

## HOW TO USE STOCK FORECASTING

The purpose of this document is to assist stock controllers, warehouse personnel, parts sale personnel and procurement personnel with understanding the Stock Forecasting function of Baseplan Enterprise.

Forecasting is an additional function of Stock Reordering. It is a method of estimating future stock requirements based on past figures. These estimates are used in the Stock Reordering process.

*Please refer to the 'How to Use Stock Reorder' guide for more information.*

Forecasting is accessed through the **Advanced** option on the *Reorder* screen.

When the Stock Forecasting licence is activated, a program is run to create and update a Forecast Usage table – an integral part of Stock Forecasting. Thereafter, each Stock End Of Month (EOM) procedure performed updates the monthly usage in this table.

**Software Version: 1801**

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## CREATING A STOCK FORECAST

1. From the Menu, select **Stock > Reorder**
2. Select **Actions > Advanced**

This will open the *Stock Forecasting* screen.

**Note:** If the 'Advanced' option is not visible under **Actions** despite being licenced for this functionality, ensure that the cmdAdvanced Menu is enabled on the *Security – Menus* screen.

3. Click ADD NEW
4. Enter a **Description** for the forecast
5. Select a forecast period range using the **Forecasting Period From** and **To** drop down lists

The forecast period range must be in multiples of 3 so that figures can be expressed as quarters of a year.

6. Select the actual usage period to be analysed when creating the forecast, using the **Actual Period From** and **To** drop down lists

The actual period must be in multiples of 3.

All the periods selected within the actual and forecast range will be displayed in the *Weighting by Period* panel. The **Weight** assigned to each period will be '1', and can be changed if required.

7. Select the method of forecast calculation from the **Forecasting Method** drop down list

Any one of the following values can be selected:

- **Mean** – This is the average of all the actual usage. By using this method, each forecasting period will have the same value i.e. the mean
- **Moving Average** – This method involves calculating averages of different subsets from the complete actuals data.

When using this method, value for the first forecasting period is obtained by calculating the average of all the actuals. Thereafter, value for the second forecasting period is obtained by calculating the average of actuals starting from the second actual period to the first forecasting period and so on.

**For example:** The actual usage of a stock item is observed from July 2013 to June 2014, to draw estimates for a period of 12 months ranging from March 2015 to February 2016.

If 'Moving Average' is selected as the **Forecast Method**, the estimates will be calculated as follows:

ACTUAL PERIOD	ACTUAL USAGE (IN UNITS)	FORECAST PERIOD	FORECAST (IN UNITS)
July, 2013	22	March, 2015	$314 / 12 \approx 26.16$ rounded down to <b>26</b>
August, 2013	223	April, 2015	$\{[(314 - 22) + 26] / 12\} \approx 26.5$ rounded up to <b>27</b>
September, 2013	19	May, 2015	$\{[(314 - 245) + 53] / 12\} \approx 10.16$ rounded down to <b>10</b>
October, 2013	10	June, 2015	$\{[(314 - 264) + 63] / 12\} \approx 9.41$ rounded down to <b>9</b>
November, 2013	4	July, 2015	$\{[(314 - 274) + 72] / 12\} \approx 9.33$ rounded down to <b>9</b>
December, 2013	10	August, 2015	$\{[(314 - 278) + 81] / 12\} \approx 9.75$ rounded up to <b>10</b>
January, 2014	2	September, 2015	$\{[(314 - 288) + 91] / 12\} \approx 9.75$ rounded up to <b>10</b>
February, 2014	4	October, 2015	$\{[(314 - 290) + 101] / 12\} \approx 10.41$ rounded down to <b>10</b>
March, 2014	0	November, 2015	$\{[(314 - 294) + 111] / 12\} \approx 10.91$ rounded up to <b>11</b>
April, 2014	15	December, 2015	$\{[(314 - 294) + 122] / 12\} \approx 11.83$ rounded up to <b>11</b>
May, 2014	2	January, 2016	$\{[(314 - 309) + 134] / 12\} \approx 11.58$ rounded up to <b>12</b>
June, 2014	3	February, 2016	$\{[(314 - 311) + 146] / 12\} \approx 12.41$ rounded down to <b>12</b>
<b>TOTAL</b>	<b>314</b>		

- **Weighted Moving Average** – This is similar to the moving average method, except that each period is multiplied by a weight.

