nextail

Replenishment user guide

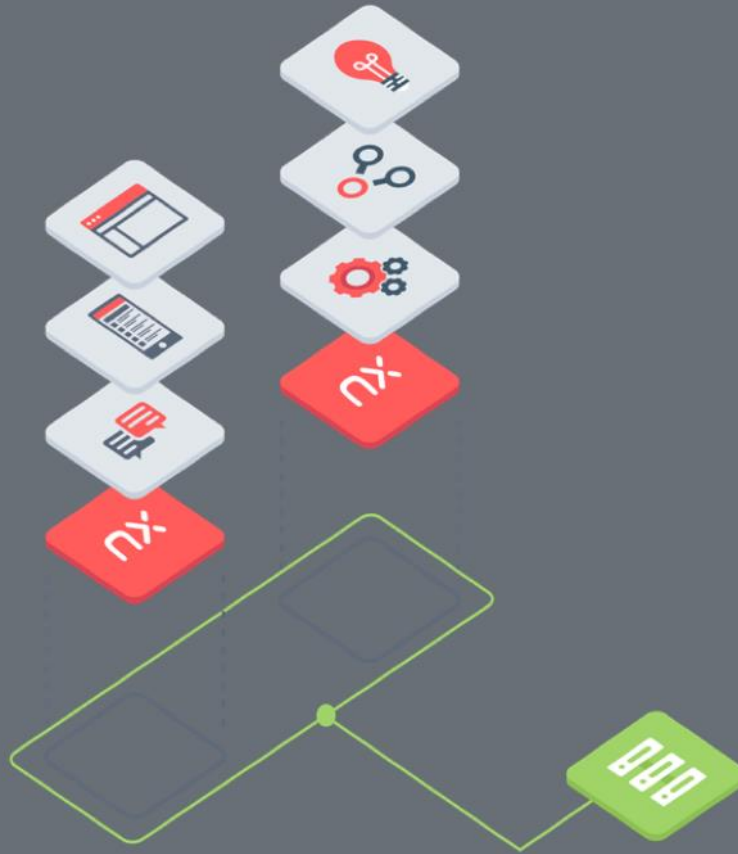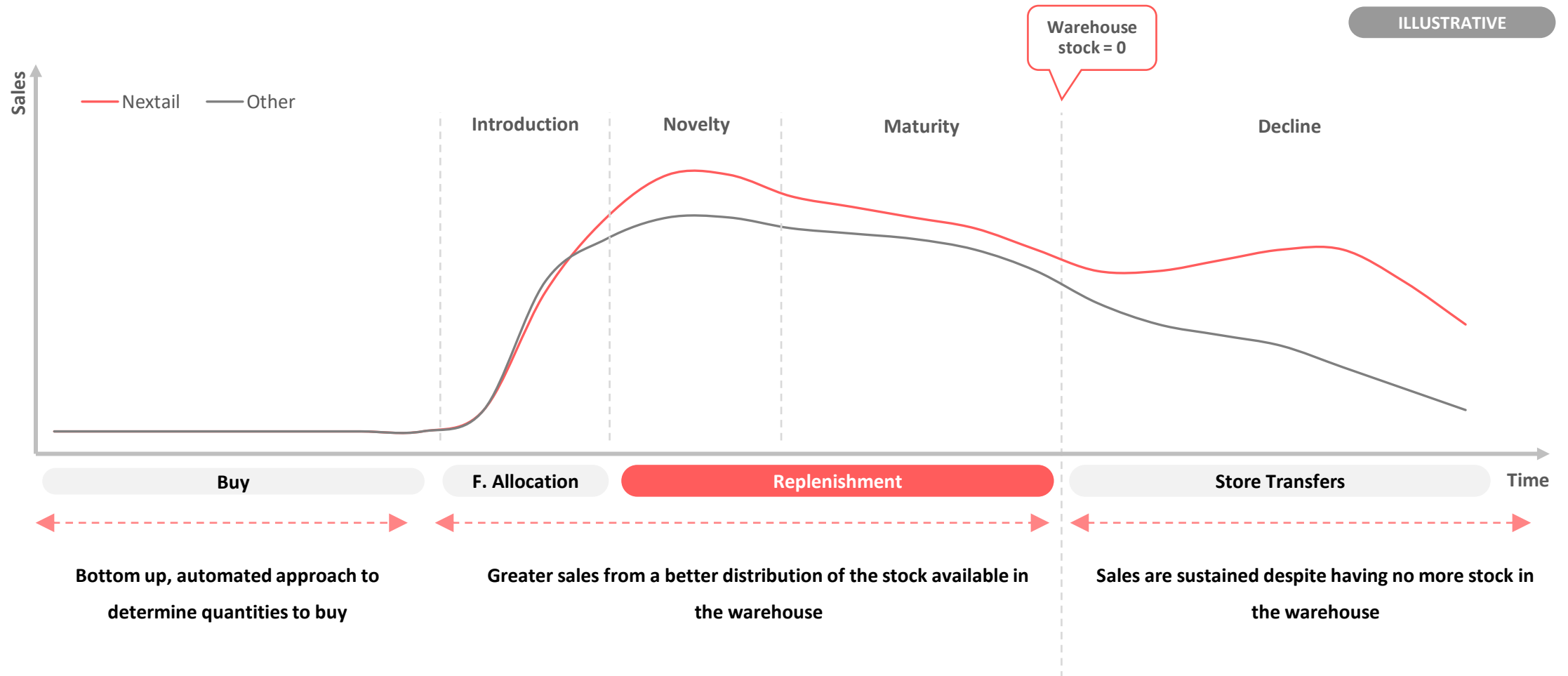July 2020

At the end of this session we will expect you to

○ Understand the two phases of Nextail's Replenishment (Demand Forecast and Global Optimisation)

○ Be aware of all the criteria that affect Nextail's Replenishment

○ Know how Nextail's Dashboard can support your Replenishment decision making

Content

After the first product allocation is in stores, replenishment is the key distribution decision...

ILLUSTRATIVE

Sales

— Nextail — Other

Warehouse stock = 0

Introduction   Novelty   Maturity   Decline

Time

Buy   **F. Allocation**   **Replenishment**   **Store Transfers**

Bottom up, automated approach to determine quantities to buy

Greater sales from a better distribution of the stock available in the warehouse

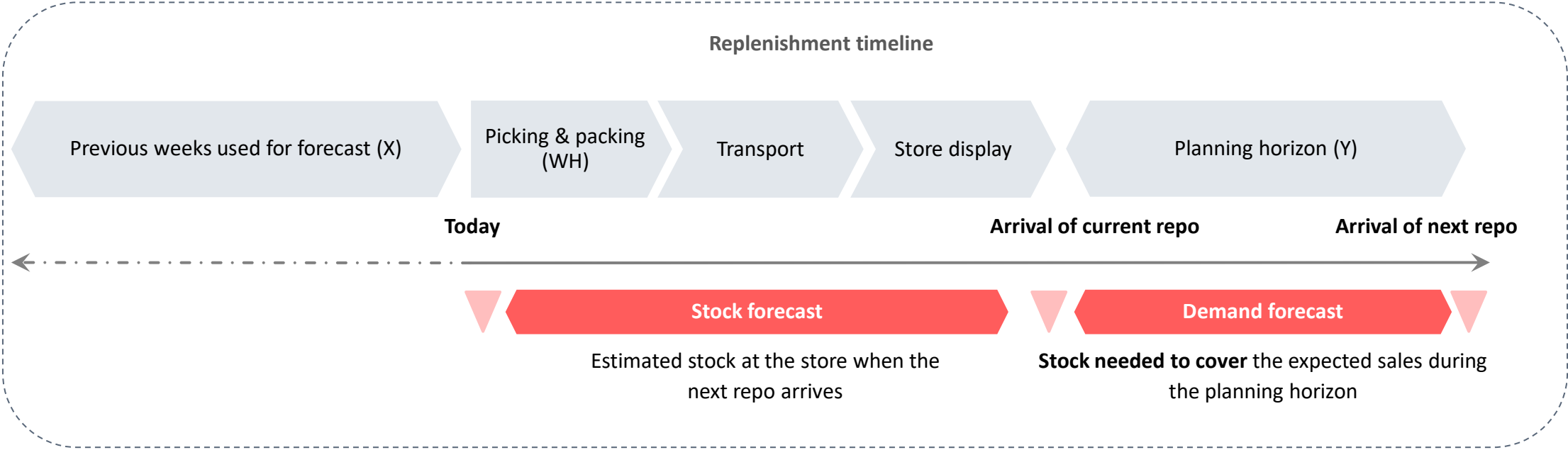**Sales are sustained despite having no more stock in the warehouse**

