LIBERO
SALES FORECASTING

Developed by
e-Evolution SC

Migrated by
Maximea LTD

Sponsor
StabilisOne LTD

TABLE OF CONTENTS

1 Background

Sales Forecasting is the part of Libero Manufacturing based on the original contribution by Victor Perez of e-Evolution, Mexico during the ADempiere project.

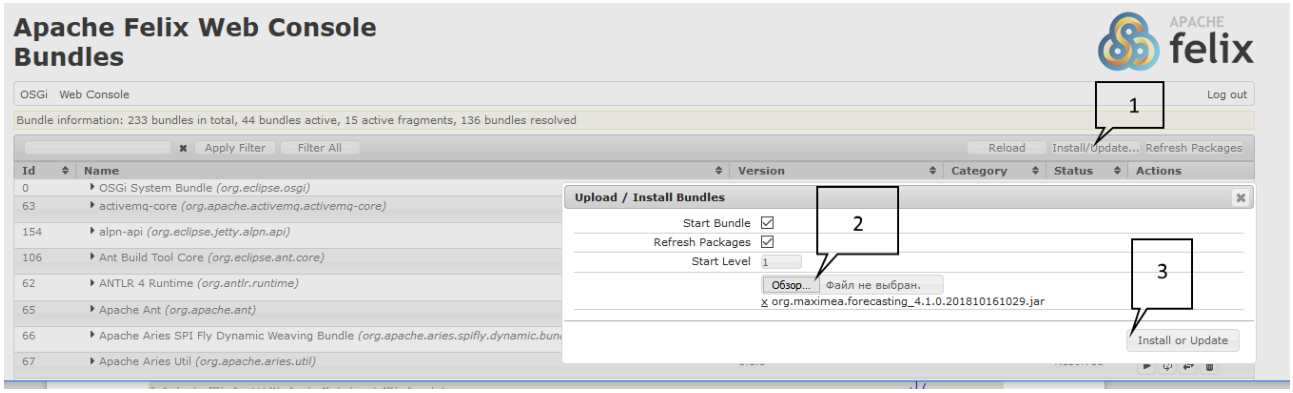
More details about Forecast Management for ADempiere you can see here http://www.adempiere.com/Forecast_Management.

2 Setup

2.1 Download and Install plugin

You can download the LiberoHR plugin for immediate use in your latest iDempiere from https://bitbucket.org/maximeaerp/org.maximea.forecasting/downloads/

In Apache Felix Web Console: 1) Install plugin 2) Select file 3) Install and Update

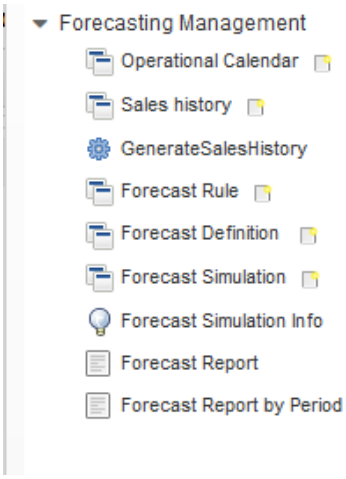


As result must be Status=Active

After that you can use this functionality.

3 Sales Forecasting functionality

3.1 Overview



This functionality allows an estimate of future sales of physical units and / or monetary of the products or services over a period of time, using quantitative and statistical methods based on historical data and market statistics.

The projected quantities and sales amounts are used for decision making, pricing, cash flow, estimated future demand, calculating master production schedule, supply plan and future capacity requirements.

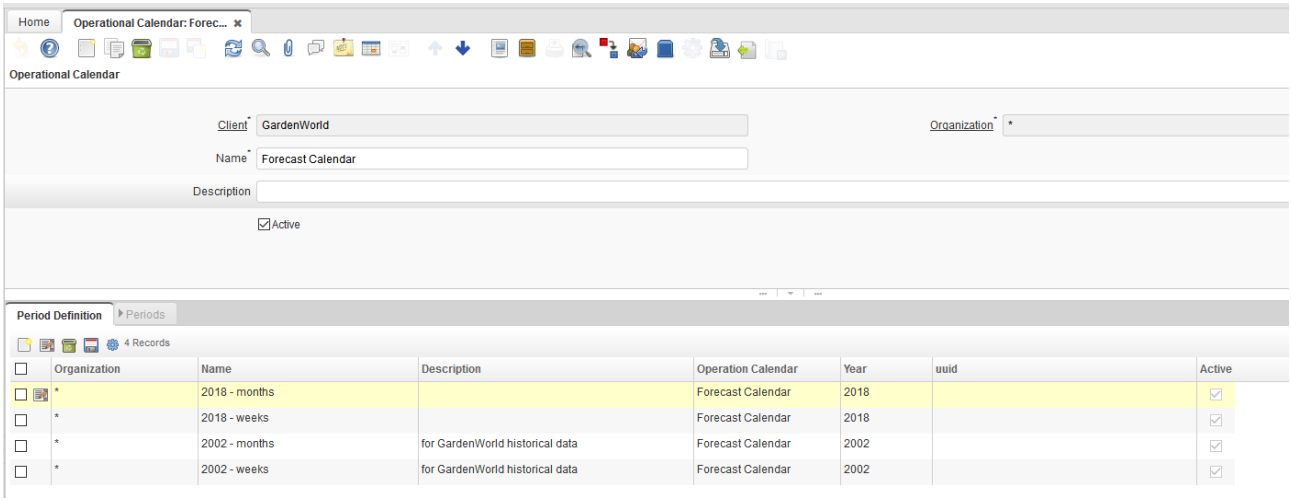
3.2 Operational Calendar

The operation calendars are defined to set measurement cycles for planning, forecast calculus and reports.

With the goal of planning in mind, it is required a correct formation of periods groups, which needs to be measured, the operative calendars allows to set calendars with weekly and monthly periods.

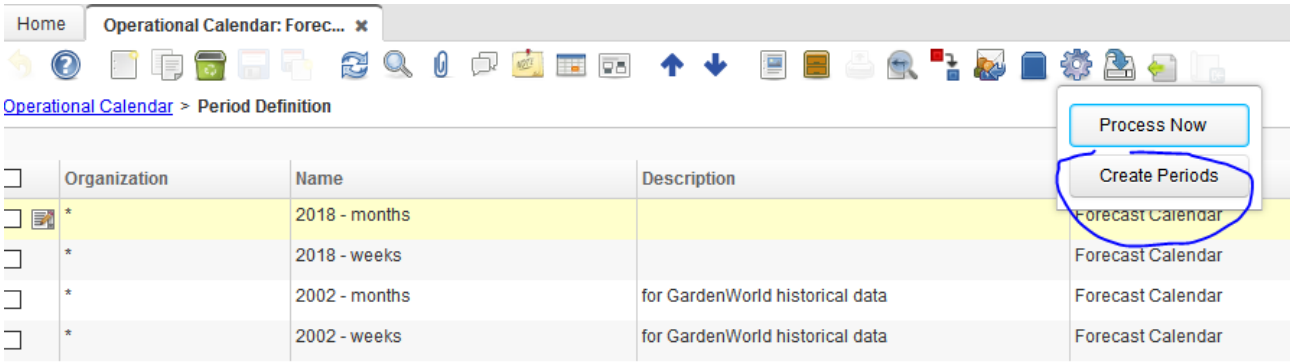
3.2.1 Period Definition

The period definition, allows to set a calendar year in order to multiple periods can be created.

