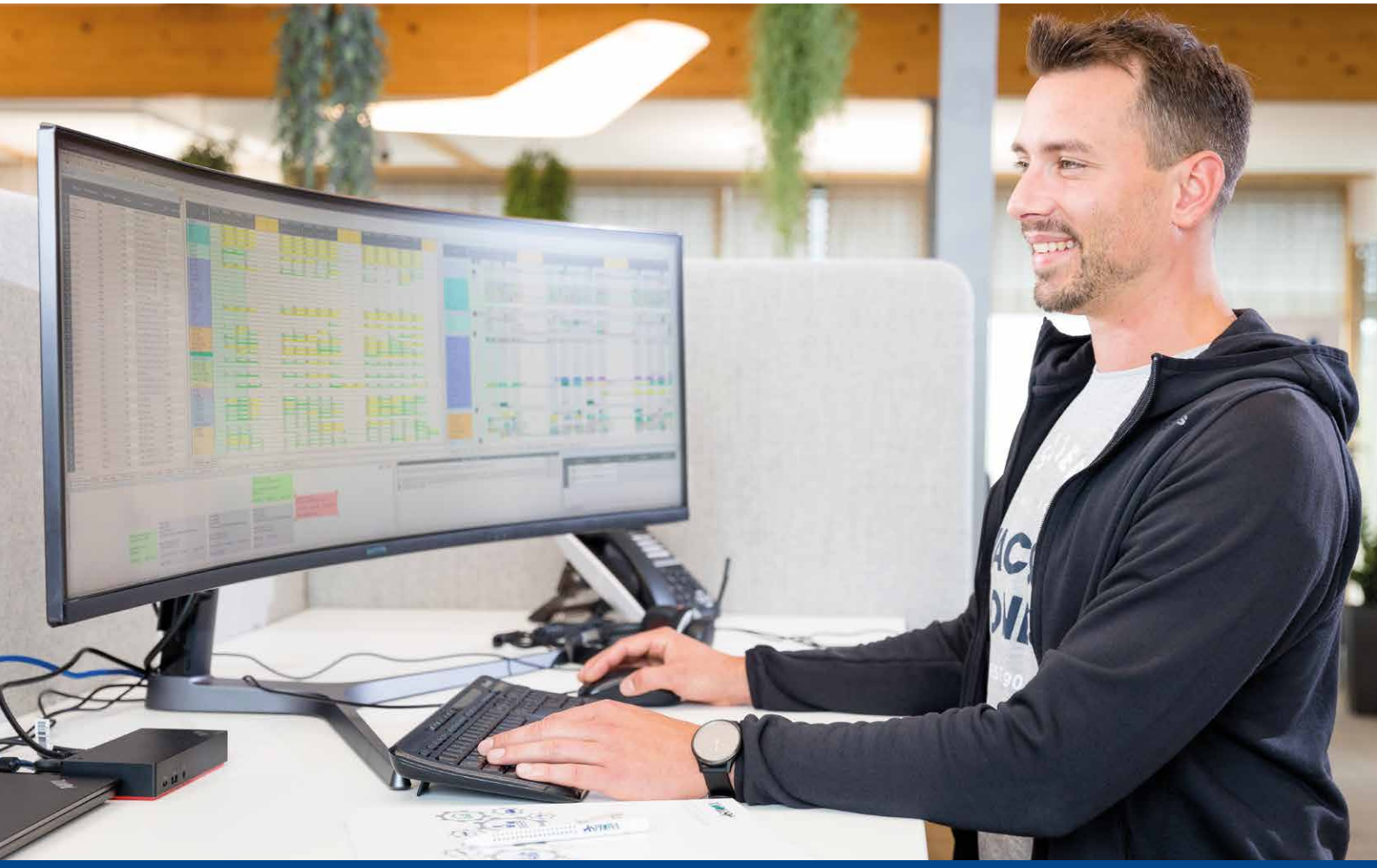
ASPROVA

*Think Ahead, Act on Time*

APS + SCP

# ADVANCED PLANNING & SCHEDULING SYSTEM

# SUPPLY CHAIN PLANNING SYSTEM



Orchestrated End-to-End-Scheduling for the

**Entire Value-Added Chain**

# PERFECT PROCESS SYNCHRONIZATION–ORCHESTRATED WITH ASPROVA APS

Asprova APS tackles your scheduling challenges with powerful functionality and a diverse set of evaluation tools.

