

7.9.6 Confidence intervals

To provide more insights to risks and opportunities Streamline can show probable forecast variability boundaries called the confidence interval.

Confidence interval algorithm

To create the confidence interval, Streamline calculates the Mean Squared Error (MSE) as the first step. The formula for the Mean Squared Error is the following:

$$MSE = \frac{1}{n} \sum_{i=1}^n \left(y_i - \widehat{y}_i \right)^2,$$

where:

- n - the number of periods (months or weeks) used in the model;
- y_i - actual sales values;
- \widehat{y}_i - forecasted values.

Confidence interval is calculated for the tree leaves while on a category level you can see the sum of all item-location pairs under it.

MSE calculation ignores sales periods affected by the 'Ignore data before' and 'Ignore zero sales' settings of the forecasting panel.

Then we estimate the upper and lower confidence intervals for the forecasts using this formula:

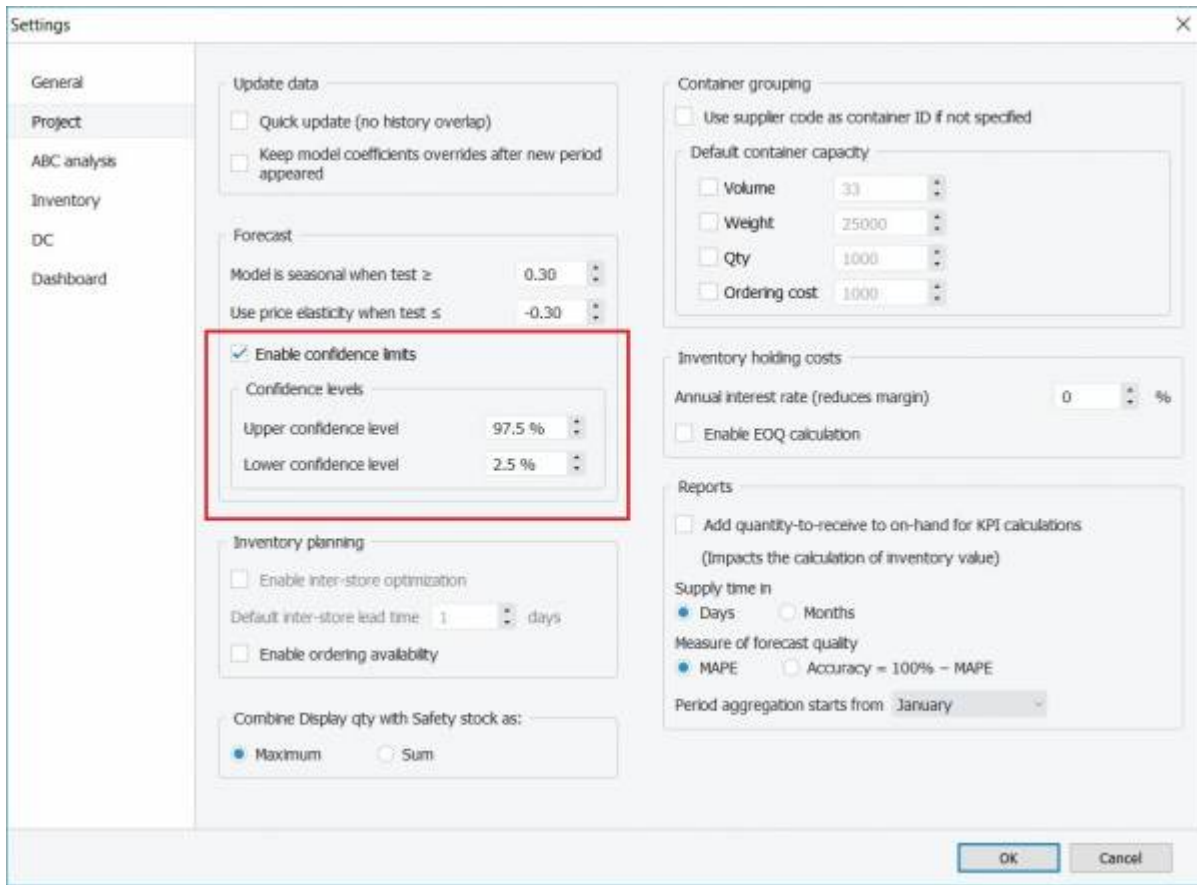
$$Ft \pm z \sqrt{MSE},$$

- Ft - forecast value;
- MSE - Mean Squared Error;
- z - value that depends on the degree of confidence levels. For example, a 95 % confidence level corresponds to $z = 1.96$. Other z -value examples are in the table below:

