

6.7.5 Panel

The **Panel** of the [Item view](#) contains a number of tree node properties and settings in the context of forecasting, inventory replenishment, and key performance indicators. It consists of the following tabs:

- [Forecasting](#). Contains input settings to the forecasting process of the selected tree node. The settings can be set up at any level of the tree.
- [Model](#). Shows the model that is used to generate forecasts for the selected planning item. The models are only available for the tree leaves.
- [Inventory](#). Displays the inventory information on the currently selected planning item. This information is only available at the planning item level.
- [KPIs](#). Depicts key performance indicators for the selected tree node. They can be viewed at every level of the tree.

Forecasting Tab

The **Forecasting** tab holds options used as input information in forecasting model building process. All the forecasting settings can be applied on an item, category or location level, generally, at every level of the tree. To put these settings into effect, re-forecast the project by clicking the **Forecast** button.

The screenshot shows the 'Forecasting' tab selected in a software interface. The tab is part of a larger panel with other tabs: 'Forecasting', 'Model', 'Inventory', and 'KPIs'. The 'Forecasting' tab contains the following settings:

- Forecast approach:** Bottom-up (dropdown menu)
- Zeros are lost sales:** Inherit (No) (dropdown menu)
- Ignore data before:** May 2017 (calendar icon and dropdown menu)
- Use ignored data for seasonality
- Model:** Inherit (Automatic selection) (dropdown menu)
- Use model from:** 05-T48 (dropdown menu)
- Multiplier:** 1.000 (spin button)
- Seasonality weighting of prior years:** Inherit (dropdown menu) and 0.60 (spin button)
- Holidays:** USA (calendar icon, dropdown menu, and edit icon)
- Use promotions:** Inherit (Yes) (dropdown menu and monitor icon)
- Bill of materials use:** Purchase (shopping cart icon and dropdown menu)
- Approval status:** Approved (F5) (checkmark icon and dropdown menu)

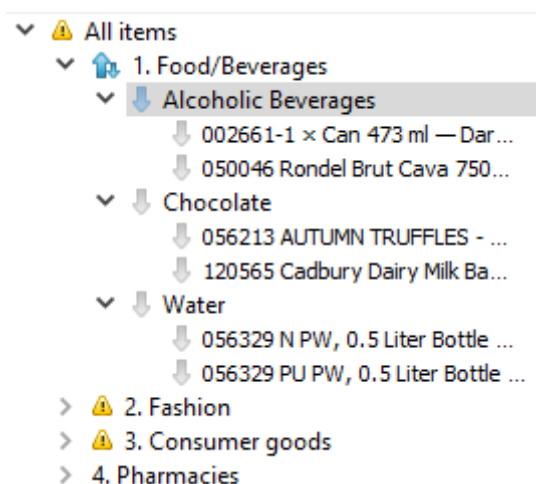
Here is the list of the forecasting settings:

- [Forecast approach](#)

- [Zeros are lost sales](#)
- [Ignore data before](#)
- [Use ignored data for seasonality](#)
- [Model](#)
- [Use model from](#)
- [Seasonality weighting of prior years](#)
- [Holidays](#)
- [Bill of materials use](#)
- [Approval status](#)

The **Forecast approach** control has the following options:

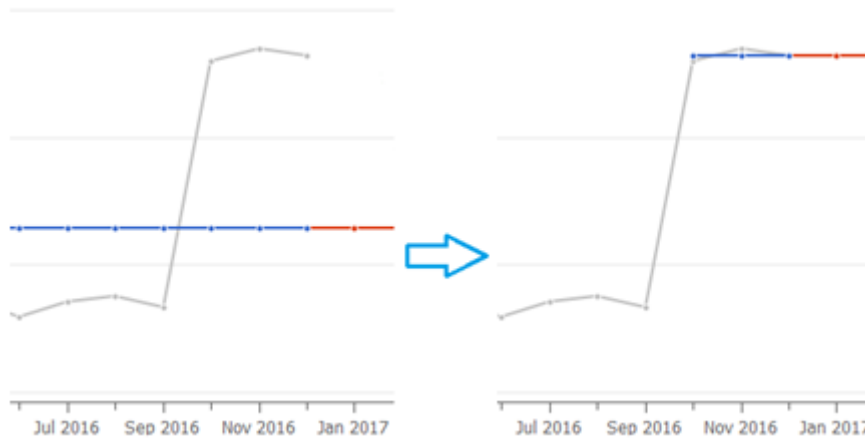
- **Inherit**. Applies the forecast approach of the parent item to this item. The applied approach is shown in the brackets.
- **Bottom-up**. This approach is used by default to build models for all nodes of the tree. It implies that forecasts on higher levels of the tree are calculated based on the forecast of lower levels as a simple sum, starting from tree leaves. Tree leaves models are standalone models that are calculated based on the imported sales history.
- **Top-down**. This method implies that the item's forecast is calculated based on the parent item model and the market share the item forms in its parent category. Market share of the item is calculated based on the [simple moving average](#) of n last periods. This method is useful when the item has no prior history and you need to have some reasonable predictions, for example, in the situation of launching a new product.
- **Top-down for child nodes**. This approach combines the last two approaches in the following way: the **Bottom-up** method is applied to the selected item, and **Top-down** technique – to the item's child nodes. In other words, in the example illustrated on the figure below, the forecast for the *Food/Beverages* category is calculated using the **Bottom-up** approach, and the *Alcoholic Beverages*, *Chocolate* and *Water* categories are forecasted based on the **Top-down** method.