Shorten your production lead time, optimize inventory, and improve resource productivity. Surpass your competitors with the best schedule possible.

## Inventory Constraints

Calculate future inventory fluctuations accurately, accounting for existing inventory levels.

## Holistic Scheduling

Concurrently run supply, demand, production, purchasing, and delivery plans.

## Simulation & Evaluation

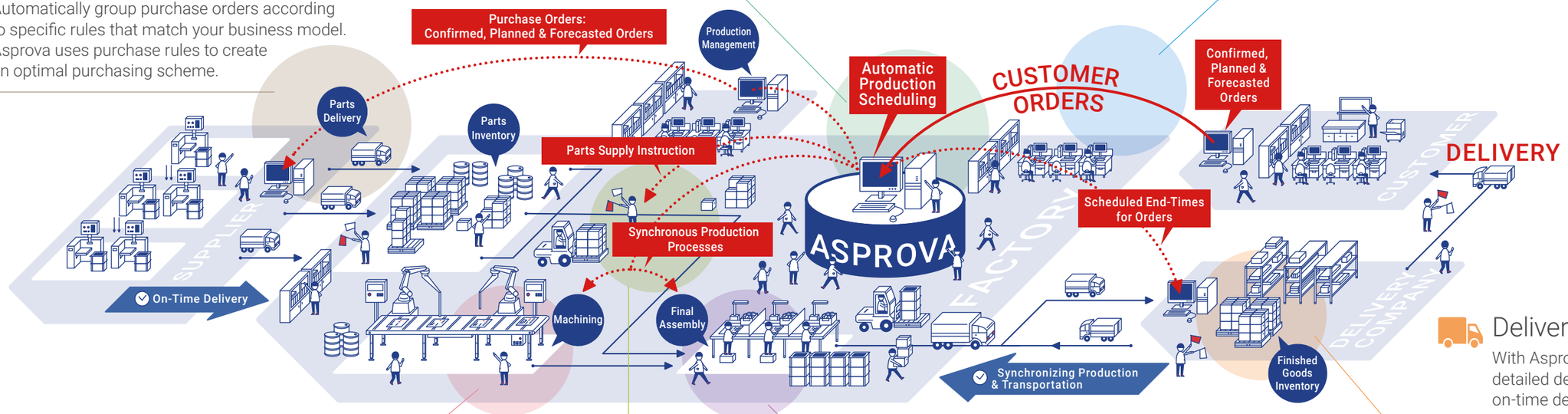
Simulate different scheduling scenarios and use Asprova's evaluation tools to choose the most effective scheduling strategy.

## Supply-Demand Balancing

Produce what you need when you need it and no more, fulfilling customer demand rapidly.

## Purchasing Plan

Automatically group purchase orders according to specific rules that match your business model. Asprova uses purchase rules to create an optimal purchasing scheme.




## Delivery Planning

With Asprova, you can map very detailed delivery rules—100% on-time delivery is within reach!

## Subresources

Schedule molds and jigs to ensure there are no interruptions—Asprova schedules secondary resources optimally at finite capacity.

## Batch Processing

Automatically optimize the production sequence—run items of the same type in batches, reducing changeovers.

## Lot Sizing

Significantly reduce lead times by automatic lot splitting and merging.

## Process Pegging

Visualize the entire process flow with transparent and adjustable pegging rules.

## Order Dispatching

Flexible, adjustable dispatching rules are indispensable for good scheduling results. Set as many as you need without limit and without programming.

## Load Leveling

With load levelling, achieve higher output with fewer resources and reduce your manufacturing costs.

## Manual Adjustments

You can make manual changes to priority, sequence, and timing. Asprova will regenerate an optimized schedule based around any manual holds.

## Operator Planning & Scheduling

Operator workgroups with specific skill sets can be scheduled optimally according to capacity.

# SYNCHRONIZE YOUR SUPPLY CHAIN LIKE NEVER BEFORE WITH ASPROVA SCP

With one shot, Asprova SCP creates a plan for your entire supply chain network. The whole network is modeled, starting at the sales orders all the way through suppliers, production sites, distribution nodes, transportation, and finally to your customers.