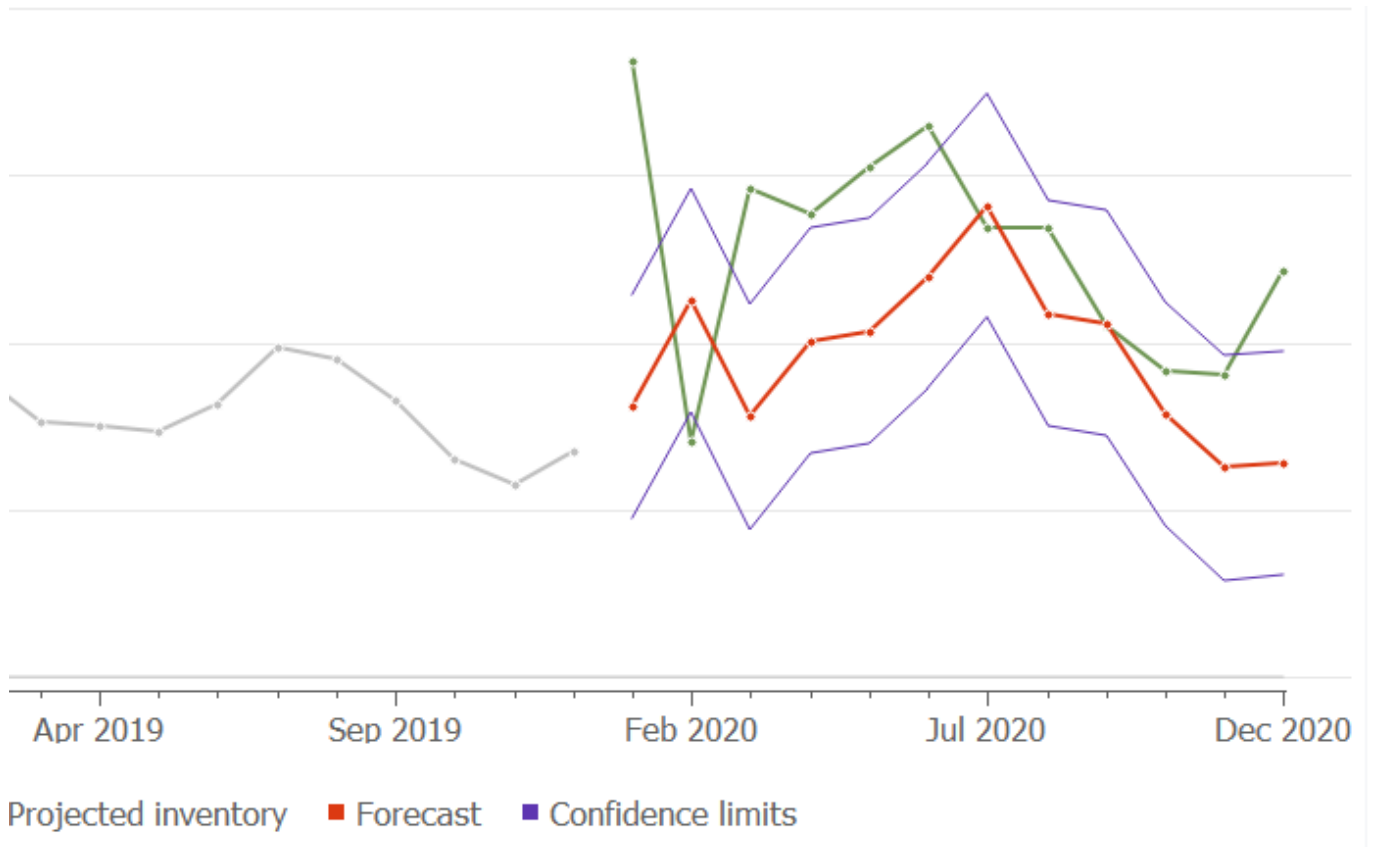
Probability	z
0.50	0.674
0.68	1.000
0.75	1.150
0.80	1.282
0.85	1.440
0.90	1.645
0.95	1.960
0.98	2.326
0.99	2.576

How to enable confidence intervals in Streamline

To enable confidence intervals in Streamline, open **Settings** and go to the **Project** tab. Then check the **Enable confidence limits** option in the Forecast section and specify upper and lower confidence levels. Click **OK**.



After you enable confidence intervals, the plot will show upper and lower confidence levels in purple. When a user hovers the mouse over the forecast the tooltip shows values of the upper and lower confidence intervals.



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Last update: **2022/08/10 16:19**

