



# **I Promise**

**Marrying Materials and Capacity to Determine  
Realistic Promise Dates**

**-- A Technology Presentation --**

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# Objectives

- This presentation is about Technology
  - The N&S questions
  - The business logic challenges we faced when developing an Available-to-Promise (ATP) solution within CMS RoadRunner
  - The client behaviour changes required to make the Technology deliver value
- We wish to share this with you to
  - Further your own TOC knowledge
  - Discuss how to strengthen the ATP solution
  - Discuss how to improve the solution implementation

# CMS RoadRunner Software enables Demand Driven Enterprises

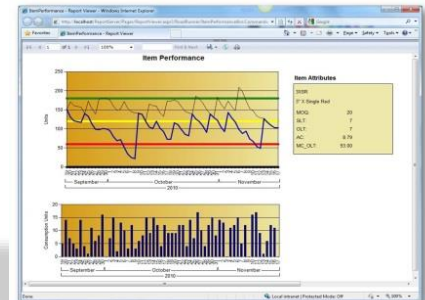
**Mx**

Production Planning & Execution  
(Drum-Buffer-Rope)



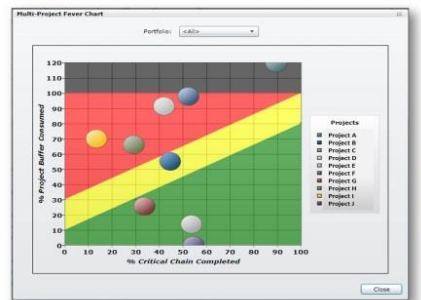
**Rx**

Inventory Management  
(Demand Driven Replenishment)



**Px**

Project Execution  
(Critical Chain Project Management)



**Bx**

Business Performance Intelligence & Analysis



# Contents

- The Power of the New Technology
- The Current Limitation
- Policies and Norms that Bypass the Limitation
- A Demand Driven System
- ATP Design Considerations
- New Policies, Norms and Behaviours
- Changing how we use the Technology
- Causing the Change
- ATP Demo

# The N & S Questions

- What is the power of the new technology?
- What current limitation does the new technology eliminate or vastly reduce?
- What policies, norms, measurements and behaviors are used to bypass the above limitation?
- What policies, norms and behaviors should be used once the new technology is in place?
- Do the new rules require any change in the way we use the technology?
- How to cause the change?

# The Power of the New Technology

- The ability to analyze and compare large amounts of data in a short period of time in order to provide users with RELEVANT information about materials and capacity
  - Must take into account the client's Demand Driven system design – Drum-Buffer-Rope (DBR) and Demand Driven Replenishment (DDR)

# The Current Limitation

- In order to have RELIABLE service levels (high Due Date Performance) two things must be good:
  - Realistic order promise dates
  - Excellent delivery performance to those dates

# The Current Limitation

- Due Date Performance (DDP) or On-Time Delivery (OTD) is a popular measure of customer service performance
  - Typically measured either to Request or to Promise
  - To Request
    - Rarely meaningful as the date is often not managed
  - To Promise
    - Assumes a realistic date
- How good is the OTD measure if the date we promise and measure to was never realistic?



# The Current Limitation

- Some ERP systems have ATP capability, BUT
- Capacity Availability
  - Often not formally considered – how many companies actually use their ERP to schedule (vs a spreadsheet)?
- Material Availability
  - Very challenging for A and T Plants – (assembly operations)
    - Large number of finished goods
    - Even larger number of raw materials and purchased parts
  - Material Requirements Planning (MRP) increases dependence on supply chain variation

# The Current Limitation

- For MRP to work, forecasted orders for finished goods are entered to drive demand on longer lead time purchase parts
  - Either sales (internal) forecasts, or
  - Customers place orders far into the future - encouraged by Customer Service Representatives (CSRs) to reserve capacity
  - Materials are purchased to and allocated to the order (forecast)
- Capacity loading fills up with orders (forecast)

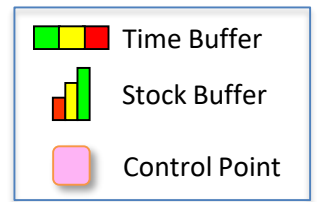
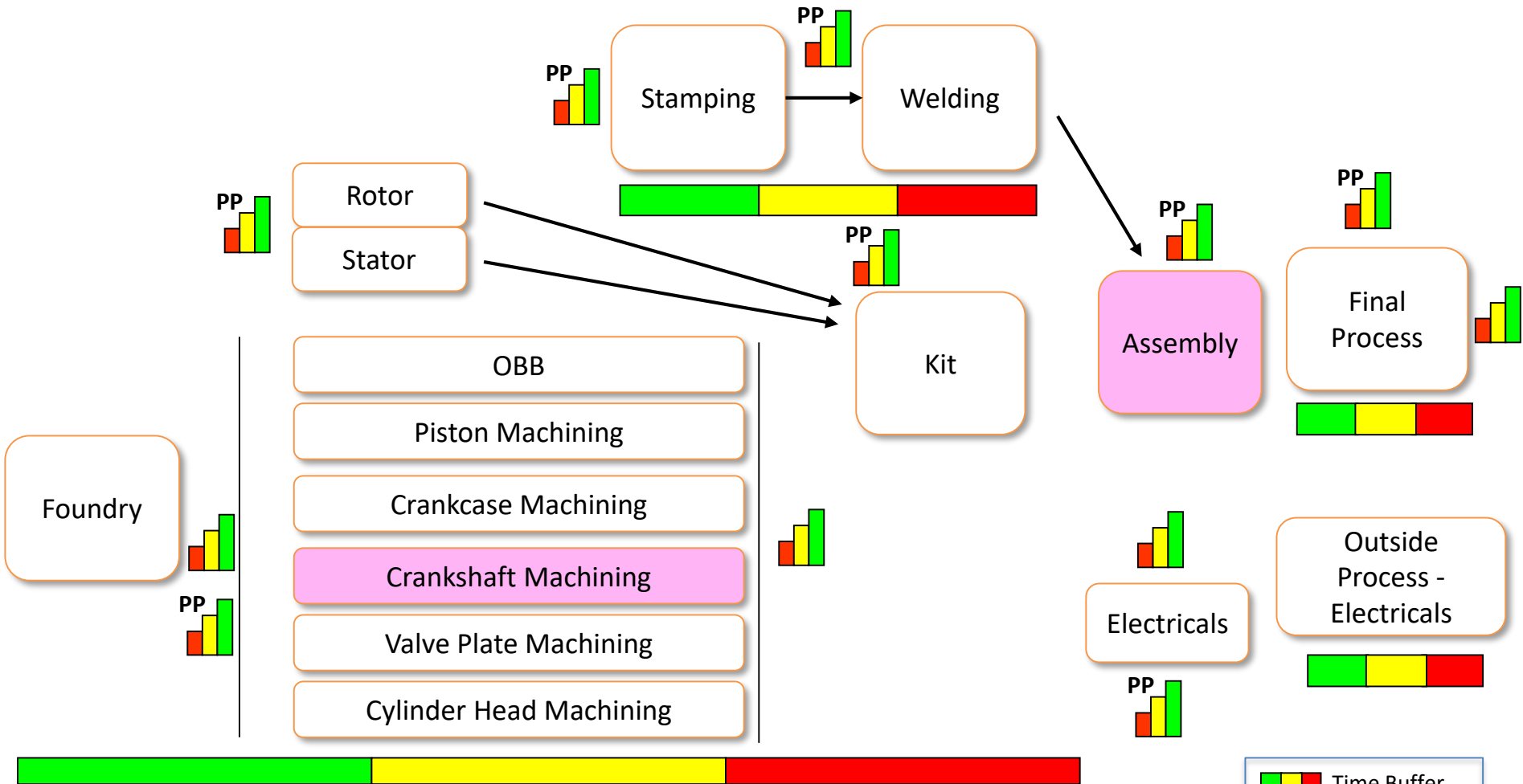
## Policies and Norms that Bypass the Limitation

