

Does MRP Have a Role in a Volatile Marketplace?

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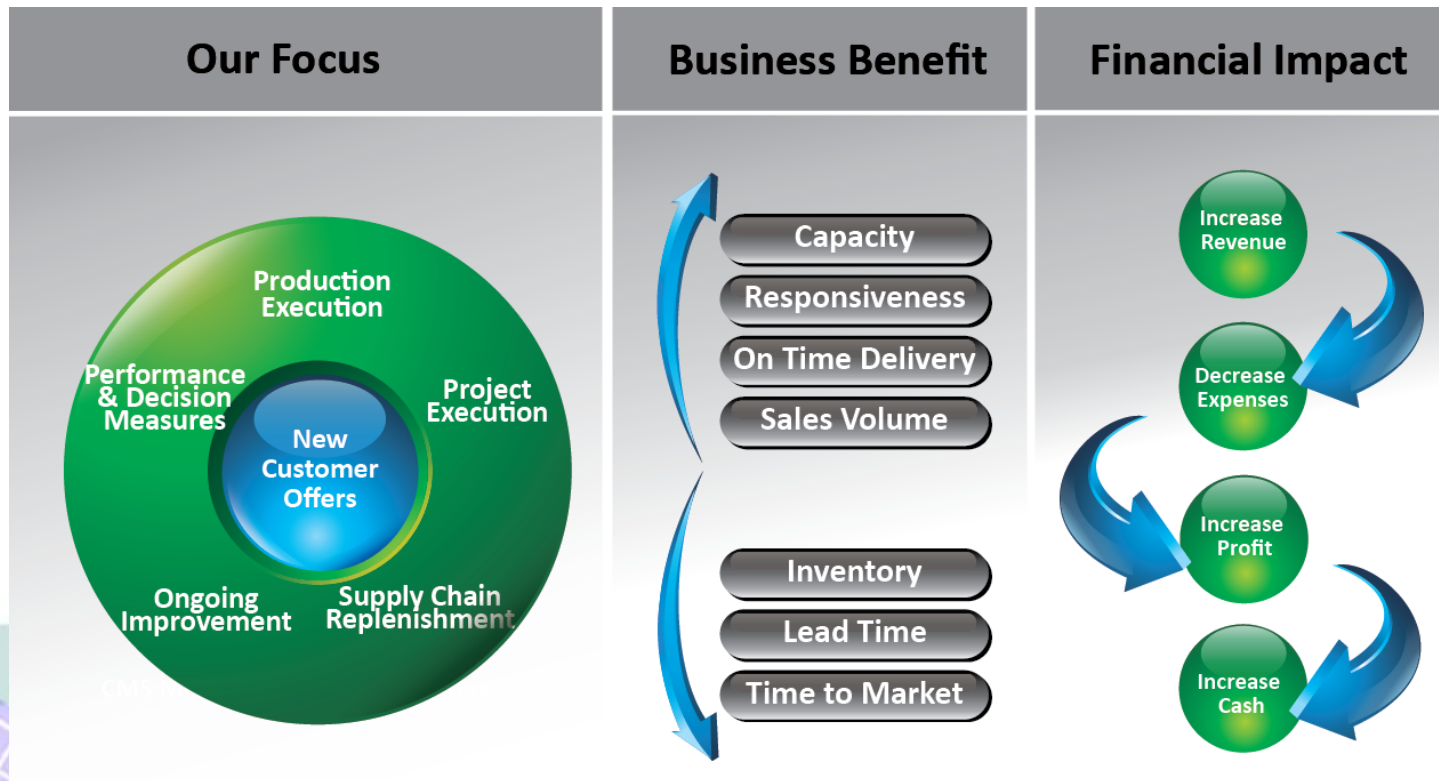
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February 17 - 19, 2011

Cambridge, Ontario


Who is CMS Montera?

- CMS Montera provides management solutions and software to increase operational performance and sales



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Who is CMS Montera?

- CMS Montera practitioners:
 - Certified by TOCICO The TOCICO CERTIFIED logo, consisting of the word "TOCICO" in a blue oval with a globe-like pattern, and the word "CERTIFIED" in a smaller blue oval below it.
 - Executive experience and management consulting backgrounds (E&Y)
 - CMC (Certified Management Consultant) and CMA (Certified Management Accountant) Certifications
- Theory of Constraints (TOC) has been our focus since 2000
- CMS Roadrunner installations in North America, Europe & the Middle East

What This Presentation is About:

- Forecast-driven MRP no longer meets the needs of many manufacturers
 - Reducing forecast variability is challenging at best
- New approaches in supply chain management are focused on:
 - Breaking dependencies in the supply chain
 - Guarding against shortages and excess inventories
- Therefore, you often CAN stop buying according to the forecast

3 Different Companies....

- Somewhat complex products
 - 300 to 8,000 FG; 2,000 to 3,000 RM
 - 3-7 levels in the Bill-of-Material)
- Considered to be product leaders in what they do, but not very large in their verticals (high-tech, industrial, consumer)
- Customers expect between 1 day and 2-week turnaround on 'standard' products (they tolerate 3-4 weeks but some sales are lost)
- Customers often live with whatever lead time is given on customized / specialty products





