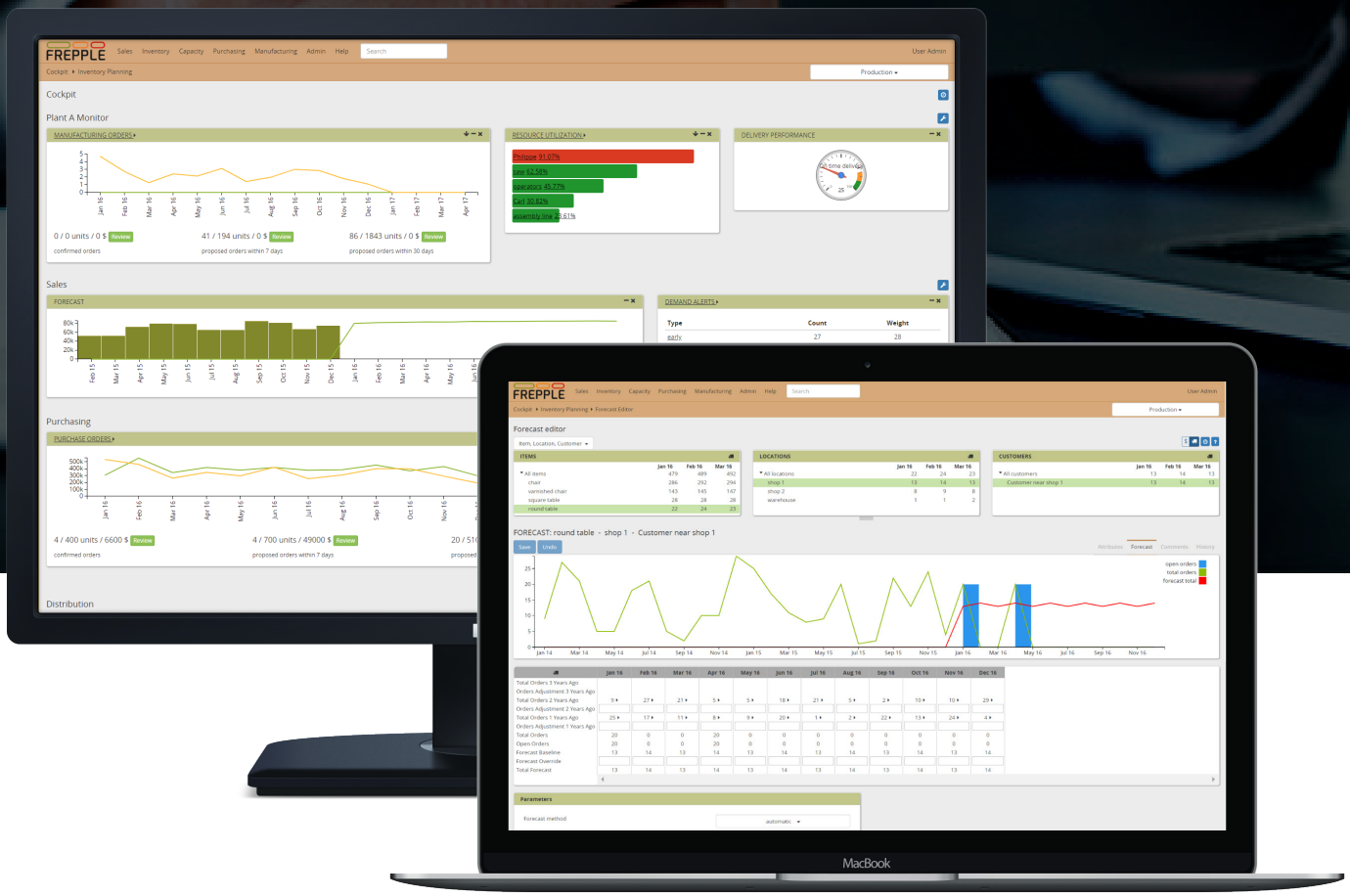
FREPPLE

open source production planning



Open source supply chain planning software

Planning is an essential process of every distribution or manufacturing company in its continuous search for optimization and efficiency.

FrePPLe is an integrated open source application framework, bringing advanced planning capabilities to companies of all sizes.

