TRAILHEAD

Advanced Rules

Exercise Guide

Version 1.0

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Preface

These training exercises are based on the Fall '20 release of Salesforce Industries Communications, Media, and Energy & Utilities Clouds. For additional information about the topics covered in this module, see the documentation available in Success Community at https://success.vlocity.com.

Overview

This module covers fundamental and advanced functionality of the Configuration / Validation Advanced Rules in Industries CPQ.

What You Will Learn

When you complete this training, you will be able to:

- Create product relationships
- Use the Vlocity Rule Builder to create Advanced Rules
- Design Entity Filters
- Build rules to modify attributes in the cart

Prerequisites

The prerequisites for this training include a solid understanding of basic Salesforce concepts and functionality. You should also have a working knowledge of your industry business objectives.

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Introducing the Advanced Rules Framework

The Advanced Rules Framework allows you to design sophisticated natural language criteria along with customizable interfaces to ensure the right products are available to eligible customers at the right price in the right configuration. Advanced Rules determine which products and under what circumstances they apply using Entity Filters, and they are built using the Vlocity Rule Builder. You can use Advanced Rules to create rules that depend on context, product attributes, and multiple criteria.

There are several rule types: Compatibility Rules (also known as Configuration / Validation Rules), Pricing, and Availability & Eligibility.

- *Compatibility Rules* use product relationships to ensure products ordered in the Cart are compatible based on conditions in order line items and related objects. They use the ProductValidationInterface and its associated implementations to execute definitions within the Product Relationship object.
- *Pricing Rules* are legacy rules to change standard pricing and operate on order line items in the Cart.
- *Availability & Eligibility Rules* are legacy rules that display or hide products in the Cart's product list based on conditions in opportunity, quote or order header data or data in related objects such as Accounts or Assets. In most circumstances, these rules are replaced by context rules.

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Exercise 7-1: Getting Started with Product Relationships

Scenario

Eliza Young is our Developer, and her focus today is to build the rules used by the powerful Industries CPQ engine that will be used to accomplish Infiwave's business objectives. In just the same way that society operates more smoothly with well-established rules, Industries CPQ and the Cart need rules, too.

As the benevolent dictator of her Salesforce empire, Eliza begins to devise the rules that will save her people from mistakes during the order capture process. She will begin by creating product relationships to ensure that all products on an order are compatible with one another and configured correctly. Eliza can even attempt an upsell using a recommendation. With these rules, all orders will be perfect orders, and it will be good.

Goal

- Require a product when another product is added.
- Exclude products when a product is present.
- Recommend a product when another product is added.
- Use the Vlocity Rule Builder.

Tasks

1. Create a product relationship to require the Office Hub Modem when the Office Internet Solution is ordered
2. Create a product relationship to exclude the Home Hub Modem when the Office Internet Solution is ordered
3. Create a product relationship to recommend Smart Hub Cloud Backup when the Office Internet Solution is ordered
4. Review the Product Validation interface implementation
5. Create an Advanced Configuration/Validation Rule to trigger the product relationships
6. Test the new rules in the Cart

Time: 20 mins

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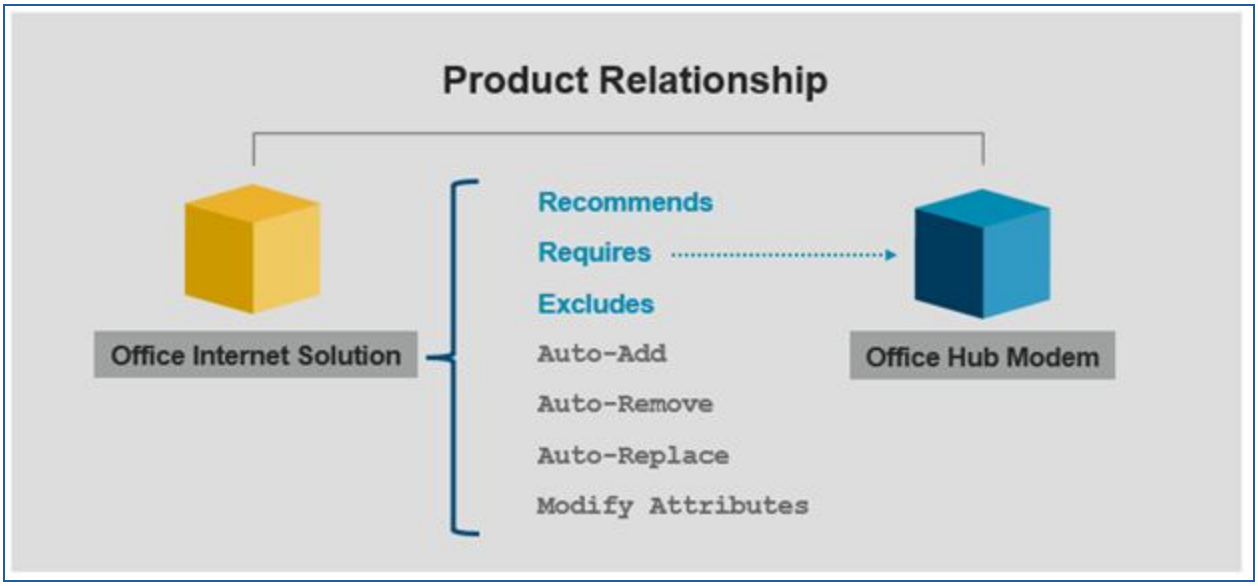
What are Product Relationships?

Product relationships are used to determine if a product combination is valid. Using product relationships, you can define that, when a product is added to the cart, related products are added with it. You can also automatically add, remove or recommend products based on other products in the cart.

Product relationships are triggered using advanced compatibility rules.

Compatibility rules run on order line item objects: Opportunity Line Items, Quote Line Items or Order Line Items. They use product relationships as rule actions.



ALERT:
If you've just received your training playground, add your email address to the system administrator profile to ensure you receive all system notifications. In the upper-right, click on the **Avatar** and select **Settings**. Enter your email address in the **Email** field on the Personal Information page and click **Save**.

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Task 1: Create a product relationship to require the Office Hub Modem when the Office Internet Solution is ordered

1. In the Lightning tab navigation bar, click **Product Relationships**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New**.
3. In the **New Product Relationship** dialog, enter the following information.

Field	Value
Product Relationship Name	`OIS Requires Office Hub Modem`
Product	**Office Internet Solution**
Relationship Type	**Requires**
Related Product	**Office Hub Modem**
Min Quantity	`1`
Max Quantity	`1`

4. Click **Save**.

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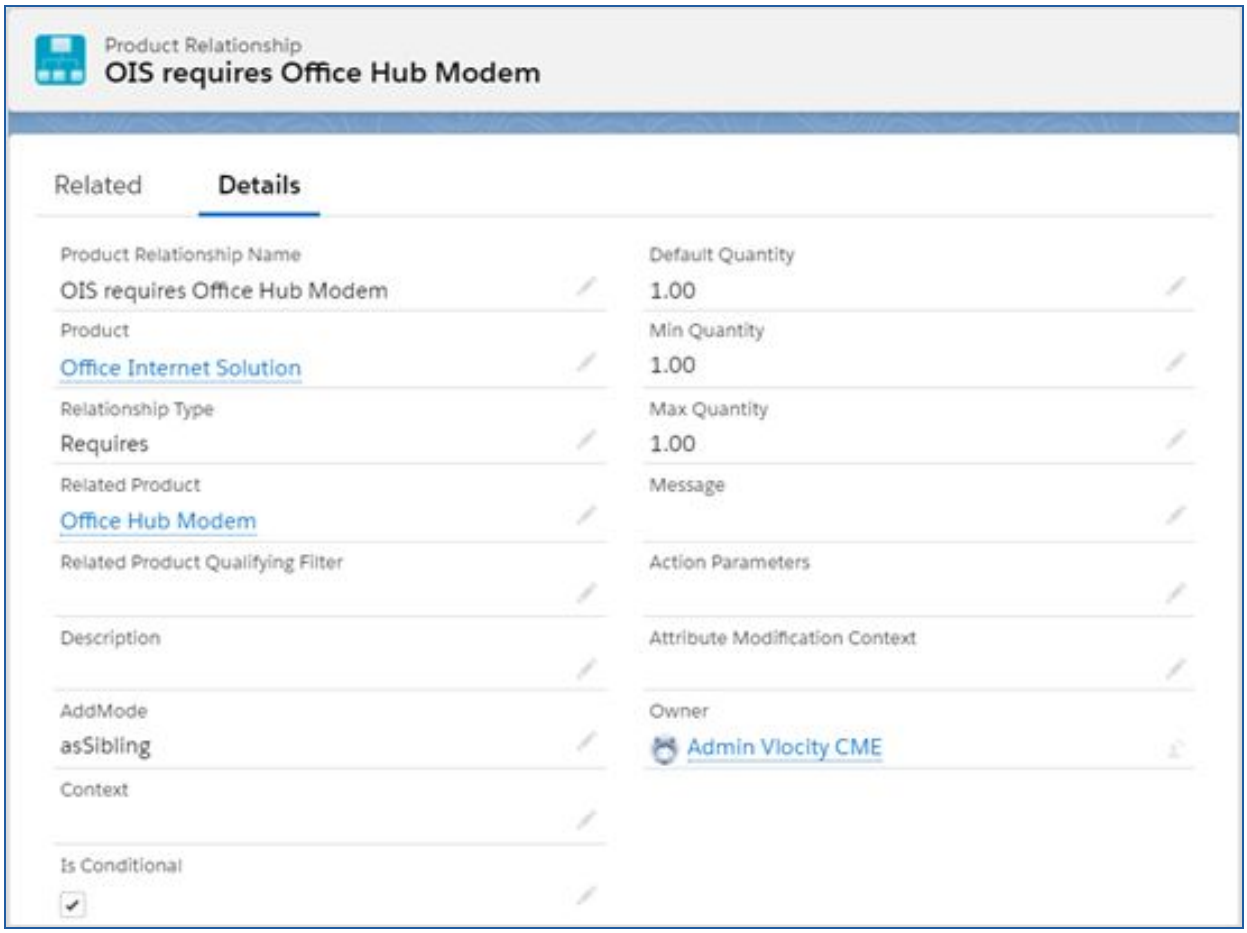

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Task 2: Create a product relationship to exclude the Home Hub Modem when the Office Internet Solution is ordered

1. In the Lightning tab navigation bar, click **Product Relationships**. You will see the "requires" relationship you set up in the previous task. Now you are going to create an "excludes" relationship.
2. Click **New.**
3. In the **New Product Relationship** dialog, enter the following information.

Field	Value
Product Relationship Name	`OIS Excludes Home Hub Modem`
Product	**Office Internet Solution**
Relationship Type	**Excludes**
Related Product	**Home Hub Modem**
Min Quantity	`1`
Max Quantity	`1`

4. Click **Save**.

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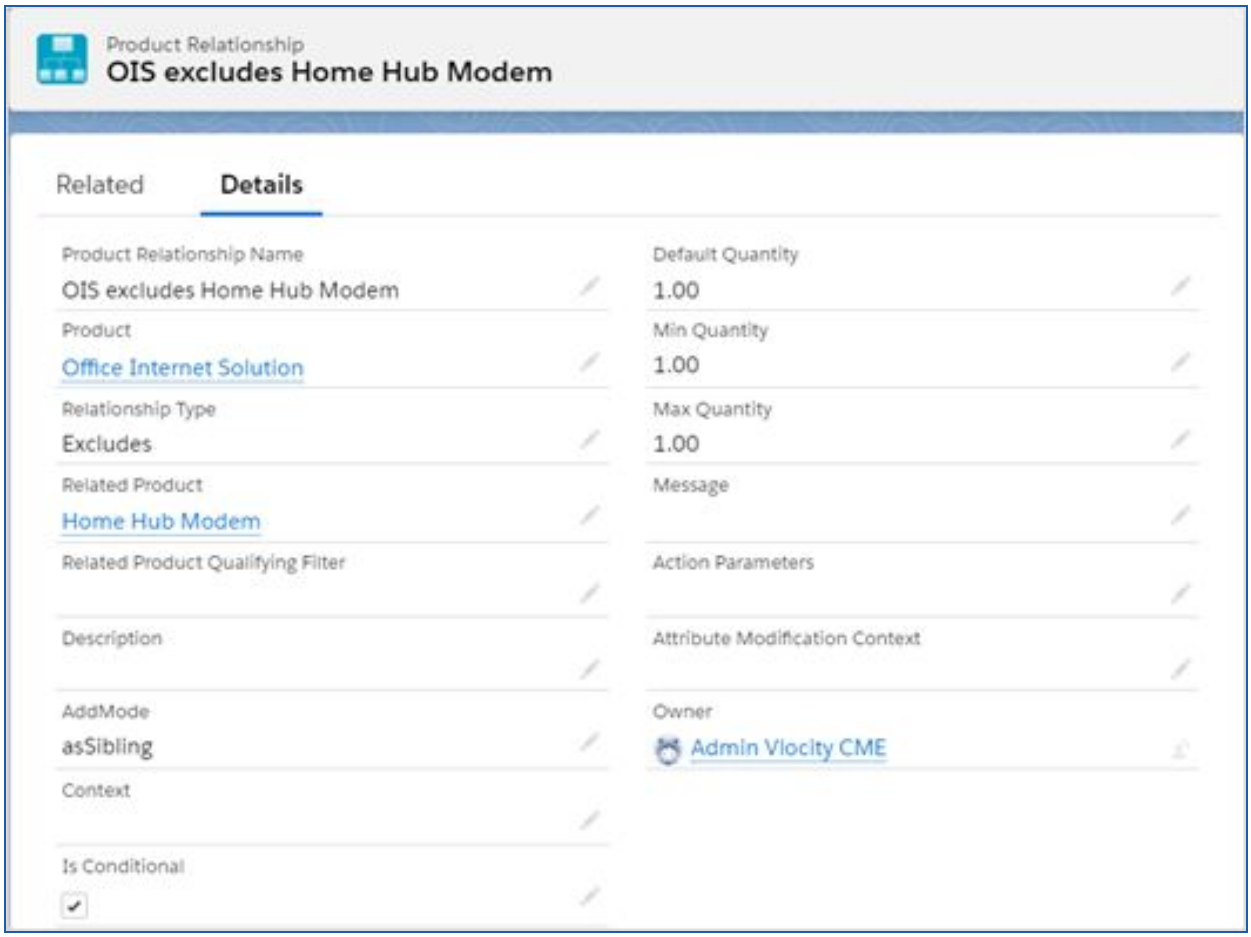

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Task 3: Create a product relationship to recommend Smart Hub Cloud Backup when the Office Internet Solution is ordered

1. In the Lightning tab navigation bar, click **Product Relationships**.
2. Click **New.**
3. In the **New Product Relationship** dialog, enter the following information.

Field	Value
Product Relationship Name	`OIS Recommends Smart Hub Cloud Backup`
Product	**Office Internet Solution**
Relationship Type	**Recommends**
Related Product	**Smart Hub Cloud Backup**
Min Quantity	`1`
Max Quantity	`1`

4. Click **Save**.

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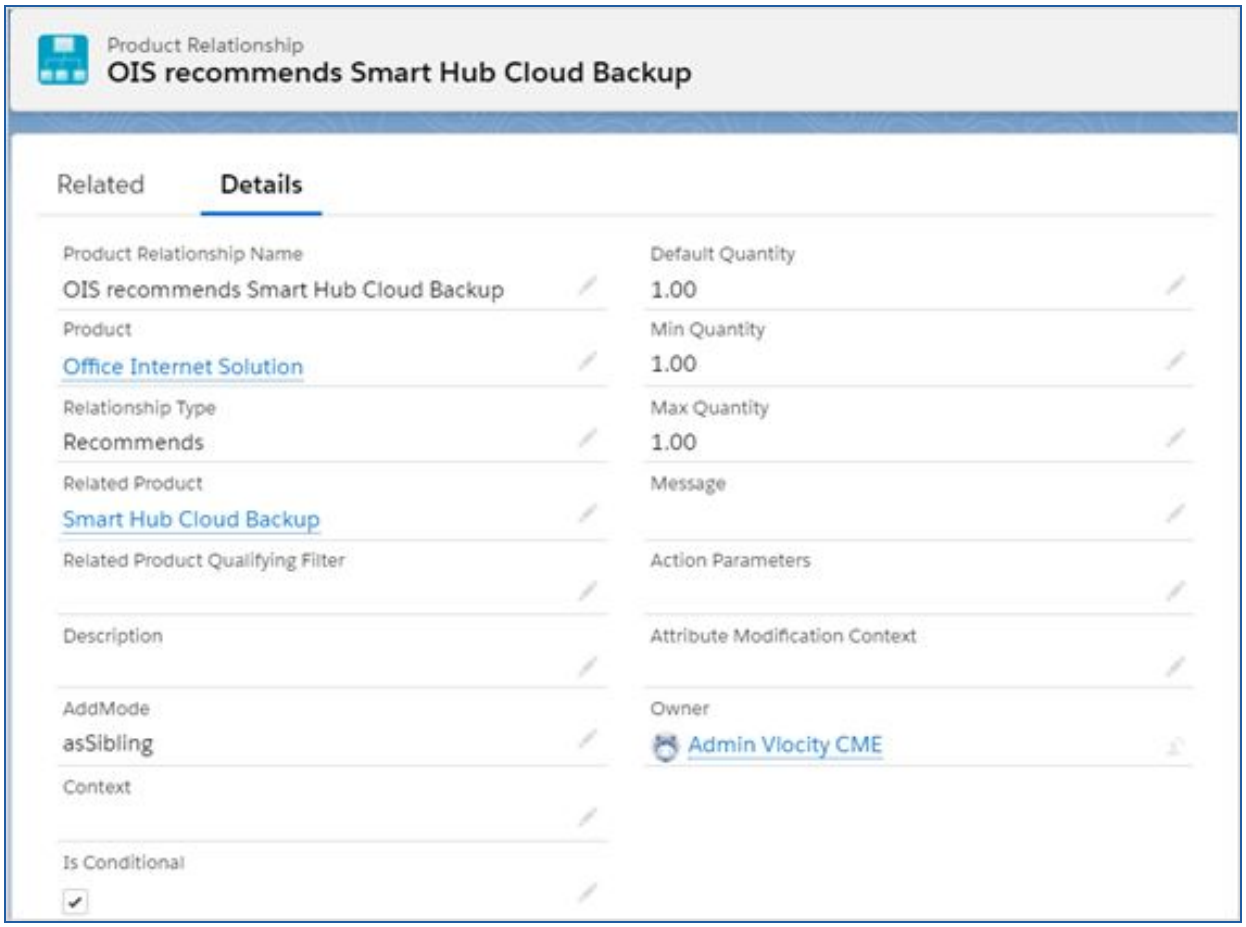
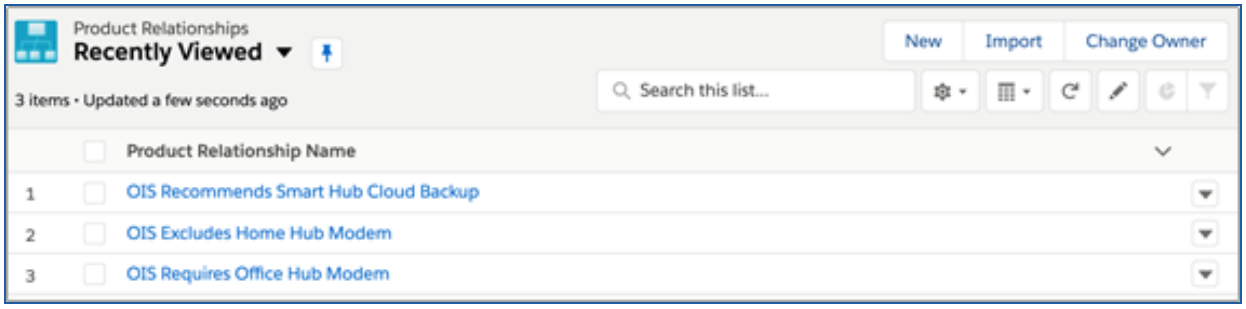


5. In the Lightning tab navigation bar, click **Product Relationships**.

6. Review the three new product relationships that you've created.



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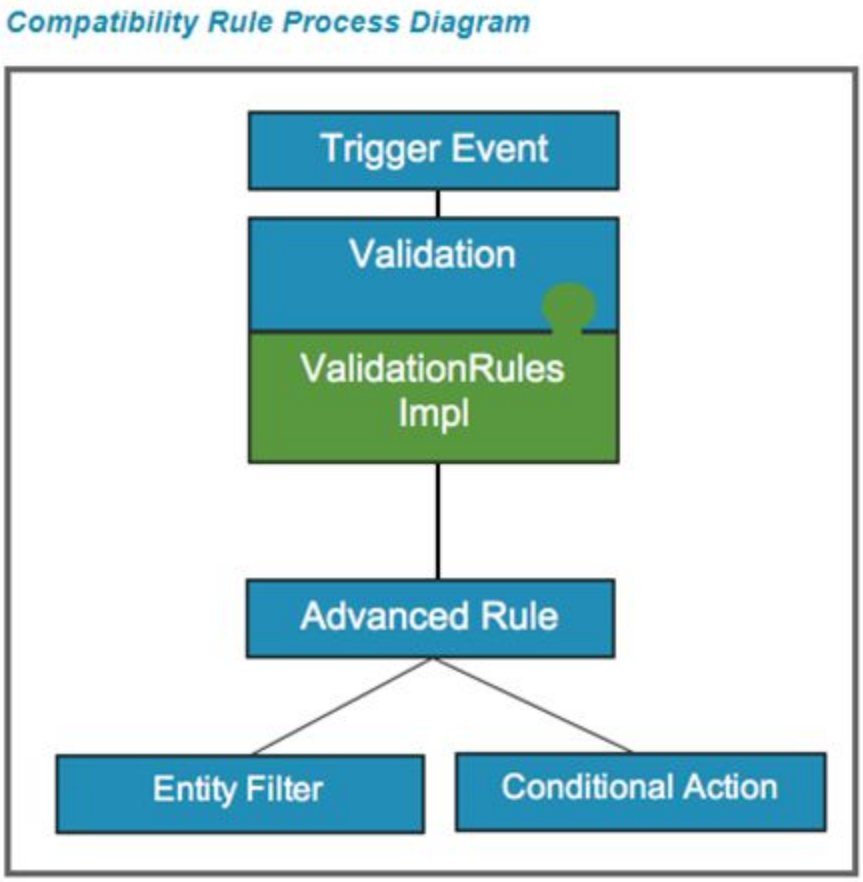
How do Compatibility Rules Work?

The diagram below provides a top-level view of the compatibility rule process.



The process begins with a trigger event, such as adding a new product to the Cart or removing a child entity from the cart. This trigger event invokes a validation process which is executed through the ProductValidationInterface and its associated implementations.

This will act on the definitions held in the Product Relationship object relating to your advanced rule, including the entities involved in the rule, the actions to be taken, and the conditions which apply.

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What is an interface implementation?

The core of the Salesforce open architecture is the interface and implementation paradigm. An interface manages the application and its call out to business logic; an implementation is that business logic. Salesforce Industries offers multiple implementations for each interface. You can choose the implementation that best fits your needs, or you can create your own implementation.

For example, the ProductValidationInterface communicates with the system to ask, “is the product in the cart configured correctly?” The implementation responds with the appropriate business logic to evaluate the configuration and add, require or exclude other products or offers. When used judiciously, you can define interfaces once and deploy them many times to consistently maintain and apply business logic.

Salesforce provides a variety of interface implementations for Advanced Rules with default implementations. The default implementations allow the Cart to run, but they don’t invoke any rules. You must activate different implementations to apply rules.

NOTE:
Activating an implementation only needs to be done once, or when new implementations have been created. Only one implementation can be active for each interface in an org.

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What is the Configuration / Validation interface?

Product relationships and compatibility rules use the ProductValidationInterface and associated implementations to execute definitions in the Product Relationship object. The ProductValidationInterface is typically triggered when a product is added to, modified in, or deleted from an opportunity, order, or quote.

The following implementations are provided by Salesforce.

Implementation	Purpose
DefaultProductValidationImplementation	Returns the list without modification.
ProductRelationshipValidationImpl	Legacy implementation that is no longer supported.
ValidationRulesFlowImplementation	Runs the active compatibility rules that are defined in the Validation Rules flow. It is an unmanaged implementation.
ValidationRulesImplementation	Runs all product relationships and active compatibility rules for the opportunity, order, or quote.

