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Optimizing Oracle Global Order Promising (GOP) for Efficient Customer Service

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Abstract: ***There is always a common question from customers - "when will I get my material?". In order to answer this question, the salesperson has to do a calculation where he/she has to consider allocated material to existing orders and then allocate to the customer request, followed by an estimation of available date considering the lead time if the material does not exist. This is a lengthy process and becomes more complicated when there are multi-level bills like 5 + levels, having 50+ components. At the same time, customers want to have updates quickly, sometimes over the phone in the consumer business. To solve this problem, Oracle has designed an application called "Global Order Promising (GOP)", with a subset functionality called "Available to Promise (ATP)". Oracle Global Order Promising is an application that helps to estimate the fulfillment date of a sales order by the requested date for items that you receive from your ordering application, such as Oracle Order Management. Promising does backward scheduling calculations on the fly and considers the supply that is or might be available in your entire supply chain, including suppliers, factories, distribution centers, and warehouses. As this is a lengthy calculation, hence needs to be optimized to get results quickly, and need to advise Oracle applications to look at specific reasonable data points. This journal explains the features of Oracle GOP applications along with some useful implementation considerations.***

Keywords: Oracle Global Order Promising, Available to Promise, GOP, ATP, CTP, Order inquiry, Sales Order Scheduling, Option Specific Sourcing, Allocated ATP, Tips and tricks for GOP, Tips and tricks for ATP, Best practices for ATP, Best practices for GOP

1. Introduction

It is common in business to receive an inquiry or an order, where customers expect to send an acknowledgment with a possible ship date. If the user decides to do the manual calculation, then it will be a lengthy calculation as he needs to consider all components, capacity, and all in-process supplies like purchase orders or any open work orders. Further, this calculation might not be accurate or need to do this calculation again once the purchase orders or work orders date gets changed.

Oracle Global Order Promising application offers an end-to-end integrated software solution that does the calculation quickly, provides reliable results, and offers flexibility to control the results. This application interacts with multiple Oracle applications to get the data. This includes - Oracle order management to get ATP inquiry details (item, quantity, request date, and organization) and supply chain management application to know in-process orders like purchase orders, on-hand stock, and work orders, planning application to know current material plan and master data to know lead times.

The below diagram shows conceptually the difference between GOP, ATP, and CTP. In general, Global Order Promising (GOP) comprises two possible logics - available to promise (ATP) where it will focus on getting a ship date by looking at in-process material whereas 'Capable to promise (CTP) focuses on resource - labor and machine capacity along with supplier capacity. ATP and CTP are linked to each other. But in order to start ATP or CTP logic, a 'ship-from organization' needs to be determined by using a global sourcing rule, A sourcing rule is nothing but priority and a corresponding source list like a manufacturing plant list or a supplier list or a combination of both.