Advanced planning and scheduling (APS)

The complexity and importance of the planning process soon exceed the capabilities of a spreadsheet or the MRP functionality of an ERP system.

An APS supports the planners in their planning decisions.

Quick business benefits

FrePPLe is quickly implementable in a pragmatic approach.

Business benefits will quickly show on multiple of the following metrics:

- Improve planner productivity
- Reduce customer lead times
- Improve forecast accuracy
- Reduce work in progress
- Improve asset utilization
- Improve customer service level
- Reduce inventory
- Improve delivery date accuracy

Demand forecasting

A reliable sales forecast is a cornerstone for all planning processes. Demand forecasting allows your planners and sales team to work together in establishing a sales forecast for the future.

FrePPLe uses advanced time series algorithms to extrapolate the demand history, and gives users across the company the capability to review and adjust the sales forecast.

Inventory planning

Correctly dimensioning the inventory across the network is important in today's complex supply chains.

FrePPLe computes safety stocks and reorder quantities for raw materials, intermediate products and end products.

Replenishment planning

This process generates the replenishment plan across a distribution network to maintain the computed inventory levels.

FrePPLe computes the purchase orders and distribution orders to be executed, as well as a time phased overview of planned replenishment for future periods.

Production planning

Production planning is the mid-term planning process to organize the mid-term material and capacity requirements to meet the forecasted demand. Eventual bottlenecks are evaluated, discussed and alternatives investigated.

FrePPLe's planning algorithm and what-if scenario capabilities give the planners a powerful and smart overview to support the decision making process.

Production scheduling

Scheduling generates a detailed short term plan, respecting all resource capacities, personnel and material availability and lead times.

FrePPLe's planning algorithms remove the manual burden of generating a feasible schedule and automates the plan generation process. Smart interactive plan adjustments are possible in a Gantt chart.

Data maintenance and integration

FrePPLe provides powerful data maintenance capabilities and has an open architecture that allows easy data integration with other business applications.

Browser based user interface

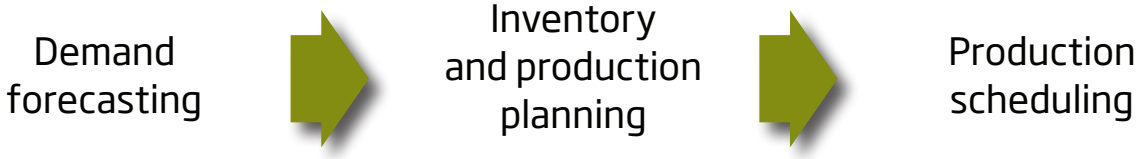
The user interactions is completely browser based, supporting all modern browsers.

Technical architecture

FrePPLe has a modern modular, open and extendible architecture, based on open source components. It integrates easily in your IT landscape and enterprise applications.

Solution overview for distribution industries

Solution overview for manufacturing industries



Demand forecasting

Demand forecasting process analyzes patterns in the demand history, and computes a predicted sales for the future periods.

Users from production, sales and marketing departments collaborate in reviewing and updating the sales forecast.

Advanced forecasting algorithms

Advanced time series algorithm analyzes the demand history and generates a baseline forecast for the future.

