Accelerate Price Waterfall Optimization

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The Optimization - Price Waterfall Accelerator provides a fast implementation of a standard waterfall simulation.

In this section:

- Overview (Optimization - Price Waterfall)
- Business User Reference (Optimization - Price Waterfall)
- Admin User Reference (Optimization - Price Waterfall)
- Technical User Reference (Optimization - Price Waterfall)
- Release Notes (Optimization - Price Waterfall)
- Archive of Documentation (Optimization - Price Waterfall)

To understand the optimization results and to query them from outside of the Optimization Engine module, please refer to Optimization Results.

Overview (Optimization - Price Waterfall)

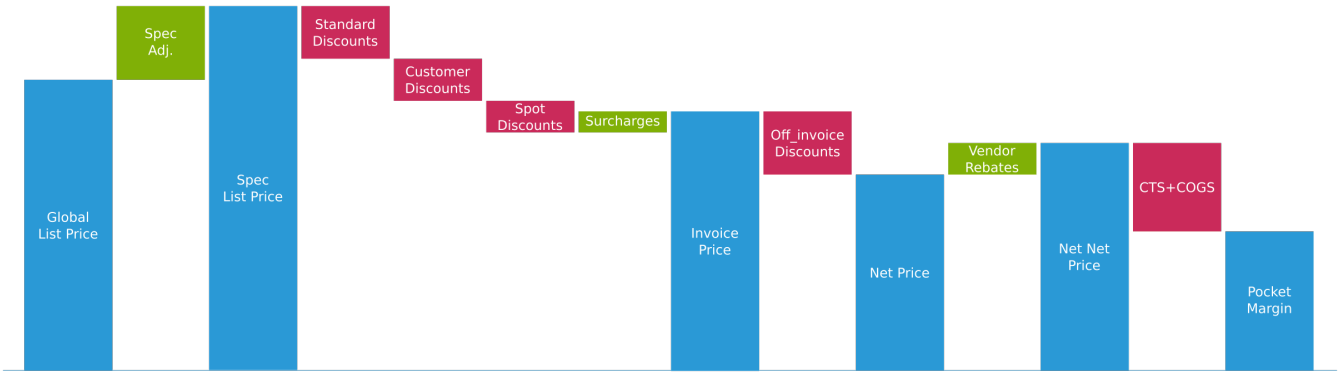
The Optimization - Price Waterfall Accelerator deploys a standard Optimization Engine model that optimizes elements of a waterfall.

To get started, you can also watch a video introducing this accelerator and its benefits.

> This Accelerator is a proof of concept meant only **waterfall optimization** use cases.

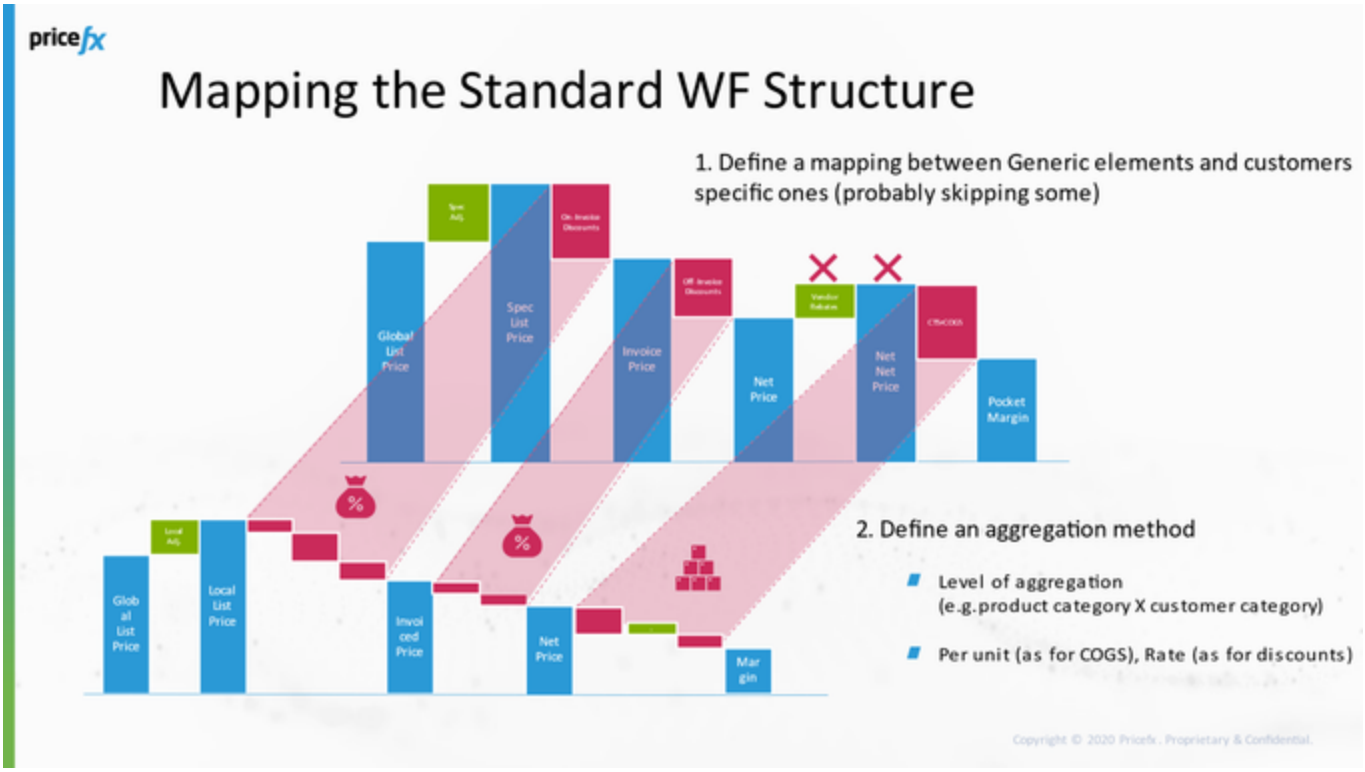
Optimization Engine can do other things, of course, but this is the main use case and any other custom requirements cannot be achieved via this Accelerator.

To be as fast and generic as possible, a standardized waterfall is built into the Accelerator and is designed to cover most of the customer needs. This waterfall looks like this:



A key part of the setup is mapping the actual customer waterfall columns to the standard one. This could mean that some of the elements of the customer waterfall will be aggregated within a single element of the standard waterfall and that some elements may not be used at all.

Illustrative example:



As a result:

- Customers need to be aware of the fact that the **results will not reflect their exact waterfall**.
- We can standardize most things – mainly the way we consume results (Optimization Realization Dashboards, Price Setting, Agreements & Promotions, etc.).

Business User Reference (Optimization - Price Waterfall)

This section explains how to run a waterfall optimization and how to understand its results. Before you can run the waterfall accelerator, you must have it deployed on the partition. See Installation for details. A model for the elasticities must be run before the waterfall optimization (covered in the Prepare Elasticity Model section).

- Data Requirements (Optimization - Price Waterfall)
- Prepare Elasticity Model (Optimization - Price Waterfall)
- Usage (Optimization - Price Waterfall)
- Current State (Optimization - Price Waterfall)
- Results Description (Optimization - Price Waterfall)

Data Requirements (Optimization - Price Waterfall)

A Price Waterfall Optimization model needs a Transactions Datamart to run. Here are the requirements for the transaction fields.

Field	Required?	Comment

Product	Yes	
Product Label	Yes	If there is no label, the same field as Product would be provided.
Product Group	Yes	
Product Group Label	Yes	If there is no label, the same field as Product Group would be provided.
Customer	Yes	
Customer Label	Yes	If there is no label, the same field as Customer would be provided.
Customer Group	Yes	
Customer Group Label	Yes	If there is no label, the same field as Customer Group would be provided.
Quantity	Yes	
Global List Price	Yes	Extended to the quantity. The unit Global List Price is defined at a Product level.
Specific List Price	Yes	Extended to the quantity. The difference compared to the Global List Price is the Specific Adjustment. If the Specific Adjustment is null, the field is the same as the Global List Price one. The unit Specific List Price is defined at a Product and Customer Group level. The Specific Adjustment rate is defined at a Customer Group level.
Standard Discount	Yes	Extended to the quantity. If there is no Standard Discount, set a field whose value is set to zero. The Standard Discount rate is defined at a Product Group and Customer Group level.
Customer Discount	Yes	Extended to the quantity. If there is no Customer Discount, set a field whose value is set to zero. The Customer Discount Rate is defined at a Product Group and Customer level.
Surcharge	Yes	Extended to the quantity. If there is no Surcharge, set a field whose value is set to zero. The unit Surcharge is defined at a Product and Customer level.

Invoice Price	Yes	Extended to the quantity. The difference between the Invoice Price and the Specific List Price is Surcharge - Standard Discount - Customer Discount - Spot Discount. The Spot Discount is calculated from the other fields. The unit Invoice Price and the Spot Discount rate are defined at a Product and Customer level.
Net Price	Yes	Extended to the quantity. The difference compared to the Invoice Price is the Off-Invoice Discount. If the Off-Invoice Discount is null, the field is the same as the Invoice Price one. The unit Net Price and the Off-Invoice Discount rate are defined at a Product and Customer level.
Net Net Price	Yes	Extended to the quantity. The difference compared to the Net Price is the Vendor Rebate. If the Vendor Rebate is null, the field is the same as the Net Price one. The unit Net Net Price and the Vendor Rebate rate are defined at a Product and Customer level.
Pocket Margin	Yes	Extended to the quantity. The difference compared to the Net Net Price is the CTS + COGS. The unit Pocket Margin is defined at a Product and Customer level. The unit Costs are defined at a Product level.

Some aggregations are done during the model run. The assumption here is that the data are defined at the expected level of aggregation. If not, the average value, at the expected level of aggregation, is used.

Prepare Elasticity Model (Optimization - Price Waterfall)

To retrieve the elasticity factor calculated from transaction data, the Optimization - Price Waterfall model deployed by the Accelerator depends on another Negotiation Guidance model. Below is the simplest way to configure such a model on the partition; for details see the complete documentation for Negotiation Guidance models.

In this section:

Deploy

⚠ Note that if the Negotiation Guidance Model Class & Logics have already been deployed on the partition, deploying them again might override specific changes done by a pricing scientist. Also if the Negotiation Guidance Model Class is already present in **Administration** > **Configuration** > **Optimization** > **Model Classes**, you can directly use it without doing the deployment again.

The deployment can be done by PlatformManager, see Accelerate Negotiation Guidance for more details.

Prepare Transaction Source

The Negotiation Guidance model runs using a transaction source. The transaction source must meet the following prerequisites.

- The transaction source must contain the following fields (create them if needed):
  - **Customer** field – ID of each customer. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it.
  - **Customer Group** field – ID of each customer group. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it. It must be defined as a dimension.
  - **Product** field – ID of each product. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it.
  - **Product Group** field – ID of each product group. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it. It must be defined as a dimension.
  - **Quantity** field – Number of products in each transaction.
  - **Revenue** field – Also named Invoice Price in the waterfall of the Price Waterfall Accelerator (extended to quantity).
  - **Margin** field – Also named Pocket Margin in the waterfall of the Price Waterfall Accelerator (extended to quantity).
  - **Optimization Metric** field – Margin percentage field, containing the quotient of *Margin* divided by *Re venue*.
- The user will define some segmentation levels.
  - These fields must be defined as dimensions in the transaction source.
  - Avoid null values because the corresponding transaction rows will be ignored in the segmentation model and will cause an error in Optimization Price Waterfall models. If necessary, create a new field by using an expression that replaces empty values with a text (e.g., "Not provided").

Create Model

1. In **Optimization** > **Models**, use the **Add Model** button.
2. Set a **Name** and a **Label**.
3. Select *Negotiation Guidance* as **Model Class**.
4. Click the **Create** button.

Run the Model

For basic negotiation guidance, it is pretty straightforward to run a model. If needed, please refer to Usage to run exactly what you need.

In the end, you need to have one and only one *sigmoidal* elasticity defined for each pair of *product* and *cus tomer*. It is important to set the parameters in order to reach this goal. In particular, in the Configuration step:

- Define levels of segmentation that belong to the customers or products (not a date of purchase, for instance).
- Set the segmentation thresholds suitably for this goal.
- Set the elasticity model to *sigmoidal.*

Only the product-customer pairs with an elasticity will be used in the optimization model. To ensure that most of the product-customer pairs have an elasticity, you can do the following in the Configuration step:

- Increase the parameter value for **Min depth of leaves for elasticity calculation**, in particular, if your model has many segmentation levels.