Replenishment can help capture more value with higher sales and

less lost sales due to a better product availability in stores

Nextail's replenishment algorithm aims at maximizing sales globally across the network and it is based on 5 guiding principles
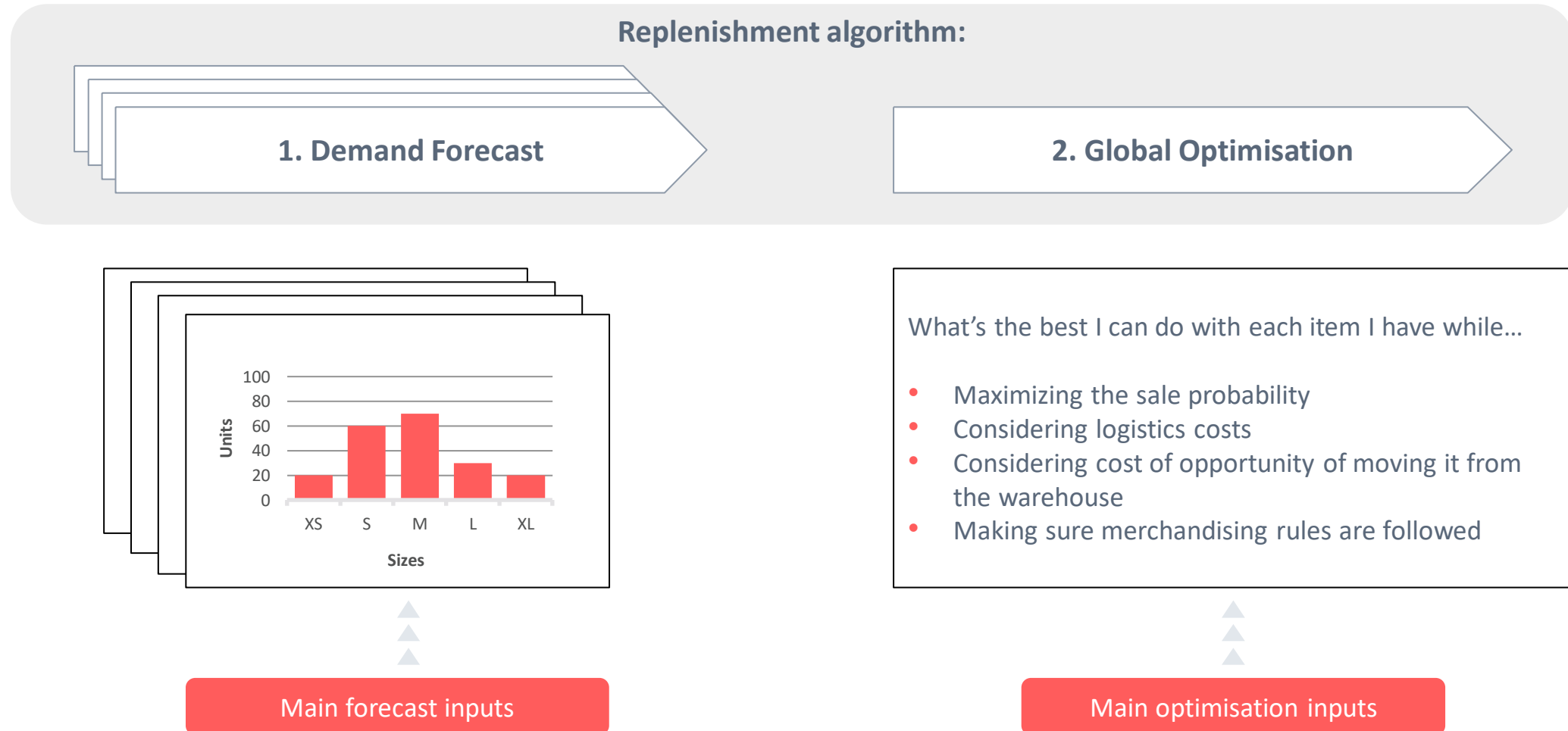
Why that's important?

Demand (not sales) forecast

Based on the sales probability and availability

- Past mistakes in inventory allocation are not "carried over"
- The system corrects and actively prevents stockouts

Global (not local) optimisation

Calculated as a whole, trying to achieve the global optimum

- No local optimisation, no concern for "store level goals"
- Each unit is sent where it is more valuable

Robustness over accuracy

Avoiding big mistakes preceeds over increasing accuracy

- The system works well even with inaccurate or scarce data
- Robust system ensures best results over the long term, while maybe sacrificing small potential short term gains

Meritocracy

The starting point is the existing stock, not store demand

- No "competition between stores for the same item"
- Each stock unit's performance drives its own replenishment

Rich constraints set

Several constraints can be considered

- "Constraints" allow to express business requirements

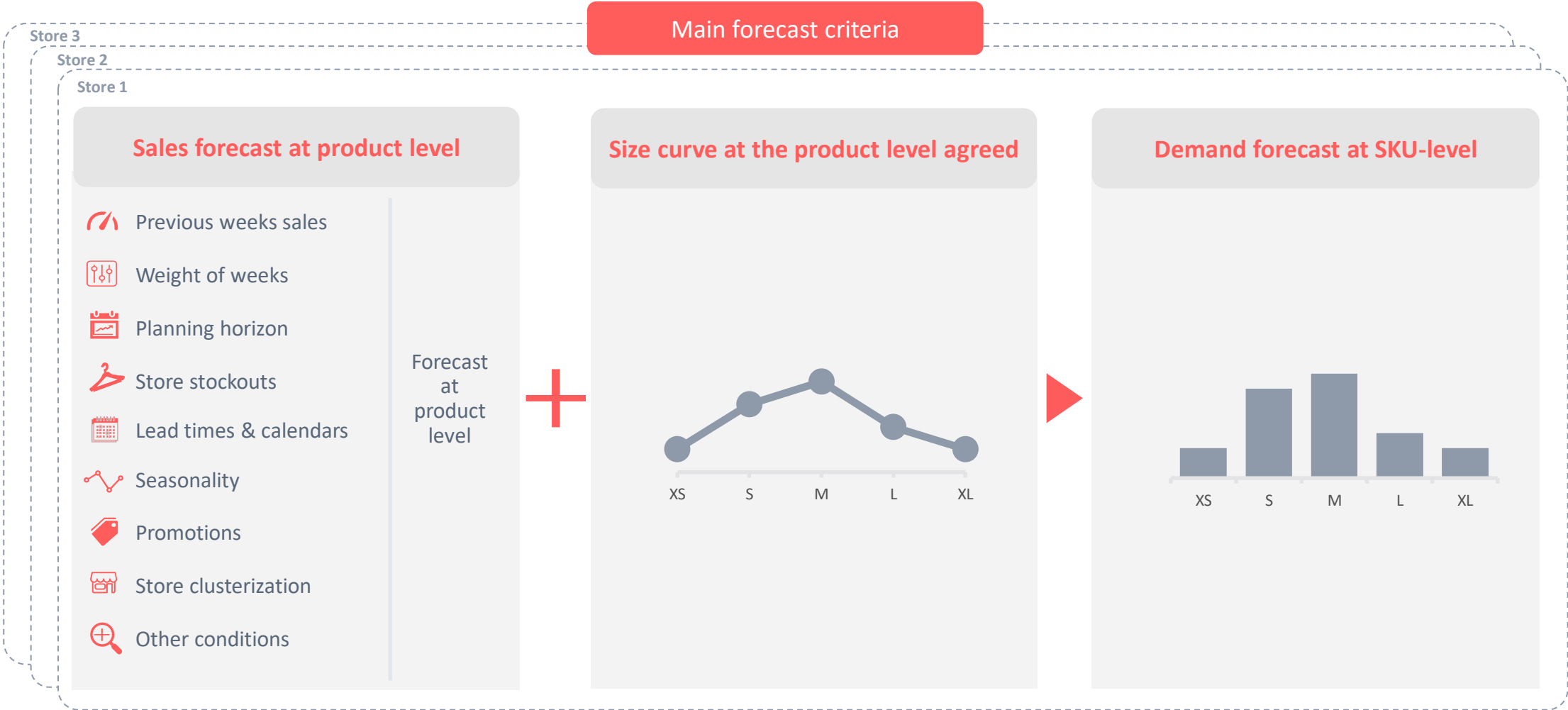# Nextail automatically takes into account timelines and lead times

Replenishment timeline

| Previous weeks used for forecast (X) | Picking & packing (WH) | Transport | Store display | Planning horizon (Y) |

Today   **Arrival of current repo**   **Arrival of next repo**

Stock forecast

Demand forecast

Estimated stock at the store when the next repo arrives

Stock needed to cover the expected sales during the planning horizon

Replenishment algorithm can be divided in two phases: forecast and optimisation

Replenishment algorithm:

1. Demand Forecast

2. Global Optimisation

What's the best I can do with each item I have while...

- Maximizing the sale probability
- Considering logistics costs
- Considering cost of opportunity of moving it from the warehouse
- Making sure merchandising rules are followed

Main forecast inputs

Main optimisation inputs

Demand Forecast & Global Optimisation consider different criteria

which play critical roles in the Nextail Replenishment algorithms

Different criteria play a key role in the Demand Forecast- like, sizes curves and past sales…

Main forecast criteria

Sales forecast at product level

- Previous weeks sales
- Weight of weeks
- Planning horizon
- Store stockouts
- Lead times & calendars
- Seasonality
- Promotions
- Store clusterization
- Other conditions