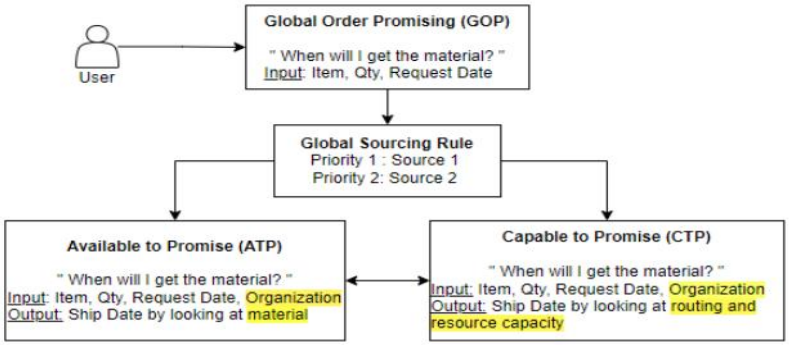


Figure 1: Relationship between GOP. ATP and CTP

2. GOP configurations

2.1 Item and Bill of Material attributes

These attributes include,

1) Check ATP: it is an item - organization-level checkbox, that decides if ATP computation logic should be applied or not.
   This is typically disabled for all expense items, loose parts or 'C' class items and configured items (Make-to-order / MTO) where we will never have any stock. However, this needs to be enabled for long lead time, and costlier parts. If you enable this item attribution for all items, it increases the computation load on the system and causes performance issues.
2) Component ATP: this is an item-organization level setting, applicable for making parts. This indicates if ATP should check the possibility of making this part if a given item is not available to allocate.
   This item attribute should be disabled for all 'buy' parts and selectively disabled for make parts if those sub-assemblies are not important from a date calculation perspective. There is a similar setting at the Bill level where one can opt out or in for specific bills related to ATP computations, such flexibility helps when a specific bill is having performance issues.
3) ATP Rules: In order to understand ATP rules, you need to understand Net ATP first. Net ATP is nothing, but excess supply left at the end of a day (or period), this excess supply is accumulated and used for order promising. This accumulation setting is mentioned in the ATP rule. Further, these rules describe what different supply orders are and demand orders to be considered for computations. It also declares a window for accumulation, it is assumed supply will be infinite post this window. This is also called the "Infinite Time Fence/ ITF".
   Having longer ITF windows causes performance issues whereas having shorter windows will leave excess supply which is not used for order promising it. Typically, ATP rules are defined to represent ITF as 'Total lead time', or 'Cumulative total lead time' with some fixed backward, forward, and accumulation window, but Oracle does have provision to define as much as ATP rules as needed.

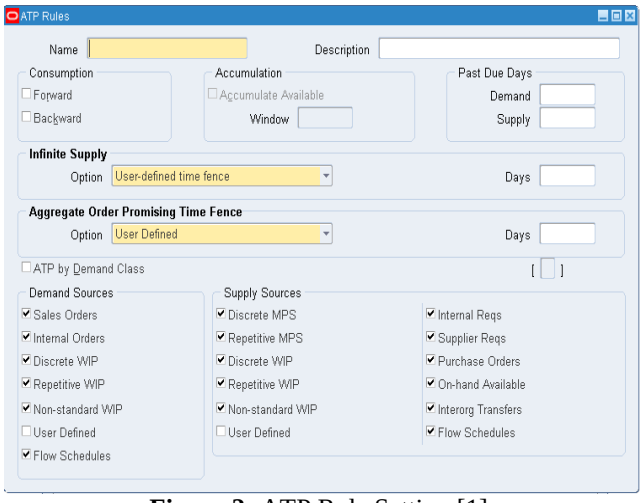


Figure 2: ATP Rule Setting [1]

4) Capable to promise: This is a bill-level attribute. When "Component ATP" is enabled for make parts, then you can check ATP-enabled material along with resource capacity if corresponding make parts need to be built to meet ATP inquiry.

2.2 Region and Zone

Oracle stores customer addresses and business entity addresses. In the end, there will be a huge address list, and defining in-transit lead time between those addresses or defining sourcing organizations will become a huge task. This problem has been solved if addresses are grouped and the corresponding lead-time or source location for a group itself. On the same line, Oracle does offer zone- which represents a group of locations/addresses, and region - which represents a group of zones.

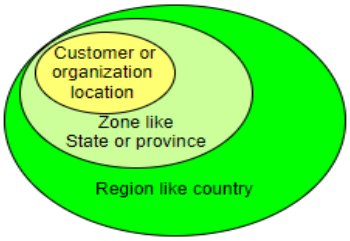


Figure 3: Region and Zone

2.3 Sourcing Rule

It stores a list of various sources of material, those sources are - buy from a supplier, make at plant or transfer from another internal plant. The sourcing rule could be a combination of various sources along with sourcing priority. For example - first priority is given to make at the plant but if plant capacity is full, then go to another source i.e. supplier. The sourcing rule also describes any re-defined allocations of supply, for example - always allocate 50% of demand to supplier A and the remaining 50% to supplier B. Following is another example of a combination of multiple sources with priority/rank along with allocation percentages.