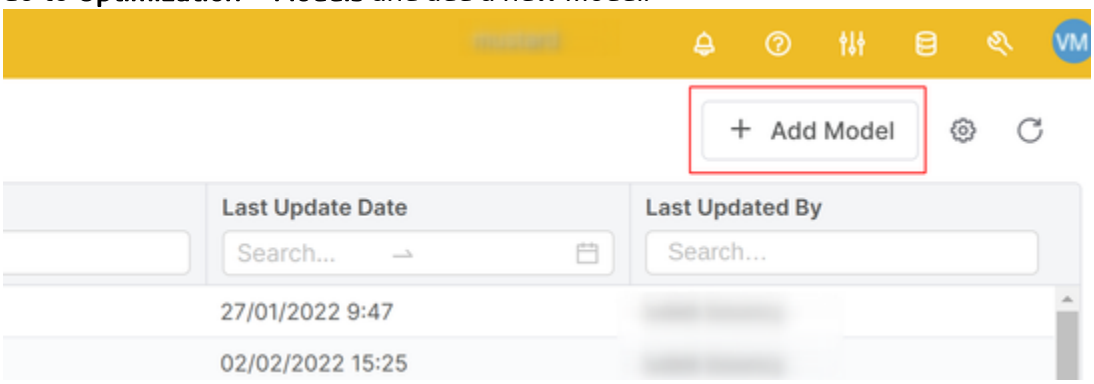
- Decrease the parameter for **Max #Transactions in segment for elasticity calculation**, in particular, if some of your leaves contain a lot of items.

Usage (Optimization - Price Waterfall)

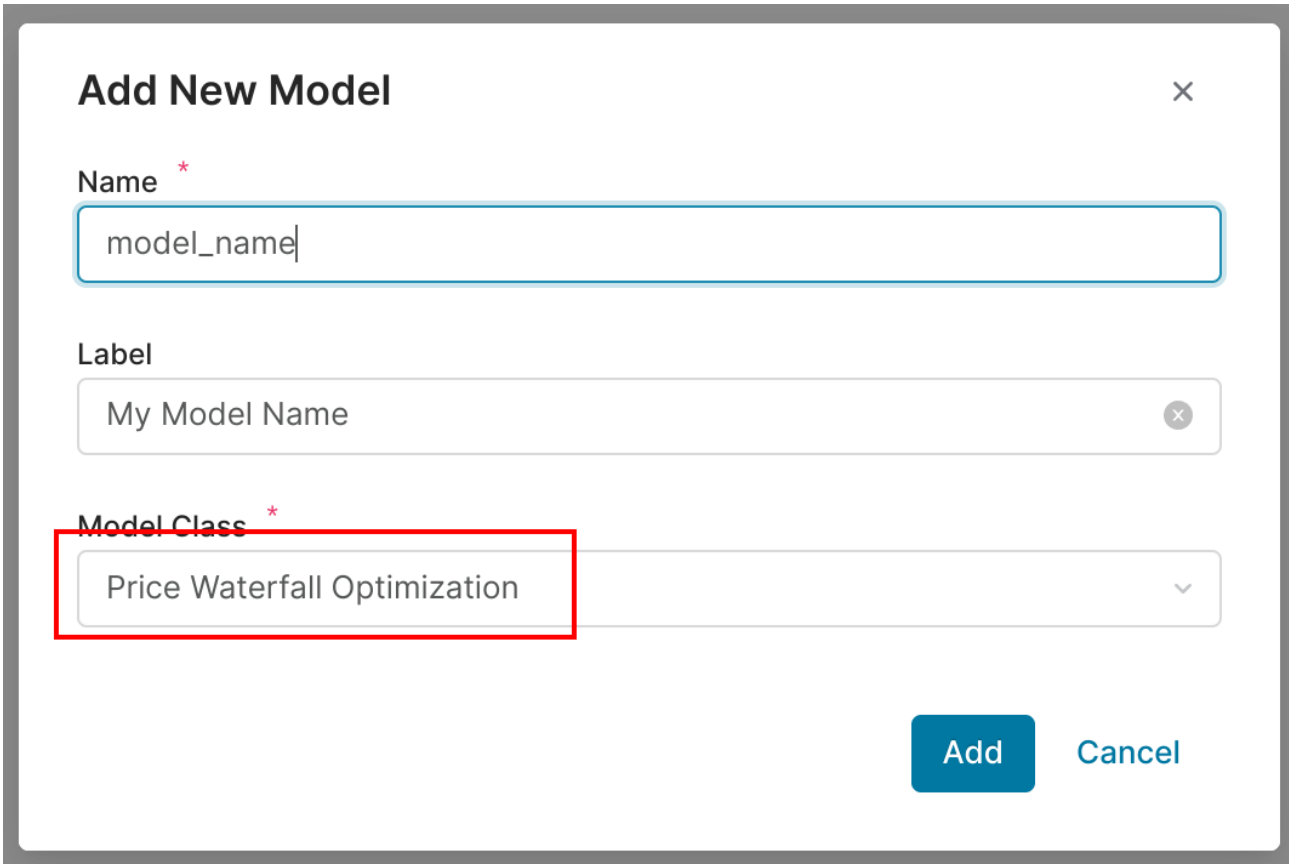
To run the Price Waterfall Optimization Accelerator, you need to create a new Model Object from the **Optimization** > **Models** menu, using the Optimization - Price Waterfall logic to instantiate the optimization model and give it the required parameters. The model will then be added to the list and will be editable.

New Model

1. Go to **Optimization** > **Models** and add a new model.

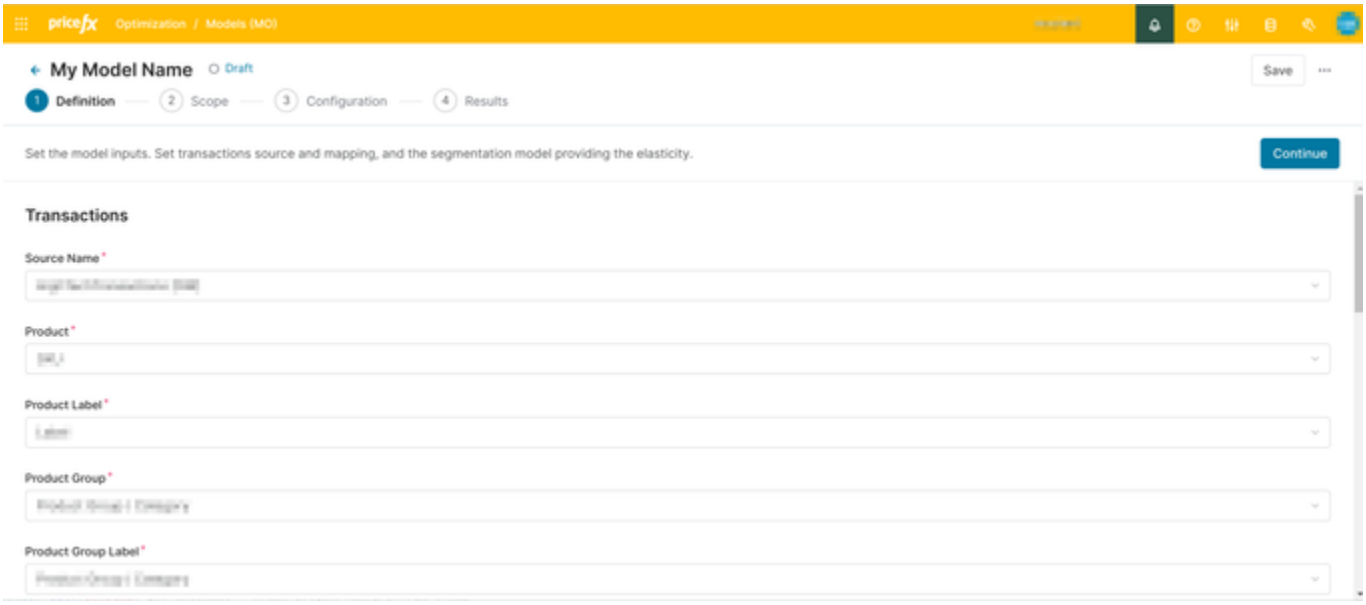


2. Define the name of the model and choose *Price Waterfall Optimization* as **Model Class**.



3. The new model opens. It is based on the data you defined when deploying the Accelerator.

The interface is:



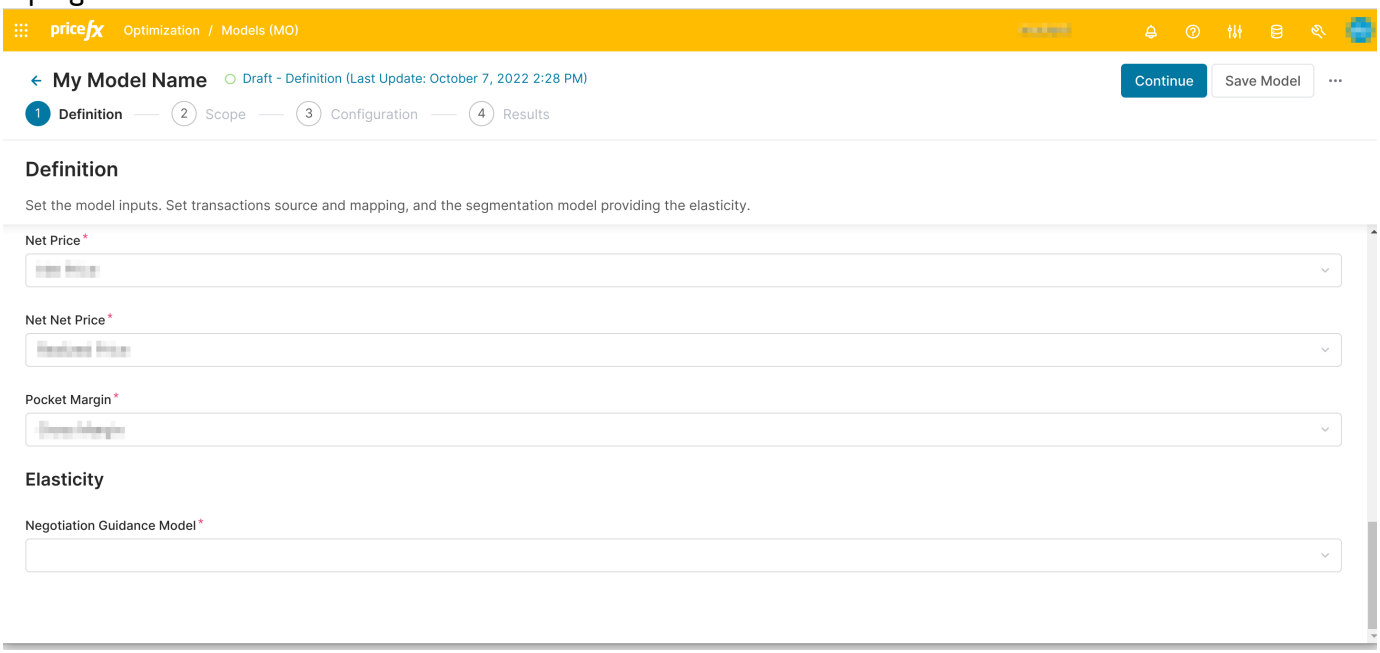
Definition, Scope, Configuration, and Results are the steps of the model and will be explained below. When you are in your model in the partition, you are always guided by the short description provided just below the name of the step.

Definition Step

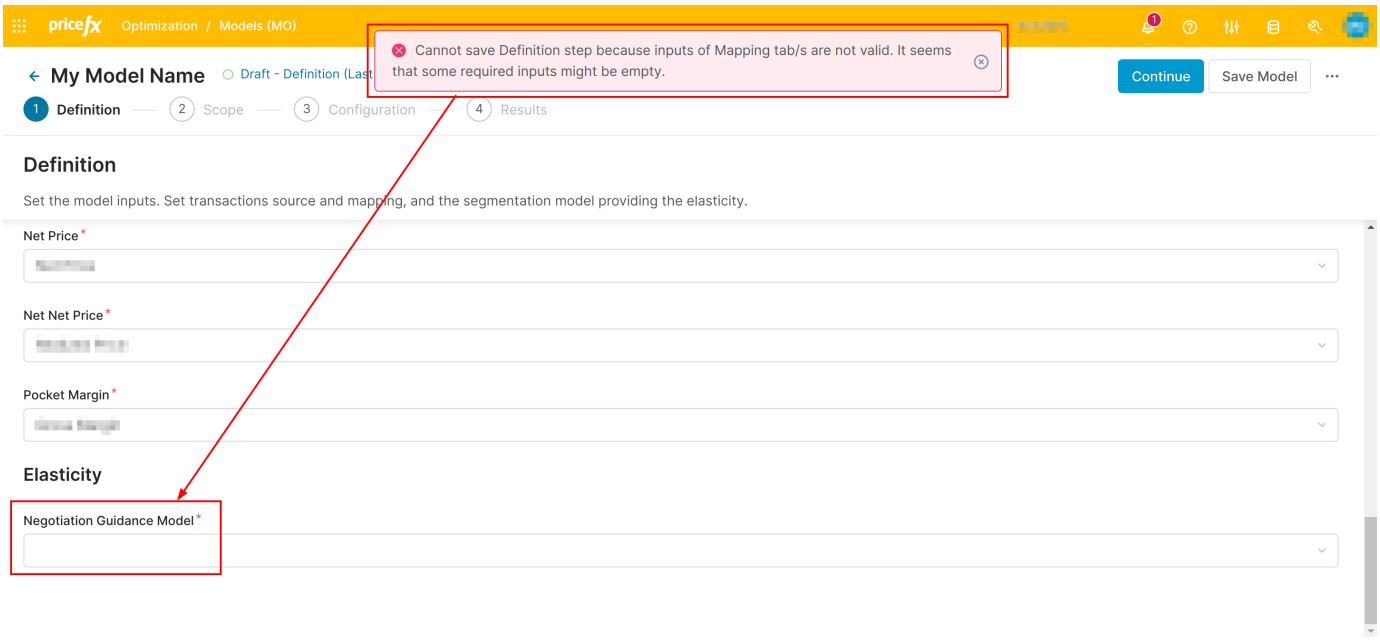
This is the first step of the model. When you open it for the first time, the user inputs of the first section, called *Transactions*, are prefilled with the default values. It is the mapping of the data. You can change it if needed. You can also apply a filter to your transactions, for instance, if you want to work with only a specific period of time.