This option is helpful if you need to apply **Top-down** method to a huge set of categories and use the **Bottom-up** approach for the item on the top of them.

Zeros are lost sales prevents periods with zero sales from demand underestimation. So, if zero sales are caused by lack of inventory in the stock, choose the **Yes** option.

Ignore data before control allows reducing the item's sales history that is used to build forecasting model. All of the periods prior to the selected period are ignored. Data of the selected period is used to build the model. This option is helpful when you need to use a shorter length of the history. For example, when sales volume has changed its level recently due to significant price change.



The **Use ignored data for seasonality** checkbox down the **Ignore data before** option allows taking ignored data into account to evaluate the seasonal components when the **Seasonal & Trend model** is built.

Forecasting	Model	Inventory	KPIs
Forecast approach	Inherit (Bottom-up) ▼		
Zeros are lost sales	Inherit (No) ▼		
Ignore data before	🕒 Mar 2015 ▼		
	<input checked="" type="checkbox"/> Use ignored data for seasonality		
Model	Inherit (Automatic selection) ▼		

The **Model** control gives access to manual selection of model type.


Watch a video tutorial (2:36)


There are several options for the **Model** control:


- **Inherit.** The model type of the parent node is used to generate the item's forecast.
- **Automatic selection.** This is the default option meaning that Streamline's expert system is used to find the most appropriate model type.
- **Auto & preorder intermittent.** Streamline's expert system is used. If it recognizes intermittent demand in data, preorder model is used instead.
- **Auto & termination.** Streamline's expert system is used. However, Streamline doesn't calculate a purchase plan for this item. This model is used when you need to know how the product will be consumed in the future based on the forecasts, but do not need to Streamline to calculate the purchase plan for this product (the product is discontinued and/or is selling out, you have no possibilities to purchase it or any other reason).
- **Seasonal & trend** model includes seasonal and trend components.


$$\text{Model} = (\text{Level} + \text{Slope} * \text{Time}) * \text{Seasonality}$$


- **Linear trend.** Linear trend model is built to forecast the item.
- **Constant level** model is just a constant value.
- **Intermittent model** is a model that has zero forecast. It changes the way the [safety stock](#) is calculated for this item.
- **Preorder/inactive.** No model is built; the item has zero forecast. This option is useful when an item is sold by preorder.

 **Use model from control** allows using the model of another item to generate the forecast for the item. To do this, enter the item code of the source, or select it from the drop-down menu.

 **Multiplier.** The result of the model will be multiplied by the multiplier. This option is used to increase or decrease the model output.

 **Seasonality weighting of prior years** sets the weights for prior years' data. Weights for the other time-stamps are calculated by the exponential law. For example, 1 means that all the seasonal coefficients get the same weight equal to 1, so there is no exponential smoothing; 0 means that data of the last year only are taken into account to calculate the seasonal coefficients. Everything within the (0;1) is the result of exponential smoothing with different weighting. The default value is 0.6. This option can be used when you need to disable the exponential smoothing or replace the default weighting with your own.



 **Holidays** control enables taking into account holidays of the given calendar when Streamline is building the model for the item.

 **Bill of materials use** parameter allows you to enable/disable manufacturing for the particular node of the data tree. This option gets into the action if [bill of materials](#) was imported.

- **Manufacture** means that if the selected item appears as a finished product/sub-assembly in the bill, Streamline generates need of its components in the material requirements plan.
- **Purchase** means that even if the selected item is a finished product/sub-assembly in the bill,

the program will not generate its material requirements but will treat it as a regular item that is sold and generate a [purchase plan](#) for it.