Forecast at product level

+

Size curve at the product level agreed

XS S M L XL

▶

Demand forecast at SKU-level

XS S M L XL

When running Global Optimisation, other criteria, including stock positions in stores and visual merchandising rules, are considered
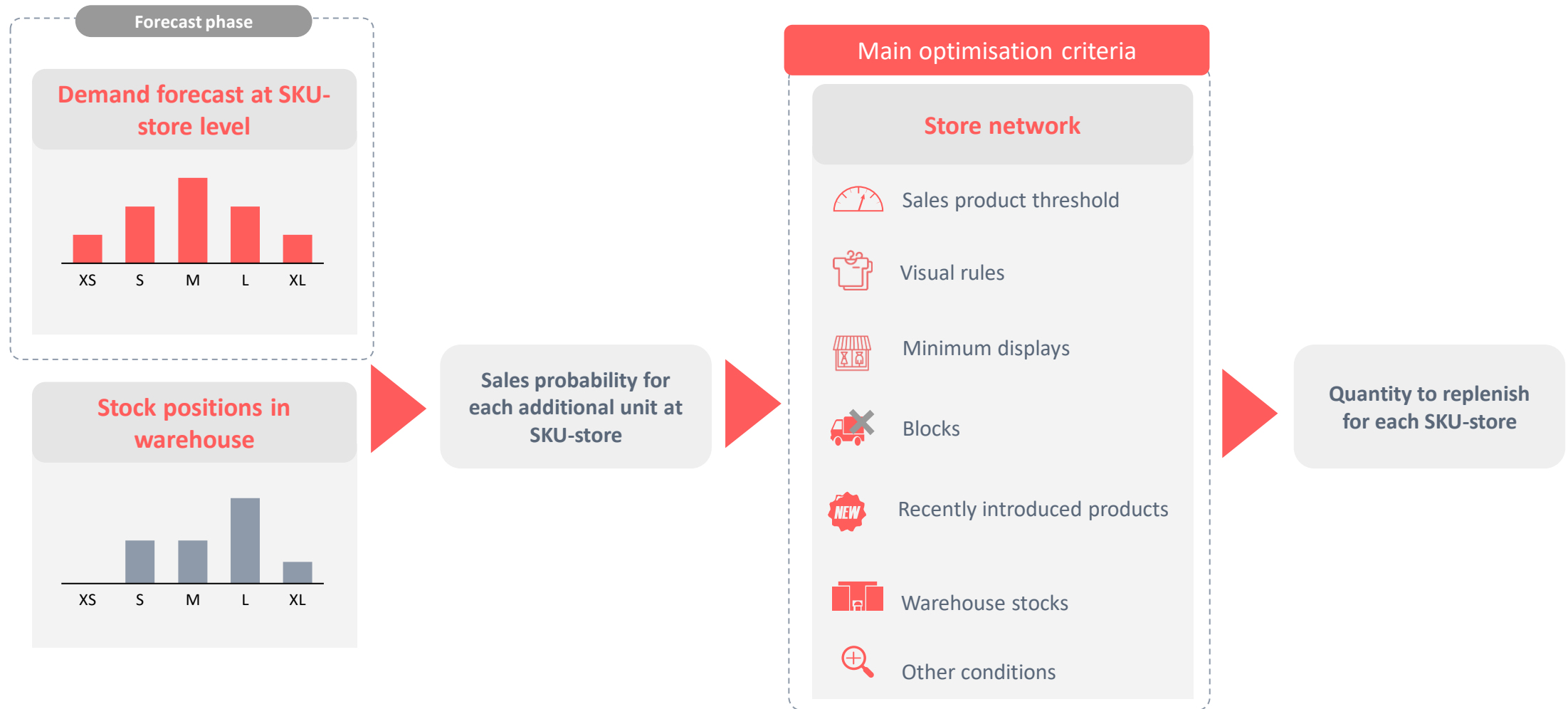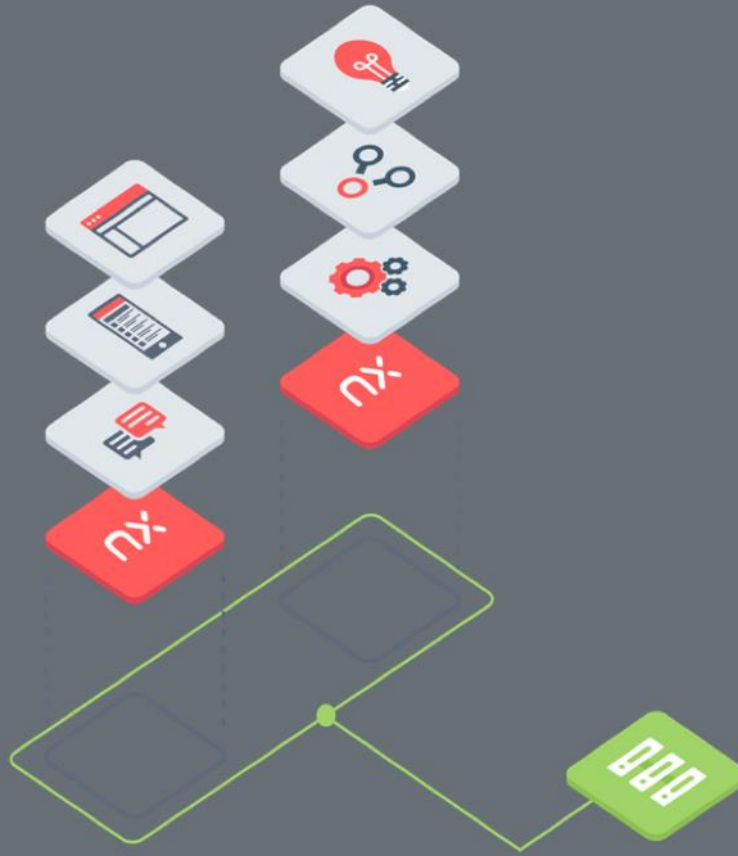
Forecast phase

Demand forecast at SKU-store level

XS S M L XL

Stock positions in warehouse

XS S M L XL

Sales probability for each additional unit at SKU-store

Main optimisation criteria

Store network

- Sales product threshold
- Visual rules
- Minimum displays
- Blocks
- Recently introduced products
- Warehouse stocks
- Other conditions

Quantity to replenish for each SKU-store

Content

The aim of the demand forecast phase is to have a reliable demand prediction

Replenishment forecast engine

It is used twice for each combination of SKU-store:

To estimate how many units will remain at the end of the "stock forecast" period...

...and how many additional units are required to cover demand until the end of the "demand forecast" period

Repo calculation

Estimated arrival of current repo

End of planning horizon

Stock forecast
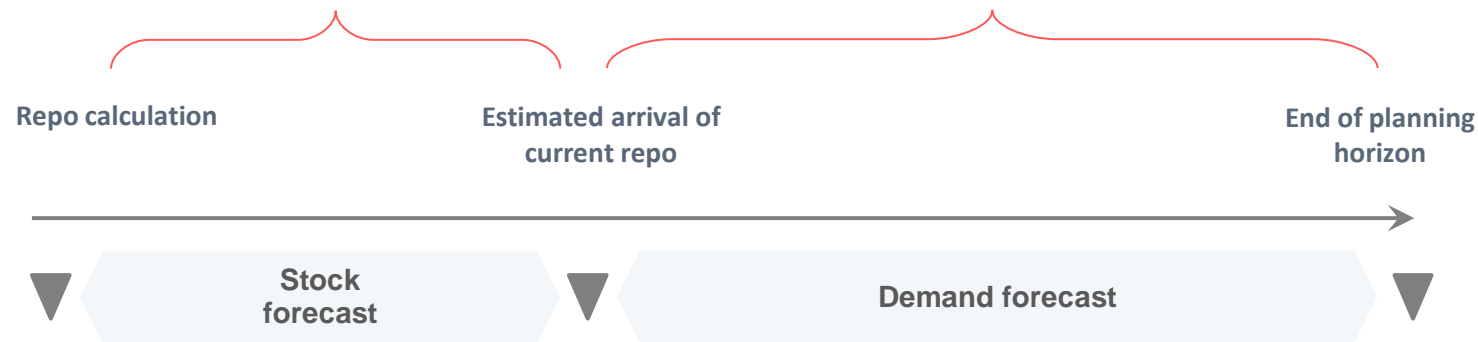
Demand forecast

It considers not just past sales, but also the sales opportunity that the product had (stockouts, period on display, etc.)

Several criteria are considered in building a reliable Demand Forecast

Criteria when forecasting	Embedded within the algorithm	Inputs you can influence
Previous weeks sales		✔
Weight of weeks		✔
Planning horizon		✔
Store stockouts	✔	
Lead times & calendars		✔
Seasonality	✔	
Promotions		✔
Store clusters	✔	
Other conditions	✔	

Some of the criteria are embedded within the algorithm, and some are inputs that you can influence

As mentioned, two key inputs are past sales and the number of future sales days to be covered with the forecast

Criteria when forecasting

- Previous weeks sales
- Weight of weeks
- Planning horizon
- Store stockouts
- Lead times & calendars
- Seasonality
- Promotions
- Store clusters
- Other conditions

Previous week sales:

Number of previous weeks used for the forecast
When there is not past sales information we use store cluster information or demand for comparable products from the past

Weight of weeks:

% of weight assigned to each of the previous weeks
Giving more weight to last week's sales captures the most recent changes in demand

Planning horizon:

Number of future sales days to be covered with forecast calculation after lead time (days we want to replenish)
The higher the planning horizon the higher the amount of stock we will replenish as we will cover longer period of sales

Information about store stock availability allows Nextail to have a real time understanding of demand