The second section is called *Elasticity* and you define there the negotiation guidance model to use in the optimization (see Prepare Elasticity Model (Optimization - Price Waterfall)).
⚠ *Until version 1.0.x of this Accelerator: You can choose only a negotiation guidance model among those on the partition whose levels match the Customer Group and Product Group fields you mapped during the deployment. If no model meets the requirements, the interface will ask you to create and run such a model.*

When the Definition step is done, you can go to the Scope step. For this, use the Continue button at the top right.



If all required fields are not provided, there will be an error message.



The Continue button will automatically run the calculation that starts the next step. After the calculation, which can take a few minutes, you can access the Scope tabs.

Scope Step

The Continue button at the Definition step will automatically run the calculation that starts the Scope step. This calculation mainly performs the aggregation of the transactions by product and by customer which is used to perform the optimization itself. At the end of the calculation, the tab is available and there is a table called *Aggregated* in the model tables (accessible through the menu in the top right corner).

In the Scope step, you define which products and customers the optimization will apply to. This step works on already aggregated data, i.e. all the historical transactions have been aggregated by product and customer.

- **Included Customer Groups** and **Included Product Groups**: they rely on the customer group field and on the product group field which was defined during the Optimization Price Waterfall Accelerator deployment. If nothing is provided, there is no filter.
- **Customer Minimum Revenue**, **Customer Minimum Margin (%)**, **Product Minimum Revenue**, and **Product Minimum Margin (%)** are filters related to the global values.
- You can add as many custom filters as you want with **Data - Advanced Filters**.
  ⚠ Remember that these filters apply to the already aggregated data (at a customer x product level), only on the fields that exist in the Aggregated table. You can filter on any transactions field in the Definition step.

In the right panel, there is an overview of the data which will be taken into account in the optimization. In particular, if some product-customer pairs are not taken into account because of the lack of elasticity parameters, it is indicated. It is refreshed to reflect your filters when you click the **Apply Settings** button.

Note that data shown in portlets are limited to scope, while filters are applied on the Aggregated table level. It might result in counter-intuitive behavior of the Product list and Customer list portlets.

Configuration Step

The Continue button at the Scope step will automatically run the calculation that starts the Configuration step. After a calculation, which can take a few minutes, you can access the configuration tabs. The

calculation creates some model tables: Segmentation contains the elasticity values that will be used for each segment, and the Problem tables define the coordinates of the data for the Optimization Engine at different levels of granularity.

In the Configuration step, you define your optimization configuration.

- **Boundaries** tab defines how much you accept a change in the key variables of the model.
- **Business Alignments** tab defines optional alignments between products list prices.
- **Objectives** tab defines the business objectives of the optimization (see below).
- **Advanced Parameters** tab defines the parameters of the optimization run itself.

Boundaries Tab

These entries define how much you allow the model to change each row value.

- Specific Adjustments, Standard Discounts, Customer Discounts, Spot Discounts, and Off Invoice Discounts are percentage values. Their minimum and maximum values are defined in percent and their maximum variations in percent points. If the maximum decrease and the maximum increase of a variable are both set to zero, then the variable is defined as static in the optimization model. Otherwise, the minimum and maximum values are hard limits and the maximum variation values are used to set constraints to the variable.
- List Price and Invoice Price boundaries are defined by a relative change in percent from the historical values. The list price maximum variations apply for both global and specific list prices.
- Spot Discounts have also another input called *outliers convergence*. The third quartile of the spot discount rate is calculated for each pair of product and customer group. Then, all the values that are higher than their third quartile are moved closer to it by a percentage defined with the outliers convergence.

Business Alignments Tab

By default, there is no business alignment set in the optimization model. If you check the box *Create Alignment Criteria*, then you can create such alignments.

You need a table containing a list of similar products (Data Source or Datamart). Each row represents a pair of similar products. The table must contain the columns to map:

- The first product ID
- Its alignment attribute
- The second product ID
- Its alignment attribute

Such a table can be created with the accelerator Accelerate Product Similarity.

Once the mapping is defined, an input matrix is displayed, where you can set the optional minimum and maximum gap percentages by pairs of alignment attributes.

Global List Price Alignments

☑ Create Alignment Criteria

Products Pairs

Similar Products Table *

PowerTools SimilarProducts [DS]

Reference Product Id *

ProductID

Reference Product Alignment Attribute *

productBrand

Following Product Id *

CoProductID

Following Product Alignment Attribute *

CoProductBrand

Attribute Alignments

Products with "To" attribute will be positioned within the minimum and maximum range. If multiple rules apply, only the first one is used.

From	To	Minimum Gap (%)	Maximum Gap (%)
Super Power	Dark Force	10	20

For instance, in the example above, the products are compared by brand. For any pair of products present in the table *PowerTools SimilarProducts*, the product of the brand *Dark Force* should try to get an optimized global list price between 10% and 20% higher than the product of the brand *Super Power*.

- The product IDs in the *Similar Products Table* must correspond to the product IDs of the source data, given in the Definition step.
- The products that are not present both in the *Similar Products Table* and the *Source* table will not be taken into account.
- The minimum gap and maximum gap values are optional in each row of the *Attribute Alignments* table.
  - If no gap is provided, no alignment will be considered between the corresponding attributes.
  - If only a minimum gap is provided, the constraint will be to have a gap of at least the minimum value.
  - If only a maximum gap is provided, the constraint will be to have a gap of at most the maximum value.
- The gaps can be negative values.
- No transitivity is taken into account. If you define a minimum gap of 10% between attributes A and B, and 10% between B and C, you need to define also a minimum gap between A and C if you want to apply it.

- If you set a maximum gap lower than the minimum gap, it will be automatically fixed, the maximum gap will be increased to the minimum gap input.

Objectives Tab

- **Revenue/Margin Optimization** is a slider from 0 to 10. The objective of the model is to maximize a mix between global revenue and global margin (profit). If the input is 0, it will maximize the global revenue; if the input is 10, it will maximize the profit; intermediate values allow to mix and weigh these two goals.
- **Revenue** objective is to define a revenue target for selected customer groups. You need to add a customer group to the input matrix. Then the current revenue of the customer group is displayed. You can enter a variation percentage to define the target revenue of the customer group; this value is displayed in the Target Revenue column. You can also define different priorities (low, medium, high) for each customer group's revenue target objective. Only the customer groups in the input matrix have a revenue target objective. If you do not create any row in this input matrix, there is no revenue target objective in the model.
- **Volume** objective is to define a volume target for selected product groups. You need to add a product group to the input matrix. Then the current volume (sold quantity) of the product group is displayed. You can enter a variation percentage to define the target volume of the product group; this value is displayed in the Target Volume column. You can also define different priorities (low, medium, high) for each product group volume target objective. Only the product groups in the input matrix have a volume target objective. If you do not create any row in this input matrix, the model has no volume target objective.

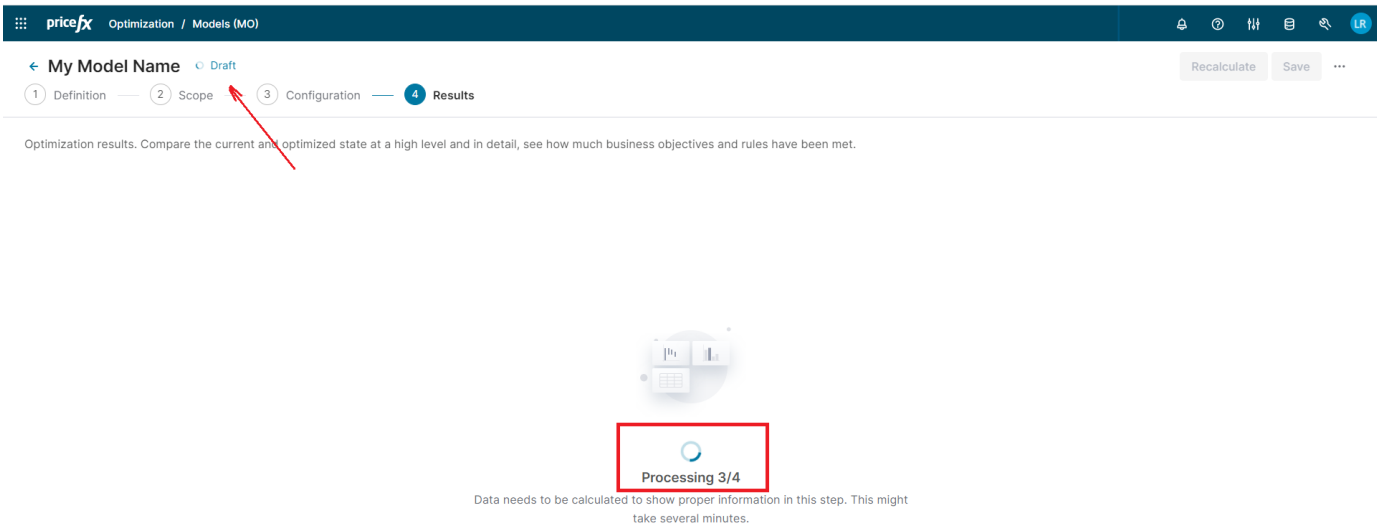
Advanced Parameters Tab

By default, the optimization will run a maximum of 500 steps, with no time limit and it will stop if it is stabilized. You can change the number of steps, in particular, if, after a run, the results logs show that the model was not stabilized yet. You can also set a maximum running time in minutes, or disable the stop when stabilized.

The Profiling checkbox can help you understand how the agents reach their optimum but it increases the need for memory and the optimization run time.

Results Step

When the Configuration step is done, you can go to the Result step, using the Continue button. It will first run the longest calculation of the model. This calculation is a sequence that you can follow in the job tracker:



Calculation run: to track the jobs click the blue text (arrow)

First, the model runs some preparations. Then, two Optimization Engines are launched, one named Simulation, which defines the initial state of the optimization, and one named Optimization which performs the real optimization. In the end, the postprocessing is run. The duration of the run depends mainly on the size of the input data in the scope and on the number of optimization steps.

Once the calculation has run, some other tables are available through the table link, but normally the user does not need to access them. If needed, go to Optimization Results (Optimization Engine) to understand what these tables are. The most important ones are the *Current* and *Optimized* tables that reflect the state of all the values before and after the optimization and have the same structure, and *Glassbox* tables that are used to dig into the way the Optimization Engine reached the optimized state.

The meaning of the *Current* results is explained in Current State (Optimization - Price Waterfall).

The Results step tabs are:

- **Impact** tab - Displays comparisons between the current state (before optimization) and the optimized one.
- **Details** tab - Displays tables that compare the current to the optimized values at different levels of granularity.
- **Glassbox** tab - Displays charts that provide the state of the values finders and the criteria at the end of the optimization. It is useful to understand how the model reached its optimized state.
- **Influencers** tab - Displays the relationships between a selected value finder and the interacting criteria.
- **Evaluation** tab - Displays the relevant optimized values for user inputs.

For more details see Results Description (Optimization - Price Waterfall).

Current State (Optimization - Price Waterfall)

The Results step starts with the optimization calculation. The optimization is a sequence that runs two different Optimization Engines and then post-processes the results, and displays them in the different tabs of the step. The runs are:

- An optimization, the run of the optimization itself. It creates the tables prefixed with `Optimized_`.
- A simulation which creates the tables prefixed with `Current_`.

Then the different dashboards display the comparison between the current state and the optimized ones.