Table 1: Sourcing Rule Example

Rank	*Type*	*Allocation %*	*Source*
1	Make At	100%	Plant A
2	Buy From	50%	Supplier A
2	Transfer From	50%	Plant B
3	Buy From	50%	Supplier A
3	Buy From	50%	Supplier B

There are two types of sourcing rules - local sourcing and global sourcing. Here local sourcing is applicable for specific organizations/plants but the global sourcing rule is applicable for any organization/ plant. Global sourcing rule is used with region or zone. For example - the US region is tied to global sourcing, having US-based manufacturing plants but if it is an EU region then it is assigned to another global sourcing rule, having EU and Asia-based manufacturing plants. So when a global inquiry is requested by a user with an item, request date, and quantity having a customer address that belongs to the EU region, then global sourcing rules come into computation having the customer address assigned to the EU region and EU or APAC-based manufacturing plants are used to get the possible ship date.

2.4 ASCP side setups

As explained earlier, Net ATP is a calculation where excess supply is calculated. Further, this excess supply is accumulated for new order promises. In order to do this calculation, the GOP uses a 'material plan'. Oracle provides a setting called 'INV: Capable to Promise', having value as - ATP based on collected data or planning data. This is an important setting explained below with the corresponding use case.

ATP based on collected data: Current supply and demand data is used to do Net ATP calculation. While doing this calculation any new supply suggestions suggested by the material plan or any rescheduling of existing supply is ignored, rather collected data or raw data is used to do calculations. Such a setting is used when material plan output is unreliable, rather business believes that the current supply/demand snapshot. This is useful when businesses create the majority of futuristic supply orders (like work orders or purchase orders) in advance and don't want to promise planned orders, which are not yet auctioned. This is the most conservative approach where promising is done either by using existing purchase orders or work orders or item lead times.

ATP based on planning output: Material plan output includes new order suggestions (also called planned orders) and rescheduling suggestions of existing purchase orders or work orders by looking at demand due dates. When ATP is promised, based planning output is assumed that the planner or buyers will execute all planning suggestions and so net ATP derived is more accurate than collected data. This is a mature approach, typically used in conjunction with capacity-constrained material plans.

Oracle does offer a feature to have multiple material plans - one plan for actual execution based, following the demand due date for backward scheduling, and another separate ATP plan where it follows the demand due date but enforces the capacity constraints (either based on CTP or without CTP), and avoids overloading of constraints. So ATP plans typically follow constraints while order promising but users can override the date if needed and then the material plan simply follows the due date direction to execute the material plan, which might results compress the lead time if needed, and overload resources if needed.

2.5 High-level ATP logic

Below flow chart illustrates ATP computation based on attributes. Here Oracle offers 'Check ATP' and 'Component ATP' attributes at the item --organization combination level, followed by corresponding settings at the bill level to enable/disable it for individual components of a bill and CTP check attribute at the routing level to decide CTP computation.

Apart from the below attributes explained logic, ATP does additional computation related to sourcing rule, option-specific sourcing, and allocated ATP, all of these additional advanced functionalities are explained below in detail.

It is important to the ATP computation flow, in order to get the best results and improve ATP calculation performance.