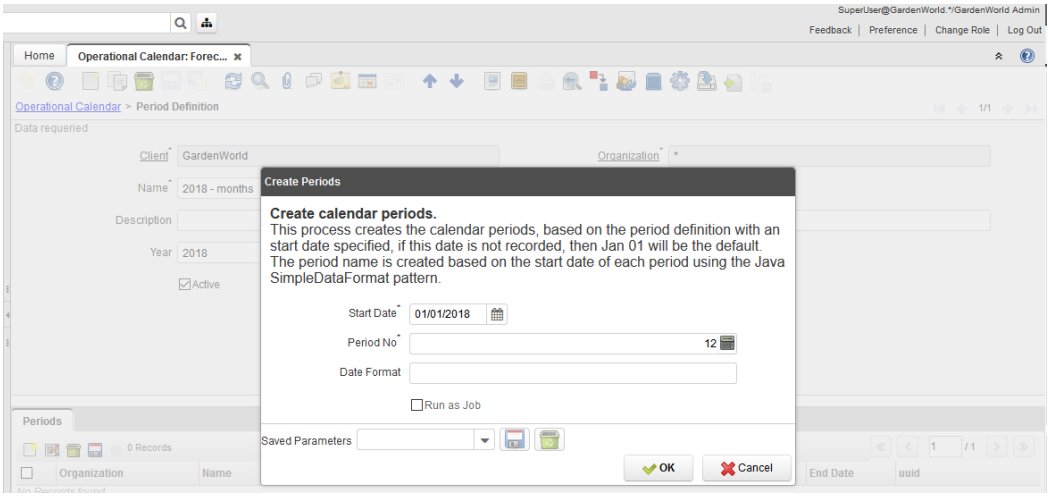


3.2.2 To create calendar periods

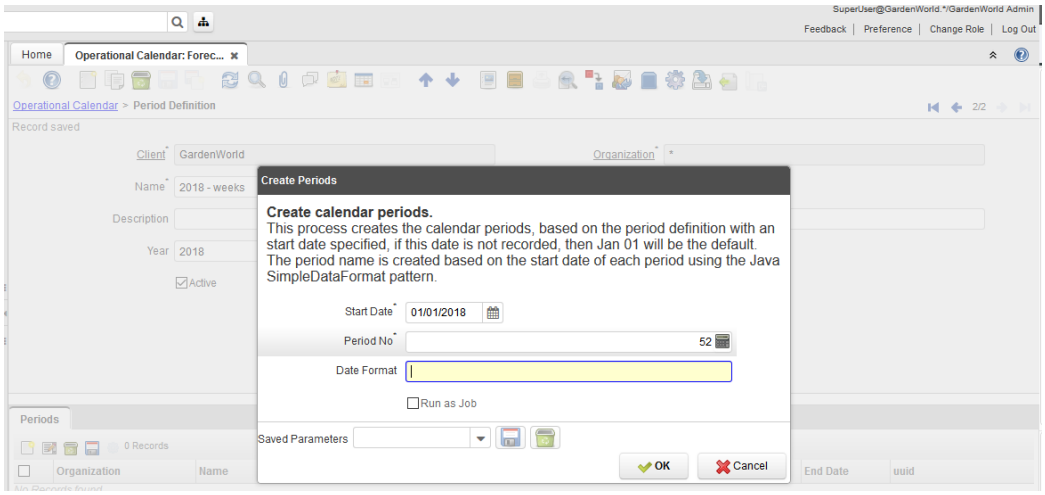
This process creates the calendar periods, based on the period definition with an start date specified, if this date is not recorded, then Jan 01 will be the default. The period name is created based on the start date of each period using the Java SimpleDataFormat pattern.



Create periods for Months

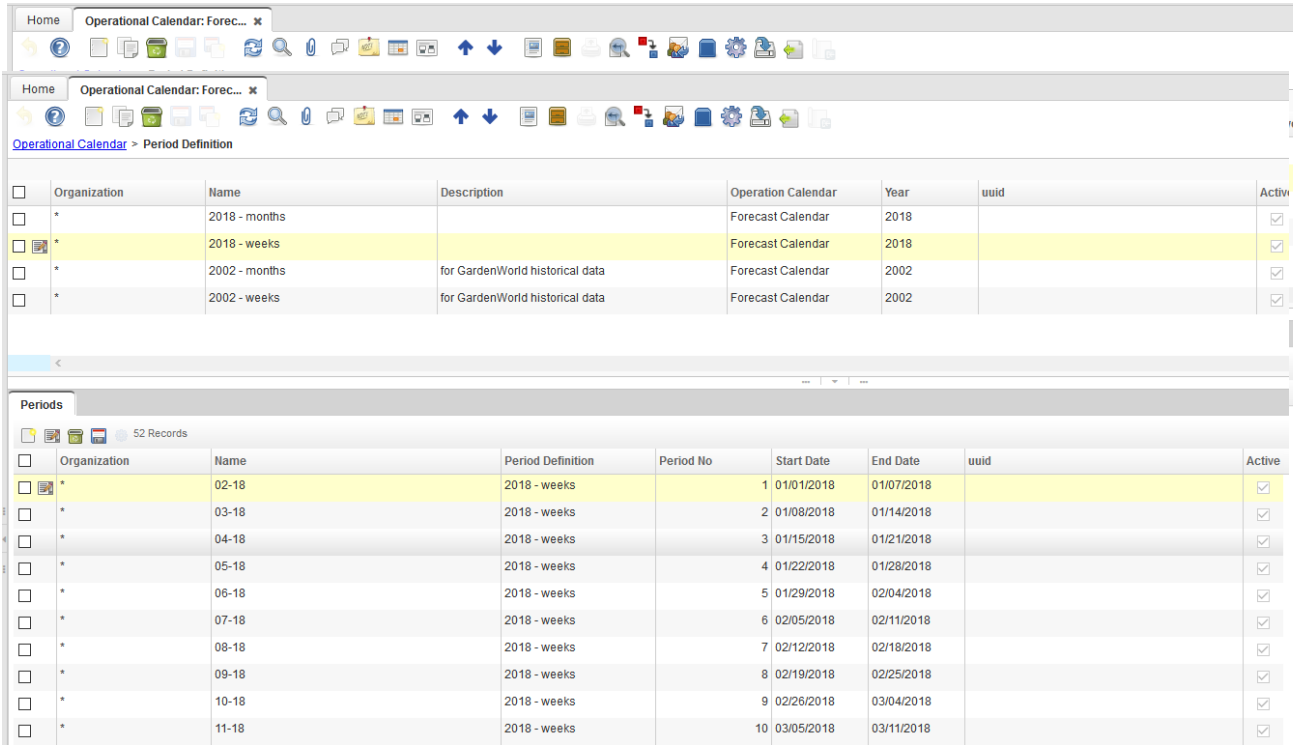


Create periods for Weeks



3.2.3 Periods

The periods are created based on period definition, each period has a name, period number, start date and end date, which set the date range for the specified period.