### Multiple Factories
Automatically calculate production plans for factories corporation wide.

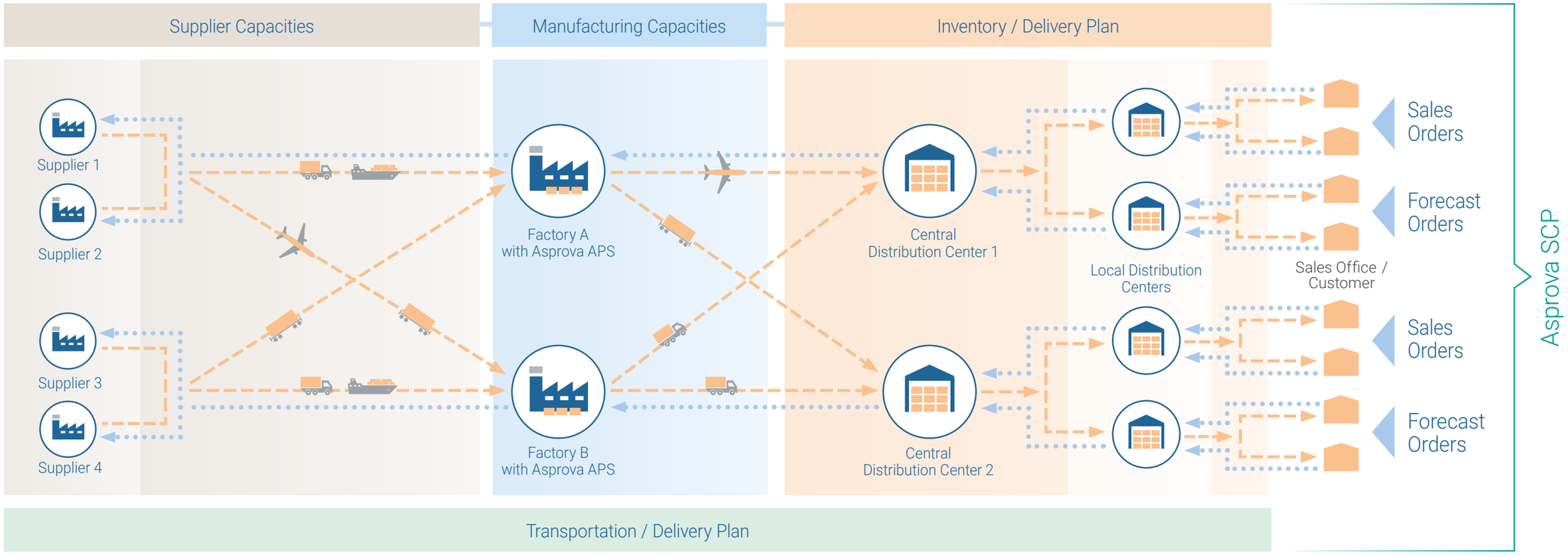
### Multiple Logistics Centers
Automatically calculate inventory plans for all items in logistic centers corporation wide.

### Suppliers
Generate supplier purchase plans corporation wide, considering lead times.

### Transportation
Calculate transportation routes between factories, suppliers, and logistics centers—including timetables, resource capacities, and costs.

### Order Management
Plan different types of orders for the entire value chain—including forecast, customer, inventory, and purchase orders.

### Synchronization
Synchronize production, purchase, raw material, finished goods inventory, and transportation plans.




### SCP & APS
Asprova SCP communicates with Asprova APS installed in various factories, synchronizing supply chain plan with production schedules.

### Transparency
See every corner of the supply chain with unprecedented clarity. Suppliers and factories are connected with your customers like never before.

### Finite Capacity Schedule
The resources of the entire value-added chain are scheduled in finite capacity—modeling all processes usefully and effectively.

### Predictive KPI
While it's a simple task to apply KPI to historical data, Asprova provides predictive KPI, enabling you to make proactive business decisions.

### High-Speed Engine
Asprova creates schedules in minutes or seconds, even when calculating for the entire supply chain.

Demand
Supply Chain

# WHY ASPROVA HAS EARNED THE TITLE BEST IN CLASS

Asprova has, for the past 30 years, been living and breathing lean manufacturing. We developed at the GEMBA of top lean companies—those with the highest level of efficiency requirements.

The best knowledge of production scheduling technology built into the software.