Criteria when forecasting
Previous weeks sales
Weight of weeks
Planning horizon
Store stockouts
Lead times & calendars
Seasonality
Promotions
Store clusters
Other conditions
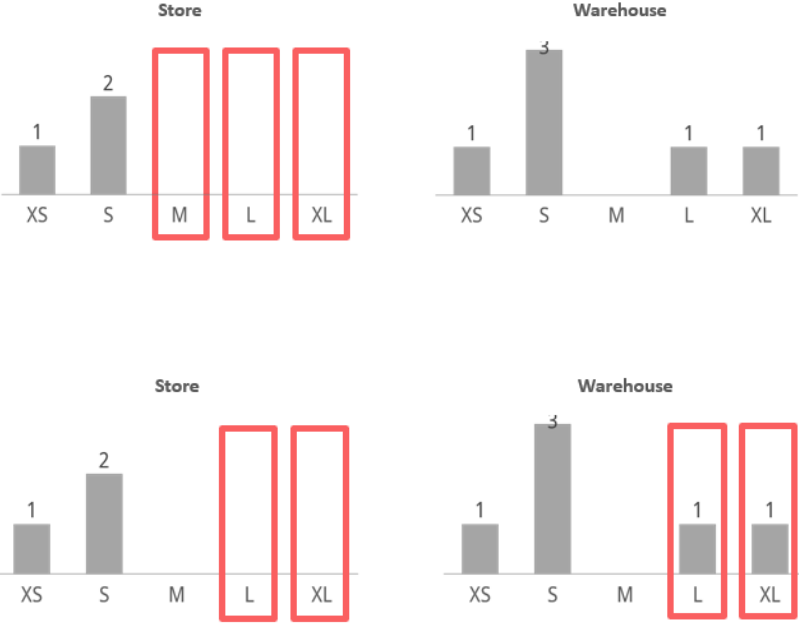
Absolute Stockouts

Definition: measures SKU size gaps in a store vs. the SKU sizes it should have (in the example sizes M, L and XL have stockouts)

Calculation: 3 sizes with 0 stock in the store, out of 5 sizes in the store (Absolute Stockout = 60%)

Real Stockouts

Definition: measures SKU size gaps in a store vs. the SKU sizes it should have adjusting for stock availability in warehouse. In the example, we only take into account stockouts that can be solved from warehouse (sizes L and XL). It is always less or equal than the absolute stockout

Calculation: 2 sizes with 0 stock in the store but with stock in the warehouse, out of 5 sizes in the store (Real Stockout = 40%)

Nextail considers stockouts to understand the real demand of a product in a store

Demand forecasting is calculated daily but, store orders are only sent through when the calendar option is ticked

Criteria when forecasting
- Previous weeks sales
- Weight of weeks
- Planning horizon
- Store stockouts
- Lead times & calendars
- Seasonality
- Promotions
- Store clusters
- Other conditions

Calendars: It guarantees the stores receive the stock that they deserve calculating the need daily even if there is no warehouse order

Lead times: Automatically taken into account when managing calendars

Calendar Plans
Filter to select the Calendar Plan you want to edit

– Group 1 · **77 stores**		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Code	Name							
A0002	ACME STORE 0002	☑						
A0003	ACME STORE 0003	☑						
A0007	ACME STORE 0007		☑					
A0008	ACME STORE 0008		☑					

LT 2 days

LT 1 day

☑ **Replenishment calculation**   ● **Warehouse dispatch**   ■ **Arrival in store**
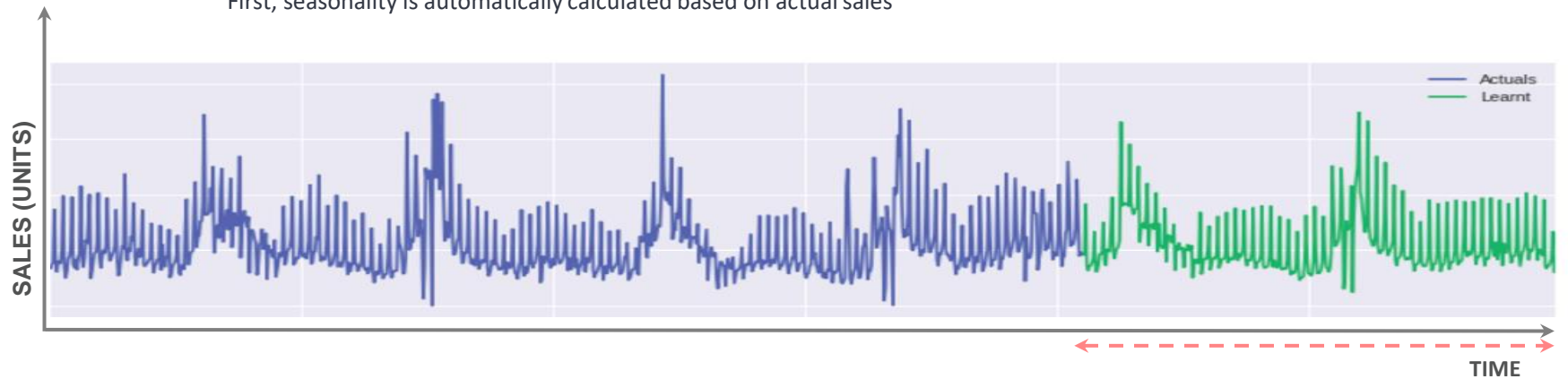
Replenishment calculates stock need for all the stores but only allocates stock (waybills) for the stores that are picked that day

The effect of recurring events (seasonality) is automatically calculated by Nextail

Criteria when forecasting
📈 Previous weeks sales
🎛️ Weight of weeks
📅 Planning horizon
📉 Store stockouts
📅 Lead times & calendars
〰️ Seasonality
🏷️ Promotions
🏬 Store clusters
🔍 Other conditions

ILLUSTRATIVE

SUMMER   WINTER   SUMMER   WINTER

SALES (UNITS)

TIME
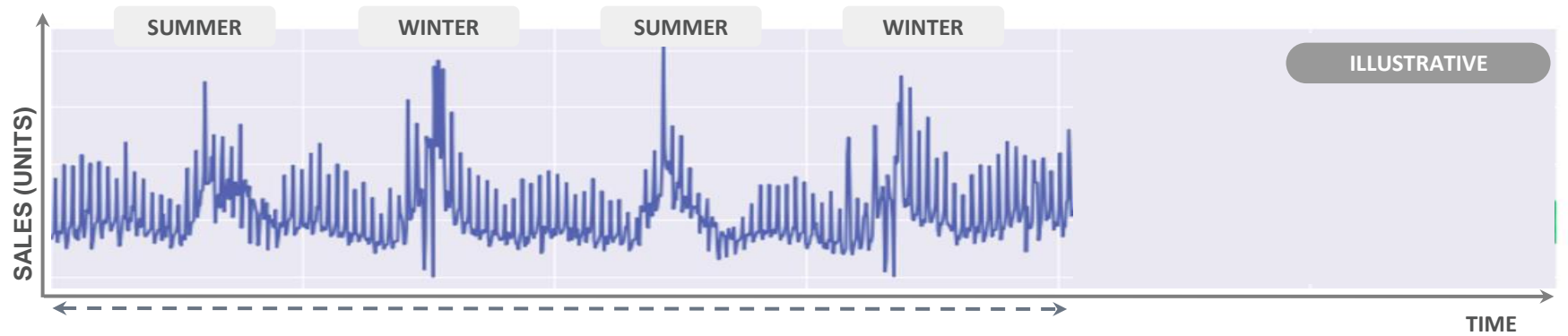
First, seasonality is automatically calculated based on actual sales

SALES (UNITS)

— Actuals
— Learnt

TIME

It is then automatically calculated for the near future, based on historical data using an individual day coefficient for each store and each date.

Some of the events that happen every year at different moments (like Easter) are adjusted in the seasonal curves

The effect of non-recurring or movable events can be set up in Nextail's platform as promotions

Criteria when forecasting

- Previous weeks sales
- Weight of weeks
- Planning horizon
- Store stockouts
- Lead times & calendars
- Seasonality
- Promotions
- Store clusters
- Other conditions

Sales SS17 | Back to school | MSS | Black Friday | Sales AW17

Jun '17 | Jul '17 | Aug '17 | Sep '17 | Oct '17 | Nov '17 | Dec '17 | Jan '18

— Weekly Sales   — Sales on sale period
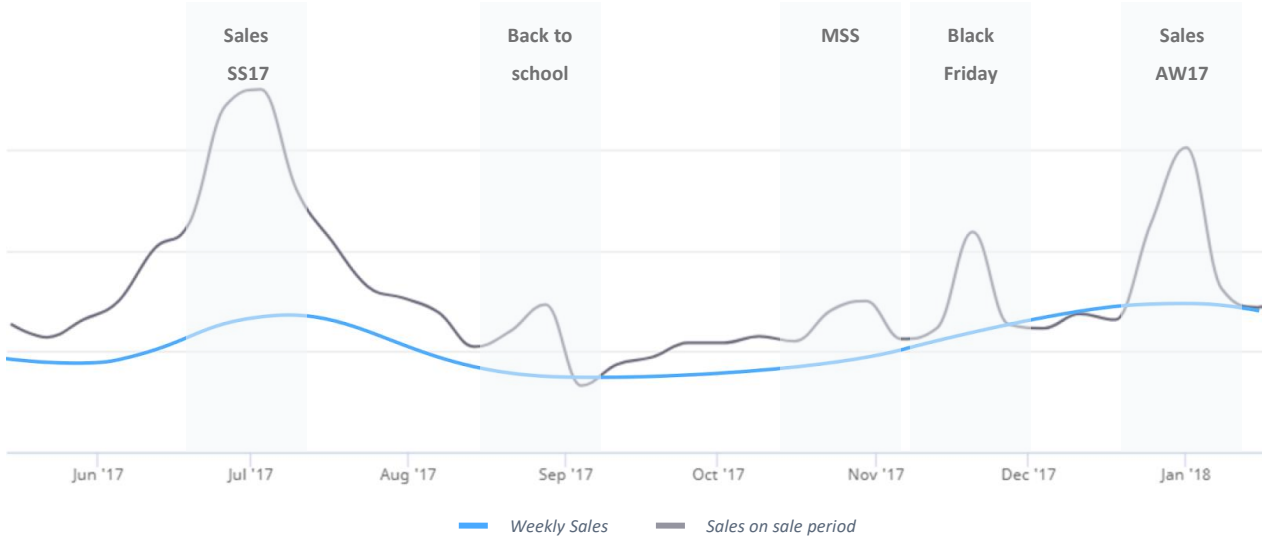
Overview of the promotions
Select the promotions available for your network of stores and products

New Promotion

ONGOING   FUTURE   **FINISHED**

Sales February	-20%	Black Friday	-30%
Period from 14 Feb to 16 Feb, 2019	Period from 8 Jan to 31 Jan, 2019	Period from 23 Nov to 26 Nov, 2018	Period from 2 Apr to 19 Nov, 2018
92 stores 7 products	10 stores 3 products	92 stores 1 products	92 stores 11 products
ACTUAL COEFF.	ACTUAL COEFF.	ACTUAL COEFF.	ACTUAL COEFF.