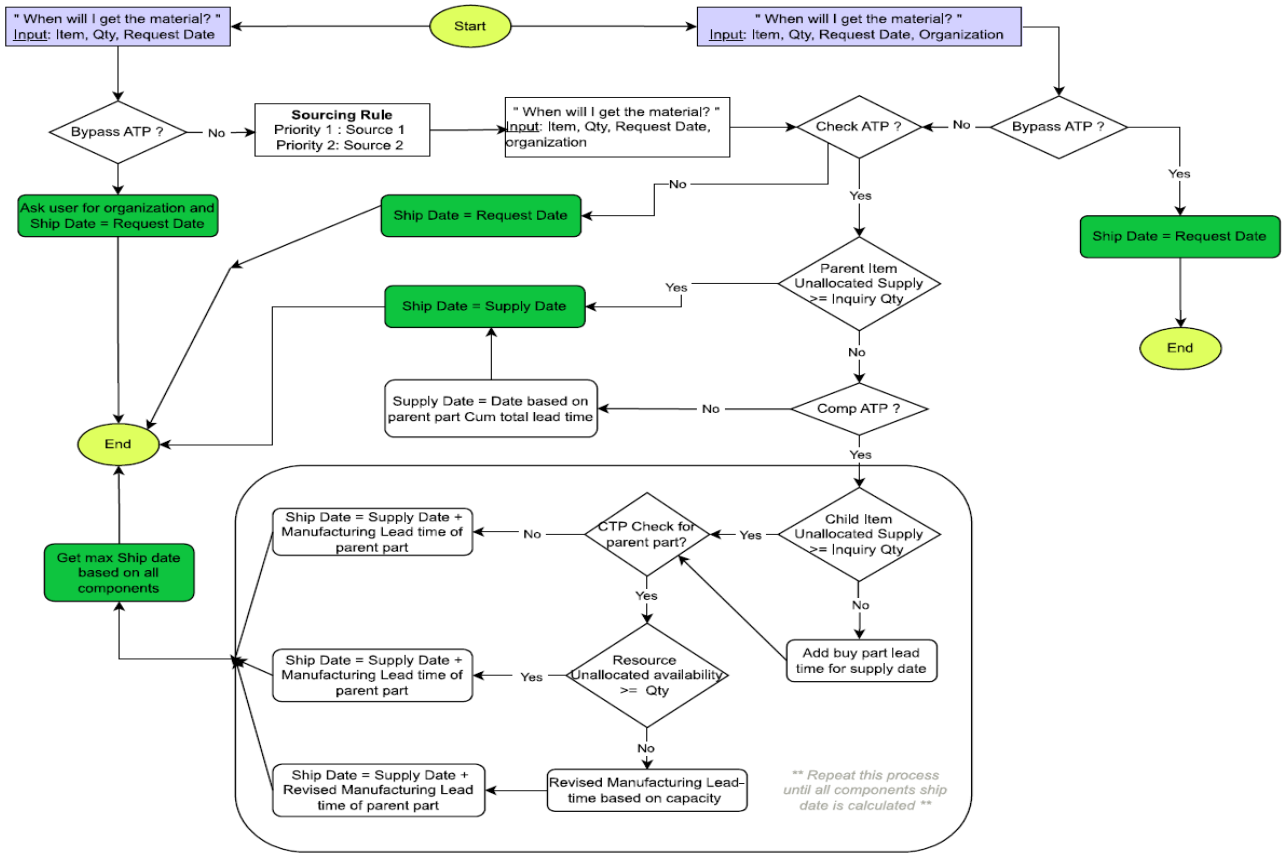


Figure 4: High level ATP calculation logic

2.6 Option Specific Sourcing (OSS)

Oracle does offer a feature called 'Assemble-to-order (ATO) model bill where it has a list of some mandatory components, followed by some options class where it has a list of options. This is also called a 'Configured bill'. Here the customer does the selection of the options from the option class (also called the make-to-order (MTO) business model) while confirming the order. Example - While selecting Tesla cars via the website, it offers multiple color and interior options where customers could choose the options and build the car as per need basis.

A model-option combination may not always be produced at a specific source. Restrictions may be associated with specific options, like equipment limitations, and engineering qualifications. If a model requires a specific option, you can predefine that it will be sourced from a reduced set of sources. Oracle CTO enables you to specify a subset of the model sources as valid sources for a model-option combination. Oracle Global Order Promising honors this setup and schedules a date for a configuration, based on the sub-set of the model sourcing that is valid for the specific configuration. The configuration BOM is created only in the reduced set of sources [3]. This is another configuration, called 'Option Specific Sourcing', available in Oracle Advanced Supply Chain Planning (ASCP).

