10. **(Optional)** Enter a Variable description in the **Description** field.
11. **(Optional)** Select the **Treat empty values as Null** checkbox to exclude blank objects from a formula calculation. For more information, see the Null Values in Formulas article.
12. Click the **Create** button to add the variable. The system will perform the Syntax Validation function, and an error message will appear under the **Formula** field, reminding the user to add the variable name to the **Formula** field.



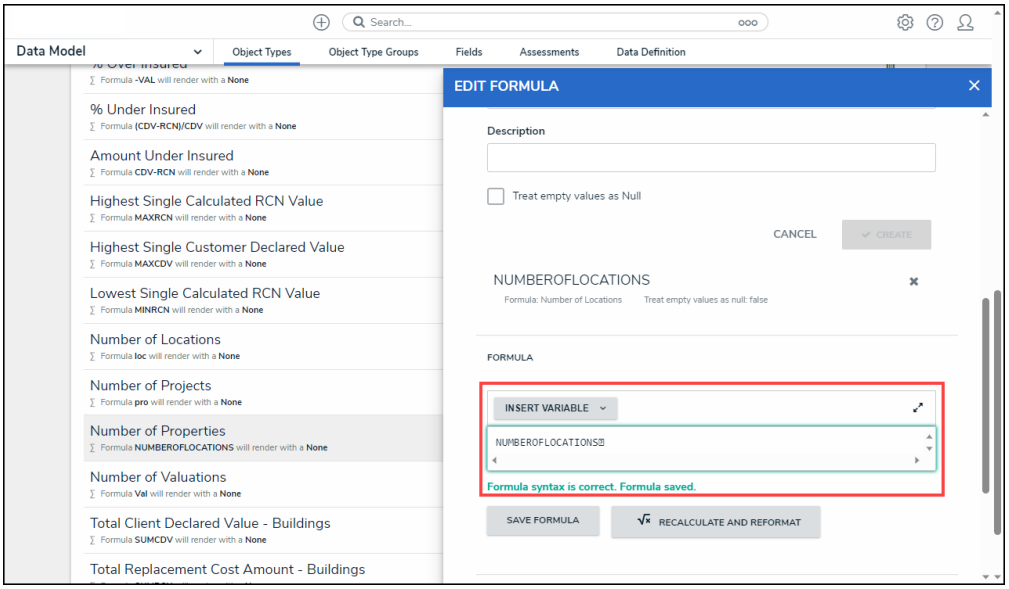

*Variable Error Message*

13. Click the **Insert Variable** button and select a Variable from the dropdown menu. The selected Variable will be added to the Formula field.




*Insert Variable Button*

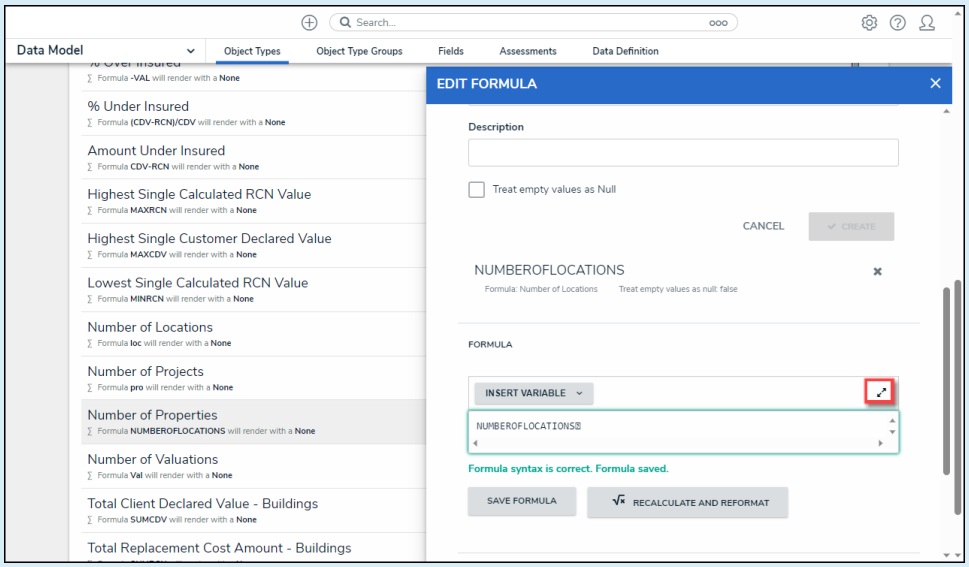
14. Click the **Save Formula** button. The **Formula** field will indicate if the Formula syntax is correct. If the Formula syntax is correct the Formula will be saved.




*Formula Syntax*

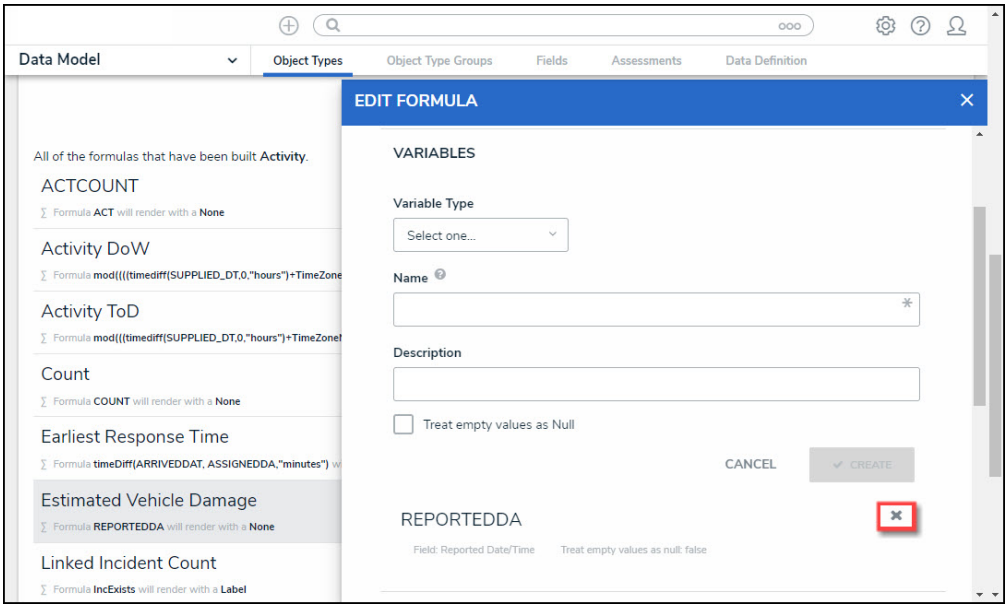
***Note:***

*Click the* **Expand** *icon on the Formula field to open the* ***Expandable*** *screen mode.*



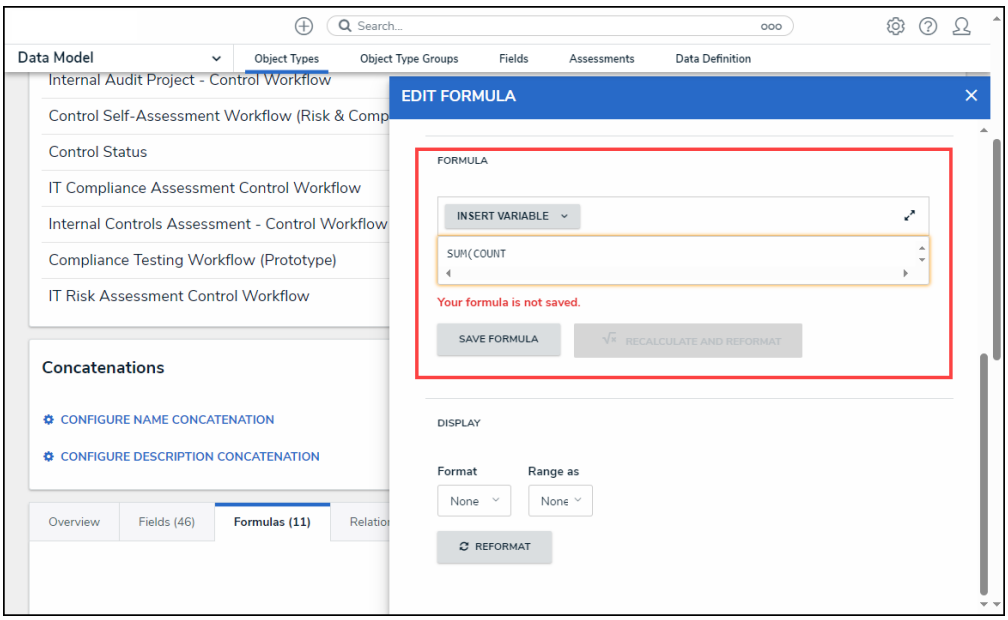

*Expand Icon*

15. Repeat steps 11 - 16 to add additional variables.
16. Click the **x** icon next to the variable to delete the variable.




*X Icon - Delete a Variable*

17. From the ***Formula*** section, enter a **Formula** using the variable name(s) you entered in the **Name** field under the ***Variables*** section. Include operators and functions in the **Formula** field (e.g., **INCIDENTSE==3**). For more information on Operators, see the Operators Table in the Variables, Operators, & Functions article.
18. A system notification will appear under the **Formula** field, indicating that **Your formula is not saved**.
19. The **Recalculate and Reformat** button will be greyed out, preventing invalid formulas from being sent to the processing queue and causing a potential slowdown.



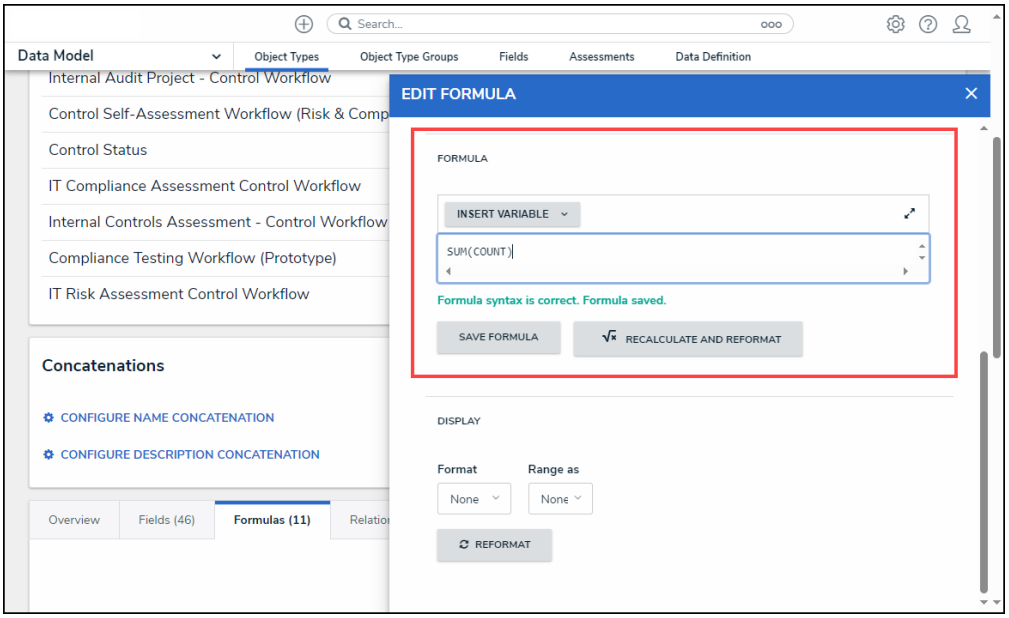

*System Notification - Your Formula is Not Saved*

20. Click on the **Save Formula** button. The system will perform a Syntax Validation on the

formula if the formula is:

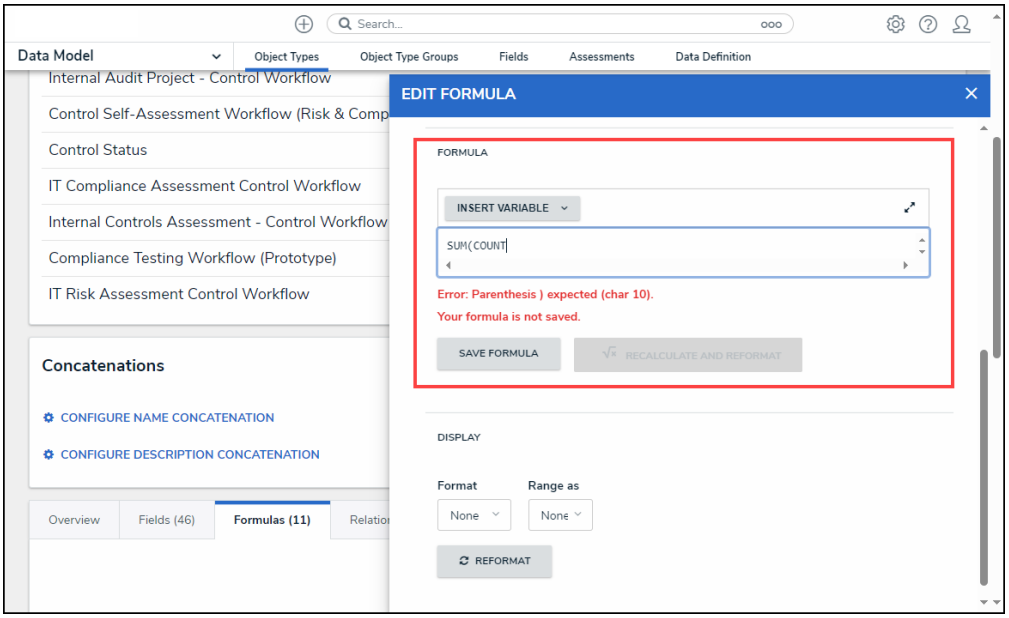
> ***Warning:***
> *The **Autosave** function was removed from the **Edit Formula** pop-up. Changes to the **Formula** field require a user to click the **Save Formula** button.*
>
> *Changes not manually saved will be discarded, and the system will revert to the previously saved state.*

- **Valid:** A system notification will appear under the **Formula** field; **Formula syntax is correct. Formula saved.** The **Recalculate and Reformat** button will be active.




*System Notification - Valid Formula*

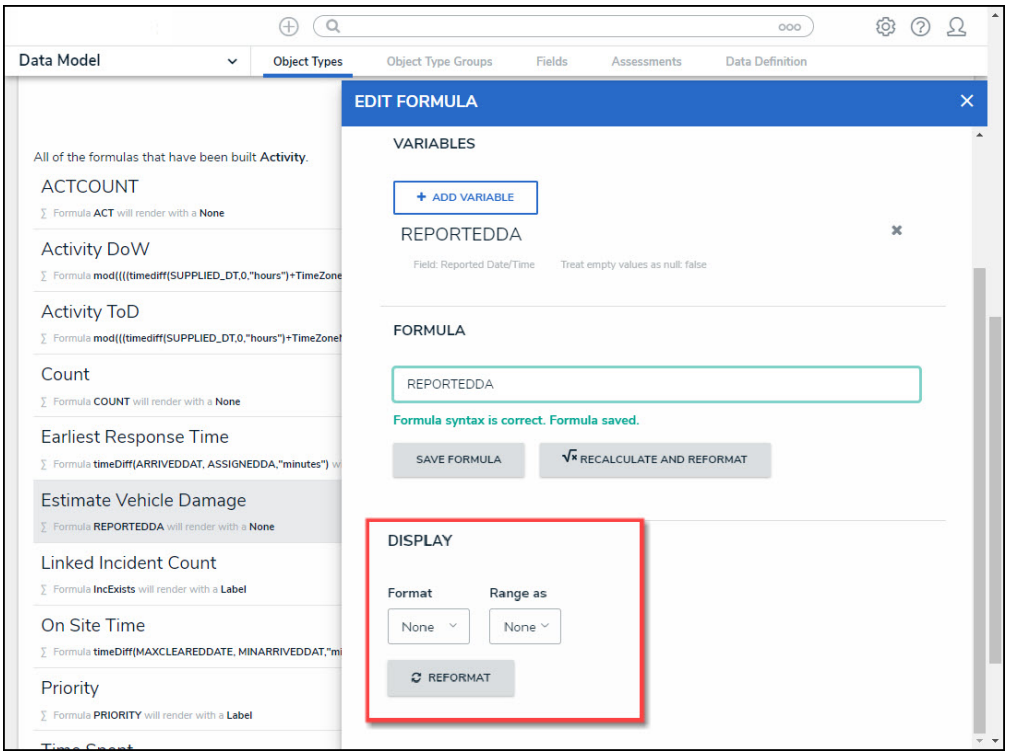
- **Invalid:** A system notification will appear under the **Formula** field; **Error Syntax error in part (char 1). The formula is not saved**. The error will indicate the character (char) location of the error in the formula and that the formula is invalid and not saved. The **Recalculate and Reformat** button will be greyed out, preventing invalid formulas from being sent to the processing queue and causing a potential slowdown.




*System Notification - Invalid Formula*

21. **(Optional)** Click the **Recalculate and Reformat** button to recalculate all the formulas in your organization.
22. In the ***Display*** section, select a format from the **Format** drop-down list:

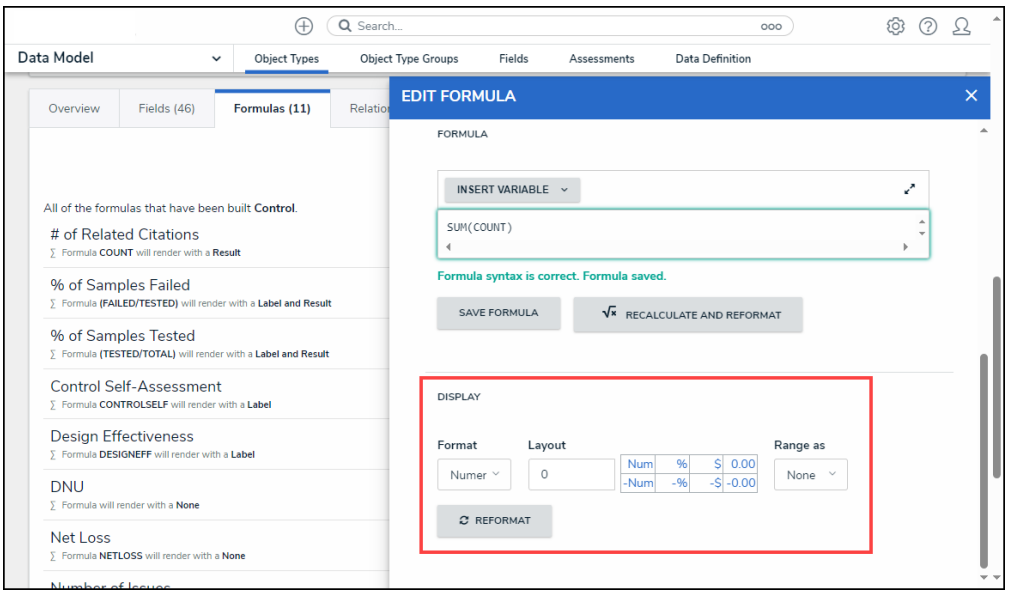
- **None:** Uses no display formats.




*Format = None*

- **Numeric:** Allows the user to choose how the numbers will be displayed using the options on the table.

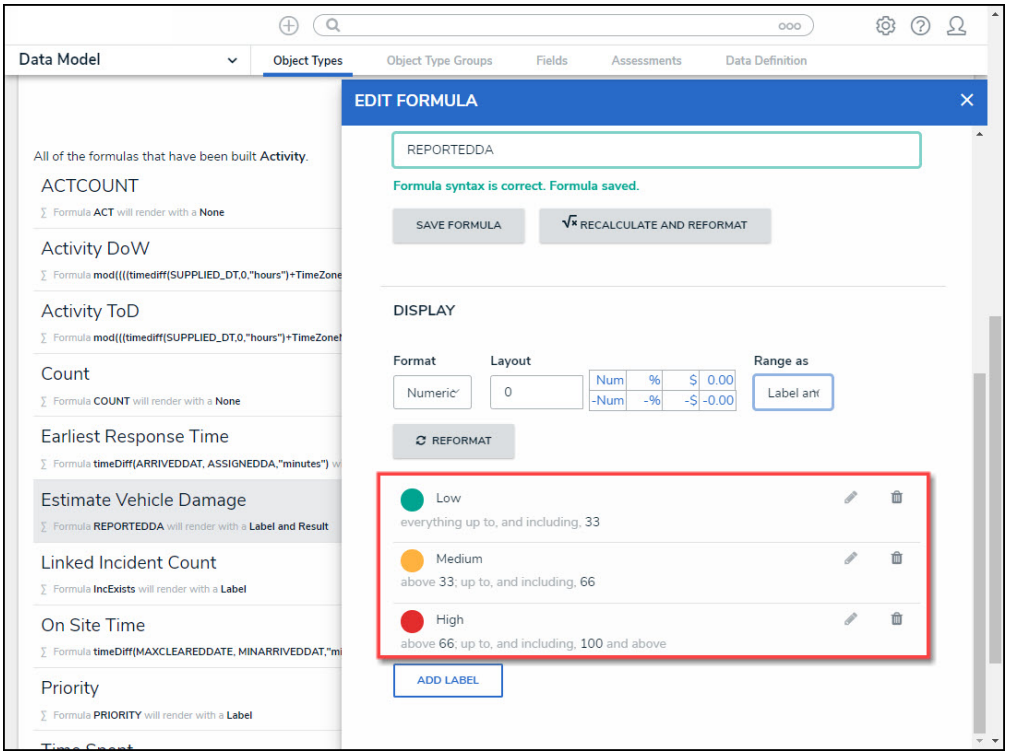
- **Num:** Displays numbers in numeric format.
- **%:** Displays numbers using percentage format.
- **$:** Displays numbers using dollar format.
- **0.00:** Displays numbers using decimal format.
- **Layout:** Previews the number format selected.