Clustering stores is key when there is not enough information at store level

Criteria when forecasting
Previous weeks sales
Weight of weeks
Planning horizon
Store stockouts
Lead times & calendars
Seasonality
Promotions
Store clusters
Other conditions

Store clusters:

- Nextail calculates them based on average sales per product and velocity

- Based on best practices, the % of cases in which cluster data is used is less than 20%

- If preferred, Nextail can use a specific clusterization provided by the customer based on other criteria

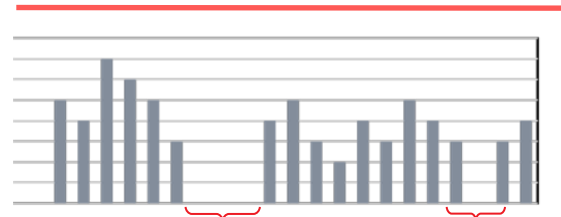# There are other conditions impacting forecast when store data is not robust enough

Criteria when forecasting

- Previous weeks sales
- Weight of weeks
- Planning horizon
- Store stockouts
- Lead times & calendars
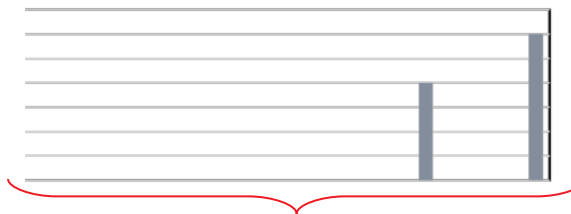- Seasonality
- Promotions
- Store clusters
- Other conditions

Description of problem

Nextail's solution

Lack of sales data

Data transmission

Enough historic data although there is some **missing data** of stock-outs

Fill in blanks by using the rest of the days and assigning them weight according to seasonality

Products reintroduced in the WH after a long period without stock

There is **not enough past-data** to elaborate a proper forecast
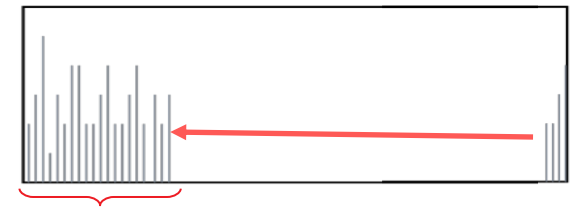
Delve deeper into the historic data until the product was available in the store and there is relevant data

# Size curves are calculated once a week based on last 60 days sales and at different levels

ACME PRODUCT

554 • ACME STORE 103
Forecast 7.4 • Final stock 7
10

43%
29%   29%
5

0
002   003   004

Show details
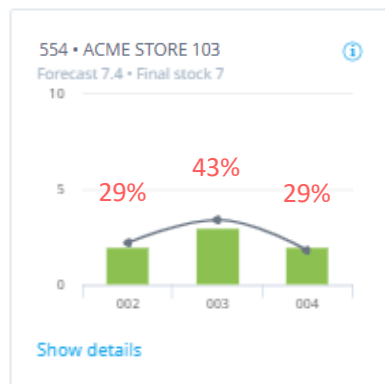
- Size curves are used to understand the sales behavior of each size in each store and break down the total product forecast into a demand forecast at SKU level.

- Normally, size curves are calculated considering the following levels:
  - Store
  - Product categorization (family /subfamily/ department)
  - Size set

- You can request to change the number of days to calculate the size curve as needed:
  - Number of past days to calculate size curves
  - Maximum number of past days without activity when calculating size curves
  - Minimum number of past days needed to calculate size curves

If data is not enough to calculate the size curves at this level Nextail algorithms goes one level above to ensure size curves are robust
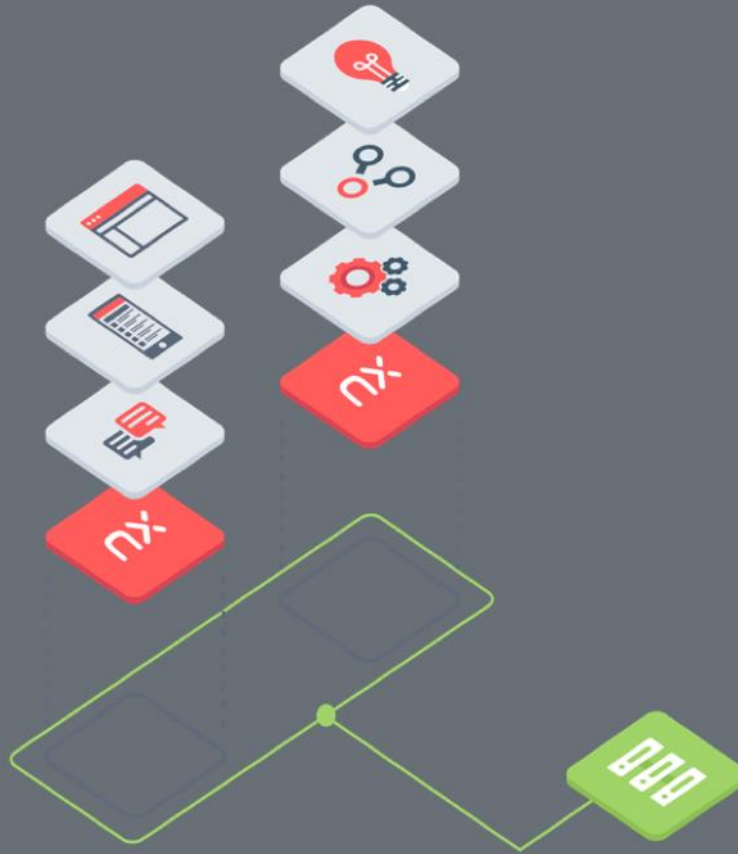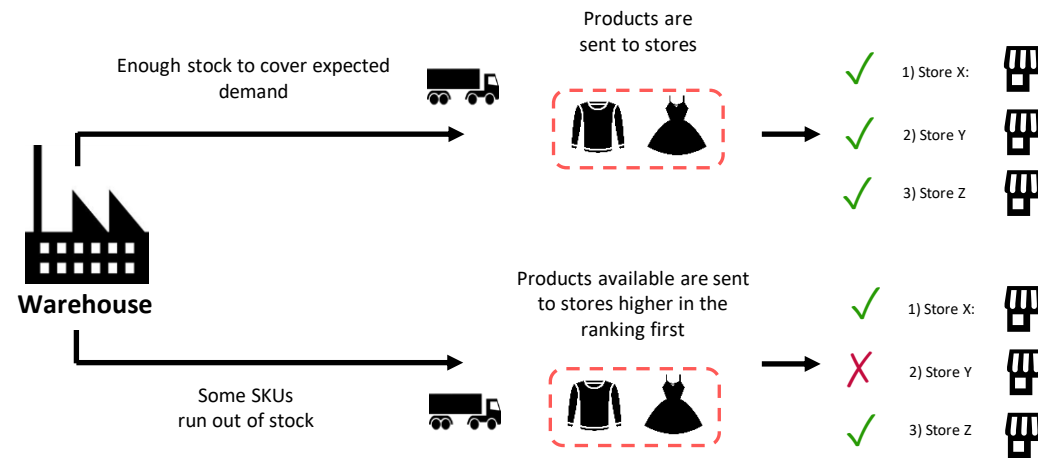
Content

The aim of global optimisation is to assign stock to stores that maximizes the sales potential across the network

Replenishment optimisation engine

It allocates units of each SKU by taking into account the value of keeping stock in WH, while applying different types of local restrictions.