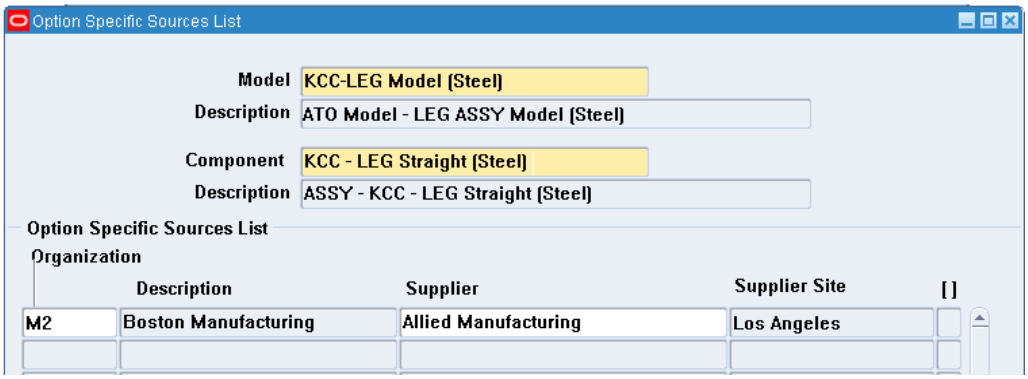


Figure 5: Option specific sourcing [3]

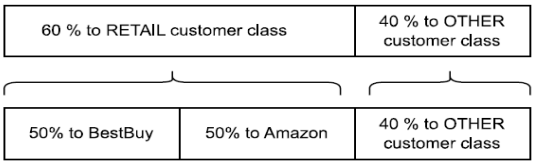
Here you will list options and corresponding sources who can provide or source material from suppliers. If all options are manufactured or sourced from a plant, then you don't need to define this configuration but if not, then need to do this setting, this will speed up ATP calculations.

2.7 Allocated ATP [4]

Allocated ATP allows you to allocate supplies by sales channels or customers. You can protect your sales channels or customers from each other by ensuring that each one gets a specified portion of the supply. Depending on the situation, the allocation can be equal to the forecast of the sales channel or customer or a portion of supply when supply is constrained [4]. Allocated ATP is typically used when you have a "blue-chip customer" where you have a tight service agreement, or you want to pay more attention to a specific customer (or set of customers). There are two types of allocated ATP options; the table below explains the types and corresponding settings in detail.

Table 2: Allocated ATP Options

Types	*Allocated ATP based on a user-defined percentage for the customer class*	*Allocated ATP based on demand class and demand priority*
Application	Typically, when customer-based supply allocation is required, the marketing team will drive this supply allocation and provide the allocation. All such customers are tied to a 'customer class'. ATP allocates the supply against the customer class with a user-defined percentage.	Customers are grouped under a 'demand class'. Here material scheduler will do supply allocation against demand class rather than supply allocation at each customer level ATP allocation is only done at demand class where % is not mentioned
Setups	Apart from regular ATP setups, the following additional setup is required, b) Define the following profile options, • MSC: Enabled Allocated ATP = Yes • MSC: ATP Allocation Method = User defined allocation percentage • MSC: Class Hierarchy = Customer Class • MSC: Enable ATP workflow = Yes • MSC: Allocated ATP forward Consumption Method = Reduce future Supply from lowest priority **OR** Reduce available Supply from any priority c) Define allocation rule, explained below d) Assign allocation rule to items/category/organization e) Run the ATP plan	Apart from regular ATP setups, the following additional setup is required, a) Create ATP Partitions: to improve ATP performance b) Define the following profile options, • MSC: Enabled Allocated ATP = Yes • MSC: ATP Allocation Method = Demand Priority • MSC: Class Hierarchy = Demand Class • MSC: Enable ATP workflow = Yes c) Define allocation rule d)Assign allocation rule to items/category/organization e) Run the ATP plan

Additional Info	We can define customer class, customer, and its site. This data can be used to define rules on the EBS side. Here we can build an allocation hierarchy as explained below.  Figure 6: Allocation rule example Apart from this, priority can be mentioned against each level of hierarchy. We can define time-based allocation as well	Demand class can be defined in EBS (not in ASCP) and then this will be used while defining allocation rules. While defining the allocation rule, you cannot mention %. We can define time-based allocation as well. Allocation rules will be assigned item, item category, organization, item organization, and global level.

