

# Replenishment Optimization

## Automated Decisions by Blue Yonder

Blue Yonder Replenishment Optimization uses historical sales data to optimize order amounts. Keeping overstocks and out-of-stocks to a minimum increases revenue and profitability. Replenishment Optimization allows companies to achieve and improve strategic KPIs and execute plans with an extremely high degree of automation, allowing for a scalable and effective replenishment process across thousands of products at hundreds of store locations.

Replenishment Optimization is a software as a service (SaaS) solution built on the Blue Yonder Platform and can be integrated into an ERP or SCM system during a standardized project.

## Accurately Manage Stock Levels

Replenishment processes for retailers pose two major challenges: the unpredictability of demand and the complexity of the supply chain itself. Good supply chain processes are demand-driven, but being demand-driven requires sound knowledge, or at least precise predictions of future demand. At the same time, the inherent complexity of the supply chain means that constraints have to be respected and tradeoffs between multiple competing KPIs have to be made.

### **Traditional approaches to replenishment automation are falling short in multiple regards:**

1. Prediction quality is often dependent on manual tuning of models and fails to deliver in highly dynamic situations, such as sales of promotional or perishable goods.
2. Achievement of strategic KPIs is more or less incidental, and in order to improve business KPIs, it is required to tune unrelated technical parameters like safety stocks.
3. Even best-in-class replenishment automation systems typically achieve only 75% automation, leading to inefficient manual oversight and in many cases negative interference with the automated process.

Blue Yonder's approach to replenishment optimization goes beyond the static approach of traditional ERP systems, and allows to extend and improve existing replenishment automation processes in multiple regards. The solution starts with a highly accurate demand forecast model that is able to quickly pick up seasonal trends, deal with complex influencing factors, and learn from complete sales histories. Based on an accurate forecast of future demand for each individual product and store location, Blue Yonder's solution can simulate various replenishment scenarios. Considering high-level KPIs such as write-off rate and out-of-stock rate, it furthermore calculates and optimizes order templates that can be executed without manual oversight or intervention.

Blue Yonder's customers typically experience a 20- to 50-fold reduction of manual interventions while reducing the out-of-stock rate by up to 80% and simultaneously minimizing write-offs.

### Key benefits

- Strategic optimization based on out-of-stock and write-off rate goals
- Data-driven forecasting without maintenance of static rule sets
- Very high automation rate (> 99% possible) leading to massive efficiency gains

### Order template generation

Using business KPI goals, demand forecasts, current stock levels and future delivery schedules, the optimal order amount for each product and location is calculated. As a result, highly precise, demand-driven order templates for automatic execution are generated, which optimize the desired business KPIs.

As a result, the need for manual intervention is greatly reduced, reducing process cost and improving turnaround time of the replenishment process. Customers are therefore able to consistently meet their strategic KPIs for out-of-stock rate and write-offs, particularly under complex and dynamic market conditions.

### KPI-based replenishment control

With KPI-based replenishment control, customers provide the desired out-of-stock rate or write-off rate for a particular inventory. A simulation provides feedback on achievable KPIs and required trade-offs. With this feature demand planners control commercial goals during the replenishment process and don't have to rely on tuning technical parameters by trial and error. This translates high-level business KPI goals into thousands of daily actions that serve to fulfill the desired business strategy.

## Demand forecast calculation

The built-in demand forecasting algorithms take both internal and external data into account. Good demand forecasts are a prerequisite for accurate order planning, so that even special events and rare situations are automatically predicted with very high accuracy, eliminating the need for manual intervention. The resulting increase in automation is the main driver for reducing the cost of the replenishment process.

## Multi-optimization

Blue Yonder's Replenishment Optimization has the unique ability to simultaneously optimize seemingly conflicting KPIs like out-of-stock and write-off rates. In practice, this means that service availability and write-off rates can be improved simultaneously and more ambitious business goals can be met.

## Bundling & packaging constraints

Replenishment Optimization automatically takes into account constraints as:

- Product bundles
- Mixed cases and trays
- Available shelf space
- Minimum display stock

Valid order templates can be generated for most product categories, allowing companies to achieve a high degree of automation and optimization, even for challenging assortments.

## Fallback orders

Order templates are generated every day for upcoming ordering opportunities. This practice provides operational safety margins in case of temporary data retrieval problems, ERP maintenance or other unplanned downtimes. In most product ranges, order forecasts with a horizon of one or two days can be used as orders without a significant impact on order quality.

This built-in risk mitigation allows Replenishment Optimization to run with a high degree of automation even for challenging replenishment cycles.

## Order template automation

All order templates are made available through Blue Yonder's standardized Supply & Demand REST API and can be retrieved automatically by an ERP system. This leads to a high degree of automation and minimizes cost, manual effort and turnaround time.

## Data monitor

The data monitor shows an overview of past data deliveries to the API and highlights missing, incomplete or incorrect data. Data delivery monitoring ensures that consistency problems are spotted early, minimizing troubleshooting time. As a result, customer data can be integrated more quickly, reducing the project cost for implementing demand forecasts and time to value.

## Audit log

All historic data deliveries are visible in the audit log, including their error state and error messages. The audit log error messages are clear, consistent and persistent, so that errors can be rapidly identified and fixed. The offending XML files can be downloaded for further troubleshooting.

The audit log ensures continuous operations and a consistent high-quality demand forecasting.

## Supply & Demand REST API

The Supply & Demand REST API enables automated data delivery that does not require any manual labor after the initial set up. Overall, the API ensures that forecasts are always up-to-date with current sales data and avoids wasted time and errors due to manual data editing. The API allows delivery of master and sales data for Replenishment Optimization using a simple and secure combination of XML and HTTPS. All uploads are automatically checked for validity and consistency prior to booking. Data can originate from any ERP or CRM system, database or technology platform, even custom solutions. The built-in HTTPS encryption guarantees that data cannot be accessed by other applications.

## Implementation & Integration

Blue Yonder Replenishment Optimization is offered including an implementation project conducted by Blue Yonder's team of data scientists. This implementation project typically includes:

- Qualification of the use case
- Assessment based on historical sales data
- Concept development, including integration architecture
- Implementation and integration
- Model tuning and optimization
- Rollout

## Technical Features

### Web interface

Blue Yonder Replenishment Optimization is available using a web interface.

- Supported browsers: Firefox (latest and ESR), Internet Explorer (version 11 or higher)
- Supported operating systems: Windows, Mac OS X, Linux
- Security: All connections encrypted using high-grade SSL security

## Supply & Demand REST API

- HTTP version 1.1
- XML version 1.0 or higher
- Compression: GZip compression optional
- Security: All connections encrypted using high-grade SSL security

## Data Requirements

Blue Yonder Replenishment Optimization uses the Blue Yonder Supply & Demand REST API, which is shared with Price Optimization.

The following key delivery categories are required for Replenishment Optimization:

- Locations and opening hours
- Product groups, products, and unit conversions
- Sales
- Sales assignments, i.e. the date range when a product is available for sale in a given location
- Stocks
- Orders
- Order assignments, i.e. the date range when a product can be ordered for a given location
- Procurement plans and calendars: a calendar per product and location to indicate valid combinations of order, delivery and availability timing

These delivery categories can be used to enhance the prediction quality or supply additional parameters to the replenishment algorithms:

- Promotions
- Prices
- Events
- Stock parameters

Would you like to optimize your replenishment? Get in touch.

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