Warehouse stock:

Several criteria are considered in Global Optimisation

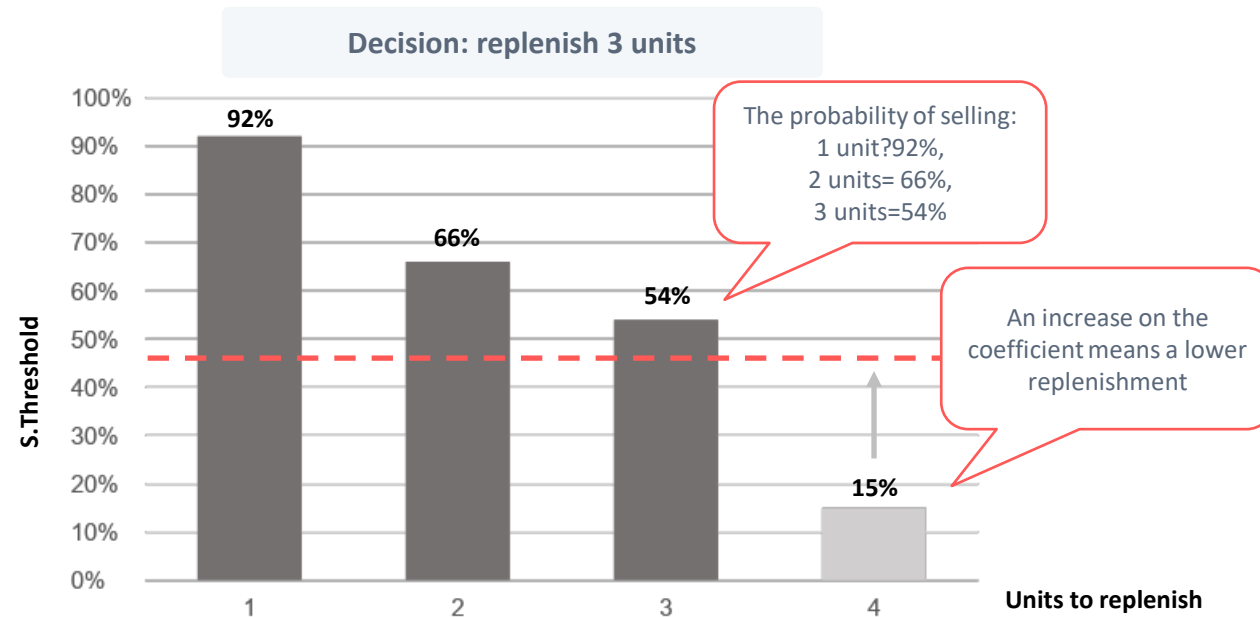| Criteria for Global Optimisation	Embedded within the algorithm	Inputs you can influence
Sales product threshold		✔
Visual rules		✔
Minimum displays		✔
Blocks		✔
Recently introduced products		✔
Warehouse stocks	✔	
Other conditions	✔	✔

Some of the criteria are embedded within the algorithm, and some are inputs that

you can influence

Sales threshold allows you to be more aggressive with the stock sent to the stores. This is the key parameter allocators will amend

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

- Probability threshold that causes an additional unit to be replenished under the planning horizon

- It balances the trade-off between having overstock in the stores and having out-of-stocks that lead to lost sales.

- It is defined at product level; it has the same value for all the stores

Important input

Decision: replenish 3 units

The probability of selling:
1 unit?92%,
2 units= 66%,
3 units=54%

An increase on the coefficient means a lower replenishment

92% 66% 54% 15%

Units to replenish

S.Threshold

Reducing the sales threshold of products with high stock levels in the warehouse makes a big impact on the number of units replenished

Product: 3105081

Sales Threshold	Units replenished	Units left in WH
30%	141 units	1397 units
15%	347 units	1191 units
5%	535 units	1003 units

Given that this is the most important lever you will be working with, it is important to know when to modify it
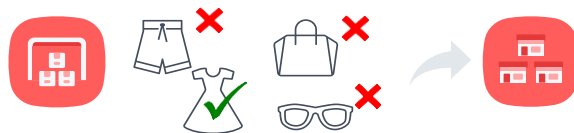
Overstock

The store stock is significantly higher than the demand forecast and the warehouse levels are still high.

- **When does this happen?**

Typical to find these cases at the beginning of the lifecycle of the product.

- **How would I act?**

The threshold should be increased in order to maintain availability for longer in the warehouse and have reaction power in cases there are changes in the sales tendency of the product

Understock

The store stock is significantly lower than the demand forecast and the warehouse levels are still low.

- **When does this happen?**

Most of the cases are presented at the end of the lifecycle of the product.

- **How would I act?**

The threshold value should be decreased in order to make sure the last units are sent to the best stores only.

Visual rules capture conditions that need to be met for a product to be displayed at a potential store

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

Minimum units per product

Min number at product level required to expose the product in the shop floor

nx *Example*

8 units

+

Minimum % of sizes

Min % of the size curve at product level required to expose the product in the shop floor

nx *Example*

60%

Products will not be replenished to a store if the visual rules are not fulfilled.
**Visual rules have been previously agreed and can be changed only through Nextail team**

Minimum displays change the replenishment from "pull" to "push" based

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

Min. displays:

- Minimum amount of units of a product required for exhibiting it in a store

- It is typically worse (except if physical display is needed)

- They can be configured at SKU or product level and either Soft or hard

- Use cases:

  - Products requiring display (e.g. glasses, accessories, etc.)
  - Store windows (products displayed but not on sale)
  - Low rotation products

Units sent over min display
Min display
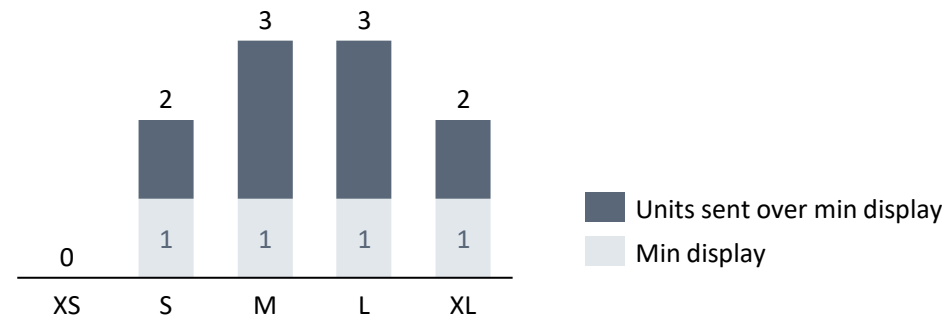
The ability to block products allows us to change store layout when needed

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

Blocks:

- It is the ability of stopping the replenishment from the warehouse to a specific store in product/SKU level

- All products in store layout are unblocked products

- The SKU blocks feature allows you to fine-tune your store layout when needed.

- The status can be easily change in Nextail admin

To be more conservative at the beginning of the product lifecycle, there are rules to manage recently introduced products

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

Maintain initial size set allocation

For the time period considered as "recently introduced", maintain a automatic min display of one per size

+

Maintain maximum stock level

For the time period considered as "recently introduced", maintain the maximum central stock (commercial stock + transits) per size in each store from the moment the product sells 1 unit.

Illustrative

4 6 3
S M L
Max. Central stock
Week 1

0 0 0
S M L
0 units sold

1 1 1
S M L
Until day 8:
0 units sold

1 6 1
S M L
Day 11:
M: 1 unit sold

Week 1   Week 2

14 Days period as recently introduced
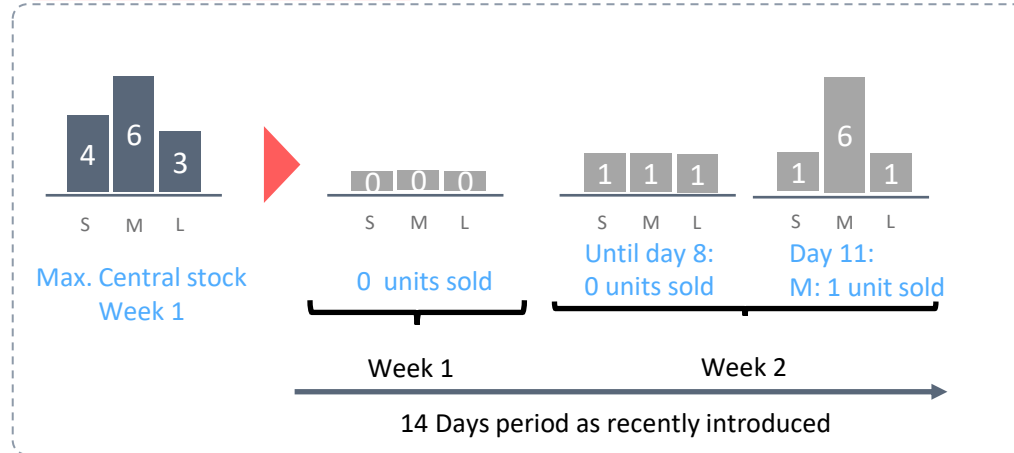
■ Automated Min. display

WH stock availability when there is scarcity, is a trigger to decide if it is worth sending units to store or keeping them in the warehouse

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

Wh stock scarcity:

Multiple size products

- Scarcity is calculated based on replenishment velocity and size curves
- If a SKU has high residual value, Nextail will only send where there is high probability
- **Residual value is based on the % of initial buy quantity left**

Current warehouse stock

	XS	S	M	L	XL
	30	75	35	50	2

Scarcity for XL size
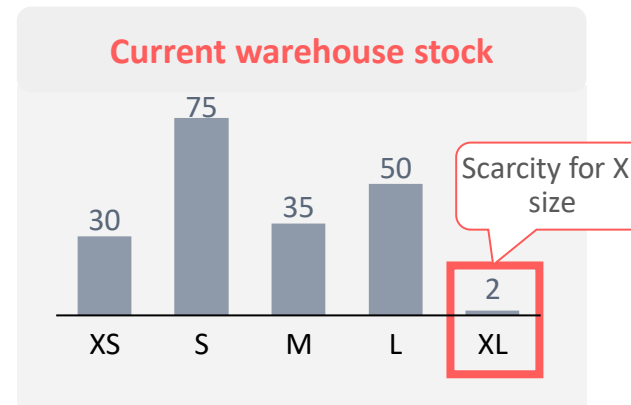
Residual value is considered as 1 in single size products. When there is scarcity in Warehouse, the scarce units are replenished to the stores with the highest demand-stock ratio

Nextail allows you to include additional business restrictions for replenishment calculation

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

Max capacity:
- Used to limit the amount of units of a product category (families) in a store.
- The algorithm will remove units less likely to be sold until the condition is met.

Max order
- Used to set a maximum number of units that a store can afford to receive.
- The algorithm will remove units less likely to be sold until the condition is met.