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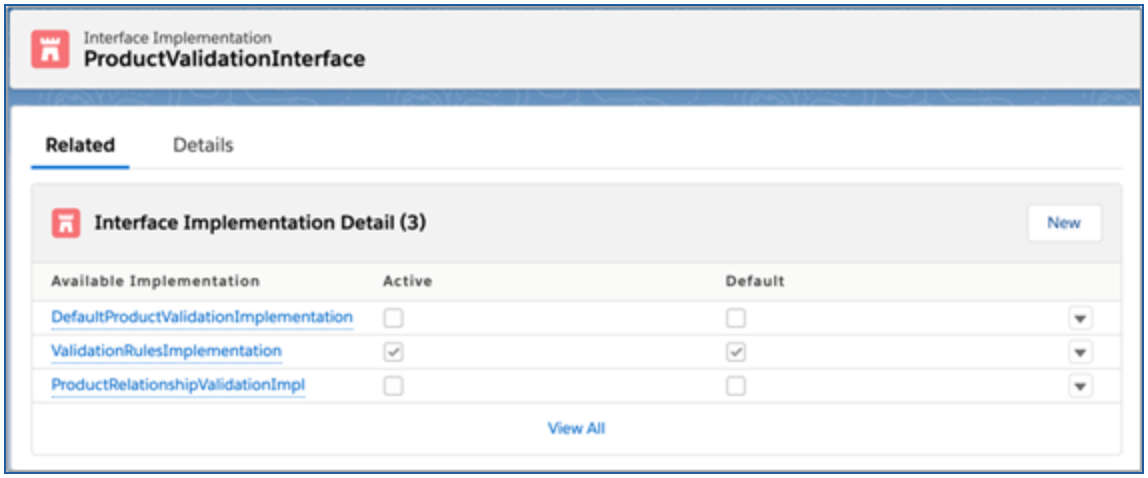
Task 4: Review the Product Validation interface implementation

1. In the Lightning toolbar, select **Interface Implementations**. If you cannot see the option in the toolbar you may need to select it from the **More** dropdown list.
2. In the Lightning search dialog, enter `productvalidation`.
3. In the search results list, click **ProductValidationInterface**.

4. In the **Interface Implementation Detail** related list, locate **ValidationRulesImplementation** and notice that it's the Active and the Default implementation.



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What are Advanced Rules?

When you need to create configuration or compatibility rules that depend on context, product attributes and multiple criteria, you can use product relationships in an Advanced Rule. Advanced Rules are built using the Vlocity Rule Builder.

What is the Vlocity Rule Builder?

Vlocity Rule Builder is a drag-and-drop design tool that allows you to define advanced rules by associating entity filters and/or rule actions with the rule. In this exercise, you'll create an advanced rule with no entity filters. You will use the three product relationships (requires, excludes and recommends) that you created earlier as rule actions.

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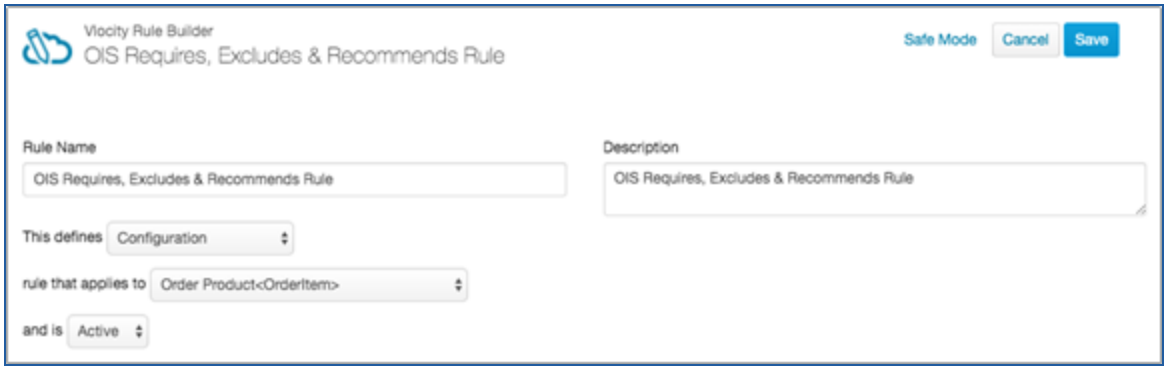
Task 5: Create an Advanced Configuration/Validation Rule to trigger the product relationships

1. In the Lightning tab navigation bar, click **Vlocity Rules**.
2. Click **New**.
3. In the rule header, enter the following information.

Field	Value
Rule Name	`OIS Requires, Excludes & Recommends Rule`
This defines	**Configuration**
rule that applies to	**Order Product<OrderItem>**
and is	**Active**
Description	`OIS Requires, Excludes, & Recommends Rule`



4. Add the three product relationships you set up in tasks 1, 2 and 3 of this exercise. Within the Vlocity Rule Builder, these appear as Actions.
    a. In the **FILTERS AND ACTIONS LIST**, click the **Actions** button to view only actions.
    b. Locate **OIS Requires Office Hub Modem** and click **Add To Rule Action**. Notice there is a search box just above the actions list to allow you to quickly locate your actions if you have a long list.

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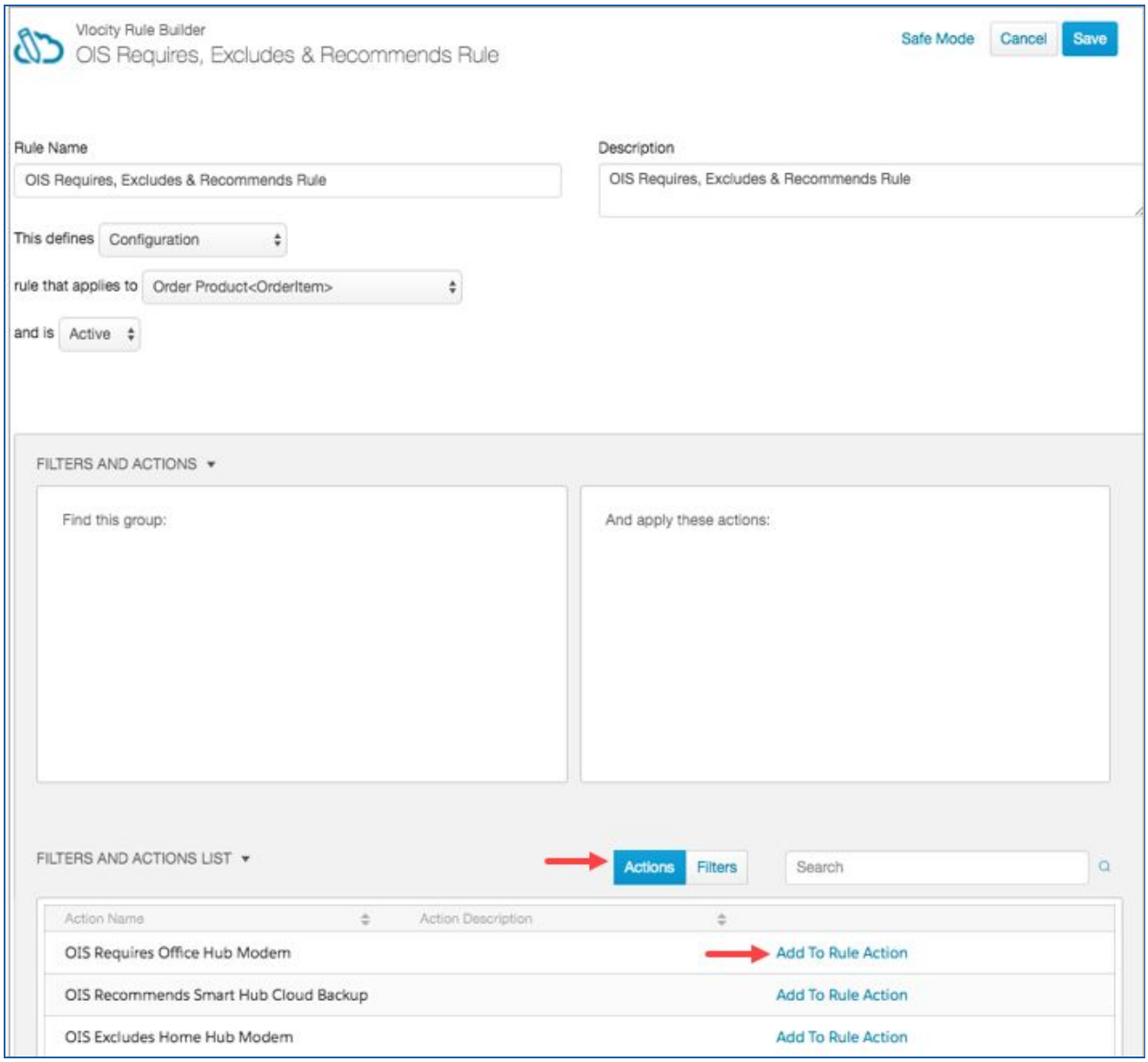

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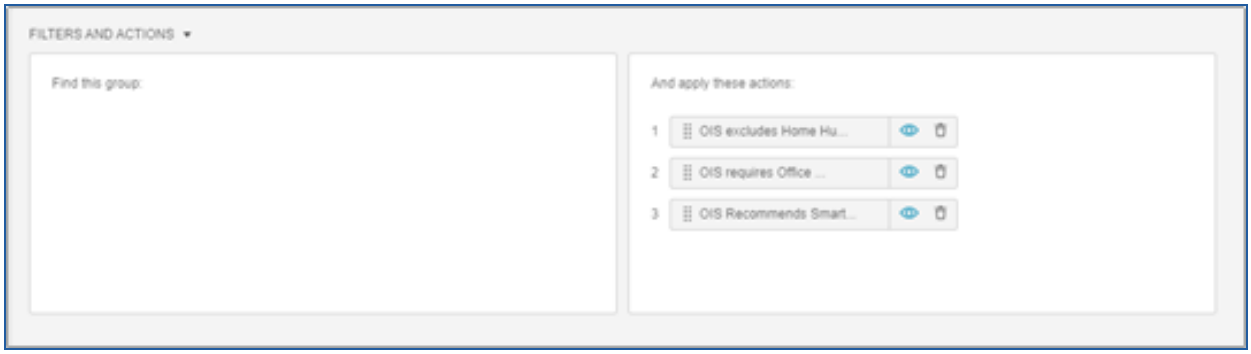
c. Repeat for OIS Recommends Smart Hub Cloud Backup and OIS Excludes Home Hub Modem. You now have three actions displayed under And apply these actions.



5. Scroll up to the top of the **Rule Builder** page and click **Save**.

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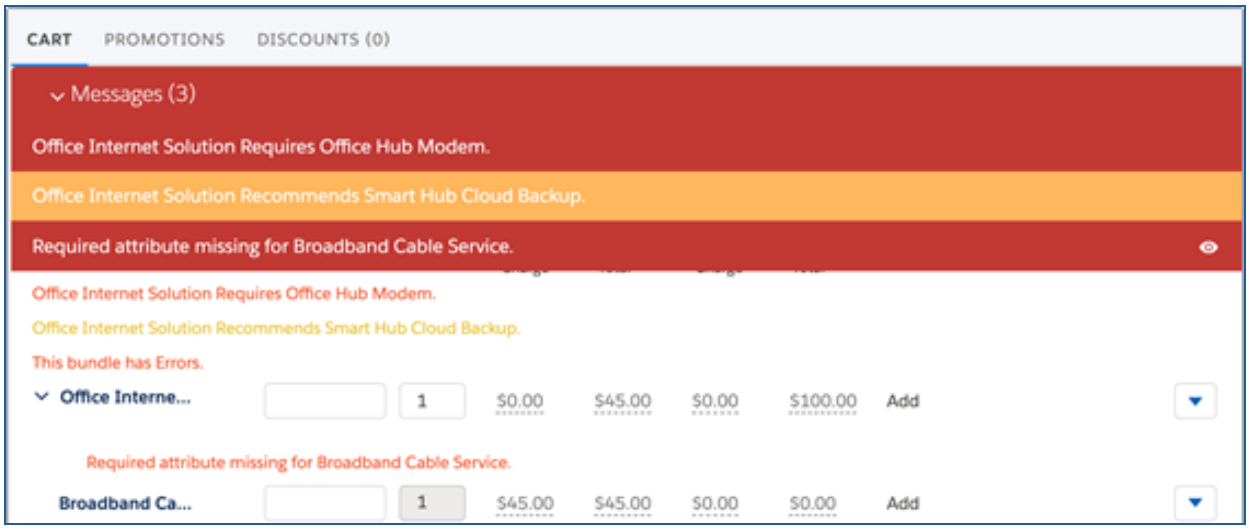
Task 6: Test the new rules in the Cart

1. In the Lightning tab navigation bar, click **Orders**.
2. Click **New**.
3. Enter the following information.

Field	Value
Order Name	`Advanced Rules Business Order`
Account Name	**Acme**
Order Start Date	**[today's date]**
Price List	**B2B Price List**

4. Click **Save**.
5. From the Power Launcher, click **Configure Order.** This invokes the Cart.
6. In the **search** dialog on the product list, enter `office`.
7. Find the **Office Internet Solution** and click **Add to Cart**.
8. Click the notifications message bar. Notice the "recommends" message in orange, and the "requires" messages in red.



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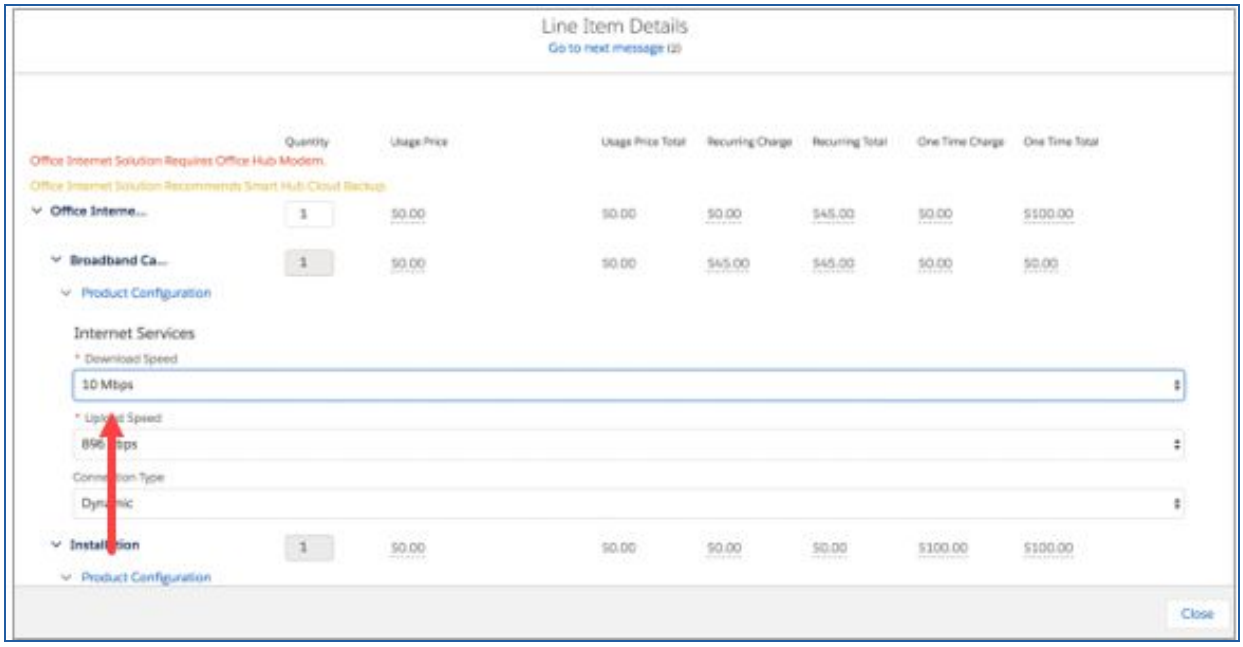
NOTE:
The required attribute missing message for the Broadband Cable Service is related to its required run-time Download speed attribute and not the new product relationships.

NOTE:
Are your required or recommended messages missing from the notifications message bar? Did you remember to refresh your platform cache? In the EPC Module "Managing the Shared Catalog" you learned that anytime you make a change to a rule you need to run maintenance jobs to clear and refresh the platform cache. Why? – because advanced rule actions are stored in the org cache.

9. Click the **Take Me There** icon for the Required attribute missing message for the **Broadband Cable Service** and select **10 Mbps** for the **Download Speed** attribute.



10. Click **Close**.

11. In the **search dialog** on the **product list** pane, enter `hub`.

12. In the product list pane, find **Smart Hub Cloud Backup,** and click **Add to Cart.**

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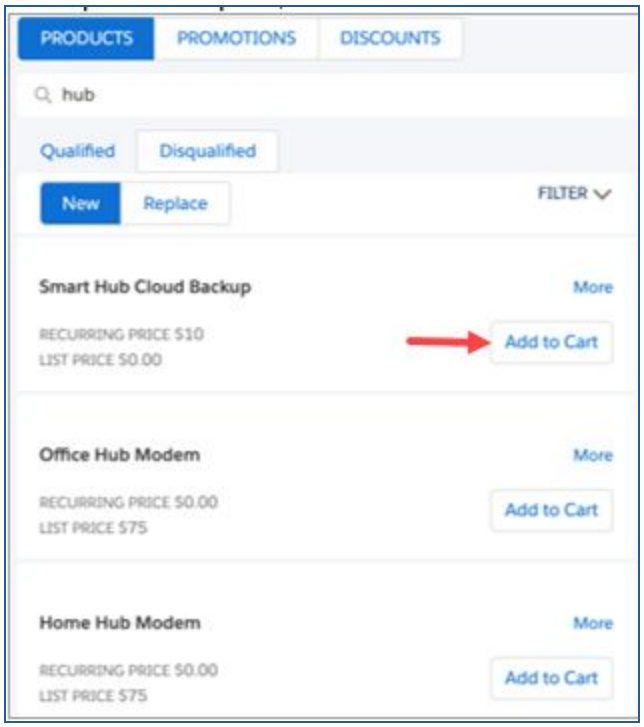
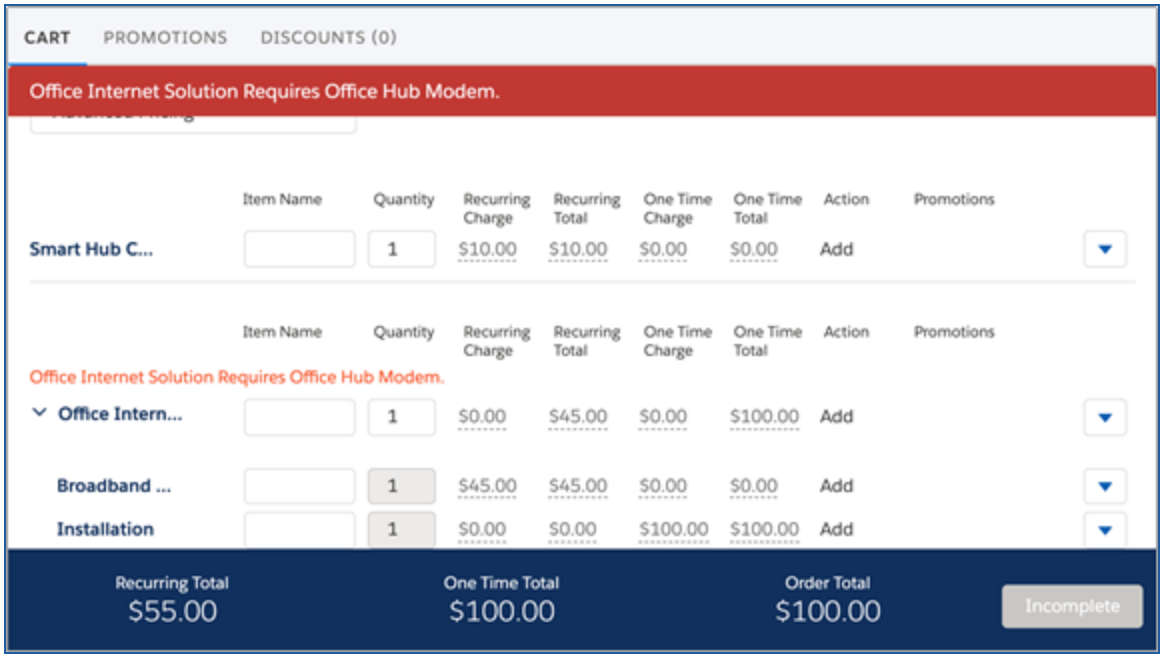


13. Notice that the recommends message disappears.



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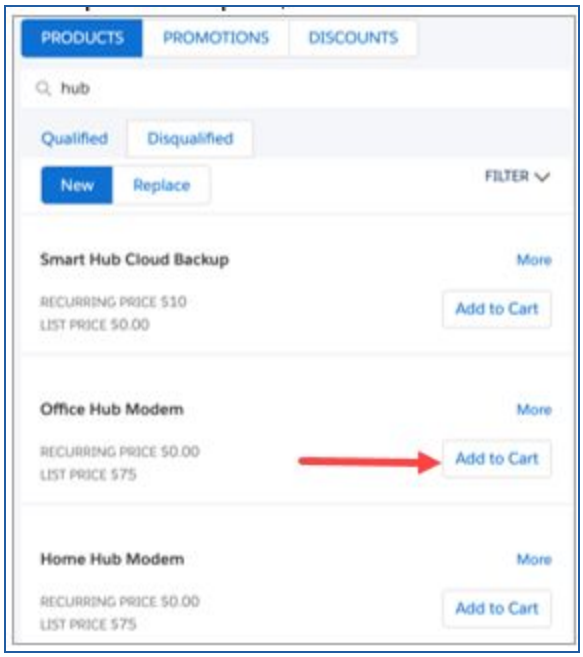
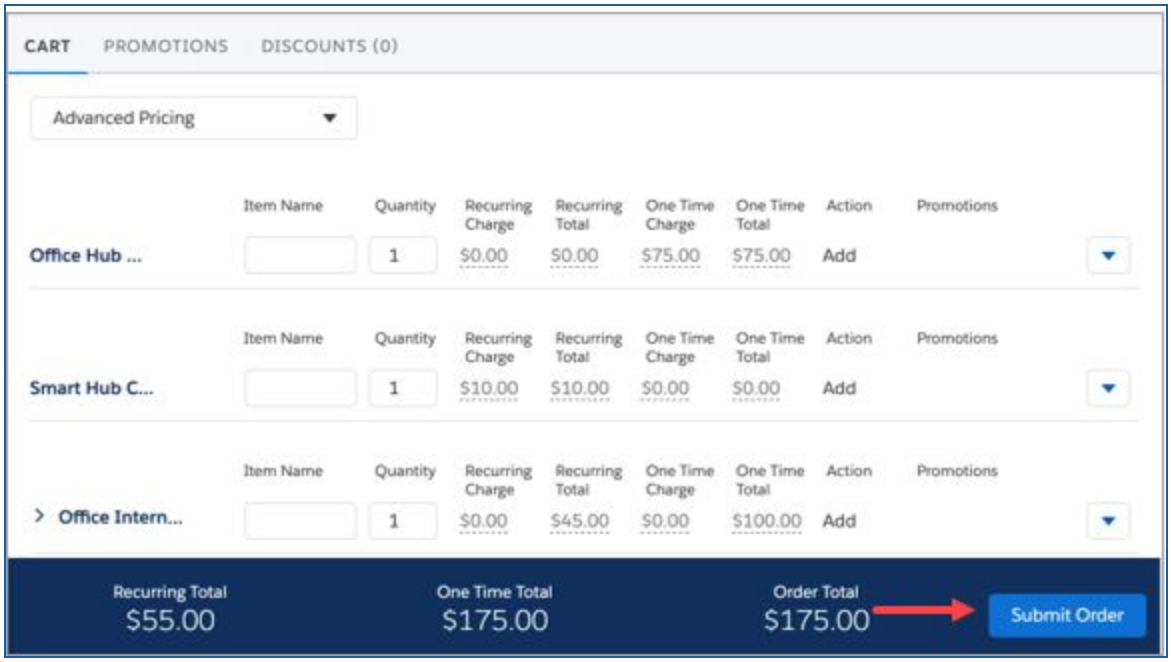
14. In the product list pane, find **Office Hub Modem**, and click **Add to Cart**.