**For example:** The actual usage of a stock item is observed over 6 months ranging from January 2015 to June 2015, to draw estimates for a period of 3 months ranging from March 2018 to May 2018.

If 'Weighted Moving Average' is selected as the **Forecast Method** and the below weights are configured, then the forecast values will be calculated as follows:

ACTUAL PERIOD	ACTUAL USAGE	WEIGHTS (ACTUALS)	FORECAST PERIOD	WEIGHTS (FORECAST)	FORECAST (IN UNITS)
January, 2015	10	3	March, 2018	1	$[(10*3) + (0*2) + (3*2) + (2*1) + (1*4) + (1*2)] / 14 \approx 3.14$ rounded down to <b>3</b>
February, 2015	0	2	April, 2018	1	$[(0*2) + (3*2) + (2*1) + (1*4) + (1*2) + (3*1)] / 12 \approx 1.14$ rounded down to <b>1</b>
March, 2015	3	2	May, 2018	1	$[(3*2) + (2*1) + (1*4) + (1*2) + (3*1) + (1*1)] / 11 \approx 1.63$ rounded up to <b>2</b>
April, 2015	2	1			
May, 2015	1	4			
June, 2015	1	2			
<b>TOTAL</b>		<b>14</b>			

**Calculated NSKU** will default to 1.

This can be changed, if required.

The value entered in this field helps derive the **Calculated Minimum Stock**, and thereby the **Recommended Order Quantity**.

8. Select the relevant main **Warehouse**
9. Enter a **Desmoothing %**, if required

This value can be greater than or equal to 0, but not more than 100%.

- If 0, then the average method is the forecast and no desmoothing is applied
- If not 0, then the actual period range should be the same duration as the forecast range

If the desmoothing percentage is not 0, then the forecast will be the calculated average plus the desmoothing percentage applied to the difference between the corresponding actual period and the average for the forecast period.

10. Check **Include Allocated Quantity (in Total Order Qty)** if allocated quantities are to be included in the order quantity

11. Enter the **Number of Periods to Use for Average**

This is the number of periods to use for the calculation of forecasts using the **Forecasting Method** selected. This value is validated to check that it is a positive number and less than or equal to the actual periods entered.

12. Check **Apply Balance of Unused Readings as One Reading** if the **Number of Periods to Use for Average** is less than the entered actual periods. If there is no balance, this checkbox is irrelevant.

If there is a balance, the unused actual periods plus forecast periods will be averaged together, unweighted and will be treated as one data point.

The **Use Moving Weights For Actuals** checkbox is relevant only if the **Forecasting Method** is 'Weighted Moving Average' If this checkbox is checked, forecast 1 will be calculated by using the weights specified for actual period 1 to 'n' (where 'n' is the **Number of Periods to Use for Average**). For forecast 2, weights from actual period 1 to n-1 will be used as the weights for actual period 2 to actual period n and so on. Weight of '1' will be used for all forecast periods. If this checkbox is unchecked, the normal weighted moving average method will be used.

13. Click SAVE in the toolbar


This will assign a system-generated **Forecast ID** to the record.

**Note:** Depending on the number of actual and forecasting periods, the size of the Stock Master file and the method of forecasting selected, there may be a slight delay before the details are saved and a **Forecast ID** is generated. All the requirements will be calculated during this time.

## USING THE STOCK FORECAST

Once a forecast has been created, it can be used to:

- Check product details
- Check the actual usage of items
- View the calculated forecast
- Edit the Order Plan
- Create purchase orders
- View the purchase order summary

1. From the Menu, select **Stock > Reorder**
2. Select **Actions > Advanced**
3. Display the relevant forecast
4. Click USE FORECAST 

This will open the *Stock Forecasting (Details)* screen, displaying forecasting details in the *Product Info* tab.

### Product Info Tab

This tab provides a list of all the parts included in the forecast along with their corresponding details from the Stock Master, Stock Location and Supplier records.

Details displayed in the *Product Info* tab can be filtered by:

- Product Group
- Item Type
- Product Category

**Note:** The same filters are also available for details in the *Actual Usage*, *Forecast*, *Order Plan* and *PO Summary* tabs.