a) Supply allocation for a customer class or demand class: If the supply pegs to independent demand that has a demand class or customer class on the allocation rule, then the supply goes to that demand class/ customer class. If the supply pegs to independent demand that has a demand class/ customer class not present in the allocation rule or does not have a demand class, then the supply goes to the OTHER demand class. Also, Excess supply, which includes supply pegged to safety stock demand, goes to OTHER.
b) Identify supply: For demand from a demand class/customer class, Oracle Global Order Promising first uses supply pegged to its own demand class/customer class. If a shortage exists, it takes supply from lower-priority demand classes (or lower-priority customer classes), starting from the next lower priority as defined in the allocation rule. This process is often referred to as backward stealing. If a shortage still exists after backward stealing, then Oracle Global Order Promising performs capable-to-promise (CTP) to see if more supply can be generated. Next, Oracle Global Order Promising determines when the shortage can be satisfied by finding the availability date based on the scheduled receipt. During this check, the system only uses availability from the demand class itself, no stealing occurs. Then it performs a forward CTP to find a date when the shortage can be made
c) In Allocated ATP based on the User-Defined Allocation percentage method, when the committed cumulative demand exceeds the cumulative allocated supply for a demand class, Oracle Global Order Promising performs forward consumption of the supply to accommodate the shortage. Therefore, when a demand class has a shortage after consuming its own allocated supply and available supply from a lower priority, the forward consumption method lets you decide how to adjust the allocated availability based on the MSC: Allocated ATP Forward Consumption Method profile option. Oracle Global Order Promising provides you with two methods for performing a forward consumption:
   - Reduce future supply from the lowest priority
   - Reduce available supply from any priority.

3. Improve performance and accuracy of ATP

ATP computation happens in every customer order line or every ATP inquiry. If a business has a typical bill of 5-10 levels with 100+ items, then Net ATP calculation and accumulation check happen for all those items along with sourcing rule and resource capacity check if CTP is enabled. This will be tremendous computations, overloading the ERP applications if it is not supported for huge computation hardware. This will slow down order imports by electronic data exchange (EDI) while interfacing with customer data and also slow down overall order booking. Hence ATP computation performance needs to be optimized to get the best results and better operating performance of the sales team. Below are some options for improving the ATP computations.

1) Selecting items for ATP/CTP computations: every organization does tons of items and not all items need to be enabled for ATP/CTP computations. These items include- all low-cost, lesser lead time items, which could be easily excluded. Focus should be given to longer lead time, costlier items, or critical items to decide possible ship dates. Businesses could come up with such items on a per-need basis. But the fewer the items for computation, the faster to get the ATP results. A similar approach is applicable for CTP computations where they need to be enabled for specific bills, having critical or important routing to be considered.
2) Infinite time fence from ATP Rules: ATP rules offer different options to configure ITF. ITF could be equal to 'Cumulative Lead Time' or can be set to 'fixed days' independent of item lead times. Net ATP will be calculated and accumulated within the ITF duration and considers infinite supply after the ITF duration. Sometimes ITF settings are setway longer than needed, creating performance issues. Example - If it is set as a fixed window of 100 days, then it does calculation even when item lead time is 10 days, which is unnecessary in this case.
3) Best results based on best business process: Below are some best business practices that lead to better ATP results with better ATP performance.
   - Lead time: Lead time is important for ATP computations when there is no available excess supply. If the lead time is not accurate, then the corresponding date based on the lead time will be inaccurate. The best practice is to establish a process to review, make, and buy items lead times more often.
   - Supply data accuracy: Supply data includes on-hand, purchase orders, and work orders. This data is vital for ATP and hence dates and quantity on these orders need to be accurate. This includes frequent reconciliation of purchase orders with suppliers, work order reconsolidation with the operation team,

and on-hand accuracy checks every year is critical. Establishing a framework to frequently review and accurately update supply quantity and dates will significantly improve ATP results.

- Firming of WO and PO: A firm work order or purchase order is a confirmation to ATP that a given supply is confirmed to be available on a given date. Having such confirmation from the supplier or operation team will result in better ATP dates.
- Planning Time Fence: You can block order inquiries or have new orders during the firm production window. This could be achieved by having a planning time fence (PTF) which will avoid any surprise orders getting added within a firm window.