15. Notice the red “requires” message disappears, and the **Submit Order** button is active, indicating a valid order.



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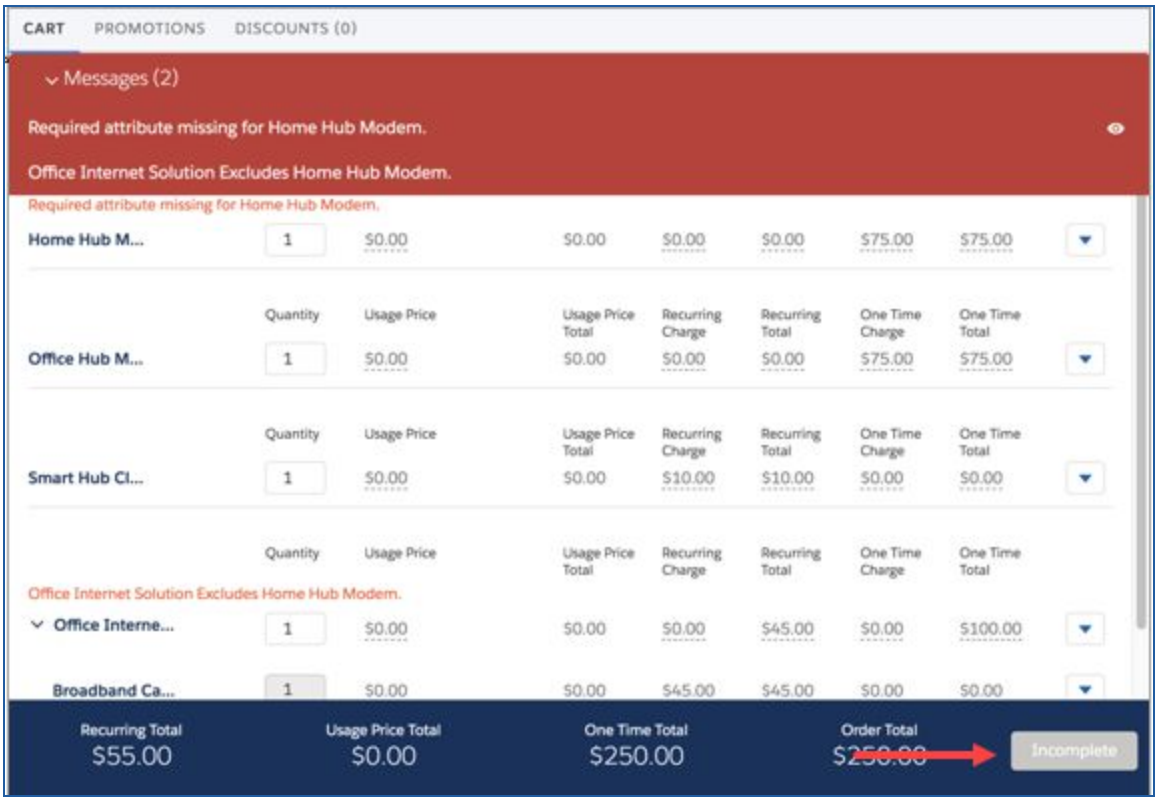
16. In the product list pane, find **Home Hub Modem**, and click **Add to Cart**.
17. Notice the red Excludes message that appears (along with another required attribute message).
18. Notice the **Submit Order** button says **"Incomplete"** and is greyed out, preventing orders from being submitted while the order is not valid.



19. Using the line item action dropdown menu, delete the **Home Hub Modem** from the cart.
20. Notice that the messages disappear, and the **Submit Order** button is blue, indicating the order is valid.
21. In the cart header, click **View Record** to exit the Cart.

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Review

Confirm your understanding by answering these questions.

1. What is a product relationship?
2. Which interface can evaluate product relationships?
3. Which implementation should be used to require, recommend or exclude one product to another?
4. Which objects does the implementation evaluate?
5. What are advanced rules?
6. What is the Rule Builder?

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Exercise 7-2: Creating Advanced Rules for Attributes

Scenario

Product management has introduced a new Business Video Service product, and it requires a high bandwidth broadband connection. Therefore, Eliza will create a validation rule using Product Relationships to conditionally exclude the Business Video Service if the Download Speed attribute for the Broadband Cable Service product is less than 200 Mbps. This rule must evaluate an attribute, so she will build an Advanced Rule in Vlocity Rule Builder.

Goals

- Exclude products from the Cart based on an attribute using an Advanced Rule
- Create entity filters
- Customize product configuration messages to the end user

Tasks

1. Create a product relationship to exclude Business Video Service when the Broadband Cable Service is ordered
2. Create an entity filter for the Download Speed attribute
3. Create an Advanced Configuration/ Validation Rule to combine the product relationship and the entity filter
4. Test the new rule in the Cart
5. Create a custom product configuration message
6. Review the custom product configuration message in the Cart

Time: 30 mins

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What are Entity Filters?

In the last exercise, you created product relationships and added them as actions to an advanced rule, which fired every time the products appeared in the cart. However, sometimes you will want to create rules that fire only when certain conditions arise. To do that, you will add entity filters to your advanced rules.

Entity filters create context for rules by filtering order line items and searching for defined conditions. Entity filters consist of one or more conditions that evaluate fields or attributes on an object and, if true, apply a rule action. This rule action can be a product relationship, a matrix, a calculation or a procedure. Rules can contain one filter or many filters, depending on the business logic that the rule implements.

For example, you might create a filter to identify premises where the service activation date is 45 days or less. Filters are reusable and additive. Once created, that filter is available for use in any rule that needs to use it.

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Task 1: Create a product relationship to exclude the Business Video Service when the Broadband Cable Service is ordered

1. In the Lightning tab navigation bar, click **Product Relationships**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New.**
3. In the **New Product Relationship** dialog, enter the following information.

Field	Value
Product Relationship Name	`BCS Excludes Business Video Service`
Product	**Broadband Cable Service**
Relationship Type	**Excludes**
Related Product	**Business Video Service**
Min Quantity	`1`
Max Quantity	`1`

4. Click **Save.**

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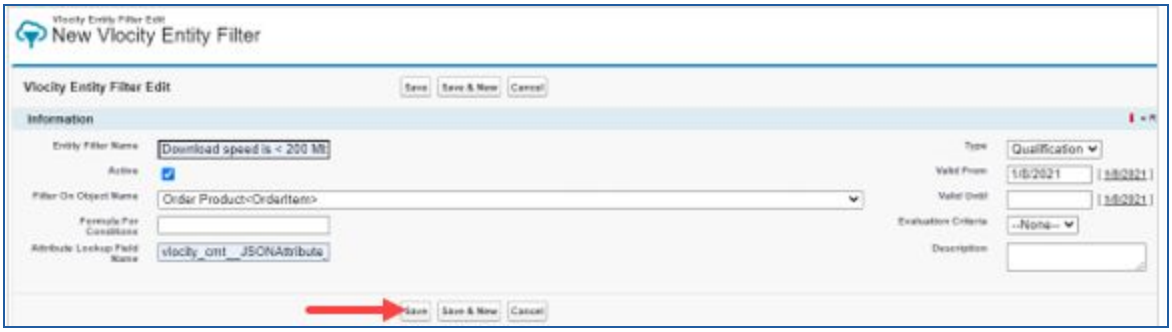
Task 2: Create an entity filter for the Download Speed attribute

1. In the Lightning tab navigation bar, click **Vlocity Entity Filters**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New** to create a new Entity Filter.
3. In the **New Vlocity Entity Filter** dialog, enter the following information.

Field	Value	Notes
Entity Filter Name	`Download Speed is < 200 Mbps`	Give the filter a name that explains its purpose
Filter On Object Name	**Order Product<OrderItem>**	This is the name of the object upon which the filter will be run
Attribute Lookup Field Name	`vlocity_cmt__JSONAttribute__c`	Defines the field name that contains a JSON String
Type	**Qualification**	See note below
Valid From	**[today's date]**	This is optional and states when the filter will become active.

4. Click **Save**.



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NOTE:
Formula for Conditions identifies how the filter conditions are connected. If nothing is entered here, the conditions are joined with *And.*

Type identifies the entity filter type. There are two types of entity filters. Evaluation filters are used as arguments in Qualification entity filters, essentially chaining them together into a compound filter.

Evaluation: Determines if a set of object records matches specific conditions. Returns true or false. If you use an Evaluation type, you will also need to enter information in the Evaluation Criteria field. Options for this field are All, Any or None.

Qualification: Determines if a set of records qualify to be acted upon. Returns qualified line items.

5. Now you need to add conditions to the filter. Scroll down to the **Entity Filter Conditions** section and click **Add**.
6. Click in the **Type** field and select **Attribute**.
7. To the right of the **Field/Attribute/Related Object** field, click **Select**.

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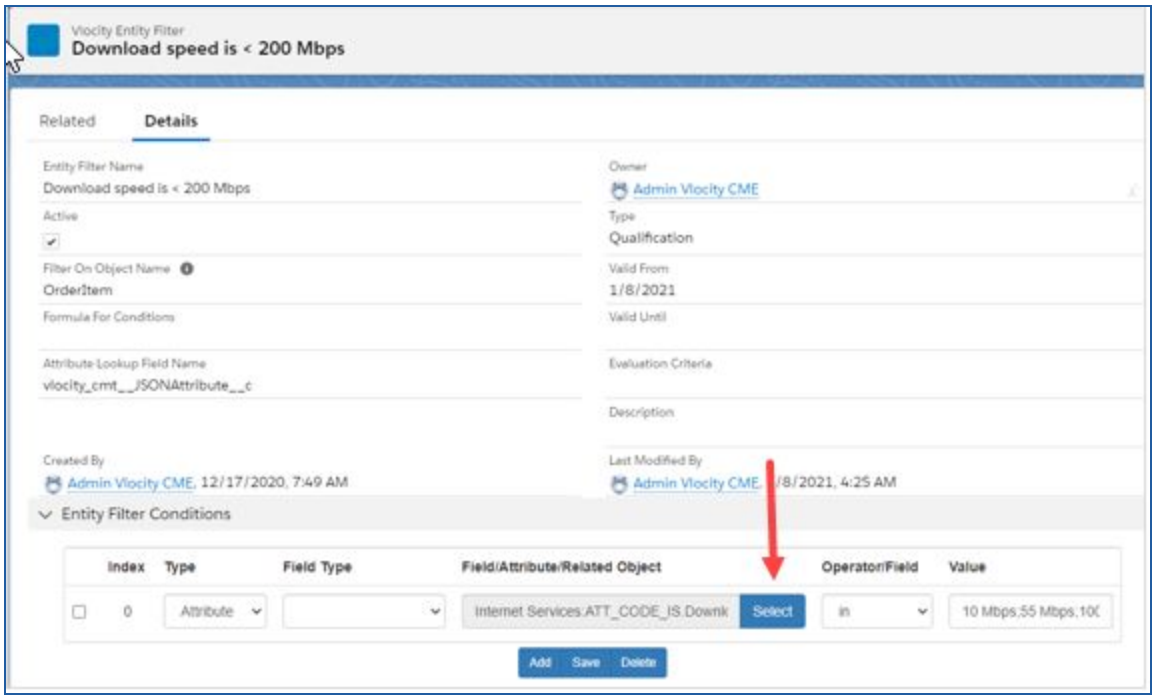
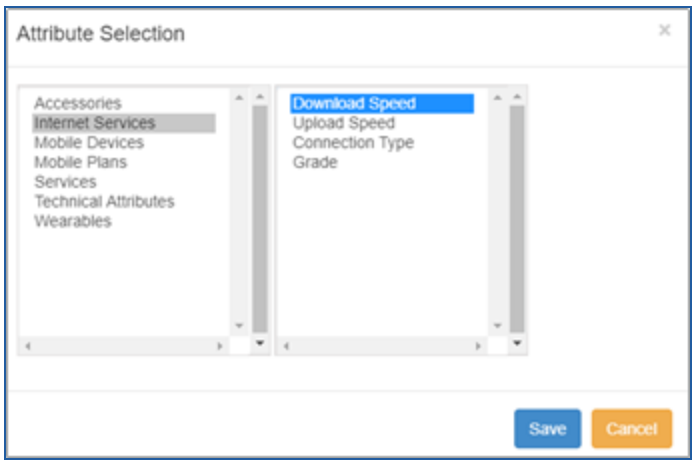


8. In the **Attribute Selection** window in the first column, select **Internet Services**.

9. In the second column, select **Download Speed**.

10. Click **Save**.



11. Click in the **Operator/Field** field, and select **in**.

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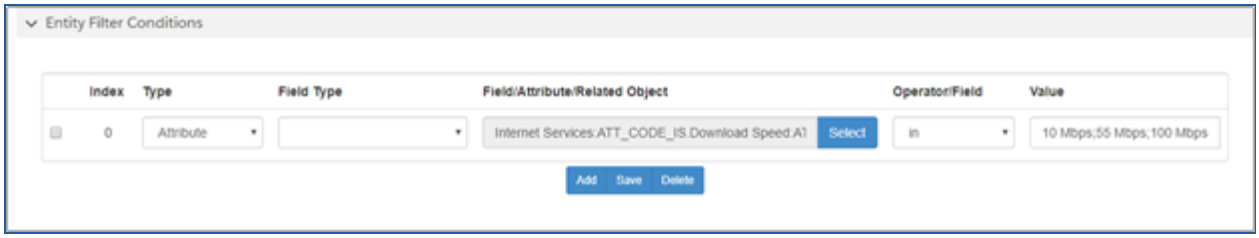
12. Click in the **Value** field, and enter a list of the download speed attribute values you will include in the filter condition, separated by semi-colons. This will be `10 Mbps;55 Mbps;100 Mbps.`

> **ALERT:**
> Ensure there is no space between the semi-colon and the next value. The values should match exactly the information above.



13. Click **Save**.

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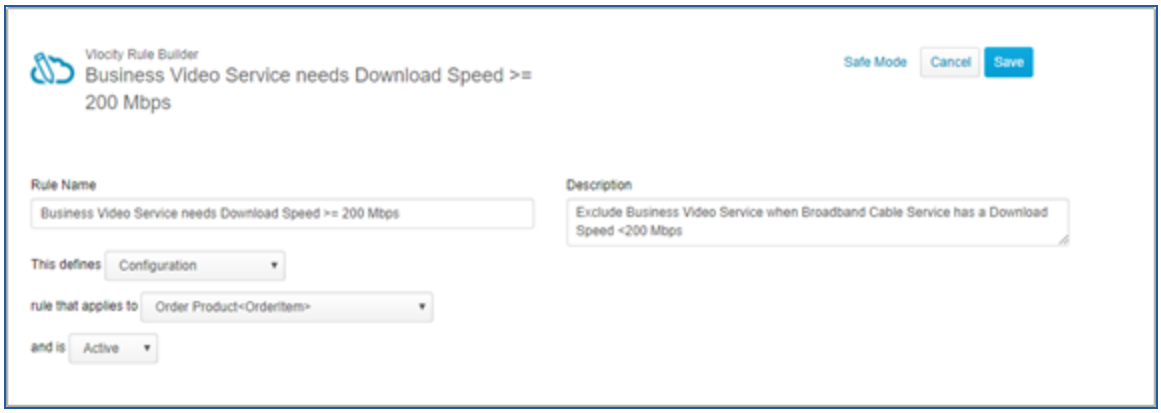
Task 3: Create an Advanced Configuration/Validation Rule to combine the product relationship and the entity filter

1. In the Lightning tab navigation bar, click **Vlocity Rules**.
2. Click **New**.
3. In the rule header, enter the following information.

Field	Value
Rule Name	`Business Video Service needs Download Speed >= 200 Mbps`
This defines	**Configuration**
rule that applies to	**Order Product<OrderItem>**
and is	**Active**
Description	`Exclude Business Video Service when Broadband Cable Service has a Download Speed <200 Mbps`



4. Add the Configuration / Validation rule to the advanced rule as an Action.
    a. In the **FILTERS AND ACTIONS LIST**, click **Actions**.
    b. Locate **BCS Excludes Business Video Service** and click **Add To Rule Action**.

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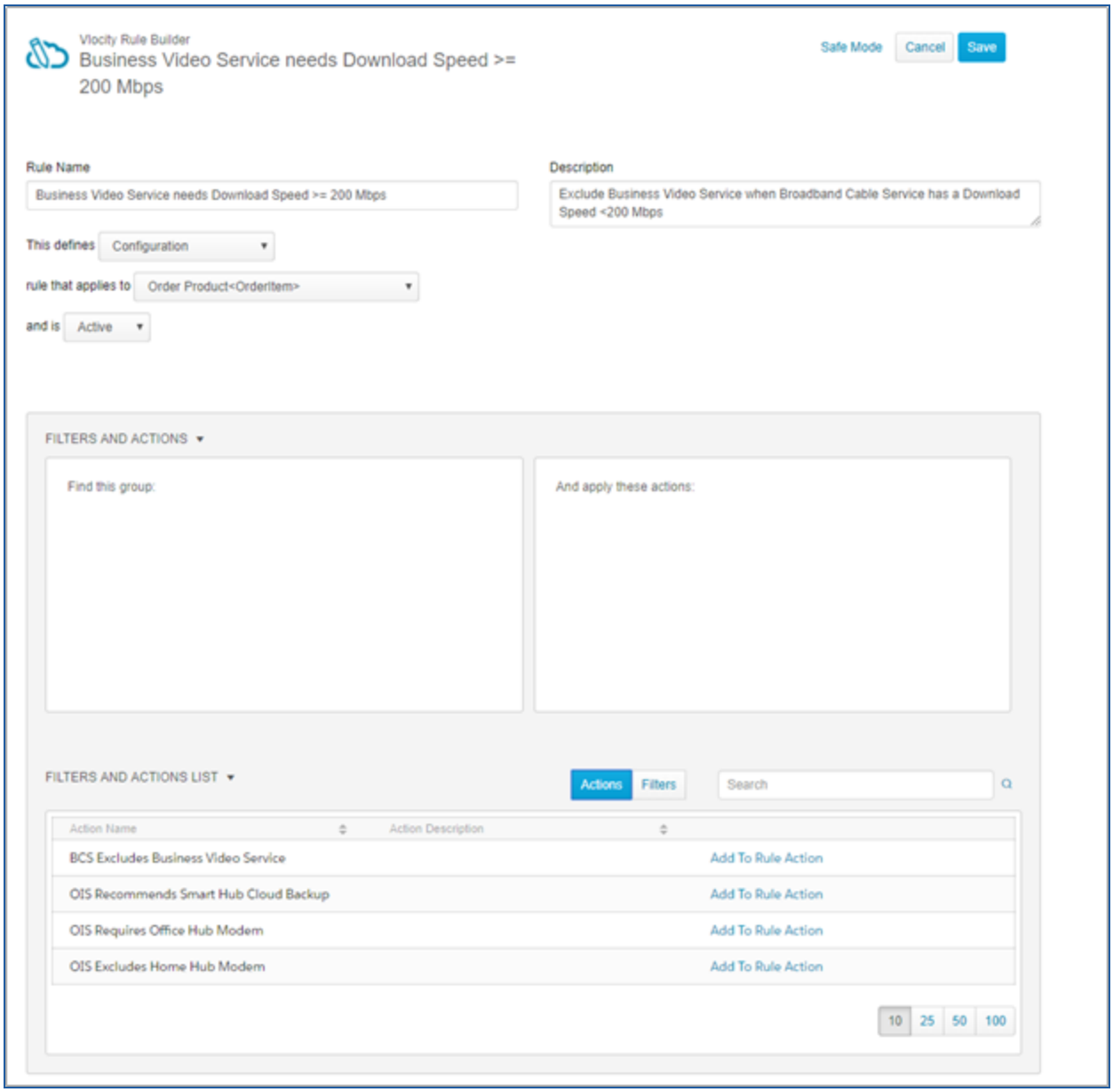
NOTE:
Product Relationships appear as Actions in Vlocity Rule Builder.



c. In the **FILTERS AND ACTIONS LIST**, click **Filters**.

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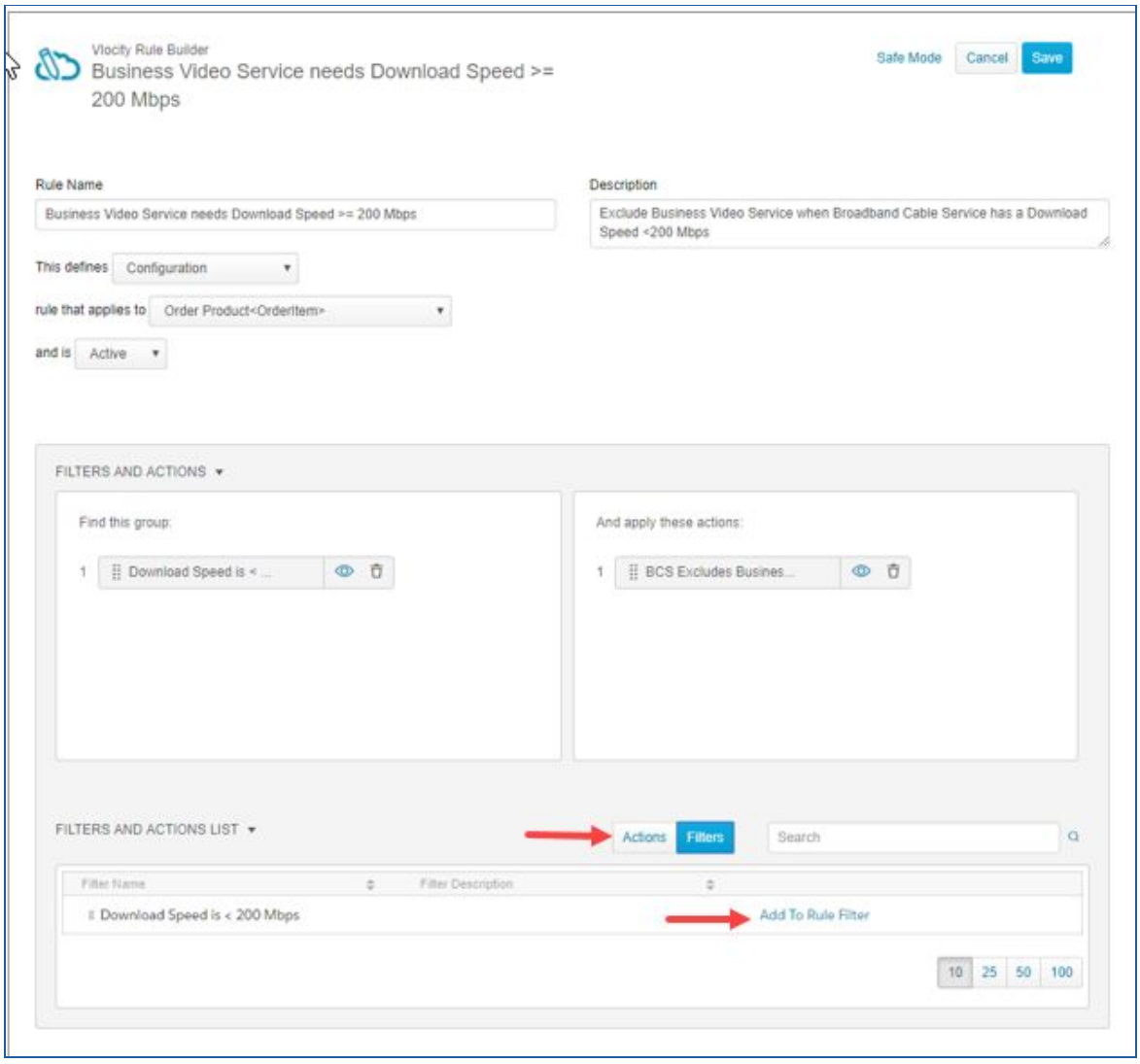
d. In the **Filter Name** column, locate **Download Speed is < 200 Mbps,** and click **Add To Rule Filter.**

5. Scroll up to the top of the **Rule Builder** page and click **Save**.

NOTE:
Entity Filters can be used to “find a group” or as the primary filter (on the left) in Vlocity Rule Builder. In addition, they can modify an action (on the right) and be used to qualify each action individually.