### Actual Usage Tab

This tab displays the usage figures for each item of the forecast by month and by quarter, based on the actual period specified when entering the forecast. Figures from the *Actual Usage* tab are used to create the forecast.

**Note:** Figures in the *Actual Usage* tab do not include any weighting factor.

### Forecast Tab

This tab displays the forecast created based on the historical *Actual Usage* figures (multiplied by the weighting factors, if applicable) entered when creating the forecast.

**Note:** Details in the *Product Info*, *Actual Usage* and *Forecast* tabs are not editable. This information is available to users to help them understand how quantities in the Order Plan were created.

### Order Plan Tab

The creation of the forecast produces a projected Order Plan with final recommended order quantities. Since the quantities are recommended, these can be changed. The order quantities are either the forecast figures (taking into account safety stocks) or changed to reflect the knowledge of future requirements. Once the final order quantity is confirmed, purchase orders can be created.



5. Select the relevant **Freight Method**

6. Click FILTER

The Order Plan is affected whenever a new **Freight Method** is selected. After selecting a new **Freight Method**, click REFRESH to view the revised Order Plan.

7. Once the **Final Order** quantities in the Order Plan are confirmed, click the CREATE POS button

This will create corresponding purchase orders from the primary suppliers (preferred item suppliers).

**Info:** "Operation has been successfully completed!"

8. Click OK

When the Order Plan is created, a reorder batch is also created in the *Reorder* screen.

Detail lines with purchase orders will have a **Status** of 'POSTED'.

Purchase order numbers will be displayed in the **PO No.** column for each posted detail line.

Purchase orders created from the Stock Forecasting screen can be viewed by selecting **Menu > Purchase Orders > Purchase Orders**. The **Status** of these orders will be 'OPEN' on the *Purchase Orders* screen.

*Please refer to the 'How to Process Purchase Orders' guide for more information.*

### PO Summary

Once the purchase orders have been created, details from the *Purchase Order Details* panel (*Purchase Orders* screen) are displayed in the *PO Summary* tab of the *Stock Forecasting* screen. This tab only displays orders than have an 'OPEN' **Status** on the *Purchase Orders* screen.

## ADVANCED STOCK FORECASTING CALCULATIONS

The Order Plan generated through Stock Forecasting is based on components derived from both configured data and actual usage.

The section below explains the derivations of some of the key forecasting figures in the Order Plan:

### Lot Quantity

Some stock items are not purchased individually, but collectively in lots.

**For example:** A box of 50 batteries, a lot of 100 oil filters. Lot quantity is the number of items in each lot.

Lot Quantity is configured from **Stock > Configuration > Lot Quantity**.

In the Order Plan, **Lot Qty** is obtained by identifying the relevant threshold according to the **Forecast Total** (sum of estimated quantities for the entire forecast period).

If a lot quantity is not available for the threshold, the lot quantity of the highest threshold just below the **Forecast Total** is used.

**For example:** If the configured **Lot Quantity** for **Threshold 4** is 1,000, with 1, 2, 3 and 4 being the thresholds configured and the **Forecast Total** is 7, then the **Lot Quantity** for this forecast will be 1,000.

## Production Quantity

**Production Quantity** or firm demand is the sum of the pre-delivery items for serialised stock items which are in **Status** 'ORDERED', where the purchase order **ETA** for the serialised item belongs to one of the time periods explained below. These quantities are displayed only for informational purposes in the Order Plan.

The **Production Quantity** is split into 3 columns:

1. Production PSR (Production Quantity Stock Required): Where **ETA** on the purchase order for the serialised item is between the current date and the lead time derived from the freight method (typically sea freight). Orders for these items should already exist in the system.

**Note:** Lead time for freight method is the period it takes for the order to arrive.

**For example:** The current date is 17<sup>th</sup> of January. 1 mast is required for the capital preparation of the serialised stock item 'Forklift'. The **Delivery Method** on the purchase order for the forklift is 'Sea Freight'. The **Lead Time** configured for 'Sea Freight' is 10 days. Thus, if the **ETA** on the purchase order for the forklift is between the 17<sup>th</sup> of January and 27<sup>th</sup> of January, then the **Production PSR** quantity on the Order Plan will be '1'.

2. Production POR (Production Quantity Required for Order Plan): Where the **ETA** on the purchase order is in the next date range i.e. from (the current date and lead time derived from the freight method) till the coverage period for the freight method. In order to arrive in time, such items must be ordered now.