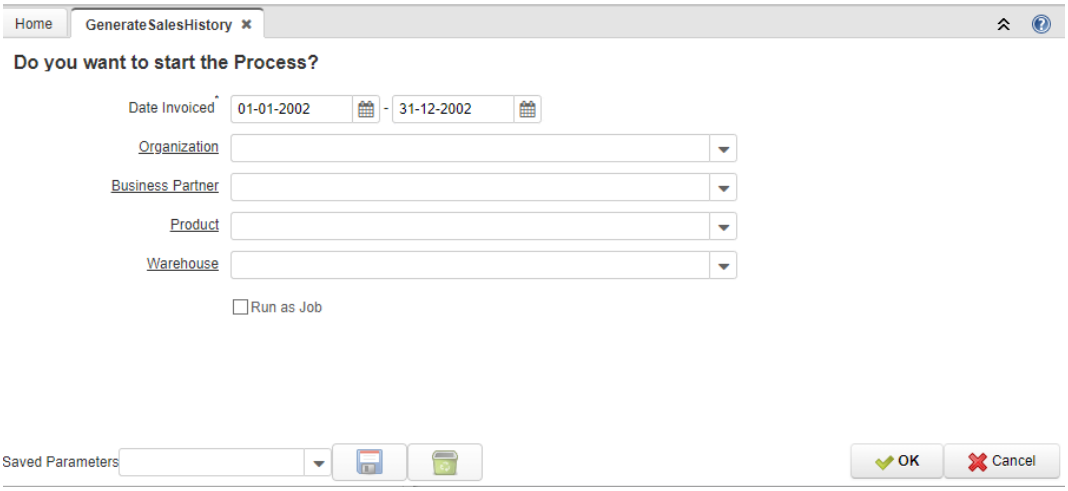


3.3 Generate Sales History Process

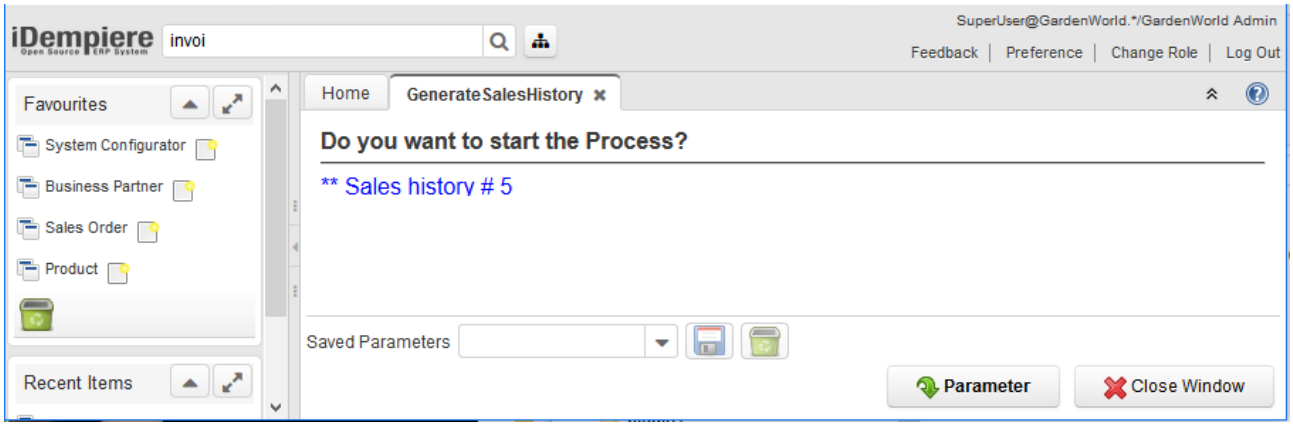
This process generates sales history based on historical invoicing.

A subset of the sales history can be generated based on many elements, including: Organization, Business partner, Product or|and Warehouse.

It is possible to use the option To import the sales history to load the sales statistics from the legacy systems.

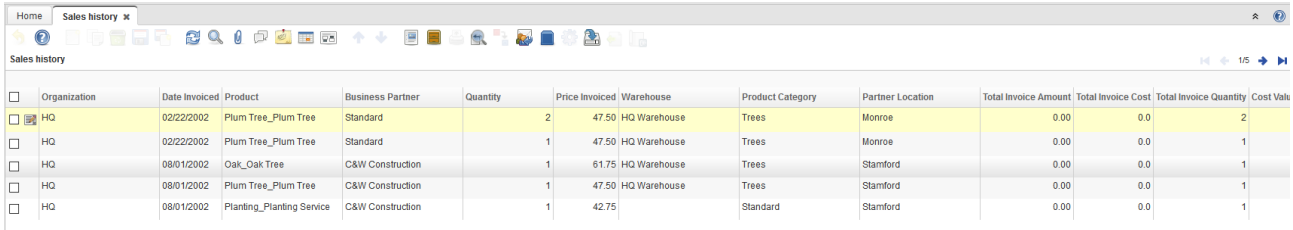


d



3.3.1 Sales history window

In this window we can see historical sales information and can use its to realize the forecast calculus and to get sales statistics reports.



3.4 Forecasting Rules

The Forecasting Rules define the business logic to calculate the forecast according with a previously implemented algorithm

These rules are used in the Forecast Definition to set the rules and forecast calculation ranges.

The rules can be identified by a name and a description, to identify the different forecast calculation algorithms.

The calculus java class: it's the implementation of the java interface for each forecast rule.

Currently the system supports multiple forecast calculation implementations, which are executed by the forecast engine.

