

GATP - An Adaptive Feedback Supply Chain Control System potential: Part 1

Applies to:

SAP SCM – APO Global Available to Promise Functionality

Summary

This white paper is intended for supply chain planners, inventory managers, demand / order fulfillment teams and supply chain focused interest groups. It explains how the SAP SCM-GATP tool acts as a corrective tool at the time of execution looking at multiple locations or invoking production when a supply and demand disparity happens despite the best attempt from planners to generate good forecast and supply plan with tools like DP & SNP.

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Table of Contents

Applies to:	1
Summary.....	1
Author Bio	1
Supply Chain Adaptive Control Generic Scenarios	3
Business Scenario	4
Geographic View of Supply Chain Model:	4
Logical View of Supply Chain Model:.....	5
Disclaimer and Liability Notice.....	13

Supply Chain Adaptive Control Generic Scenarios

In the real world of business with highly sophisticated customer driven supply chain systems, the planning system / demand plans can still go astray due to numerous reasons ranging from inconsistent historical data, wrong guesstimate, management overrides, wide of the mark statistical forecast, customer forecast override – Sales or Production department overrides to cite a few. This may cause chaos due to unplanned demand in the supply chain putting pressure of shorting the orders and/ or loosing a potential business opportunity / Customer.

A potential fall out could be any one of the following

- **Supply and demand planning disparity by product location:** There could be incorrect quantity being planned for any of the following reasons:
 - **Planned location disparity:** For a particular product at a plant or distribution center where the demand is not high was planned with higher quantity and/or less quantity planned for a plant / distribution center with high demand.
 - **Planned product disparity:** A product with less demand is being planned instead of a product with high demand
 - **Planned product location disparity:** The planning disparity might happen as a combination of the above two.
- **Component and capacity unavailability:** Besides the above reason, a potential fallout for manufacturing organizations planning finished products with high lead times (For examples, companies with global supply chain procuring parts from China but Selling in North America or Europe). Also if the critical customer requested product is out of stock and if one needs to replenish it looking at the capacities and production constraints and which planning did not account for any such exceptions, at the same time minimizing interactions with production planner to look into available capacities, GATP works as a great tool to invoke production planning without changing the results of Planning team.
- **Planned time to customer disparity while planning supply chain:** The planners typically tend to not involve transportation and shipment scheduling lead times in their date forecast

To counter the above problems, many companies built internal customized algorithms and end up writing customized ABAP programs to perform location substitution and product substitution or capacity and component checks. The solution of customized Z Programs involves following drawbacks:

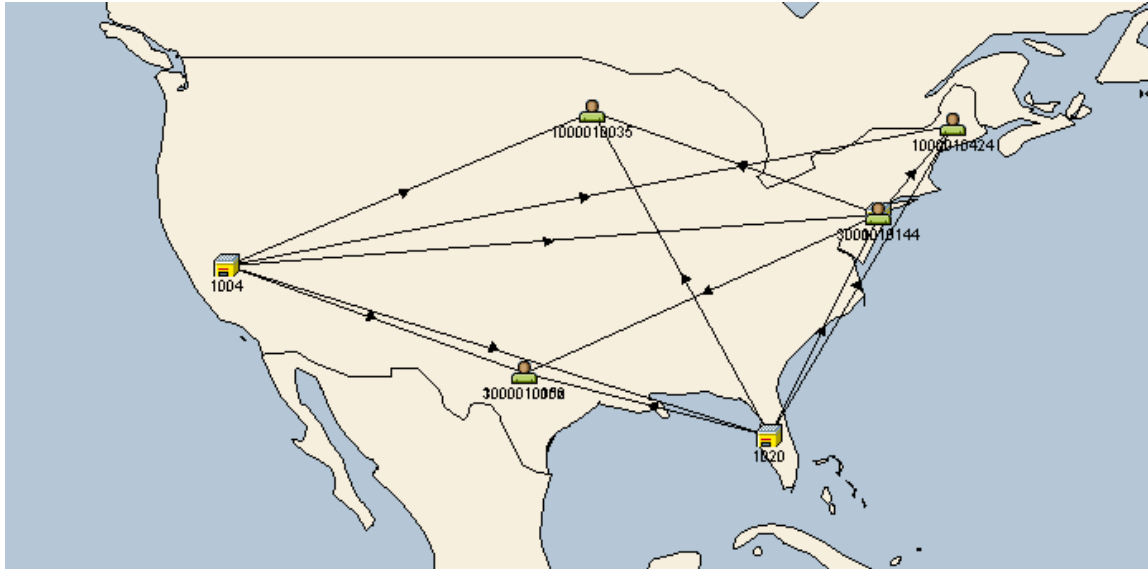
- High cost of ownership of these customized programs.
- Impact of upgrades resulting in more testing and SAP support of these in new releases.
- Potentially lagging behind what might be available with more mature standard functionality.

