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Microsoft Dynamics™ NAV 5.0

Reservations, Tracking, and Action Messages

Technical White Paper

This paper provides a conceptual and technical overview of the reservations, tracking an actions messages functionality in Microsoft Business Solutions—Navision Manufacturing 2.60 and Microsoft Navision 3.0. These changes also apply to version 3.70, 4.0 and 5.0.

It is intended for supply chain professionals who support or implement and customize the products at customer sites.

Date: January, 2007

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Introduction

The reservations system is comprehensive and includes the interrelated and parallel features of tracking and action messages. In addition, the planning system borrows elements of the functionality to fulfill its own objectives.

The reservations system forms the structural foundation for the order tracking[1] system. At the core of both systems is the linking of a demand entry and a corresponding supply entry. A reservation is a user-generated link, and an order track is system-generated. An item quantity that is entered in the system is either reserved or tracked—but not both at the same time. How the program handles an item will depend on how the user has set it up.

The logic of the tracking system, in turn, forms the basis for both action messages and the program's creation of planning lines during the planning routines. An action message can be considered as an appendage to a tracking record. Action messages—whether created dynamically in order tracking, or during the planning routines—provide a convenient tool for efficient supply planning.

This paper describes the reservations, tracking and action messages features and how they integrate to form a cohesive system.

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[1] Item Tracking is the subject of a separate technical white paper.

Reservations

A reservation is a firm link that connects a specific demand and supply to each other. This link will directly affect the subsequent inventory transaction and ensure the proper application of item entries for costing purposes—a reservation will override the default costing method of an item.

Offsetting in Reservations

Reservations are made against item quantities that are part of the availability calculation. The calculation is defined as:

Inventory + Scheduled Receipts – Gross Requirements

Note that orders with the status Planned are not considered part of availability.

The following table shows the details of the order network entities that participate in the availability calculation:

	Field Name in T_27	Source Table	Table Filter	Source Field
Inventory	Inventory	Item Ledger Entry		Quantity
Scheduled Receipt	FP Order Receipt (Qty.)	Prod. Order Line	=Firm Planned	Remaining Qty. (Base)
	Rel. Order Receipt (Qty.)	Prod. Order Line	=Released	Remaining Qty. (Base)
	Qty. on Purch. Order	Purchase Line	=Order	Outstanding Qty. (Base)
	Trans. Ord. Receipt (Qty.)[2]	Transfer Line[2]		Outstanding Quantity[3]
Gross Requirement	Qty. on Sales Order	Sales Line	=Order	Outstanding Qty. (Base)
	Scheduled Need (Qty.)	Prod. Order Component	<>Simulated	Remaining Qty. (Base)
	Trans. Ord. Shipment (Qty.)[3]	Transfer Line[3]		Outstanding Quantity[3]

Manual Reservation

The user must assign a reservation—as it is considered a conscious and intentional decision on the part of the user. A basic premise is that by reserving quantities, the user gains full ownership of and responsibility for these items. Reserved quantities are not included when the program runs its planning routines.

From this follows that the user must also change or cancel a reservation manually. In some cases, the system reacts by making additional modifications—without involving the user. These are:

- **Decreasing the quantity: the system will update related quantity fields.**

- **Changing date fields: the system will update related date fields. However, changing the due date on a demand so that it precedes the shipment/due date of the supply will cause the system to break the reservation.**

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[2] Valid from Microsoft Navision version 3.0

[3] Valid in Microsoft Navision version 3.0.

- Deleting the order: will cause the system to break the reservation.

- Changing dimensions (location, bin, variant, serial no.): will cause the system to break the reservation.

- When using item tracking in version 5.0, the late binding reshuffling system also changes reservations without informing the user – if the user only reserves a quantity and not any specific Lot or Serial item-tracked items.

Automatic Reservation

There are a few special circumstances under which the program will automatically reserve items. These occur during the planning routines and are designed to ensure that make-to-order connections are maintained (not discarded) throughout the planning calculation process. They are described in detail in the section Tracking Created in Planning.