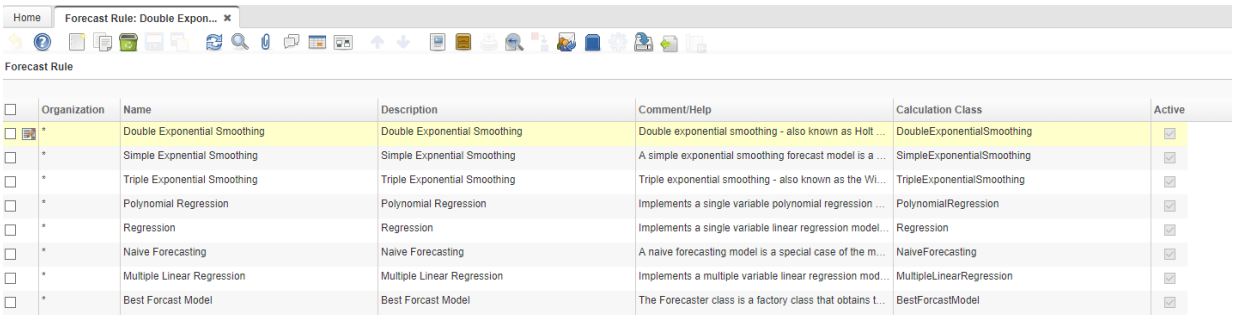
The forecast rules are used by the Forecast definition to determine the forecast calculations, based in the following rules:

- Double Exponential Smoothing
- Simple Exponential Smoothing
- Triple Exponential Smoothing
- Polynomial Regression
- Regression
- Naive Forecasting
- Multiple Linear Regression
- Best Forecast Model
- Moving Average

3.4.1 Forecast Engine

The forecasting engine has the function to expose the implementations for each forecast rule, the interface ForecastRule.java is the interface to implement each forecast rule.

The developers can use this interface to implement their own calculation algorithms.



3.5 Forecast definition

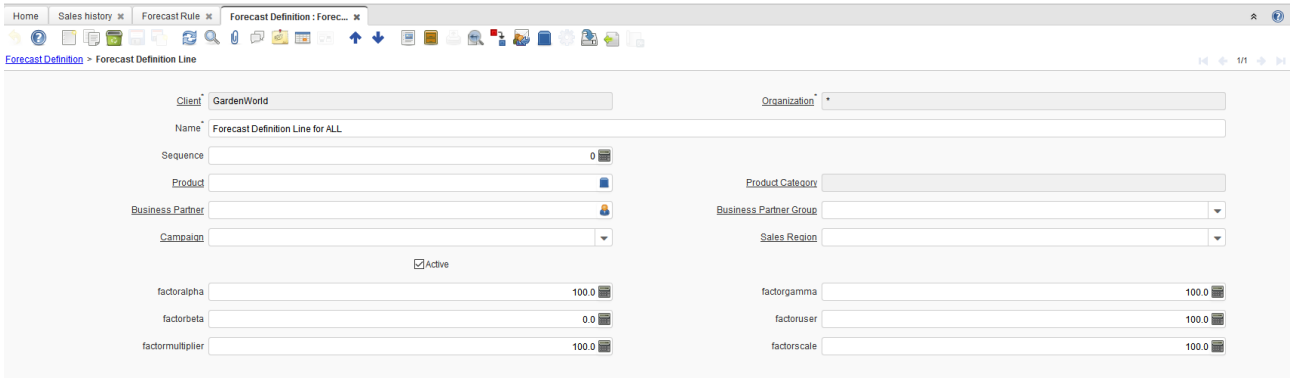
This window allows to define the valid combinations, used to select the historic sales records. The combinations order is determined by the sequence, where the lower sequence has priority over the higher sequence.

The information to define combinations are defined by business partner data (business partner, business partner group, sales region and campaign), Product data (product, category, classification, class and group), factor data for calculus (Alpha Factor, Gamma, Multiplier, Scale).

The suitable use of the forecast definition, allows to generate calculus with different factors for each main group of data defined for a business partner or product.

In this way is possible to get a forecast for each product category, different from another.

To set the sequence of the combinations is possible to use the tab of sequences, with which is possible to define the order of each combination.

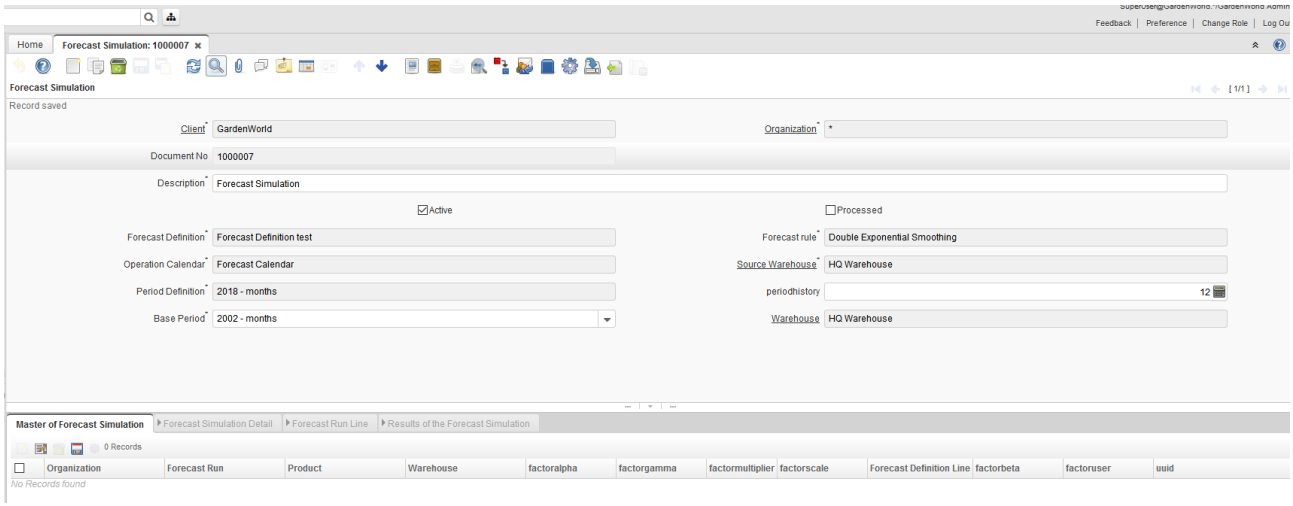


3.6 Forecast simulation

The forecast simulation window, allows to define the required parameters to process a forecast calculation, these parameters are used for the forecast engine to extract the data from the sales historical, to execute the calculation algorithm based on the forecast rule and to save the forecast results.

