

A Case Study: Experiences from our Demand Driven Journey

STEMCELL Technologies Inc

Presented by: Barry Katz, Senior Director, Supply Chain Operations | October 2018

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Agenda

- **Company Introduction & Overview**
- **The Problem: Improve Service Levels and Reduce Inventory**
- **The Solution: With an Eye on a DDAE**
- **Results**
- **What We're Learning**



Company Overview



Dr. Allen Eaves - Founder, President, CEO

A Family Owned Company

- We can move quickly in a fast moving market
- Sales are largely dependent on the new products that we develop
- New products are developed by our outstanding R&D scientists - who are essential to STEMCELL's success!
- Planning and prioritization of new product development is done carefully and confidentially
- Leadership & decisions are focused on long-term growth and stability



Scientists Helping Scientists™ | WWW.STEMCELL.COM



Our Mission: “To Enable Life Sciences Research ...”

To advance the pursuit of scientific knowledge and understanding by supplying high quality, innovative reagents, tools and services that enable life science research.

Our Vision: “... In Every Lab ...”

To have our products in all research labs around the world, significantly impacting the development of new life science discoveries.

Our Values: “... by Being Scientists Helping Scientists.”

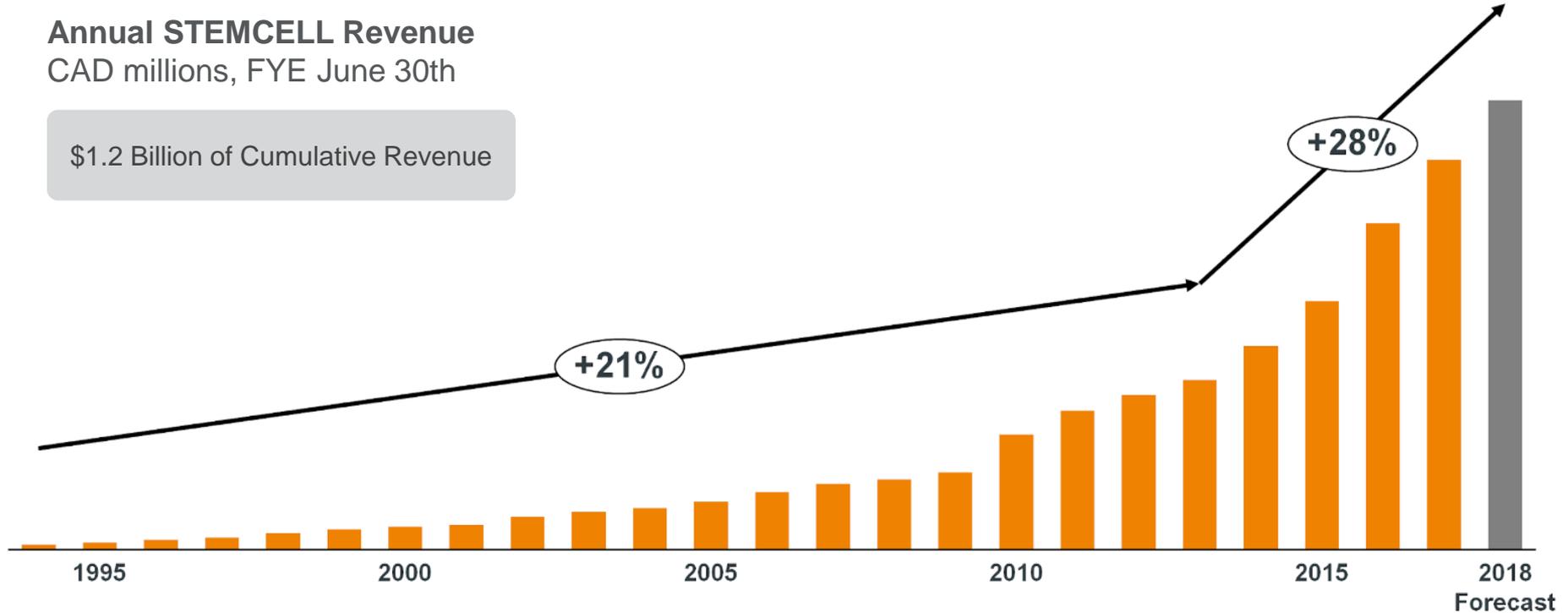
Innovation, Responsiveness, Quality, Integrity, Collaboration



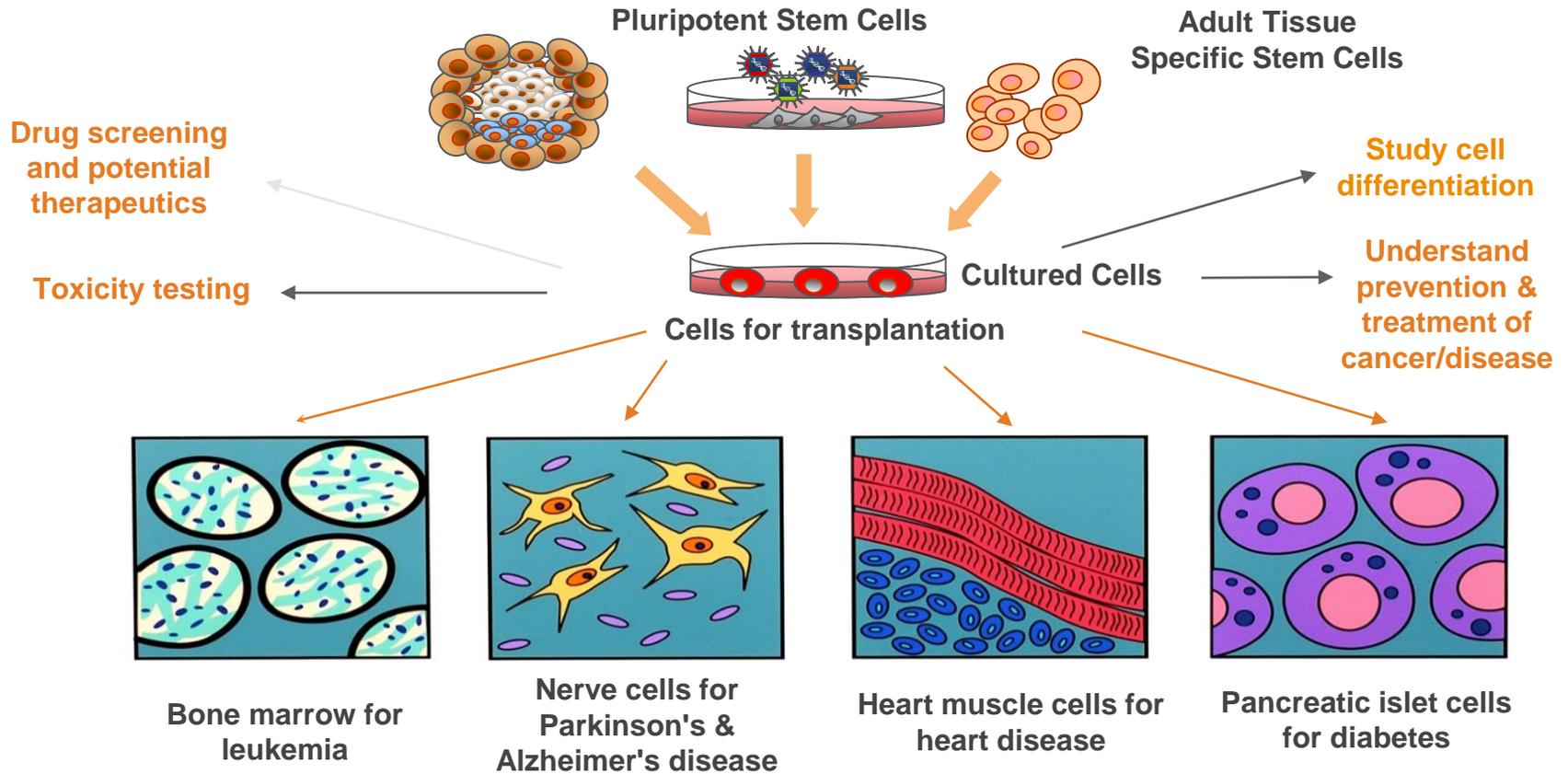
STEMCELL has Grown Organically at an Average Annual Rate of 22% for 25 Years