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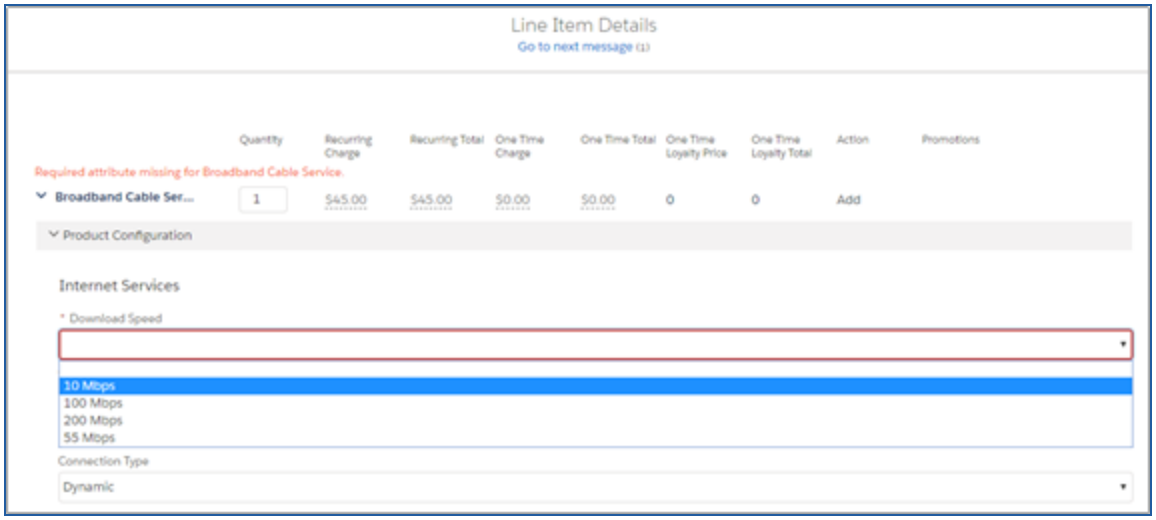
Task 4: Test the new rule in the Cart

1. In the Lightning tab navigation bar, click **Orders**.
2. Click **New**.
3. Enter the following information.

Field	Value
Order Name	`Advanced Rules Business Order #2`
Account Name	**Acme**
Order Start Date	**[today's date]**
Price List	**B2B Price List**

4. Click **Save**.
5. From the Power Launcher click **Configure Order**. This invokes the Cart.
6. In the search dialog on the product list, enter `business`.
7. Find **Broadband Cable Service** in the product list and click **Add to Cart**.
8. In the red notification message, click the **Take Me There** icon, and set the **Download Speed** to **10 Mbps**.



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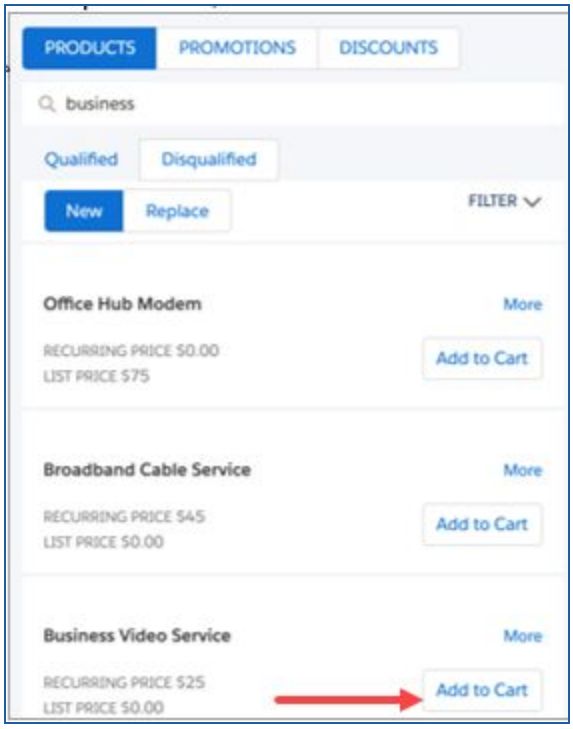
9. Click **Close**.

10. In the product list, find **Business Video Service**, and click **Add to Cart**.



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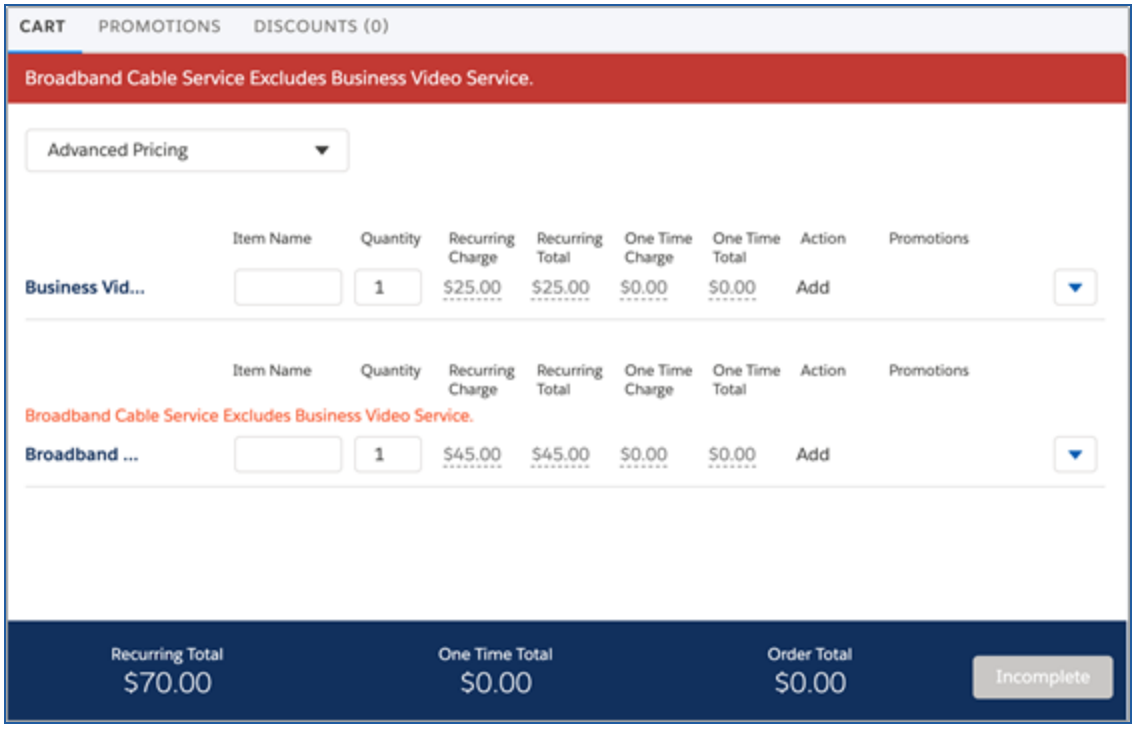
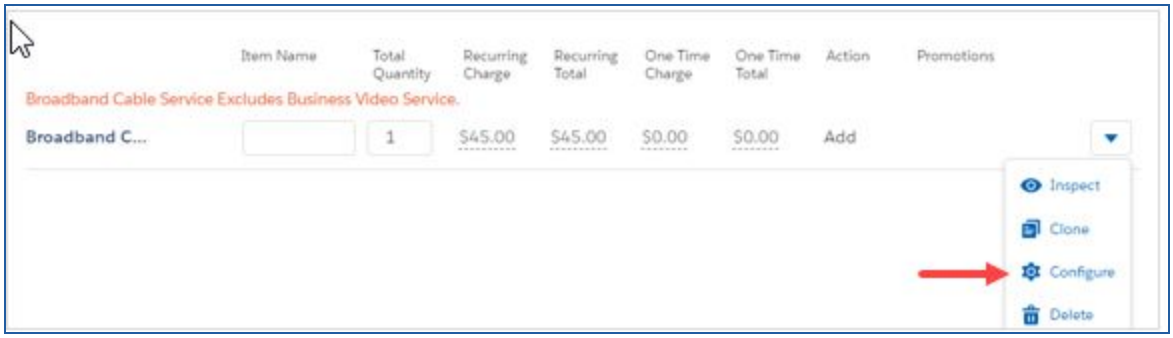
11. Notice the new red Excludes notification message. Your blue **Submit Order** button at the bottom of the cart has also changed to a gray **Incomplete** button.



12. Using the line item action dropdown menu for the **Broadband Cable Service** in the cart, select **Configure**, and change the **Download Speed** attribute to **200 Mbps**.



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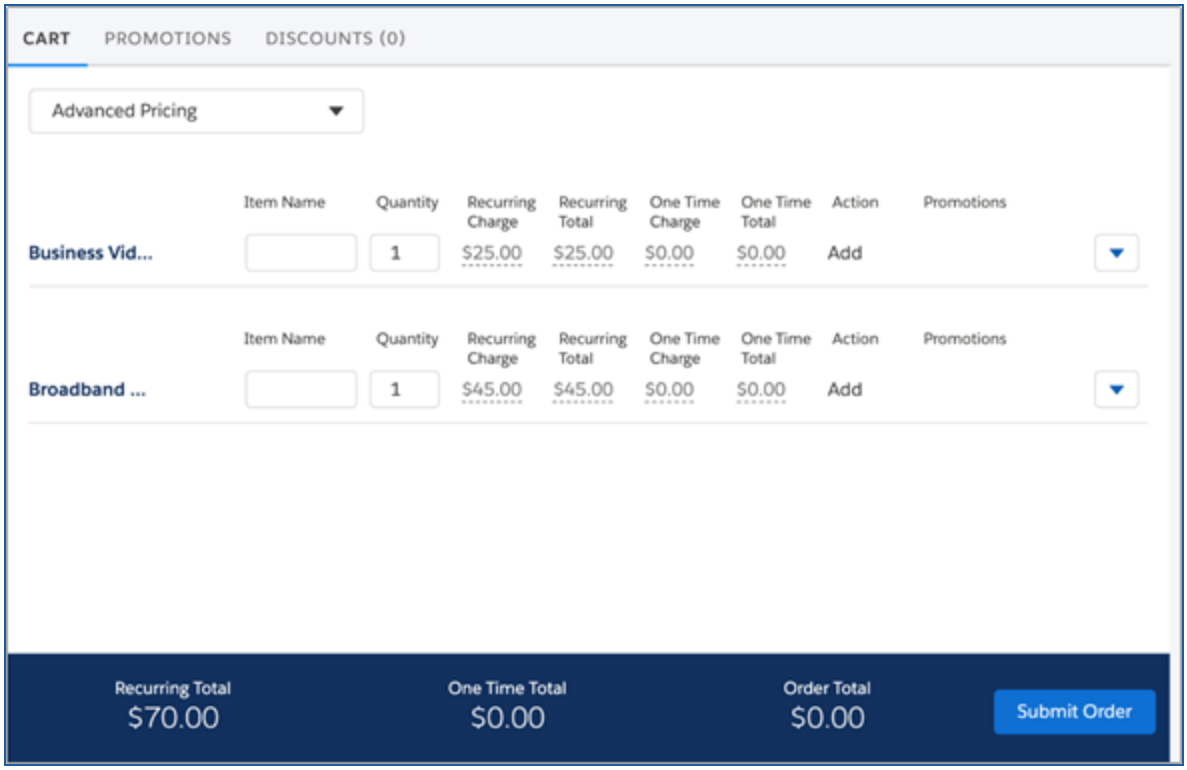
13. Notice the configuration compatibility error has been resolved: the red notifications no longer display and your button at the bottom of the cart has changed from a gray **Incomplete** button to a blue **Submit Order** button.



14. In the cart header, click **View Record** to exit the Cart.

Eliza deploys her Advanced Rule to conditionally exclude Business Video Service when the Broadband Cable Service is configured with a download speed less than 200 Mbps. She is pleased that it is working like a charm, but she is getting feedback that agents do not understand the reason why it happens. Eliza decides to create a custom message to address the confusion.

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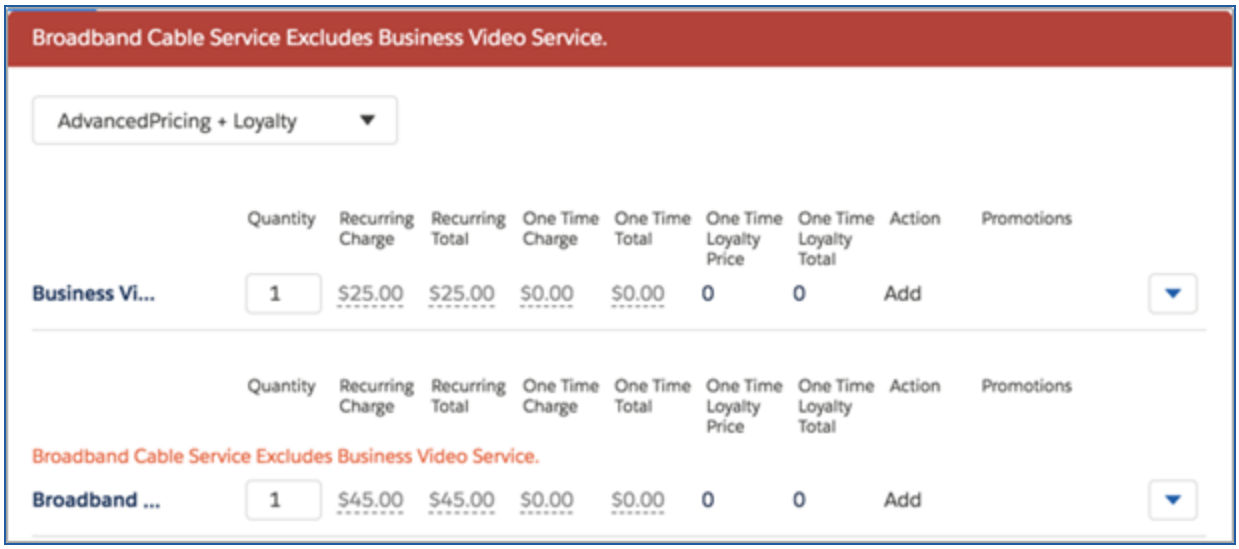
What are Product Configuration Messages?

As we just saw, when we ordered the Business Video Service and the Broadband Cable Service's download speed attribute was set to 10 Mbps, we saw the default product configuration message. Default product configuration messages are set up as follows:

`PRODUCT A` [EXCLUDES/REQUIRES/RECOMMENDS] `PRODUCT B`



Especially when working with attributes, sometimes a more precise message to the user is needed in order to provide the information necessary for the user to correct the configuration incompatibility. You can create custom product configuration messages for each product relationship.

NOTE:
Before you can create product configuration messages, you need a custom field on the Product Relationship object. This has already been created for you in your training org and added to the product relationship layout.

To finish setting up the custom product configuration message, we must add a custom setting that will alert the interface implementation to the new message field, and then we can create the custom message for the product relationship.

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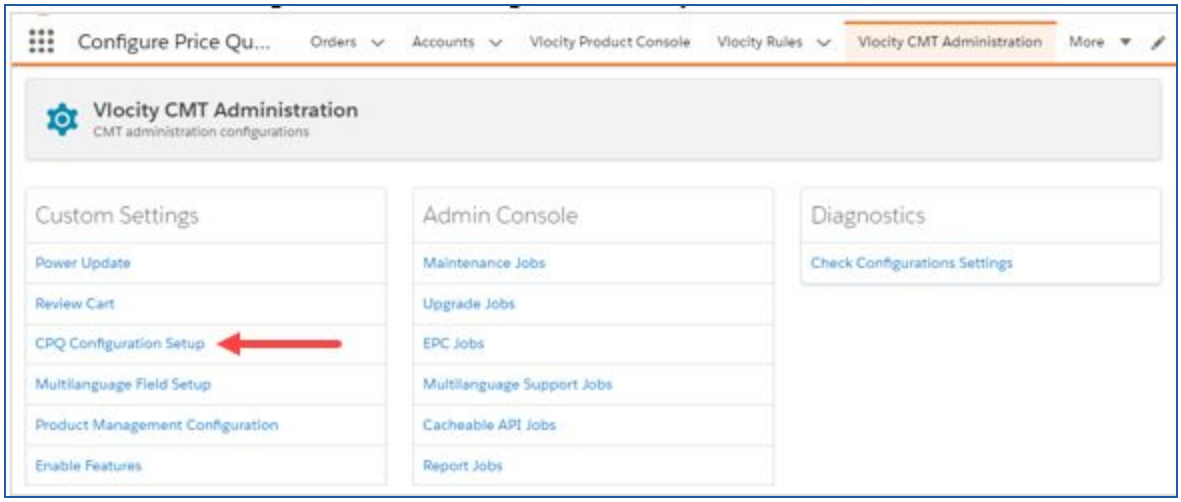
Task 5: Create a custom product configuration message

1. In the **Lightning tab navigation bar**, click **More** to expand the overflow dropdown menu, and click **Vlocity CMT Administration.**
2. Under **Custom Settings**, click **CPQ Configuration Setup**.



3. At the bottom of the CPQ Configuration Setup page, click **Add**.
4. Enter the following configuration values.

NAME	VALUE
`CustomRuleMessageFieldName`	`Message__c`

> **NOTE:**
> Message__c is the API name of the field that was created for you on the Product Relationship object. Make sure to include two underscores after "Message."

5. Click **Save**.

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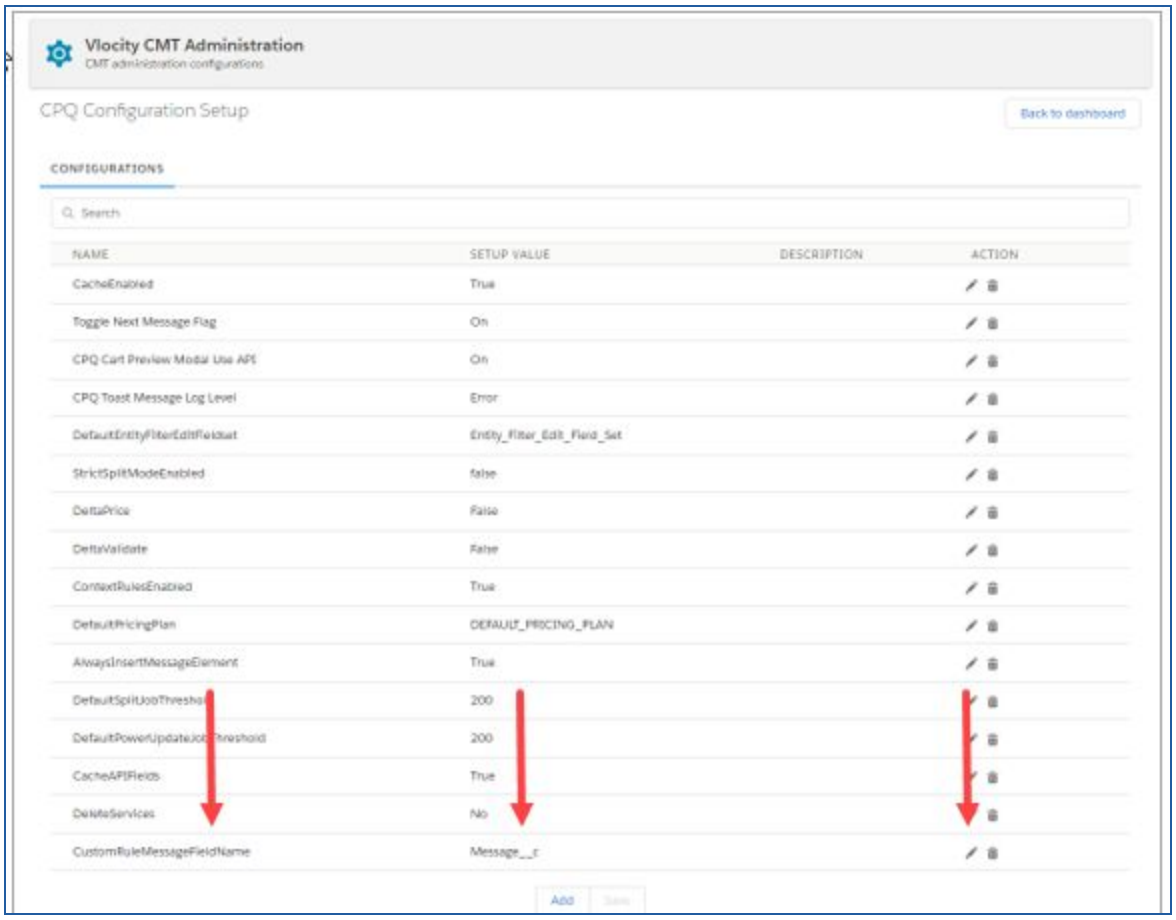

6. In the **Lightning tab navigation bar**, click **More** to expand the overflow dropdown menu, and click **Product Relationships**.

7. Under **Recently Viewed**, click **BCS Excludes Business Video Service**.

8. Click the edit icon next to the **Message** field to open the record for editing.

9. In the **Message** field, enter the following information.

Field	Value
Message	`Broadband Cable Service Download Speed must be >= 200 Mbps`

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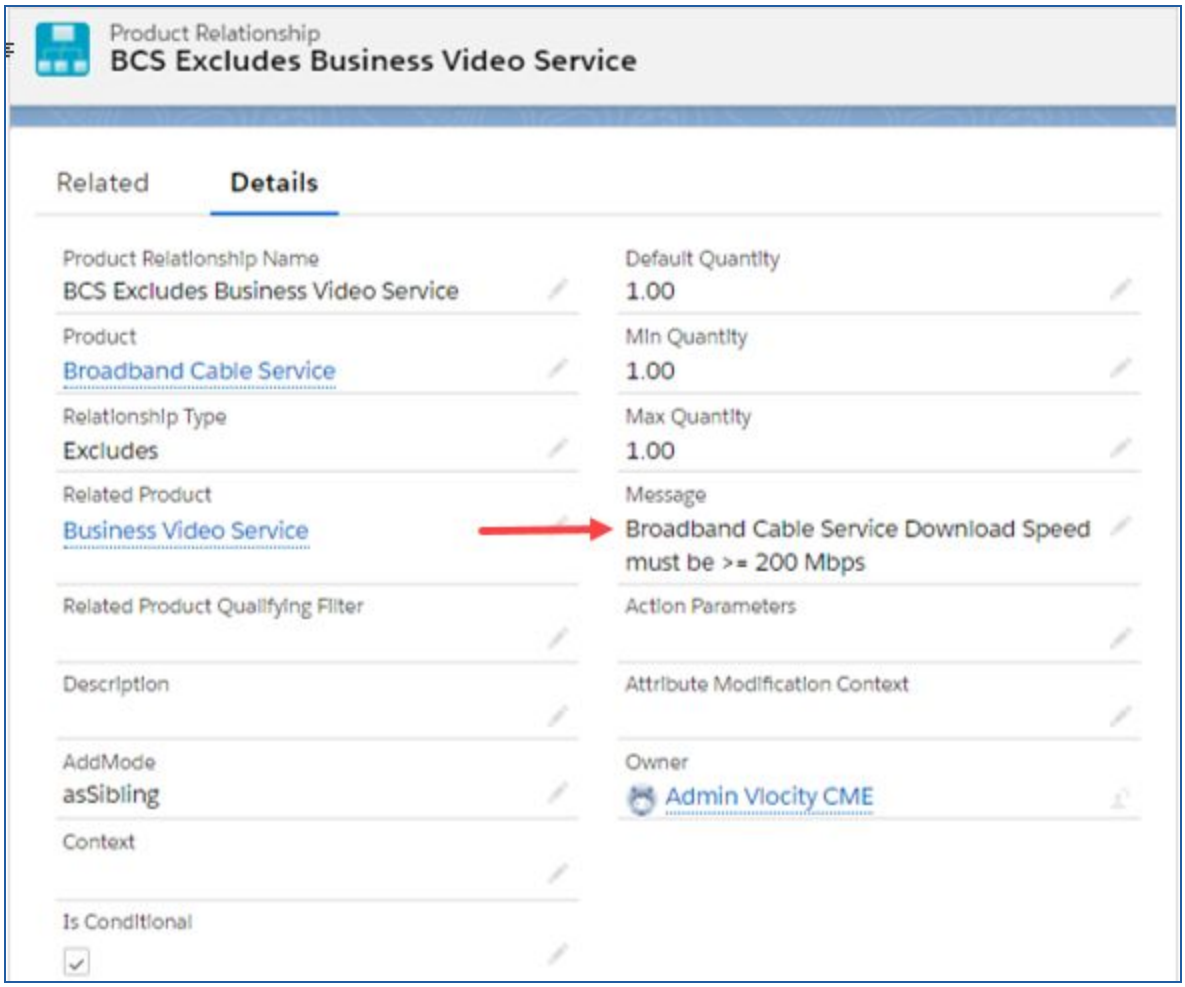
10. Click **Save**.