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Supply Chain Lead Times

Customer Tolerance

Standard



Special



Vendor Lead Time



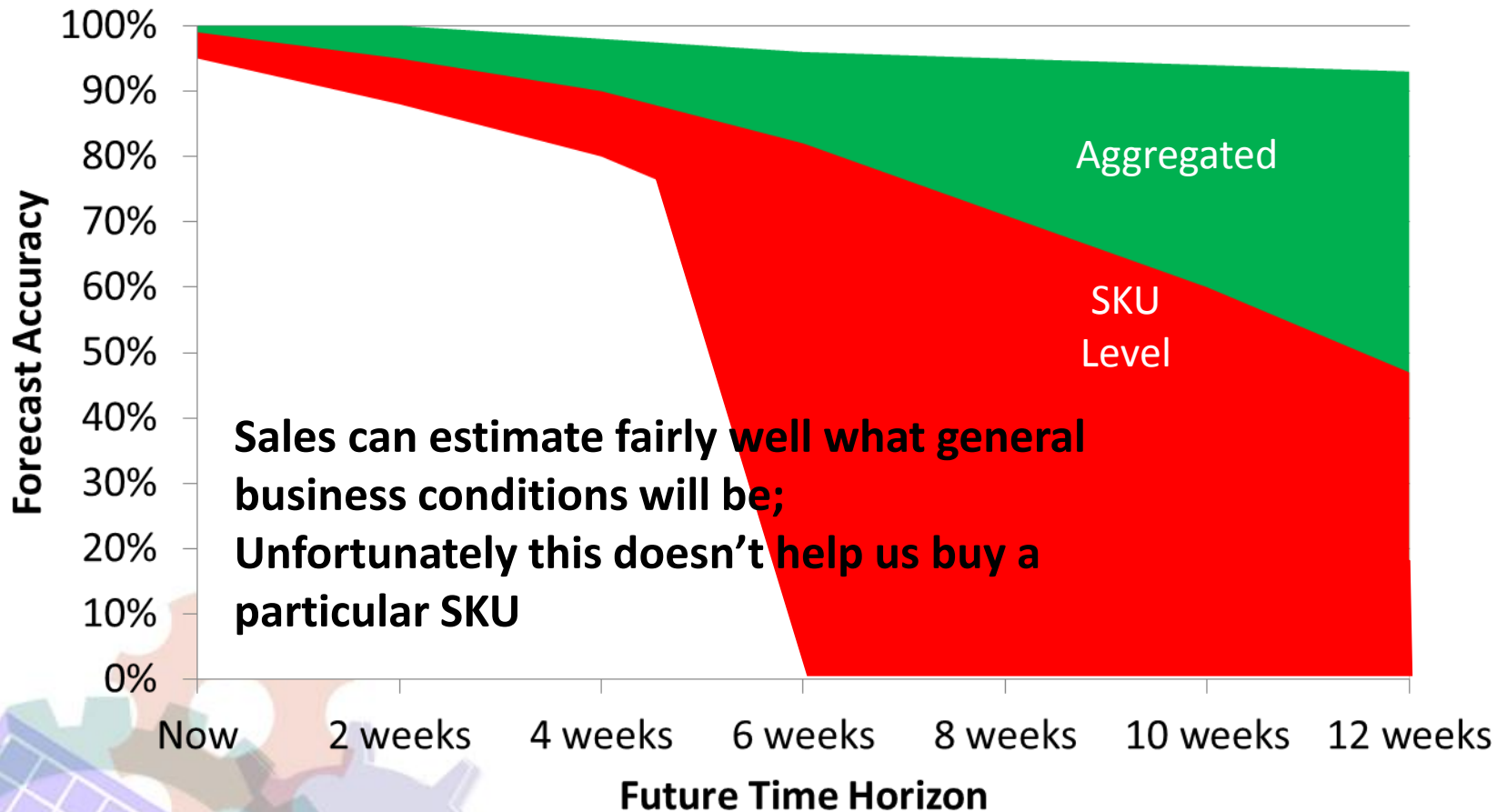
Plant Behaviour



- Materials are very expensive, so we want to buy only what we need; vendors are reluctant to hold stock
- MRP uses firm customer orders where they exist, otherwise MRP needs a forecast to drive material requirements



Forecast Accuracy

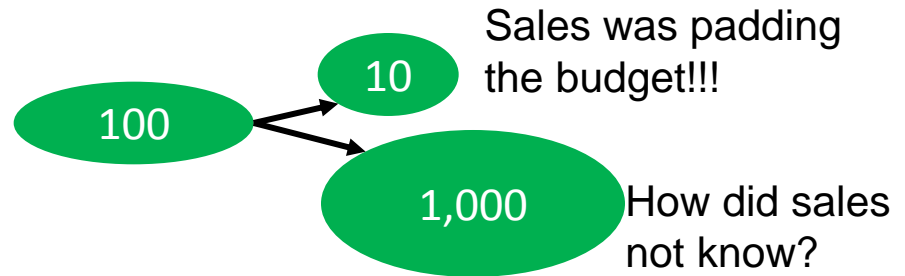


Ways the Forecast can be Wrong

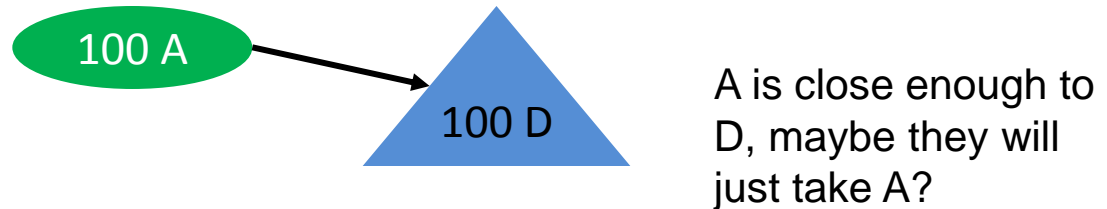
- Timing



- Quantity



- The SKU



- And sometimes more than one of these happen at the same time.....