What is the current state and why not use the `Aggregated` table?

The Current state is the result of a *simulation* of the Optimization Engine (which is different from an *optimization* of the Optimization Engine). It takes the problem description and does the following steps:

- Set the static variables and value finders to their initial value.
- Calculate the computed variables that can be calculated from the variables already set.
- Continue until all the variables are set.
- Do not take care of the criteria.

So it provides the initial state of the Optimization Engine. It is a consistent state which is not ensured for the `Aggregated` data.

What should be identical in the Aggregated and Current data?

The static variables and value finders are:

- Unit global list prices by product
- Specific adjustment rates by customer group
- Standard discount rates by product group and customer group
- Customer discount rates by product group and customer
- Spot discount rates by product and customer
- Unit surcharges by product and customer
- Off-invoice discount rates by product and customer
- Vendor rebates rates by product and customer
- Unit costs by product

At the end of the simulation, these variables are set to the values provided by the *Problem* tables. As the *Problem* tables rely on the *Aggregated* table, the values should be identical to the aggregated ones. These values can differ from the source values because of the aggregations. For instance: maybe the specific adjustment rates in the source data differ in a given customer group.

In practice, what could be different between the Aggregated and the Current data?

The other values are calculated from the previous ones:

- Quantities
- Unit specific list prices by product and customer group
- Unit invoice prices by product and customer
- Unit net prices by product and customer
- Unit net net prices by product and customer
- Unit margins by product and customer
- Revenues by customer group
- Quantities sold by product group
- Global revenue of the scope
- Global profit (margin) of the scope

Some differences may be due to:

- Mix of the granularities. For instance, the global list price depends on the product, and the specific adjustment rate depends on the customer group. But the specific list price which results in the specific

adjustment rate applied to the global list price not only depends on the product and the customer group, but also needs to be consistent for different products in the same customer group, or for different customer groups and the same product. The simulation takes this constraint into account.
- Use of another computed variable to calculate the given one. For instance: two successive steps of the waterfall. It can also be the case for the quantity: if the calculated margin rate is not equal to the source value, the elasticity model can be set on a different reference. It is taken into account in the accelerator and should not happen. However, a small change in the elasticity formula or the aggregation query can lead to large differences between the quantities provided by the source data and the ones outputted in the current state.

Results Description (Optimization - Price Waterfall)

Once a model has been run, the Results step contains fours tabs:

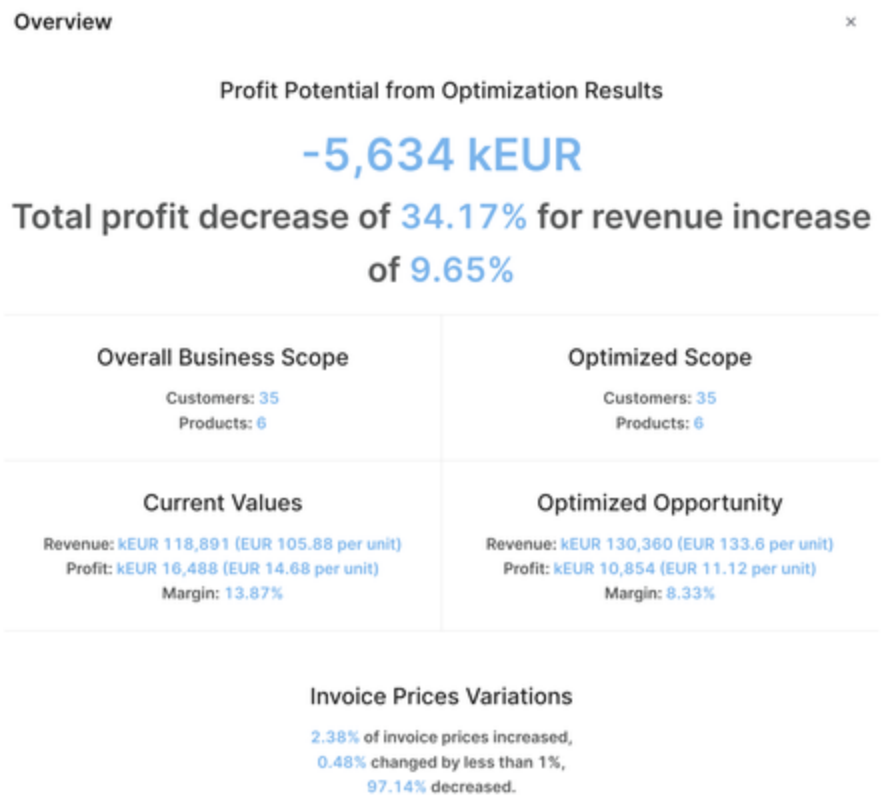
- Impact Tab
- Details Tab
- Glassbox Tab
- Influencers Tab
- Evaluation Tab

Impact Tab

This tab displays comparisons between projections with the current pricing and projections with the optimized one. So, be careful, the "current" charts represent the initial state of the Optimization Engine and not historical values from the past. They show what the Optimization Engine thinks would happen if the historical prices and discounts were kept as they are. There are eight portlets in the dashboard, described below.

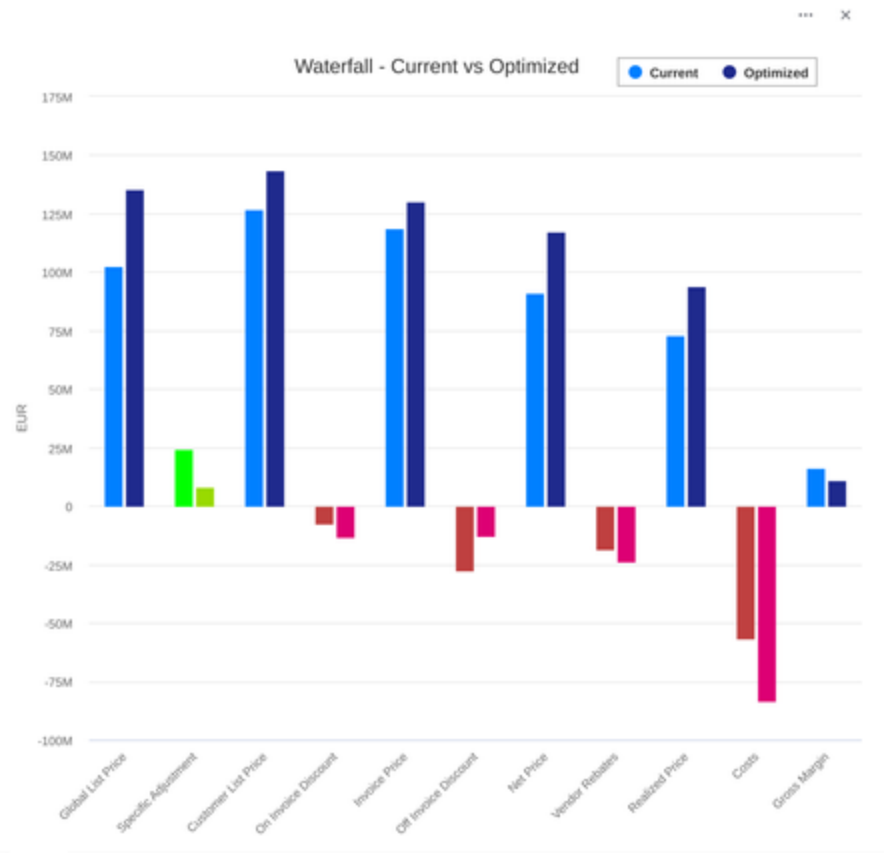
Overview

The overview provides a summary of the difference between the projections from current pricing and the projections from optimized pricing: global revenue and profit, but also the count of increased, stable, and decreased prices.



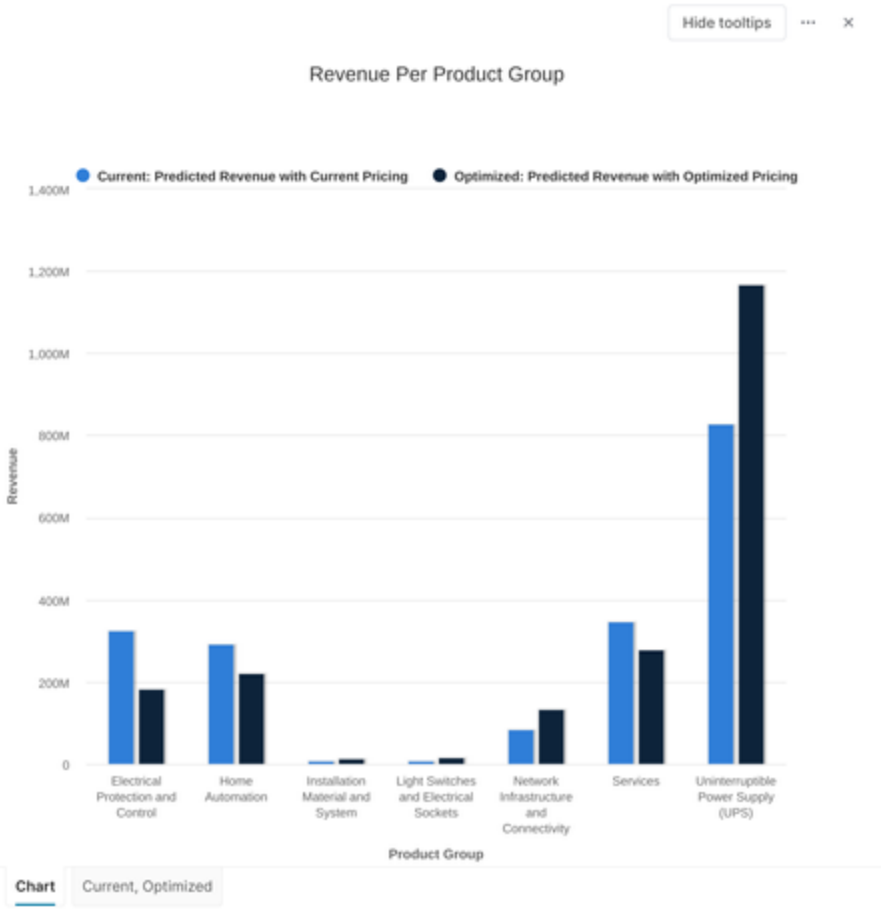
Waterfall

The waterfall displays both the current and the optimized waterfall (in parallel). All the values are extended ones, within the scope of the optimization. They are presented in a bar chart, hence negative values like discounts are below the X-axis.



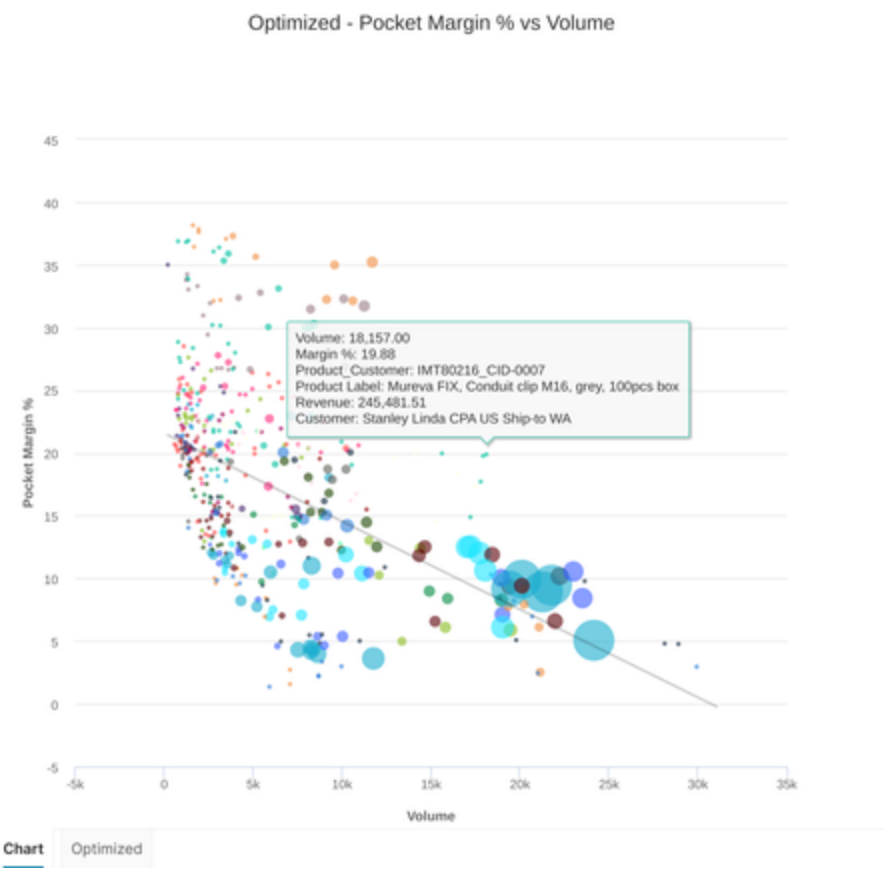
Revenue and Margin by Product and Customer Groups

These four portlets display the extended values of revenue and profit, aggregated by product and customer groups, to allow the end user to see where the optimization had more or less impact on the results.