4) Enable for 24 x 7 only if needed: If there is any warehouse business, then it is expected to continue receiving, shipping, and transferring. In this case, it is expected to check the net ATP more frequently to promise or optimize existing orders. So you could use the Oracle 24 x 7 ATP feature in such cases. Alternatively, you could have a separate ATP material plan that you could run multiple times in a day but you will get an error message "ATP plan is not available" which is discomfort to the users/ customers.
5) Create ATP Partitions: It is advised to have a spare partition in the Oracle database for the ATP plan. It will be used when the ATP material plan is ready and needs to purge existing ATP data with new data as per the ATP plan. This is one of the technical configurations that need to be followed by the IT team.
6) Disable debug: This is one of the rare issues observed where ATP debug is enabled for date investigation, but it causes ATP performance issues as the system will track each and every calculation to log so it does slow down. So make sure that ATP debug is disabled during the ATP plan run or while the user/customer performs any action.

4. Area of improvement for Oracle GOP

- ATP Inquiry Screen: The biggest concern for GOP applications is understanding ATP computations. Currently, Oracle GOP offers an ATP pegging tree, shoes infinite time fence, followed by capacity, material, planning time fence, and lead time constraints but this tree is difficult to understand from a user standpoint. Here users need to be mature enough to understand, hence possible extension is needed from Oracle to explain in layman's terms.

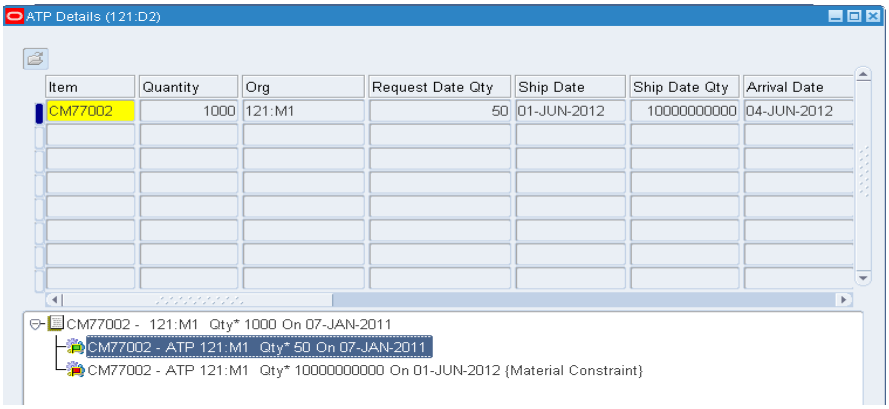


Figure 6: ATP Inquiry [5]

- ATP plan generates recommendations for existing sales orders based on the current supply/ demand snapshot and it is expected to implement the changes for all sales orders. In reality, businesses don't want to implement all the sales order date changes, rather they want to implement them in a controlled way, example - any date changes within a week should be excluded. Only reschedule-out is accepted for customers but others will not. In order to achieve such a need, businesses need to develop custom processes.
- Suppose an order due on Day 10 has corresponding purchase order # 1001 aligned to it. An urgent new order got booked and ATP results were overruled, changed to Day 2 instead of pegging to Day 20 i.e. lead time of the given item. Now on the next day, purchase order # 1001 is pegged to a new urgent order with rescheduled in exception to this purchase order. At the same time, earlier orders will be allocated to lead time and moved to Day 20. In this case, earlier orders were stolen by later booked urgent orders, which upset customers and created noise in the supply chain. There is a direct easy fix to this problem, this includes - limiting ATP overrule access, using demand class for supply consumption or enabling project manufacturing where stealing of supply happens within a customer/ customer project instead of across multiple customers.

5. Conclusion

The Oracle Global Order Promising (GOP) offers comprehensive software solutions, complementing the Oracle Advanced Supply Chain Planning (ASCP) application. It serves the essential purpose of providing sales and customer representatives with real-time information regarding material availability by assessing current supply and demand dynamics. Additionally, it encompasses various supplementary functions to address diverse business requirements and applications.

When implemented effectively, the GOP can significantly transform business operations. However, if not configured correctly, it may yield inaccurate results and require extensive computational resources, causing frustration

among users. Therefore, customizing GOP applications according to specific business requirements is imperative to optimize their functionality.

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