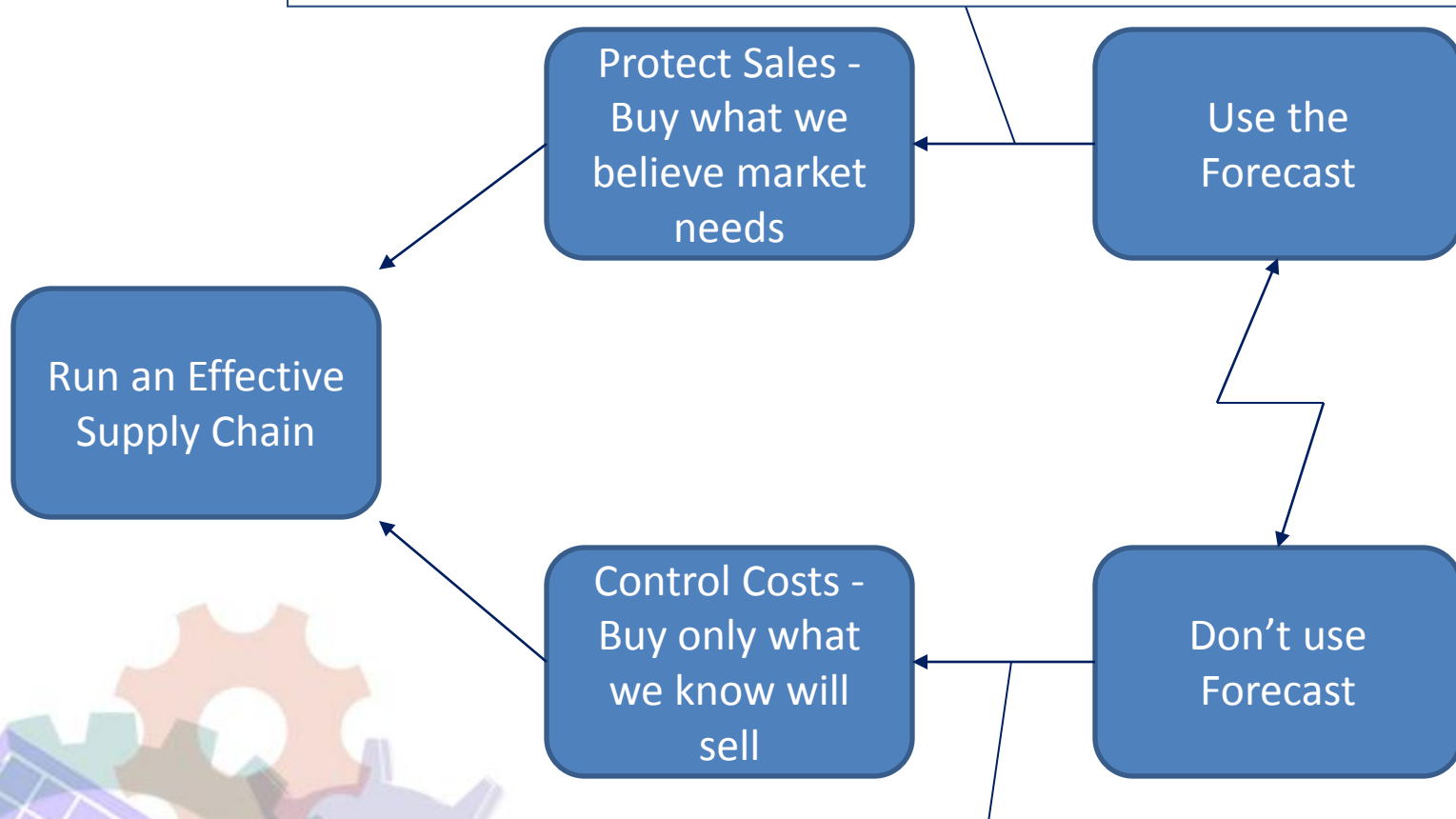


When variability/reality happens?

- We end up with inventory we can't use, while the parts we need aren't here
- Customers aren't getting their orders when they need them, or they take their business elsewhere
- Lots of expediting, overtime, critical parts lists
- Lots of time spent debating the forecast, planning distrusts sales, sales thinks operations expects a crystal ball

Why do we put up with it?

- Supply Lead Time > Customer Tolerance Time
- Inventory is very expensive if we stock everything



- The forecast is unreliable for sku-level planning
- Inventory is very expensive when we buy things we don't need

Typical compromises

- Improved Forecasting
- Excel becomes the planning system
- Manual Replenishment Systems



Improved Forecasting

- Forecasting Software has not shown itself to be a crystal ball
- The approach is a perpetuation of push-based supply
- Forecast accuracy can be improved with
 - Shorter time horizons
 - Greater aggregation of products, geography, and time
- Additional collaboration between suppliers and customers has shown limited impact



Manual Work Arounds

- Who knew what Excel could be trained to do?
- Extensive custom report development, upgrading of user's skills in running Excel
- 10 different planners – 10 different methods for procuring parts
- What happens when a Super User leaves the company?