**Note:** Coverage period for the freight method is the time between consecutive orders delivered by that method.

**For example:** The **Delivery Method** 'Sea Freight' has been configured with a **Coverage** of 1 week. The current date and **Lead Time** are the same as mentioned in the previous example. 2 batteries are required in the capital preparation of a generator, where 'Generator' is a serialised stock item. If the **ETA** on the purchase order for the generator is between the 27<sup>th</sup> of January and the 3<sup>rd</sup> of February, then the **Production POR** quantity on the Order Plan will be '2'.

3. Production FPR (Production Quantity Required for Future): Where the **ETA** is after the 2 periods explained above. These items need not be ordered during the current period.

**For example:** The same **Delivery Method** details as described in the examples above, are used. A total of 12 pre-delivery items are required for a serialised stock item. If the **ETA** on the purchase order for this serialised item is after the 3<sup>rd</sup> of February, then the **Production FPR** quantity on the Order Plan will be '12'.

## Lead Time

Lead time is the amount of time it takes for an order to arrive by the selected **Delivery Method**. Different delivery methods have varying lead times.

**For example:** The Lead Time for 'Sea Freight' is 20 days, while that for 'Air Freight' is 3 days.

Lead Time is configured from **Purchase Orders > Configuration > Delivery Methods**.

Depending on the delivery method selected for the Order Plan, the Lead Time is derived and converted to the right unit i.e. days, weeks or months.

## Stock Coverage

This is the period of time between successive orders, given a certain **Delivery Method**.

**For example:** A period of 20 days between 2 successive orders delivered by sea freight.

Stock coverage is configured from **Purchase Orders > Configuration > Delivery Methods**.

Depending on the delivery method selected for the Order Plan, the coverage is derived and converted to the relevant units i.e. days, weeks or months.

## Conversion Factor Unit

The conversion factor unit is the unit of measurement for the lead time and stock coverage period.

1. From the Menu, select **Purchase Orders > Configuration > Delivery Methods**

Depending on the delivery method selected for the Order Plan, the conversion factor unit can be 'Days', 'Weeks' or 'Months' for the **Lead Time** and **Coverage**.

## Calculated Minimum Stock

This is the quantity that is required in stock to provide coverage during the lead time and stock coverage period.

If the **Forecast Total** is less than or equal to the **Calculated NSKU**, no coverage is required as it is unlikely that the items will be used at all during the lead time and stock coverage period.

If the **Forecast Total** (sum of the forecast periods) is greater than the **Calculated NSKU**, with a default value of '1', then the Calculated Minimum Stock is obtained as below:

### Conversion Factor Unit is 'Days'

**Calculated Minimum Stock** = [Forecast for **Qtr 1** / (13.0 \* 7)] \* (**Lead Time** + **Stock Coverage**)

### Conversion Factor Unit is 'Weeks'

**Calculated Minimum Stock** = (Forecast for **Qtr 1** / 13.0) \* (**Lead Time** + **Stock Coverage**)

### Conversion Factor Unit is 'Months'

**Calculated Minimum Stock** = (Forecast for **Qtr 1** / 3) \* (**Lead Time** + **Stock Coverage**)

In all other cases, the **Calculated Minimum Stock** will be 0.

## Final Safety Stock

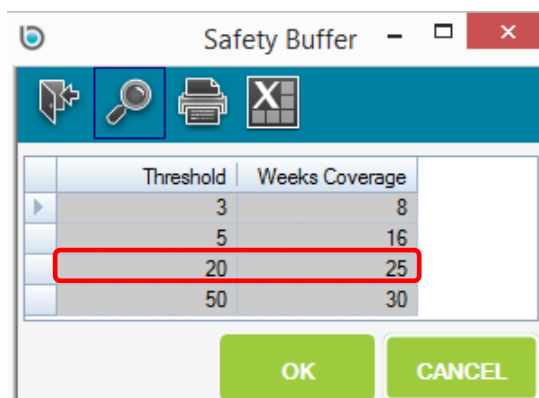
The final safety stock ensures that the stock does not get exhausted before the next order arrives.