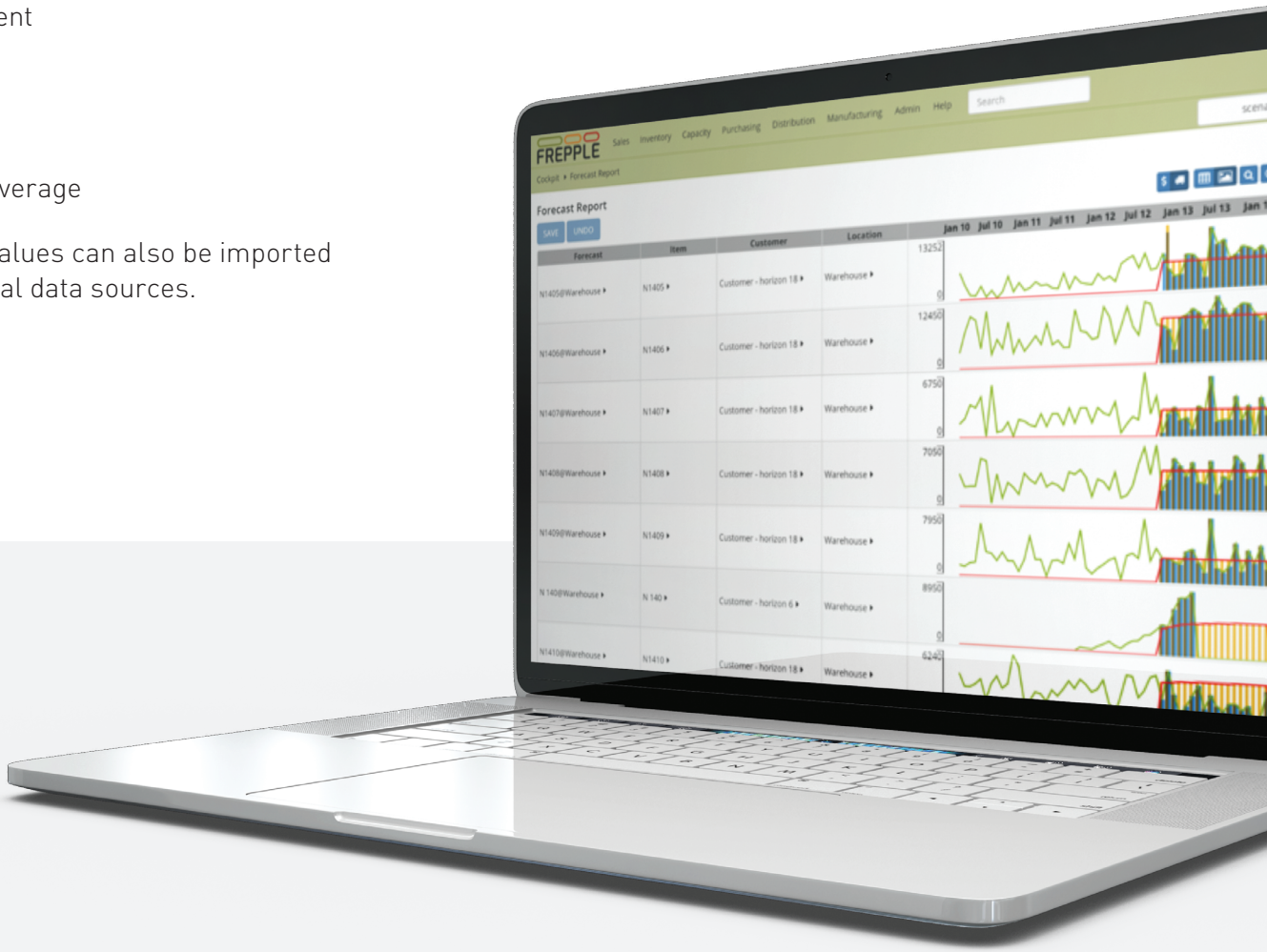
The system tunes and evaluates different forecast methods and automatically selects the one giving the lowest forecast error among:

- intermittent
- constant
- trend
- seasonal
- moving average

Forecasts values can also be imported from external data sources.

Outlier detection

Exceptional one-of sales are detected by the system. An alert is created to notify the user, and the system will also automatically trim the value to avoid the exceptional demand from excessively impacting the computed forecast.



Bottom-up, top-down and middle-out forecasting

The system can compute a forecast at a chosen level in the hierarchy. Choosing the right level is important to minimize the forecast error.

A top-down forecast is computed at the top level and then disaggregated to the lower levels.

A bottom-up forecast is computed at the lowest level, and higher levels sum up all lower values.

A middle-out forecast is computed at an intermediate level in the hierarchy, and then disaggregated to lower levels while higher levels display the aggregated sum.

Multi-dimensional navigation and editing

A hierarchy of products, locations and customers can be defined. The forecast values can then be reviewed and edited at any level in the hierarchy. Values edited at higher levels are proportionally disaggregated.

Users can thus collaborate and work together on the forecast values:

- A Sales manager reviews the forecast at the region level
- An account manager reviews the forecast at the customer level
- A product manager reviews the forecast for a product range
- The general manager reviews overall forecasted sales value

Inventory planning

Positioning inventory at strategic places in the supply chain is essential to dampen variability in the supply chain and keep customer lead times short and stable.