For realistic scheduling results, all process rules and restrictions are encompassed in a digital twin.

Achieve the best possible process synchronization and discover how to improve further.

Accurate simulations give you absolute transparency—see the future months in advance.

Determine the cost impact of today's decisions into the next year.

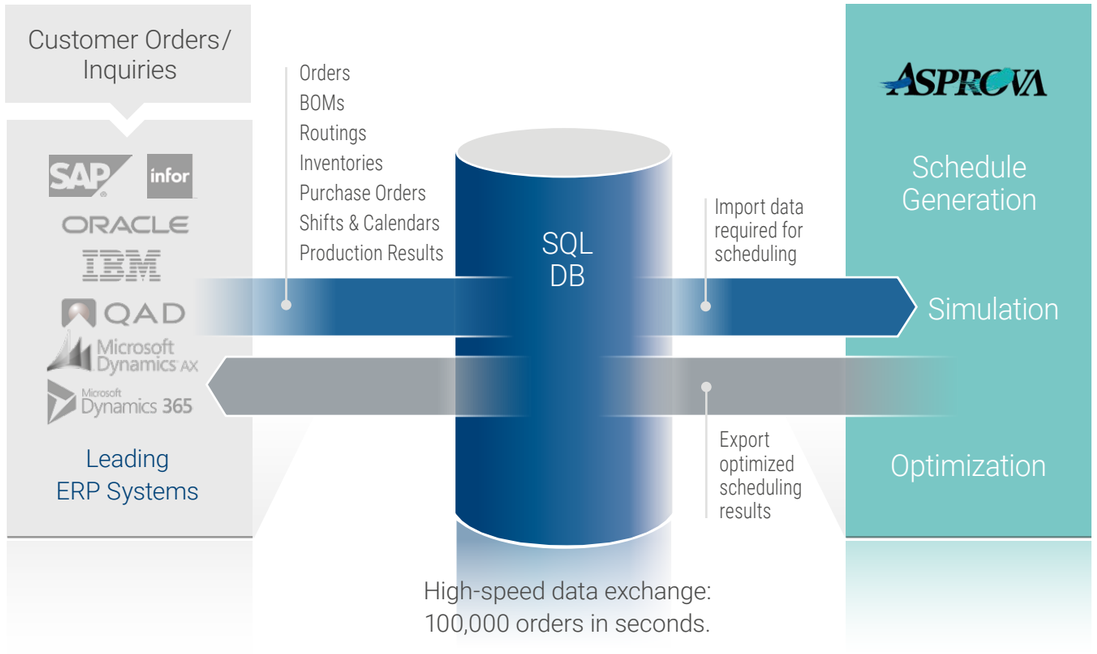
Profits increase, costs are reduced, and customers are happy.

With Asprova, you not only synchronize the production processes, but all organizations throughout the factory, which significantly increases total efficiency company wide.



# EFFORTLESS INTEGRATION WITH YOUR IT ENVIRONMENT

Asprova comes with interface tools, including Windows' ODBC-providers, and is easy to connect to the required systems, whether ERP, MES, MDA, or others.




## Compatibility

- Easy deployment in heterogeneous system environments.
- Supports flat files for legacy systems if needed.