In addition, a user can set up the Item card, Customer card, and sales order line to ensure that certain combinations will make the program automatically reserve the order. The user can specify the reservation policy in the Reserve field. The options are Never, Optional, Always. In these situations, the reservation will be made against inventory, purchase orders and production orders—in that order. If supply is insufficient, the system will issue a warning to the user.

Physical Design

The Reservation form is accessible from all order lines in the program. Here, the user must specify which demand or supply entry to link to.

The reservation consists of a pair of records, which share the same entry number. One record has a negative sign and points to the demand. The other record has a positive sign and points to the supply. The system stores these records in the Reservation Entry table and assigns a Reservation Status of *Reservation*. The user can view all reservations in the Reservation Entries form.

Order Tracking and Action Messages

Order tracking is used to provide an overview of offsetting between demand and supply within the order network. The tracking records serve as the foundation for creating dynamic action messages and planning line suggestions in the planning routines. These tools can facilitate the planner's overall task of keeping a comprehensive replenishments plan valid.

The Order Network

The tracking system is based on the principle that the order network should be in an optimal state of continual balance, in which every demand that enters the system is offset by a corresponding supply and vice versa. To this end, it is the objective of tracking to identify the logical link between all demand and supply entries in the order network.

In compliance with this philosophy, a change in demand will result in a corresponding imbalance on the supply side of the order network, and vice versa. In reality, the order network is in a state of constant flux as users enter, amend and delete orders. Tracking processes orders dynamically—reacting to each change at the time that it enters the system and becomes a part of the order network. When tracking has run its course, the order network will be in balance—but only for the time being—and only until the next change occurs.

In order to increase the transparency of the order planning calculations, the Order Tracking form is also used in version 5.0 to capture and display the Untracked Quantities (the difference between known demand and suggested supply). These quantities are displayed in the form Untracked Planning Elements by lines referring to the cause of the excess quantities (e.g.: Anticipated Demand – Blanket Order – Safety Stock Level; Order Size – Fixed Reorder Quantity; Reorder Qty – Minimum Order Qty; Rounding; Dampener)

Offsetting in Tracking

In contrast to reservations, which can only be made against available item quantities, tracking is possible against all order network entities that participate in the net requirement calculation of the planning routines. The calculation is defined as:

Gross Requirement + Reorder Point – Scheduled Receipts – Planned Receipts – Projected Available Balance

Note that demand stemming from forecast or planning parameters set by the user is not tracked.

The following table shows the order in which network entities participate in the net requirements calculation:

Table No.	Entity Name	Track
32	Item Ledger Entry	X
37	Sales Quote	Simulated Production Order[4]
37	Sales Order	X
39	Purchase Order	X
246	Planning Line/Requisition Line	X
5406	Planned Prod. Order Line	X

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[4] The system uses sales quotes as the basis for simulated production orders, and tracking will function within a simulation. However, there will not be tracking from genuine demand/supply towards simulated production orders or sales quotes.

5406	Firm Planned Prod. Order Line	X
5406	Released Prod. Order Line	X
5406	Simulated Prod. Order Line	Quote[4]
5407	Prod. Order Component	X
99000829	Planning Component	X

Note that the tracking system offsets available stock on a *first-come first served* basis—that is, as orders are entered into the order network. This implies that the system does not prioritize orders that may be more urgent in terms of their due date. It is therefore up to the logic of the planning system or the wisdom of the planner to rearrange these priorities in a meaningful way.

Action Messages

When the system detects an imbalance in the order network, it automatically creates an action message to notify the user. Action messages—system-generated calls for user action—are the direct output of the order tracking system. An action message will specify the details of the imbalance and suggest how to restore balance to the order network. It will address one bill of materials (BOM) level at a time. If the user accepts the action message, this may give rise to additional action messages at the next BOM level.

There are five basic action messages – which are also used when creating planning line suggestions—to cover all the possible scenarios of restoring balance to the order network.