Annual STEMCELL Revenue
CAD millions, FYE June 30th

\$1.2 Billion of Cumulative Revenue

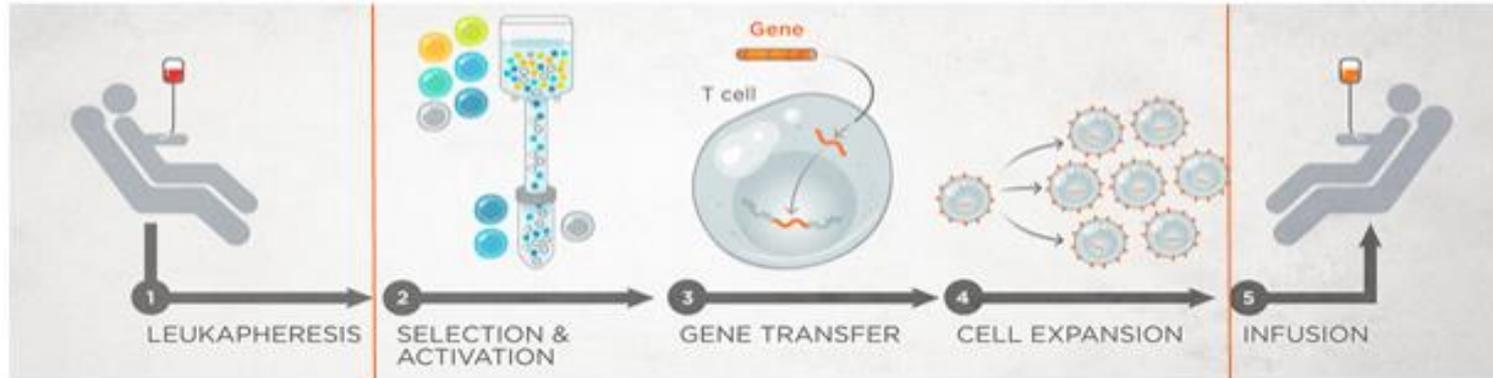


The Promise of Stem Cell Research



Arm-to-Arm CAR-T Cell Therapy

- Once Infused Patients' Engineered T Cells Find and Kill Cancer Cells



STEMCELL Major Product Lines and Services



Over 2,500 leading products and brands



- Cell culture media
- Cell separation reagents
- Primary cells
- Instrumentation
- Education and training
- IT solutions for transplant labs
- Global scientific society management services

Instrumentation

Instruments, instrument service and disposables



ROBOSEP



RoboSep™-S



RoboSep™-16



ClonaCell EasyPick



STEMvision



RoboSep™
Tips & buffer



SmartDish™



STEMgrid™-6



Vancouver



Cambridge, UK



Cologne



Beijing



Shanghai



Vancouver



Vancouver



Vancouver
(Warehouse)



Seattle
Warehouse



Cambridge, Mass



Grenoble



Seoul



Singapore

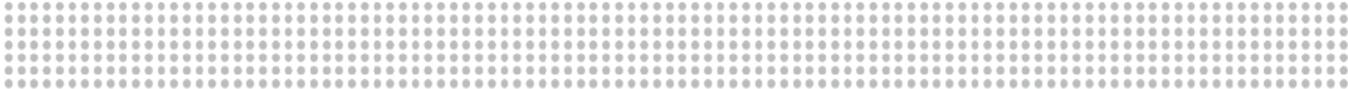


- STEMCELL Offices
- Direct Sales
- Distributors

Global Presence



Our Competitive Advantage - Supply Chain's Wildly Important Goal



Service Level

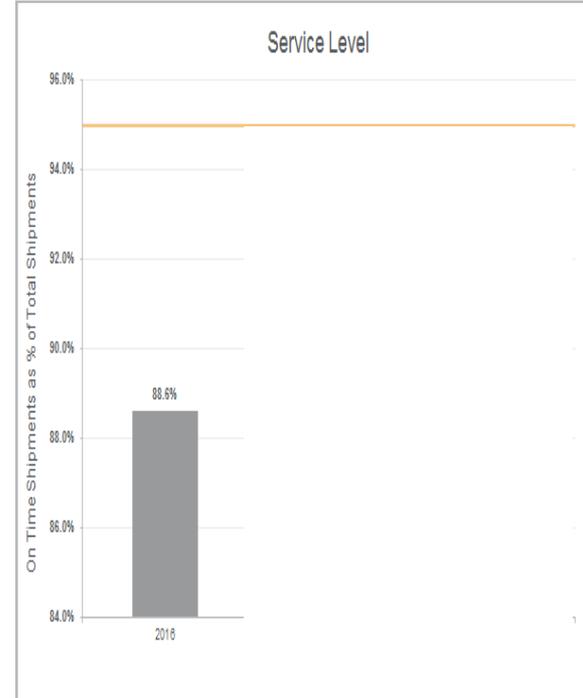


The global Service Level result for Fiscal Year 2016 was 88.6%.