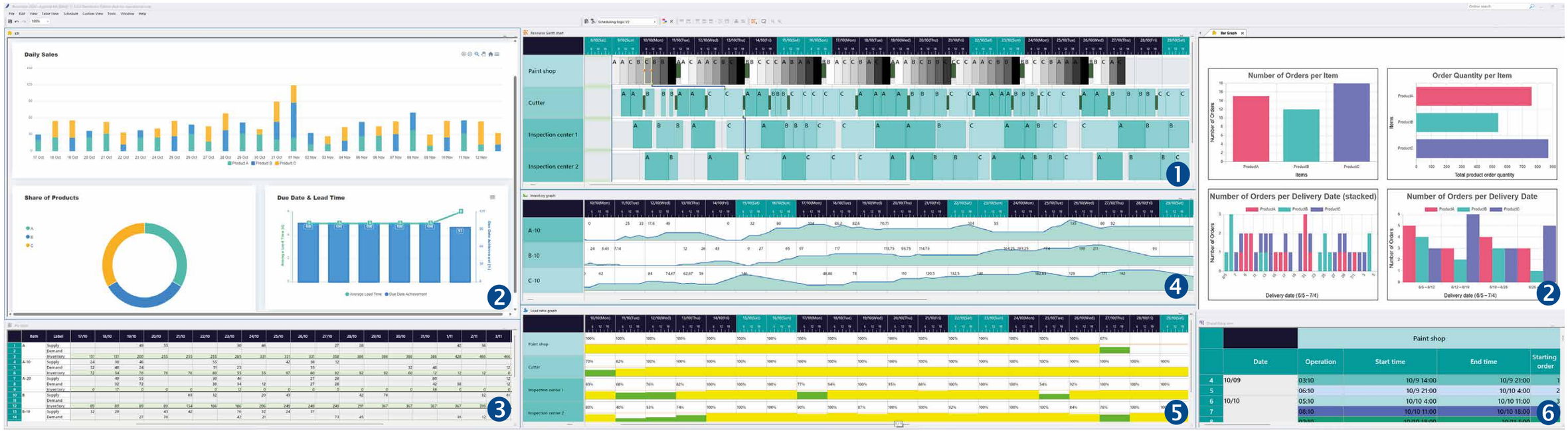
## Simple Field-Mapping and Filtering

- Specify merge and filter rules for whole tables.
- No matter your table configuration, custom rules guarantee a precise interface.

## Flexibility

- If deploying an intermediate database, choose from MS SQL, Oracle, or another RDB.
- Easily connect to multiple data sources, such as Excel, CSV, or text files.
- Filter and convert data when interfacing with other systems.
- Cloud or client: run Asprova locally or host on a server.

# ALL THE FEATURES YOU NEED IN ONE PACKAGE




## APS DASHBOARD

These images show charts and tables of live updated information. When running a reschedule or what-if scenario, the graphs are linked and instantly reflect the changes.

### Resource Gantt Chart ❶

Display the schedule for each resource. Customer, production, inventory, and purchase orders are pegged.

### Custom View ❷

Access data from Asprova to create visualizations, using its built-in browser engine.

### PSI Table ❸

See changes in demand, supply, and inventory on a daily, weekly, or monthly basis with custom calculations.

### Inventory Graph ❹

View stock fluctuation per item or group and predict shortages well in advance.

### Load Graph ❺

Identify bottlenecks and adjust your shift models and production strategies months in advance.

### Dispatching View ❻

Display and easily adjust work orders and the sequence for each resource.



## DESIGNED TO MEET YOUR NEEDS

Asprova transforms data into knowledge for flawless scheduling. Charts and custom visuals show you instantly what you could not see before in spreadsheets. Make proactive decisions and be confident that your schedule is the best possible outcome for your production.

### Abundant Standard Functions

- Acess an unlimited number of parameters, readily available to model your production realistically.
- Take advantage of easy to map properties, a stable system, and a fast implementation.

### Rich Visual Features

- Recognize possible lateness, undercapacity, or shortages at one glance in varied charts or graphs.
- Manage production more proactively, make decisons weeks in advance, avoiding costly guessing.

### Efficient Scheduling

- Swiftly respond to unexpected changes, facilitated by a robust automatic scheduling system at its core.
- Spend less time on scheduling work.