1. **Variable Safety Stock** is calculated by finding the weeks' coverage for the threshold in the *Safety Buffer* screen, according to the **Actuals Total** (total usage during the entire actual period)

The *Safety Buffer* screen is accessed from **Stock > Configuration > Safety Buffer**.

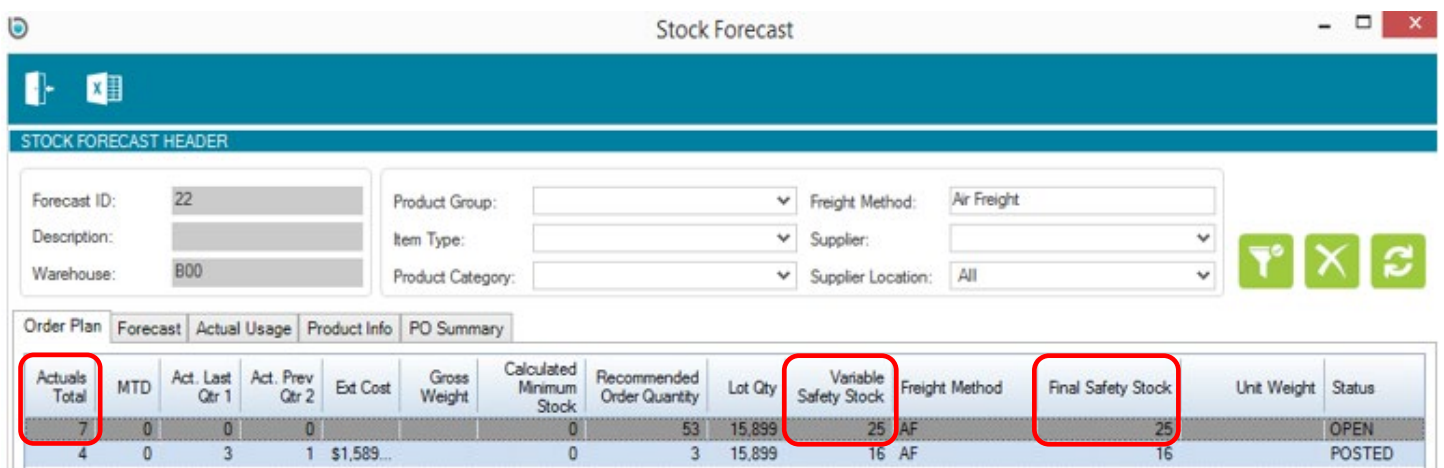
2. If no safety buffer is found for a particular threshold, then the weeks' coverage for the threshold just above the **Actuals Total** value is used
3. If the **Variable Safety Stock** is still 0, then the **Final Safety Stock** is set to the **Min. Stock** on the Stock Location for the item
4. Thereafter, the highest of **Variable Safety Stock** and **Fixed Min. Stock** (**Min. Stock** field on Stock Location) will be used as the **Final Safety Stock**

**For example:** The following safety buffer has been configured in the system:



Threshold	Weeks Coverage
3	8
5	16
20	25
50	30

**Actuals Total** for an item is 7. Threshold 20 will be identified as per this total. Therefore, the **Variable Safety Stock** will be 25.



Actuals Total	MTD	Act. Last Qtr 1	Act. Prev Qtr 2	Ext Cost	Gross Weight	Calculated Minimum Stock	Recommended Order Quantity	Lot Qty	Variable Safety Stock	Freight Method	Final Safety Stock	Unit Weight	Status
7	0	0	0			0	53	15,899	25	AF	25		OPEN
4	0	3	1	\$1,589...		0	3	15,899	16	AF	16		POSTED

### Recommended Order Quantity

This is the quantity of the stock recommended to be ordered by the system for the forecasting period. As opposed to the projected quantity to order, this value does not take into account lot quantities.

1. If **Forecast Total**  $\leq 2$ , then **Recommended Order Quantity** = 0
2. If **Calculated Minimum Stock**  $\leq 1$ , and **Available Stock** = 0, then **Recommended Order Quantity** = **Calculated Minimum Stock**

This is because these stock items are unlikely to be used during the lead time and stock coverage period. Therefore, it is better to order these as and when there is a requirement.