A number of factors affected the result:

- Supplier issues
- Production issues
- **Capacity constraints**
- **Lead-time variability**
- **Trouble planning and executing product transitions**

HOW Were We Going to Improve It



Our External Variability Reality

- Global sourcing and demand
- Variable product shelf life (1 day to 10 years)
- Product complexity and/or customization
- Increasing product variety and changes in mix
- Biological variability from batch to batch
- Many single source & long lead time parts
- Short customer tolerance times
- Changing demand variability
- Pressure for leaner inventories



We Needed to Change the Way Looked at Things



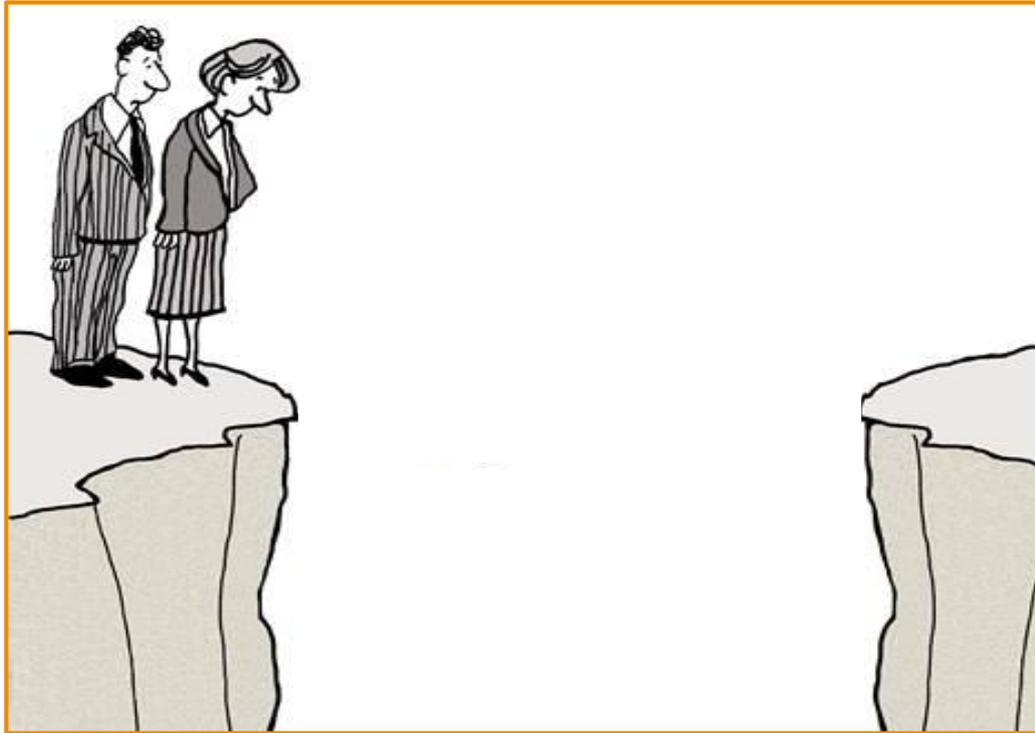
**Just Working Harder...
Only Gives You a Headache**

2016 Solution Proposal

- Adopt DDMRP as planning methodology deploying **REPLENISHMENT+**
- Update BOM configurations to support strategic inventory positioning
- Capture complete demand and supply pipeline
- Certify Planning and Procurement teams - CDDP

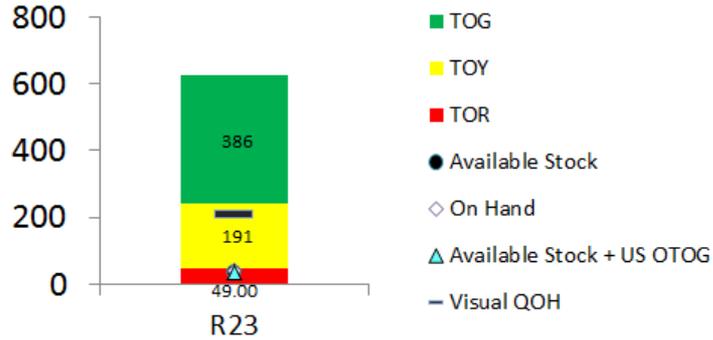
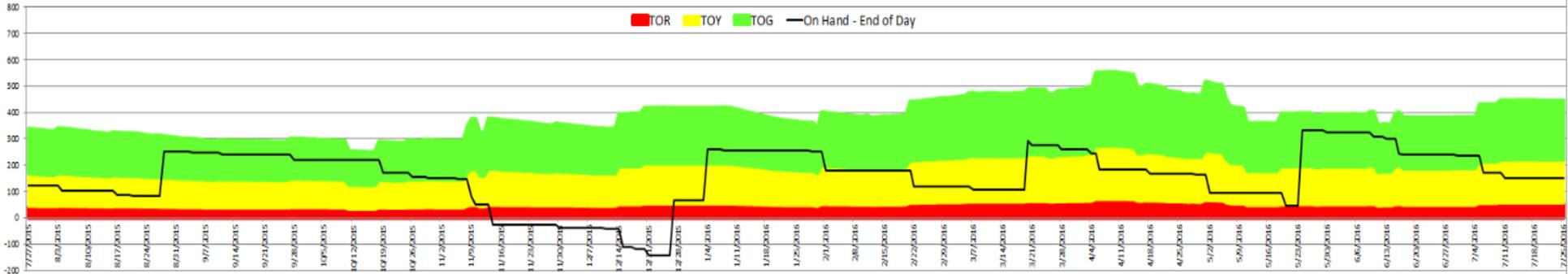


How did we know that DDMRP will deliver the service levels we need?