*Format = Numeric*

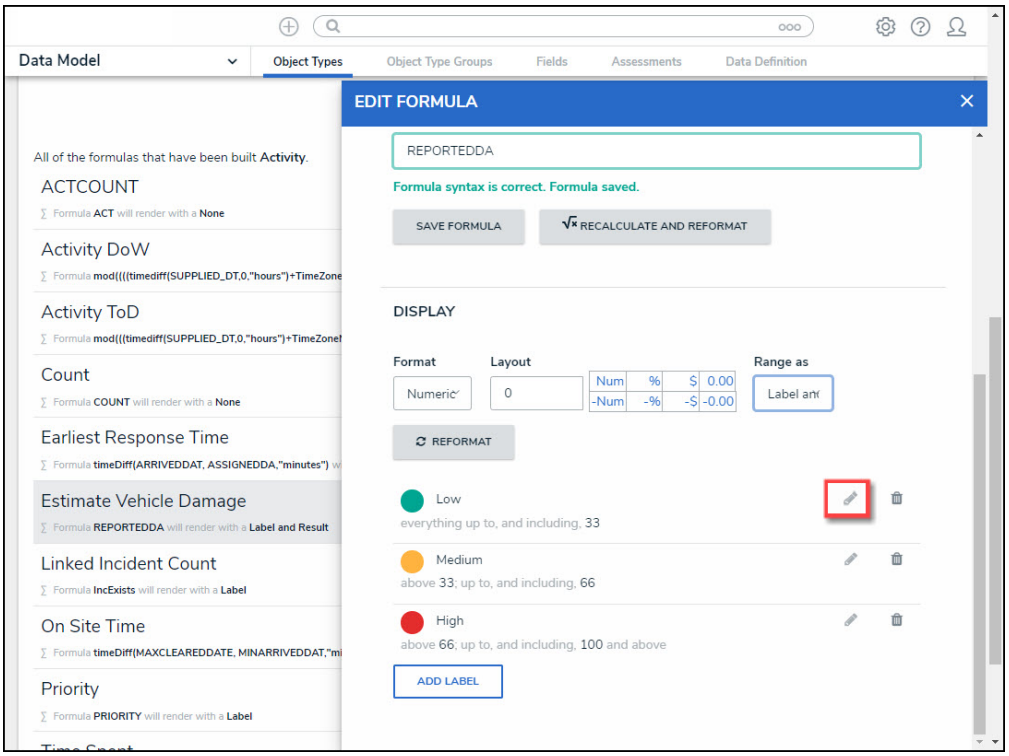
- **Range as:**
  - **None:** The formula will display the numeric results only.
  - **Label:** The formula will display the range labels only (e.g., Low, Medium, High) in the color selected for that range.
  - **Label and Result:** The formula will display the numeric results and labels (e.g., Low – 1000) in the color selected for that range.
  - **Result:** The formula will display the numeric results only in the color selected for that range.

23. If a user selects **Label**, **Label and Results**, or **Results** from the **Range as** drop-down list, the system will automatically add three default formula labels **Low**, **Medium**, and **High.**




*Formula Labels*

24. Click the **Edit** icon next to the **Formula Label** you want to edit.



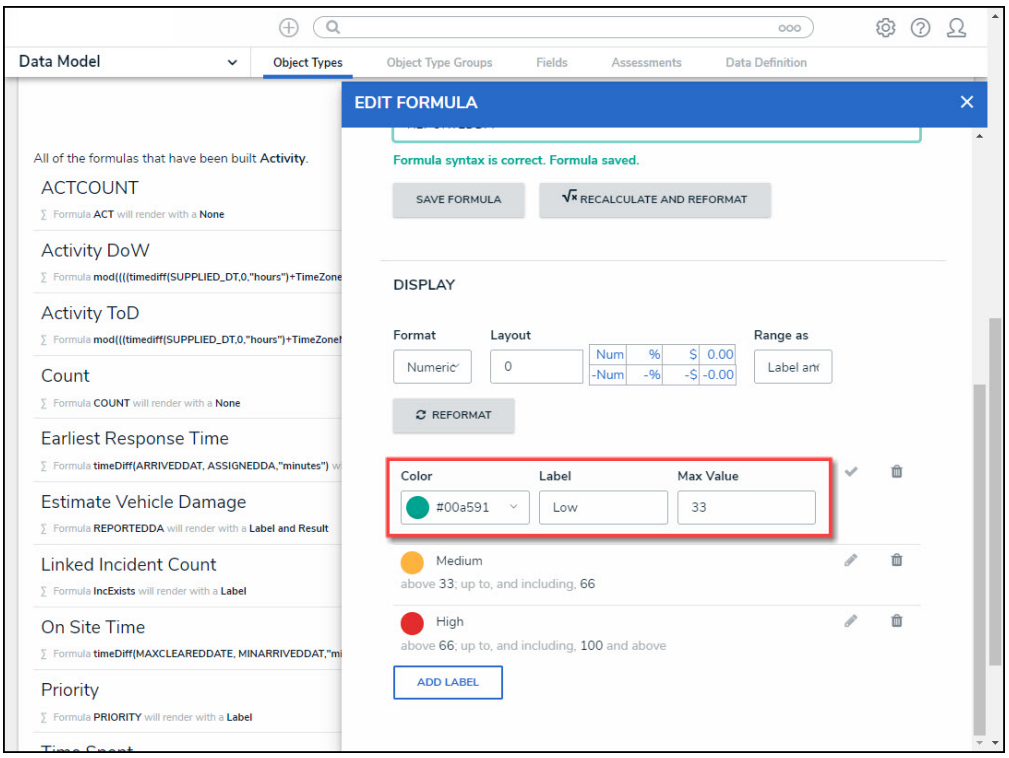

*Edit Icon*

25. The **Formula Label** fields will appear, allowing the user to edit the field values:

- **Color:** Click the **Color** drop-down to reveal the color picker and select a new color for

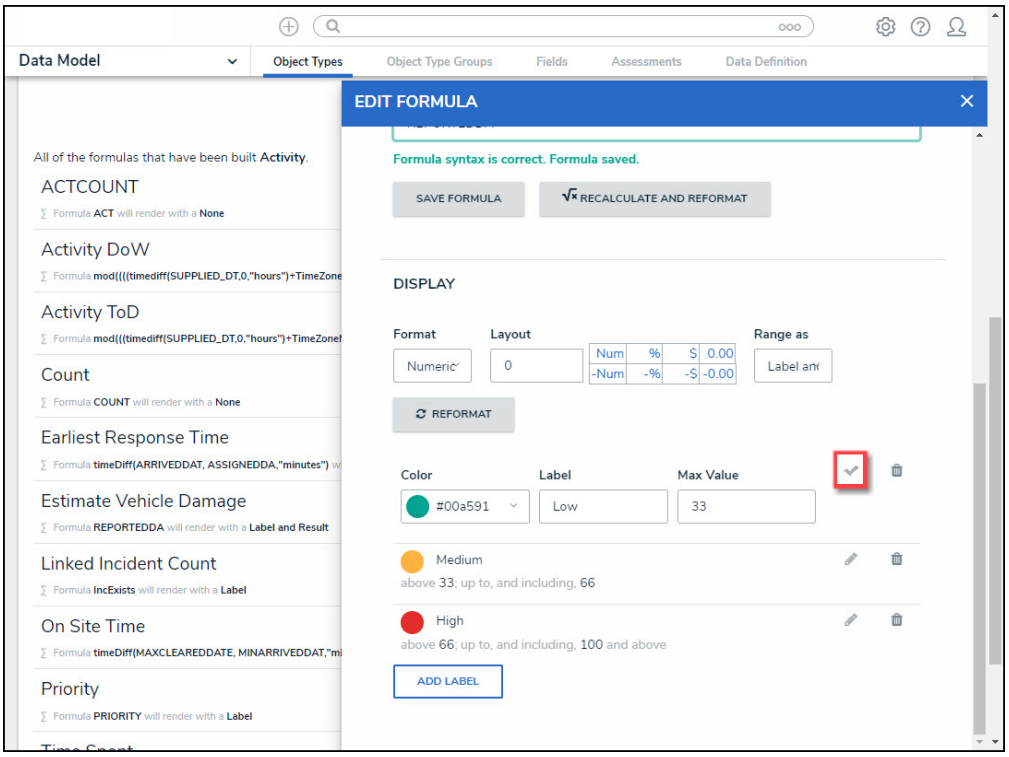
the label. You can also type a hex color into this field to select a color.

- **Label:** Enter a new name for the label in the **Label** field.
- **Max Value:** Enter a maximum value in the **Max Value** field, creating a numeric value range for the **Formula Label**.