3. If **(Available Stock - Final Safety Stock)** < **Calculated Minimum Stock**, then **Recommended Order Quantity** = **[(Calculated Minimum Stock + Final Safety Stock) - Available Stock]**
4. Otherwise, **Recommended Order Quantity** = 0

### Projected Quantity to Order

This is the item quantity that the system recommends to be ordered in the Order Plan. It is displayed in the **Order Plan** column on the *Order Plan* tab.

Projected Quantity to Order (**Order Plan**) = **Recommended Order Quantity / Lot Qty**

The result is rounded off to the next whole number and multiplied by the **Lot Qty**

**For example:** The **Recommended Order Quantity** for a selected forecasting period is 21. The **Lot Qty** identified is 5. Therefore, the projected quantity to order will be calculated as below:

$$21 / 5 = 4.2$$

Rounding off 4.2 to the next whole number i.e. 5, the projected quantity to order will be  $5 * 5 = 25$ .

### Net Stock on Hand

This is displayed by the **Quantity** field in the relevant stock location.

Net Stock on Hand = Sum of stock quantities in all relevant stock locations

### Total on Order

This is the **Qty on Order** column in the Order Plan. It denotes the quantity of stock on POs that is yet to be received.

**Qty on Order** = Quantity Ordered – Quantity Received

**Note:** The purchase orders must belong to the relevant warehouse and must not have a **Status** of 'OPEN', 'CANCELLED' or 'COMPLETED'.

If allocated quantities are not included in the forecast (**Include Allocation Qty** checkbox is unchecked on the *Stock Forecasting* screen), then allocated quantities must be subtracted from the result obtained.

### Available Stock

**Available Stock** = Net Stock on Hand + **Qty on Order**

This calculation takes into account the value of the **Include Allocation Qty (in Total Order Qty)** checkbox on the *Stock Forecasting* screen.

On the stock location, **Quantity** indicates the total number of stock items regardless of allocated quantity. **Qty Available** indicates the total quantity of items in the location minus allocated quantities.

If the **Include Allocation Qty (in Total Order Qty)** on the *Stock Forecasting* screen is checked, then **Available Stock** = **Quantity** (from stock location) + **Qty on Order**

If this checkbox is unchecked, then **Available Stock** = **Qty Available** (from stock location) + **Qty on Order**

In the latter case, the **Qty on Order** is reduced by the allocated quantity. The **Available Stock** is then set to **Quantity** (from stock location) + **Qty on Order**.

### Allocated Quantity

**Allocated Quantity** = Sum of allocated stock quantities in all relevant stock locations

### Quantity on Hand (National)

This is the quantity on hand of the stock item in the top (national) warehouse.



### Quantity on Hand (Other)

This is the quantity on hand of the stock item across all warehouses included in the forecast other than the top / national warehouse.

## STOCK REORDER

When a stock reorder batch is created from the *Stock Forecasting* screen, the **Source** of batch will be 'Forecasting'.

Forecasting requirements are part of the Reorder process. If purchase orders have already been created through the *Stock Forecasting* screen, the **Status** of this reorder batch is updated to 'POSTED'.

Please refer to the 'How to Use Stock Reorder' guide for more information on standard reordering.

### Standard Reordering and Advanced Reordering Differences

The key points of difference between the standard and advanced stock reordering functionalities are as follows:

#### 1. Trigger of when to order

STANDARD REORDERING	ADVANCED REORDERING
Will auto reorder if the available item quantity is less than the <b>Min. Stock</b> on the Stock Location (also taking into account the <b>Qty. On Order</b> )	Will auto reorder if the <b>Forecast Total</b> is more than 2 and/or the <b>Forecast Total</b> is greater than the <b>Calculated NSKU</b> quantity.

#### 2. Quantity to reorder

STANDARD REORDERING	ADVANCED REORDERING
Will reorder to fill up from <b>Qty Available</b> to the <b>Max. Stock</b> on the Stock Location (also taking into account the <b>Qty On Order</b> )	Will recommend to order the forecast quantity for the period according to the lead time and stock coverage for the delivery method plus a safety buffer, which is the highest of: <ul style="list-style-type: none"> <li>• The <b>Variable Safety Buffer</b> calculated as the weeks' coverage based on the threshold which in turn is based on the total actuals</li> <li>• The <b>Min. Stock</b> on the Stock Location (taking into account the available quantity including <b>Qty On Order</b>)</li> </ul>

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