1. *Change Quantity*— change the quantity on an existing supply order to cover a changed or new demand.
2. *Reschedule*— reschedule the due date on an existing order.
3. *Reschedule and Change Quantity*— reschedule the due date and change the quantity on an existing order.
4. *Create a new order*— If demand cannot be fulfilled by 1, 2 or 3 above, the system will suggest creating a new order.
5. *Cancel*— cancel an existing order.

The tracking system will always attempt to resolve an imbalance within the existing order network. If this is not possible, it will issue an action message to create a new order. Below is the prioritized list that the tracking system uses when determining how to restore balance. If an additional demand has entered the order network, the system will seek to track it against the following:

1. Check for any excess supply within the existing tracking record for this demand.
2. Check for planned and scheduled receipts in order of receipt date. The latest possible date will be selected.
3. Check for available stock.
4. Check if a supply order exists within the current tracking record, the system will issue an action message to increase the order (*Change*).
5. Check If no supply order exists within the current tracking record, the system will issue an action message to create a new order (*New*).

An open demand will pass through the list and offset available supply at each point. Any remaining demand will always be covered by point 4 or 5.

If a decrease in demand quantity occurs, the tracking system will prioritize using the same list—but in the reverse order, attempting to resolve the imbalance. This means that existing action messages could be modified or even deleted, if necessary. The tracking system will always present the net result of its calculations to the user.

Physical Design

Tracking records are paired—supply offsetting demand—and stored in the Reservation Entry table, where they are assigned a Reservation Status of Tracking. When the user wants to view order tracking, the system uses the Order Tracking Entry table to hold this temporary data and provide the display.

The tracking system creates action messages automatically and stores them in the Action Message Entry table. The user can retrieve and view them in the Planning Worksheet form by running the Get Action Messages batch job. Running the Carry Out Action Message batch job will process the action message suggestion.

Setup

In the Order Tracking Policy field found on the Item card, the user can specify the tracking policy for the specific item. The options are None, Tracking Only, Tracking & Action Msg.

If a user changes the option to None, the system will delete any tracking and action messages that are related to the item. If a user changes the option from None, tracking will be activated from that point on, however it is not retroactive. Existing demand and supply will not be covered unless the user runs a plan.

Note that the contents of this field can be overruled in the planning system. In the planning system, Order Tracking can be set to either "Respect Item Card" or "Apply to All Items". If you select "Respect Item Card" then the order tracking information entered on the item card is used. If you select "Apply to All Items" then the information set up on the item card is disregarded and the planning system creates order tracking for all items regardless of the order tracking policy entered on the item card.

Tracking Created in Planning

The planning system deletes all existing order tracking records and action message entries, and recreates them (if "Apply to All Item" was selected when setting up order tracking or the related item card) —in the form of planning line suggestions—according to its own logic and priorities. When the planning run has finished, the order network will be in balance.

Planning System vs. Tracking and Action Messages

The following comparison highlights the differences between the methods used by the planning system in creating planning line suggestions and the tracking system in creating tracking records and action messages:

- The planning system deals with the entire supply and demand pattern of a particular item, whereas order tracking addresses the situation of the order that activated it.

- The planning system deals with all levels of the BOM hierarchy, whereas order tracking deals with one BOM level at a time.

- The planning system establishes links between demand and supply according to prioritized due date. Order tracking establishes links between demand and supply according to order entry sequence.

- The planning system takes planning parameters into account, whereas order tracking does not.

- The planning system creates links in a user-activated batch mode when balancing demand and supply, whereas order tracking creates the links automatically and dynamically as the user enters orders.

Automatic Reservations

During the planning routines, there are a few special situations where the system creates an automatic reservation—from the original tracking record—in order to maintain some customized order information that the user has entered. These are:

1. A multi-level production order where the Manufacturing Policy field of the relevant items contains the option Make-to-Order (M-T-O). The planning system will respect and maintain the BOM structure that the user has defined.

2. A production or purchase order where the Reordering Policy field of the relevant items contains the option Order. The planning system will ensure that all requirements related to the order are processed at the same time.