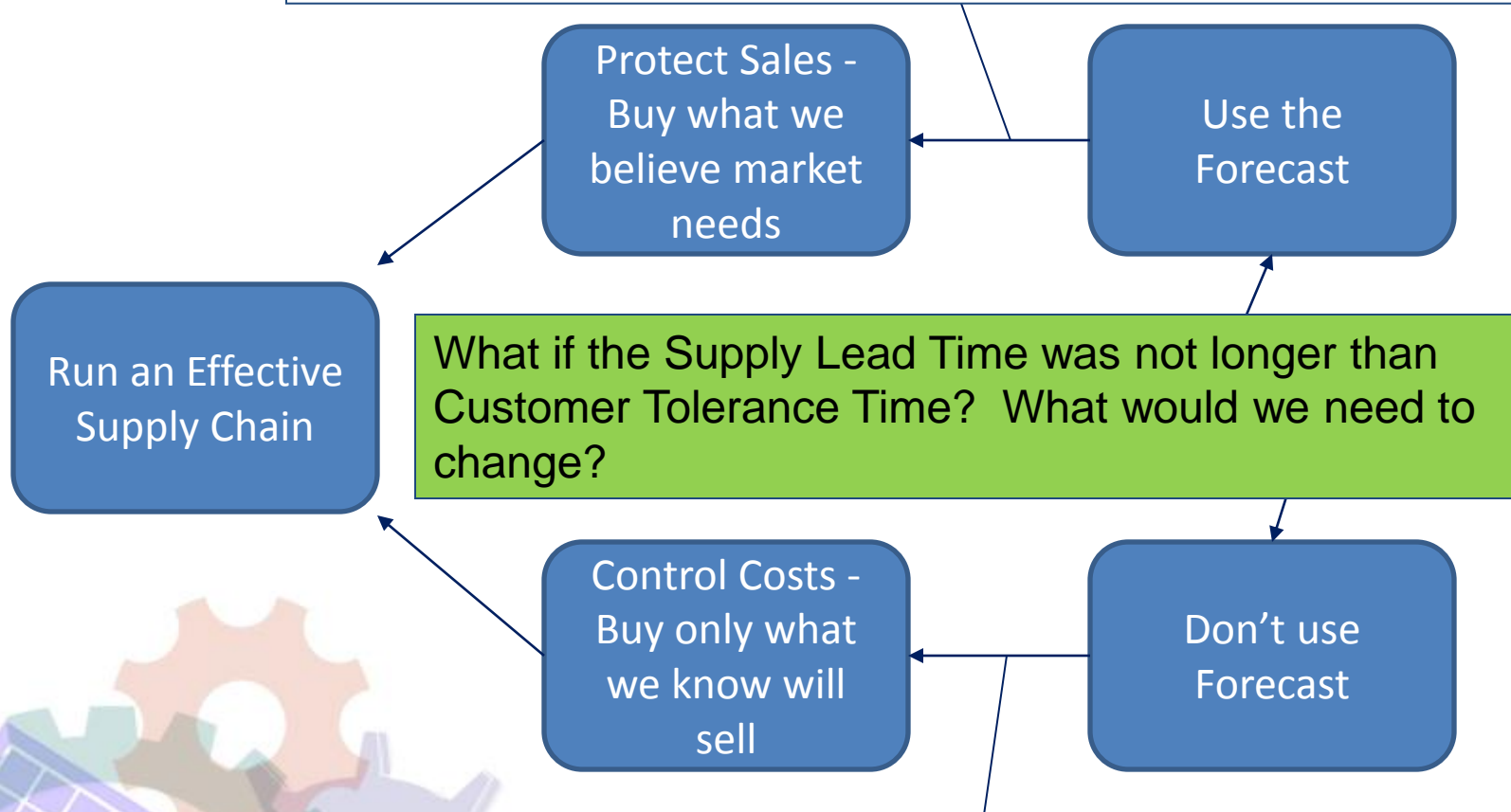


Re-order Point Approaches

- Kanban, min-max, re-order point systems:
 - Proliferation of inventory in the absence of MRP
 - V-type and A-type plant challenges
 - Don't change when business conditions change
 - Demand increases or decreases
 - Seasons come and go
 - Products come and go
 - Priorities are often due-date based, not availability based – including MTS vs. MTO – or no priority exists
 - Difficult to determine real requirements, especially in volatile environments

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Break Dependencies
Consumption-Driven
Dynamic Buffers
Synchronized Priorities

What is our alternative?

In order to bring the Supply Lead Time in line with the Customer Tolerance Time, we need to:

*Break key dependencies in the supply chain with **consumption-driven** dynamic buffers of inventory, and **synchronize priorities** during execution*

And do it in a way that increases ROI, ROCE



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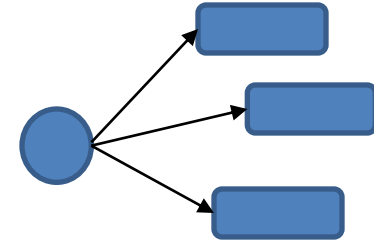


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Break Key Dependencies

- Points of aggregation
 - Parts used in multiple assemblies
 - Products sold to multiple customers/locations
- Points where the supply lead time is longer than the customer tolerance time
- Points where there is a capacity & throughput benefit to replenishing to stock rather than demand
 - Setup sensitive resource that produces many FG



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Replenishment Matrix

- Analyze BOMs & consumption history to identify active finished goods and components
- Determine best places to decouple with stock, and resulting market responsiveness
- Pay close attention to aggregation opportunities, as some low volume items may benefit from sharing components with other higher-volume items

	PP – PTS	PP – PTO
FG – MTS	FG stock requirement is reduced because of available parts	Generally avoid this quadrant, except for perishable PP
FG - MTO	Lead time is only the manufacturing time	Lead Time is the longest PP, plus manufacturing