The **Approval status** control helps you to set which forecasts are satisfied, reviewed, or need to be revised in the future. The control differs in the set of its options whether a tree leaf or branch is currently selected. If a tree leaf is selected it has the following options:

- **Undecided**. This is the default option meaning that either the item forecast has not reviewed yet, or the forecast was review and the decision about its approval was not taken.
-  **Approved**. This option means that the forecast of the item is satisfactory and is approved. If you approve an item, its forecasting model will not be recalculated even if you change sale data or inventory information in the current period or add a new period by clicking the **Update data** button. Thus this model will be applied to the updated data.
-  **Needs attention**. This is a kind of reminder that is set when you are not sure which forecast correction to make at this time and have decided to make it later. An attention icon is added to the node and all the nodes above it to easily spot such items if the tree is collapsed. This status stays with the item whatever changes we made to the item's model in the [Model tab](#).

If a tree branch is selected, the **Blank** option is added to this control. This is the default option. Items (or categories) can have mixed statuses in this branch.

If you apply any of **Undecided**, **Approved** or **Needs attention** statuses to the branch, Streamline applies it also to all the nodes in the tree the branch.

Model Tab

The **Model** tab shows the forecasting model structure and its coefficients in the table. You can adjust each of the coefficients of the model to align the forecast with your needs. Alternatively, to change the forecast, you can use the [forecast adjustments](#).

Information on this tab is available only for the tree leaves. There are two types of models in Streamline: time-series model and the intermittent demand model.

Time-series model

Model	
	Coefficient
Level	189.5938
Slope	1.122024
Jan	-0.03972852
Feb	0.06148135
Mar	-0.04171722
Apr	0.05984404
May	0.7370456
Jun	0.1253775
Jul	-0.2622837
Aug	-0.2299646
Sep	-0.1063562
Oct	-0.1018044
Nov	-0.09123121
Dec	-0.1336688
Safety stock σ	3.453619
Seasonality test	0.9803358
Model MAPE	2%
Forecast MAPE	7.5%

Generally, the model looks like:

$$Model = (Level + Slope \times Time) \times Seasonality$$

An example of the time-series model is shown in the figure on the right. All cells with the yellow background are editable in Streamline.

- **Seasonality** component in the model formula is represented by the coefficients of twelve months in the table.
- **Level** is the model level.
- **Slope** is the slope of the trend.
- **Safety stock σ** is unbiased standard deviation of the model on the learning set.
- **Seasonality test** shows how seasonal the data is based on auto-correlation coefficient. If the test value is greater than a threshold, the seasonality component is used in the model. By default, the threshold is 0.3 and can be changed in the [project settings](#).
- **Model MAPE** is the [MAPE](#) calculated based on the model response for the data that was used to build the model.
- **Forecast MAPE** is the MAPE of the forecast, it's only available when we forecast [As of](#) is set to some period in the past.

Calculation of the forecasts

The exact formula to calculate the forecast for a period is:

$$Model_i = (Level + Slope \times Time_i) \times Seasonality$$

$$Time_i = \frac{(N_{blue} - 1)}{2} + i$$

$$Seasonality = 1 + seasonal\ coefficient + \sum holiday\ coefficient$$

Where:

- *i* is the number of the forecasted period;
- N_{blue} is the number of blue points in the **Plot**;
- *seasonal coefficient* is the seasonal coefficient of the month of *i-th* period. For weekly model, the *seasonal coefficient* is a linear combination of seasonal coefficients of two adjacent months; and
- *holiday coefficient* is a holiday coefficient that falls to this period.

Example

Consider an example of forecast calculation. We will use the build-in Streamline example of *Multi-location Demand and Revenue Forecasting* having monthly data.

Let's take a look at the first item **00266-1** in the **East** location, and change the model **Slope** from **0** to **1.5** for demonstration purposes.

Forecasting	Model	Inver
	Coefficient	
Level	1748.014	
Slope	1.5	
Jan	-0.281368	

The model is built based on fourteen periods from **November 2015** to **December 2016**. The forecasts of this model range from **January 2017** to **December 2017**:

Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Dec 2017
1264	980	1230	1402	2280	2214	2388	2620	1874	2025	1692	1297

Let's calculate the forecast for **January 2017**. It's the first forecasted period, thus *i* = 1.

$$\text{Jan}_{2017} = (1748.014 + 1.5 * ((14 - 1) / 2 + 1)) * (1 - 0.281368) = 1264.26$$

Intermittent demand model

Model	
	Coefficient
Transaction probability	0.9166667
Median	45.26337
Deviation, o.o.m.	0.1400021
Seasonality test	0
95% safety stock, 1 period	76.91789
95% safety stock, 2 periods	139.7685
95% safety stock, 3 periods	195.3469
Model MAPE	100%
Forecast MAPE	N/A

There are several criteria that trigger intermittent demand model in Streamline. One of them - when a part of zero demand periods exceeds 60% of demand history length.