Business Scenario

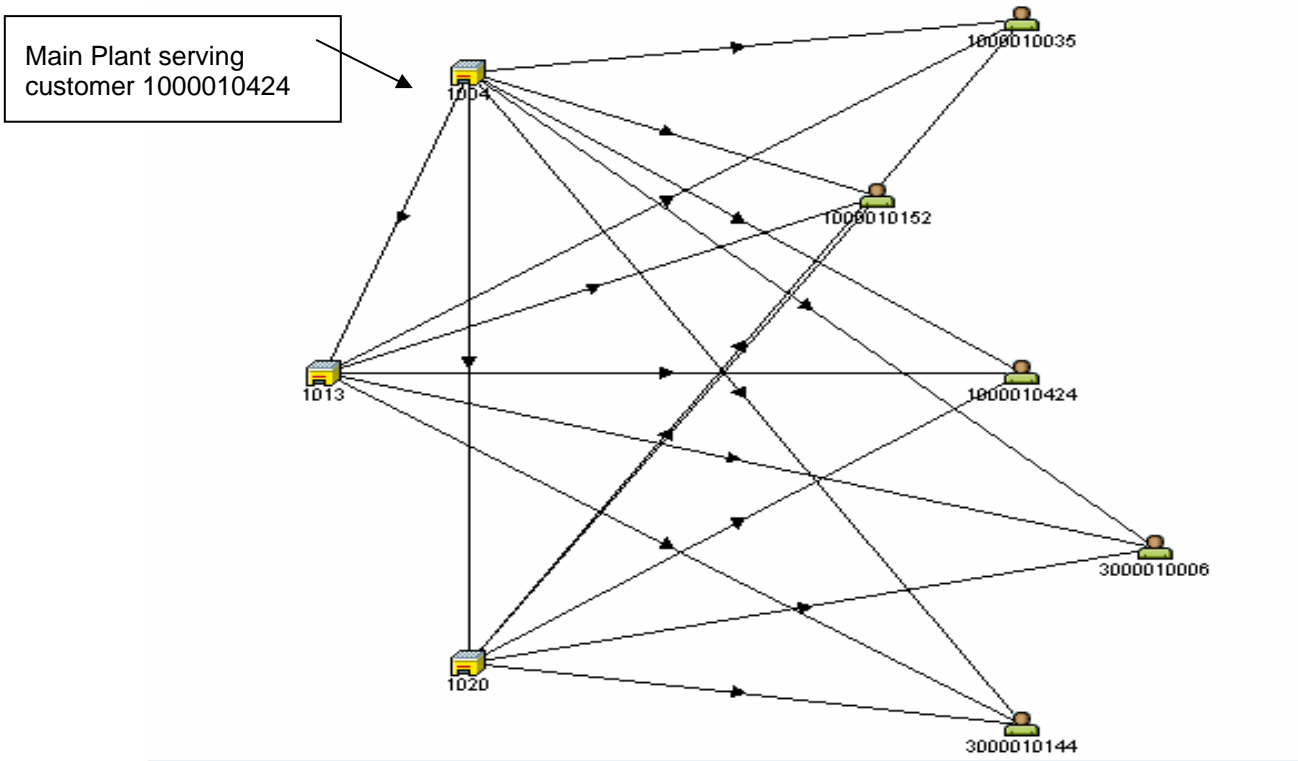
With Solution using GATP using Rules Based ATP to correct for Unplanned Demand:

The Business Scenario described here involves 3 distribution centers 1004, 1013 and 1020 for 2 products 7001603-838 & 7001603-668. The SNP planner knows typically what needs to be planned at 1004 which is the main Plant / DC serving the customer for both products 7001603-838 & 7001603-668.

Geographic View of Supply Chain Model:



Logical View of Supply Chain Model:



Let us look at the Planning Situation of the two products 7001603-838 & 7001603-668 @ 1004, 1013 & 1020

Summary of Demand & Supply Situation in SNP Planning Book – The Total row shows total of all Total Demand, Total Receipt and Stock on Hand at start and later by each time bucket.