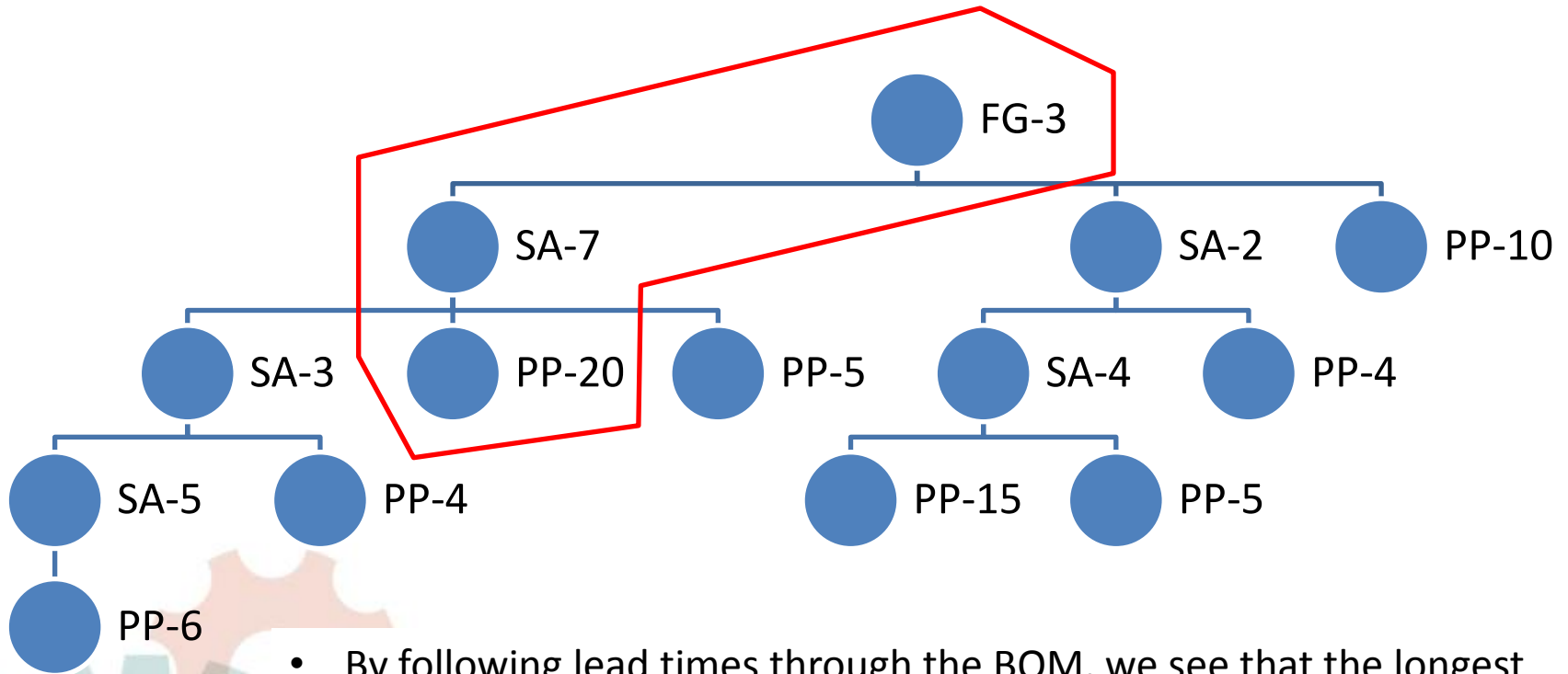
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Break Key Dependencies



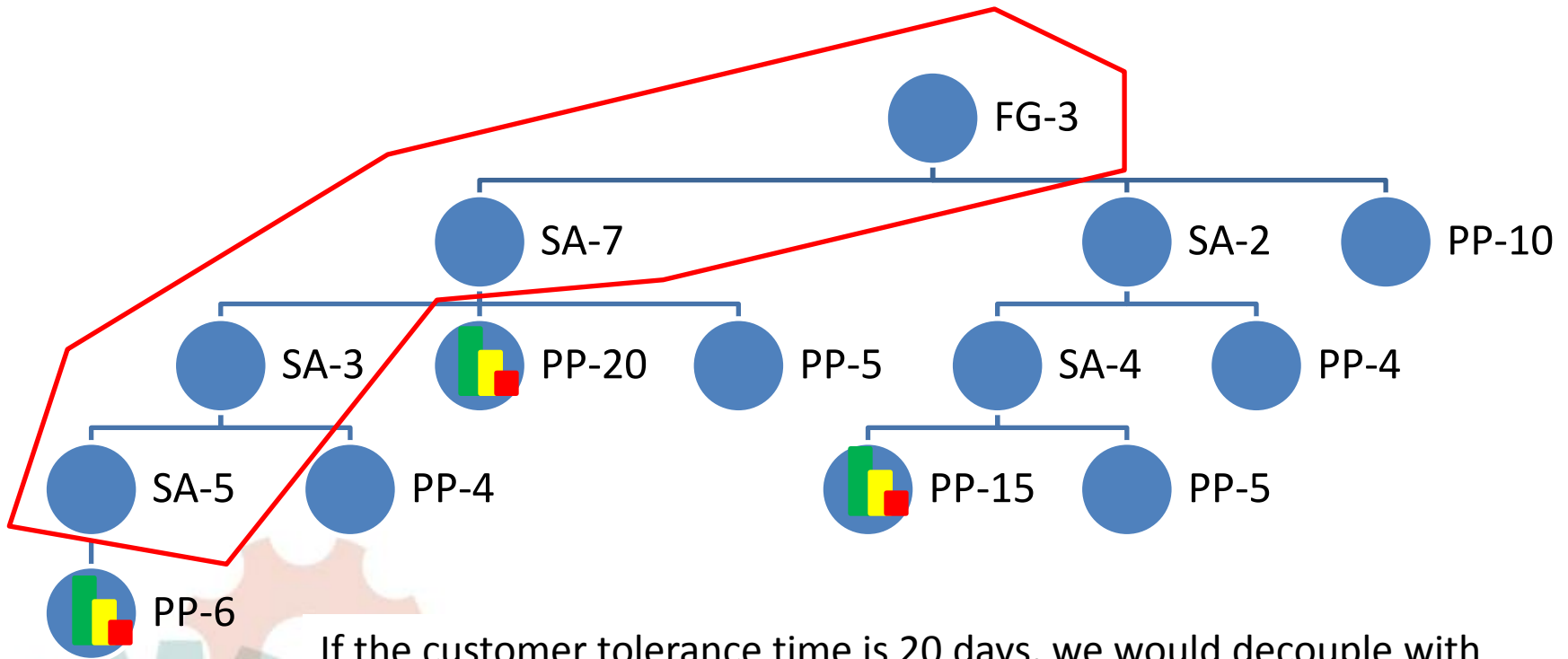
- By following lead times through the BOM, we see that the longest leg is FG-3 – SA-7 – PP-20 for a total of 30 days
- A single work order would drive activity for FG production, all SA parts, and purchase orders for PP items; the order would be due 30 days from now



