

Exclusive Features of Service Optimizer 99+(SO99+):

ToolsGroup's Service Optimizer 99+ is a market leading, demand and service-driven supply chain planning application. Our powerfully simple forecasting and optimisation models help business perform better by increasing Service Levels while decreasing Inventory.

The technology behind SO99+ was developed over 30 years ago at the MIT and since has been continuously developed to provide cutting edge solutions as recognised by Gartner, Nucleus Research and Frost & Sullivan, who positioned us in the Leaders Quadrant for Supply Chain Planning.

ToolsGroup's key differentiators are:

- Single Integrated Model: SO99+ is one, fully integrated solution which encompasses forecasting, inventory optimisation and replenishment planning on a single platform, optimizing the entire end-to-end supply chain with zero latency. No need for integration between modules or Databases within, makes zero supply chain latency.
- Self-Adaptive Modelling: SO99+ uses a proprietary composition of algorithms that's self-learning. It automatically and continuously adjusts demand models, avoiding the manual choice of models used and over-fit risks. The demand is modelled and analysed at the lowest possible level, up to Item-customer-daily combination. This is then rolled-up to get higher level demand numbers along product, market and time hierarchies. Due to this build-up of demand, bottom-up from the detailed level, SO99+ forecast accuracies are much higher compared to competitors who prefer a top-down approach of calculating aggregated forecast numbers and then to slicing and dicing on the basis of assumptions/rules.

SO99+ also does automatic modelling of trends, patterns and seasonality, and employs advanced Machine Learning for better accuracies and automation

- Demand Modelling: SO99+ is a stochastic solution. It uses order-line details to generate forecast with confidence interval, and thus capturing demand variability. The modelling is combinatoric and not assumed to be normal distribution. In today's supply chain, a demand confidence interval helps to understand the latest data feeds and segregate noise from the demand signal. This is mandatory because noise has no statistical relevance, hence must be discarded, otherwise you will end up with a "nervous" supply chain. And just using a normalized variability (say plus or minus 10%) isn't enough. It doesn't understand true deviations well enough, causing numerous false positives and false negatives. Demand variability models are also key input towards safety stock modelling.
- Frequency Based Forecasting (FBS): The proprietary technology of Frequency Based Forecasting allows the automatic understanding of key characteristics of demand. Other than the quantity, SO99+ does take into consideration order lines frequency and order lines size in order to automatically model the customer demand behaviour and, for instance, to adjust the reactive ability to the unexpected signals accordingly. This gives your supply chain the ability to predict -when to expect an order from a customer for an item and in what quantities.

Retaining order-line details helps to plan safety stocks more accurately. For example, two demand patterns, one with 2 x 50 each per month and the other with 10 x 10 per month, will have net monthly demand of 100 but with different demand and inventory models and hence different safety stock norms

- Detailed Demand Profiling: SO99+ generates demand models on a sold-to sales area level. Sales areas can be demands coming from a zone/territory, group of customers, channel, individual customer or a particular facility of a customer. SO99+ models daily, weekly and monthly demand profiles, helping to identify demand pattern within a forecasting period and ensure product availability accordingly.

SO99+ models demand with a bottom-up approach. Demand models can be generated at the granular-most level of item-sold to-daily levels. From this, forecast can be generated at any other aggregation level. This bottom up approach is found to improve forecast accuracy, by 15 to 40% and with increased Demand Sensing ability.

- Modelling Demand Drivers: In SO99+ different Demand Drivers are modelled separately, i.e. Base line forecast, Trends, Patterns, Seasonality, New Product Introduction, Product Replacements, Promotions, Special Actions, Market Intelligence etc are modelled separately, thus final statistical demand is built layer by layer with respective contribution from these individual Demand Drivers. Contribution from each signal is modelled separately at item-sales area levels and gets adjusted dynamically with time to improve Demand Sensing capability.
- Demand Sensing: is a capability and technology for improving near-future forecasts using detailed short-term demand data. Near-future means hours or days, depending upon how dynamic is your supply chain. Demand sensing reduces forecast error by up to 50%, increases inventory accuracy up by 20%, and optimally deploys downstream (e.g., Distribution Centre) inventory.