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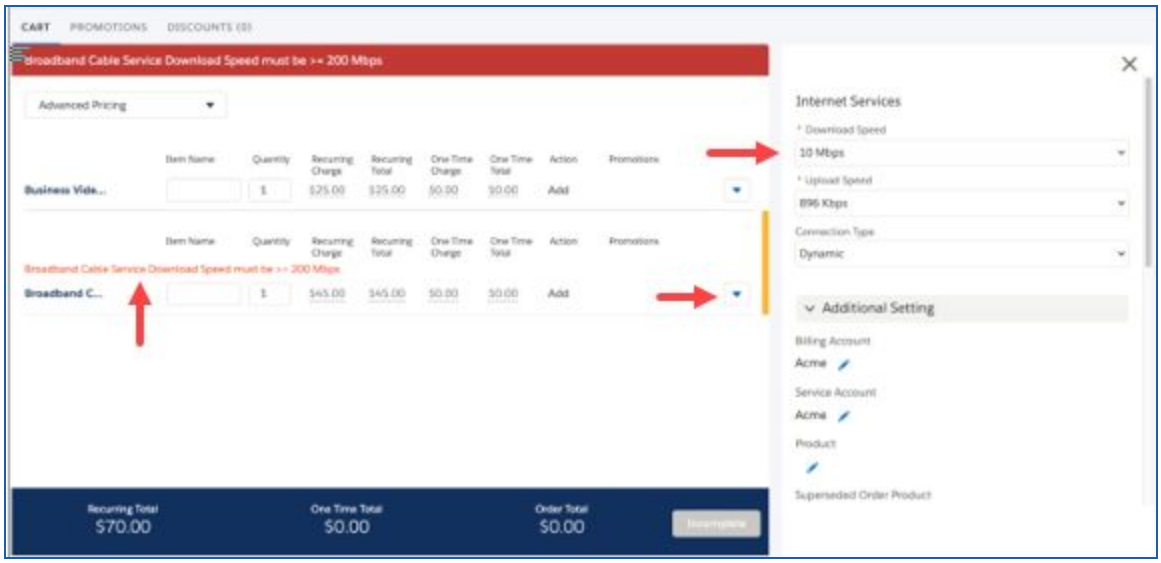
Task 6: Review the custom product configuration message in the Cart

1. In the **Lightning tab navigation bar**, click **Orders**.
2. Under **Recently Viewed**, click the order number next to **Advanced Rules Business Order #2**.
3. From the **Power Launcher**, click **Configure Order**. This launches the Cart.
4. Click the line item dropdown action menu for **Broadband Cable Service** and click **Configure**.
5. Under the **Internet Services** attributes, set the **Download Speed** to **10 Mbps**.
6. Notice the new custom product configuration message that displays.



7. In the cart header, click **View Record** to exit the Cart.

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Review

Confirm your understanding by answering these questions.

1. What are entity filters? What types of entity filters can be created? What are their purposes?
2. What are the major components of a rule built using Vlocity Rule Builder?

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Exercise 7-3: Creating Advanced Rules to Modify Attributes

Scenario

The custom product configuration message is good and can certainly be used to give specific feedback to the user. But Eliza thinks that the real solution is to ensure that incompatible attribute values are not shown to the user in the first place. She can do that using an advanced product relationship that will modify the attributes displayed to the user.

Goal

- Create a rule to modify product attributes at run-time

Tasks

1. Build the JSON code that describes the attribute modification
2. Create a product relationship to modify the Broadband Cable Service product's attributes
3. Create an advanced rule to trigger the new product relationship
4. Review the attribute modification rule in the Cart

Time: 30 mins

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Eliza needs to create a new product relationship that will modify the attributes of the Broadband Cable Service product when the Business Video Service is in the cart. To do that, she must describe specifically how the attributes should be modified. That information is stored in JSON notation in the Action Parameters field. So, as a first step, she needs to write the attribute picklist modifications list in JSON notation. She could do it by hand, but it'll be easier and ensure fewer errors if she uses a point-and-click tool to help her. The Product Configuration Procedures page allows her to generate a list of action parameters that she can paste into her product relationship.

NOTE:
Product Configuration Procedures are used in Salesforce Industries to configure attribute configuration rules for a single product rather than attribute configuration rules that should occur when there is a dependency between multiple products. In the following example, we will not use a Product Configuration Procedure per se, but we can use the interface to generate the JSON notation.

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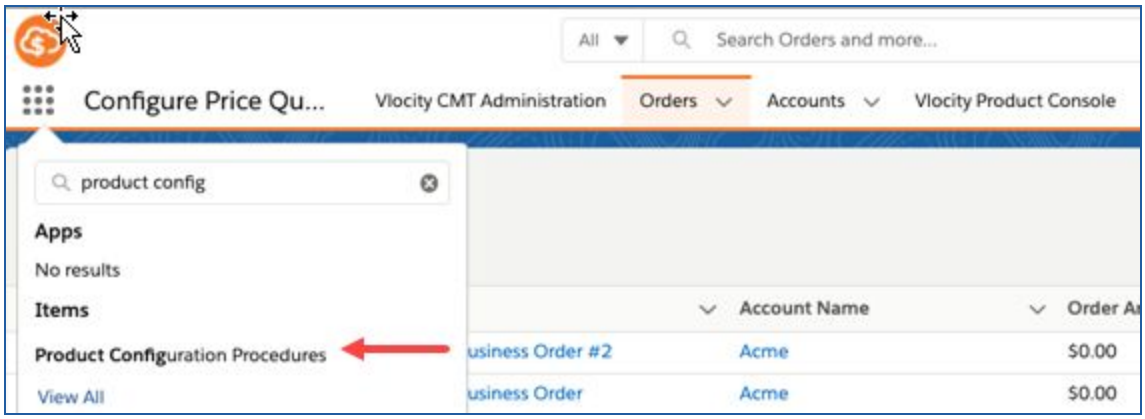
Task 1: Build the JSON code that describes the attribute modification

1. In this task you are going to use the JSON Generator tool to build JSON code which excludes 10 Mbps, 55 Mbps and 100 Mbps options from the **Download Speed** attribute of the **Broadband Cable Service** product.

2. Click the **Lightning App Launcher** and type in the search dialog `product config`.

3. Under **Items**, click **Product Configuration Procedures**.



4. Click **New**.

5. Generate the action parameters in JSON notation.

6. In the **Product Configuration Procedure** dialog, enter the following information.

Field	Value
Configuration Procedure Name	`JSON Generator`
Select a product	**Broadband Cable Service**
Add Attribute	**Download Speed**

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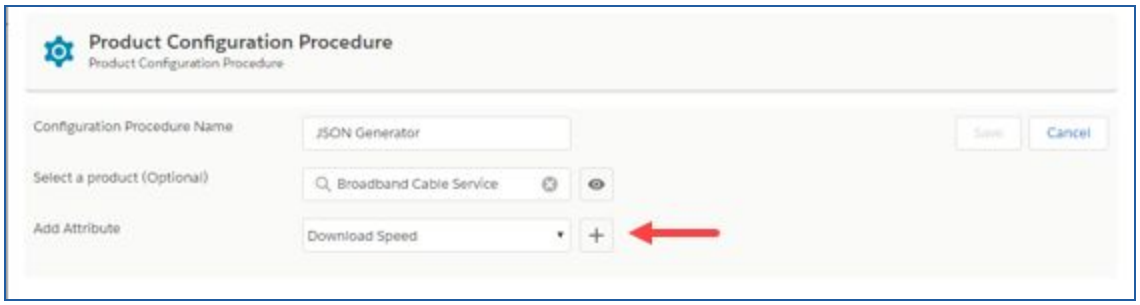
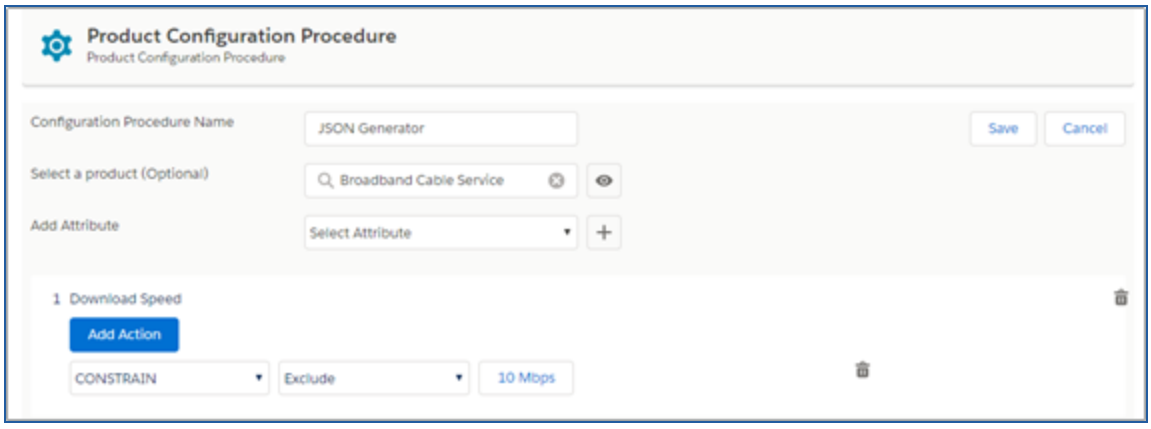


7. Click the **+** next to the **Download Speed** attribute.

8. A new button will appear under a **Download Speed** heading.

9. Exclude 10 Mbps from the attribute.
    a. Click **Add Action**.
    b. In the first dropdown (**Select Action**), select **CONSTRAIN**.
    c. In the second dropdown (**Action Type**), select **Exclude**.
    d. Click **Select Options** and select **10 Mbps**.



10. Exclude 55 Mbps from the attribute.
    a. Click **Add Action** again.
    b. In the first dropdown (**Action**), select **CONSTRAIN**.
    c. In the second dropdown (**Action Type**), select **Exclude**.
    d. Click **Select Options** and select **55 Mbps**.

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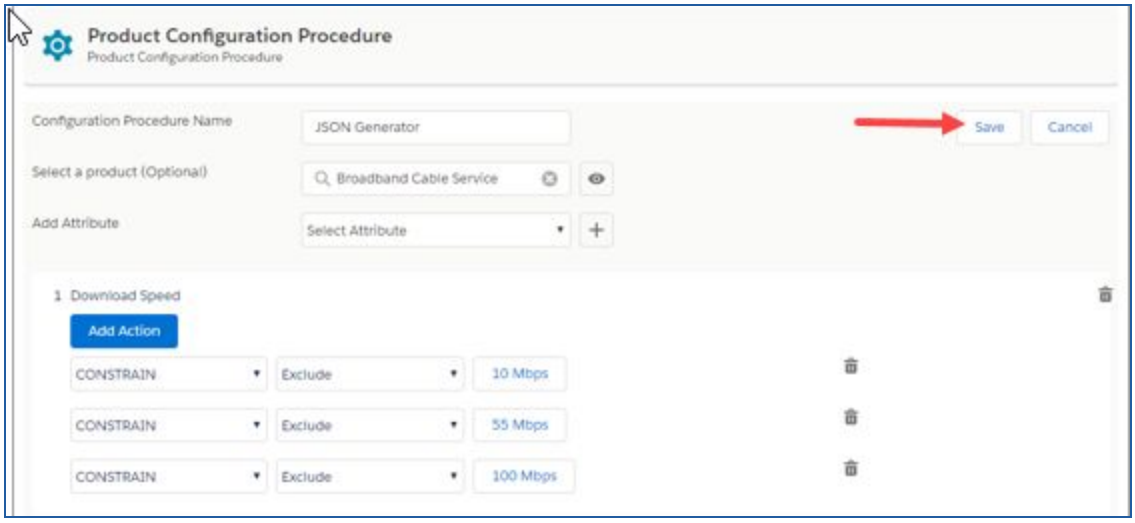
11. Exclude 100 Mbps from the attribute.
    a. Click **Add Action** for a third time.
    b. In the first dropdown (**Action**), select **CONSTRAIN**.
    c. In the second dropdown (**Action Type**), select **Exclude**.
    d. Click **Select Options** and select **100 Mbps**.



12. Click **Save**.

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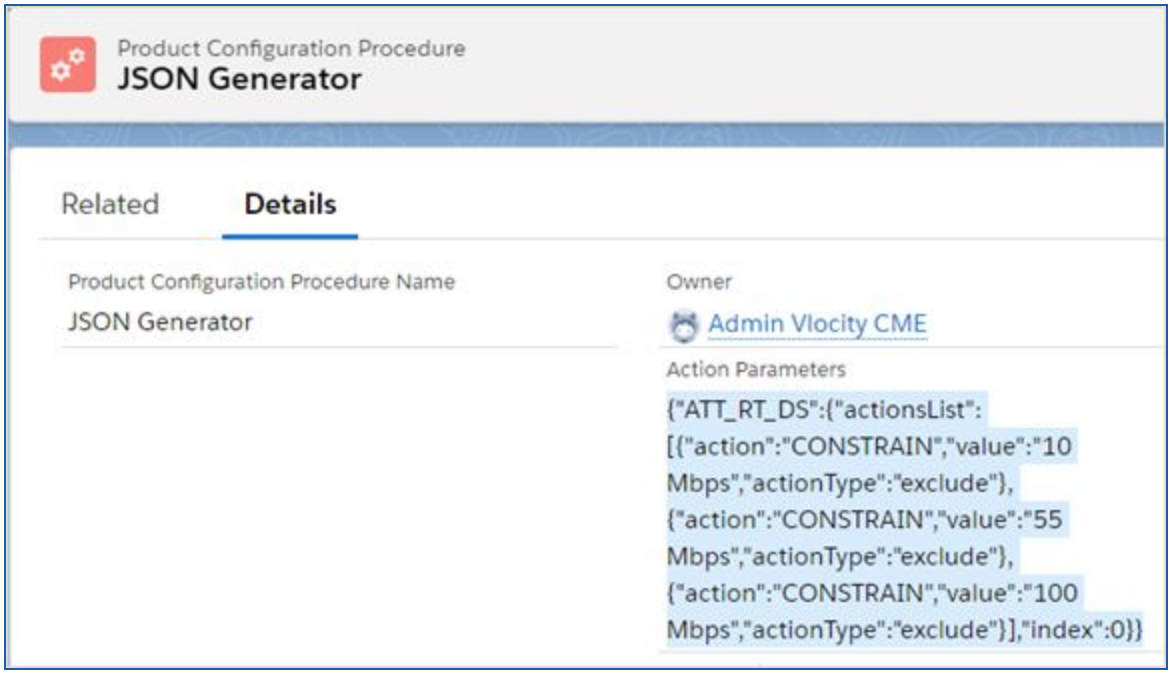
13. In the **Product Configuration Procedure** page, select the **Action Parameters** code, and copy and paste it to a text editor such as Notepad.



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Task 2: Create a product relationship to modify the Broadband Cable Service product's attributes

1. In the **Lightning tab navigation bar**, click **Product Relationships**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New**.
3. In the **New Product Relationship** dialog, enter the following information.

Field	Value
Product Relationship Name	`Business Video Modifies Broadband Cable Attributes`
Product	**Business Video Service**
Relationship Type	**Modify Attributes**
Related Product	**Broadband Cable Service**
Min Quantity	`1`
Max Quantity	`1`
Action Parameters	**[paste in JSON action parameters from text editor]**
Attribute Modification Context	**Cart**

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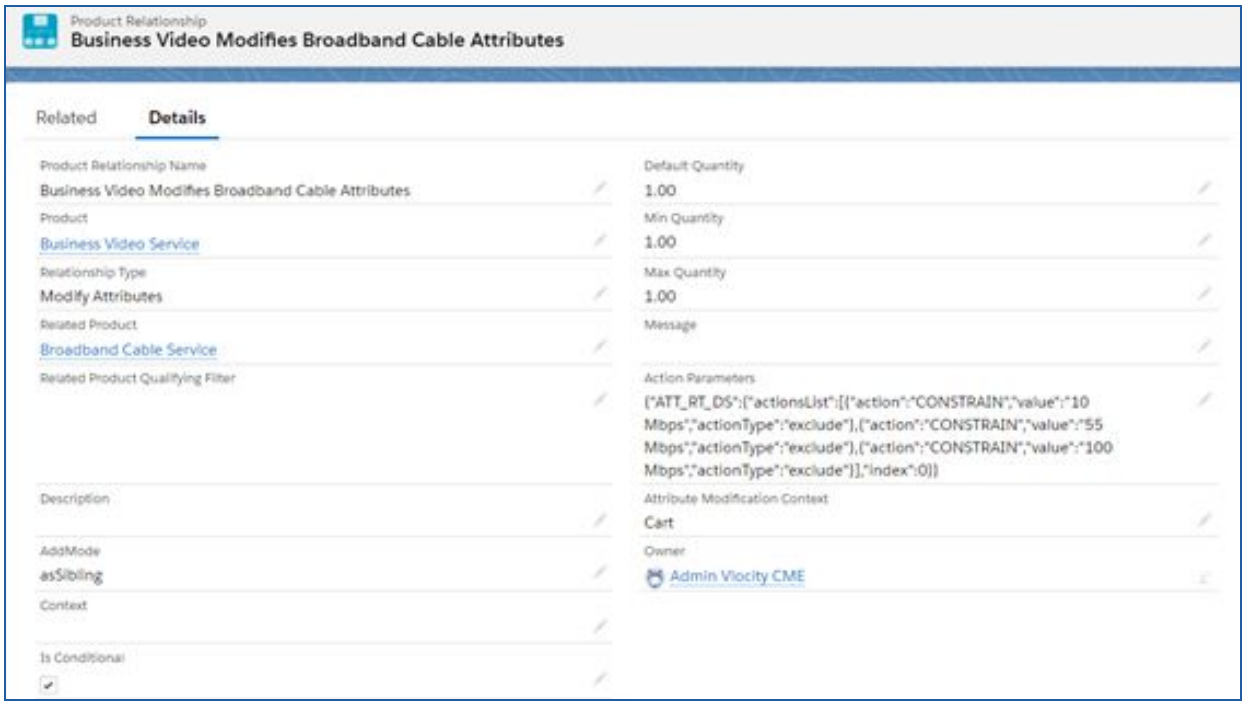
4. Click **Save**.



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Task 3: Create an advanced rule to trigger the new product relationship

1. In the **Lightning tab navigation bar**, click **Vlocity Rules**.
2. Click **New**.
3. In the rule header, enter the following information.

Field	Value
Rule Name	`Attribute Mods Actions Rule`
This defines	**Configuration**
rule that applies to	**Order Product<OrderItem>**
and is	**Active**
Description	`Rule to trigger all of the attribute modification relationships`

4. Under **FILTERS AND ACTIONS LIST**, click **Actions**.

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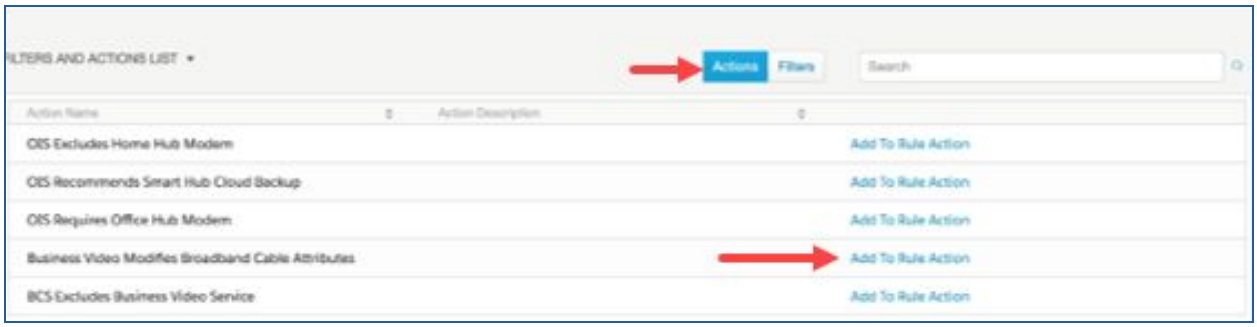
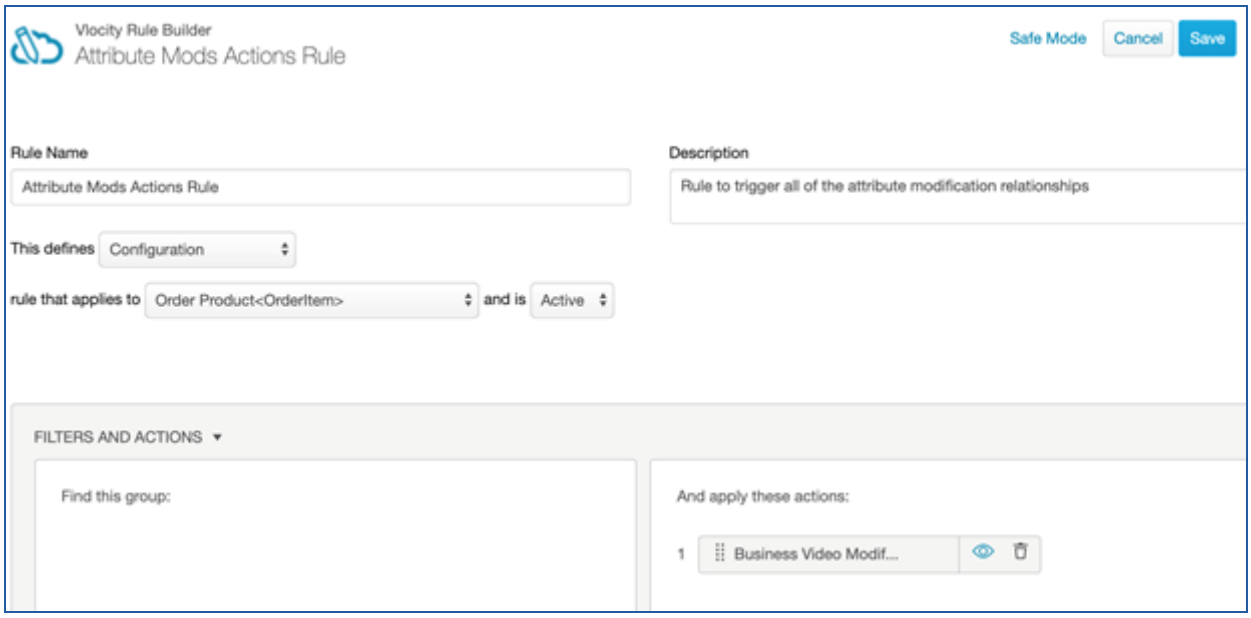
5. In the **FILTERS AND ACTIONS LIST**, find **Business Video Modifies Broadband Cable Attributes** product relationship in the **Actions** list, and click **Add To Rule Action**.



6. Click **Save**.

> **NOTE:**
> In this example, we are creating an advanced rule that has no (entity) filter specified. This means that the rule will be applied to all line items in the cart without restriction. This way, we can group all of our attribute modification actions (product relationships) together in a single rule, for easier maintenance and reduced rule proliferation.



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ALERT:
Rules are cached in the org cache of the CPQPartition platform cache. When you make changes to rules, you need to clear and refresh the cache in order for changes to be reflected at run time. To clear the cache, go to the **VIocity CMT Administratio**n tab in the Lightning Toolbar and run the Clear and Refresh Cache **Maintenance Jobs.**

Task 4: Review the attribute modification rule in the Cart

1. In the Lightning tab navigation bar, click **Orders**.
2. Click **New**.
3. Enter the following information.

Field	Value
Order Name	`Advanced Rules Business Order #3`
Account Name	**Acme**
Order Start Date	**[today's date]**
Price List	**B2B Price List**

4. Click **Save**.
5. From the **Power Launcher**, click **Configure Order**. This invokes the Cart.
6. In the search dialog on the product list, enter `business`.
7. Find **Business Video Service** in the product list and click **Add to Cart**.
8. Find **Broadband Cable Service** in the product list and click **Add to Cart**.
9. Click the **line item dropdown** action menu for **Broadband Cable Service**, and click **Configure**

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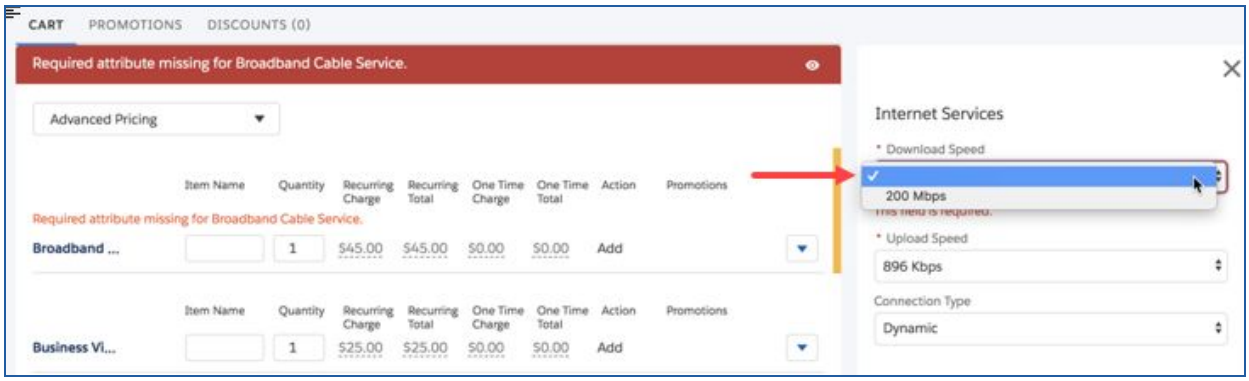
10. For Download Speed, click the dropdown menu and notice that there is only one picklist value available for the attribute.