Pocket Margin % vs. Volume

Two portlets display bubble charts, one with the current values and one with the optimized ones. Each bubble is a pair (product, customer). The size of the bubble is the revenue, the position of the bubble is the sold quantity on the X-axis, and the margin % on the Y-axis. A regression line shows the tendency. The color of the bubble of a given pair is the same in both portlets.

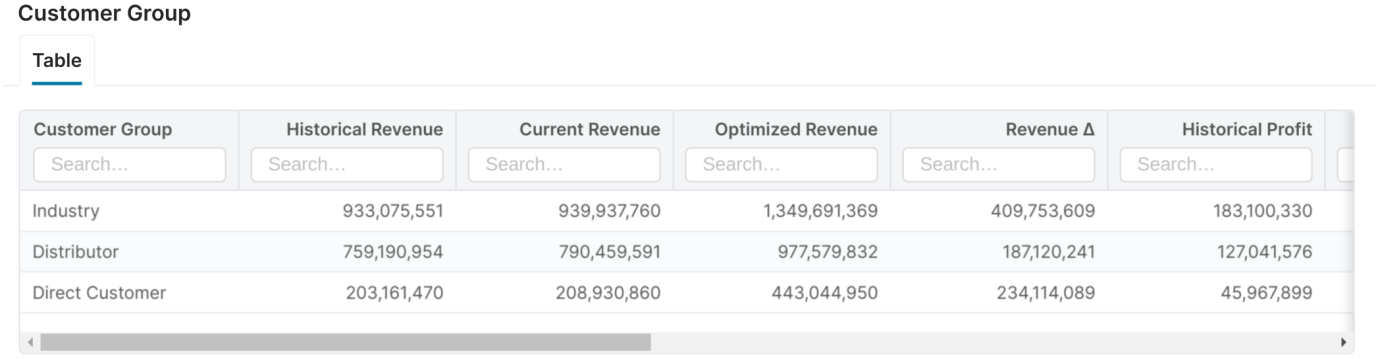


Details Tab

The Details tab displays the results tables in an easy way for the user to interact with. Different aggregations are provided: by product, by customer, by product and customer, and by customer group. Each table provides values for all the fields that *are calculated at this level of granularity*. The values provided are the historical, current, and optimized ones, plus the delta between the current and the optimized value. If needed, you can export these tables to Excel.

For the record:

- *historical* means the aggregated value coming from the source Datamart;
- *current* means the initial state of the Optimization Engine;
- *optimized* means the final state of the Optimization Engine.



Glassbox Tab

This tab's target audience is Configuration Engineers, Business Analysts, and team members working on improving a new optimization model. The tab provides insights to understand how the Optimization Engine reached its final state. One needs to understand the main concepts of the Optimization Engine to benefit from this dashboard. Two interesting pages to help users are Glossary (Optimization Engine) and E xplainability (Glassbox).

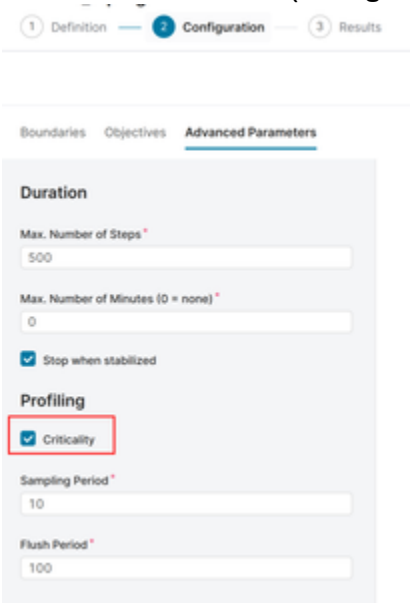
There are the following portlets in this dashboard:

- three portlets about criteria satisfaction (Satisfaction, Criteria Comparion, and Satisfaction by Criteria Type),
- two bar charts about the interactions between value finders and criteria (Impact vs. Satisfaction and Impact vs. Influence),
- two bubble charts about the value finders' influences and the criteria impacts,
- two boxplot charts about the value finders' variations and two others about the initial movements of the value finders,
- a portlet comparing satisfaction of criteria between the current and optimized scenarios (in form of a Sankey chart),
- and optionally a chart of the evolution of the criteria agents during the optimization process.

A full documentation of the Glassbox charts is available in Glassbox Dashboards.

Set the Evolution of Criteria Satisfaction Option

As it involves a large amount of data, the last portlet is only created if the "Profiling" option in the Advanced Parameters (Configuration step) is checked.



Influencers Tab

This tab's target audience is Configuration Engineers, Business Analysts, and team members working on improving a new optimization model. One needs to understand the main concepts of the Optimization Engine to benefit from this dashboard.

The user is able to select a value finder, know its dimensions coordinates. The chart displays information about the criteria in relationship with the selected value finder. The complete documentation is in Value Finder - Criterion Influence.

Evaluation Tab

This tab simulates the evaluation logic that can be called from any other module. One portlet represents one visible element of the logic. The query that can be done from any other module of the partition is:

```
api.model("myModelName").evaluate(
  "query_results",
  [
    product: "myProductId",
    customer: "myCustomerId",
    product_group: "myProductGroup",
    customer_group: "myCustomerGroup"
  ]
)
```

Any of the second parameter keys are optional. The outputs depend on the provided keys. See the details.

Admin User Reference (Optimization - Price Waterfall)

Installation (Optimization - Price Waterfall)

Price Waterfall Optimization Accelerator deploys a standard *Price_Waterfall* Model Class that optimizes the elements of a standard waterfall.

In this section, you will find all information to deploy and run a standard waterfall optimization. More details on data mapping, elasticity model creation, and optimization results evaluation are given on the sub-pages.

Prerequisites

Before you start the installation of the Accelerator, ensure you have a **transactions Datamart**. The Accelerator deployment requires fields mapping to define the price waterfall levels. You need a transactions Datamart with all required waterfall fields. For details see Data Mapping (Optimization - Price Waterfall).

To use the Accelerator, you will need:

- **Negotiation Guidance Model** - To create and run an optimization model, you need to generate a Negotiation Guidance Model which will provide the price elasticities of the waterfall elements. To run a Negotiation Guidance Model, see Prepare Elasticity Model (Optimization - Price Waterfall). To learn how

to ensure compatibility between the Negotiation Guidance Model and the price waterfall optimization, see the next paragraph.

- **Optimization Engine (Image)** – To run an optimization model, your partition needs to be allowed to use the Optimization Engine. The Optimization Engine image is automatically enabled on the partition when you deploy the accelerator using PlatformManager, with 2 CPUs and 4Gi memory. Please contact Pricefx Support if you want to increase these values.
- **Pricefx Hurricane 9.2.0 or later** – The Accelerator can only be deployed on a partition with at least Hurricane 9.2.0 version of Pricefx.

Version Compatibility

There are some specific compatibility limits to be aware of. They depend on the accelerator version.

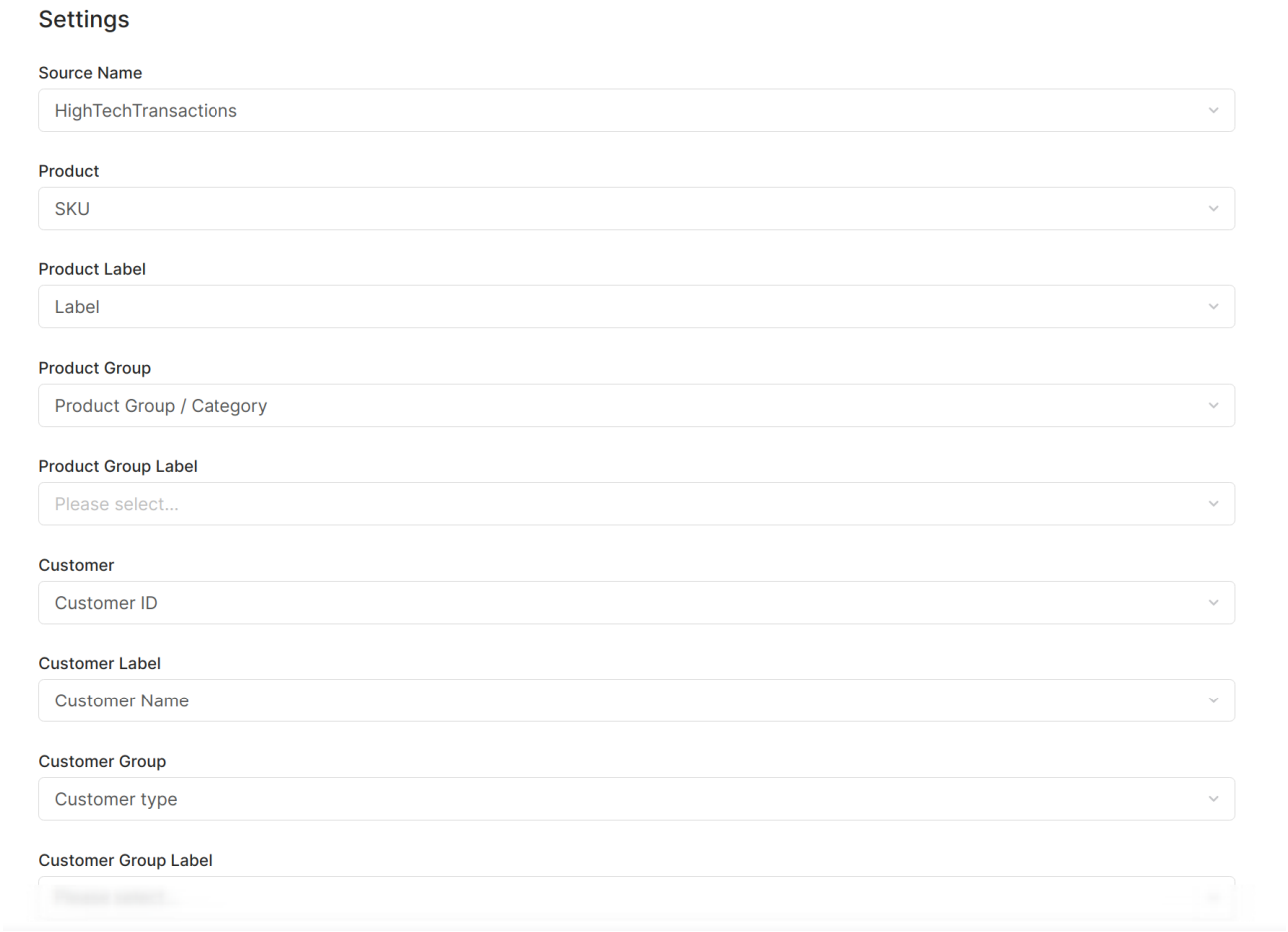
Optimization Price Waterfall Accelerator Version	Pricefx Platform	Associated Negotiation Guidance Model
1.0.1 and before	Minimum 9.2.0 Hurricane	The model must meet these requirements: • It is based on a Model Type (Price Optimization Package Accelerator, any version). • It is of the kind Segmentation. • It has calculated elasticity. • If the user can choose the elasticity function, the choice must be *Exponential* (for the oldest versions, it is the only available elasticity function). • The first two levels of segmentation must be the customer group and the product group fields of the Optimization Price Waterfall model (in any order).

1.1	Minimum 10.0 Bee's Knees	The model must meet these requirements:
		• It is based on a Model Class (Optimization – Negotiation Guidance Accelerator).
		• It has calculated elasticity.
		• The elasticity function must be of the type *Sigmoidal*.
		• The segmentation levels have to be of type string/text.
		• Negotiation Guidance accelerator version:
		  • < 2.0: no restriction
		  • from 2.0: the segmentation fields must have the exact same labels and names

Since 1.2	Minimum 10.4 Bee's Knees	The model must meet these requirements: • It is based on a Model Class whose name contains `Negotiation_Guidance` Accelerator). • It has a calculated sigmoidal elasticity for all the product-customer pairs in the scope of optimization. • No restriction on the NG version

Deployment

1. Get access to PlatformManager and target partition, as described in common installation prerequisites.
2. Go to PlatformManager at https://platform.pricefx.com/ and log in.
3. Go to **Marketplace** and find the *Optimization - Price Waterfall* accelerator.
4. Click the accelerator tile, select the partition where you want to deploy the accelerator package and confirm the deployment dialog to start.
   For detailed description of all deployment options, see PlatformManager documentation.
5. Set up Datamart mapping.