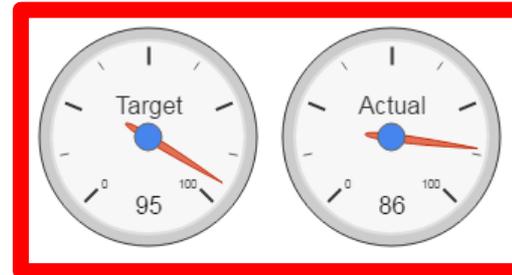
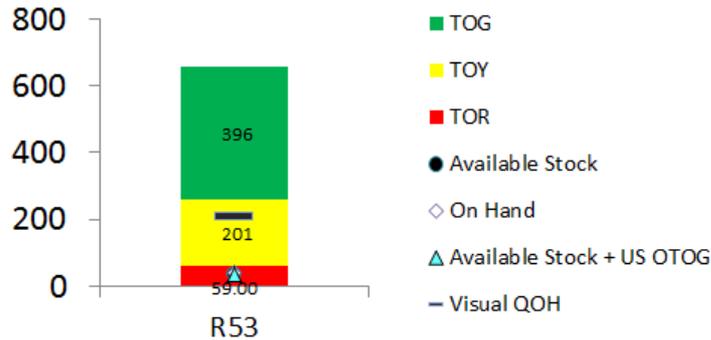
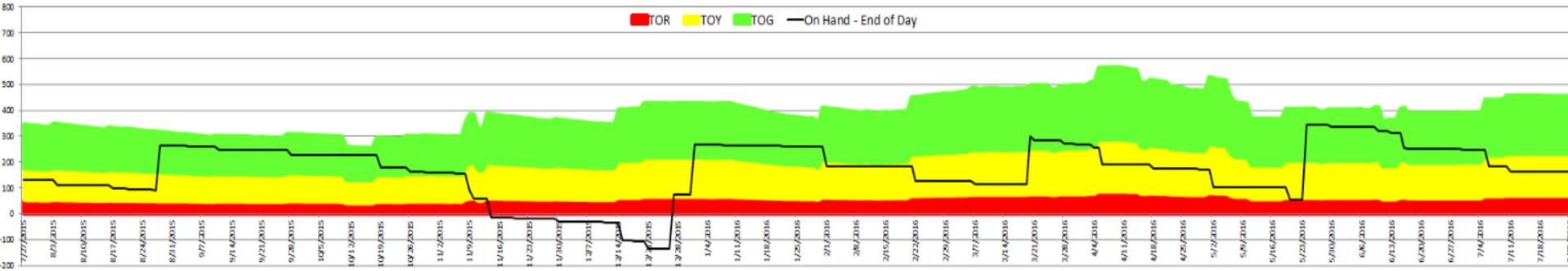
Historical simulation example

Demand pattern analysis optimizes inventory and minimizes risks to service levels