- CSRs 'Promise' orders using incorrect and / or incomplete capacity and material information
  - Often requires lengthy negotiations with production planning
- If date is still not acceptable, CSRs may have to offer a better date to secure the order
- Un-forecasted orders are criticized for stealing materials and capacity
- Often creates large imbalances to plant loading

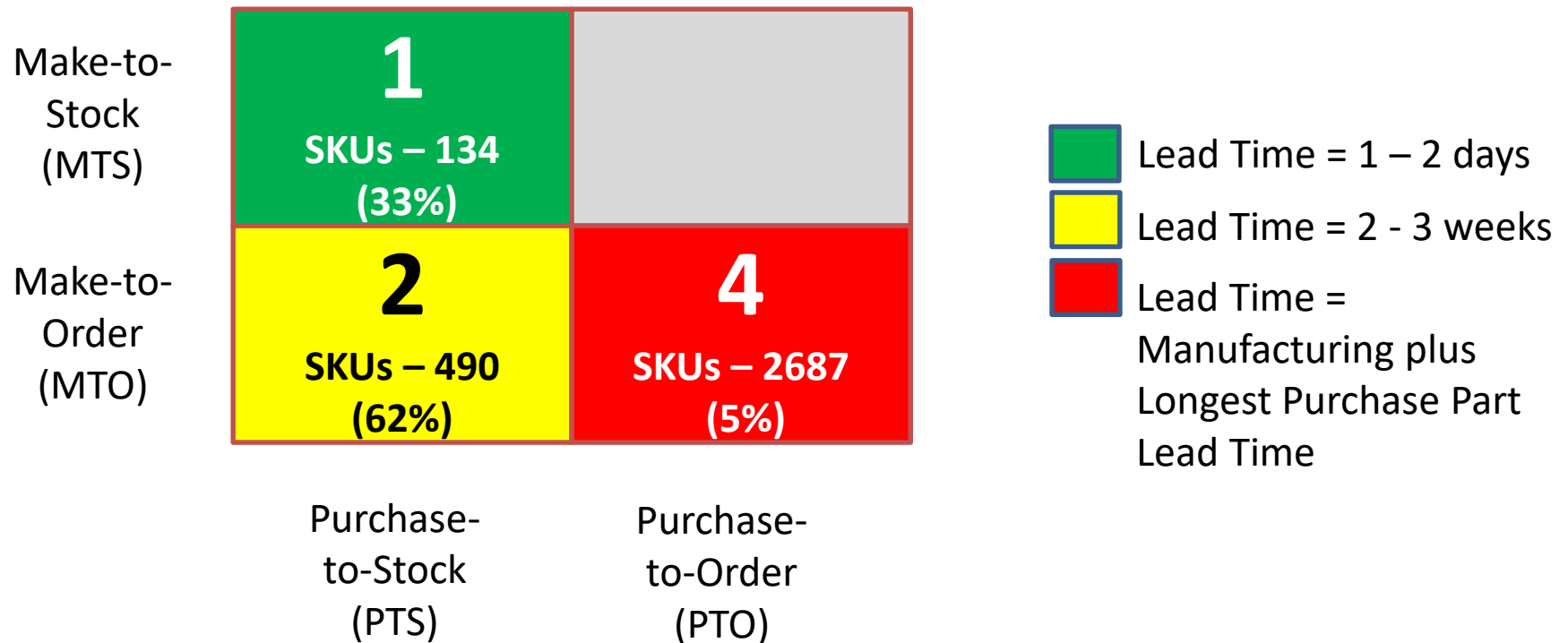
# Implementing a Demand Driven System

- Major components of DBR and DDR include
  - Buffers (stock, time & capacity) to decouple critical areas
  - Control Point / Drum schedules to clarify priorities and measure performance