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Break Key Dependencies



If the customer tolerance time is 20 days, we would decouple with Consumption-Driven Replenishment (CDR) buffers at PP-20, PP-6 and PP-15
The new longest leg is FG-3 – SA-7 – SA-3 – SA-5 for a total of 18 days;
purchase orders are still required for non-stocked PP items

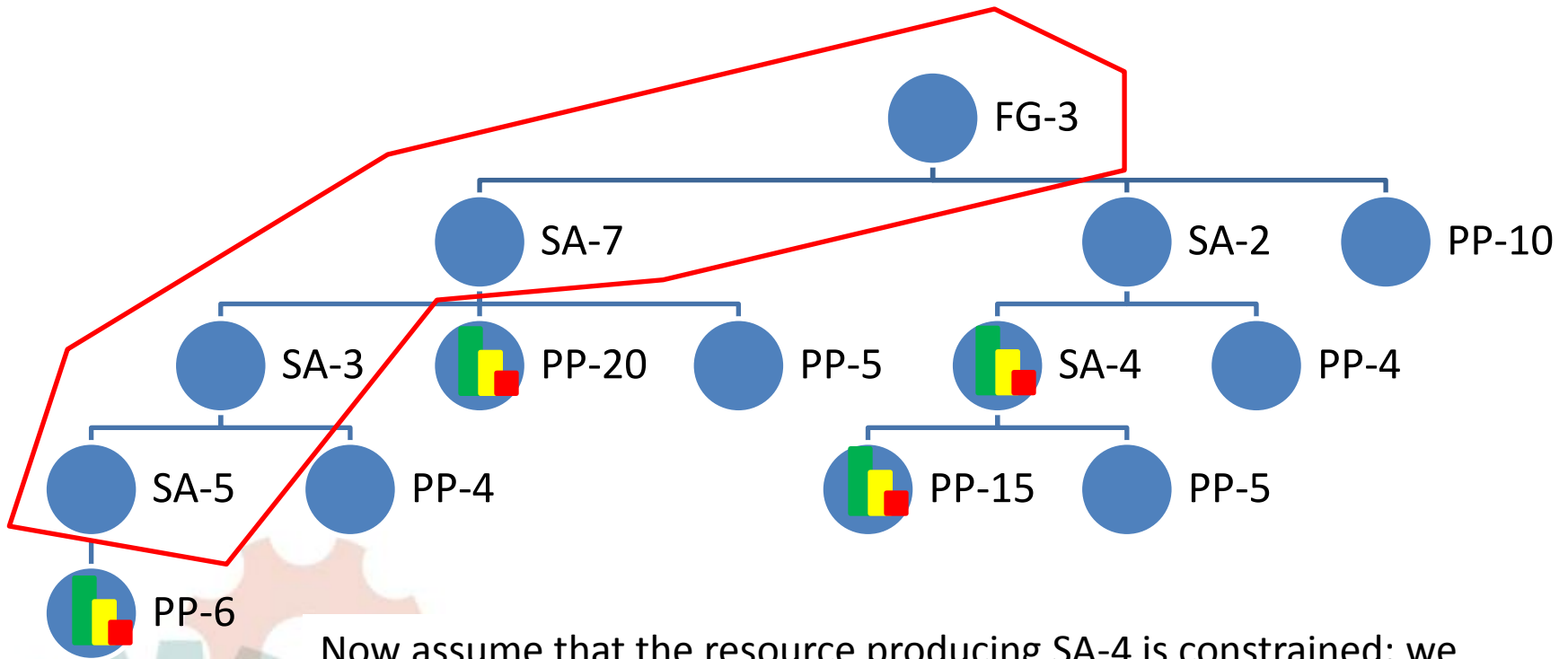
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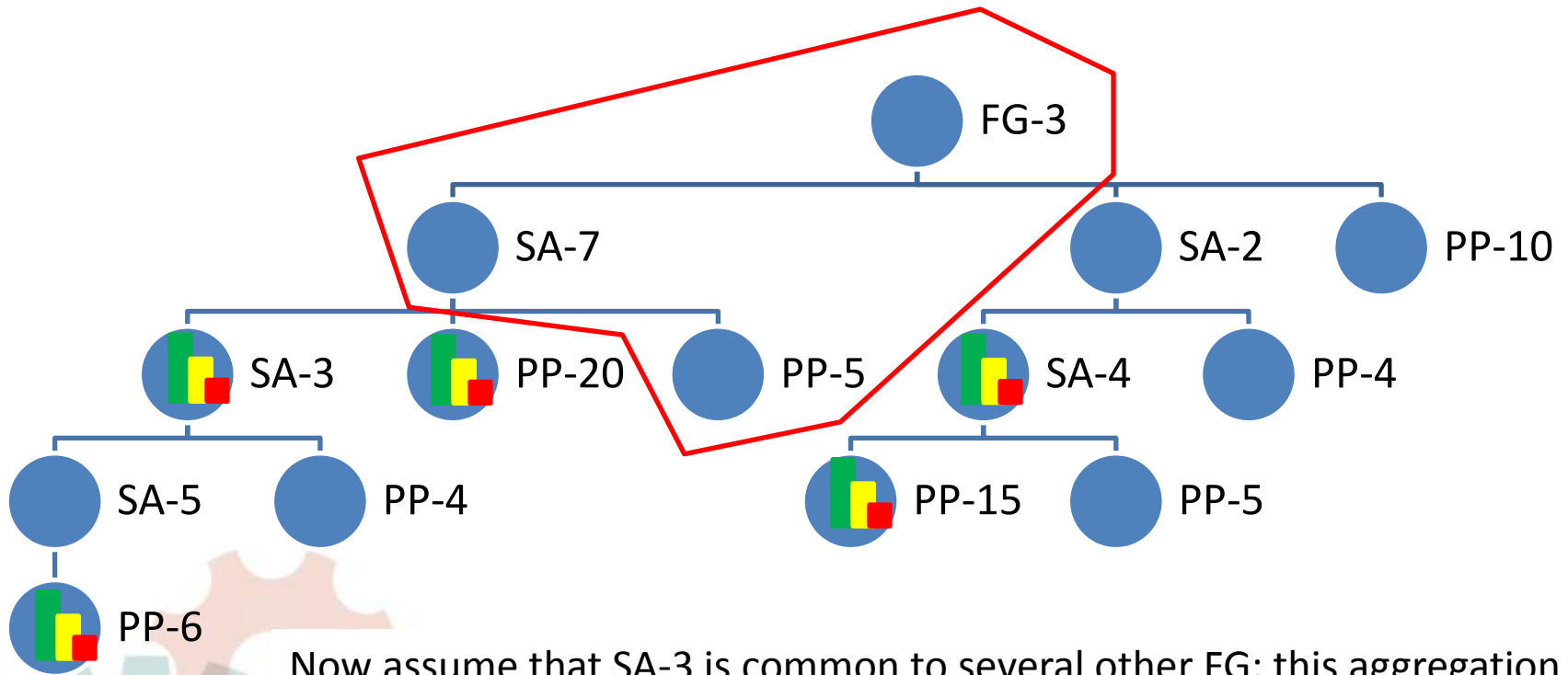
Break Key Dependencies