This model always returns '0' as expected sales, but [calculates Safety stock](#) based on stochastic model of log-normal distribution. That is, the intermittent demand model expects that a log-normally-distributed transaction occurs with a probability of p , and no sales with probability $1-p$.

The **Median**, **Deviation**, and **Transaction probability** are the parameters of the distribution which are estimated. Alternatively, you can set them manually in the **Model** tab.

The **Deviation** is given in orders of magnitude (o.o.m.). One order of magnitude is 10 times greater/less, so **Deviation** is usually very small.

Below the **Seasonality test** a set of safety stock values are given in the table. It shows the **Safety stock** for one (two or three) [data aggregation period\(s\)](#) based on service level of 95%.

Promotional model

Forecasting	Model	Inven
	Coefficient	
Level	7.705049	
Slope	0	
Promo Mo	0.4825382	
Promo Tu	0.4825382	
Promo We	0.4825382	
Promo Th	0.4825382	
Promo Fr	0.4825382	
Promo Sa	0.4825382	
Promo Su	0	
Safety stock σ	1.746975	
Seasonality test	0.1961991	
Model MAPE	36.9%	
Forecast MAPE	33.3%	

This model comes into play if the forecasted item has [information on promotions](#) imported and the data aggregation period is one week.

The promotional model is characterized by seven additional coefficients describing the future promotions weight into the generated forecasts (see figure on the right). Each of the coefficients corresponds to a particular day in the week.

Inventory Tab

Forecasting	Model	Inventory	KPIs
		Value	
		On hand	49
		Pending sales orders	0
		In transition	0
		Lead time, days	30
		Order cycle, months	1
		Min lot	
		Max lot	
		Rounding	1
		Service level	98%
		Safety stock	12
		Shelf life, months	∞
		Shelf life exceeding	
		Purchase price	598
		Gross margin	8.8%
		Turn-earn index	76.4
		Order now	60
		Purchase value	35880
		Stockout	0
		Overstock	0

The **Inventory** tab shows us:

- Inventory information such as *On hand*, *Stockouts*, *Overstocks*, and other.
- Replenishment information of how many to order (*Order now*) and how much it costs (*Purchase value*).
- Key performance indicators such as *Gross Margin*, and *Turn-earn index*.

Along with each model Streamline stores corresponding **On hand** and **Orders to receive** information taken at the moment of the forecast. Therefore, if you update these data using the **Update data** button, they **will not be changed** in the **Inventory planning**, and consequently, in this tab until you re-forecast the project. However, the updated data will be shown in the [Table](#) and [In transition details dialog](#).

- **Type** - indicates the type of the item. It is shown if [bill of materials](#) was imported.
 - *Finished* - indicates finished products or goods.
 - *Intermediate* - indicates products that are made during the manufacturing process and are used to create finished products.
 - *Material* - indicates materials, the items that are used to build intermediate and finished products. They represent the lowest level of the bill tree.
- **On hand** - the amount of inventory that is currently in stock. Color-coding of the column:

- **Red** - the items with insufficient **On hand** inventory to cover lead-time demand. This is an irretrievable loss.
- **Light-green** - the items with **On hand** quantity enough to satisfy the expected lead-time demand.
- **Dark-green** - the items having **On hand** enough to cover the demand forecast during the (lead time + order cycle) period.
- **Days/Months of supply** shows how many days/months of the future demand the (**On hand - Pending sales orders**) quantity can cover.
- **Pending sales orders** is the quantity on open sales orders.
- **Qty to receive** - the amount of inventory expected from your supplier.
- **Lead time** is entered in days and represents the interval of time between when a replenishment order is placed and when it is received. It's also possible to change the default value of **Lead time** in the inventory report setting.
- **Order cycle** represents how often the item is ordered from your supplier. It can be given in sales history periods (weeks or month), days, or lead times. If it is not given, a default value is used from the [inventory report settings](#).
- **Min lot** and **Max lot** represent optional constraints on how few or how many of this item can be purchased from your supplier. Zero value means that the parameter is not given.
- **Rounding** allows Streamline to take into account how many items come packed in a carton, allowing the application to suggest exactly the right amount of the item to order.
- **Display qty** - the minimum number of units a shelf to display. This parameter typically arises in the retail business. You can [control](#) how this amount is used when [final safety stock](#) is calculated.
- **Service level** is the percentage of the time (in the long run) that the item is in stock, based on the forecast. It can be changed in the [inventory report settings](#).
- **Safety stock** is the safety stock for any location's warehouse. Its level depends on the inventory replenishment strategy. Calculation of the **Safety stock** can be customized in the [inventory report settings](#). **Safety stock** is an assessment of the reserve stock for:
 - the next **Order cycle** if the [periodic strategy](#) is used;
 - the **Lead time** if the [min/max approach](#) is used.
- **Safety stock debt** shows the quantity of material that is required to keep the **Safety stocks** of all finished products that use this material on the recommended level. It is calculated for all items that are used to create finished goods and is shown if [bill of materials](#) was imported.
- **Shelf life** is the desired time the item can be in stock. After the time expires, some actions should be taken as clearance sale, return to the supplier and so on. The red cell background means that even if you order 1 unit of the item, it won't be sold with the probability of more than the shelf life exceeding percentage. Thus, the item *won't be ordered*. To make Streamline order this item, increase the shelf life or shelf life exceeding percentage.
- **Shelf life exceeding** shows the average percentage of the item's purchase quantity that we might have to: send to a clearance sale, return to the supplier and so on. If you just discard the expired product, the percentage should be very small. If you recycle them (e.g. roast the meat