# Client Example of Demand Driven System



# Sales Lead Time Matrix – Sales Quadrants



# Demand Driven System and ATP

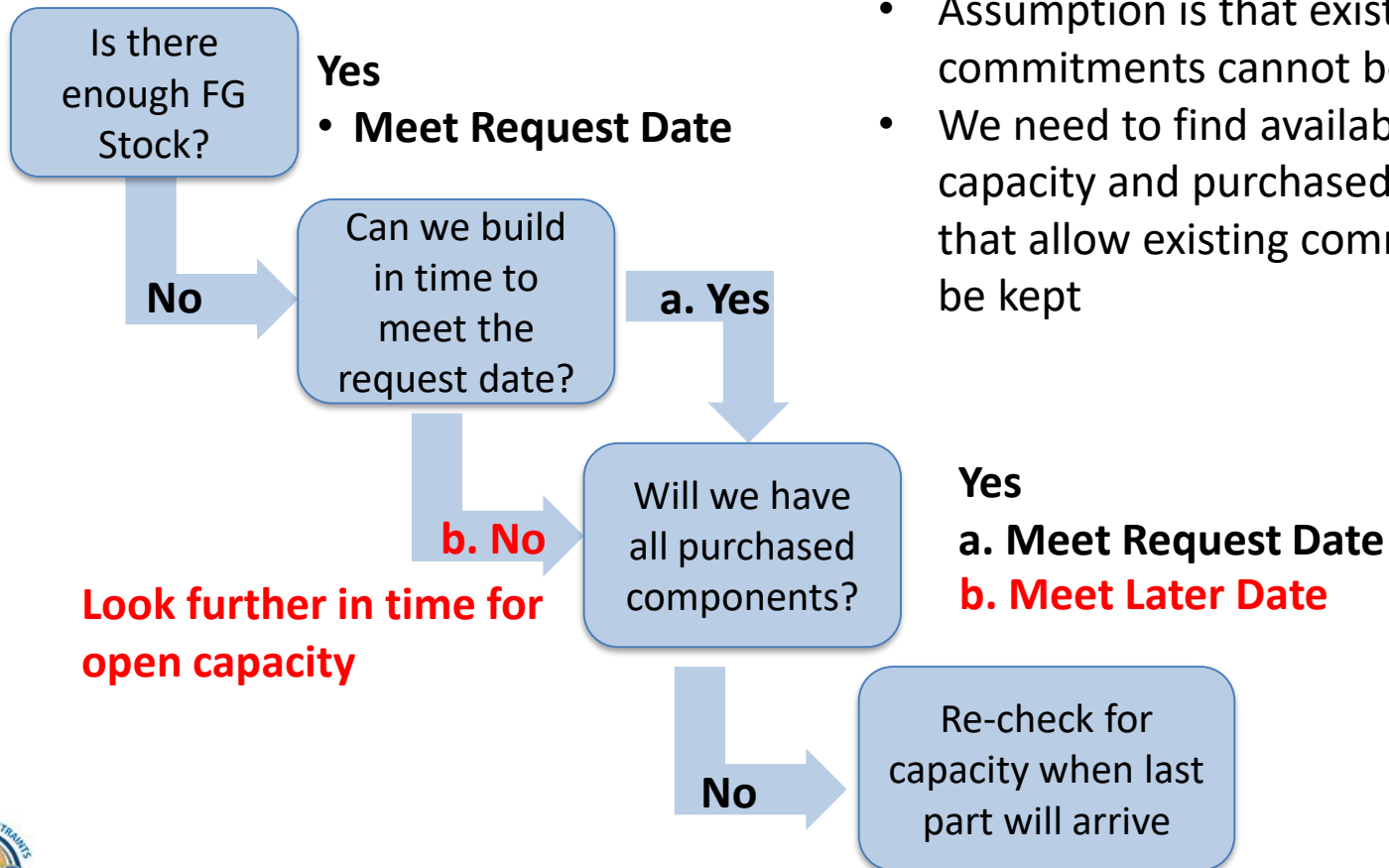
- Scheduling and capacity management is replaced by DBR using CMS RoadRunner 
- MRP is replaced by DDR using 
- While ATP should not be required to promise Quad 1 (MTS items), it still requires an estimate of capacity and materials in order to replenish the finished good stock buffers
- Quad 2 requires ATP for larger orders (materials) and some “reality checking” on capacity
- Quad 4 requires ATP for all orders

# ATP Design Considerations

- Which to check first – materials or capacity?
- How much time to ‘back off’ from request date to drum start, drum start to release date?
- How precise do we need to be? - drum start, order size
- How to account for capacity consumption from MTS items
- How to account for capacity consumption from MTO items
- Should material be reserved to orders – to prevent over promising material?
- Should capacity be reserved until the sales order is firm – to prevent over promising capacity?
- How will we consider the capacity impact with alternative drums – parts that can run on several alternative pieces of equipment?
- Should we provide the earliest possible date as well as the ability to achieve the request date?
- How will we promise orders that don’t go through any drum / control point?



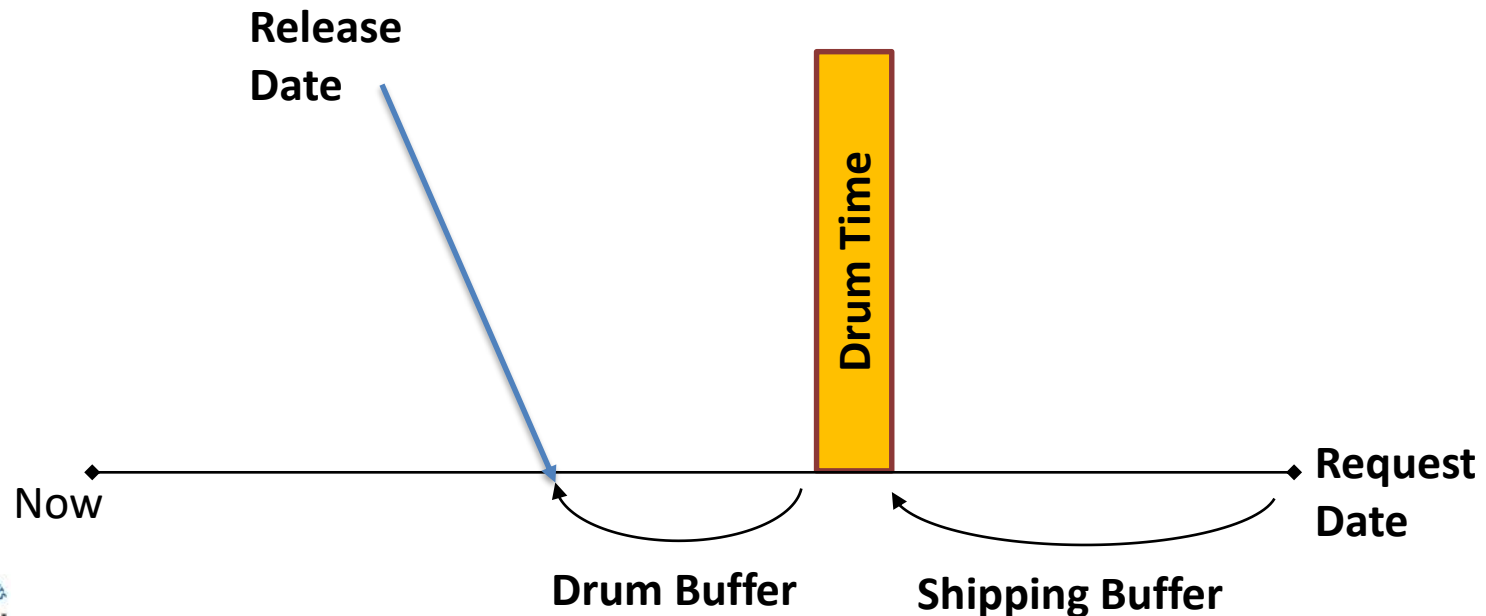
# Check Material, then Capacity, then Material, then Capacity



- Assumption is that existing commitments cannot be violated
- We need to find available drum capacity and purchased materials that allow existing commitments to be kept