Min order
- Used to stablish a trigger when sending units to a store from the WH
- If a store doesn't cover the trigger with the units to be sent, it will not receive any units.

Prepacks
- Used when the suppliers send the products with units of different sizes in one physical content
- The algorithm will prioritize sending prepacks before sending single units

Nextail replenishes automatically linked lines aggregating the data of all the products in the chain

Criteria for Global Optimisation
Sales product threshold
Visual rules
Minimum displays
Blocks
Recently introduced products
Warehouse stocks
Other conditions

- Linked lines are created automatically in Nextail once you have created them in ODBMs
- Nextail will aggregate all store stock and sales data for all products linked under the active product reference (the new ref)
- Nextail will calculate demand forecast for the linked lines as if it was a single product
- Nextail will replenish the product using the stock available in the warehouse for any of the linked lines

Switch history

REFERENCE	NAME	ACTIVE
737443	White Sl Alexa Bow Cami	Yes
733681	White Sl Alexa Bow Front Cami	
736292	White Sl Alexa Bow Cami	
737439	White Sl Alexa Bow Cami	

All data is aggregated under the Active reference, all changes in parametrization (blocks, thresholds) needs to be done in this reference.
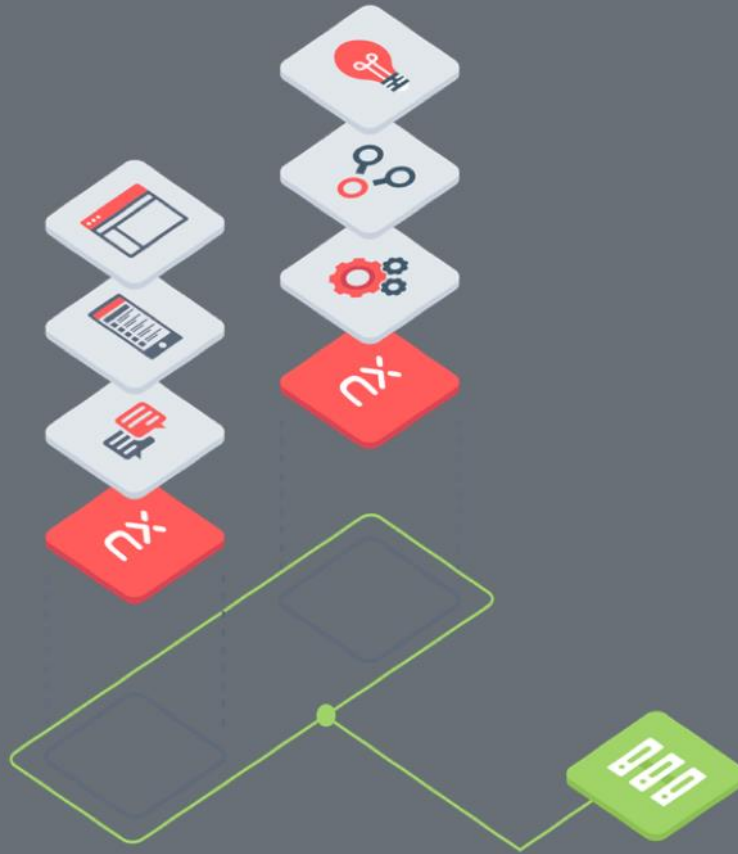
Content

1	Overview of Nextail's Replenishment
2	Criteria impacting the Demand Forecast
3	Criteria impacting Global Optimisation
4	**Nextail's dashboard to support Replenishment**
5	Next steps