- **Forecast Definition**: *Establishes the forecast definition for this simulation.*
- **Forecast Rule**: *Establishes the forecast rule to calculate this simulation.*
- **Operational Calendar**: *Establishes the calendar to use, for the base periods definition and the target period definition.*
- **Source Warehouse**: *Determines the warehouse for which the sales statistics information will be filtered, in this way it is possible to calculate a forecast for an specific warehouse.*
- **Base Period Definition**: *Defines the basic periods to filter the sales history information.*
- **Target Periods Definition**: *Defines the target periods, once the simulation process is executed the calculated values are organized in the order of the target periods definition.*

- **Periods Historical**: *Determines the number of history periods, which must be used for the forecast calculation, the periods number are equivalent to the defined inputs at the operational calendar.*
- **Target Warehouse**: *Determines the destiny warehouse with which the results are generated. In some enterprises the sales historical is generated for each point of sales, by this field is possible to change the source warehouse to a target warehouse with the goal of consolidate the demand in a target warehouse.*
- **Calculate Forecast**: *This process allows to execute, by the forecast engine, the calculus algorithm established by the forecast rule, the forecast engine uses the established factors in the forecast definition. The calculated values for each period are saved as result of the simulation.*



3.6.1 Master of Forecast Simulation

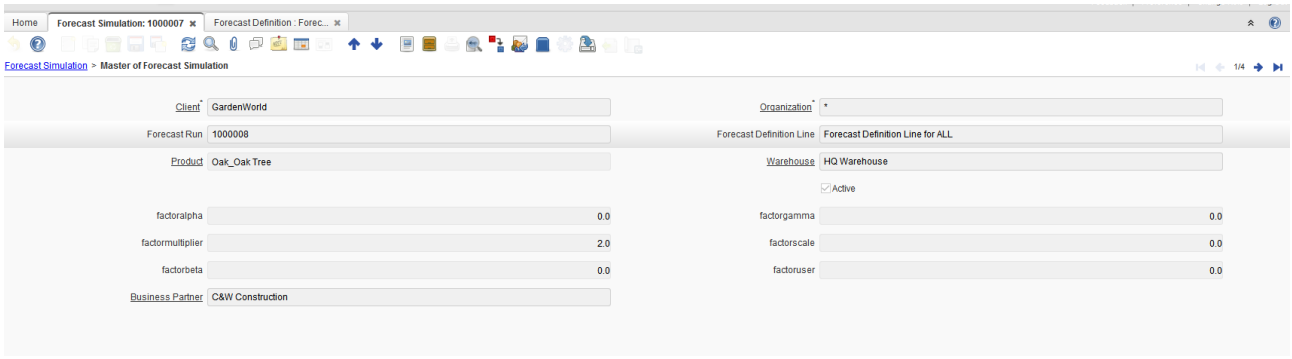
The records of this tab are generated as result of applying the combinations set in the forecast definition, each master record is a unique combination of product, warehouse, and the forecast factors used for this calculus.

Alpha Factor: *This factor is used for the forecast engine and determines the smoothing constant used for some forecast models of exponential smoothing. It hast to be a value in the range of 0.0-1.0*

Gamma Factor: *This factor is used for the forecast engine and determines the smoothing constant used in second place for some forecast models of exponential smoothing forecast, the Gamma Factor is used to smooth the tendency, it must be a value in the range of 0.0-1.0*

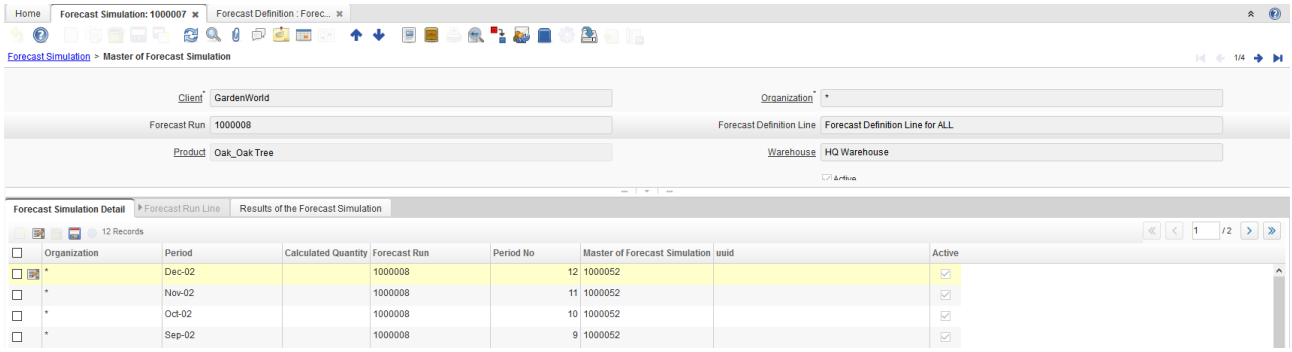
Multiplied Factor: *This factor is used by the forecast engine and determines the percentage in which the calculated quantity of the forecast is increased or decreased. A negative percentage indicates the quantity is reduced.*

Scalar Factor: *This factor is used for the forecast engine and determines the percentage to be multiplied or scale a calculated quantity of the forecast, this value must be absolute.*



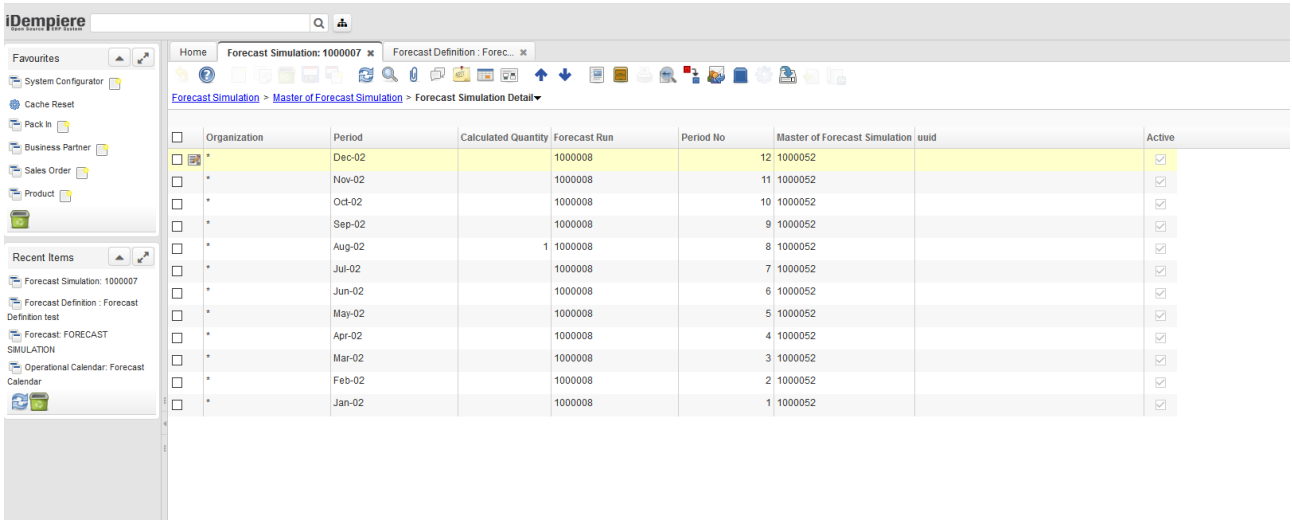
3.6.2 Forecast Simulation Detail

The records of this tab are generated as result of applying the established combinations in the forecast definitions and the number of established periods in the definition of basic periods for each master of forecast simulation, a detail record is created for each period accumulating the invoiced quantities between the range of the start and the period end date.