Review

Confirm your understanding by answering these questions.

1. What type of rule component is used to modify a product's attributes?
2. What format is used to encode attribute modifications?
3. What field stores attribute modifications?
4. How would you create an attribute modification rule that depends on account information, rather than a related product?

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Exercise 7-4: Creating Advanced Rules to Reverse Attribute Modification

Scenario

Eliza is happy to know that she has protected her innocent user population from incompatible attribute choices using her new attribute modification rule. However, she soon learns that there is a fly in the ointment: when users remove the product that triggers the attribute modification, the modified attributes do not return to their original state. Eliza realizes that she must create a rule to restore attributes when the product is removed from the cart. As a matter of cosmic history, it is much easier to destroy than to create, and as Eliza finds out, this is no different.

Goal

- Create a rule to restore modified attributes to their original state
- Create evaluation entity filters
- Chain together a qualification entity filter and an evaluation entity filter to create a compound filter
- Create rule actions that are modified by entity filters

Tasks

1. Edit the cart to remove Business Video Service
2. Create a product relationship to restore the Broadband Cable Service product's modified attributes
3. Create an evaluation entity filter to test for Business Video Service in each line item
4. Create a compound qualification entity filter to check the contents of the Cart
5. Create an advanced rule to trigger the new product relationship
6. Review the reverse attribute modification rule in the Cart

Time: 30 mins

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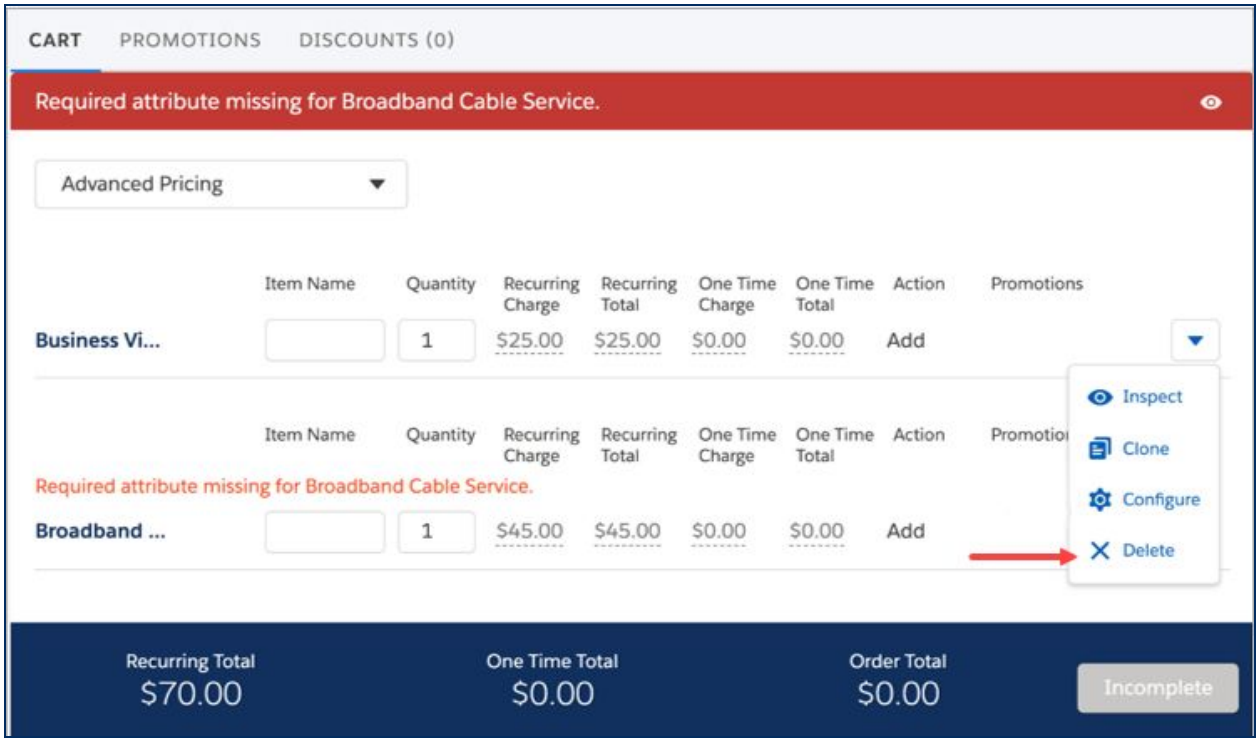
Task 1: Edit the cart to remove Business Video Service

1. You should be reviewing **Advanced Rules Business Order #3** in the Cart.
2. In the cart line items pane using the dropdown line item action menu, delete **Business Video Service** from the Cart.



3. Using the **dropdown line item** action menu for **Broadband Cable Service**, click **Configure**.
4. Click **Download Speed** and notice that even though **Business Video Service** has been removed, the attribute picklist values remain modified. This is because the actual underlying JSON structure was modified.

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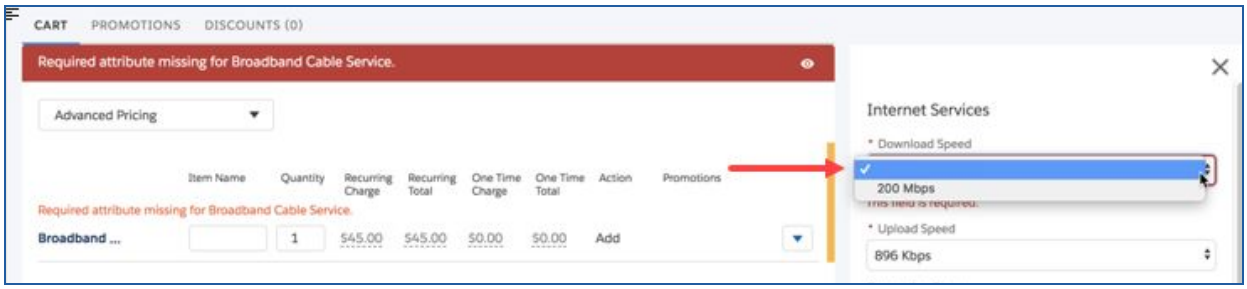

5. Click **X** to close the configuration window.

6. In the **cart line items** pane using the **dropdown line item** action menu, delete **Broadband Cable Service** from the Cart.

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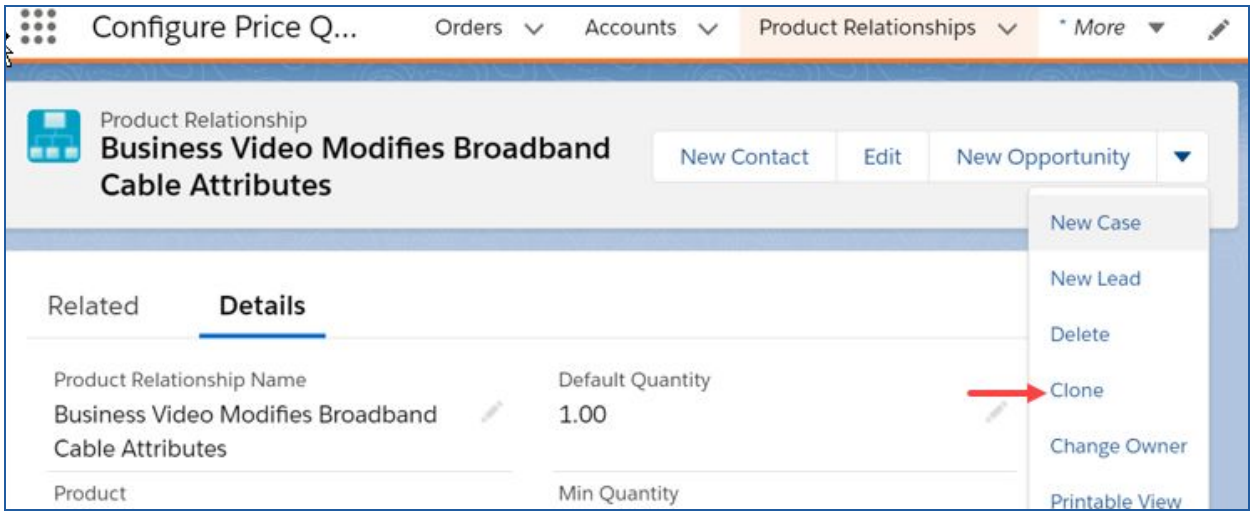
Task 2: Create a product relationship to restore the Broadband Cable Service product's modified attributes

1. In the **Lightning search dialog,** enter `business video modifies` and press **Enter**.
2. In the **search results** list, click **Business Video Modifies Broadband Cable Attributes** product relationship.

3. Click the **dropdown action** menu and click **Clone**.



4. In the **New Product Relationship** dialog, change or enter the following information.

Field	Value
Product Relationship Name	`Restore Broadband Cable Attributes`
Product	**Broadband Cable Service**
Relationship Type	**Modify Attributes**

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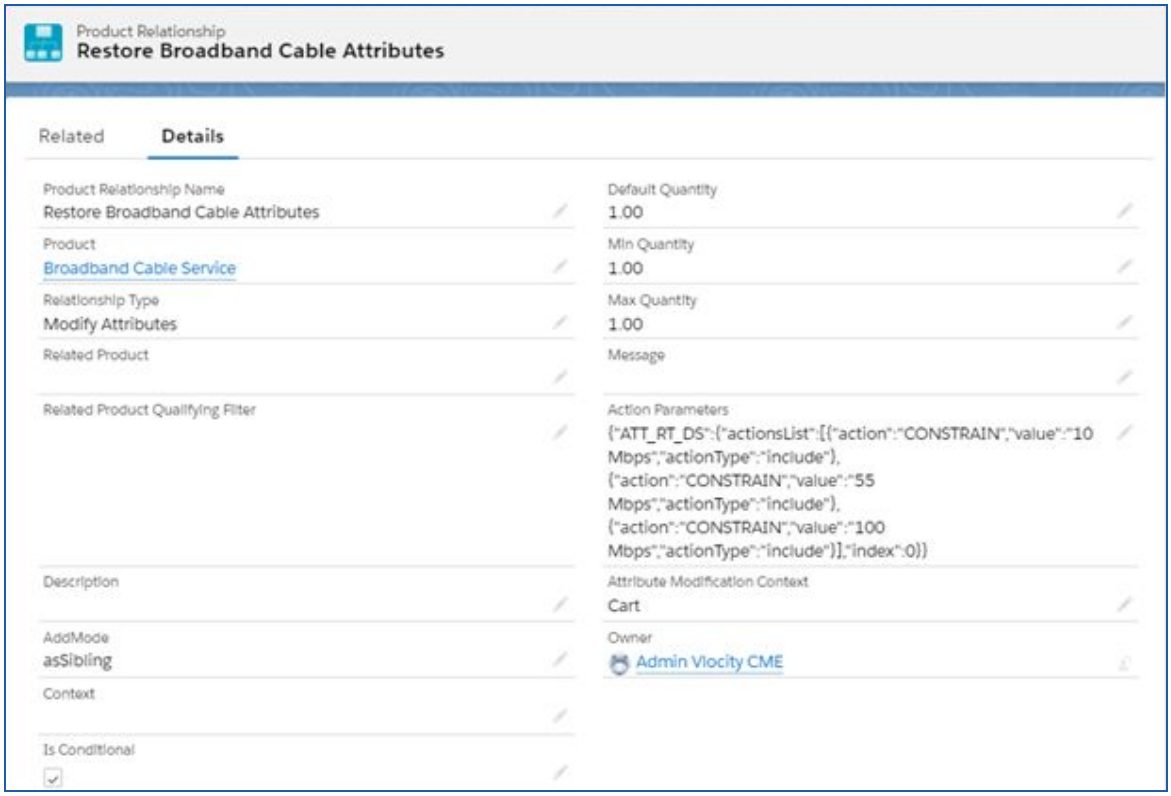
Related Product	**[delete Broadband Cable Service]**
Action Parameters	**[change exclude to include]** `{"ATT_RT_DS":{"actionsList":[{"action":"CONSTRAIN","value":"10 Mbps","actionType":"include"},{"action":"CONSTRAIN","value":"55 Mbps","actionType":"include"},{"action":"CONSTRAIN","value":"100 Mbps","actionType":"include"}],"index":0}}`

5. Click **Save**.



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NOTE:
In the previous exercise, you created a product relationship that defined when attributes should be modified based on a dependency between two products. However, in this case, you will modify attributes based on other factors, such as the non-existence of another product. You can use this same technique when evaluating an account's SLA agreement or other non-product-related factor. To do this, you select the product to be modified and leave the related product field blank. A blank related product alerts the rules engine to apply the given action parameters to the product on its own.

NOTE:
To create more concise JSON, you could also write the action parameters with values listed in an array like the following.

```
{"ATT_RT_DS":{"actionsList":[{"action":"CONSTRAIN","value":
["10 Mbps","55 Mbps","100
Mbps"],"actionType":"include"}],"index":0}}
```

With her new product relationship in hand, Eliza now realizes the tricky part: she needs the product relationship to fire ONLY when Business Video Service does not exist in any line item of the Cart. Checking for the non-existence of something is actually harder than checking for its existence, as it turns out. To do this, she will create a compound entity filter that chains an evaluation entity filter with a qualification entity filter.

What are Evaluation Entity Filters?

Evaluation Entity Filters evaluate if all, any, or none of a set of records satisfy certain conditions. Evaluation entity filters accept a list of items as input and return true or false as the output. For example, an evaluation filter evaluates to true if any of the product children has a maximum quantity of less than 10 and a minimum quantity larger than 2.

In our example, you will use an evaluation entity filter to check for the Business Video Service name, and then you will chain this evaluation entity filter to a qualification entity filter that prepares the list of input items for evaluation and, when true, passes the list of qualified items to the rules engine. As you will see, evaluation entity filters are not used directly in rule building and instead are "internal filters" to qualification entity filters.

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Task 3: Create an evaluation entity filter to test for Business Video Service in each line item

1. In the **Lightning tab navigation bar**, click **Vlocity Entity Filters**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New**.
3. In the **New Vlocity Entity Filter** dialog, enter the following information.

Field	Value	Notes
Entity Filter Name	`EVAL Is Business Video a line item`	
Filter On Object Name	**Order** **Product<OrderItem>**	
Type	**Evaluation**	
Valid From	**[today's date]**	
Evaluation Criteria	**None**	This specifies the criteria in which the filter should return a True result. In this case, it says that if none of the line items are Business Video Service, all the line items have satisfied the condition, and thus can be passed either directly to the rules engine or to other conditions in the calling qualification filter.

4. Click **Save**.

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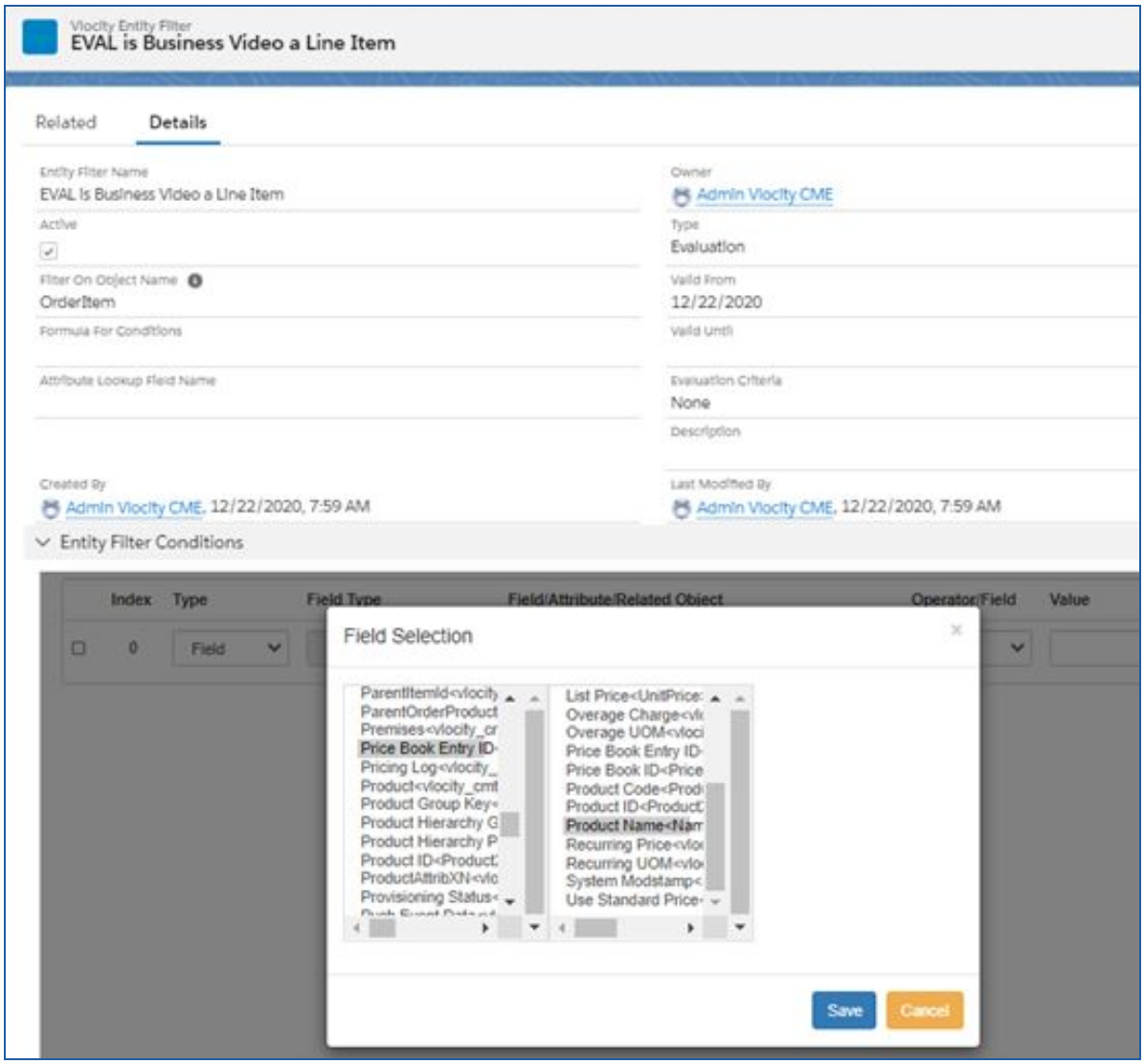
5. Create the **Entity Filter Condition.**
    a. Under **Entity Filter Conditions**, click **Add**.
    b. In **Field/Attribute/Related Object**, click **Select**.
    c. In the first column of the **Field Selection** dialog, click **Price Book Entry ID**.
    d. In the second column of the **Field Selection** dialog, click **Product Name**.
    e. Click **Save**.



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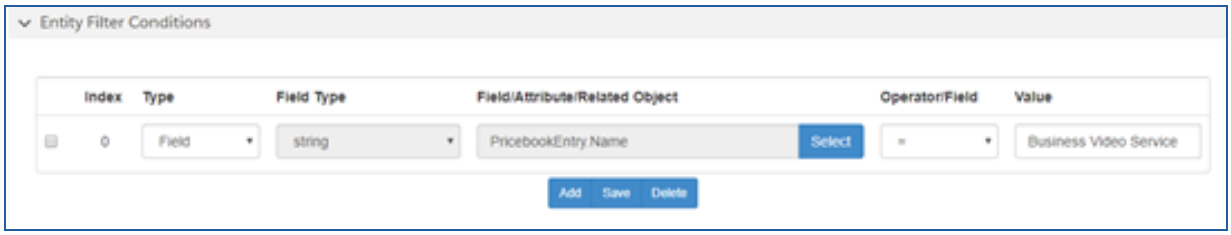
NOTE:
In the condition, you select PricebookEntry.Product Name as the field to evaluate. This is the correct field since the object that you are evaluating is an order line item, and the primary key to this object from a data model perspective is the pricebook entry object.

f. Using the **Operator/Field** dropdown menu, select **=**.

g. In the **Value** field, enter `Business Video Service`.



6. Click **Save**.

NOTE:
In a real-world implementation, it is unlikely that you would create a rule that evaluates a product name, since that might change, and if it did, it would "break" this filter and the rule that uses it. Instead, you would create the filter to evaluate the product code field, which is unlikely to change.

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Task 4: Create a compound qualification entity filter to check the contents of the Cart

1. In the **Lightning tab navigation bar**, click **Vlocity Entity Filters.** (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New**.
3. In the **New Vlocity Entity Filter** dialog, enter the following information.

Field	Value	Notes
Entity Filter Name	`Check Cart for Business Video`	
Filter On Object Name	**Order** **Product<OrderItem>**	
Type	**Qualification**	Unlike an evaluation entity filter, this entity filter is a qualification entity filter, which will output a list of qualified records.
Valid From	**[today's date]**	
Description	`Ensures there are no Business Video Services in Cart.`	

4. Click **Save**.
5. Create the **Entity Filter Condition.**
   a. Under **Entity Filter Conditions**, click **Add**.
   b. In **Type**, select **Function**.
   c. In **Field/Attribute/Related Object**, click **Items in cart**.
   d. Click in the text entry next to **Value** and enter `EVAL`.
   e. Select **EVAL Is Business Video a line item** from the type-ahead.
   f. Click **Save**.

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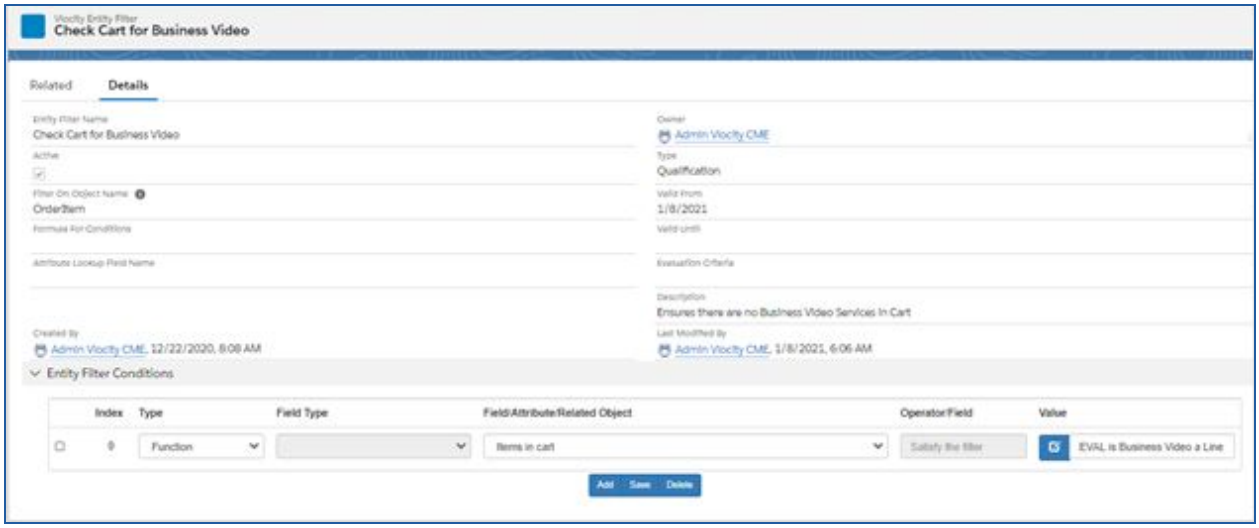

NOTE:
In a condition that uses a function, you can optimize the processing by reducing the number of records with a defined scope as you can see in the dropdown menu: items in the cart, items in a bundle, sibling, parent or root entities. Then, the reduced set of records is passed to the linked evaluation entity filter for processing.