Planning Book: [Live] SJM SNP MAIN PLANNING BOOK / SJM SNP PLAN

TLB View

APO - Location Details (all) Item Number Details (all)

Design Graphic Optimizer Location Multilevel Network Deployment

Item Number	APO - Locati ...	SNP PLAN	Unit	Initial	06/19/2007	06/20/2007	06/21/2007	06/22/2007	06/23/2007	06/24/2007
Total	Total	Total Demand	EA		202					
		Total Receipts	EA				202			
		Stock on Hand	EA	2,024	1,822	1,822	2,024	2,024	2,024	2,024
	1004	Total Demand	EA		202					
		Total Receipts	EA							
		Stock on Hand	EA	1,986	1,784	1,784	1,784	1,784	1,784	1,784
	1013	Total Demand	EA							
		Total Receipts	EA				15			
		Stock on Hand	EA	25	25	25	40	40	40	40
	1020	Total Demand	EA							
		Total Receipts	EA				187			
		Stock on Hand	EA	13	13	13	200	200	200	200
7001603-668	1004	Total Demand	EA		97					
		Total Receipts	EA							
		Stock on Hand	EA	997	900	900	900	900	900	900
	1013	Total Demand	EA							
		Total Receipts	EA				5			
		Stock on Hand	EA	15	15	15	20	20	20	20
	1020	Total Demand	EA							
		Total Receipts	EA				92			
		Stock on Hand	EA	8	8	8	100	100	100	100
7001603-838	1004	Total Demand	EA		105					
		Total Receipts	EA							
		Stock on Hand	EA	989	884	884	884	884	884	884
	1013	Total Demand	EA							
		Total Receipts	EA				10			
		Stock on Hand	EA	10	10	10	20	20	20	20
	1020	Total Demand	EA							
		Total Receipts	EA				95			
		Stock on Hand	EA	5	5	5	100	100	100	100

Details of the planning situation based on Supply and Demand scenario in Product View:

For originally requested product 7001603-838 planned for 1004

Stock @1004 = 989 units of this the old sales order of qty 5 is already consumed and the remaining available qty is only 984 units. Since we are not doing ATP on stock transfers orders so the 2 orders of 10 and 95 are not consuming this stock.

Product View: 7001603-838, Planning Version 000

Element	DatTim	Avail/ReqD	Avail/ReqT	Category	Receipt/Requirements Element	Rec/ReqQty	Conf. Qty	Available	Surp/short	PP-Firmed	Con
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000192/FG1/CC/(12/31/1969)	90	90	90	90		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000193/FG1/CC/(12/31/1969)	100	100	190	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000194/FG1/CC/(12/31/1969)	100	100	290	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000195/FG1/CC/(12/31/1969)	100	100	390	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000196/FG1/CC/(12/31/1969)	100	100	490	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000197/FG1/CC/(12/31/1969)	100	100	590	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000198/FG1/CC/(12/31/1969)	100	100	690	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000199/FG1/CC/(12/31/1969)	100	100	790	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000200/FG1/CC/(12/31/1969)	100	100	890	100		
Stock	06/19/2007	07:34:22	07:34:22	Stock	0002000201/FG1/CC/(12/31/1969)	99	99	989	99		
SNP Product Horizon	06/18/2007	23:59:59			SNP Product Horizon						
PReqRel	06/19/2007	00:00:00	00:00:00	PReqRel	10941111/000010	10	0	979	10		
PReqRel	06/19/2007	00:00:00	00:00:00	PReqRel	10941112/000010	95	0	884	95		
SalesOrder	06/29/2007	00:00:00	00:00:00	SalesOrder	42/000010/1	5	5	879	5		
PP/DS Horizon	07/02/2007	23:59:59			PP/DS Horizon						

For originally requested product 7001603-838 planned for 1013

Stock @1013= 10 units – the purchase requisition of 10 units is not consuming the stock as it is not ATP allocated like sales order.

Product View: 7001603-838, Planning Version 000

Element	DatTim	Avail/ReqD	Avail/ReqT	Category	Receipt/Requirements Element	Rec/ReqQty	Conf. Q...	Available	Surp/short	PP-Firmed	Conv. In...	Not PegR
Stock	06/19/2007	11:42:36	11:42:36	Stock	0002000380/FG/CC/(12/31/1969)	10	10	10	10			
SNP Product Horizon	06/18/2007	23:59:59			SNP Product Horizon							
PurRqs	06/21/2007	03:00:00	03:00:00	PurRqs	10941111/000010	10	0	20	10			
PP/DS Horizon	07/02/2007	23:59:59			PP/DS Horizon							