Now assume that the resource producing SA-4 is constrained; we might decouple with a CDR buffer at SA-4;
The longest leg remains FG-3 – SA-7 – SA-3 – SA-5 for a total of 18 days
Question – do we still want to stock PP-15?

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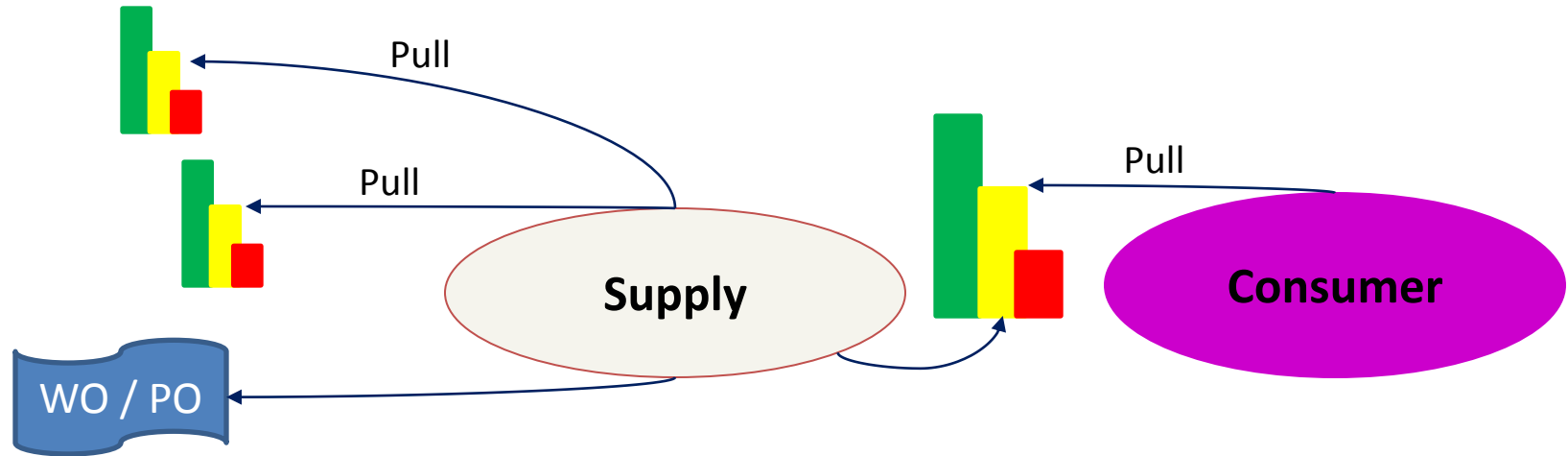
Break Key Dependencies



Now assume that SA-3 is common to several other FG; this aggregation allows some stock to be safely kept.
The longest leg becomes FG-3 – SA-7 – PP-5 for a total of 15 days

Break Dependencies
Consumption-Driven
Dynamic Buffers
Synchronized Priorities

Consumption Driven Replenishment



- Supply replenishes the buffer within the replenishment time, which will cascade back to drive additional demand for components and purchased parts
- A stock buffer is placed between consumption and supply
- The buffer covers consumption across the replenishment time, with provisions for demand and supply variability
- The buffer is managed as a collective amount of inventory and supply orders
- Consumption point draws inventory as required (could be shipments to customers, or manufacturing pulling materials & components from stock)

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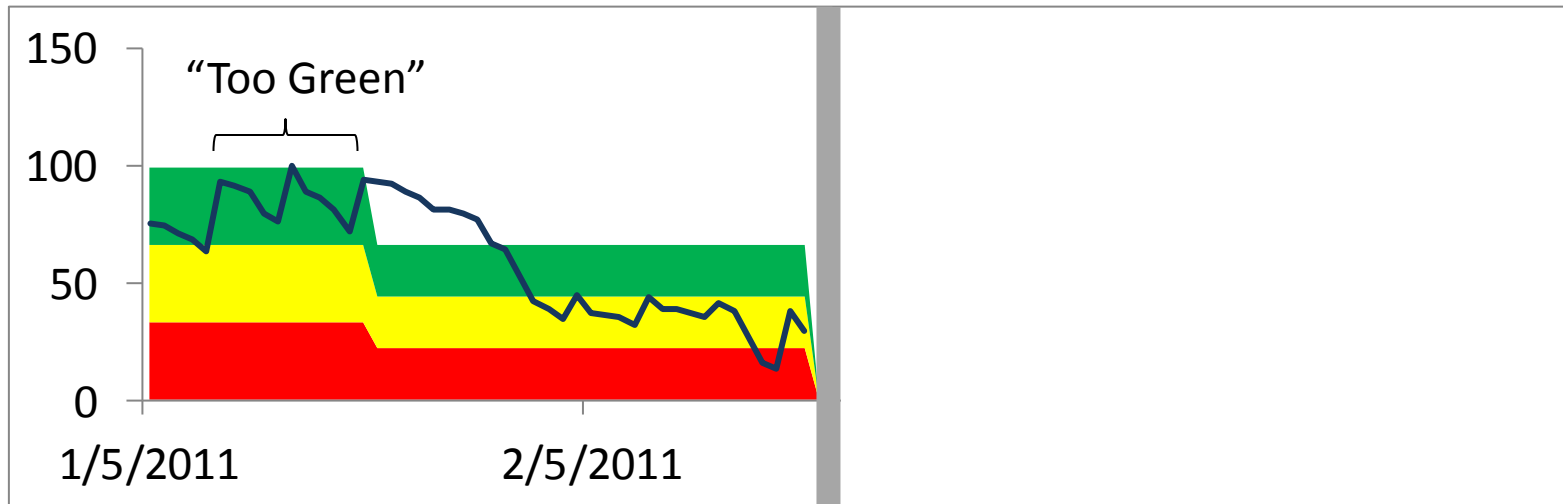
Transition