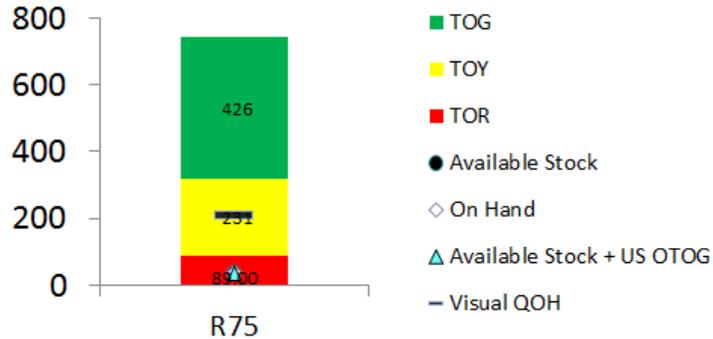
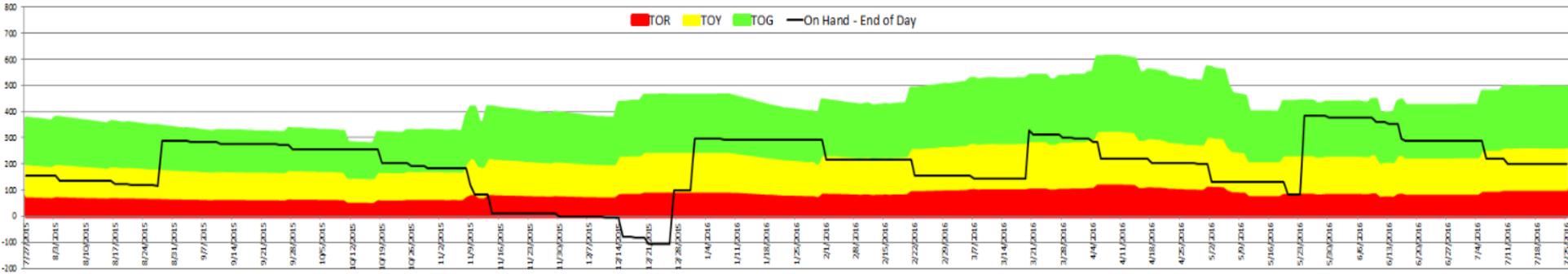
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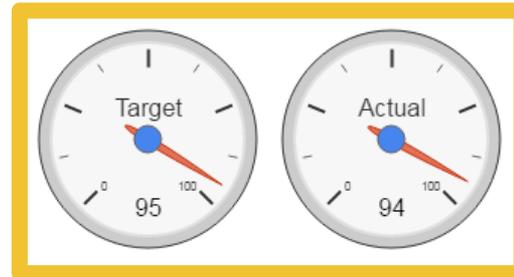
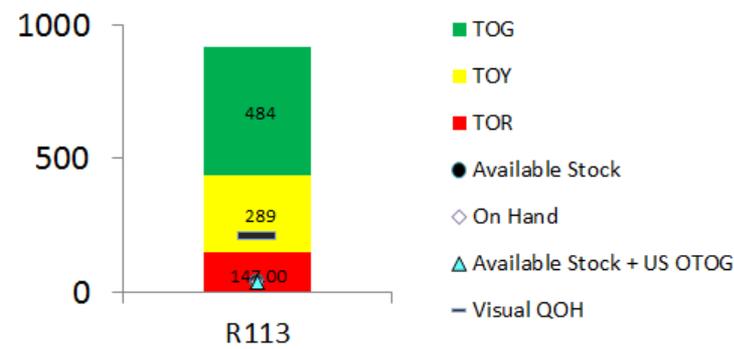
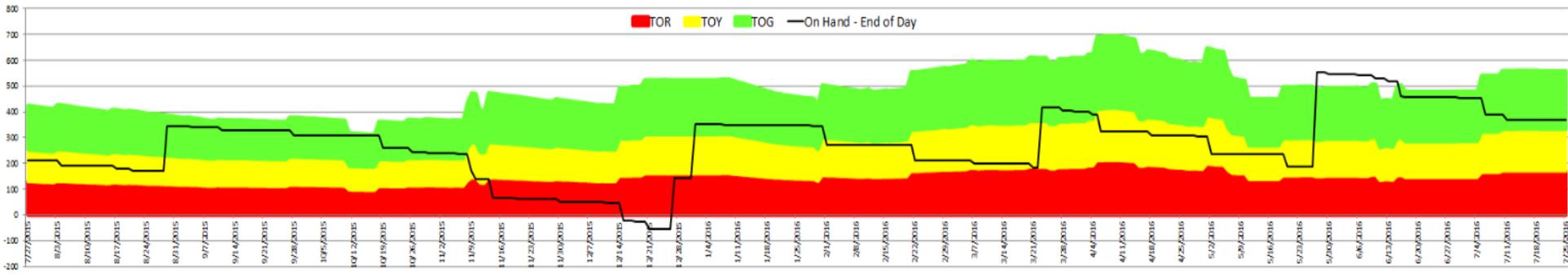