   - Some rules apply in the mapping:
     - Labels are not mandatory. If not filled, a related name field will be used.
     - Product Group and Customer Group fields must *match the segmentation model* used by the optimization.
     - Numerical Datamart fields must be configured as *extended*.
   - More details, particularly if your waterfall does not match the standard Accelerator one, are in Data Mapping (Optimization - Price Waterfall).
6. Click **Continue** and wait until the deployment is complete.

Data Mapping (Optimization - Price Waterfall)

This section details how to create the data structure needed if you want to use the Optimization - Price Waterfall Accelerator and how to configure it during the deployment.

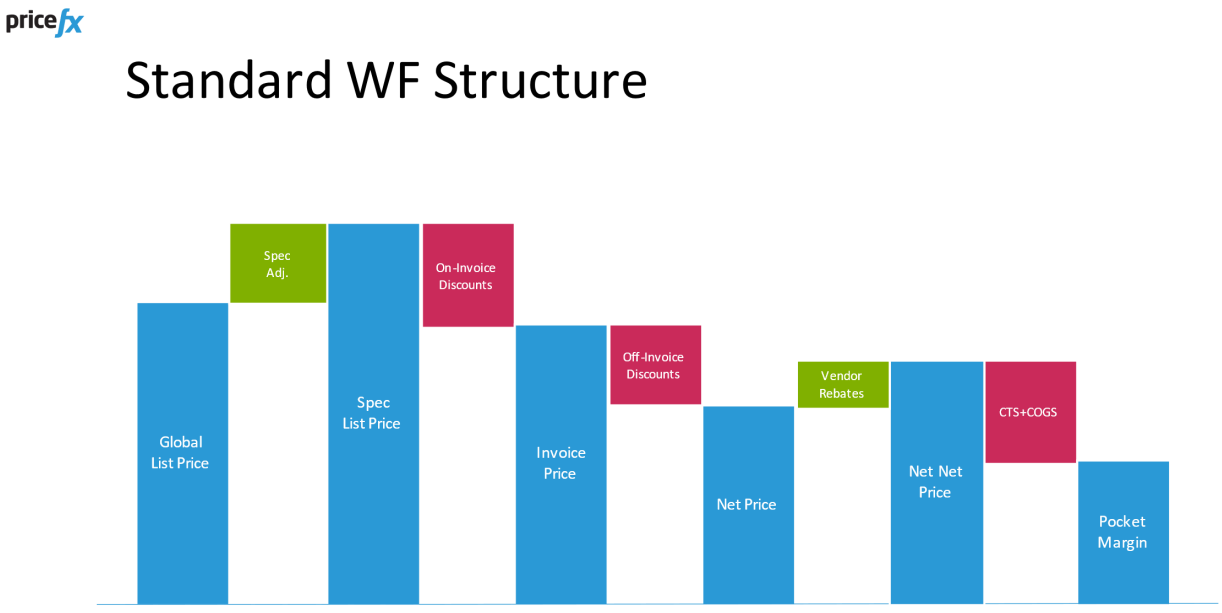
Objectives of Data Mapping

By default, the Accelerator generates an "aggregation" table containing data in a format understood out-of-the-box by the deployed logics. For this, the Accelerator needs to have the raw transactions lines available in a Datamart. Then, the Accelerator will ask for a mapping between the fields of the transactions Datamart and the ones that will be used in the Accelerator.

This approach ensures that the expected fields are correctly aggregated and that their names are compatible with the deployed logics.

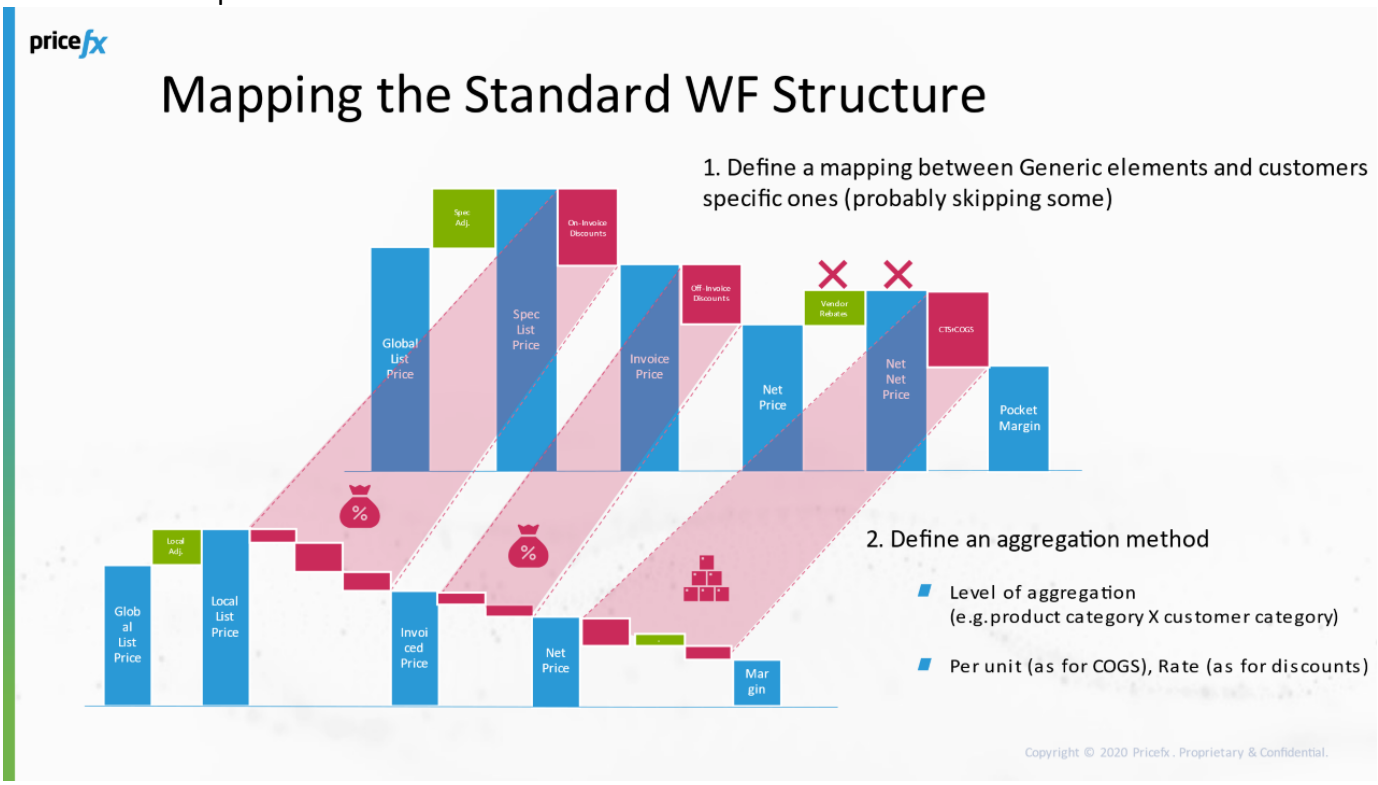
Standardized Waterfall

To be as fast and generic as possible, a standardized waterfall is built into the Accelerator and is designed to cover most of the customer needs. This waterfall looks like this:



A key part of the setup is mapping the actual customer waterfall columns to this standard one. This could mean that some of the elements of the customer waterfall will be aggregated within a single element of the standard waterfall and that some elements may not be used at all.

Illustrative example:



As a result:

- Customers need to be aware of the fact that the **results will not reflect their exact waterfall**.
- We can standardize most things – mainly the way we consume results (Optimization Realization Dashboards, Price Setting, Agreements & Promotions, etc.).

What to Map and How

The prerequisite to the Accelerator deployment is the availability of a Datamart containing the transaction data and the fields listed below. You may need to create such a Datamart if the existing data are not directly available or integrate information from several distinct sources (e.g. Master Data + Data Source + Price Extension).

Transactions Datamart Prerequisites

- The transaction source must contain the following fields (create them if needed):
  - **Product** field – ID of each product. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it.
  - **Product Group** field – ID of each product group. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it. Must be defined as a dimension.
    - It must be a segmentation level of the segmentation model you will use in the optimization.
  - **Customer** field – ID of each customer. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it.
  - **Customer Group** field – ID of each customer group. Be careful: it cannot be a source key. If it is, duplicate the field to be able to access it. It must be defined as a dimension.
    - It must be a segmentation level of the segmentation model you will use in the optimization.
  - **Quantity** field – Number of products in each transaction.
  - **Global List Price** field – Global list price in each transaction (extended to quantity, Optimization Price Waterfall Accelerator does not expect unit prices). It is a price defined at a product level.

- **Specific List Price** field – extended to quantity. List price after applying a specific adjustment (defined at the level of the customer group) to the global list price in each transaction. If it doesn't exist in your waterfall, you can map it with the Global List Price field again.
- **Invoice Price** field - extended to quantity. It is the price after applying the on-invoice discount (defined at the customer level) to the specific list price in each transaction. If it doesn't exist in your waterfall, you can map it with the Specific List Price field again.
- **Net price** field – Price after applying an off-invoice discount to the invoice price in each transaction (extended to quantity, Optimization Price Waterfall Accelerator does not expect unit prices). If it doesn't exist in your waterfall, you can map it with the Invoice Price field again.
- **Net net price** field – Price after applying a vendor rebates to the net price in each transaction (extended to quantity, Optimization Price Waterfall Accelerator does not expect unit prices). If it doesn't exist in your waterfall, you can map it with the Net Price field again.
- **Pocket Margin** field - extended to quantity. The master unit cost of each product will be inferred from Pocket Margin, Net Net Price, and Quantity.

- **Avoid null values** in the first level of segmentation used to calculate the elasticities, because the corresponding transaction rows will be ignored by the elasticity model and will cause an error in Optimization Price Waterfall models. If necessary, create a new field by using an expression that replaces empty values with a text (e.g., "Not provided").

There are also some label fields asked during the mapping. If not provided, the model will use the corresponding id field (product field for the product label field, and so on.)

Dealing with Missing Fields

In some cases, you will want to instantiate a waterfall without all of the discounts. However, the fields are still required by the Accelerator to do its mapping, meaning that it will expect values you cannot give from a Data Source as they are not available in your problem. In this case, you can simply provide the same fields several times to simulate two sequential values separated by a discount of 0.

Example:

In this example, the column of the Datamart “Invoice Price” is used twice to compensate a missing “Net Price”. The “Net net price” exists and the discount between it and the “Net Price” will be computed with the “Invoice Price” instead. The discount between the column “Invoice Price” and “Net Price” will always be 0, as they refer to the same value.

Architecture Components (Optimization - Price Waterfall)

The Optimization - Price Waterfall Accelerator has its own components and also depends on another accelerator. Make sure you review these components and dependencies before the installation.

> This page contains only a components list. For detailed description of the components, see Technical User Reference (Optimization - Price Waterfall).

Dependencies

This accelerator depends on other accelerators whose components will be deployed during the installation too.

- poai-accelerator-library (see below)
- dashboard-accelerator-library

Accelerator Components

The Optimization Price Waterfall Accelerator consists of following components, which will be deployed to your partition:

Advanced Properties

- **poai-accelerator-settings** - Contains mapping of Datamart fields made by admin during the installation process.

Model Class

- Price_Waterfall

Calculation Logic

- PW_1_Def_Eval_Mapping_Configurator
- PW_2_Sco_Calc_Wrangling
- PW_2_Sco_Eval_Scope
- PW_2_Sco_Eval_Scope_Configurator
- PW_3_Conf_Calc_FilterScope
- PW_3_Conf_Eval_Boundaries_Configurator
- PW_3_Conf_Eval_Objectives_Configurator
- PW_3_Conf_Eval_AdvancedParameters_Configurator
- PW_4_Res_Calc_RunOptimization
- PW_4_Res_Calc_PrepareResults
- PW_4_Res_Eval_Impact
- PW_4_Res_Eval_Details
- PW_4_Res_Eval_Glassbox
- PW_4_Res_Eval_Query

Groovy Library Logics

- PW_InternalLibrary

poai-accelerator-library

This library is not provided as a standalone package in PlatformManager Marketplace, it is included during deployment of this Optimization - Price Waterfall Accelerator.