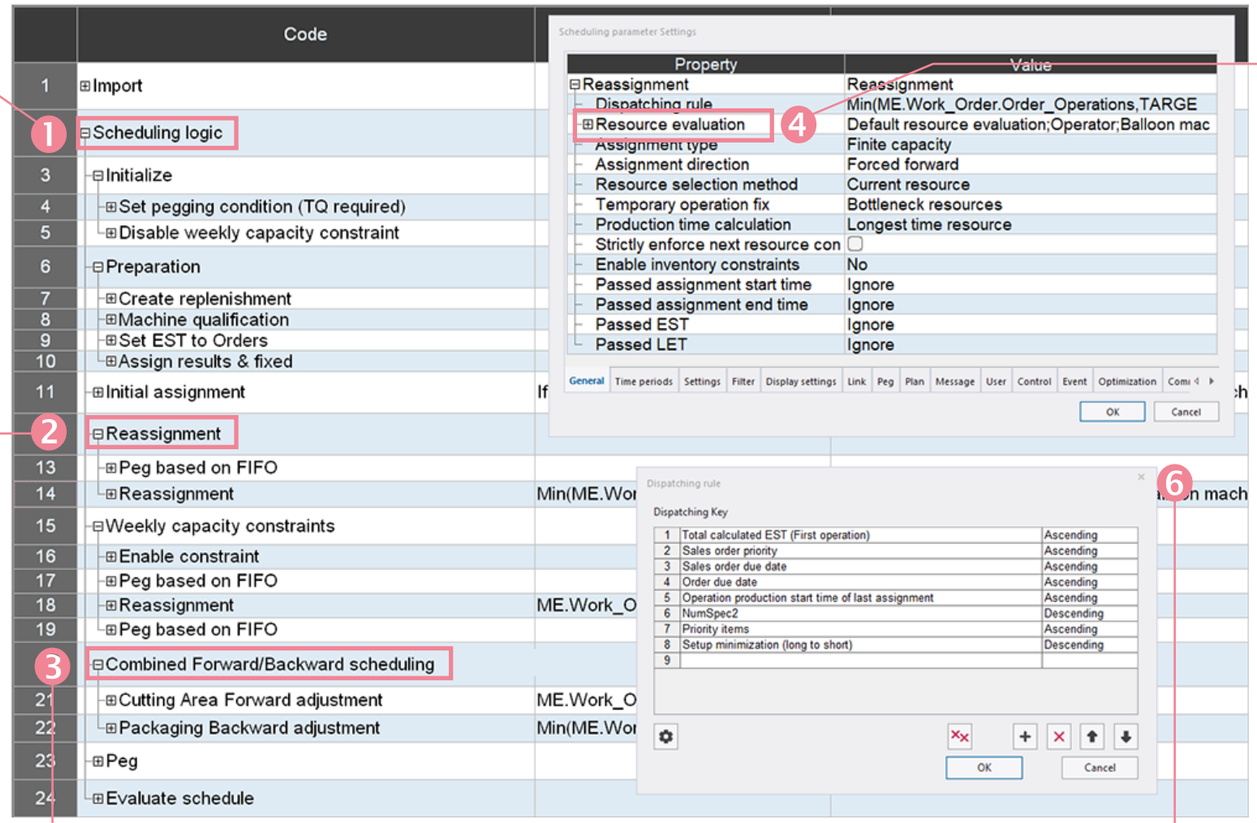
### As Easy As It Gets

- Asprova stands out by efficiently managing myriad tasks in a high-speed white box system, providing users with an intuitive approach to mastering scheduling challenges.
- Manage dynamic constraints using straightforward expressions.

# TAILOR-MADE OPTIMIZATION WITH STEP-WISE SCHEDULING

## 1 Automatic Scheduling

It is impossible to optimally schedule a factory manually. To get the best possible results, Asprova offers custom scheduling logic that generates a realistic schedule optimized to your business goals. With configurable, automated logic, you have the time and ability to fine-tune your schedule, hitting business targets, even rapidly moving ones. Select your strategy and with the press of a button, Asprova's powerful scheduling logic is brought to bear—a new schedule for the next shift, week, month, or year is at your fingertips in minutes or even seconds.




## 2 Multiple Simulations in One Scheduling Run

Optimization happens by running multiple simulations for the entire production area. In each simulation, data is calculated that progressively optimizes subsequent scheduling runs. Iterative simulations and re-evaluations refine scheduling results, providing you with the best outcome. One scenario may be to schedule production based on factors such as delivery dates and other priorities in an initial simulation, according to capacity. Then, applying grouping algorithms in subsequent simulations will optimize setup times and other efficiencies, ultimately reducing operation costs while keeping on-time-delivery.

2

| | Code | Production time total | Setup time total | On-time delivery % |
|---|---|---|---|---|
| 1 | Initial assignment | 1148,7 days | 75,24 days | 63,72% |
| 2 | Reassignment \| On-time delivery | 1148,8 days | 75,26 days | 89,46% |
| 3 | Reassignment \| Setup optimization | 1142,6 days | 69,01 days | 88,51% |
| 4 | Reassignment \| Production time minimization | 1114,6 days | 70,58 days | 84,34% |