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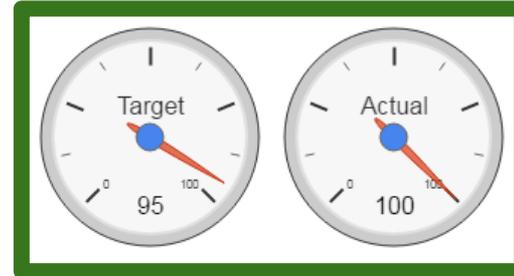
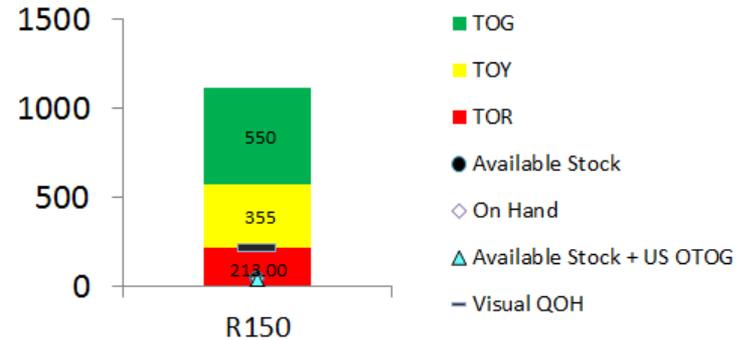
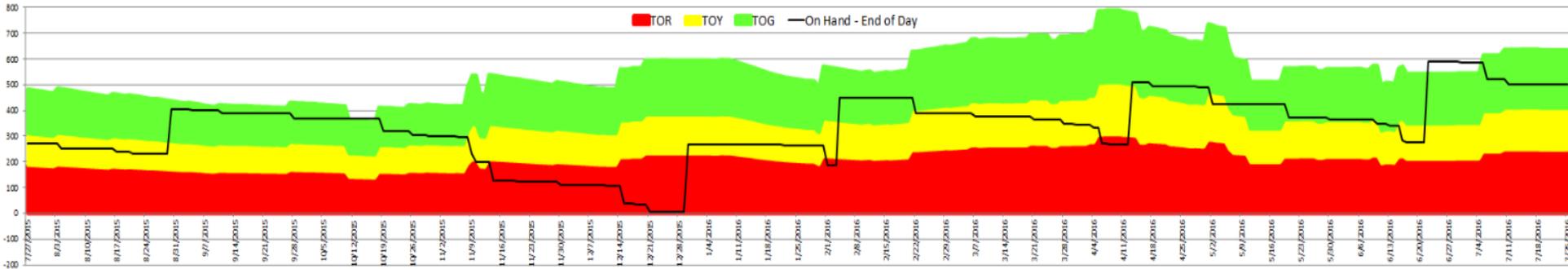
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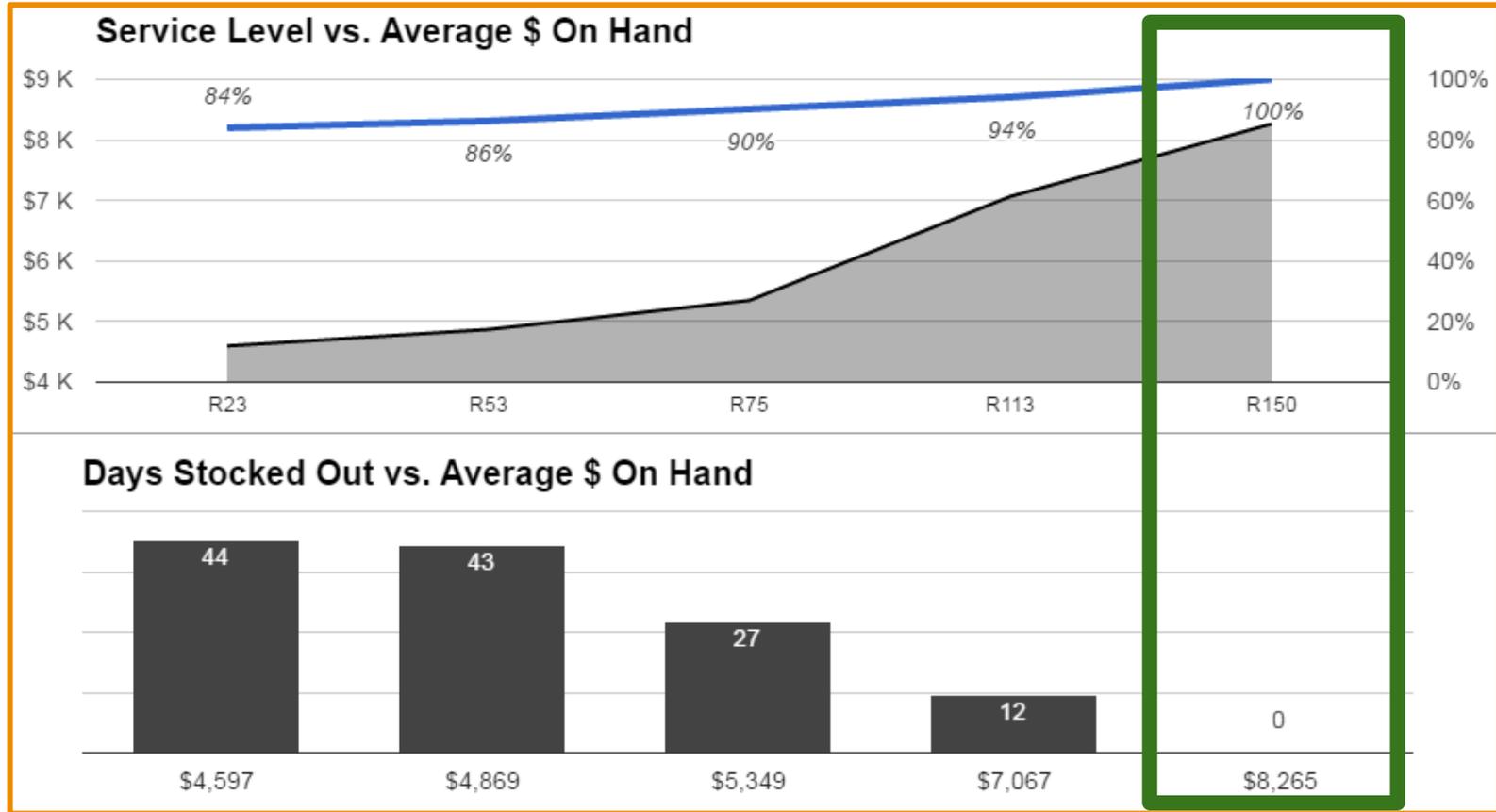