Automatically reserved items created during the planning routines are handled in the following ways:

- They are applied against item quantities that are part of the availability calculation, as are manual reservations. See Offsetting in Reservations for further details.

- They are included in subsequent planning runs, as opposed to manually reserved items.

Physical Design

The planning system stores the linked demand and supply entries in the Reservation Entry table and assigns the Binding field option of Order-to-Order, indicating a system-generated automatic reservation and the specific treatment it receives.

In the case of an M-T-O production order, the system assigns a Reservation Status of Reservation. A reservation with a binding will override the item's default costing and application method.

In the case of a Reordering Policy of Order, the system assigns a Reservation Status of Tracking. A tracking with a binding is not important in terms of costing, but it serves to keep the related orders together physically and with regard to entry date. An example of this is a production order created directly from a sales order.

In the case of non-allocated supply or demand, the system will assign a Reservation Status of Surplus. This could result from demand due to forecasted quantities or user-entered planning parameters. This is legitimate surplus—which the system recognizes—and does not give rise to action messages. Surplus could also be genuine, excess supply or demand that remains untracked. This is an indication of an imbalance in the order network, which will cause the system to issue action messages. Note that an action message suggesting a change in quantity will always refer to surplus tracking.

Setup

The user can set the following parameters to influence how the system calculates during the planning routines:

- **Time and quantity dampeners are fields found on the Planning tab of the Manufacturing Setup. The user can enter values to limit the system's issuing of insignificant action messages.**

- **The Planning Flexibility field is found on the planning, purchase and production order lines. The user can select the option None or Unlimited. The option None indicates that the relevant line is firm and unchangeable. The system will not include it when calculating action messages.**

Glossary

action message

A system message that identifies the need for and the type of action to be taken to correct a current or potential problem. The goal is to keep the order network in balance. When it's out of balance or changed, action messages are used to suggest changes to reestablish the balance.

bill of materials

A listing of all the subassemblies, intermediates, parts, and raw materials that go into a parent assembly showing the quantity of each required to make an assembly. It is used in conjunction with the master production schedule to determine the items for which purchase requisitions and production orders must be released.

dampener

A user-input parameter to suppress the reporting of insignificant or unimportant action messages caused by changes in the order network.

demand

The need for a particular product or component. The demand could come from any number of sources, for example, customer order or forecast, an interplant requirement or a request from a branch warehouse.

make-to-order

A manufacturing policy where a product can be made after receipt of a customer's order. The final product is usually a combination of standard items and items custom designed to meet the special needs of the customer.

multilevel order

A production order that is used when one or more of the items on the component list is specifically produced on the same production order, for example, in a make-to-order environment. This is a subset of a multilevel bill of material.

offsetting

A proactive tracking process carried out by the planning system to match or counterbalance existing supply with (new) demand.

order network

The total supply and demand represented by various entities of inventory, purchase order lines, production order lines, sales order lines and component lines.

order network entity

The building blocks of a planning system, that is, inventory lines, sales order lines, component lines, purchase order lines, and so on.

order tracking

A process that shows the logical dependencies between supply and demand in the order network. If the network is in total balance, then every demand can be tracked to a balancing supply.

planning flexibility

A feature that indicates to what degree the planning system is allowed to reschedule or change the quantity of an order. The range of flexibility lies between none and unlimited.

planning system

The planning of net requirements by using MRP logic. This applies to the standard MPS-MRP sequence, but it also applies to the planning sequence that goes directly from the production forecast to MRP.

planning worksheet

Contains proposals about replenishments for both purchase and production orders. It replaces the MRP worksheet and can be used for different types of materials planning, not just MRP.

reordering policy

A policy that explains how an item is to be reordered when there is a need to replenish the item.

reservation

The process of designating stock for a specific order or schedule. A reservation can be made against scheduled availability, such as a firm planned production order or a released production order.

scheduled receipt (quantity)

The quantity of an item that is expected to be received on a specific date.

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