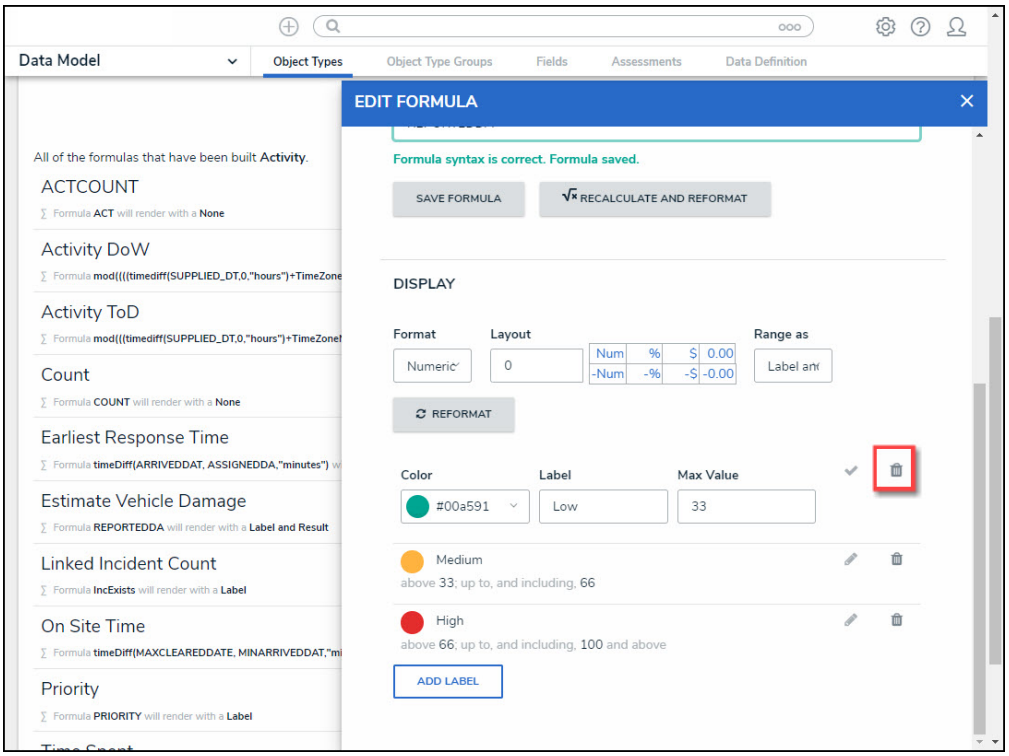

*Formula Label Fields*

26. Click the **Save** icon to save your changes.



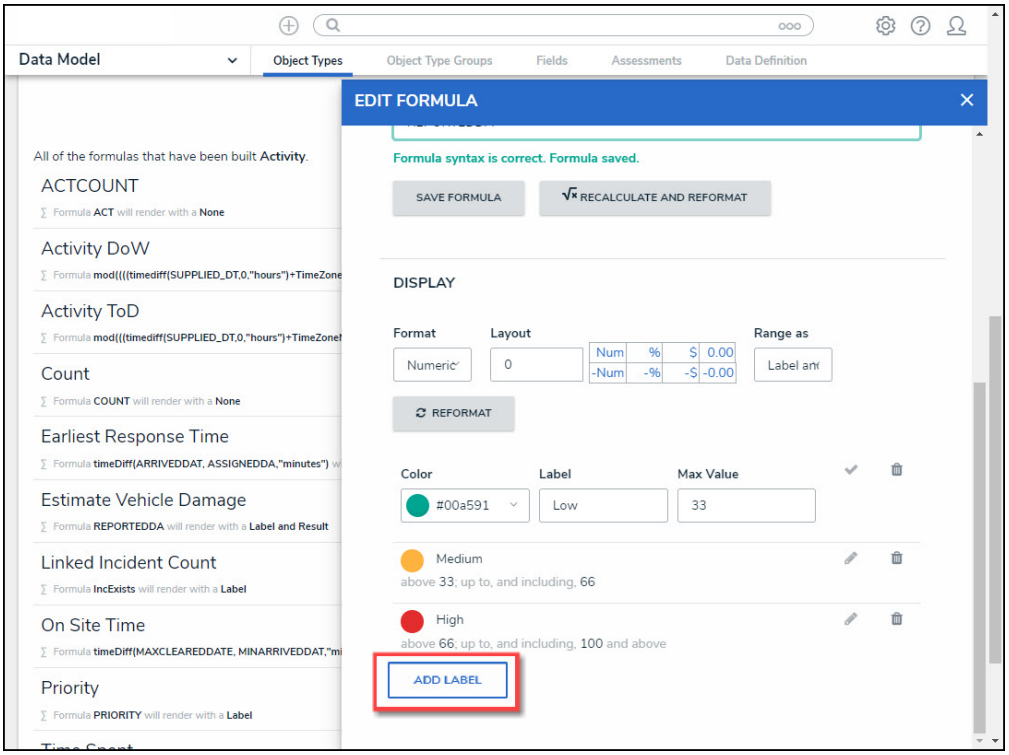
*Save Icon*

27. Click the **Delete** icon to delete a Formula Label.



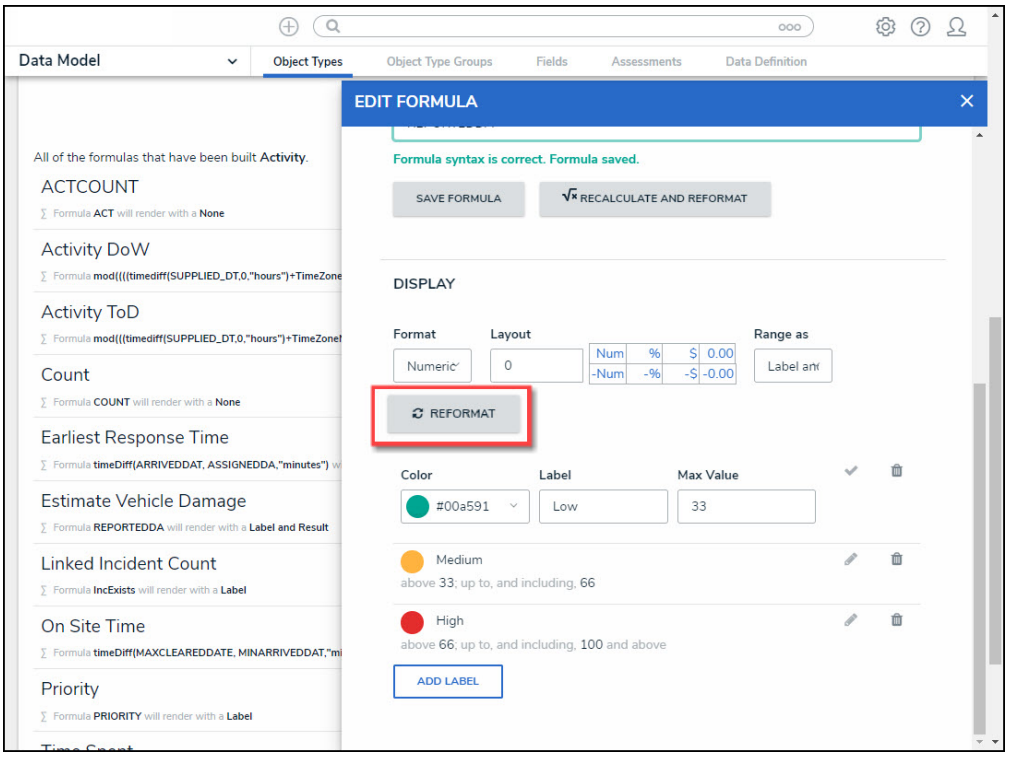

*Delete Icon*

28. Click **Add Label** button to add a new label.



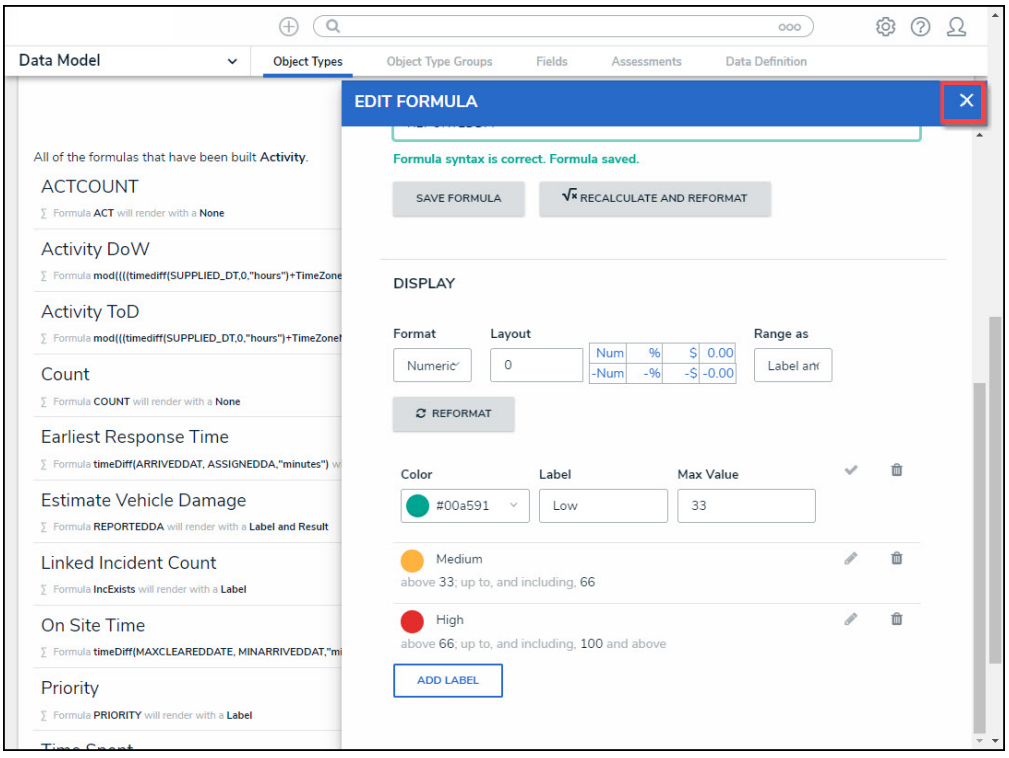

*Add Label Button*

29. If changes are made to the **Formula Label** on the ***Display*** section, you must click the **Reformat** button before the changes are displayed.




*Reformat Button*

30. *Click the **x** in the **Edit Formula** pop-up header to close the pop-up.*




*x Closes the Edit Formula Pop-up*

# Add a Condition to a Transition

# Overview

A **Condition** controls an object's movement to different states or performs a specific action. A **Condition** consists of fields, formulas, and workflow states that create a formula. The formula uses a set of parameters to control whether a transition or action can occur.

## Related Information/Setup

For more information on formulas, see the following articles:

- Formulas Overview
- Variables, Operators & Functions
- Null Values in Formulas
- Formula Examples

Before adding a Condition to a Transition, you must create a State and a Trigger. See the following articles for more information on creating States and Triggers.

- Create a New State
- Add a Trigger and Transition to a State

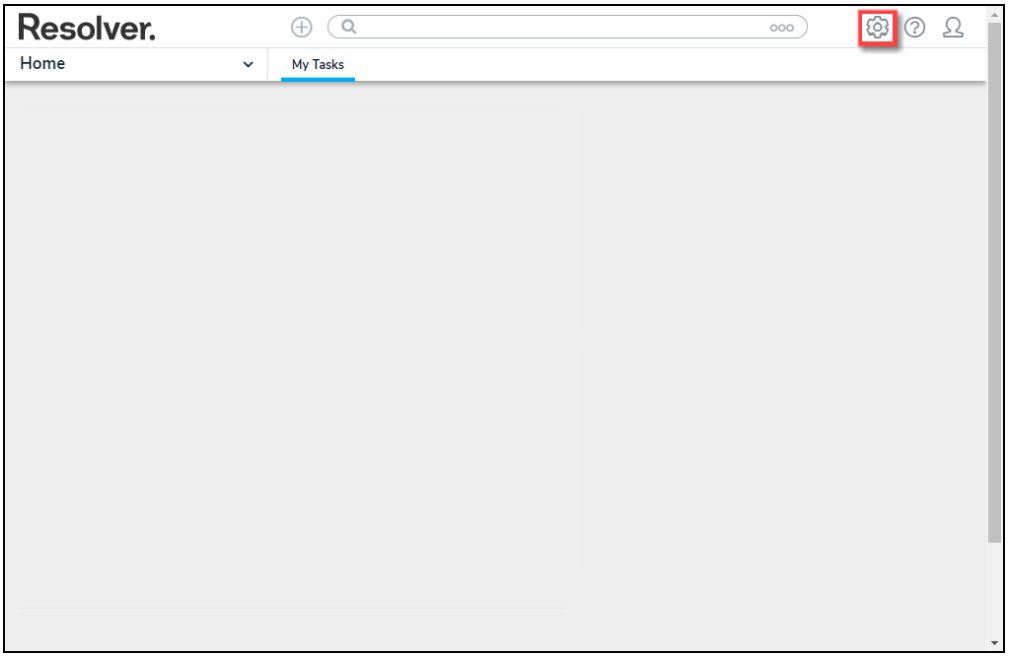
## Example

The following example outlines an everyday scenario where you would want to add a condition to a transition.

Your company's policy for severe incidents is to skip the typical review process and transition to the investigation stage. Create a Condition on the Incident object type workflow for the **Submit for Review** trigger. If the “Severe” option is selected. The object is automatically transitioned to the **Investigation Required** state once the **Submit for Review** trigger is selected on a form.