# Back off Shipping Buffer, Drum Time and Drum Buffer

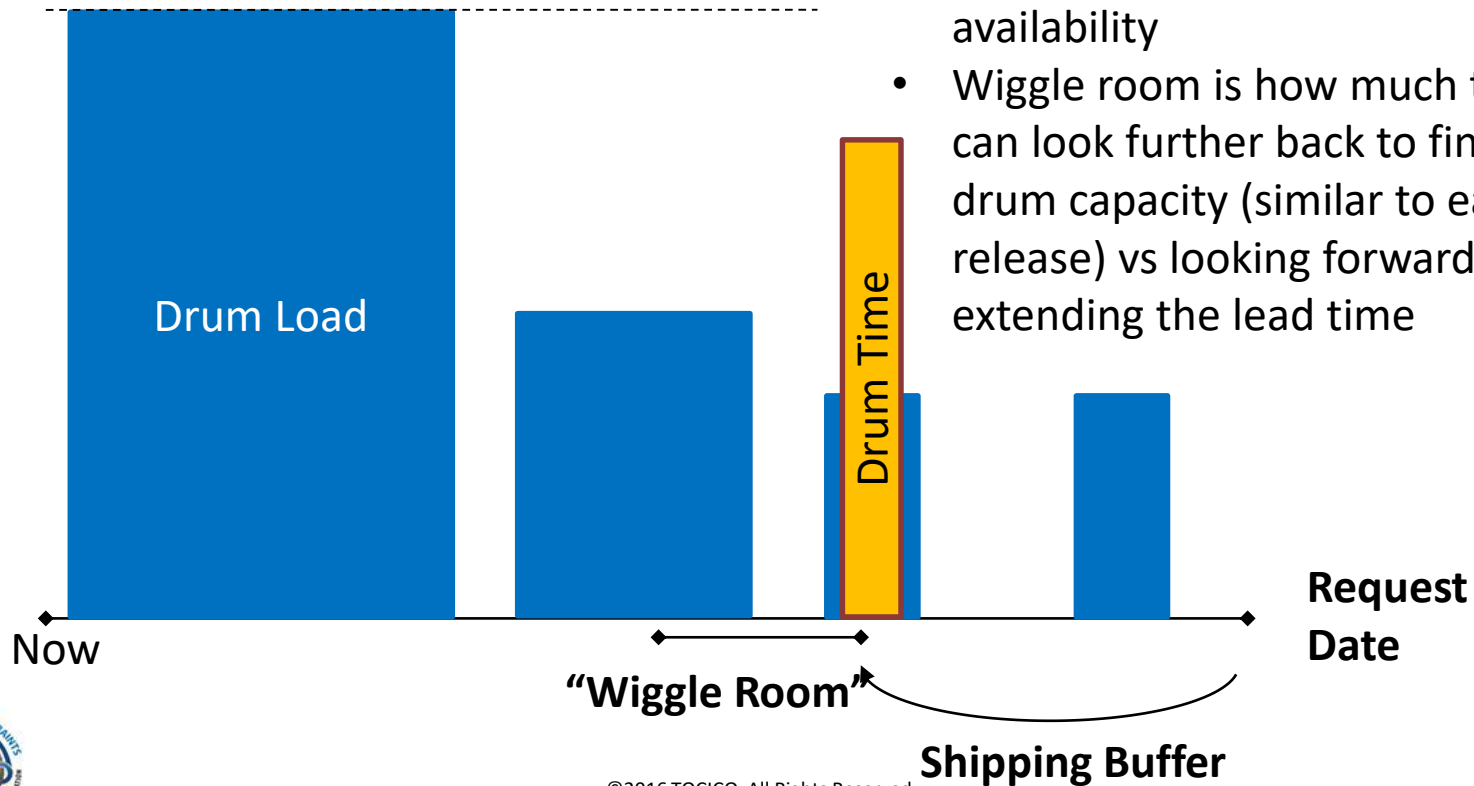
- Start with the request date
- Work backwards by backing off the shipping buffer time plus drum time to arrive at the drum start date
- Work further backwards by backing off the drum buffer time to arrive at the release date



# Don't be too Precise

Early release of orders is required to ensure demand smoothing (wiggle room)

Capacity  
Limit



- Software is very precise in calculating dates, but capacity is more fluid in its availability
- Wiggle room is how much time we can look further back to find available drum capacity (similar to early release) vs looking forward and extending the lead time