For originally requested product 7001603-838 planned for 1020

Stock @ 1020= 5 units

Product View: 7001603-838, Planning Version 000

	DatTimAlrt	Avail/ReqD	Avail/ReqT	Category	Receipt/Requirements Element	Rec/ReqQty	Conf. Q...	Available	Surp/short	PP-Firmed
	06/19/2007	12:08:53	Stock	0002000381/FG/CC/(12/31/1969)		5	5	5	5	
	06/18/2007	23:59:59		SNP Product Horizon						
	06/21/2007	03:00:00	PurRqs	10941112/000010		95	0	100	95	<input type="checkbox"/>
	07/02/2007	23:59:59		PP/DS Horizon						

For product that can be substituted for the original product 7001603-668

Stock @ 1004 = 997 units

Product View: 7001603-668, Planning Version 000

	DatTimAlrt	Avail/ReqD	Avail/ReqT	Category	Receipt/Requirements Element	Rec/ReqQty	Conf. Q...	Available	Surp/short	PP-Firmed	Conv. In...
	06/19/2007	09:24:59	Stock	0002000202/FGH/CC/(12/31/1969)		97	97	97	97		
	06/19/2007	09:24:59	Stock	0002000203/FGH1/CC/(12/31/1969)		100	100	197	100		
	06/19/2007	09:24:59	Stock	0002000204/FGH1/CC/(12/31/1969)		100	100	297	100		
	06/19/2007	09:24:59	Stock	0002000205/FGH1/CC/(12/31/1969)		100	100	397	100		
	06/19/2007	09:24:59	Stock	0002000206/FGH1/CC/(12/31/1969)		100	100	497	100		
	06/19/2007	09:24:59	Stock	0002000207/FGH1/CC/(12/31/1969)		100	100	597	100		
	06/19/2007	09:24:59	Stock	0002000208/FGH1/CC/(12/31/1969)		100	100	697	100		
	06/19/2007	09:24:59	Stock	0002000209/FGH1/CC/(12/31/1969)		100	100	797	100		
	06/19/2007	09:24:59	Stock	0002000210/FGH1/CC/(12/31/1969)		100	100	897	100		
	06/19/2007	09:24:59	Stock	0002000211/FGH1/CC/(12/31/1969)		100	100	997	100		
	06/18/2007	23:59:59		SNP Product Horizon							
	06/19/2007	00:00:00	PReqRel	10941136/000010		5	0	992	5		
	06/19/2007	00:00:00	PReqRel	10941137/000010		92	0	900	92		
	07/02/2007	23:59:59		PP/DS Horizon							

For substituted product 7001603-668

Stock @ 1013 = 15 units

Product View: 7001603-668, Planning Version 000

For Substituted Product 7001603-668

Stock @ 1020= 8 Units

Product View: 7001603-668, Planning Version 000

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In order to set up corrective feedback action when the correct product was not ordered out of the default plant 1004 – we define location substitution and product substitution rules as shown below. If the product with actual demand is not found at the default location 1004 due to incorrect planning look at alternative locations like 1013 and 1020.

Maintain Location Determination Procedure

The screenshot shows the SAP 'Maintain Location Determination Procedure' interface. At the top, there are three buttons: 'Profile & parameter', 'Location determinations', and 'Cancel selection'. Below this, there are two main tabs: 'Overview' and 'Details'.

Overview Tab: Contains a table with the following data:

Determinin.	Ty.	Loc. procedure txt
LS2	3	USD

Details Tab: Contains a table with the following data:

Location	Costs
1004	10.000
1013	20.000
1020	30.000

The following two products can be substituted if the planning did not do a good job at planning the right product at right location.

Maintain Product Substitution Procedure

The screenshot shows the SAP 'Maintain Product Substitution Procedure' interface. At the top, there are three buttons: 'Profile & parameter', 'Product substitutions', and 'Cancel selection'. Below this, there are two main tabs: 'Overview' and 'Details'.

Overview Tab: Contains a table with the following data:

Substituti	Ty.	Product proced. text
USD1	0	USD Products

Details Tab: Contains a table with the following data:

Product	Valid from	Valid to	Rea	Select
7001603-838				
7001603-668	06/06/2007	06/06/2007	0	<input type="checkbox"/>

Let us now see how this works, we now create a Sales Order for Product 7001603-838 for 2000 Units from default plant 1004; based on above supply situation we can only supply 984 units out of 1004 of the requested Product since the Planning did not expect a high demand for this product or due wrong forecast.