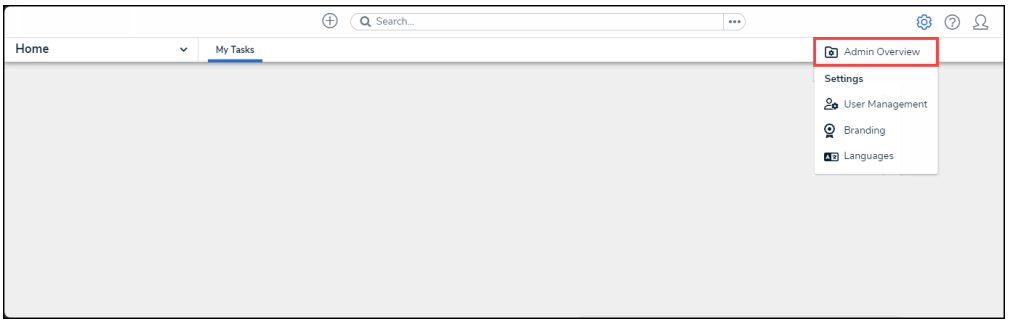
## Navigation

1. From the ***Home*** screen, click the **Administration** icon.



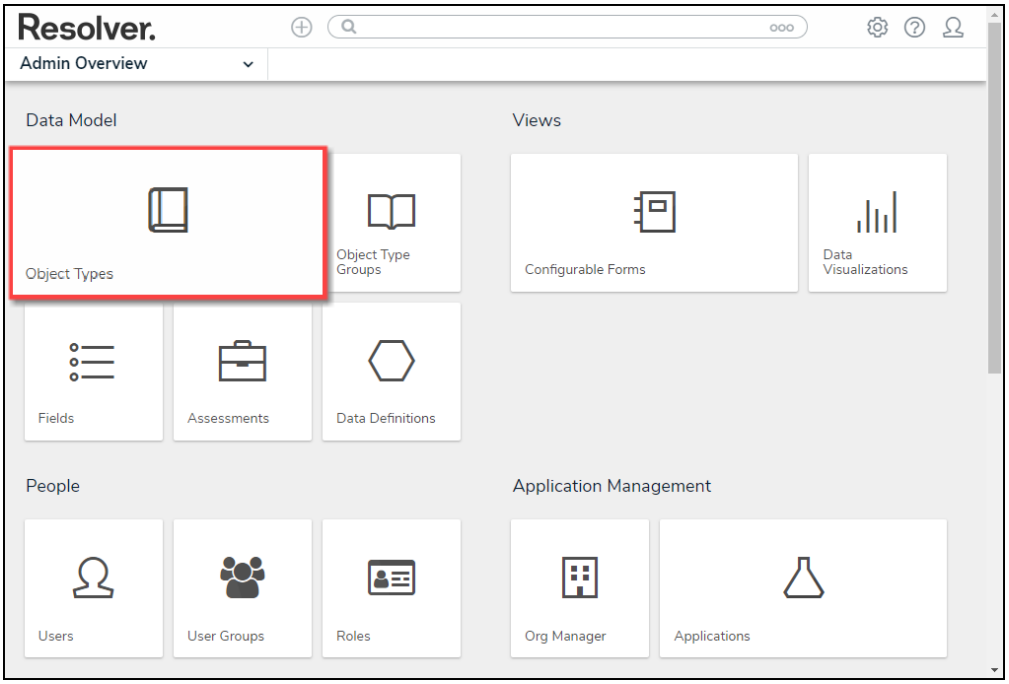

*Administration Icon*

2. From the **Administration Settings** menu, click the **Admin: Overview** link.



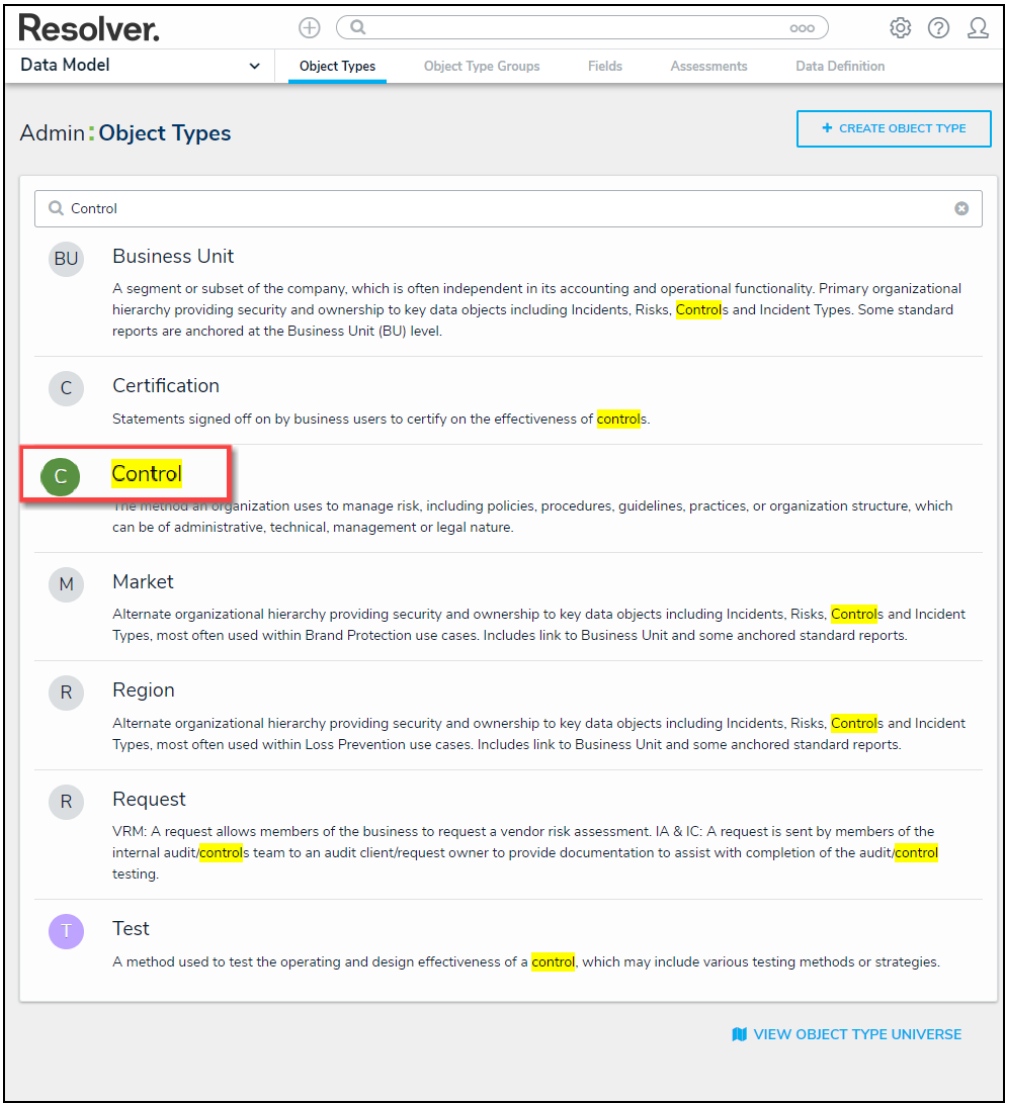

*Admin: Overview Link*

3. From the ***Admin Overview*** screen, click the **Object Types** tile on the ***Data Models*** section.



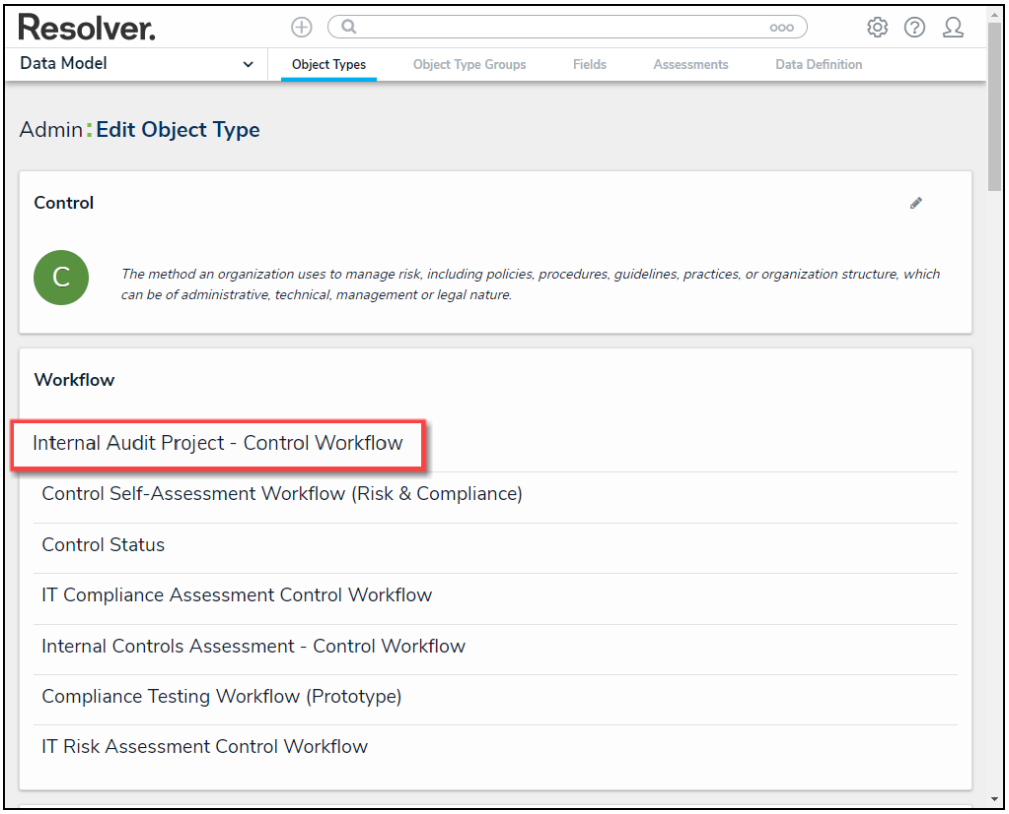

*Object Types Tile*

4. From the ***Object Types*** screen, enter an **Object Type Name** in the **Search** field to narrow down the list.
5. Click the **Object Type's Name** you want to edit.