3.6.3 Forecast simulation line

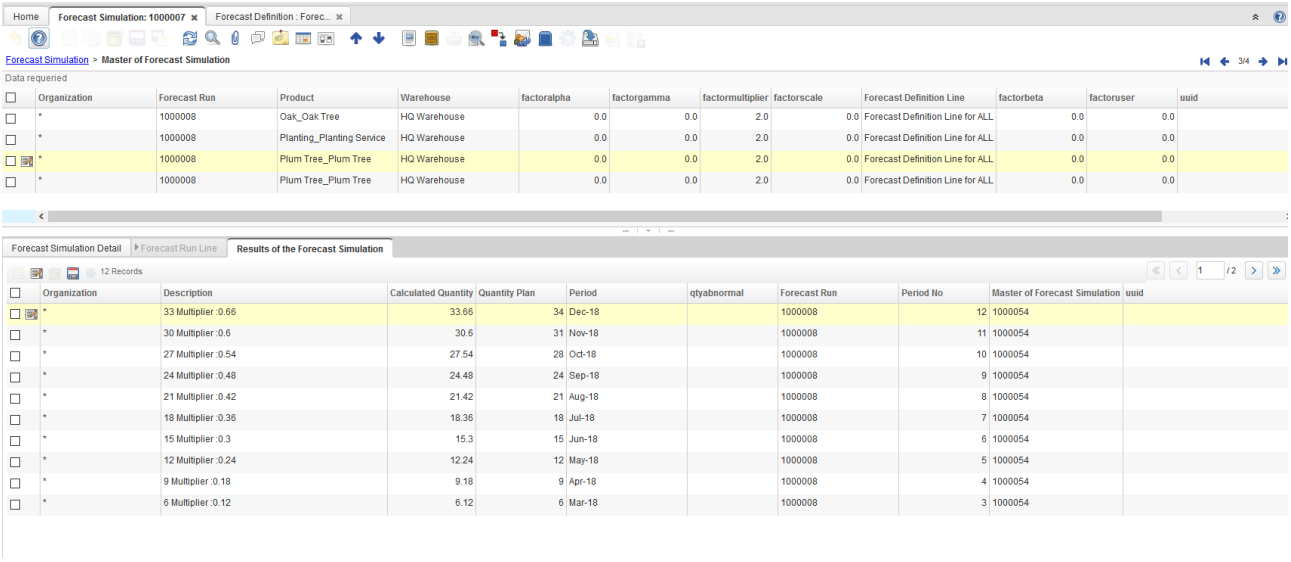
Shows the source of the sales historical for each detail.



3.7 Results of the Forecast Simulation

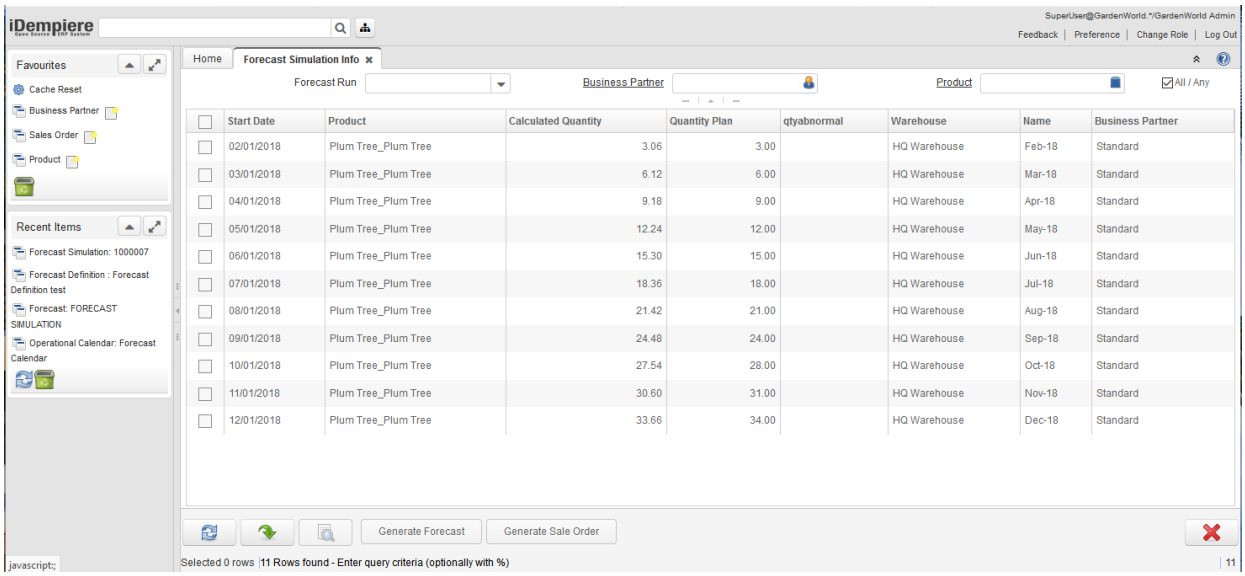
The records on this tab are generated by the execution of the Forecast Engine, using the implemented algorithm in the Forecast Rule, a record is created for each established period in the target periods definition.

The Forecast Engine uses the Forecast Simulation Detail, the Forecast Rule and the factors, to calculate a resultant forecast for each target period, this allows to use the sales historical of the previous year and to calculate the current year sales forecast.



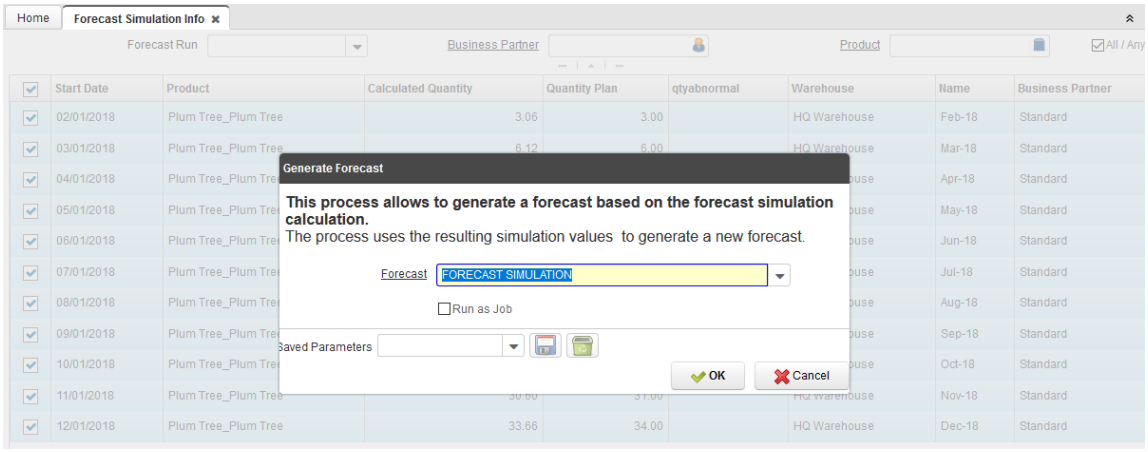
3.8 Forecast Simulation InfoWindow

The forecast simulation InfoWindow allows to compare base period data with the simulation result of the target period, after executing a forecast simulation. The goal of this query is to validate that the results are considered in the company plans.