The inventory planning module will compute safety stocks and replenishment quantities for all decoupling inventory points.

Manage safety stocks

The system will propose a safety stock based on the following factors:

- Forecasted demand, computed by the system
- Requested customer service level
- Demand variability, computed by the system from the demand history
- Supply lead time variability

Users can impose constraints on the system proposal:

- Minimum and maximum quantities
- Minimum and maximum period of cover.

Manage replenishment quantities

The system proposes a replenishment quantity using an economic ordering formula, based on the following factors:

- Forecasted demand, computed by the system
- Inventory holding costs
- Order processing cost
- Product cost

Users can impose constraints on the system proposal:

- Minimum and maximum quantities
- Minimum and maximum period of cover

Simulate policy changes

Users can simulate policy changes. The impact on the replenishment plan can be reviewed before saving the change.

Manage inventory policies at aggregate levels

Inventory policies can be specified for individual item-locations and each time bucket.

To manage a large number of item-locations in a efficient way, segments can be configured to define a dynamic group of item-locations using an attribute filter expression. Inventory policies can be associated to the segments.

Some examples:

- Customer service level differentiated by an ABC categorization.
- Replenishment frequency policy per location and per item category.
- No-stock policy for expensive, slow moving or bulky items at some locations.

End to end supply chain vision

Safety stock and replenishment quantities can be managed at all levels in the supply chain: raw materials, intermediate products, finished goods in warehouses, finished goods in distribution centers and store locations.

Managed inventories at strategic positions provide protection against variability across the supply chain and contribute to the overall customer service level.

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Replenishment planning

The replenishment planning process generates a replenishment plan across a distribution network to maintain the computed inventory levels.

FrePPLe aligns closely with the upcoming DDMRP (Demand Driven MRP) philosophy, with concepts as decoupled lead times and buffer zones.

Generate purchase orders and distribution orders

The output consists of a list of purchase orders and distribution orders for the complete planning horizon.

The short term ordersare approved by a planner and sent to the the ERP system for execution.

The time phase planned replenishment for future periods are used to provide suppliers visibility into the forecasted purchases.

Intuitive review workflows

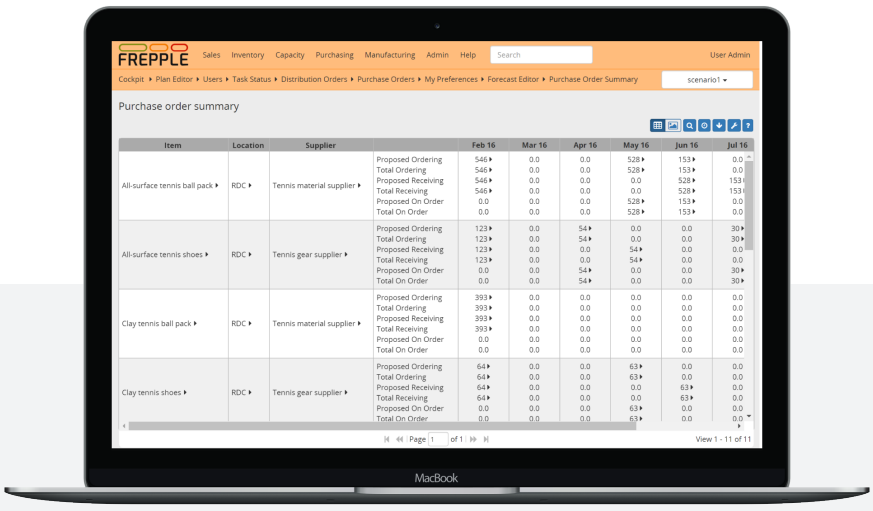
The planner is provided with a handy list of purchases orders and distribution orders for approval.

Item-locations with a significant stock-out risk are highlighted with a color code, allowing the planner to focus on the critical parts requiring attention.