*Click the Object Type's Name*

6. From the ***Edit Object Type*** screen, click on a workflow under the ***Workflow*** section.



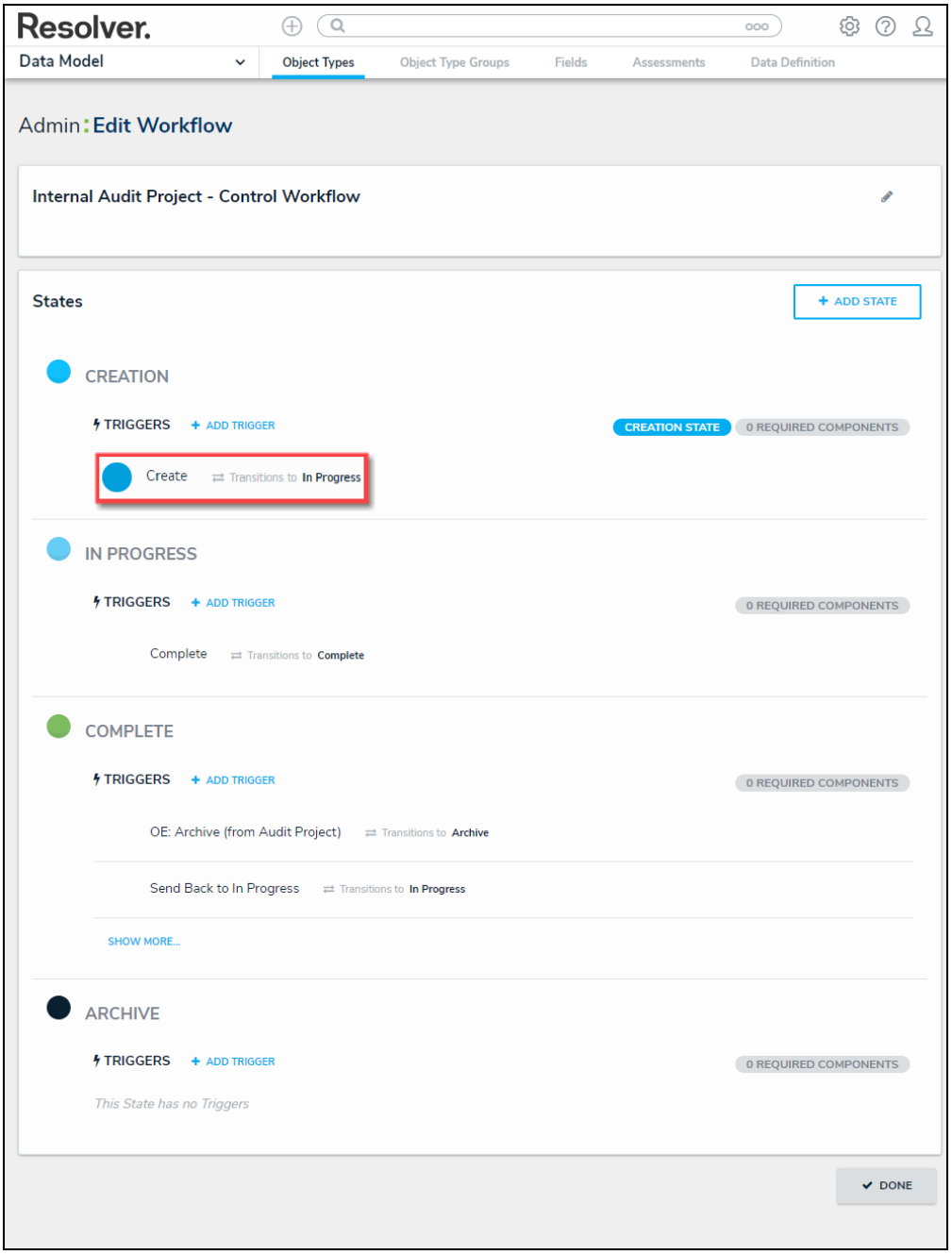

*Click on a Workflow*

7. If there are no workflows listed, click on the **Configure Workflow** button.


*Configure Workflow Button*

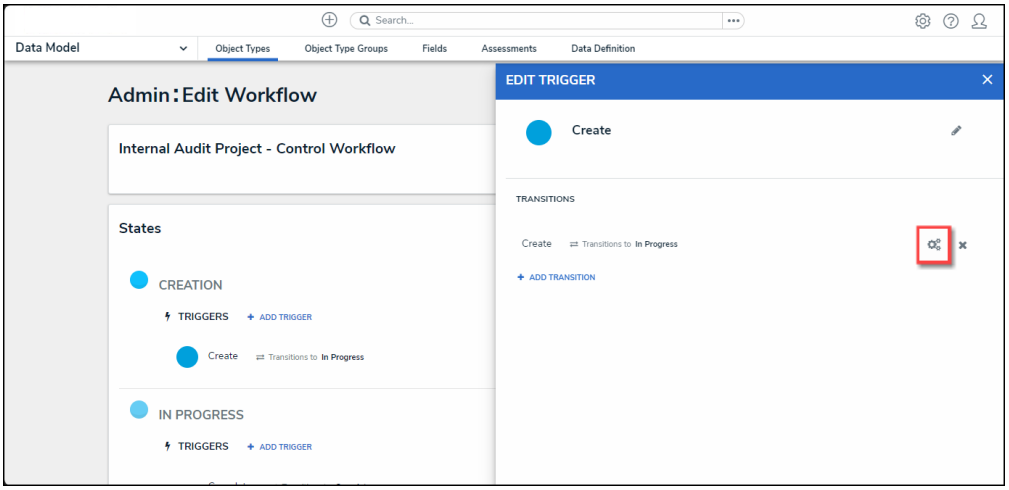
8. From the ***Edit Workflow*** screen, click a **Trigger** under the ***State*** section.

> ***Note:***
> *You must already have a **Trigger** added to a **State** before you can add a condition to a transition.*




*Click on a Trigger*

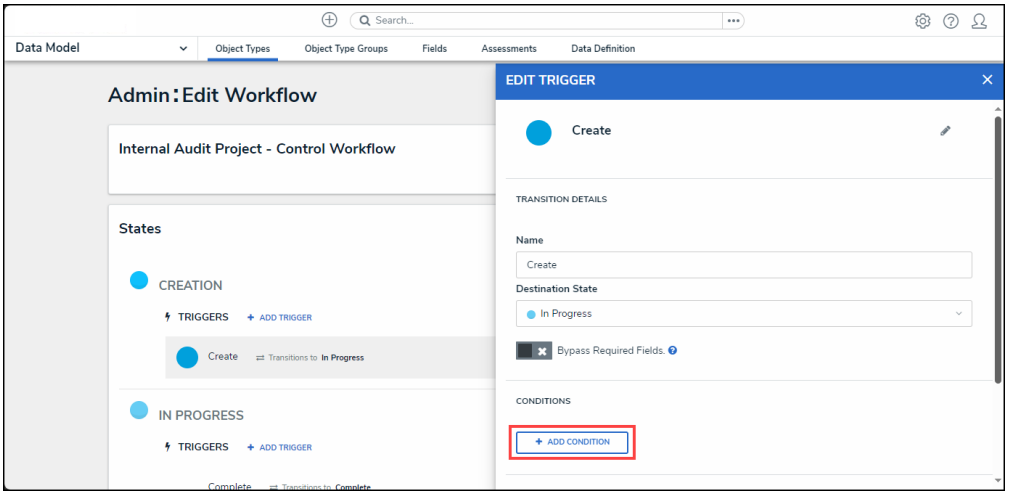
9. From the ***Edit Trigger*** pop-up, click the **Edit** icon next to the transition.




*Click the Edit Icon*

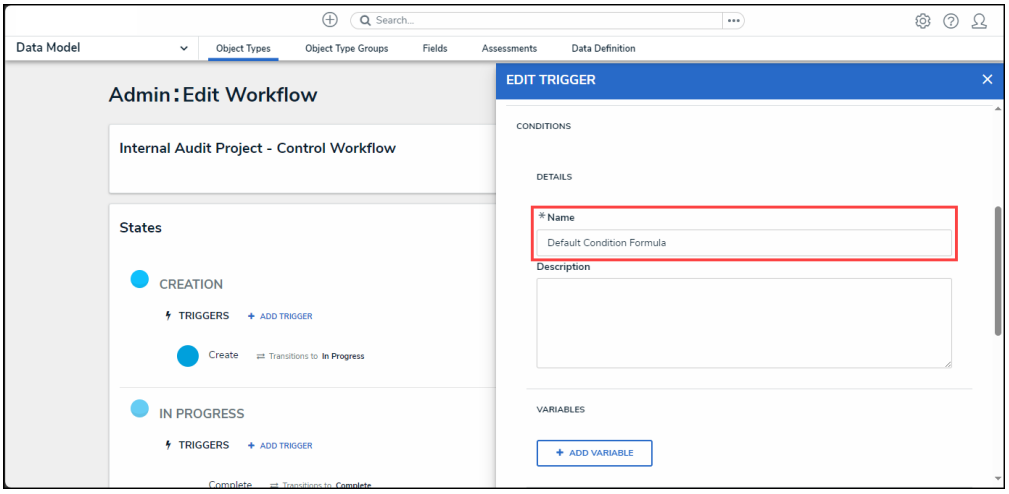
# Adding a Condition on a Transition

1. From the ***Condition*** section, click the **+Add Condition** button.



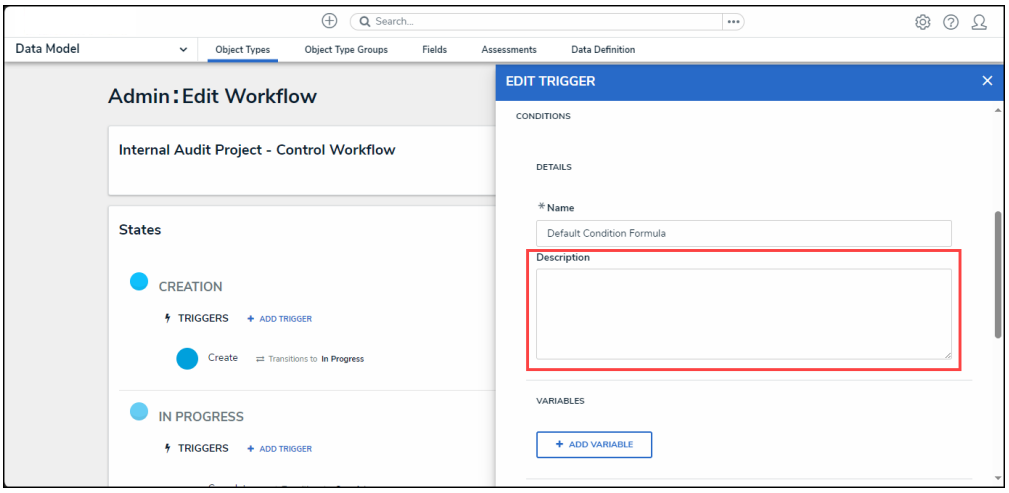

*+ Add Conditions Button*

2. **(Optional)** Enter a condition name in the **Name** field under the ***Details*** section. By default, conditions are named **Default Condition Formula**.



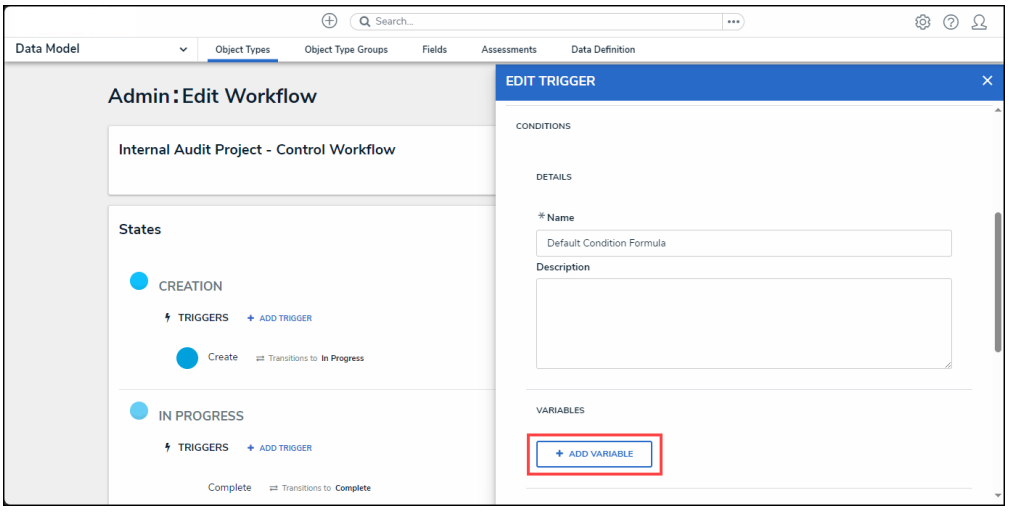

*Name Field*

3. **(Optional)** Enter a brief condition description in the **Description** field.




*Description Field*

4. From the ***Variables*** section, click the **+Add Variable** button.

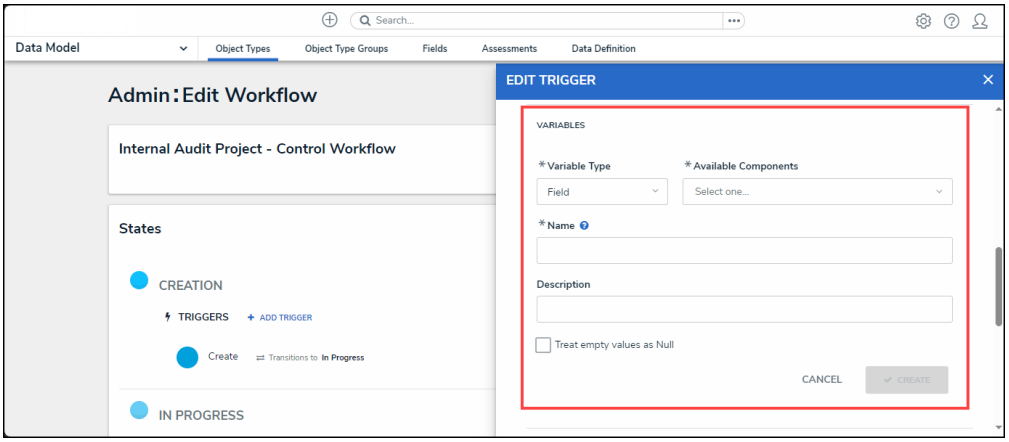



*+Add Variable Button*

5. From the ***Variables*** section, select a **Variable Type** from the drop-down list. A **Variable** is a value in which the formula calculations are performed.