# MTS Capacity Projection based on Buffer Consumption

**Drum Load**

Parameters

Work Center Group: All

Drum: West Oil line

Drum Utilization %: 100

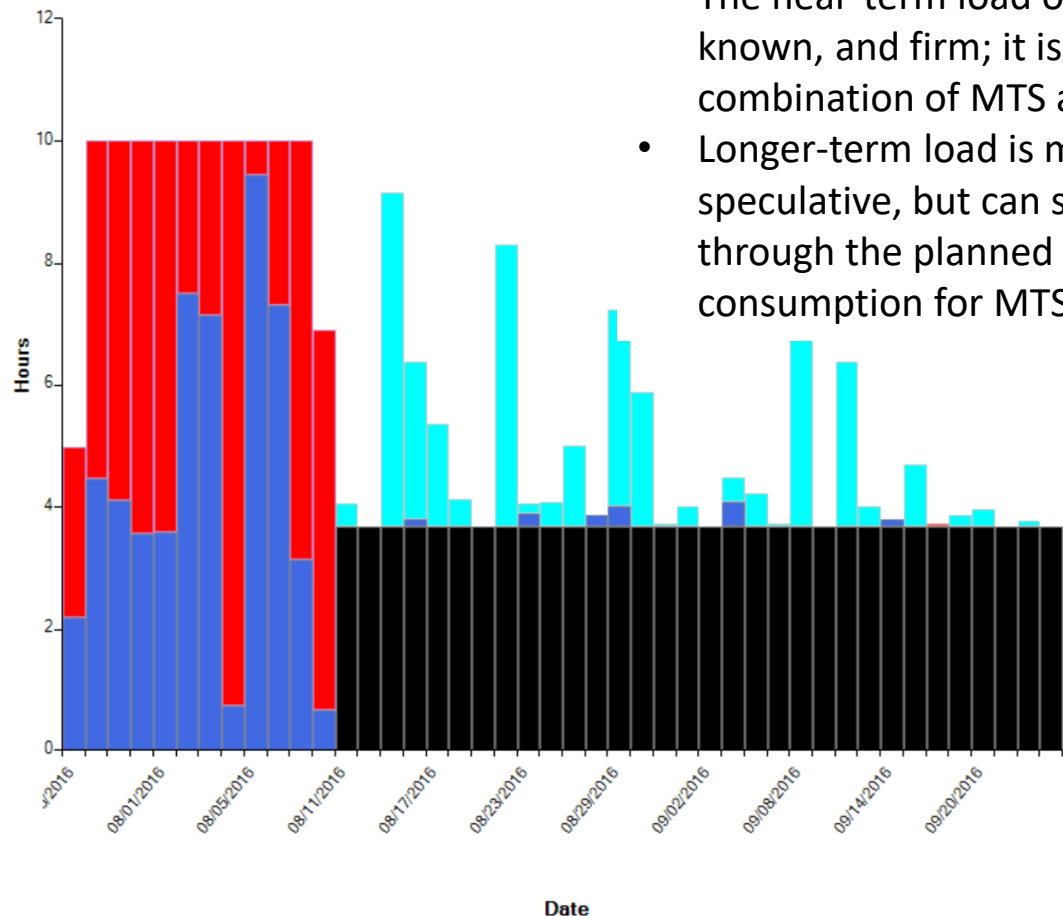
MTS Projection: Buffer AC

MTS Projection Adjustment %: 100

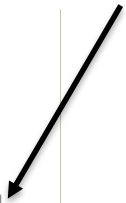
End Date: 2016/09/24

Smooth MTO Orders

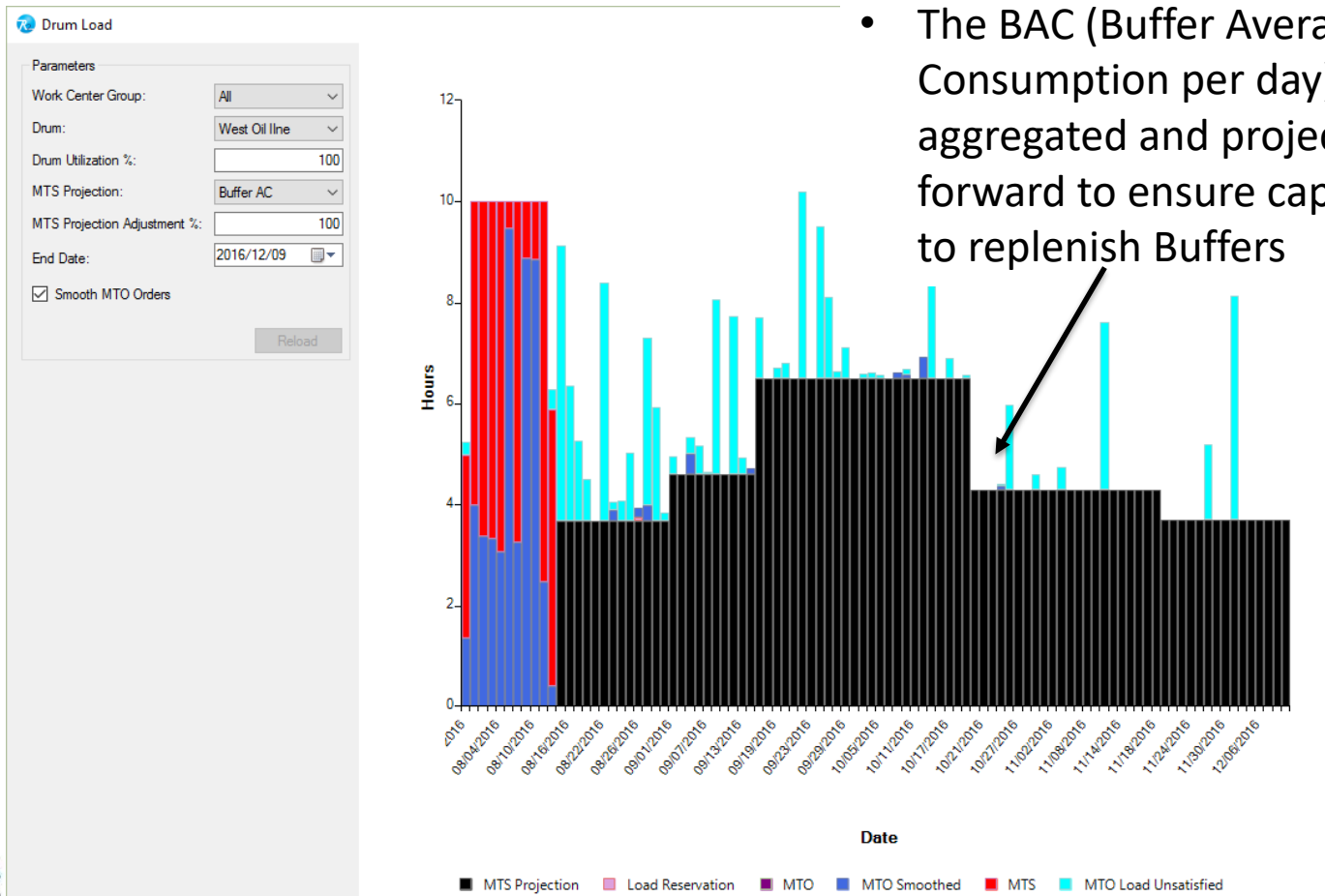
Reload



- The near-term load on a drum is known, and firm; it is some combination of MTS and MTO orders
- Longer-term load is more speculative, but can still be projected through the planned rate of buffer consumption for MTS



# Projected Buffer Consumption needs to consider Seasonality



- The BAC (Buffer Average Consumption per day) is aggregated and projected forward to ensure capacity exists to replenish Buffers



# MTO Capacity Consumption needs to consider both Satisfied and Unsatisfied demand

- MTO satisfied is demand for which a production work order exists
- MTO unsatisfied is demand for which a production work order has not yet been created – often because it is still subject to change