In a demand sensing environment, downstream data such as customer, POS or channel data is employed to identify demand trends, provide advanced warning of problems, and remove the latency between plan and what is really happening in the supply chain. The quicker deviations can be identified, the quicker and more intelligently a business can respond.

Demand sensing can also use a much broader range of demand signals (including current data from the supply chain) and different mathematics to create a more accurate forecast that responds to real-world events such as market shifts, weather changes, natural disasters, consumer buying behaviour, etc.

- Machine Learning Capabilities: SO99+ is a self-learning, self-calibrating application. Demand, Inventory and Supply models are automatically generated from raw data, both structured and unstructured, and on continuous, ongoing basis. SO99+ includes unique machine learning technology able to glean market learning from Big Data and apply to the forecast (NPI, Promotion Planning, and Causal Factors). This is a unique offering
- Trade Promotions: Our powerful machine learning technology makes it possible to recognize the shared characteristics of promotional events and identify their effect on normal sales. It extracts knowledge about which variables most impact demand and produces a set of simple intelligible rules, easily understood by the user.
- Stock to Service Inventory Models: SO99+'s Stock-to-Service inventory trade-off models allows to identify the relationship between the Target Stock and the Target Service Level. This supports strategic business decisions and interaction between Sales, Supply Chain and Finance who can agree the Business Policies on the basis of common information. Strategies agreed can be directly applied to the model, which will translate this high-level information into detailed Service Levels and Safety Stocks for each Item, at each Location and dynamically adjusting.

- Stage Optimization: Long and complicated distribution networks can be modelled and optimized in SO99+. Problems like whether to hold stock upstream to deploy it when needed or to build higher buffers closer to the market is addressed through Stage Optimization. SO99+ is able to suggest the best Service Level to keep at each node in the network.
- Postponement: SO99+'s postponement solution supports the business in sizing and positioning the inventory buffers in Bill of Material chains, irrespective of whether they are simply made by Component and Finished Product or more complicated, with a number of Semi-Finished products in between (WIP).
- Lot Size Optimization: Lot Size analysis is able to provide alerts on items where the lot size in use is excessively high, supporting discussions and negotiations with suppliers. Lot Size Optimization allows the calculation of the optimal batch to be moved, and can be actuated within the automatic run in order to allow the handling of economically-wise better quantities (minimum quantities can be assigned).
- Dynamic Replenishment: Our replenishment solution maintains optimal inventory levels for every location in your network – down to the Dealer or Store level – to achieve service targets. Time-phased Replenishment Demand is updated on a daily, rolling basis in response to changing variables like promotions, seasonality and supply constraints. It uses an advanced statistical method that ensures the locations with the highest probability of stocking out get served first with inventory.

In SO99+ Replenishment/Distribution Planning is multi-echelon. It creates replenishment flows to deliver target service levels: Time-phased Min and Max net requirements that incorporate the statistical demand and supply characteristics; Automatically creates constrained replenishment proposals; Automatically creates transfer proposals to balance the network; Preventive alerts & Predictive KPIs that link Operations to the P&L

For one-time buys and new products that have no sales history, our allocation solution calculates optimal inventory levels using advanced statistical methods. "Clustering" adjusts the replenishment plan depending on store properties (store size/type, footfall, overall sales volume). "Supersession" analyses the sales history of similar items in a category to help calculate optimal inventory levels. "Holdback" recommends reserve levels at the DC level to be allocated as-needed to stores. These advanced capabilities support retailers' decisions to intelligently re-allocate stock, prevent unnecessary markdowns due to poor stock allocation, and plan alternative fulfilment (e.g., letting customers order online in store and have products shipped home). This equally applies to other industries too, but with varying granularity.

- S&OP: Sales and Operations Planning is a tactical process to operationalize a firm's strategic plans like revenue targets or market share, and in the process balance demand and supply. Even traditional well-run S&OP processes are being challenged by the growing complexity caused by SKU proliferation, more new product launches, global value chains, shortened and variable lead times, pressure for greater service, and an explosion of data. So, to stay competitive and deliver on both service and revenue commitments, companies need to improve their S&OP processes and tools. By injecting a much higher level of automation and intelligence into your planning process, our Powerfully Simple technology enables an entirely new approach to S&OP

In S&OP, collaboration and workflows are no longer enough. Our advanced analytics and optimization are coupled with a single unified data model that spans strategic, tactical and operational planning. Together they ensure that you can execute what you plan, resulting in reduced costs, improved service levels and efficient operations.