- **Field:** After selecting the **Field** variable, the following field will appear:
  - **Available Components:** Select a field or formula from the **Available Components** drop-down field adding it directly to the Object Type.

> ***Note:***
> *Fields must be added to a formula after an Object Type or through an association (Relationship or Reference).*
>
> *Only numeric fields, date fields, and select lists (numeric values) are accepted. For more information, see the Fields article.*

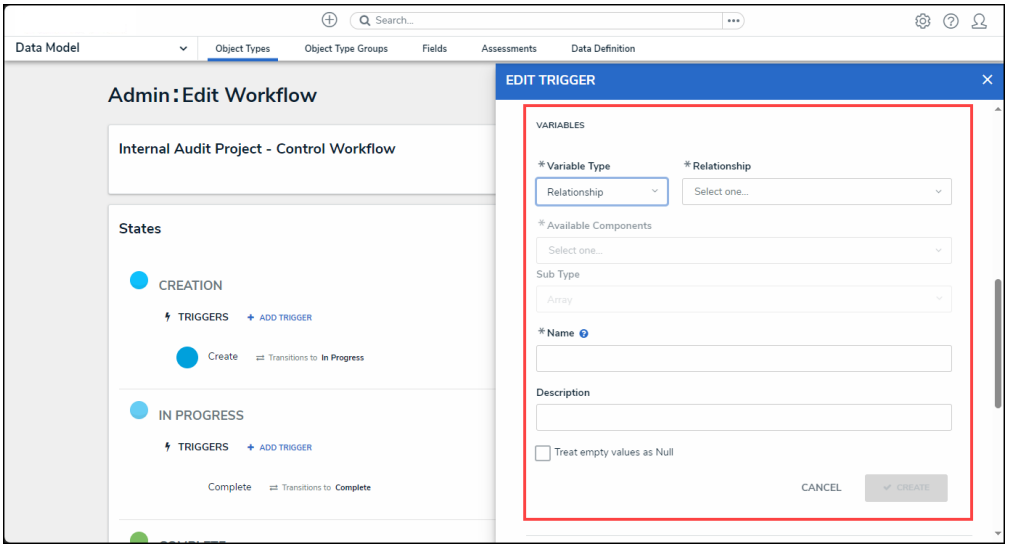



*Variable Type = Field*

- **Relationship:** After selecting the **Relationship** variable, the following fields will appear:
  - **Relationship:** Select the Object Type **Relationship** from the drop-down list. Relationships connect two or more objects. Relationships must be added to an Object Type to appear on the Relationship drop-down list. See the Add Relationships to an Object Type article for further information on adding a Relationship to an Object Type.
  - **Available Components:** Select a field or formula from the **Available Components** drop-down field adding it directly to the Object Type.
  - **Sub Type:** Select a **Sub Type** from the drop-down list. Subtypes specify how the data from multiple objects are compiled, calculated, and displayed. For more information on Subtypes, see the Sub Type Table in the Variables, Operations, & Functions article.
    - **Array:** Creates a set of values from the variable.
    - **Sum:** Calculates a total from the variable's set of values and returns a

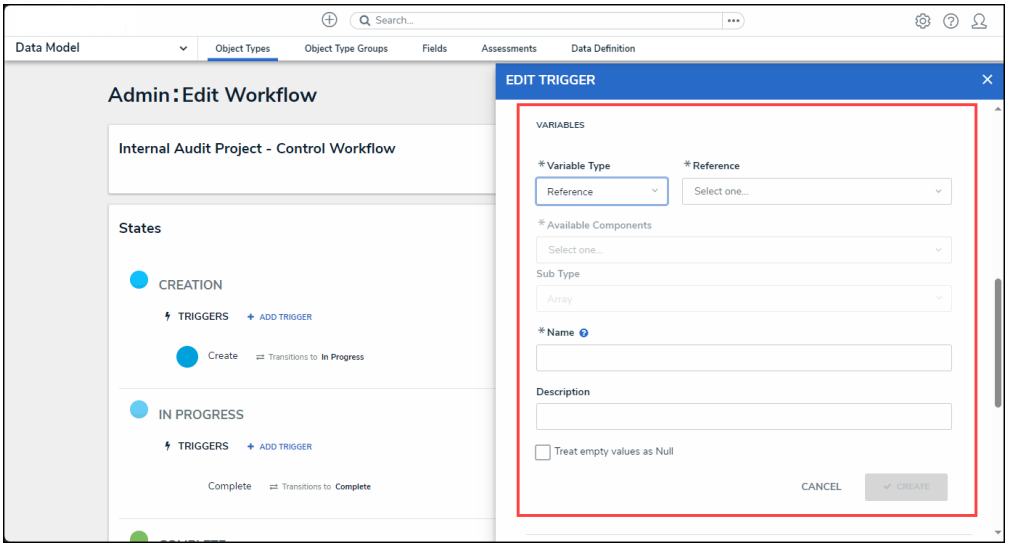
single number. Select list variables cannot use Sum Sub Types.

- **Count:** The number of times a variable has been added to an object.
- **Average:** Calculates an average number from the variable's set of values. Select list variables cannot use Average Sub Types.
- **Every:** Checks if the variable contains a value on the objects in the relationship/reference.
- **Min:** Calculates the lowest number from the variable's set of values. Select list variables cannot use Min Sub Types.
- **Max:** Calculates the highest number from the variable's set of values. Select list variables cannot use Max Sub Types.



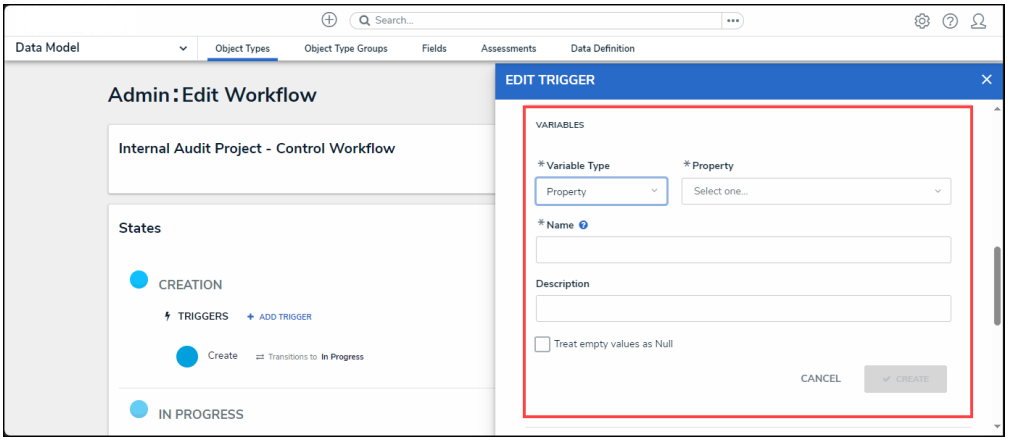

*Variable Type = Relationship*

- **Reference:** After selecting the **Reference** variable, the following fields will appear:
  - **Reference:** Select the Object Type **Reference** from the drop-down list. References indicate that an object is connected to another object through a relationship. References are automatically created when a relationship is created. For further information on adding a Relationship to an Object Type, see the Add References to an Object Type article.
  - **Available Components:** Select a field or formula from the **Available Components** drop-down field adding it directly to the Object Type.
  - **Sub Type:** Select a **Sub Type** from the drop-down list. Subtypes specify how the data from multiple objects are compiled, calculated, and displayed.




*Variable Type = Reference*

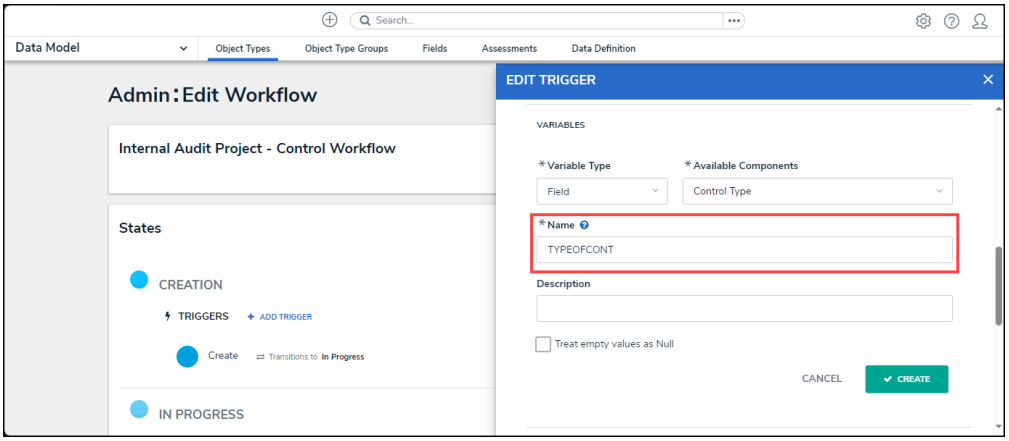
- **Property:** After selecting the **Property** variable, the following field will appear:
  - **Property:** Select a **Property** type from the drop-down list:
    - **Is Submitter Confidential:** This property type creates a formula that compares the number of confidential submissions against the number of not confidential submissions for customers that use the **Confidential Reporting Portal**.




*Variable Type = Property*

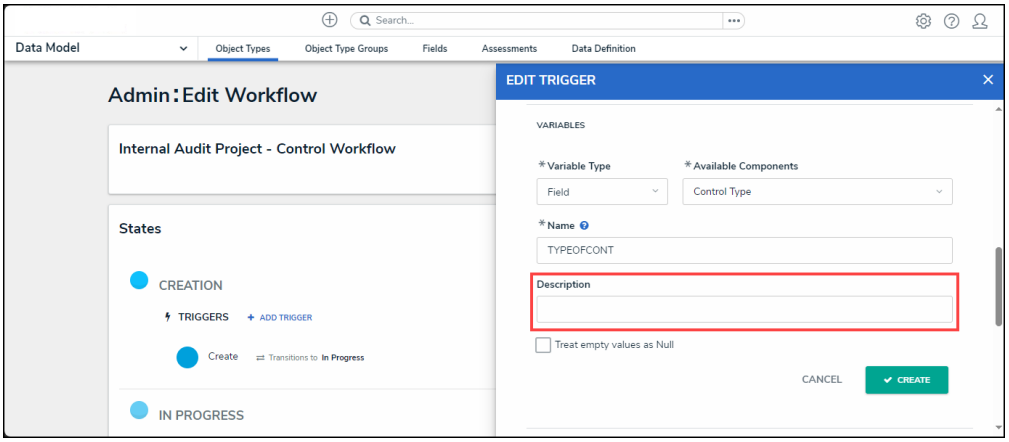
6. The system will automatically populate the Name field with the field or formula's unique ID by default.
7. **(Optional)** Enter a Variable name in the **Name** field.