- There is always a significant imbalance between the stock and orders you have now, vs. what you should have under CDR
- The transition means:
 - Placing/Expediting new orders to avoid shortages
 - Breaking up large supply orders to smooth supply
 - Determining best courses of action on reducing excess inventories



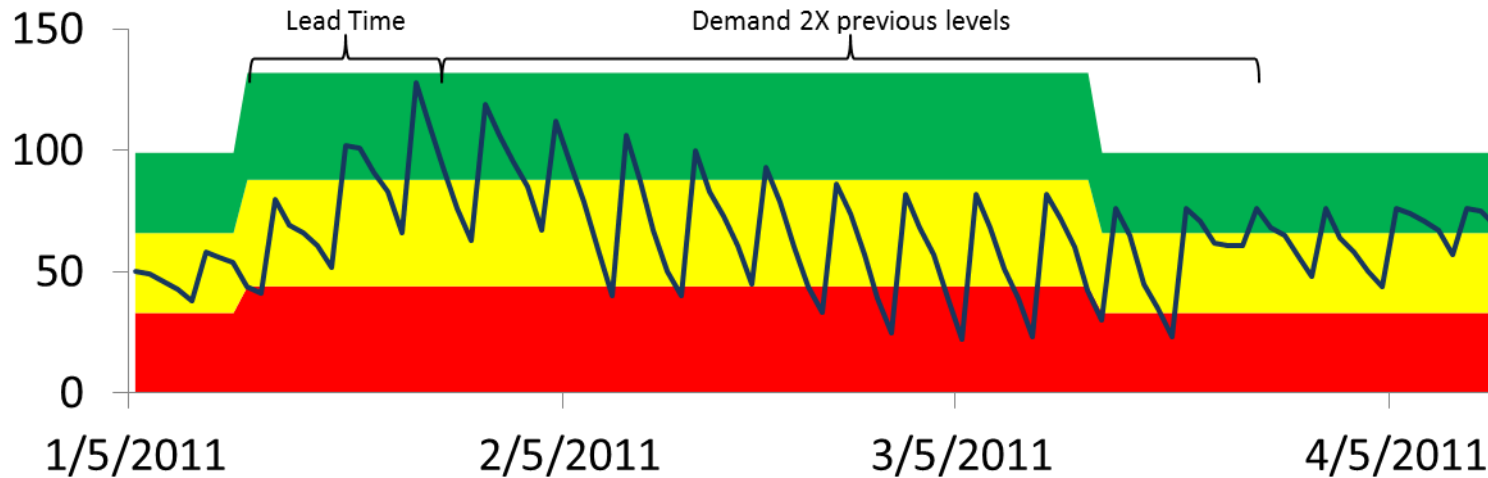
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Dynamic Buffer Adjustments



- Decrease the buffer when consistently Green
- Increase the buffer when consistently Red
- This process automates many of the routine decisions that keep the system current

Proactive Buffer Adjustments



When to increase the target:

- At least one lead time in advance of the demand increase; the level of 'paranoia' is in proportion to the ability to re-supply in-season

- New products
- Revision changes
- Price Changes
- Seasonal Demand
- Promotions

How much to change:

- in proportion to the capacity shortfall during the season

When to reduce the target:

- Also one lead time in advance of the demand correction, however inventory levels, actual demand vs. expected demand, and the post-season demand may change the timing and size of the change



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Break Dependencies
Consumption-Driven
Dynamic Buffers

Synchronized Priorities

Synchronized Priorities

- Most replenishment systems use due dates to determine priorities
- Rapidly evolving circumstances make it likely that someone sees the wrong priority
- % Buffer Remaining should drive priority, not due dates!!!

	Item 1	Item 2
Buffer	100	100
Inventory	60	60
WO	40	40
WO Due	Feb 25	Feb 25
WO % BR	60%	60%

	Item 1	Item 2
We just shipped 40 units of Item 1 to customer A	20%	60%



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Benefits of Consumption-Driven Replenishment

- **Increased Sales** - better service to customers, with shorter, more reliable lead times
- **Lower Working Capital** - the right inventory levels – and usually much lower than what is currently held
- **Lower Costs** – simplified execution, less fire-fighting, and more time to manage exceptions
- **Reduced Stress** - Less conflict between planning, operations, and sales

Conclusions

- **Break key dependencies** in the supply chain with **consumption-driven dynamic buffers** of inventory, and **synchronize priorities** during execution
 - Planning for effectively all items will be either replenishment based, or to order if lead times allow
- You don't need to make most execution decisions (purchasing and manufacturing) with the forecast anymore

	PP – PTS	PP – PTO
FG – MTS		
FG - MTO		



Thank You!

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