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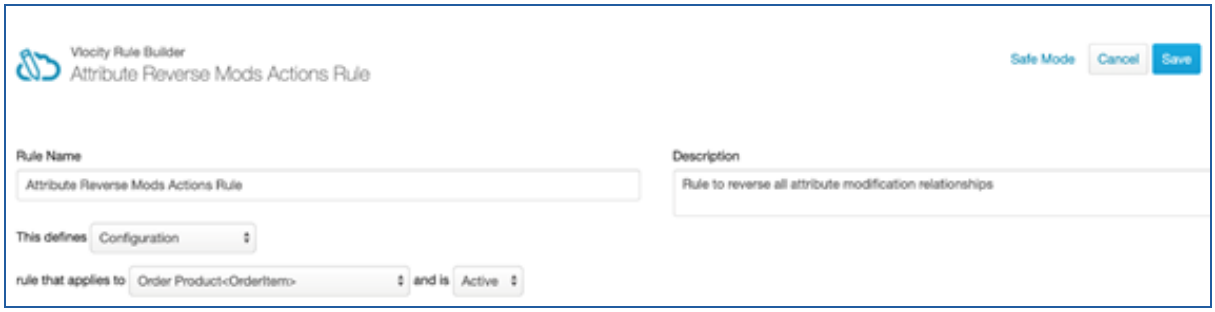
Task 5: Create an advanced rule to trigger the new product relationship

1. In the Lightning tab navigation bar, click **Vlocity Rules**.
2. Click **New**.
3. In the rule header, enter the following information.

Field	Value
Rule Name	`Attribute Reverse Mods Actions Rule`
This defines	**Configuration**
rule that applies to	**Order Product<OrderItem>**
and is	**Active**
Description	`Rule to reverse all attribute modification relationships`



4. Under **FILTERS AND ACTIONS LIST**, click **Actions**.

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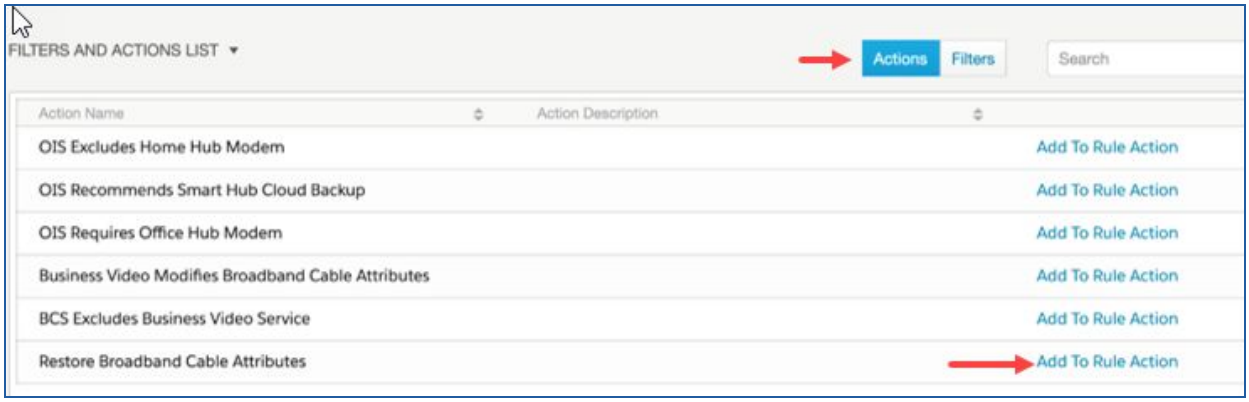
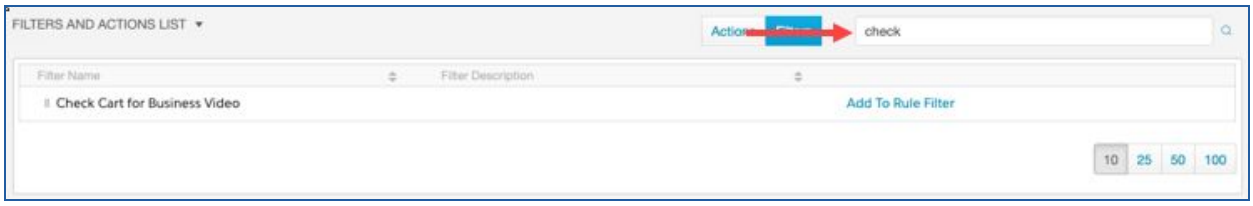
5. In the **FILTERS AND ACTIONS LIST**, find **Restore Broadband Cable Attributes** product relationship in the **Actions** list, and click **Add to Rule Action**.



6. Under **FILTERS AND ACTIONS LIST**, click **Filters**.

7. Next to **FILTERS** in the Search dialog, enter `check`. Notice how the search dialog refines the Filter list.



8. Drag the **Check Cart for Business Video** filter on top of the **Restore Broadband Cable Attributes** action.

9. Under **Filter Name**, hover over the **Check Cart for Business Video**. Your cursor will change to .

10. Press your left mouse key to select the item.

11. Drag it on top of the **Restore Broadband Cable Attributes** action.

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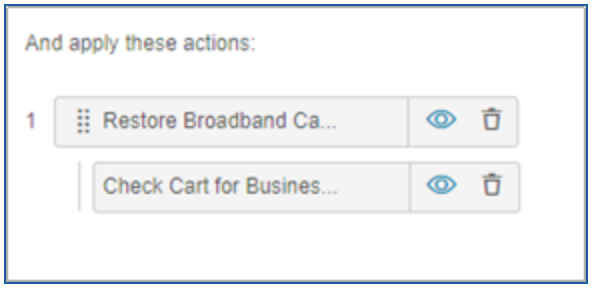
The filter will now display as an action modifier.



NOTE:
By using the filter as a modifier to the action, you increase reusability of this rule. You can add multiple actions to this one rule, and each action will only fire for records qualified by the attached filter.

12. Click **Save**.

ALERT:
Rules are cached in the org cache of the CPQPartition platform cache. When you make changes to rules, you will need to run maintenance jobs from within the **Vlocity CMT Administration tab** to clear and refresh the cache in order for changes to be reflected at run time.

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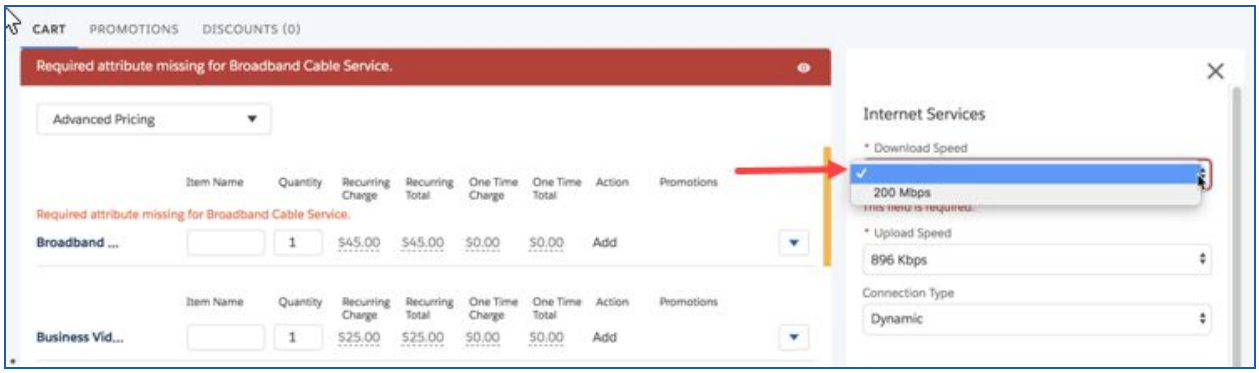
Task 6: Review the reverse attribute modification rule in the Cart

1. In the **Lightning search dialog**, enter `business order #3` and press **Enter**.
2. In the **search results list**, click the **order number**.
3. From the **Power Launcher**, click **Configure Order**. This will launch the Cart.
4. In the **search** dialog on the product list, enter `business`.
5. Find **Business Video Service** in the product list and click **Add to Cart**.
6. Find **Broadband Cable Service** in the product list and click **Add to Cart**.
7. Click the line item action dropdown menu for **Broadband Cable Service** and click **Configure**. Notice that there is only one picklist value available for the attribute.



8. Click **X** to dismiss the configuration window.
9. Using the dropdown line item action menu for **Business Video Service**, click **Delete**, and select **Delete** in the **Delete Item** dialog.

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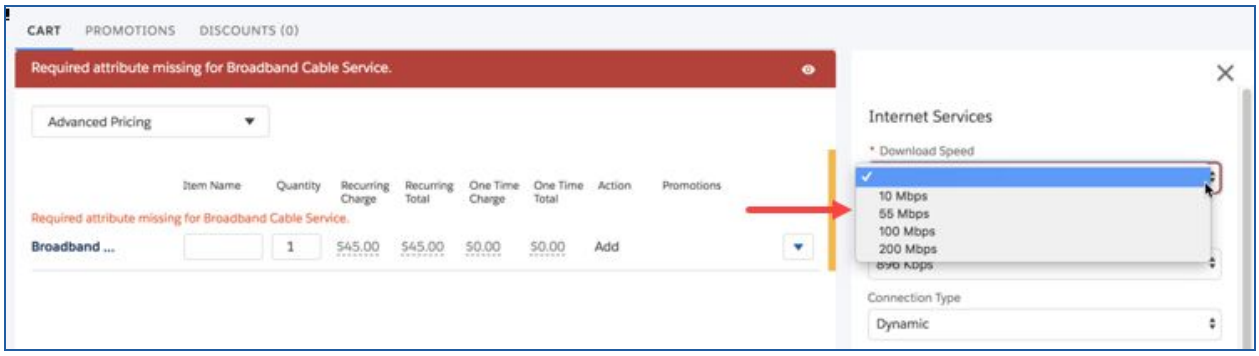
10. Click the line item action dropdown menu for **Broadband Cable Service** and click **Configure**. Notice that all the picklist values have been restored.



Review

Confirm your understanding by answering these questions.

1. Why would you need to create a rule to reverse a modify attributes rule?
2. What is an evaluation entity filter?
3. How do you use an evaluation entity filter? Can it be used directly in Vlocity Rule Builder?
4. How can you limit the scope of records passed to an evaluation entity filter?
5. What does it mean when you apply an entity filter to a rule action as a modifier? How is it advantageous?

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Exercise 7-5: Create Advanced Rules for Auto-Add

Scenario

Eliza is on a roll! The contact center has piloted her new rules, and everyone is impressed with how well they're working. Unnecessary support calls look like they are declining, the CSRs are creating "the perfect order" and even the new employees are up to speed. Now, product marketing has an additional request: when high-priority accounts based in California purchase the iPhone X, they want to automatically offer them a free phone case.

Goal

- Create entity filters for account information
- Create Configuration / Validation rules to Auto-Add products to an order

Tasks

1. Create an Auto-Add configuration/ validation rule
2. Create an entity filter for high-priority accounts in California
3. Create an advanced configuration / validation rule to combine the rule and the entity filter
4. Test the new rule in the Cart

Time: 30 mins

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Task 1: Create an auto-add configuration/ validation rule

1. In the **Lightning tab navigation bar**, click **Product Relationships**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New**.
3. In the **New Product Relationship** dialog, enter the following information.

Field	Value
Product Relationship Name	`Apple iPhone X Auto-Adds a Free Phone Case`
Product	**Apple iPhone X**
Relationship Type	**Auto-Add**
Related Product	**Incipio Canvas Fabric Wrap Case - iPhone X**
Min Quantity	`1`
Max Quantity	`1`

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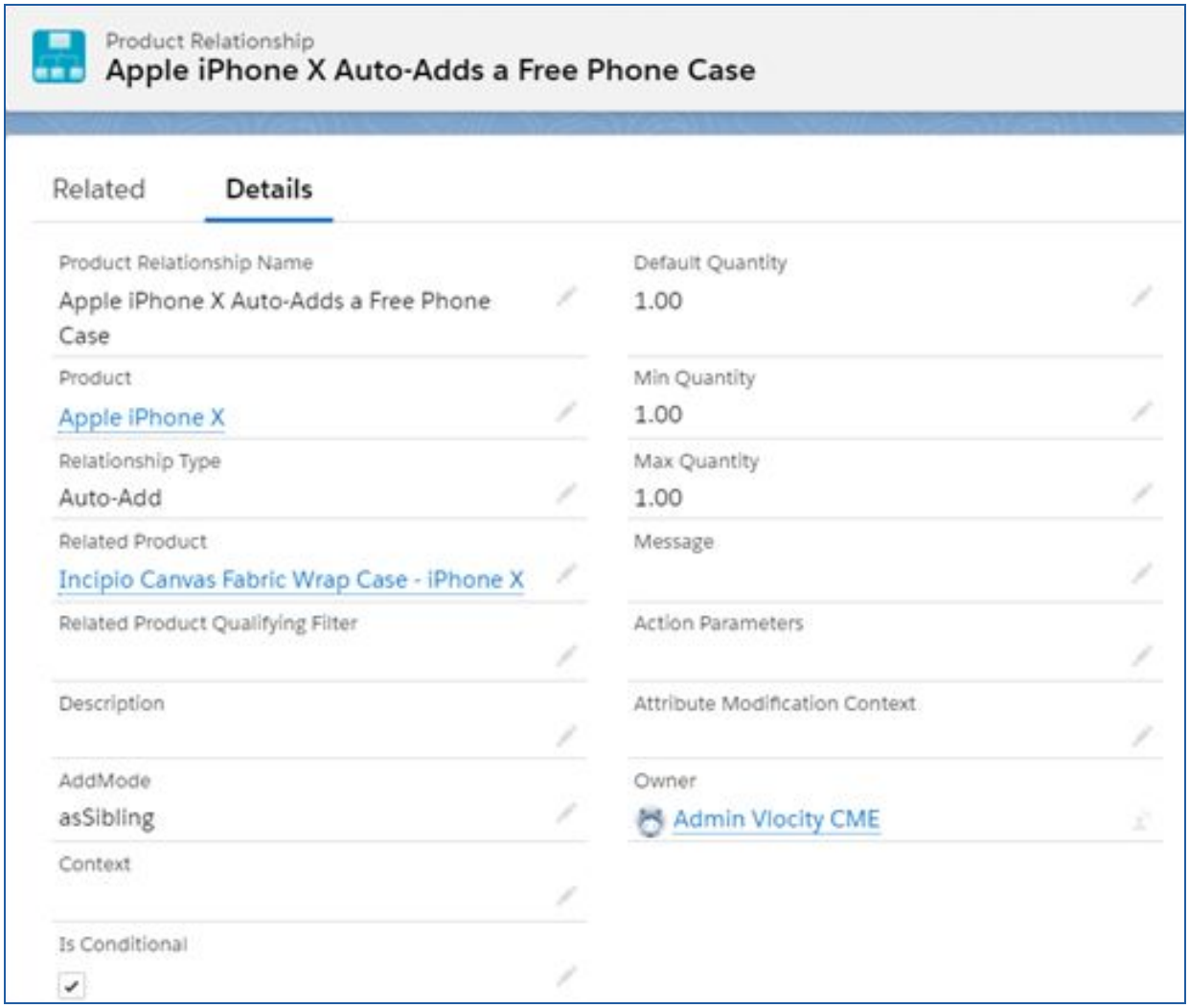

4. Click **Save**.

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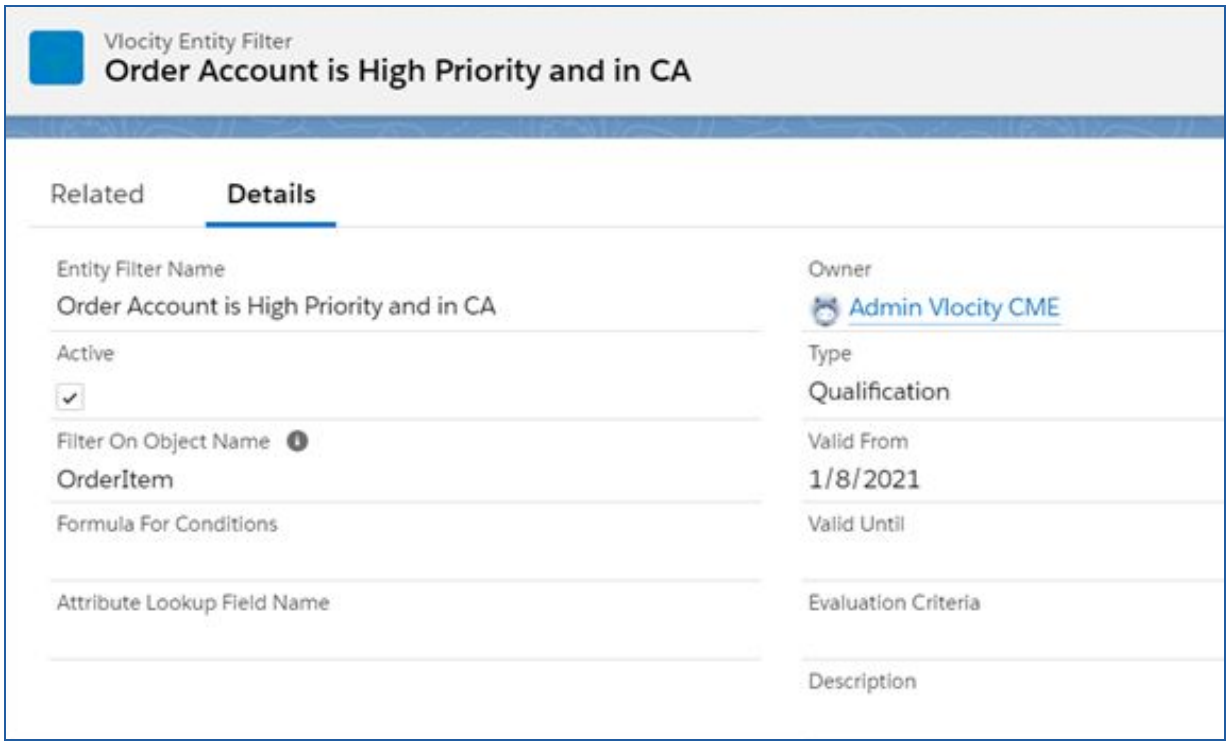
Task 2: Create an entity filter for high-priority accounts in California

1. In the **Lightning tab navigation bar**, click **Vlocity Entity Filters**. (If you don't see it, click **More** to expand the overflow dropdown menu.)
2. Click **New**.
3. Enter the following information.

Field	Value
Entity Filter Name	`Order Account is High Priority and in CA`
Filter On Object Name	**Order Product<OrderItem>**
Type	**Qualification**
Valid From	**[today's date]**

4. Click **Save**.



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5. Now it's time to add the filters. You'll begin by adding the filter for high priority accounts first.
    a. In the **Entity Filter Conditions** section, click **Add**.
    b. Ensure the **Type** field is set to **Field**.
    c. To the right of the **Field/Attribute/Related Object** field, click **Select**.

    d. In the **Field Selection** window in the first column, scroll down and select **Order ID<OrderId>.**
    e. In the second column, scroll down and select **Account ID<AccountId>**.

ALERT:
In the second column, ensure that you select **Account ID<AccountId>**. If you select Account Id<vlocity_cmt__AccountId__c>, then the third column will not display.

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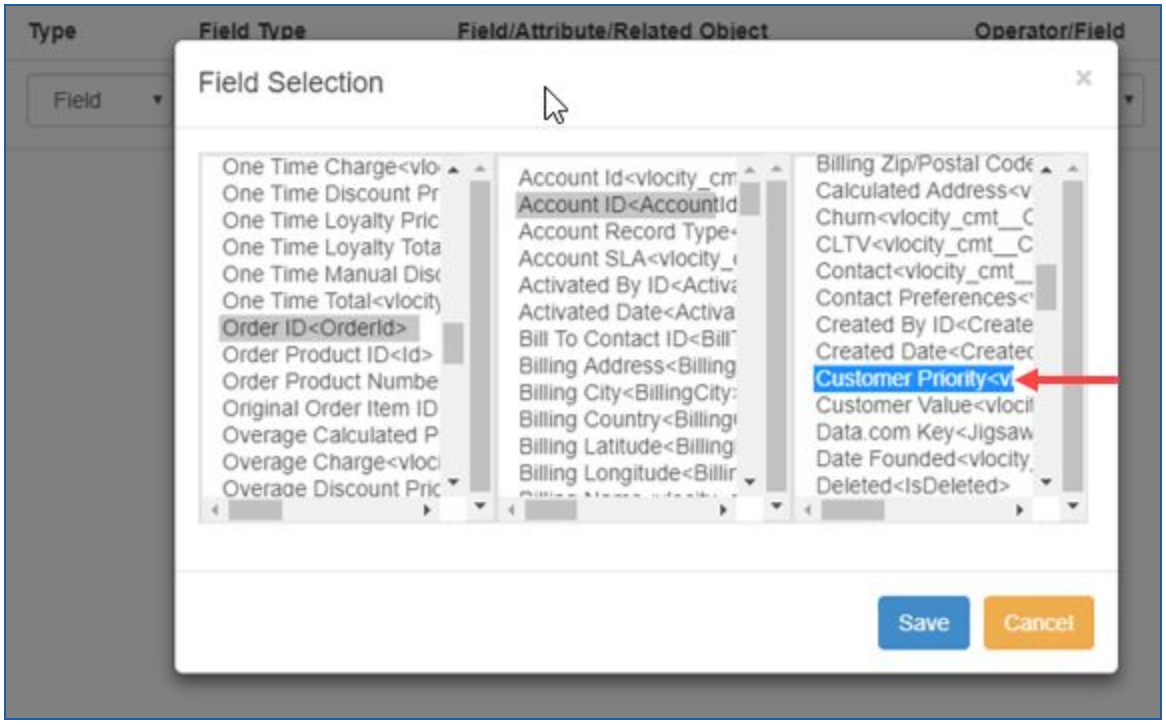
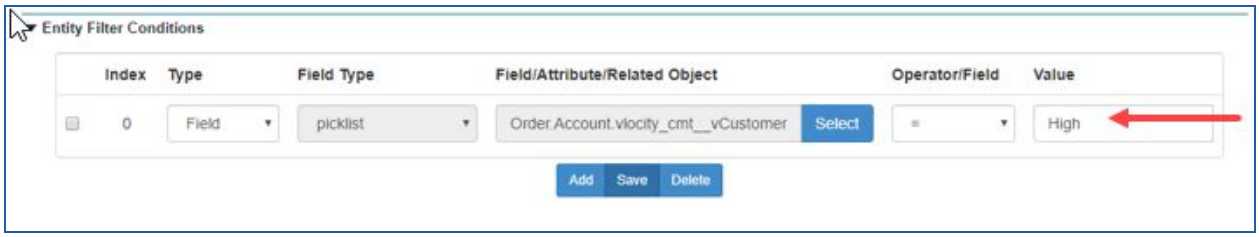
f. In the third column, scroll down and select **Customer Priority <vlocity_cmt__vCustomerPriority__c>**.



g. Click **Save**.
h. Click in the Operator/Field field and select =.
i. Click in the **Value** field and enter `High`.



j. Click **Save**.

6. The condition we just created will filter high-priority accounts. Next, we need to create a second filter for accounts in California.

   a. In the **Entity Filter Conditions** section, click **Add**.