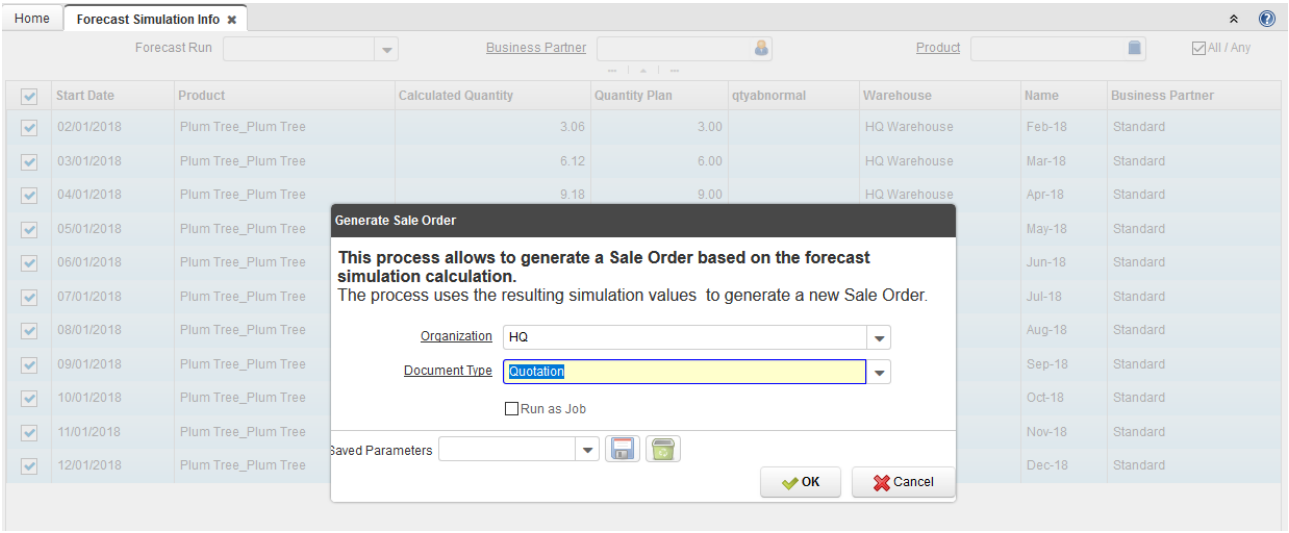
3.8.1 Create Forecasts

Used process Create Forecast you can create new records to Forecast and use its for Manufacturing.



3.8.2 Create Sale Orders

Used process Create Sale Order you can create new Sales Orders by Business Partner.



3.9 Forecast

The Forecast window allows to maintain the sales forecast information for an organization.

Inside the forecast window the field Price List has to be defined to determine the sales goal amounts and to obtain an estimated value for the sales plan by sales representative.

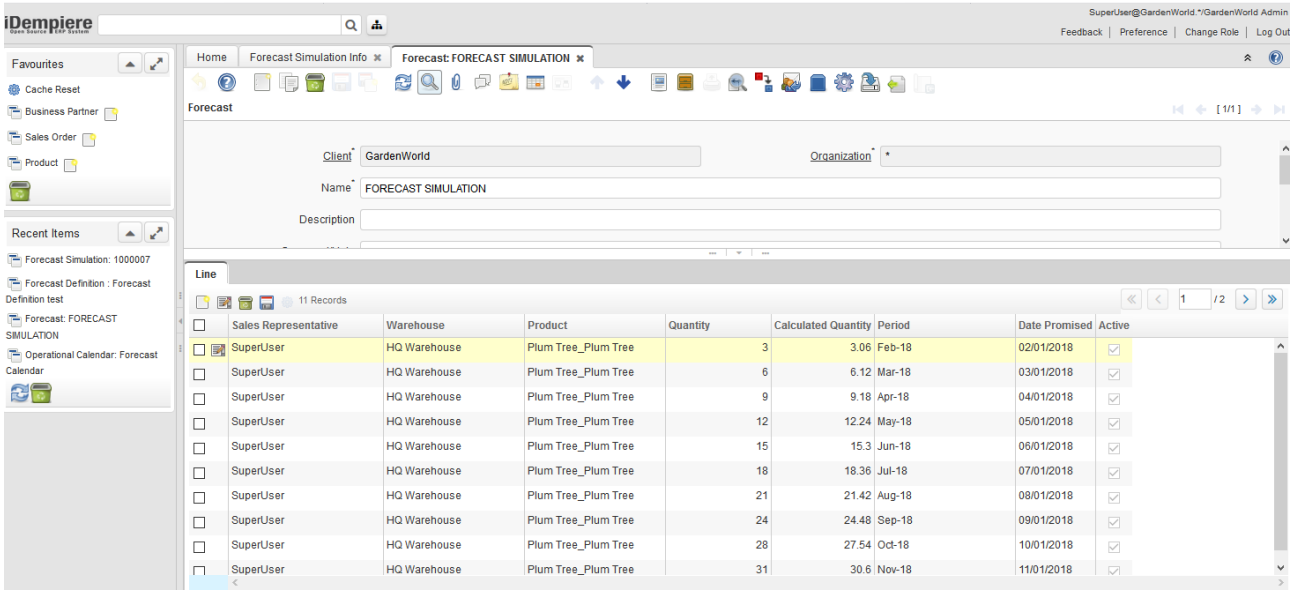
The Forecast report show the Sales Plan , the goal amounts which has to be accomplished, the information to be grouped by sales representative, product, warehouse and period.

The field Operational Calendar and Periods Definition, must be defined to determine the delivery promised date for the forecast products.

The forecast lines can be captured manually entering the sales representative, product, warehouse, quantity, period or it can be generated from a simulation using the Generate forecast process.

The products and its quantities are considered by MRP when the forecast is already processed, iDempiere allows to have several forecast simultaneously.