- Automation and Data Processing: SO99+ can scale to process high volumes of data associated with hundreds and thousands of item-location combinations every hour/day.

The platform supports a seamless environment between planning and execution, as well as the ability to replenish the high frequency demand signals with optimized execution.

Increased process automation to ensure that the resulting demand signal used to drive the execution environment does not require significant amounts of manual effort.

- Planning run time: Conventional planning systems can build Demand-Inventory-Supply models only at some aggregate levels. Such systems when made to plan at a more detailed level of – product, channel and/or daily time scale – the results are much longer run times than most businesses can accommodate. This is because the forecast in such conventional systems are developed using multiple time series methods, then the one with the least error is picked and finalized by the system. This is quite inefficient and time consuming as the planning for each item-location is repeated many times. This is further aggravated if limits are also defined for forecast error. As the required planning granularity increases, conventional algorithms will go bust, either it can't model demand at that level of detail and ends up giving erratic results or will result in eternal running times.

ToolsGroup's Multi Echelon Inventory Optimization

“Inventory Optimization” is the ability to automatically determine the optimal stock levels for multiple SKUs in multiple locations, in such a way that fulfils a global service level target and simultaneously optimizes a desired objective function. Typically, optimization balances inventory investment and service-level goals over a very large assortment of stock-keeping units (SKUs). In contrast to traditional “one-at-a-time” marginal stock level setting, inventory Optimization simultaneously determines all SKUs’ stock levels to fulfil total service and investment constraints or objectives.

The most common objective is to minimize the monetary investment: the SO99+’s Stock-to-Service inventory models automatically provides the relationship between Average Stock and Target Service Level, allowing to analyse the trade-off between the economical commitment and the market performance achievable. Considering high-level strategic input and a number of parameters characterizing the specific item/location, including the service planned at the source warehouse, SO99+ automatically identifies the target service level for each SKU-L such that the overall Service Business Policy is met whilst optimizing the mix of stock needed to maintain such policy.

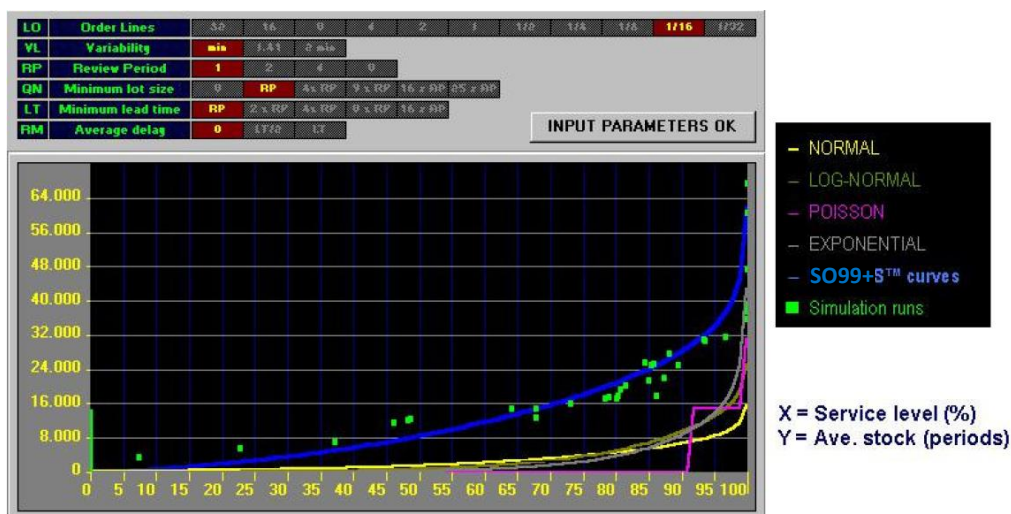
Objective functions available include: maximize net margin, maximize residual shelf-life, minimize obsolescence risk and others.

In Service Optimizer 99+ inventory mix Optimization:

- The population of items to be optimized together is called “Service Class”. These “Service Classes” are sets of items that can be freely defined by the user on the basis of specific business objectives.