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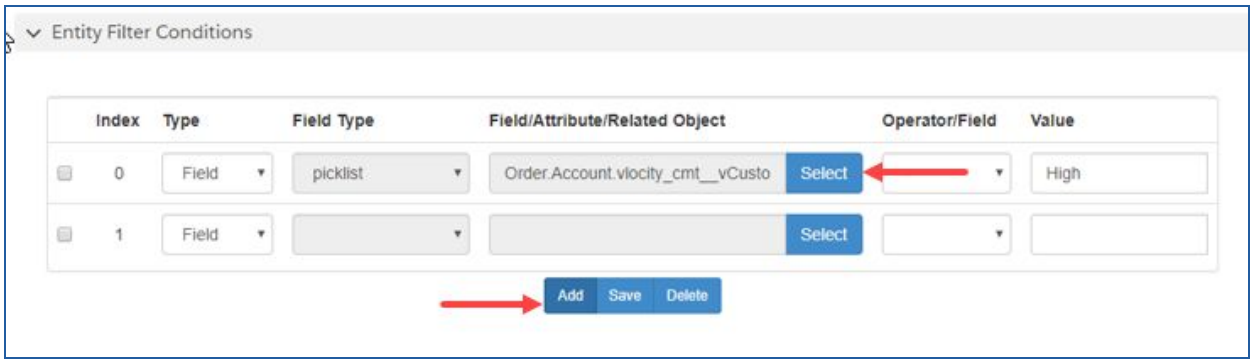
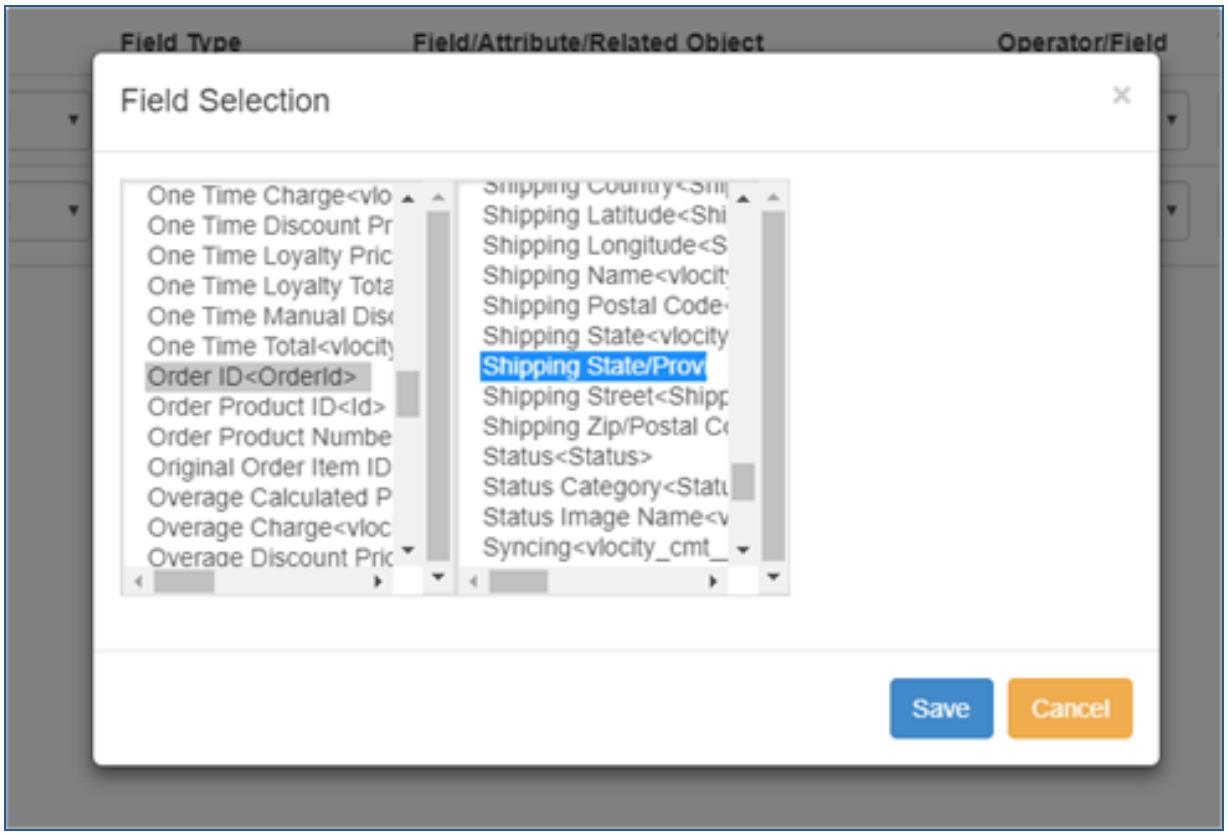
b. To the right of the **Field/Attribute/Related Object** field, click **Select**.



c. In the **Field Selection** window in the first column, scroll down and select **Order ID<OrderId>.**
d. In the second column, scroll down and select **Shipping State/Province**.
e. Click **Save**.



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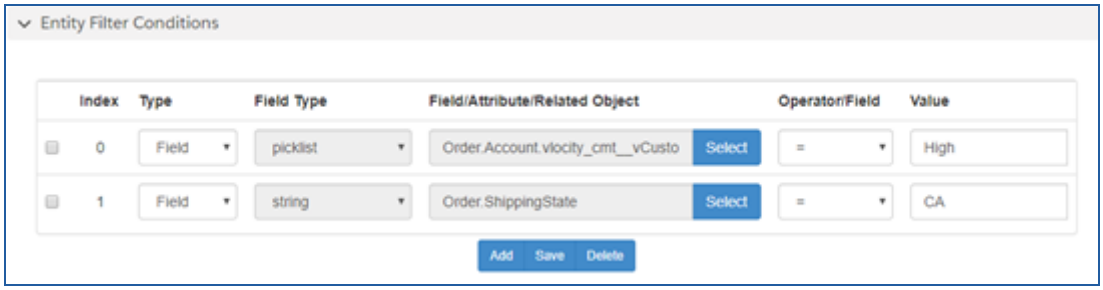
f. Click in the **Operator/Field** field and select **=.**
g. Click in the **Value** field and enter `CA`.



7. Click **Save**.

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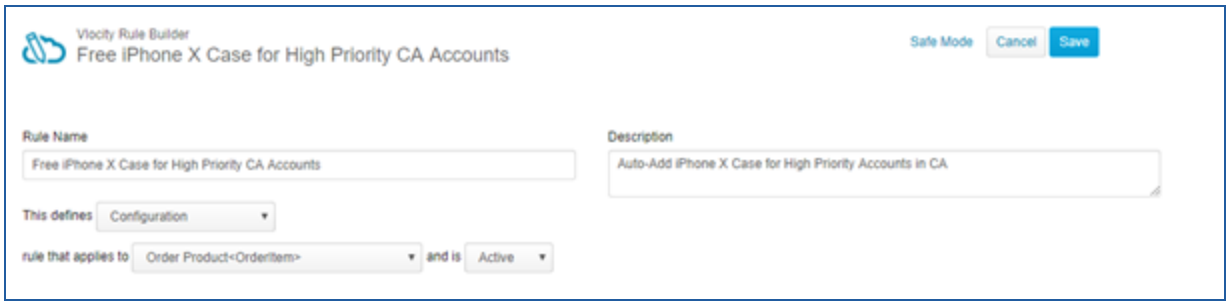
Task 3: Create an advanced configuration / validation rule to combine the rule and the entity filter

1. In the **Lightning tab navigation bar**, click **Vlocity Rules**.
2. Click **New**.
3. In the rule header, enter the following information.

Field	Value
Rule Name	`Free iPhone X Case for High Priority CA Accounts`
This defines	**Configuration**
rule that applies to	**Order Product<OrderItem>**
and is	**Active**
Description	`Auto-Add iPhone X Case for High Priority Accounts in CA`



4. Add the Configuration / Validation rule to the Advanced rule as an Action.
    a. In the **FILTERS AND ACTIONS LIST**, click **Actions**.

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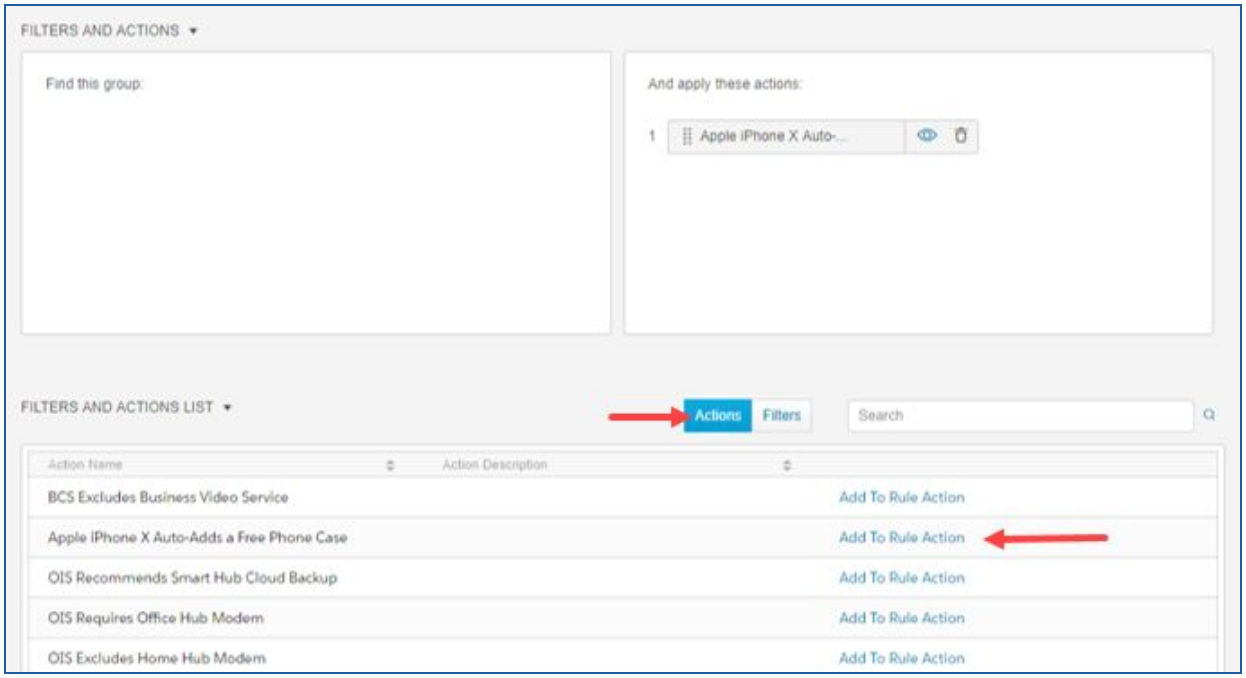
b. Locate **Apple iPhone X Auto-Adds a Free Phone Case** Configuration / Validation rule and click **Add To Rule Action**.



c. In the **FILTERS AND ACTIONS LIST**, click **Filters**.
d. In the **Filter Name** column, locate **Order Account is High Priority and in CA**, and click **Add To Rule Filter.**

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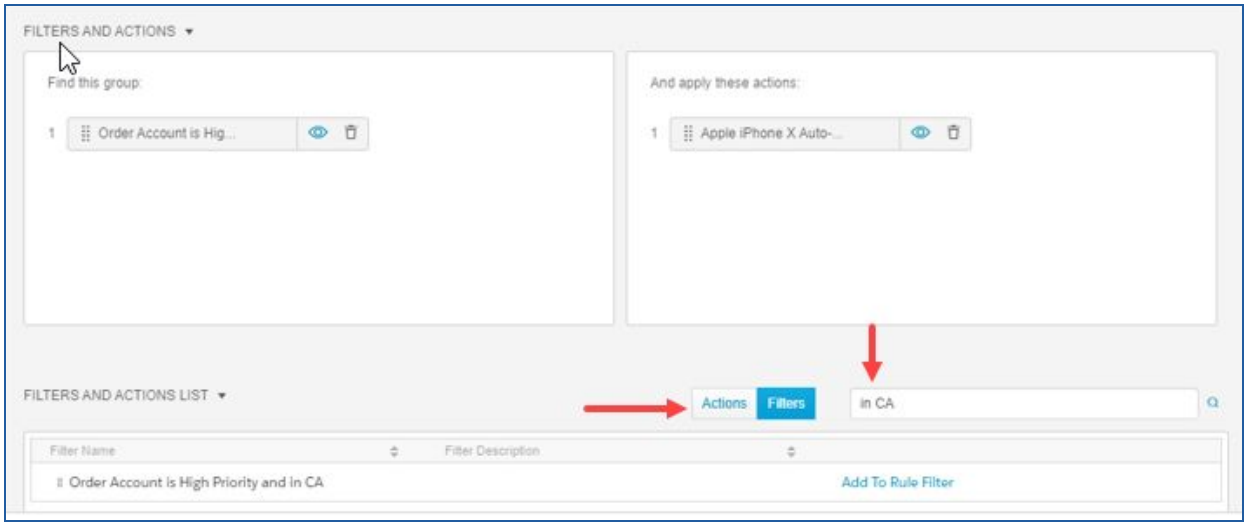
e. Scroll up to the top of the **Rule Builder** page and click **Save**.



ALERT:
Don't forget to go to **Vlocity CMT Administration** and from within the **Maintenance Jobs**, run the clear and refresh cache jobs so your changes are implemented at runtime.

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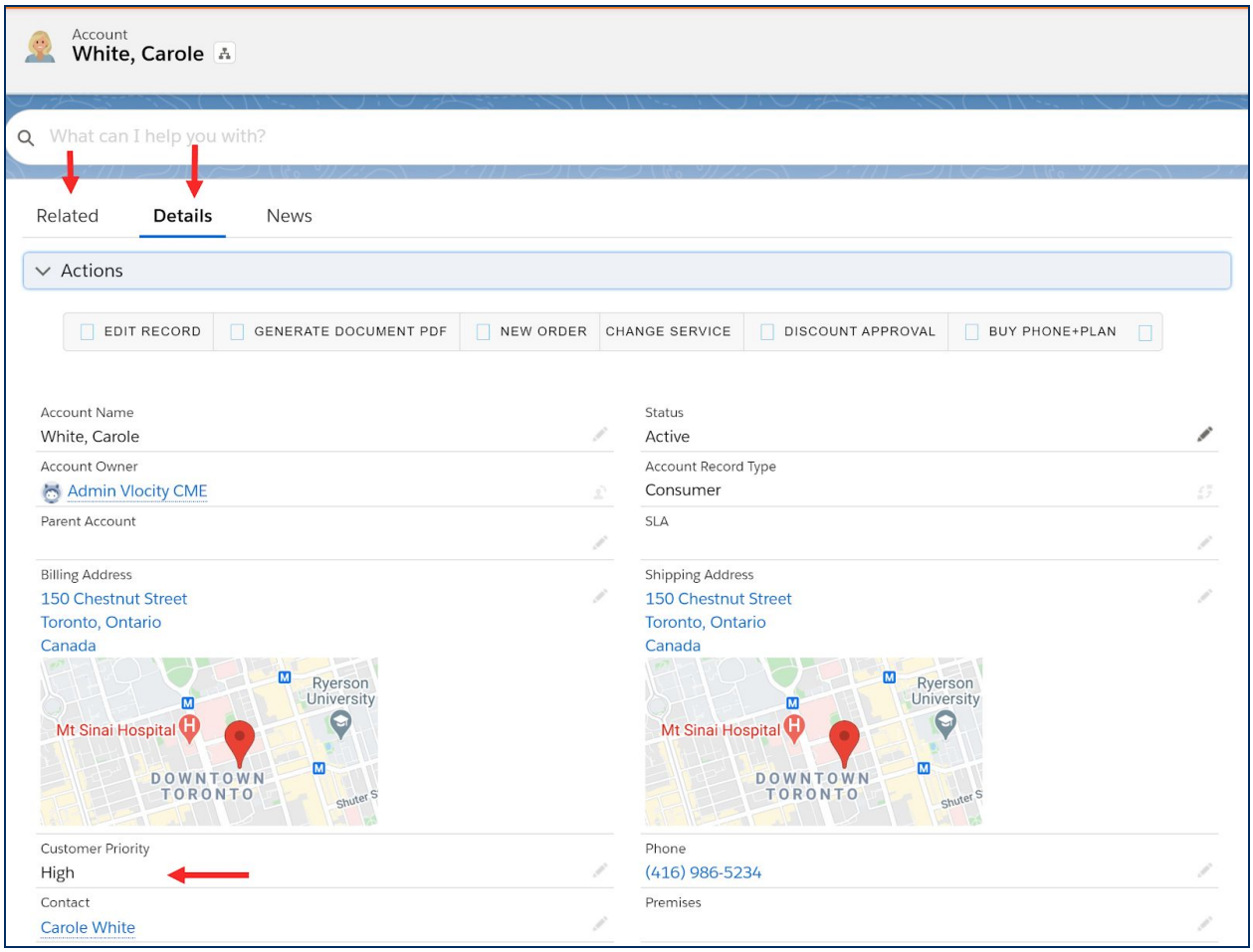
Task 4: Test the new rule in the Cart

1. In the **Lightning search dialog**, enter `white` and press **Enter**.
2. In the search results list under **Accounts**, click **White, Carole.**
3. Click **Details**.
4. Notice the **Customer Priority** field is set to **High**.



NOTE:
This satisfies the first entity filter condition that you created in Task 2, Step 5.

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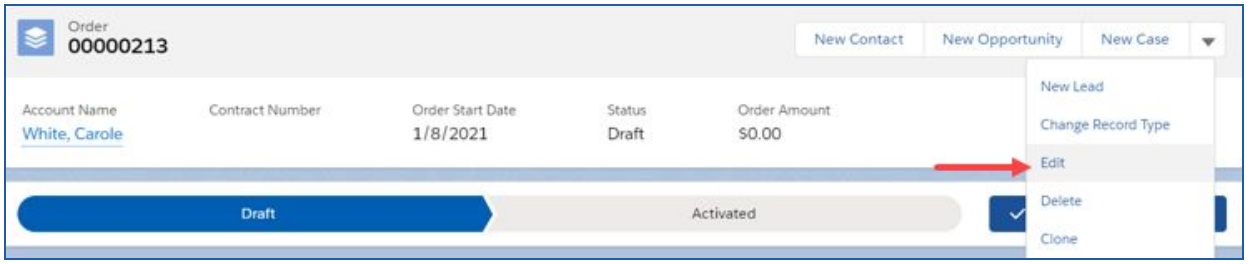
5. In the **Lightning tab navigation bar**, click **Orders**.
6. Click **New**.
7. In the **New Order** dialog, enter the following information.

Field	Value
Order Name	`Advanced Rules Auto-Add Order`
Account Name	**White, Carole**
Order Start Date	**[today's date]**
Price List	**B2C Price List**

8. Click **Save**.
9. In the **order header** using the dropdown action menu, click **Edit**.



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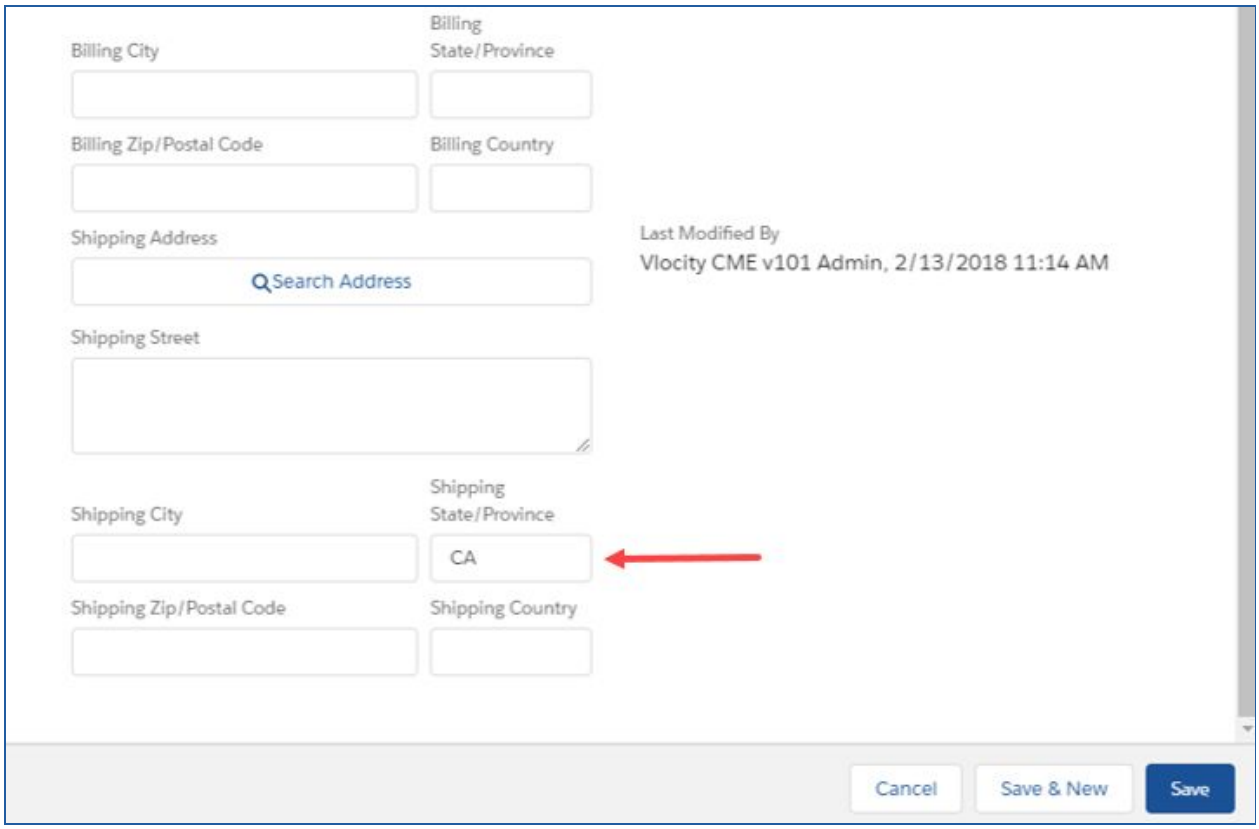
10. In the **Edit** dialog, set the **Shipping State/Province** to CA.



11. Click **Save**.

> **NOTE:**
> This satisfies the second entity filter condition that you created in Task 2, Step 6.

12. From the **Power Launcher**, click **Configure Order**. This invokes the Cart.
13. In the search dialog on the product list, enter `apple`.
14. Find **Apple iPhone X**, and click **Add to Cart.**

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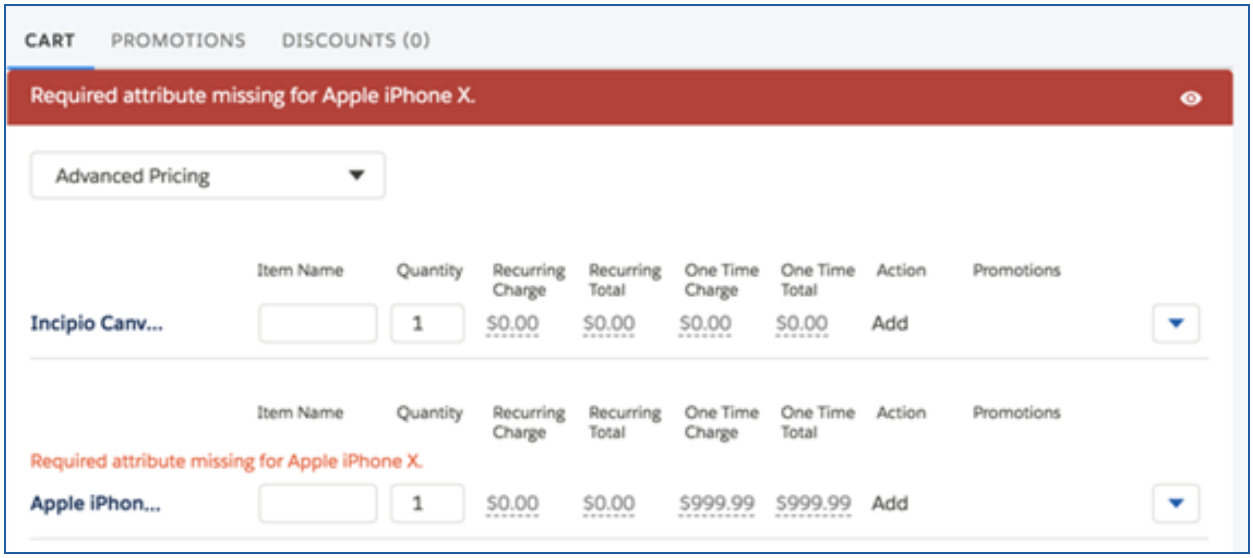
15. Notice the phone case is automatically added to the order.



Review

Confirm your understanding by answering these questions.

1. What types of data can be evaluated in an entity filter condition?
2. How many entity filters can be added to an Advanced Rule?

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Exercise 7-6: Using Advanced Rules to Create an "Or" Configuration Rule Challenge

Scenario

Marketing is at it again! This time, the requirement is for the Home Networking Service product. For this product, they say it should only be sold with the Broadband Cable Service product OR the DSL Service product. So, product A REQUIRES (product B or product C). Your task is to create a new rule that provides this functionality.

Goal

- Review the requirements below and challenge yourself to use the skills you have learned to create an "Or" configuration rule.
- Challenge exercises solidify what you learned in the exercises, build your skills, and allow you to make mistakes -- which is how you will master this application.

Tasks

1. Create a quick sketch to plan how you will build this rule using entity filters, product relationships and advanced rules
2. Create the product relationships
3. Create the entity filters
4. Create the advanced rule using Vlocity Rule Builder
5. Test the new rule in the Cart

Time: 30 mins

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Task 1: Create a quick sketch to plan how you will build this rule using entity filters, product relationships and advanced rules

As they say, it's quicker to measure twice, and cut once. Take a moment to create a build plan for your new rule. Use any format (even the back of a napkin).

Task 2: Create the product relationships

Use product relationships to build the REQUIRES relationships among the products. Think about a custom message that you'd like your users to see.

Task 3: Create the entity filters

Use entity filters to specify the conditions under which you want the product relationships to apply.

Task 4: Create the advanced rule using Vlocity Rule Builder

Use Vlocity Rule Builder to combine the entity filters with the product relationships (the rule actions). Hint: the entity filters will need to modify the rule actions as shown in VAR-4.

Task 5: Test the new rule in the Cart

Once you've got it working, bask in the glory of your new advanced rule!

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Yay! All done!

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