Groovy Library Logics

- PW_Library

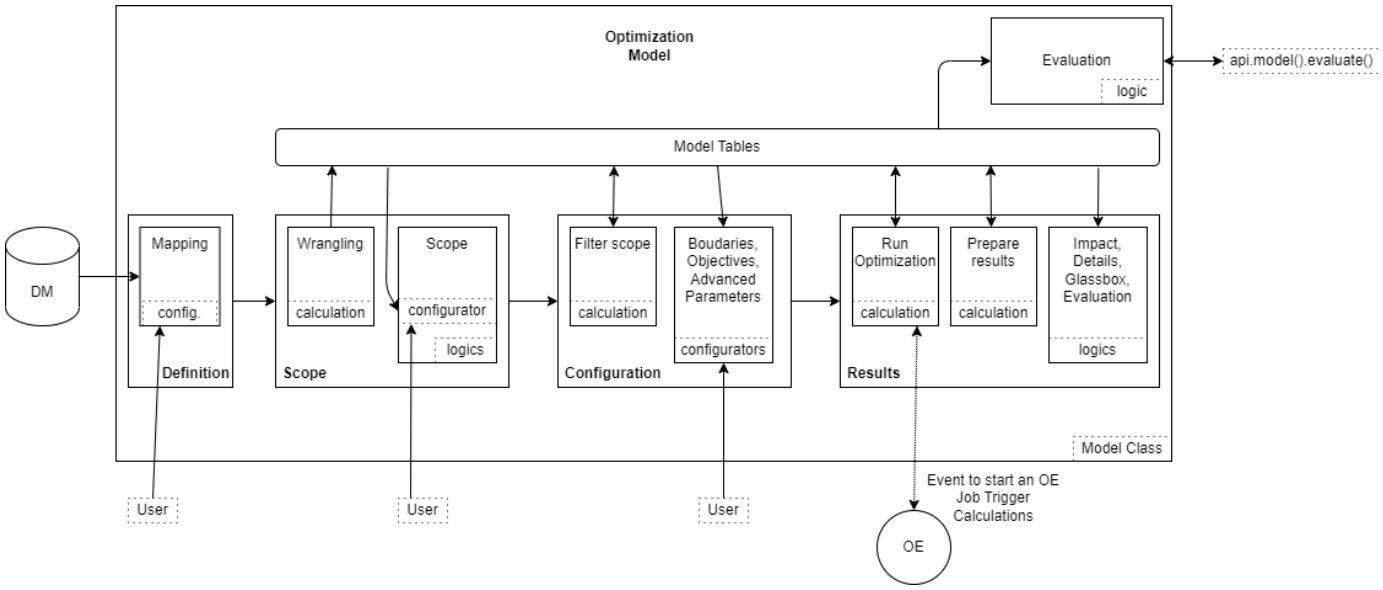
Technical User Reference (Optimization - Price Waterfall)

This section details the Model Class and the logics that the Price Waterfall Optimization Accelerator deploys. For each step, its aim, its outputs, and the main reasons to modify the logics are explained. If there is a need to modify the logics, refer to the process in Optimization Price Waterfall Accelerator Customization and to documentation in Problem Modeling (Optimization Engine), Problem Description, and Problem Tables (Optimization Engine).

In this section:

Price_Waterfall ModelClass

Optimization Price Waterfall Model Class organizes a list of logics to create the model architecture. It is transformed into an optimized UI in the Pricefx platform. The general architecture is:



There are two types of logics: `calculation`, which writes tables in the model, and `evaluation`, whose purpose is only to display some results. The standard Model Class definition is documented in Model Class (MC).

All the logics of the Optimization Price Waterfall Accelerator follow a standard naming convention: first *PW_* prefix, then the number of the step and the first letters of its name, then *Calc* or *Eval*, depending on the formula nature, then the name of the tab. In the end, there are two library logics named PW_Library and PW_InternalLibrary.

Libraries

The logics are **PW_Library** and **PW_InternalLibrary**.

- Aim of the logics

  PW_Library is used in nearly all the other logics deployed by the Accelerator and defines a set of generic OE-related functions to facilitate the model's tables reading and writing and to deal with parameter definition in the UI. It is accessed via the calls on `libs.PW_Library.XXX` in the code. *It is preferable to keep this code unmodified* to facilitate the maintenance and readability of the project.

  PW_InternalLibrary contains some functions needed specifically for this Accelerator, such as reading its configuration from the application settings, applying the user filters in each part of the model, preprocessing the data for the charts, and many small helpers for the charts rendering.

- Common reasons to modify the logics

  If a specific function is needed for the project, it should be added in *PW_InternalLibrary*. It will be accessed then via `libs.PW_InternalLibrary.XXX` in the code.

Definition Step

There is no calculation logic run in this step. The tab is **Mapping** and its related logic is `PW_1_Def_Eval_Mapping_Configurator`.

Mapping Tab

The logic is **PW_1_Def_Eval_Mapping_Configurator**.

- Aim of the logic
  When users deploy the accelerator, they define the Data Source and the mapping of the entries. But in some cases, they could want to change the source or the mapping for some models. This tab displays the Datamart source and the mapping deployed by the accelerator and allows the user to change it. It is also the place where the model for elasticity is defined.
- Outputs of the evaluation
  It declares the mapping of fields to be used in the model.
- Common reasons to modify the logic
  If the optimization model needs fewer or more fields than the ones which are preset by the accelerator, then it is the place to update the mapping.

  You can also remove the *Elasticity* user input if no elasticity is used in the optimization.

Scope Step

The calculation logic is **PW_2_Sco_Calc_Aggregating** and there is one tab called **Scope**.

Calculation: Aggregating

The logic is **PW_2_Sco_Calc_Aggregating**.

- Aim of the logic
  This logic aggregates the transaction Datamart, which was confirmed or changed in the previous step. The optimization is *done at a product x customer level*, not at the transaction level.
- Outputs of the calculation
  A Datamart table called *Aggregated* is created in the model. It is a product x customer Datamart. This is the main connection to external data.
- Common reasons to modify the logic
  This calculation is the main connection to the external data and most often requires to be modified to accommodate the specifics of the customer data, such as mandatory filters. If the waterfall structure is not the standard one, maybe some columns should be added to the Aggregated table. In this case, you may also change the user inputs to define this mapping, too (see https://pricefx.atlassian.net/wiki/spaces/ACCDEV/pages/3850928345#Mapping-Tab).

  The Aggregated table is a result of an aggregation. In some cases, the aggregation can change; for example to replace an average with a median.

Scope Tab

The logic are **PW_2_Sco_Eval_Scope** and **PW_2_Sco_Eval_Scope_Configurator**. An evaluation logic that takes the user inputs and displays also a dashboard needs a corresponding configurator, called in the first element.

- Aim of the logics
  This logic lets the end user choose the filters to scope the optimization, through the configurator *PW_2_Sco_Eval_Scope_Configurator*. It means, for example, creating a model with a scope filtered on a product group or a set of customers. On the right, it displays some charts to evaluate how the scope is defined.
- Outputs of the evaluation
  A map of filters which are called later in the code by `model.inputs('definition', 'scope').Scope`.

A dashboard with information, charts, and tables that summarize the scope taken into account according to the user filters.

- Common reasons to modify the logics
  The main reason to modify these logics is to retrieve data from other sources (PX, DS, DM...) or with different filters. The filtering options that we expose to the user are modified here.

Configuration Step

Calculation: Filtering

The logic is **PW_3_Conf_Calc_FilterScope**.

- Aim of the logic
  The goal of this calculation is to transform the Aggregated table into a collection of tables stored in the model and to present the data efficiently for the Optimization Engine. It involves mainly SQL requests, used with Pricefx API functions, as well as shortcut functions to filter the data and read the Accelerator settings from the library PW_InternalLibrary. This step also extracts the elasticities from the Segmentation Model in a table.

- Outputs of the calculation
  This step writes a collection of tables; the most important ones are:

  - Segmentation table - Produced from the selected Segmentation model.
  - Problem_nameOfTheSpace_nameOfTheScope tables - Data manipulation to prepare the last tables needed by the Optimization Engine. These logics are prefixed by "Store_" and create the model tables that act as an endpoint for the Optimization Engine. Be careful, *their names follow a strict format*. Only the problem tables that do not contain user input values, like objective and constraints, are created here. The other ones are created during the RunOptimization calculation.

- Common reasons to modify the logic
  The complexity of the data preparation needed in this step depends on the problem to solve. The main reason to modify this logic is to expose different Problem tables to the Optimization Engine if some spaces or some scopes are changed in the problem.

Boundaries, Business Alignments, and Objectives Tabs

The logics are **PW_3_Conf_Eval_Boundaries_Configurator**, **PW_3_Conf_Eval_BusinessAlignments_Configurator**, and **PW_3_Conf_Eval_Objectives_Configurator**.

- Aim of the logics
  These tabs are used to retrieve the user objectives and as such, are configurators. They contain all the information needed to guide the optimization process by setting the constraints and the goals to reach. The separation into two tabs is mainly for UI purposes.

- Outputs of the evaluation
  The user inputs are stored to be aggregated in the following steps with the rest of the data. In general, it means computing some target and threshold values at different levels of granularity.

- Common reasons to modify the logics
  It is quite common to change these logics by adding or modifying the constraints and objectives in the problem; for example, adding targets at some levels or setting thresholds to keep some values in check. These modifications are *needed but not sufficient* as the problem modeling itself must be changed to take them into account. It is possible to change the number of tabs where these objectives and constraints are defined, but then the Model Class definition has to be modified too.

Advanced Parameters Tab

The logic is **PW_3_Conf_Eval_AdvancedParameters_Configurator**.

- Aim of the logics

  This tab is used to retrieve the optimization run parameters and as such, is a configurator.

- Outputs of the evaluation

  The user inputs are stored to be used in the RunOptimization calculation. The most important values are the following three that define when the Optimization Engine will stop:

  - **Max. Number Of Steps** - For how long, in a number of steps, the optimization will run before considering it has reached a "good" state. The default value should be enough, but remember that this value can be increased if the optimization logs many values as "still converging".
  - **Max. Number of Minutes** - For how long, in a number of minutes, the optimization will run before considering it has reached a "good" state. The default value is 0 (= no limit), but for some large models it may be useful to define a default limit;
  - **Stop when stabilized** - Allows an early stop if the model is stabilized.

  There is also a Profiling group of parameters but it is more for a development purpose.

- Common reasons to modify the logics

  The most common reason to change the logic is to set different default values. All the outputs of this logic are used in the PW_4_Res_Calc_RunOptimization logic.

Results Step

Calculation: RunOptimization and PrepareResults

The logics are **PW_4_Res_Calc_RunOptimization** and **PW_4_Res_Calc_PrepareResults** and they are run in this order.

RunOptimization Calculation

- Aim of the logic

  The goal of this calculation is to create a simulation and an optimization run and retrieve their results. To do so, we need to create a Problem Description that details the structure of the problem to solve by the Optimization Engine and to give endpoints for the OE to get the data of the problem. The previous steps will change the problem by altering its scope and changing the objectives, and the data will be fed directly to the OE thanks to the model tables.

  This step consists of:

  - **Data manipulation** to prepare the last tables needed by the OE. These logics are prefixed by *Store_* and create the model tables prefixed by *Problem_* that act as an endpoint for the OE. Be careful, *their names follow a strict format*: These endpoints must be named according to the `Problem_nameOfTheSpace_nameOfTheScope` present in the *ProblemDescription.groovy* and return the corresponding data. The behavior of the OE and its way of reading data from endpoints highlight the need for a well-thought-out Scope step. Creating tables of the needed data, already computed and aggregated, implies being well aware of "where is the data I need" and "how do I need to transform it". Due to computations depending on user inputs from business rules and objectives, some tables have to be created in later steps, explaining why even the RunOptimization calculation can have some *store* logics. That is why it is normal to refactor and improve scope logics and the other store logics during the development of *ProblemDescription.groovy*.

- **ProblemDescription.groovy** element - Returns the problem description in a map. The content of the problem description is detailed in Problem Description.
- **GlassboxConfig.groovy** element - Parses the problem description to automate the post-processing.
- **Run.groovy** element - Contains the code that handles the problem description. It takes the description of the problem and the advanced parameters user inputs, and triggers the two optimization jobs thanks to `model.startJobTriggerCalculation`. Each run will return prefixed tables of similar structures. The jobs will run in parallel. The first one is the optimization itself and its outputs are prefixed by "*Optimized*". The second one is a simulation: it simulates the first state of the optimization and will be a reference to compare before/after values in the results dashboards. Its outputs are prefixed by "*Current*". The job type (optimization vs. simulation) is indicated by the input parameters of the `model.startJobTriggerCalculation` function.

Once the problem description is created, it is sent via a Kafka message to trigger the instantiation of a job running an OE configured by this file. The OE has to have access to the correct endpoints to get the data and to know where to write back the results when the computation is finished.

Outputs of the calculation

The Groovy code does some preparation work. It creates Problem_nameOfTheSpace_nameOfTheScope tables - data manipulation to prepare the last tables needed by the OE. These logics are prefixed by "Store_" and create the model tables that act as an endpoint for the OE. Be careful, *their names follow a strict format*. Only the problem tables that contain user input values, such as objectives and constraints, are created here. The other ones are created during the PW_3_Conf_Calc_FilterScope calculation.

A Groovy element also reads the problem description to retrieve a list of parameters used during the postprocessing step to reformat the Glassbox data.