Historical simulation example

Demand pattern analysis optimizes inventory and minimizes risks to service levels



An informed service level investment

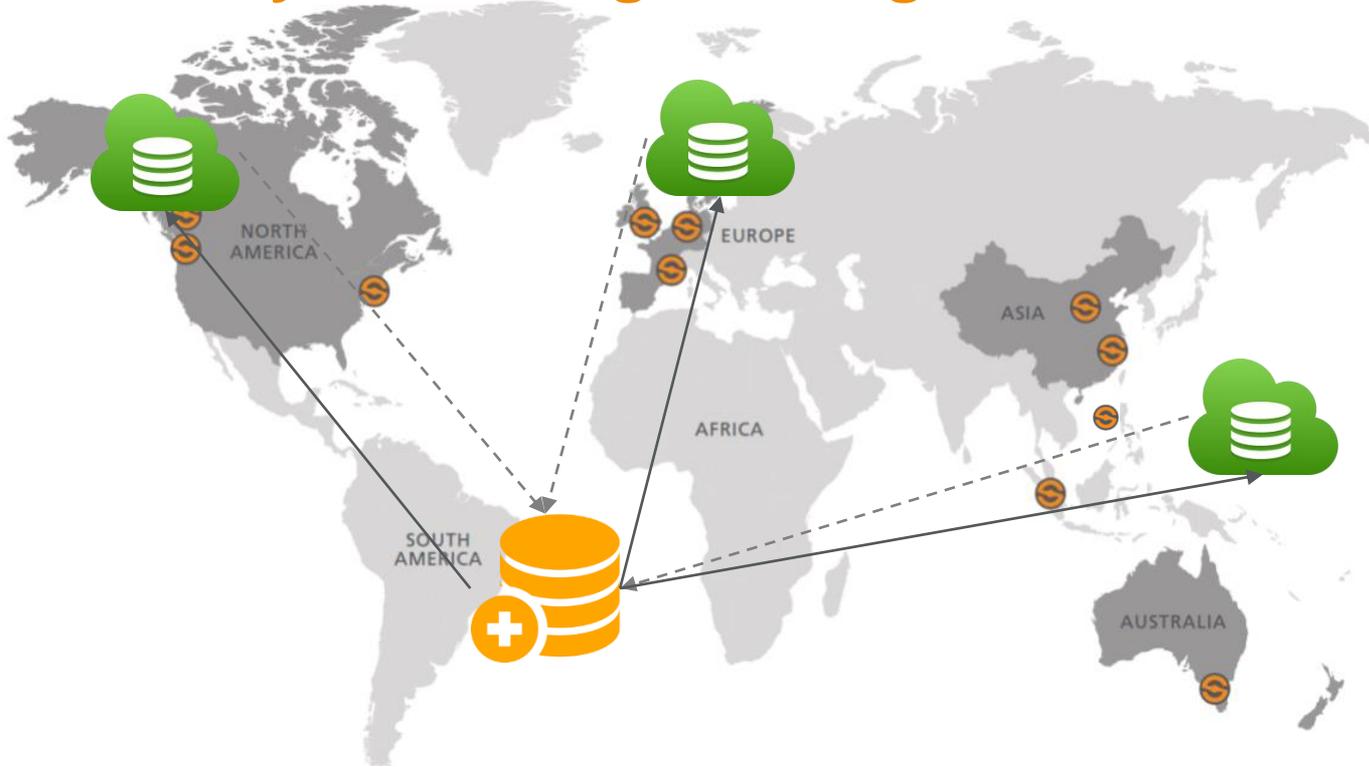


Multisite System Design & Integration



Global Presence

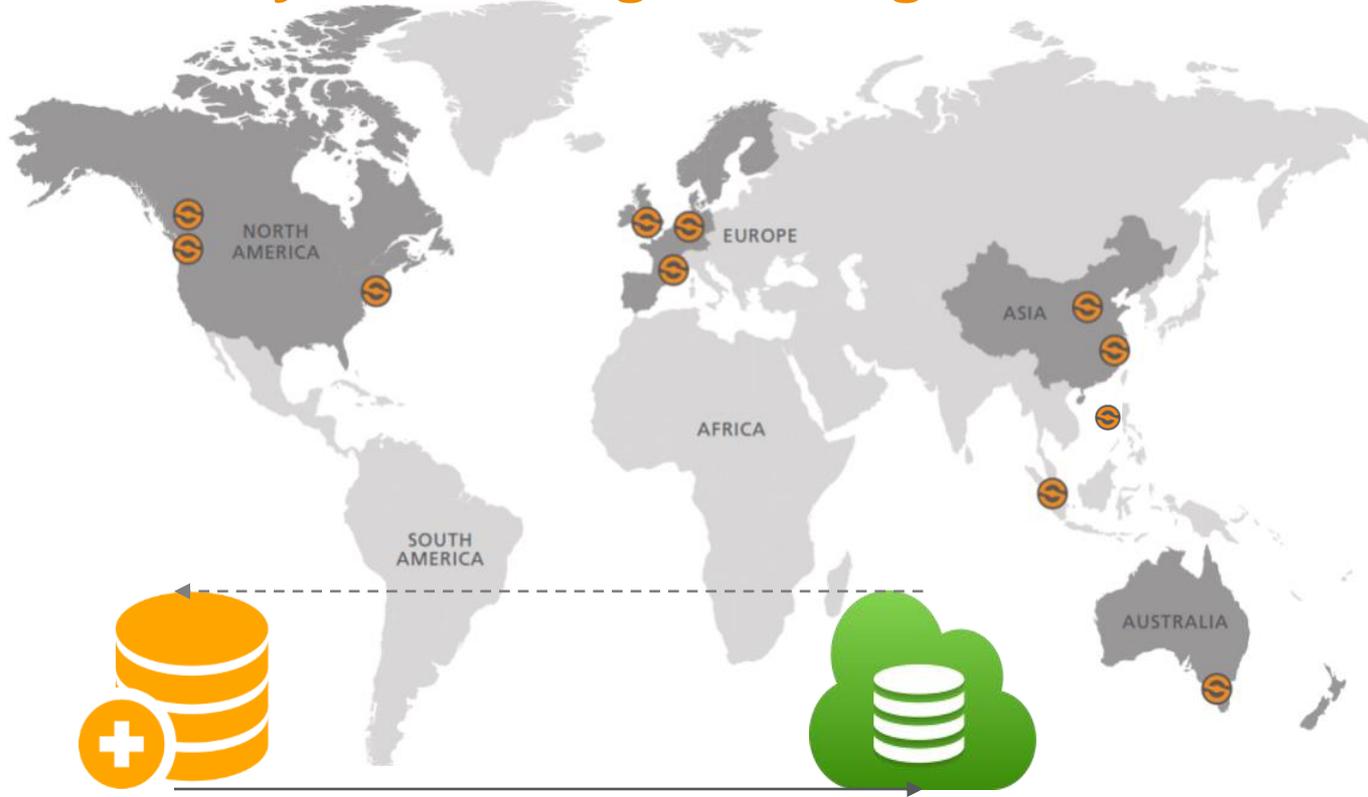
Multisite System Design & Integration