Rebalance excess inventory

The system will propose returning excess inventory in the network to the parent locations, making it available for other locations

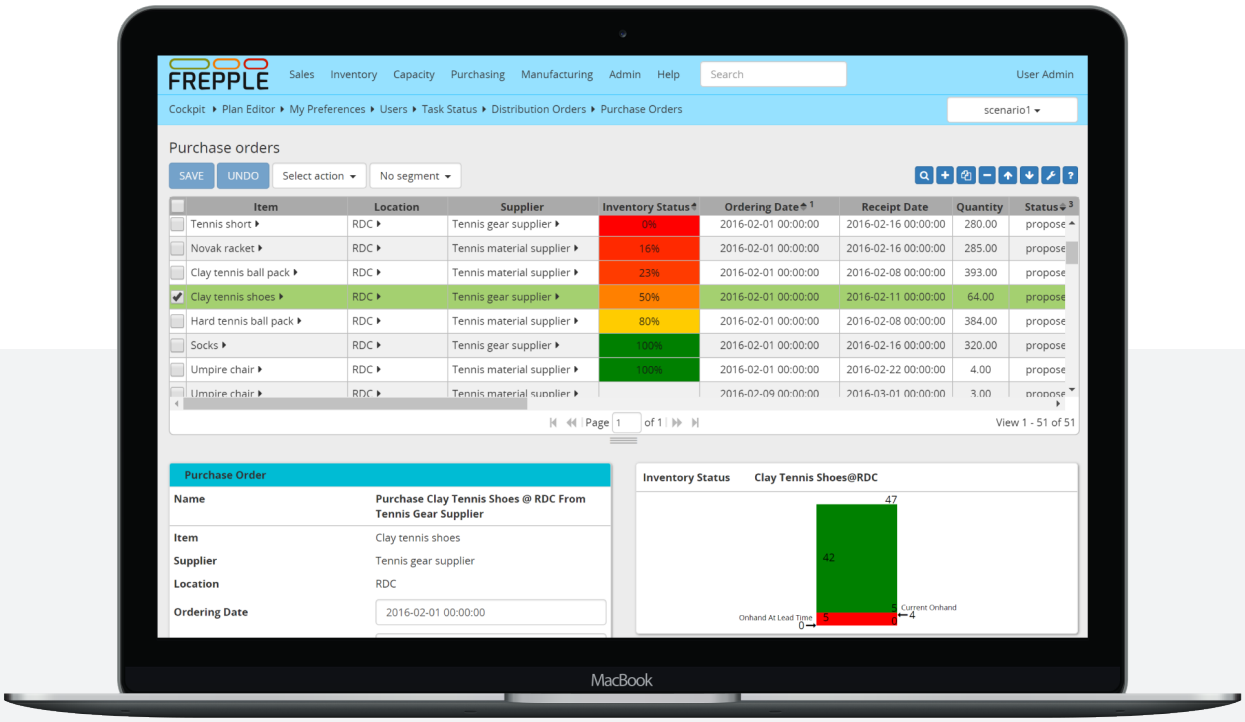
Excess inventory needs to meet configurable thresholds in terms of unit cost, total cost and burnout period before a rebalancing order is proposed.



Rich modeling capabilities

FrePPLe offers plenty of features to accurately model your plants, business rules and constraints:

- support for single-level or multi-echelon networks
- location calendars
- supplier calendars and capacity
- minimum, maximum and multiple purchase and distribution size
- alternate replenishment modes
- date effective material and capacity usage
- pegging from raw material to demand
- constrained and unconstrained planning modes