Create E-SJM Standard Order: Overview

E-SJM Standard Order: Net value:

Sold-to party:

Ship-to party:

PO Number: PO date:

Sales | **Item overview** | Item detail | Ordering party | Procurement | Shipping | Reason for rejection

Req. deliv.date: Deliver.Plant:

Complete div. Total Weight:

Delivery block: Volume:

Billing block: Pricing date:

Payment card: Exp.date:

Card Verif. Value: Incoterms:

Payment terms:

Order reason:

Item	Material	Order quantity	SU	S	Description	Customer Material Numb	ItCa	DGI	HgLvl	D	First date	Print
	7001603-838	2000		<input type="checkbox"/>						D	06/19/2007	

But the planner planned some of this product at alternate Plant/DC 1013 and 1020. Also the planning team planned an alternate product instead with potentially same Form Fit Function that the customer is OK accepting substitution for the original product.

APO Availability Check - Result Overview

Alert monitor

Product/Location	Material Availability Date	Reqmt Quantity	Confirmed Qu.	Cumulated Confirmed Quantity	Un	Pr	Product Alloc	Production	De
7001603-838 / 1004 / Item: 000010									
Sched.line: 0001	06/19/2007	2,000	0	0	EA		0		
Product/Location Selection									
7001603-838 / 1004	06/19/2007	2,000	984	984	EA	2,000	0		<input checked="" type="checkbox"/>
7001603-838 / 1013	06/19/2007	1,016	10	20	EA	20			<input checked="" type="checkbox"/>
7001603-838 / 1020	06/19/2007	996	5	5	EA	996	0		<input checked="" type="checkbox"/>
7001603-668 / 1004	06/19/2007	991	991	991	EA	991	0		<input checked="" type="checkbox"/>

Based on the rules defined for fulfillment process – the system first looks for the Original Product 7001603-838 is first searched at default location 1004 – the best system could find was 984 Units – Based on rules control – the system searches for alternate product at alternate location 1013 and 1020.

After exhausting all location for the requested product 7001603-838 – the system starts to search for substitutable product at default location 1004 and then alternate location as shown above.

The final out of the results get displayed as multiple schedule line out of different locations – the user can choose what potential alternatives they want by selecting or unselecting the check box in screen print shown above.

Below is how the Sales Order was fulfilled when the planning team did not envision such spike in Demand and hence tries to get a Global insight into the Supply Chain and provide a corrective action to the Unplanned Demand.

The screenshot displays the SAP 'Create E-SJM Standard Order: Overview' interface. At the top, there is a menu bar with 'Sales document', 'Edit', 'Goto', 'Extras', 'Environment', 'System', and 'Help'. Below the menu is a toolbar with various icons. The main header area shows the order title 'Create E-SJM Standard Order: Overview' and a sub-header 'Orders'. The order details section includes fields for 'E-SJM Standard Order' (with a dropdown arrow), 'Net value' (1,009,000.00 USD), 'Sold-to party' (1000010424 EASTERN MAINE MEDICAL / 489 STATE ST / BANGOR ME 04401), 'Ship-to party' (1000010424 EASTERN MAINE MEDICAL / 489 STATE ST / BANGOR ME 04401), 'PO Number' (2223), and 'PO date'. Below this is a tabbed interface with 'Sales', 'Item overview', 'Item detail', 'Ordering party', 'Procurement', 'Shipping', and 'Reason for rejection'. The 'Item detail' tab is active, showing fields for 'Req. deliv.date' (06/19/2007), 'Deliver.Plant', 'Complete div.' (checkbox), 'Total Weight' (2,000.000 LB), 'Delivery block', 'Volume' (0.000), 'Billing block', 'Pricing date' (06/19/2007), 'Payment card', 'Exp.date', 'Card Verif. Value', 'Incoterms' (FOB ORIGIN), 'Payment terms' (2300 Net 30), and 'Order reason'. At the bottom, there is a table titled 'All items' with columns: Item, Material, Order quantity, SU, S, Description, Customer Material Numb, ItCa, DGI, HgLvlt, D, First date, Plnt, and Batr. The table contains five rows of data for different materials and quantities.

Item	Material	Order quantity	SU	S	Description	Customer Material Numb	ItCa	DGI	HgLvlt	D	First date	Plnt	Batr
	107001603-838	2,000 EA		✓	Frontier CRT		TAPA			D	06/19/2007	1004	
	207001603-838	984 EA		✓	Frontier CRT		TAN			10 D	06/19/2007	1004	
	307001603-838	20 EA		✓	Frontier CRT		TAN			10 D	06/19/2007	1013	
	407001603-838	5 EA		✓	Frontier CRT		TAN			10 D	06/19/2007	1020	
	507001603-668	991 EA		☐	Identity DR		TAN			10 D	06/19/2007	1004	

In a subsequent part of this article we will cover how production can be invoked if the above method has been exhausted and the planning team did not account for the additional demand in their production plans with a look in the available capacity using PPDS.

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