Drum Load

Parameters

Work Center Group: All

Drum: West Oil line

Drum Utilization %: 100

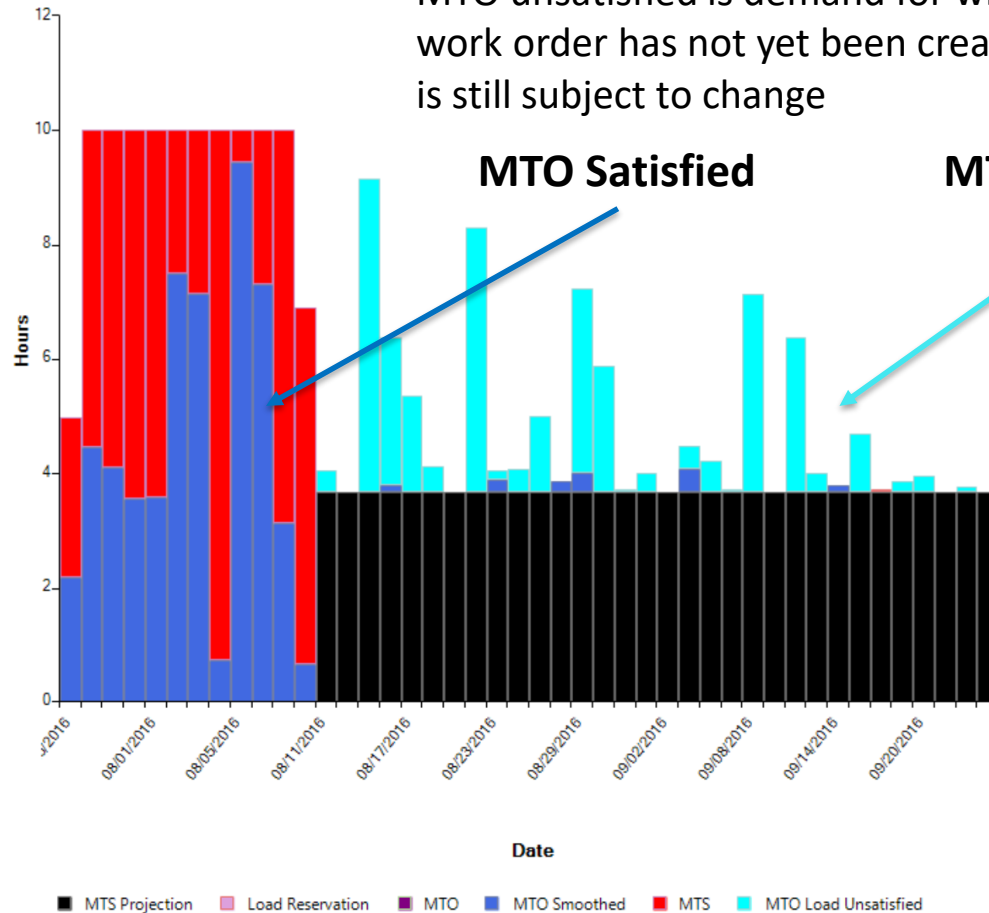
MTS Projection: Buffer AC

MTS Projection Adjustment %: 100

End Date: 2016/09/24

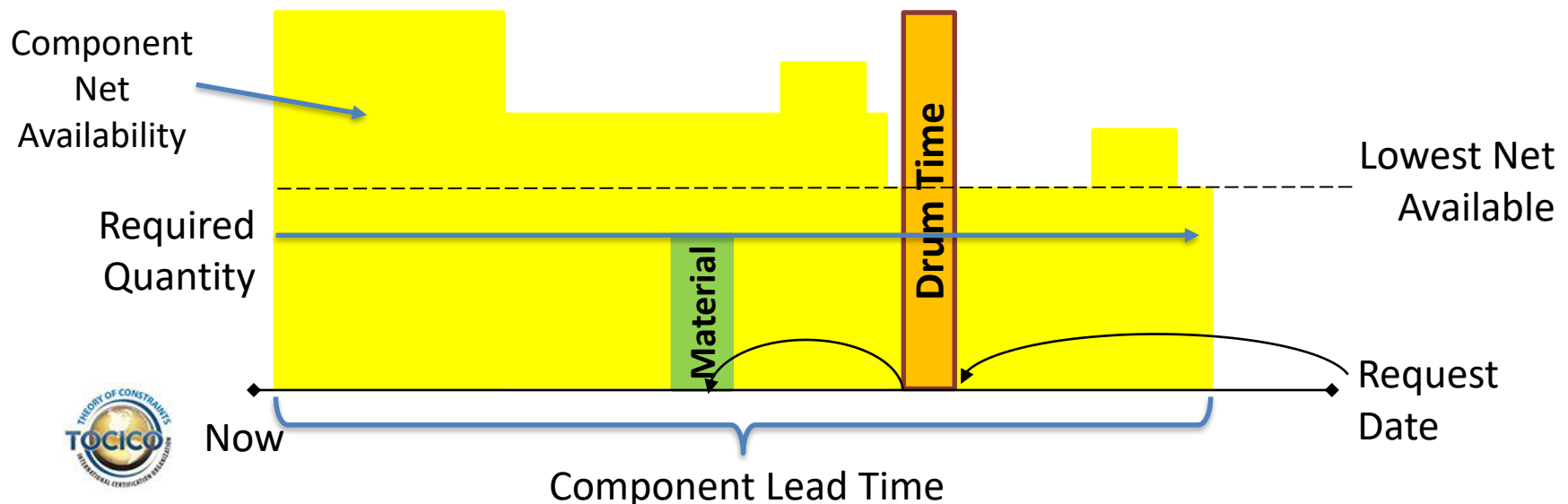
Smooth MTO Orders

Reload



# Material is not reserved to specific orders, but Existing Orders must be Protected

- Whether the purchased material is PTS or PTO the approach is the same
- As long as Supply (on-hand plus on-order) is greater than the demand within a component's Supply Lead Time (SLT), then material is considered available
- If a new order inquiry asks to use some available capacity (that will be run before other firm orders) this new order can use the materials as long as the Net Available stays positive over the SLT (i.e. doesn't create a shortage)
- This ensures protection of existing commitments and prevents 'bad' stealing
- If demand occurs outside a component's SLT, the assumption is that the material can be ordered to arrive as needed – regardless of the replenishment policy