> ***Warning:***
> *Using a function name (Sub Type Name) in the name field will cause an error.*



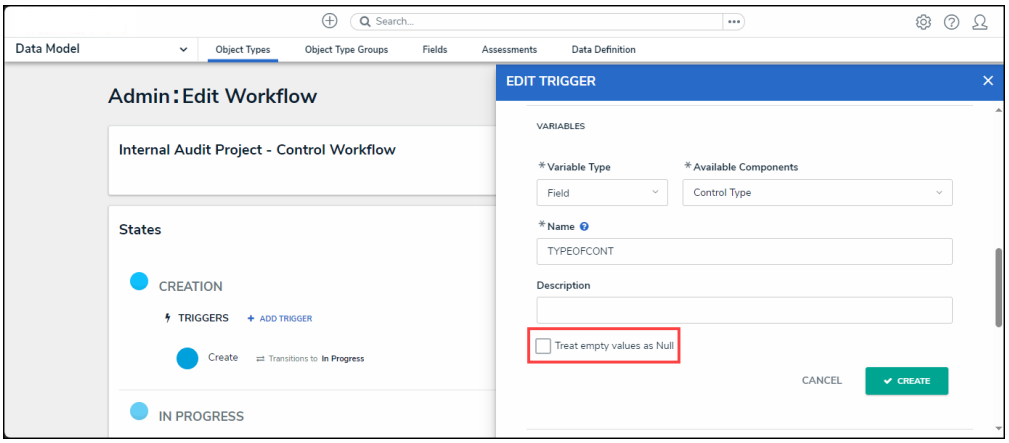

*Variable Name*

8. **(Optional)** Enter a Variable description in the **Description** field.



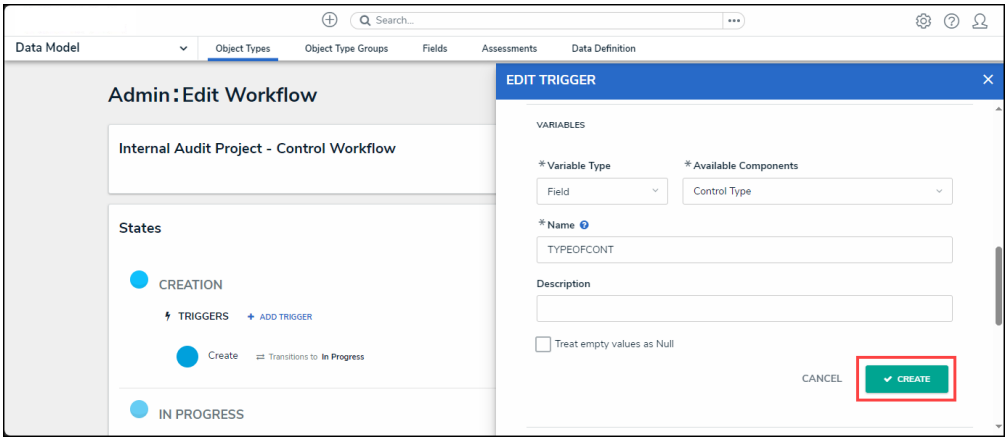

*Description Field*

9. **(Optional)** Select the **Treat empty values as Null** checkbox, to exclude blank objects from a formula calculation. For more information, see the Null Values in Formulas article.



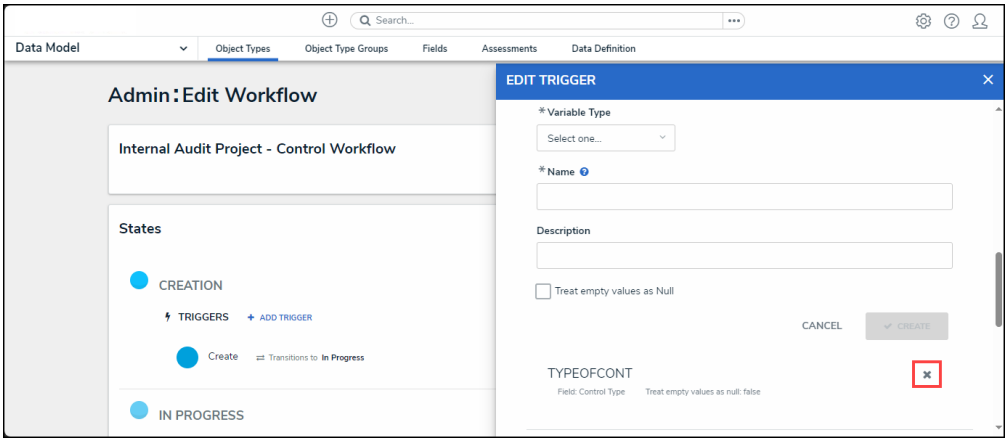

*Treat Empty Value as Null Checkbox*

10. Click the **Create** button to add the variable.



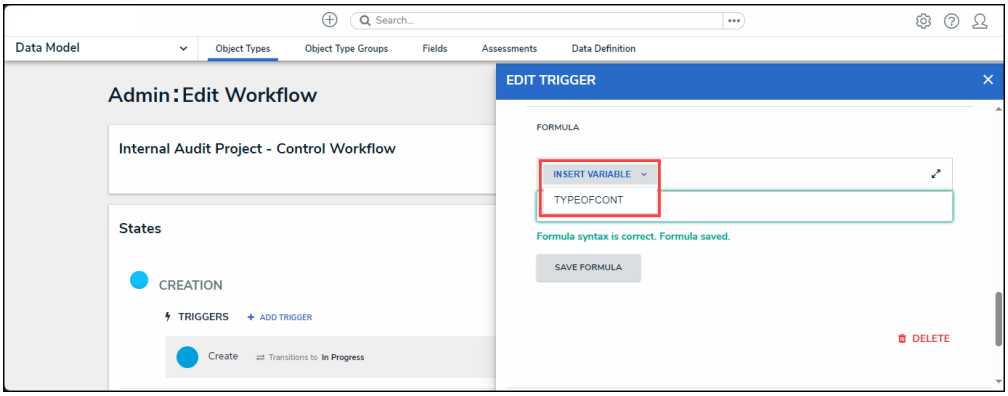

*Create Button*

11. Repeat steps 7 - 16 to add additional variables.
12. Click the **x** icon next to the variable to delete the variable.




*X Icon - Delete a Variable*

13. **(Optional)** Click the **Insert Variable** button and select a variable from the dropdown list to use within the **Formula** field.

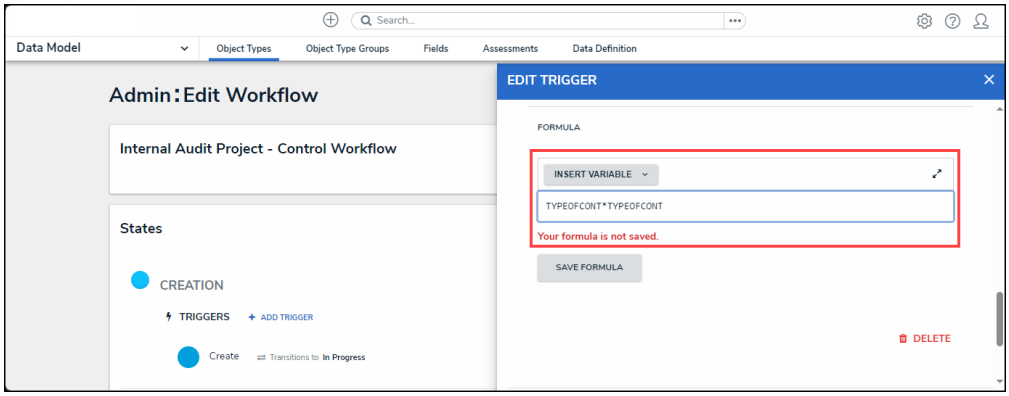



*Insert Variable Button*

14. From the ***Formula*** section, enter a **Formula** using the variable name(s) you entered in the **Name** field under the ***Variables*** section. Include operators and functions in the

**Formula** field (e.g., **INCIDENTSE==3**). For more information on Operators, see the Operators Table in the Variables, Operators, & Functions article.

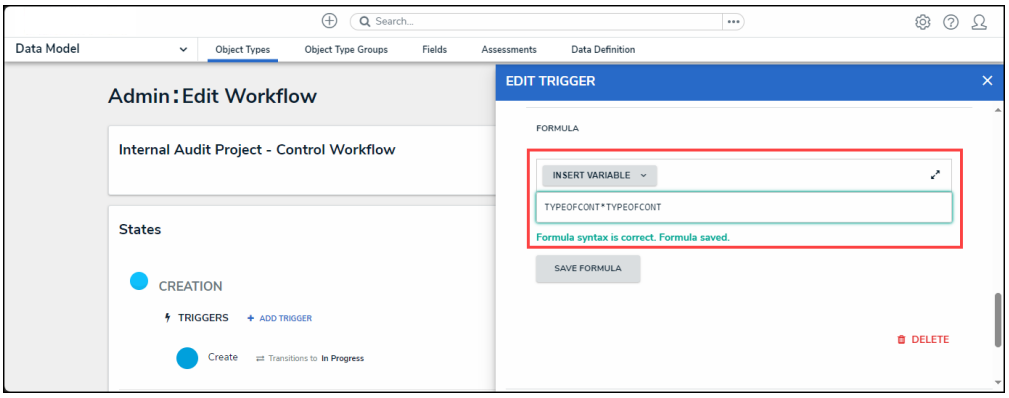
15. A system notification will appear under the **Formula** field, indicating that **Your formula is not saved.**




*System Notification - Your Formula is Not Saved*

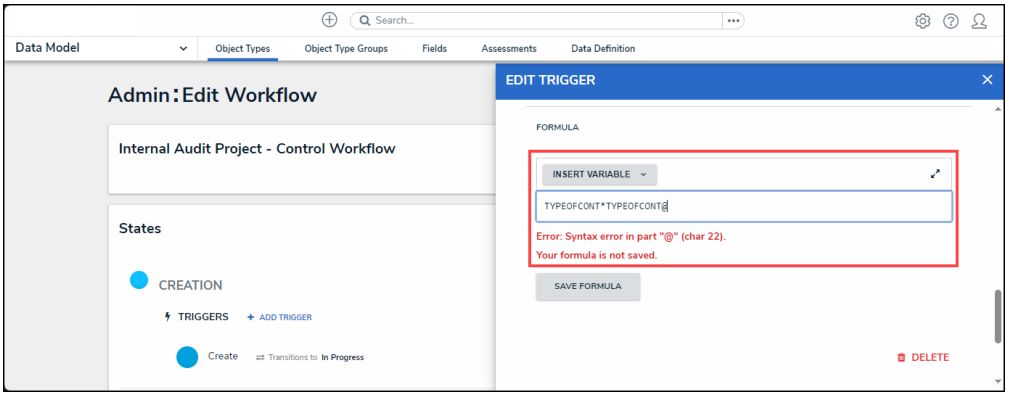
16. Click on the **Save Formula** button. The system will perform a Syntax Validation on the formula if the formula is:

- **Valid:** A system notification will appear under the **Formula** field; **Formula syntax is correct. Formula saved.**




*System Notification - Valid Formula*

- **Invalid:** A system notification will appear under the **Formula** field; **Error Syntax error in part (char 1). The formula is not saved**. The error will indicate the character (char) location of the error in the formula and that the formula is invalid and not saved.




*System Notification - Invalid Formula*

17. Syntax Validation helps to prevent users from saving invalid formula expressions, which can negatively impact APIs.
18. Click the **Done** button to add the Variables to the Object Type.