Production planning

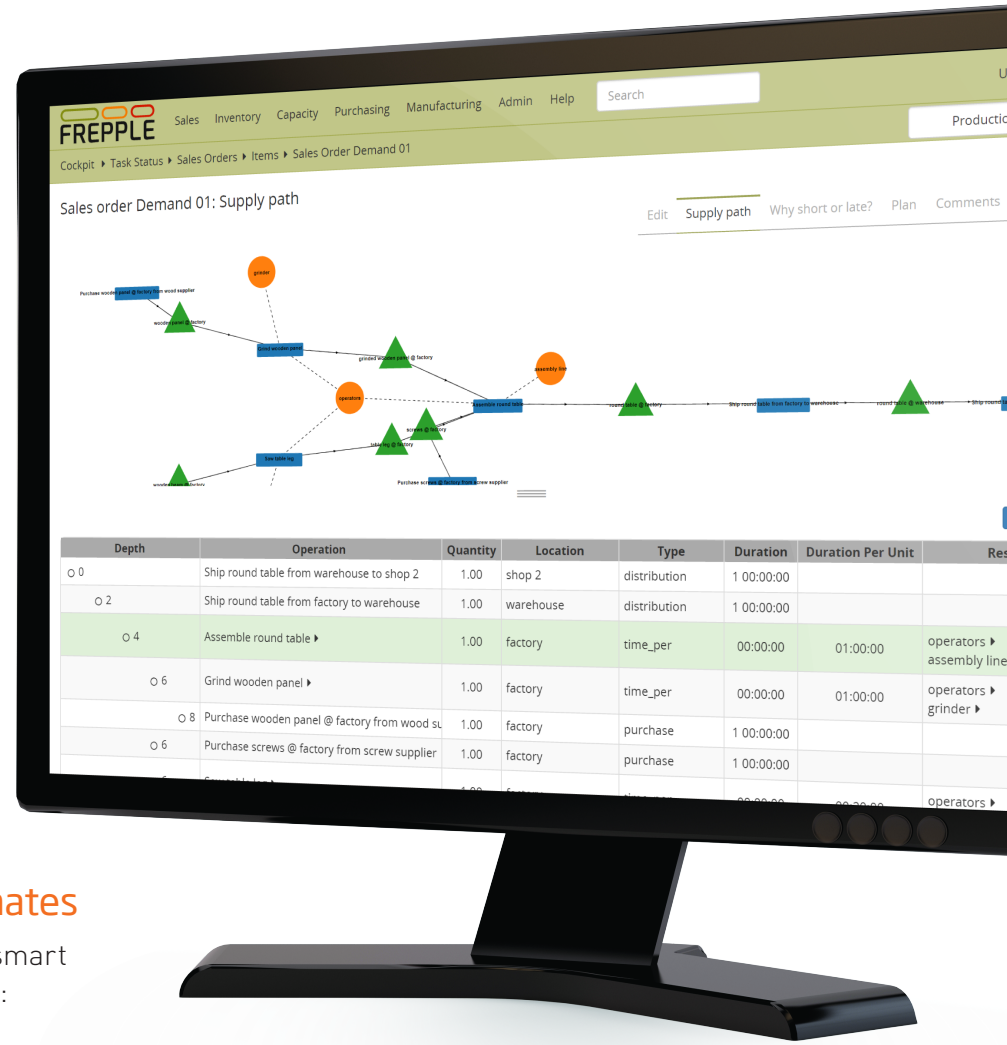
The production planning is the mid-term planning process, typically looking forward about a year in the future. The goal is to spot bottleneck areas early on and organize the mid-term material and capacity requirements to meet the forecasted demand.

FrePPLe aligns with industries' best practices in planning such as theory of constraints, agile manufacturing and lean manufacturing.

Finite capacity planning

The planning algorithm performs a fast heuristic search through all levels in the supply chain to generate a production plan respecting all material constraints, lead times and resource capacities.

Bottleneck areas are quickly identified, their impact on the demand becomes clear, and alternative plans can easily be evaluated.



Intelligent selection of alternates

The planning algorithm will make a smart selection among available alternates:

- Alternate production operations
- Alternate resources
- Alternate materials
- Choice between producing an item, transporting it from a warehouse or purchasing it from a supplier

The criterion for choosing the right alternate can be the priority, total cost or incurred penalty.

Intelligent allocation of material and capacity

The planning algorithm will allocate constrained material and capacity to the most important sales orders first, sorting them by priority then by due date.

Less important sales orders will be planned late or short if all material supply or resource capacity is already allocated to more important sales orders.

Delivery date quoting

When new sales orders are received the system can quickly compute a feasible delivery date. The system computes in real time a delivery date for the order that respects all material, capacity and lead time constraints.

The result is an accurate and reliable delivery date that can be replied to the customer.

Forecast consumption

Short term demand consists primarily of customer sales orders Longer term demand consists primarily of sales forecast.

Where both sales orders and forecast are present, the forecast consumption logic reconciles both into a total demand signal that is consistent and complete across the complete horizon.