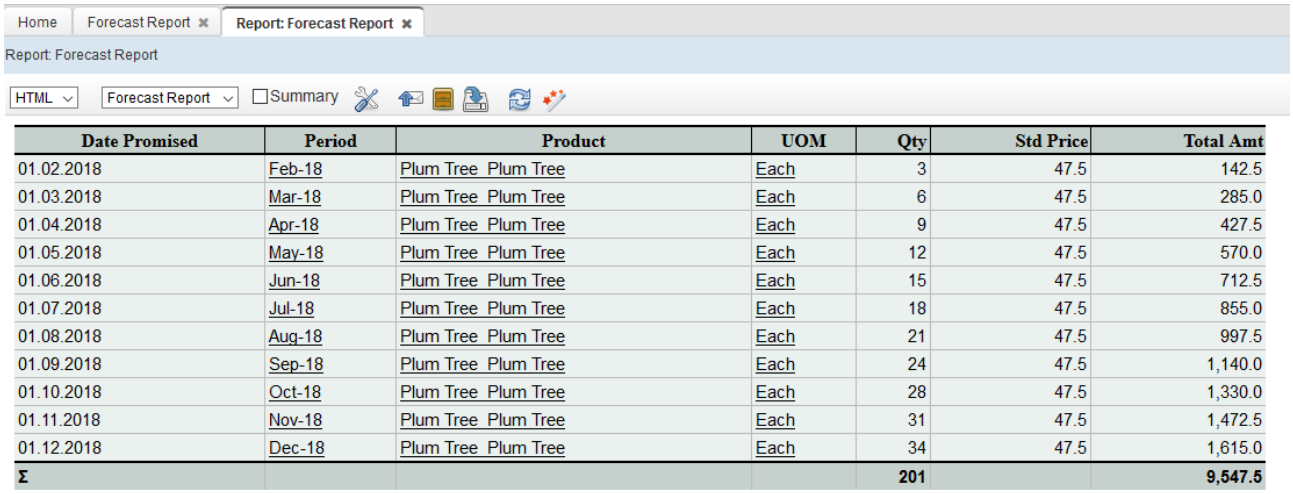
If you don't want that MRP considers a Forecast processed, it should be deactivated.



3.10 Forecast Report

This process generates a sales forecast detailed report, classified by sales representative, product warehouse, period and promised date, these parameters can be used to create filters at the report result.

The main goal of this report is to analyze the sales plan, considering quantities and amounts.

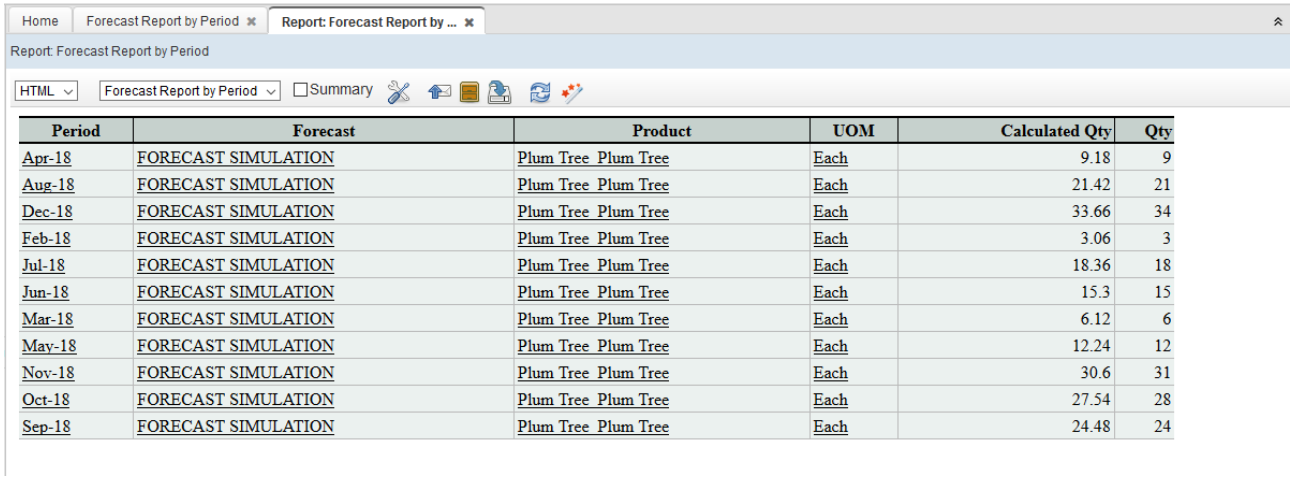


Date Promised	Period	Product	UOM	Qty	Std Price	Total Amt
01.02.2018	Feb-18	Plum Tree_Plum Tree	Each	3	47.5	142.5
01.03.2018	Mar-18	Plum Tree_Plum Tree	Each	6	47.5	285.0
01.04.2018	Apr-18	Plum Tree_Plum Tree	Each	9	47.5	427.5
01.05.2018	May-18	Plum Tree_Plum Tree	Each	12	47.5	570.0
01.06.2018	Jun-18	Plum Tree_Plum Tree	Each	15	47.5	712.5
01.07.2018	Jul-18	Plum Tree_Plum Tree	Each	18	47.5	855.0
01.08.2018	Aug-18	Plum Tree_Plum Tree	Each	21	47.5	997.5
01.09.2018	Sep-18	Plum Tree_Plum Tree	Each	24	47.5	1,140.0
01.10.2018	Oct-18	Plum Tree_Plum Tree	Each	28	47.5	1,330.0
01.11.2018	Nov-18	Plum Tree_Plum Tree	Each	31	47.5	1,472.5
01.12.2018	Dec-18	Plum Tree_Plum Tree	Each	34	47.5	1,615.0
Σ				**201**		**9,547.5**

3.11 Forecast Report by Period

This process generates a report summarized by forecast period , some parameters can be used to filtrate the report results.

The main goal of this report is to analyze the sales plan, considering quantities and amounts by an specific period.



Period	Forecast	Product	UOM	Calculated Qty	Qty
Apr-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	9.18	9
Aug-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	21.42	21
Dec-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	33.66	34
Feb-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	3.06	3
Jul-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	18.36	18
Jun-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	15.3	15
Mar-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	6.12	6
May-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	12.24	12
Nov-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	30.6	31
Oct-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	27.54	28
Sep-18	FORECAST SIMULATION	Plum Tree_Plum Tree	Each	24.48	24

4 Project Protocol

4.1.1 Project Version

Sales Forecasting v1.0.1

4.1.2 Source Repository

https://bitbucket.org/maximeaerp/org.maximea.forecasting/src/default/

4.1.3 Project Forum for Support

https://groups.google.com/forum/#!forum/idempiere

4.1.4 Contact

maximea@maximea.pl