At the end of its run, the OE will write a set of model tables containing its results and the Glassbox information needed to understand why this solution was used. This writing is done directly by the OE and is *not related to a Groovy logic*. This job is done by the two OE jobs, the simulation one and the optimization one.

- The Glassbox table provides optimization indicators for each pair of instantiated value finder - criterion. The simulation job does not create any Glassbox table.
- The tables prefixed by *Results_* present the state of the objectives and constraints at the end of the optimization.
- The tables prefixed by *Solution_* present the raw values that the system was *meant to find* (declared as Value_Finder in the Problem Description). The simulation job does not create any Solution table.
- The tables prefixed by *Simulation_* present the value of computed variables marked as exposed in the description, typically including *values of interest* such as forecasted quantities.

Common reasons to modify the logic

Any modification of the problem modeling and type of constraints to apply or objectives to reach implies a modification of the Problem Description, thus *ProblemDescription.groovy* should change accordingly.

⚠ If the problem description changes, do not forget to check if it is necessary to change or create some Problem tables, either in the Configuration step, PW_3_Conf_Calc_FilterScope logic, or here in the Results step, PW_4_Res_Calc_RunOptimization logic.

In some cases, it could be useful to change the OE image and/or the OE tag that the job trigger refers to. Their values are in the element *Run.groovy*.

PrepareResults Calculation

Aim of the logic

This calculation retrieves the outputs of the RunOptimization logic and reformats them to provide tables that can be used to show user-friendly optimization results. Each element stores one model table or some similar tables.

- Store_Optimized and Store_Current logics create the Optimized and Current tables that mirror each other. The Current table details the state of the system before the optimization; the Optimized one is the state after the optimization. Therefore a lot of visualizations will directly use these two tables to highlight the evolution of key values and the impact of the optimization. They are both created the same way, using the function defined in `AggregationUtils.groovy`.
- Store_Details_ logics write tables whose goal is to clearly show, for each type of variable adjusted by the OE, the optimized value, the reference value (what would that value be if the OE did not optimize anything), their difference, and the needed data to know what is impacted by this value (for example, returning the SpecificAdjustmentRate, but also the revenue and the margin rate, by customer group in the Customer Groups table). This way, the user can see the impact of the optimization on every adjusted value.
- StoreGlassboxTables element is a call to the Optimization Common Library to calculate aggregated metrics on the optimization agents criteria and value finders. (Refer to https://pricefx.atlassian.net/wiki/spaces/ACCDEV/pages/4818370673/Optimization+Common+Libraries#GlassboxLib – internal access only.)

Outputs of the calculation

This calculation writes a collection of tables:

- Current table – Details the state of the system before the optimization.
- Optimized table – Details the state of the system after the optimization. Its architecture mirrors the Current table one.
- Details tables – There is one table for each type of variable adjusted by the OE, and it contains the optimized value, the reference value (what would that value be if the OE did not optimize anything), their difference, and the needed data to know what is impacted by this value (for example, returning the customer_id and the customer_type for the Detail_CustomerAdjustment table). This way, the user can see the impact of the optimization on every adjusted value.
- GlassboxVF_ tables – Their names are built as GlassboxVF_NameOfTheSpace_NameOfTheValueFinder, there is one table by value finder key (i.e. type of value finder). These tables store the overall values of each value finder.
- GlassboxProbe_ tables – Their names are built as GlassboxProbe_NameOfTheSpace_NameOfTheValueFinder, there is one table by value finder key (i.e. type of value finder). These tables store the initial movement of each value finder.
- GlassboxCriteria_ tables – Their names are built as GlassboxCriteria_NameOfTheSpace_NameOfTheCriterion, there is one table by criterion key (i.e. type of criterion). These tables store the overall values of each criterion.
- Glassbox_AggregatedMetrics table – Summarizes the global interaction indicators between each value finder key and each criterion key.
- Glassbox_VFs_by_Key table – Summarizes the global overall indicators of each value finder key.
- Glassbox_Criteria_by_Key table – Summarizes the global overall indicators of each criterion key.
- Glassbox_Spaces table – Summarizes the total number of criteria and value finders in each space.

Common reasons to modify the logics

If the problem description has been changed, then the parameter set that helps to create the Current and the Optimized tables has to be changed too. It is in the element `AggregationUtils.groovy`.

The other most common reason to change the logic is to reformat some data to ease the work of providing charts in the Result step tabs.

Impact Tab

The logic is **PW_4_Res_Eval_Impact**.

- Aim of the logic

  This tab exposes the results of the OE execution in an HTML summary and some complex graphs. It is a comparison of the optimized values and the current ones (what would that value be if the OE did not optimize anything).

  The charts are created with the usual method:

  ```
  api.newChartBuilder(...)
  ```

- Outputs of the evaluation

  There are eight portlets:

  - HTML summary to write explicitly the main variations.
  - Waterfall comparison.
  - Four bar charts that compare the revenue and margin, before and after the optimization, by product group and by customer group.
  - Two bullet charts, one for the current state and one for the optimized one. They show the volume, the revenue, and the margin percentage for each pair of product x customer.

  For details see https://pricefx.atlassian.net/wiki/spaces/ACCDEV/pages/3992879122#Impact-Tab.

- Common reasons to modify the logic

  Add, modify or remove visualizations. This step is one of the most straightforward ones and its modification should not impact the previous steps.

Details Tab

The logic is **PW_4_Res_Eval_Details**.

- Aim of the logic

  This tab clearly shows, for each type of variable adjusted by the OE, the optimized value, the current value (what would that value be if the OE did not optimize anything), their difference, and the needed data to know what is impacted by this value. This way, the user can see the impact of the optimization on every adjusted value.

- Outputs of the evaluation

  Some data tables. For details see https://pricefx.atlassian.net/wiki/spaces/ACCDEV/pages/3992879122#Details-Tab.

- Common reasons to modify the logic

  Add, modify or remove table outputs. In practice, if the list of the value finders or their definition in the problem description change, the detail tables would change and thus these outputs would be modified.

Glassbox and Influencers Tabs

The logics are **PW_4_Res_Eval_Glassbox** and **PW_4_Res_Eval_Influencers**.

- Aim of the logic

These tabs expose the technical state of the OE execution at the end of the process. It is a development tool to help tune the model. It is only a call to the Optimization Common Library tools. A previous call to the same library should have be run from a calculation (refer to the PrepareeResult calculation paragraph).

- Outputs of the evaluation
  This logic displays charts that show the satisfaction, influences, impacts of the value finders and the criteria, initial movements of the value finders, and evolution of the criticality during the process of optimization. For details see Glassbox Dashboards.
- Common reasons to modify the logic
  In general, there is no reason to change this dashboard.

Evaluation Tab

The logic is **PW_4_Res_Eval_Query**.

- Aim of the logic
  This logic is used to access model results from outside of the model itself; for example in another logic. The first step is to use `api.model("ModelName")` to get the model and then use the function `evaluate` on it to retrieve an answer depending on the nature of the given parameters. The code needed to get these results is:

```
def model = api.model(“The Model Unique Name”)
def results = model.evaluate(
  “query_results”,
  [
    product: "someProductID",
    customer: "someCustomerID",
  ]
)
def unitNetPrice = results['unit_net_price']
```

The accepted inputs and the corresponding returned results are:

Inputs	Results
product	• unit global list price • product group
customer	• specific adjustment rate • on invoice discounts rate • customer group and all from customer_group
customer_group	• specific adjustments rate
product and customer_group	• unit specific list price • all from product • all from customer_group
product and customer	• unit specific list price

	• unit invoice price • off invoice discounts rate • unit net price • vendor rebates rate • unit net net price • unit costs • unit pocket margin • and all from above

Outputs of the evaluation

The evaluator provides all the optimized waterfall values. For details see Results Description (Optimization - Price Waterfall).

Common reasons to modify the logic

If the optimization model depends on new fields and if it provides new values, the evaluator should be changed to take them into account.

Release Notes (Optimization - Price Waterfall)

Optimization - Price Waterfall 1.2.0

This document summarizes major improvements and fixes introduced in the Price Waterfall Optimization Package release version.

Version	1.2.0
Release Date	Jan 24, 2024

Table of contents:

New Features and Improvements

Description	ID
The Optimization Engine image is now automatically enabled on the partition when you deploy the accelerator using PlatformManager.	PFPCS-6767
In the Results step on the Details tab, all Detail tables now contain the fields: Historical value, Current value, Optimized value and Value for all the default values: Quantity, Revenue, Profit, and Margin%.	PFPCS-7254
Configuration for Optimization Engine jobs has been added to the accelerator so that it is handled during its deployment.	PFPCS-7392

The balance Revenue vs. Profit is a slider input from 0 to 10, and the intermediate values are better taken into account in the optimization computation.	PFPCS-7401
The elasticity function has been improved in order to have a closer to reality behavior.	PFPCS-7405
The latest version of Optimization Engine (v2) is now used in Price Waterfall Optimization accelerator.	PFPCS-7494
Default preferences for layout are now part of the accelerator release.	PFPCS-7607
Glassbox logic used to be part of the Price Waterfall Optimization accelerator. It is now packaged separately in the Optimization Common Library (OCL) - Glassbox Library and used as such within the accelerator.	PFPCS-7628
When installing the accelerator from PlatformManager, engines configuration steps are now the first steps of the accelerator installation. This is to prevent errors when trying to run a model while the accelerator installation has not been completed.	PFPCS-7703
There is a new tab Influencers to display the criteria impacted on a given value finder.	PFPCS-7911
Users can configure a maximum decrease and a maximum increase, in percent points, for specific adjustments, on-invoice and off-invoice discounts, and vendor rebates.	PFUN-18557
To improve consistency of the results, it is possible to reposition the outliers of the spot discounts.	PFUN-18562
It is possible to align the list prices based on a given dimension (typically: a brand).	PFUN-18564
The on-invoice discounts are split into: standard discounts (defined at a product group and customer group level), customer discounts (defined at a product group and customer level), spot discounts, and surcharges (defined at a product and customer level).	PFUN-18589

Fixed Issues

Description	ID
When you create a new model, there is an unexpected timeout on the first step.	PFPCS-6765
Call to the elasticity model uses labels of the segmentation levels.	PFPCS-6975
In a specific case, the list prices are too far from their criteria bounds.	PFPCS-6980
If some elasticities do not exist, the optimization fails.	PFPCS-7551
There are wrong elasticities if the related Negotiation Guidance model is based on discount rates.	PFPCS-7795
There are too large oscillations during the optimization process.	PFUN-18666
Current values are not consistent.	PFUN-19265

There are missing option values in the evaluation tab user input.	PFUN-19851
Invoice prices become negative during the optimization.	PFUN-20990

Optimization - Price Waterfall 1.1.0

This document summarizes major improvements and fixes introduced in the Price Waterfall Optimization Package release version.

Version	1.1.0
Release Date	Feb 16, 2023

Table of contents:

New Features and Improvements

Description	ID
You can set a boundary for Price List change.	PFUN-15024
Visual comparison of the satisfaction of the criteria between the current and optimized scenarios is available now.	PFUN-15588
It is possible now to filter the original data before the aggregation - by using an advanced filter in the Definition step.	PFUN-16310
Query tab has been renamed to Evaluation tab. In addition, its results display now as a table (instead of a dashboard).	PFUN-16756
There is a possibility to set a boundary for list price change for specific Price List to be able to properly steer the change of list price and adjust the price waterfall.	PFUN-16820
Drop-down lists with selectable values are available for inputs in the Evaluation tab.	PFUN-17028
Quantity is now computed directly with elasticity on the unit price defined by the revenue measure.	PFUN-17100
Optimization Price Waterfall Accelerator uses a faster and more flexible way to batch query the elasticities of every pair of product - customer (implemented in NG Accelerator).	PFUN-17161
The following elements have been renamed to reflect the current name of this accelerator: • Model class: from POAI to Price_Waterfall • Logics prefix: from POAI to PW_<step number>	PFUN-17988

• Gitlab repository: from poai-accelerator to Optimization - Price Waterfall • package-definition files • pom.xml references • text in the readme file	
In the Impact step, bubble charts have been removed as they were slow to load and were of limited use.	PFUN-18712

Fixed Issues

Description	ID
Deltas for UnitInvoicePrice value finder thresholds are too large.	PFUN-16891
PO AI accelerator: User is unable to change mapping from the default setting if there is no segmentation model corresponding to the product group and customer group.	PFUN-16934
It is possible to choose any model for as an elasticity model. After the fix, only models fulfilling these conditions are available for selecting. • No condition on the MC name. • The model must contain a table called Segments. • The table Segments must contain a field called ElasticityParameters.	PFUN-16935
Product and Customer filters are not applied correctly when used together.	PFUN-18180
"Wrangled Data" has been renamed to "Aggregated".	PFUN-18186