Rich modeling capabilities

FrePPLe offers plenty of features to accurately model your plants, business rules and constraints:

- supports make-to-stock, make-to-order and configure-to-order items
- minimum, maximum and multiple batch sizes
- alternate operations, resources and materials
- date effective material and capacity usage
- availability calendars
- assembly coordination
- pegging from raw material to demand
- resource setup matrices and conversion times
- resource and operator skills
- co-products
- constrained and unconstrained planning modes

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Production scheduling

Production scheduling is the short term planning process, typically with a horizon of 1 to 2 weeks. Material and capacity are scheduled at a detailed level and the resulting plan is communicated to an ERP or shop floor control system for execution.

FrePPLe models the complete supply chain network with its bill of distribution, bill of material, resources, and suppliers for the raw materials. The planning algorithm will plan all sales orders and forecast through this network, respecting all capacity, material and lead time constraints.

FrePPLe aligns with industries' best practices in planning such as theory of constraints, agile manufacturing and lean manufacturing.

Finite capacity scheduling

Orders are scheduled in order of priority and due date. For each order the planning algorithm performs a fast search through all levels in the supply chain and bill of material to allocate material and capacity.

The generated schedule respects all material constraints, resource capacities and operator availability.

Smartly handles constraints interactions

The solver engine simultaneously plans material, capacity and lead time constraints and smartly recognizes the interactions between the constraints. When the material supply is delayed then the capacity allocation will be postponed. Similarly, when capacity is short then the material supply will be planned to match the capacity usage.

Interactive Gantt plan editor

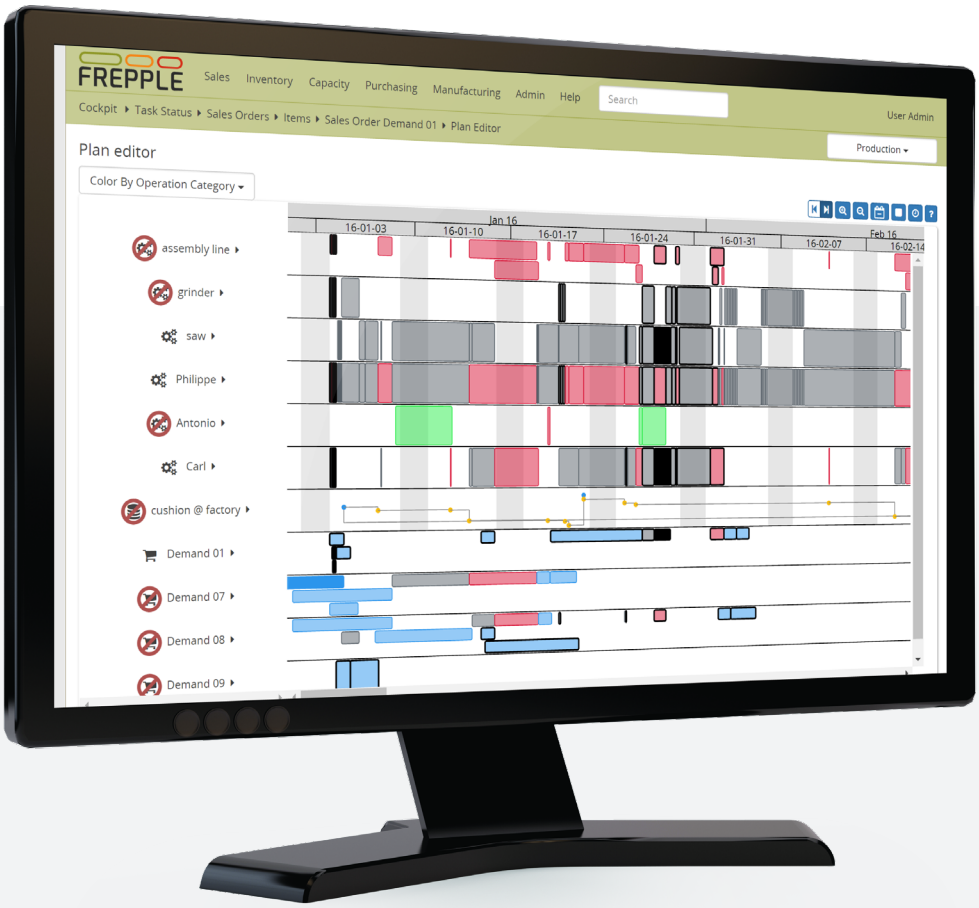
A Gantt chart provides a powerful and visual overview of the plan.