## 3 Combined Forward & Backward Scheduling

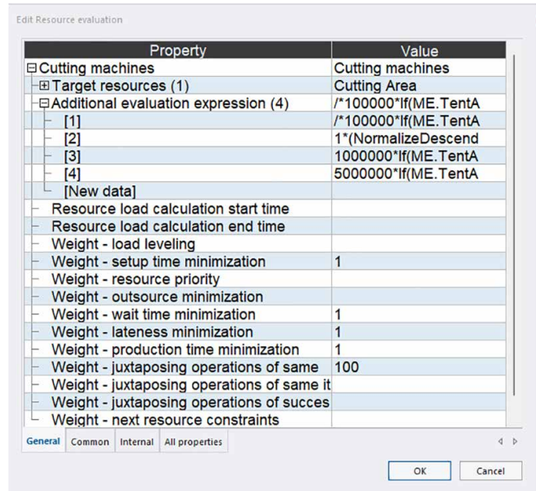
Using a multiplex strategy, Asprova optimizes scheduling even around multiple bottlenecks. A holistic strategy—combined forward and backward scheduling over multiple iterations—ensures efficient coordination against bottleneck and process capacity constraints to minimize waiting times and reduce overall throughput times.

## 4 Resource Evaluation

Asprova determines the optimal utilization of resources according to your business targets. Resource combinations and groups—production lines, sub-resources such as jigs and tools, and human resources such as work groups—are all modeled and evaluated for peak performance.

## 5 Resource-Specific Optimization

Resource evaluations may not universally apply to all scheduled resources, given the diverse criteria and priorities across different areas. Asprova is built to handle this, setting distinct goals and priorities in various departments, machines, groups, or manufacturing zones.




## 6 Order Prioritization

Your challenge is always managing many orders at different priorities—not solely based on just one factor such as due date, but other factors such as customer priority, specification, or rework. Asprova manages this with dispatching rules which are customized for different areas of your production. In a paint shop, an optimal order sequence will be based on sort criteria like brightness level, texture, and finish. This sequence must be coordinated with upstream and downstream mechanical processes, as well as overall order rules such as delivery date. This applies for all processes requiring sequencing, such as those constrained by geometry, material, or temperature.

# ASPROVA MODULES

**SCP** — Supply Chain Planning

Asprova SCP creates procurement, production, and delivery schedules. The entire supply chain—including demands, customers, distribution centers, and factories—is optimally planned.

**MS** — Manufacturing Scheduler

Schedule all factory resources at finite capacity in fine detail, with the full features Asprova's scheduling logic provides.

**MRP** — Material Requirements Planning

Use Asprova's MRP functionality to schedule with fixed lead times tracking any number of parts to a high degree of complexity, whether alternate BOMs or overwhelmingly large parts lists.

**SED** — Schedule Editor

Edit and make modifications without disrupting the workflow of the scheduler. Integrate feedback and manual changes easily with the automatic scheduling process.

**BOM** — Bill of Material

Update master data freely while scheduling work is being done on the main module. Create items on the fly and edit.

**MES** — Manufacturing Execution System

Production floor, sales department, and management teams can interface with the schedule directly. Custom charts, tables, and permissions give production managers the option to input feedback or make necessary changes.

**NLS** — Network License Server

Manage Asprova licenses and give users permissions as necessary.

**DS** — Data Server

Manage project data on a network, on a virtual machine, or in a cloud solution as needed.



# MODULE OPTIONS

**SCP** — Planned Inventory

Set inventory targets to be maintained at specific locations within your supply chain network, on a per-item and per-time period basis. The resulting plan will be calculated to meet these targets.

**MS** **MRP** — Sales Order

Based on customer orders, Asprova dynamically generates, assigns, and pegs manufacturing orders to meet demand. Use the sales plan to forecast production and manage planned and firm orders.

**MS** **MRP** — Purchase Order

Create purchase order proposals automatically, with precise lot sizes and replenishment lead times, considering all inventory levels and the detailed production schedule.

**SCP** **MS** **MRP** — KPI

Leverage the predictive KPI option to access financial key performance indicators, aiding in the assessment of plans and schedules. This evaluation can be conducted for the entire project, chosen orders, specific resources, selected items, or defined periods.

**MS** — Resource Lock

An especially powerful tool for precisely scheduling tanks and similar processes, this will lock capacity on the schedule for dynamically calculated time based on subsequent processes.

**MS** — Time Constraint Max

Sets a firm limit on time between processes, with other rules such as overlaps also being considered. This is crucial for perishable WIP like food and beverages, chemicals, medicines, and similar products which are time-sensitive.