or make a clearance sale), the numbers may be larger.

Streamline implies that the product moves by the **FIFO** rule. So if you got some goods, a newly appeared lot will never sell until we sell the expiring ones. Streamline doesn't take into account that some lots of goods are doomed and be discarded for sure.

- **Purchase price** is the price you pay the supplier for the item, imported from Excel file or 3-rd party system. If base currency or currency of supplier is imported, the column shows it.
- **Note** shows the annotation for the planning item.
- **Gross margin** is a gross profit margin that is calculated based on the item balance value or item purchase price (is used as a fallback if item balance value is not given) and selling price over the last 12 months. The formula looks like:

$$\text{Gross_margin} = (1 - \text{item_purchase_price} * \text{inflation_coefficient} ^ \text{sellout_time} / \text{aver_sales_price}) * 100\%$$

where:

`item_purchase_price` - the [item purchase price per unit](#) imported from the datasource;

`aver_sales_price` - the average selling price calculated over the last 12 months;

`inflation_coefficient` = $1 + \text{interest_rate}$;

`sellout_time` = $(\text{lead_time} + \text{days_to_sell}) / 365.25$;

`interest_rate` - the annual interest rate that is taken from the [project settings](#);

`days_to_sell` - the [Average days to sell](#) value.

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- **Turn-earn index** is an item gross margin accumulated over the last 12 months, and calculated as:

$$\text{Turn-earn_index} = \text{gross_margin} * \text{inventory_turnover}$$

- **Order now** section gives recommendations of what and how much to order today.
- **Qty** column shows the item amount that should be ordered. An example of the column calculation can be found on the [example calculation page](#).
- **Excess order** shows the excess part of the order that is gotten due to the constraints such as [Min lot](#) or [Rounding](#). For example, if you round the suggested quantity of **127** by **10**, resulting in **130**, then, you will have 2.3% of excess that is calculated as $(130 - 127) / 130 * 100\%$.
- **Value** shows the purchase order item value in the base currency.

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- **Purchase value.** The cost of the item in the recommended purchase order.

KPIs tab

Forecasting	Model	Inventory	KPIs	
			Value	
			Inventory value	74.25
			Days of supply	42
			Expected overstock value	0.00
			Expected stockout value	0.00
			Non-moving inventory value	0.00
			Turnover Turns/year	8
			Turnover Days to sell	46
			Gross margin	16.7%
			Turn-earn index	132.8
			Annual revenue	881.10
			Revenue next year	698.54

The **KPIs** tab shows important performance indicators of the item.

- **Inventory value** shows the value of the item in stock.
- **Days of supply** shows how many days of the future demand the (**On hand - Pending sales orders**) quantity can cover.
- **Expected overstock value** is the item's expected overstock cost.
- **Expected stockout value** is the item's expected inventory deficiency cost.
- **Non-moving inventory value** is calculated if this item will not be sold during the forecast horizon period according to the forecast, and is the balance value of the item in stock.
- **Inventory turnover** shows how many times an item was purchased and then sold out for the last 12 months.
- **Average days to sell** displays how many days it takes to make one turnover cycle.
- **Gross margin** is a gross profit margin that is calculated when item purchase price or balance value is imported.
- **Turn-earn index** shows an item gross margin accumulated over the last 12 months.
- **Annual revenue** is the **averaged** item revenue over 12 months.
- **Revenue next year** is the **averaged** item next year revenue.

[Next: List View](#)

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