- This classification has nothing to do with the ABC classes used in manual inventory planning systems, but are used to represent the way the Business wants “service policy” to be articulated and tailored.
- The primary use of this flexibility is for the user to specify a service level target for each Service Class/Location (for instance, planning higher service levels target on groups of items that are key for the business and lower levels to less strategically important ones). Each group of Items (Service Class) at each location can be managed independently: different target service levels as well as different objective functions (minimize stock cost, maximize margin or maximize residual shelf life are examples of objective functions) providing the flexibility to model the desired behaviour on each subset.
- The Optimization process can be run for each location independently or by launching a loop to optimize all locations following a sequence, from upstream to downstream with high precision.
- The Optimization may be constrained by applying overrides to single or aggregates of SKU/L for parameters such as “minimum service level”, “minimum safety stock”, “fixed Service Level”, or other relevant business constraints.
- The result of this Optimization is an aggregate “exchange-curve” (Stock-to-Service), which describes the optimal average stock of the aggregate (in terms of the objective function chosen) as a function of the aggregate service level, ranging from zero to the service level assigned as aggregate target. Apart from the aggregate “Stock-to-Service exchange-curve” the result of Optimization also models the individual service level objectives and corresponding stock control parameters for each SKU/L.
- This curve can be used to immediately know the marginal cost of the service level target chosen, so that the user might decide, for example, to save a certain amount of inventory cost by slightly lowering its service target. If the solution is accepted, the individual service targets are saved on the database for each SKU-Location, together with the corresponding stock levels (safety stocks, reorder level, order-up-to-level).

In an experiment, as shown below, with “slow moving” inventory, shows SERVICE OPTIMIZER 99+’s probability function yielding much more accurate predictions than Normal, Log-Normal, Poisson, or Exponential probability functions



A reliable stock-to-service curve is strongly influenced by the quality of the assumptions made about the consumption probability distribution. The need for higher service levels, together with a trend toward smaller replenishment lot sizes, requires the right-end tail of the probability distribution to be sufficiently reliable. And this must be true also for slow to medium movers, which become more and more important in the product mix, due to product proliferation and the evolution of distribution network. The common approach to “demand modelling” is based on traditional assumptions, which are increasingly inadequate.

ToolsGroup Advanced Analytics Solutions- AI Powered

Solution	Problem Scope	Examples
Promotions & Events Forecasting	Promotions & Planned events demand forecasting through removing the baseline demand and extracting the uplift actions	Retailers & CP looking to improve forecasting by complementing their TPM/TPO systems
Cannibalization & Cross-Selling	Forecasting on cross-product cannibalization, cross-effects, competitor’s events	Retailers, Telcos, CPG trying to understand the impact of media, promotions, competitors on a total revenue impact
Events Auto-Detection	Auto-detection of start, end and active products on events like promotions	Companies with limited structured data on events looking to understand better demand events
New Product Introduction	Using product specs and combining it with an array of available product and market data including social media predict launch performance	Retailers and merchandisers with high number of SKUs Telcos looking to customize plans & demand potential CPG looking to develop the new product characteristics
Media Effect Forecasting	Online Media, Social Media, TV Advertising, Print and other media actions modelling into the demand forecasting	CPG, Food & Beverages or brands with high spending on below and above the line advertising looking to develop close ROI metrics and marketing attribution
Social Sensing Index	Developing time series data on sentiment across social digital channels including Twitter, Facebook, Instagram, YouTube, Blogs and more	CPG companies looking to incorporate extra sensing towards improving sales forecasting Luxury and Cosmetics trying to understand demand through social signals
Internet of Things Signals	Leveraging devices streaming data in real time, we combine those signals to enhance the forecast and add early visibility	Industrial and Manufacturing companies looking to leverage their data for parts, production, and forecasts. Auto-replenishment cases looking to incorporate real time signals from devices Retailers measuring client activity, foot traffic through beacons and more
Customer Signals	Starting from Lead and Opportunities data (CRM, Loyalty programs and more) enhance sales per product and location.	Product owners with different sales channels looking to understand potential of portfolio and improve sales visibility

Other solutions include: Supply Chain Assessment, Network Modelling, Dynamic VMI, DDMRP, Production Scheduling, Demand Collaboration, Supplier Collaboration and Decision Advantage (Supply Chain Planning as a Service). Learn more at www.Toolsgroup.com OR reach us@ ToolsGroup@logicamatrix.com, +919048441070