Nextail's dashboard allows the user to check high level KPIs (all products and all stores)…
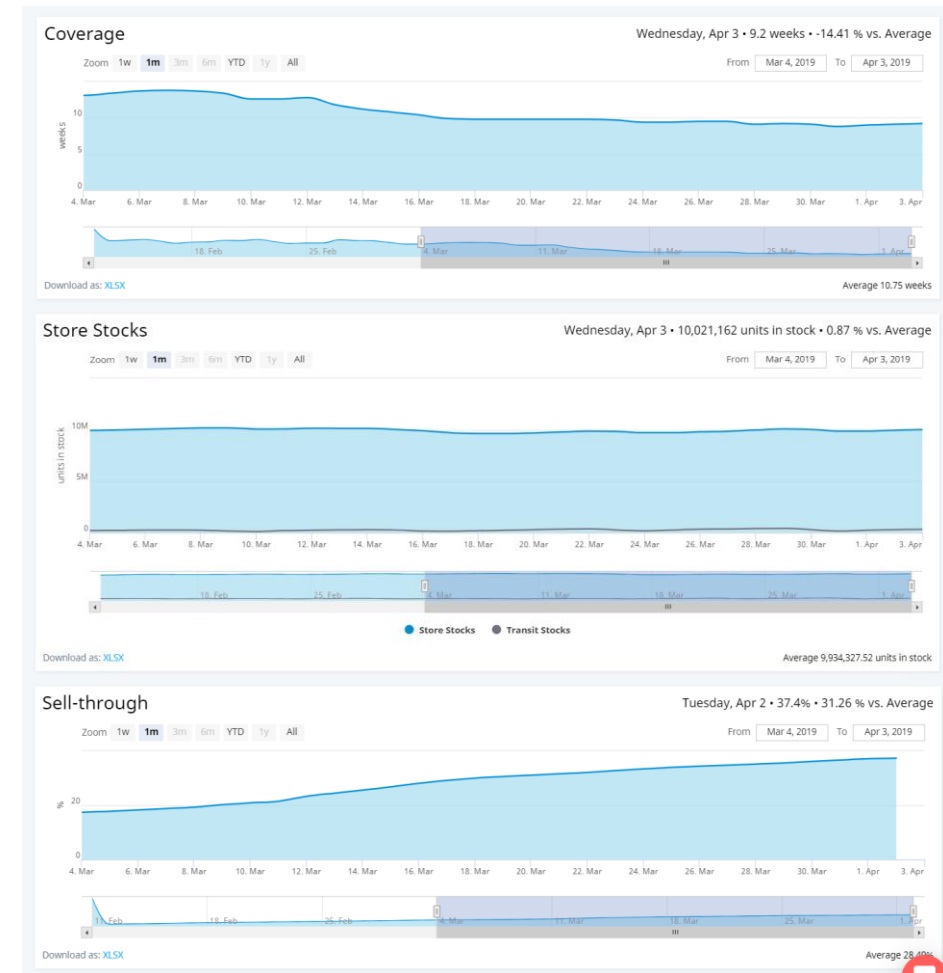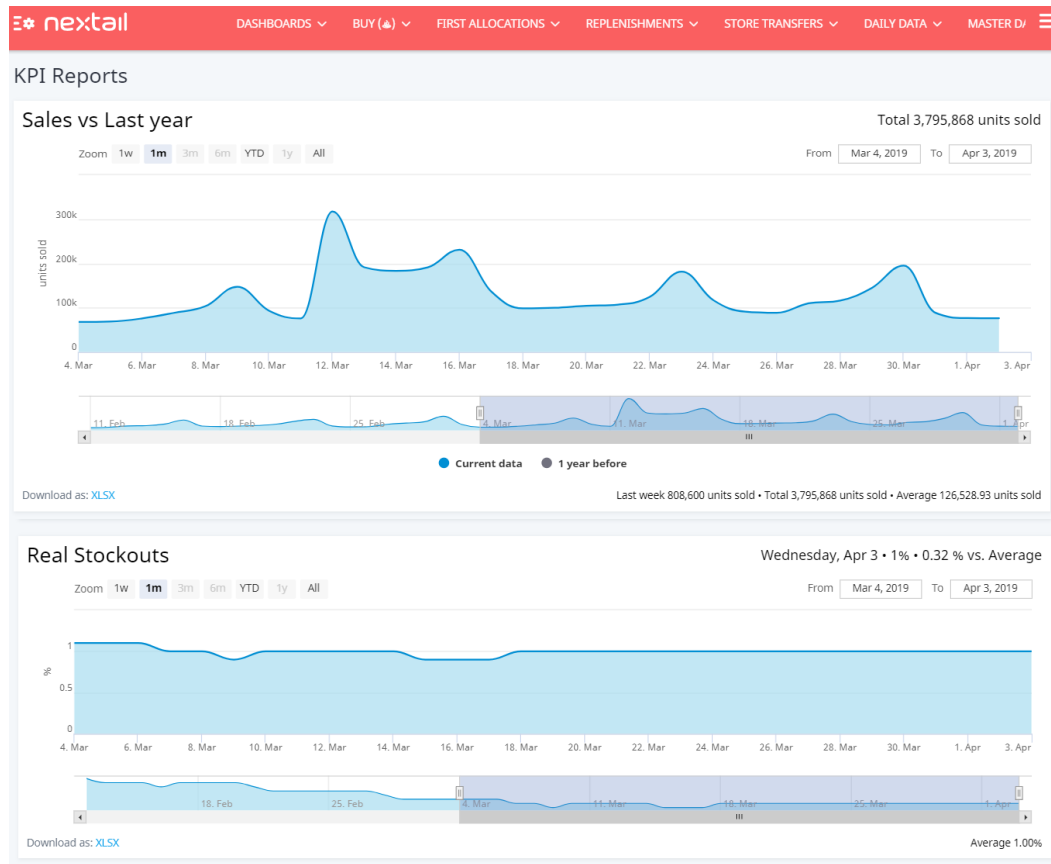
… or in a detailed view, both filtering by stores and product groups or by a specific product reference
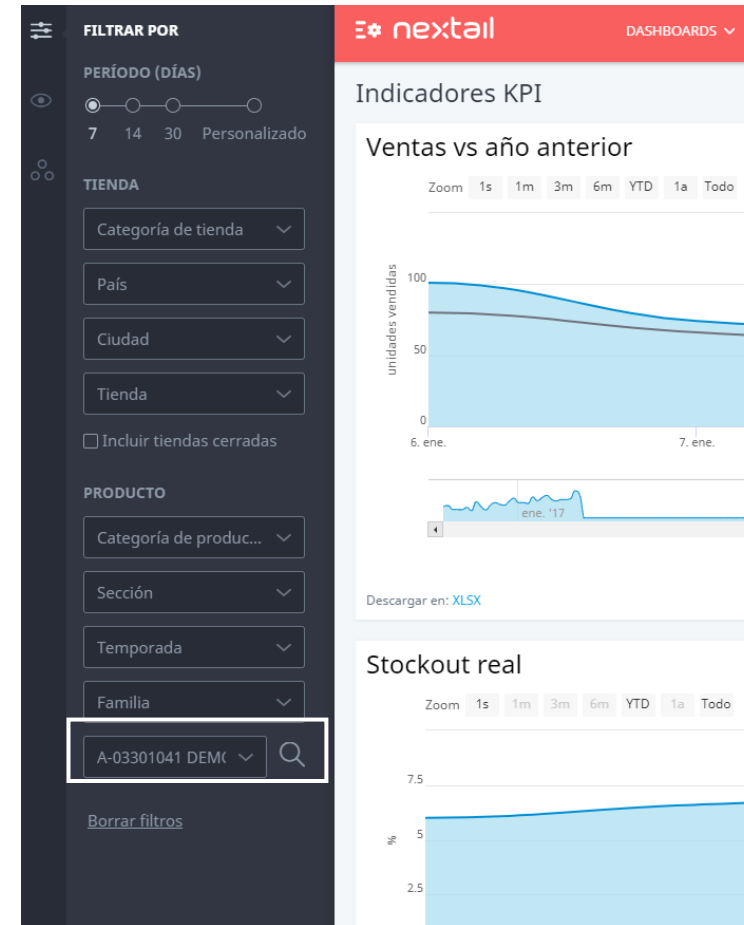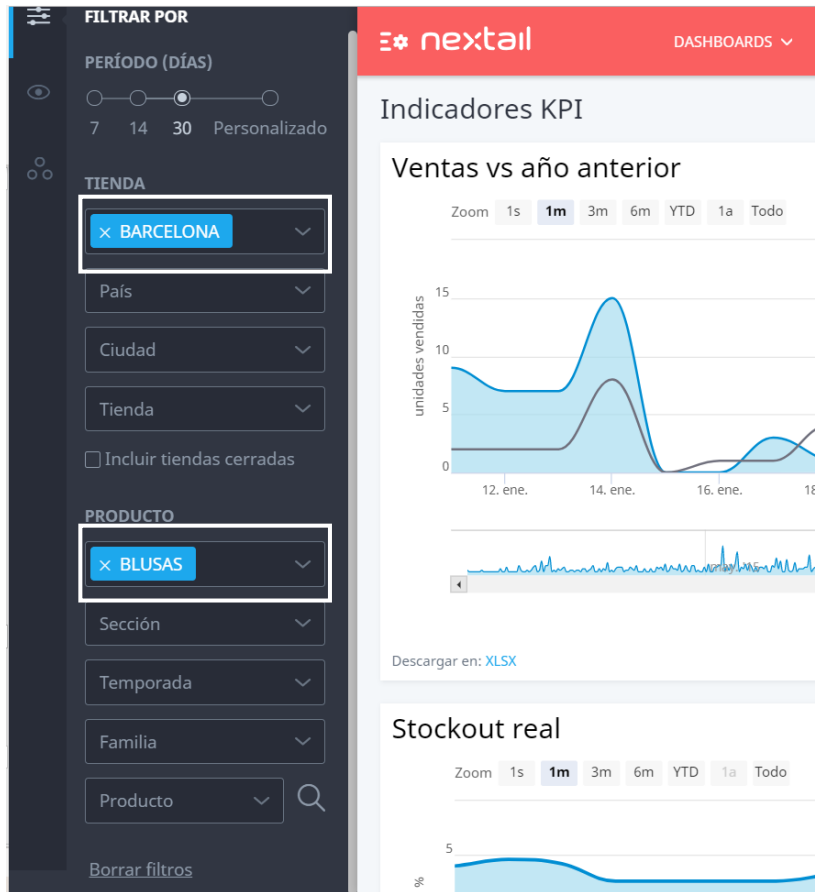
The user can also group by a product/store categorization, to be able to compare how KPIs perform in different divisions
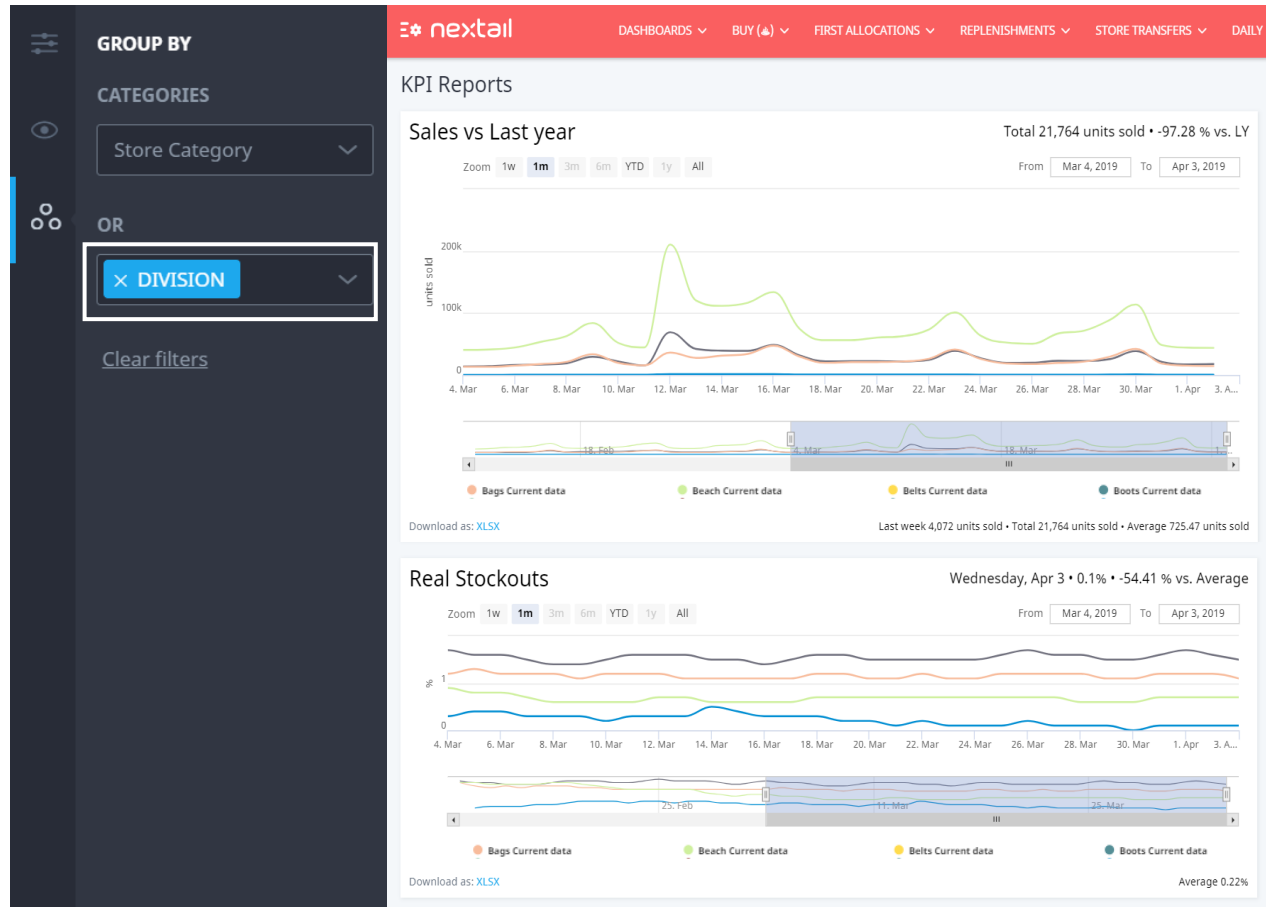
Sorting the *Top Products report* by "sales value" can help the user discover the highest sold products across your store network

Sorting the *Top Products report* by "real stockouts" can help point out products with higher than desired stockout levels

Also a *Top Products report* can be filtered for one specific store, to understand a product's sales, stock and stockouts by store

Sorting the *Top Stores report* by "real stockouts" can help detect stores with higher stockouts in order to adjust replenishment parameters

Content

1   Overview of Nextail's Replenishment

2   Criteria impacting the Demand Forecast

3   Criteria impacting Global Optimisation

4   Nextail's dashboard to support Replenishment

5   **Next steps**

As a reminder, this session should leave you feeling confident on the following points:

○ Understand the two phases of Nextail's Replenishment (Demand Forecast and Global Optimisation)

○ Be aware of all the criteria that affect Nextail's Replenishment

○ Know how Nextail's Dashboard can support your Replenishment decision making

Did we achieve our goals?

?   Understand the two phases of Nextail's Replenishment (Demand Forecast and Global Optimisation)

?   Be aware of all the criteria that affect Nextail's Replenishment

?   Know how Nextail's Dashboard can support your Replenishment decision making