**MS** — Group Assign

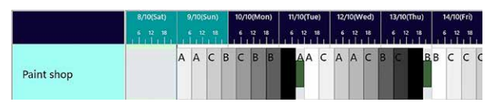
Instead of a sequential assignment, groups of operations or orders can be assigned together in one go, considering complex relationships between various operations.

**MS** — Event

Automatically assigns "events" to the schedule that use capacity according to predefined conditions. This could be tank cleaning for a time dynamically calculated by many factors such as process or skill level.

**MS** — Optimization

Dynamically sequences operations considering multiple targets and constraints such as paint shop color or furnace temperature sequencing.




**MS** — My Schedule

Asprova My Schedule provides access to production schedules on any device, enabling different departments, manufacturing, and management to collaborate seamlessly. Employees can enter feedback, adjust cycle times, and use browser-based access to stay updated and efficiently manage production processes.

# TRUSTED BY OVER 4000 CUSTOMERS


- Our 30 years of continuous development is driven by the strict demands of top lean companies, providing a solution tailored to meet your dynamic requirements.
- Incorporating the invaluable lean manufacturing know-how from global players, our standard package offers you the all-around best solution.

## Asprova—A Proven Solution at Many Companies

Alumil, Lorenz, BIC, Fujitsu, Grupo Antolin, Yamaha, Classen, AMU, OSRAM, Dan-Wood House, Jabil, Leki, Mazak, Turkish Aerospace, Chart, Sony, Halcor, Komatsu, Magma, Toyota, Bridgestone, Emmi, Neumarkter Lammsbräu, Honda, Kikkoman, Teka, Jemako, autoneum, Panasonic, Ricoh, Imefy, Denso, Aristo, Lacasa, Minimax



# USERS AND THEIR SUCCESS WITH ASPROVA

## GEBHARDT, Germany—Automatic Warehouses

GEBHARDT is a warehouse logistics systems manufacturer with a very high degree of in-house production. They implemented Asprova in 2016, scheduling in minutes thousands of production orders daily, each of which requires consideration of up to 100,000 components. They successfully reduced throughput times and doubled their output.

## STRAUSS COFFEE, Poland—Coffee Roaster

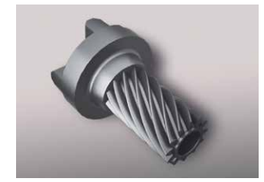
STRAUSS is a renowned coffee roaster with strict requirements for bottleneck process management and silo utilization. They implemented Asprova in 2012, taking an OEE below 50% and raising it to above 85%, realizing process standardization, decreasing production and maintenance costs, and achieving close to 100% on-time deliveries.

## KONTIO, Finland—Log House Manufacturer

KONTIO is the world-leading log house manufacturer. They implemented Asprova in 2015 without programming despite their highly complex processes. As a result, they reduced the time consumed for production scheduling by 70%, halved overall lead times, increased output, and cut their semi-finished inventory in half.

## SCHOLZ, Germany–Plastic Injection Molds

SCHOLZ produces extremely high-precision molds. They implemented Asprova in 2018, scheduling orders with up to 80 highly complex components, each of which has many processes, all synchronized to final assembly. SCHOLZ can now reschedule their entire order level of twelve months within seconds, multiple times per day.



Explore our website and watch compelling testimonial videos from our accomplished users at **www.asprova.eu/en**

Working with Asprova

## About Asprova

Asprova stands as the leading APS software globally. Our continuing mission is to empower every factory on the planet to achieve peak manufacturing standards—becoming lean, efficient, and cost-effective.

## What Does “Asprova” Mean?

At our inception 30 years ago, we had a dream of solving difficult problems. We wanted to revolutionize industry, impacting work on every level of the company. We were led by a spirit of inquiry, determined to understand the valuable members of the factory’s team. Recognizing the tremendous shortfall of manual scheduling, and the far-reaching effect of the production schedule on every worker, we discovered our focus, and our name was born:

**A**dvanced
**S**cheduling
**PRO**duction
**V**alue
**A**dded

## International Support

Asprova maintains a global presence with offices in Europe, Asia, and North America. Additionally, we boast a robust network of worldwide sales and implementation partners.

## Supported in Many Languages

ASPROVA
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