# Capacity needs to be reserved until the sales order is entered

**Drum Load**

Parameters

Work Center Group: All

Drum: West Oil Iline

Drum Utilization %: 100

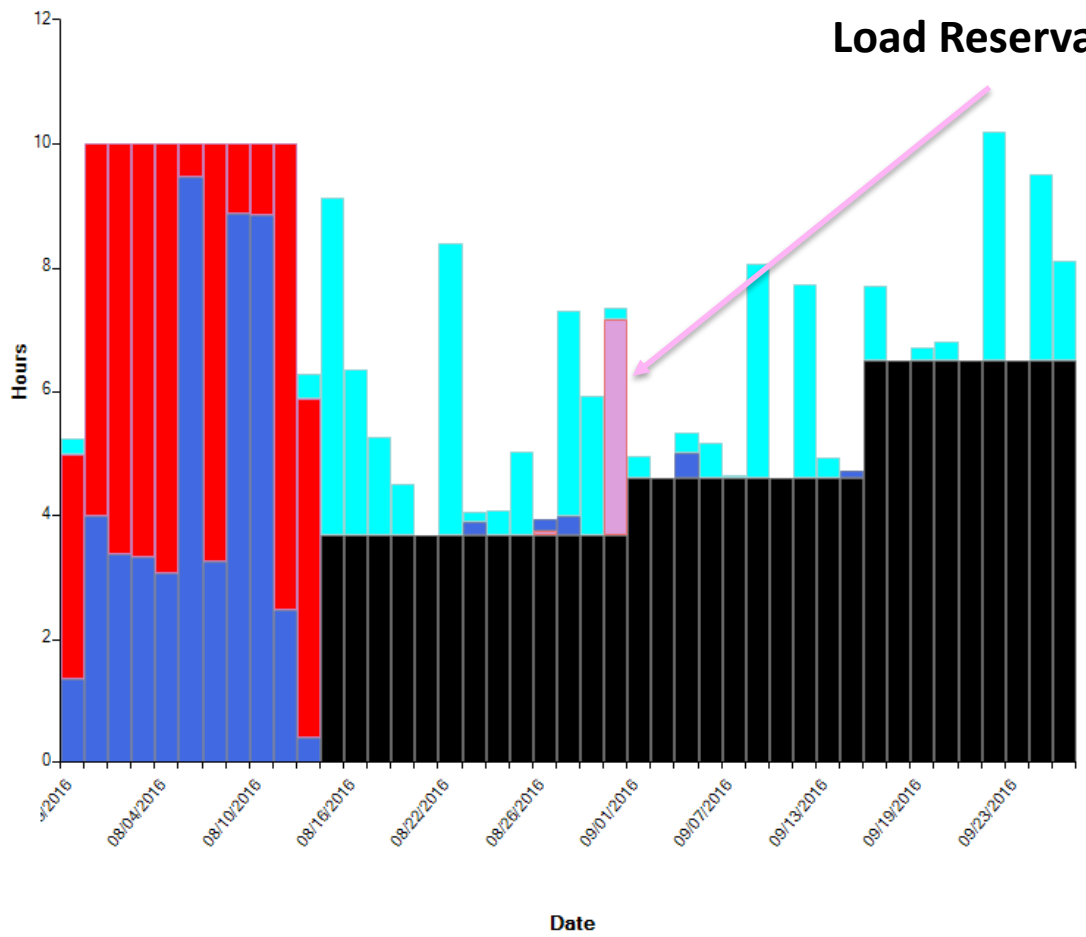
MTS Projection: Buffer AC

MTS Projection Adjustment %: 100

End Date: 2016/09/27

Smooth MTO Orders

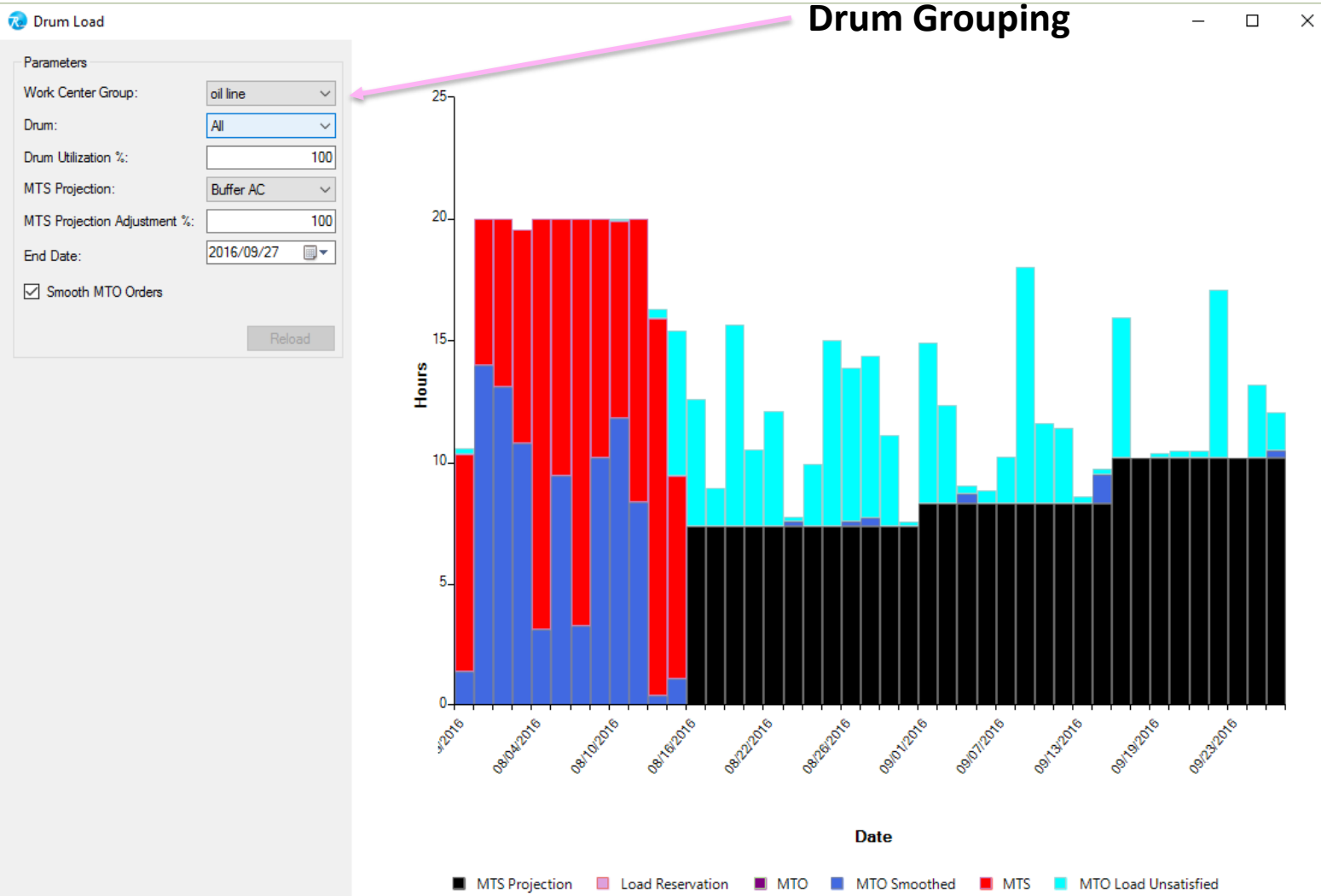
Reload



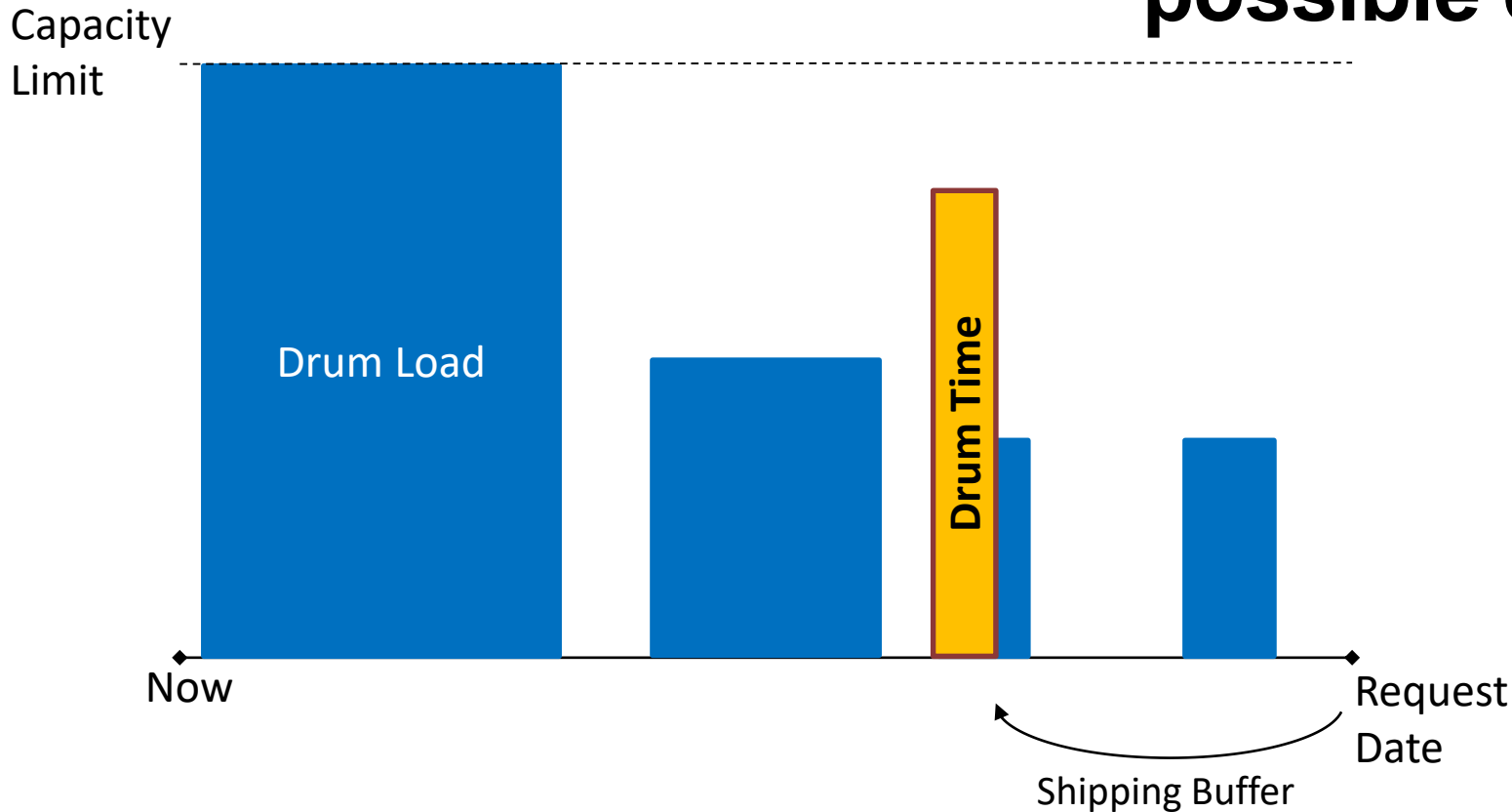
■ MTS Projection ■ Load Reservation ■ MTO ■ MTO Smoothed ■ MTS ■ MTO Load Unsatisfied