The interactive capabilities in the Gantt chart allow the planner to fine-tune and adjust the plan: drag-and-drop operations to new dates, move to alternative resources, change production order quantities. All interactive changes to the plan are intelligently propagated. For instance, after moving an assembly operation to an earlier date the production of all subassemblies and purchasing of components is also moved earlier.

Rich modeling capabilities

FrePPLe offers plenty of features to accurately model your plants, business rules and constraints:

- fixed and variable operation times
- order prioritization
- incremental planning mode
- alternate operations, resources and materials
- availability calendars for shifts, holidays, planned maintenance and overtime
- resource setup matrices and conversion times
- resource and operator skills



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User interface

The user interface is fully browser-based, supporting all modern web browsers.

Easy to use

The user interface is designed around simple, graphical and intuitive workflows, driven directly by day to day planners' needs.

Integration with Excel and other office tools is easy and effective.

Internationalization

FrePPLe is available in English, Dutch, French, Russian, Italian, German, Portuguese, Chinese, Taiwanese and Japanese.

Additional languages are frequently contributed by our user community.

Integrated data maintenance

Planning relevant data information can be created and maintained in the planning tool itself. You're always a single click away from editing the master data – simple and effective.

Role-based user permissions

The access rights of users can be controlled in detail: view, edit and create permissions can be assigned per object type.

Roles can be defined to represent a certain set of permissions.

What-if scenario analysis

Users can easily create what-if scenarios. Alternative plans can easily be generated and analyzed without disturbing the production system.

Technical architecture

FrePPLe has a modern modular, open and extendible architecture, based on open source components.

It integrates easily in your IT landscape and enterprise applications.

Flexible and extendible

FrePPLe is designed to be extensible.

Custom add-ons modules can extend the application with:

- Custom data models and attributes
- Custom reports and menus
- Customer planning logic
- Custom dashboard widgets
- User interface styling themes
- Etc...

Easy to integrate

FrePPLe architecture enables it to integrate with other applications or even be embedded in them.

The interface technologies are available:

- Data integration with CSV files
- Data integration with Excel files
- Data integration through a web-based REST API
- Data integration through database access with ETL tools
- User interface single sign on authentication
- User interface embedding with iframes

A standard connector is available for the following ERP systems:

- Openbravo
- Odoo

Technical specifications

FrePPLe is built on a set of proven, scalable and secure open source components.

- ✓ Modern web-based user interface
- ✓ Supported for all major modern web browsers: Chrome, Firefox, Internet Explorer, Safari and Opera
- ✓ Application server is supported on Linux and Windows
- ✓ Data is persisted in a PostgreSQL relational database
- ✓ The web application is deployed on Apache web server, and is based on the Django web application framework
- ✓ The solver engine is implemented in C++, extended with a rich scripting API in Python

Editions

	Community Edition	Cloud Edition	Enterprise Edition
Features			
Finite capacity planning and scheduling	✓	✓	✓
Import and export Excel and CSV files	✓	✓	✓
What-if scenarios	✓	✓	✓
Odoo integration	✓	✓	✓
Demand forecasting		✓	✓
Inventory planning		✓	✓
Interactive Gantt chart		✓	✓
Order due date quoting		✓	✓
Openbravo integration		✓	✓
Support	User forum	Professional support system	
License	Gnu Affero General Public License	Proprietary license	
Deployment	On premise	Cloud-based	On premise

Community edition

The Community Edition is fully functional and without any limitations, but it comes without any support or guarantees.

Cloud edition

The Cloud Edition adds more advanced features and professional support. Customers can freely switch between the Cloud and Enterprise Editions.

Enterprise edition

The functionality of the Enterprise Edition is identical to the Cloud Edition, The only difference is that the software is running on your own servers.

About frePPLe bvba

FrePPLe is a company located in Brussels and Paris.
We develop, maintain and host the frePPLe product and offer related customization, implementation and training services.

frePPLe bvba

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