ACTsolutions
Analytics and Control Technology

DISTRIBUTION – Optimization and Simulation

Manage the distribution, from factories, distribution warehouses to retail outlets has an impact on costs and service levels and will significantly affect the value that the company generates. We must give answers to several factors balancing the costs and constraints: **what to send**, **to whom**, **when**, **how**. Moreover it requires having the right stocks at the various points of the network. The complexity of the processes, the dynamic nature of markets, the number of SKUs require the use of scientific approach to avoid that a lot of margin remain trapped in a "less than optimal" management. Our tools, models and methods allow you to the excellent management of the distribution network and, more generally, the demand (demand optimization and Simulation).

Distribution Optimization

In some distribution processes users have to define a distribution plan that establishes **what**, **where / who**, **when**, **how** deliver goods (BEST Shipping). Often this involves more Distribution Centers, warehouses as well factories (OPT Net). Several constraints must also be respected like resource availabilities, capacity to stock, costs impact. Even the quantity sometime is a variable, for example when is required more products than the availabilities. This generally requires to make coherent decision in short, medium and long term, managing variability that occurs over the time. Decision variables can be summarized:

Decisions Variables	NOTE
what	which kind of references to send / purchase / produce;
where/who	from or to where/who;
when	which is the best timing;
how	how I manage the flow: for instance direct shipping, via transit point, by trucks or others;

A master plan must consider and handle forecast and expected events that can happen with a certain probability but are not yet sure. Let's give **two examples** corresponding to two different situations but conceptually the same.

I - A company produce products, these products are collected in a couple of distribution centers, one in far-east and one in Europe. The products are stocked until they have to be

Distribution Simulation

Why to simulate a distribution process?

The distribution network usually have an important influence on service levels and often the cost impact is also important.

Moreover the distribution network is affected by uncertainty, such as the evolution of demand, that make difficult to understand exactly what is the best design or management strategy.

Appropriate simulation models provide a substantial contribution:

- to size correctly in a network of distribution,
- to understand the impact of changes
- to identify tactics and strategies of management,
- to estimate the cost and level of service under certain conditions;

Generally speaking is possible to model, with different levels of detail, the distribution network.

The proper level of abstraction is one of the key-success factors: while a too high level can cause enormous difficulties and effort that it will not be paid back, a too low level will lead to poor or even incorrect, results. Theoretical knowledge, know-how of process and appropriate technologies are necessary. Our powerful simulation platforms and a wide range of mathematical tools allow to handle correctly the different situations.

The highly specialized people and the innovative technologies (eg, OPT Net, BEST Shipping, BEST Tour, Arena and SIMIO) allow you to achieve the objectives

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shipped to the stores. The correct product must be shipped at the right time in correct quantity at the lowest cost! Demand has picks that have to be managed, shops have a receiving capacity that cannot be overtaken. Late orders has to be manage. All this decisions must be coherent and moreover balancing costs and service level, have to be optimized. The organization must be aware of the impact of single actions on the global business focus.

II - Let's consider a retailer, with 500 retail stores, 15.000 SKUs. The process of distribution is central and plays a significant role on the final margin for the organization. Stock costs, handling and transport costs, product's availability on the shelf depends on a proper planning of supply and distribution. Traditional approaches require that IT systems implement, at the various levels of decision-making, rules and procedures. These systems are often complex but do not guarantee the consistency of actions respect to an overall target for business, neither pursue the optimality. To manage in an appropriate way the complexity of these situations it is required a scientific approach based on optimization techniques that can even govern the dynamics of the demand.

The difference is like to have a “list of actions” (let's say procedures) or to have a navigator (an intelligent object able to receive the objective and automatically and dynamically creates the proper sequence of actions")!

The optimization of the shipments (BEST Shipping) is a step of the wider distribution optimization or, even better, the Demand Chain Optimization, requiring also a proper and analytical demand forecast (BEFORE!) and a proper planning of the supply and the stocks.

clearly and quickly.

Why risk?

Do not hesitate to contact us for any question or a free pre-analysis.