# Capacities of alternative drums are grouped together



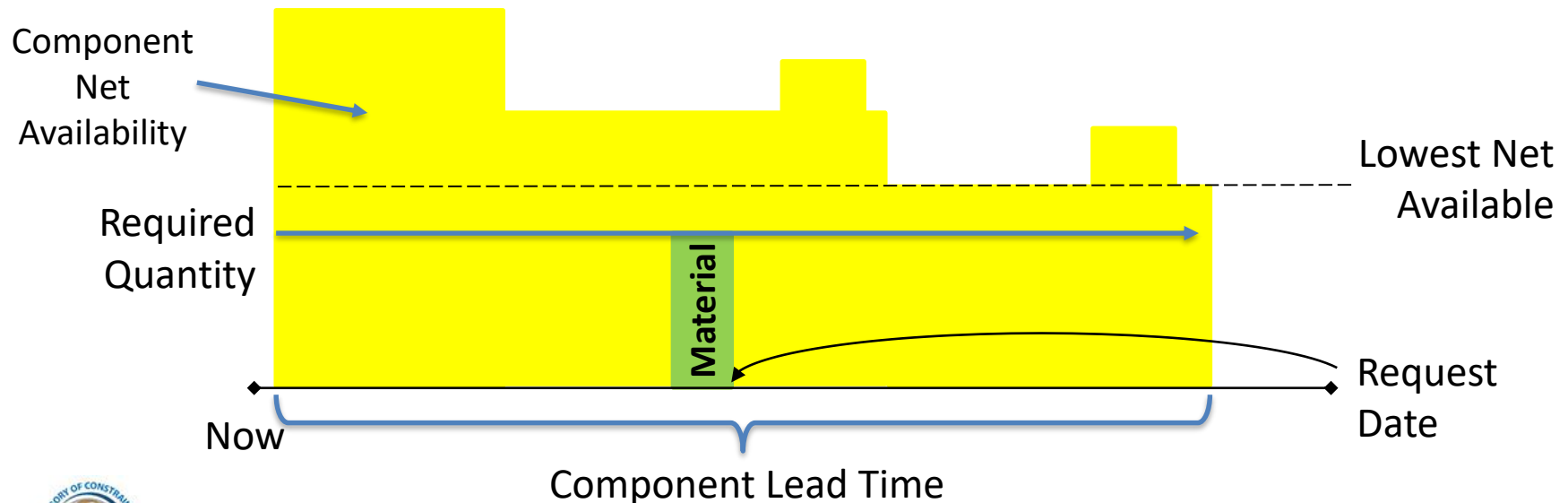
# Provide ability to suggest earliest possible date



Sometimes customers have an urgent need sooner than the normal lead time

# Order promising for items that don't go through any drum is based on materials only

- Release date is determined by Request Date offset by only the Shipping Buffer
- As long as Supply (on-hand plus on-order) is greater than the demand within a component's Supply Lead Time (SLT), then material is considered available



# New Policies, Norms and Behaviours

- Learning to trust in Quad 1 and Quad 2 lead times
  - Believing that lead times can be much less and OTD can be much higher when you are used to being long and unreliable, takes time
- Learning to trust the system data
  - If garbage in leads to garbage out, we have to make sure that the data feeding the ATP is good
    - On hand levels
    - Purchase order arrival dates
    - Supply lead times
    - Capacity loading

# Changing How We Use the Technology

- Entering less orders
  - In the past, entering orders early and far out into the future was the way to reserve capacity and drive demand on the raw materials
  - Once DBR and DDR are implemented along with the new ATP solution, only short term firm orders need to be entered
  - Years and years of CSRs asking their customers to order early and far out into the future needs to be reversed
  - If not, orders entered far out into the future (less accurate and more based on forecast) unnecessarily reserve capacity and material further extending the lead times for any new orders – the ‘lead time cycle’

# Causing the Change

- Frame the implementation inside the competitive advantage that will be created with shorter lead times and more reliable delivery
  - Develop the Sales Lead Time Matrix up front
  - Creates the need for better order promising
- Involve customer service and sales people in the Demand Driven system implementation – not just planning and production people
- Explain the ‘lead time cycle’ to CSRs and sales people often

# Summary

- Improving reliability (OTD or DDP) requires better, more realistic promise dates
- Providing more realistic promise dates requires a better picture of available capacity and materials
- When developing a good ATP technology, it is better to be 'approximately correct, than precisely wrong'
- Just because the technology solution is correct and usable doesn't mean anyone will use it
- Customer service and sales people should be included in Demand Driven system implementations

# Short ATP Product Demo



# About the Presenters

- **Duncan Patrick** is Executive Vice President of CMS Montera
- Prior to CMS, Duncan was on the leadership team of a national industrial distributor, Ernst & Young management consultant, and a landman with Husky Energy
- Duncan is a Certified Management Consultant and certified by the TOCICO in all aspects of TOC. He holds an MBA degree from Western Business School, Canada and a Bachelor of Commerce from The University of Calgary, Canada



- **Peter Milroy** is Vice President – Consulting with CMS Montera
- Prior to CMS, Pete was a controller with a large apparel manufacturer, a lecturer at Wilfrid Laurier University and a controller with a social services agency
- Pete is a Certified Public Accountant and certified by the TOCICO in Supply Chain, Finance & Measurement and Project Management. He holds a Bachelor of Business Administration from Wilfrid Laurier University in Waterloo, Canada