-  STEMCELL Offices
-  Direct Sales
-  Distributors

Global Presence

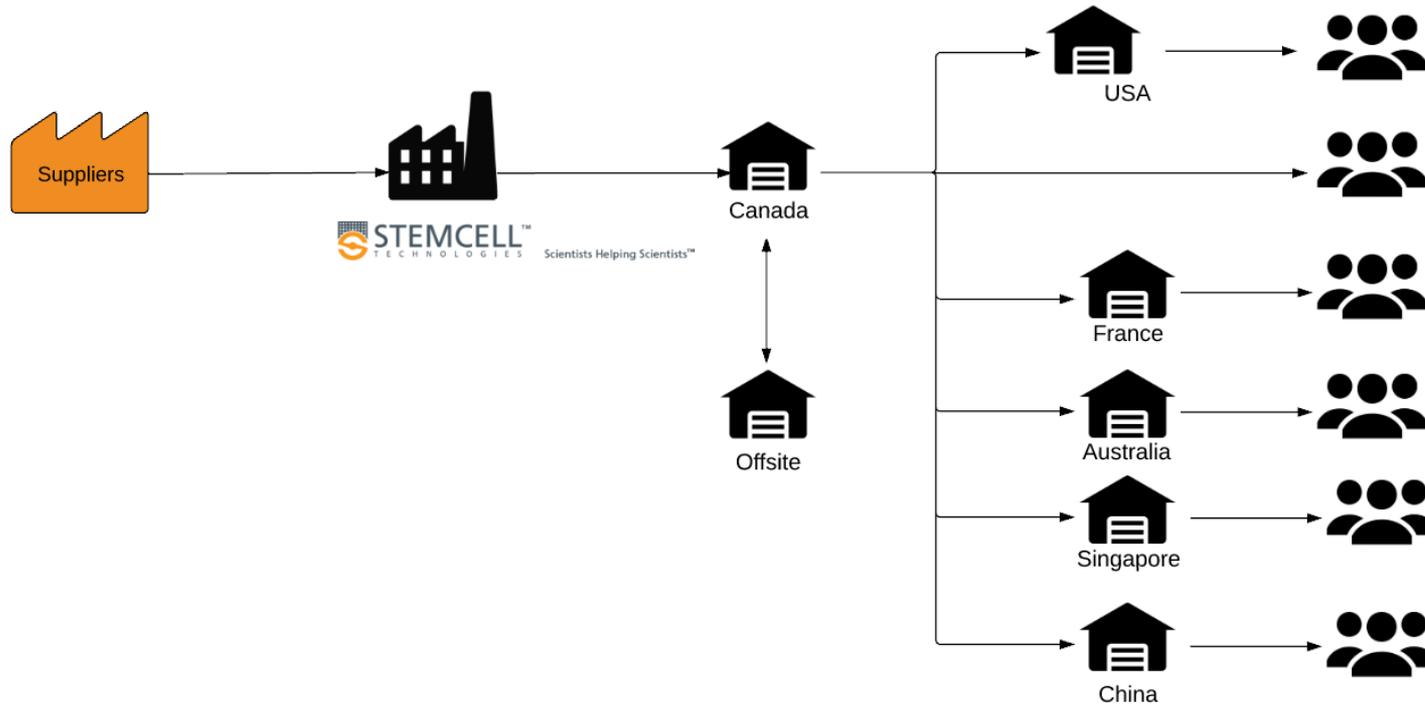
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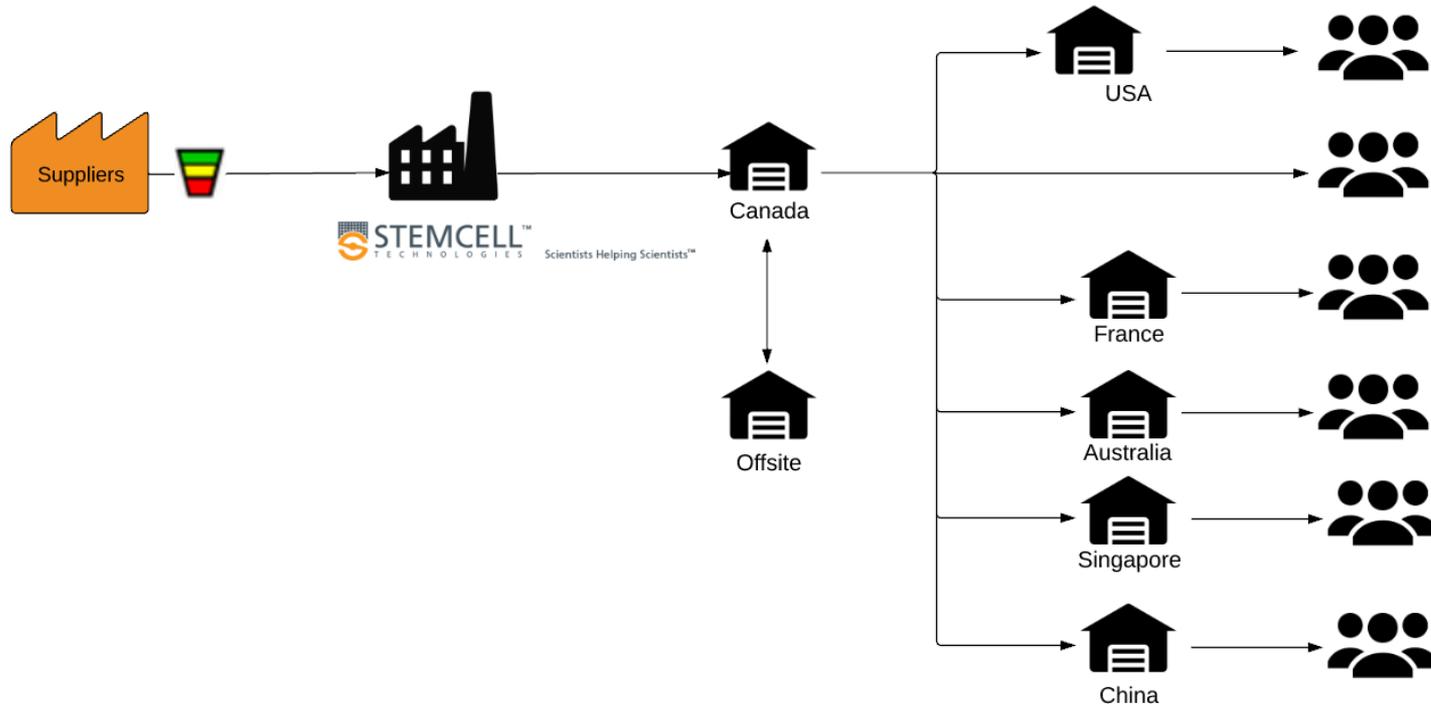
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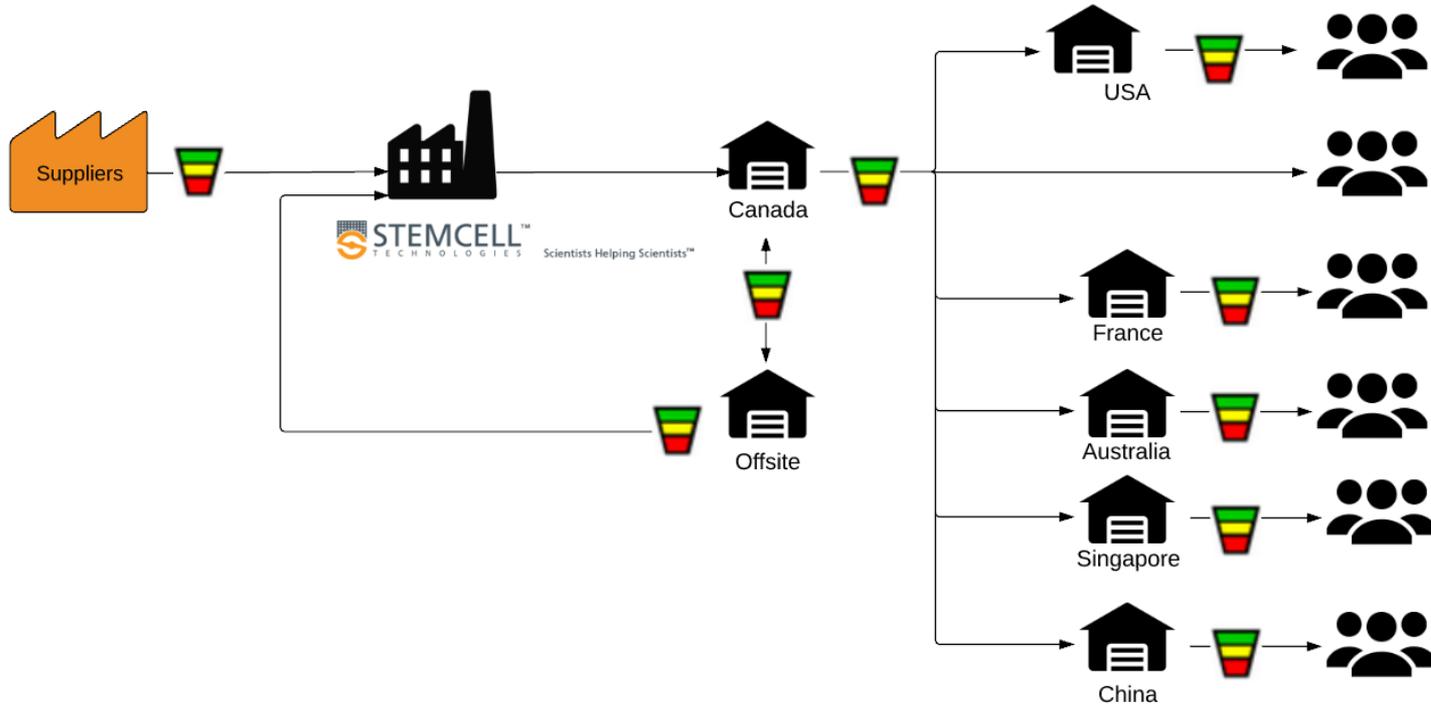
Buffers For Our Distribution Network



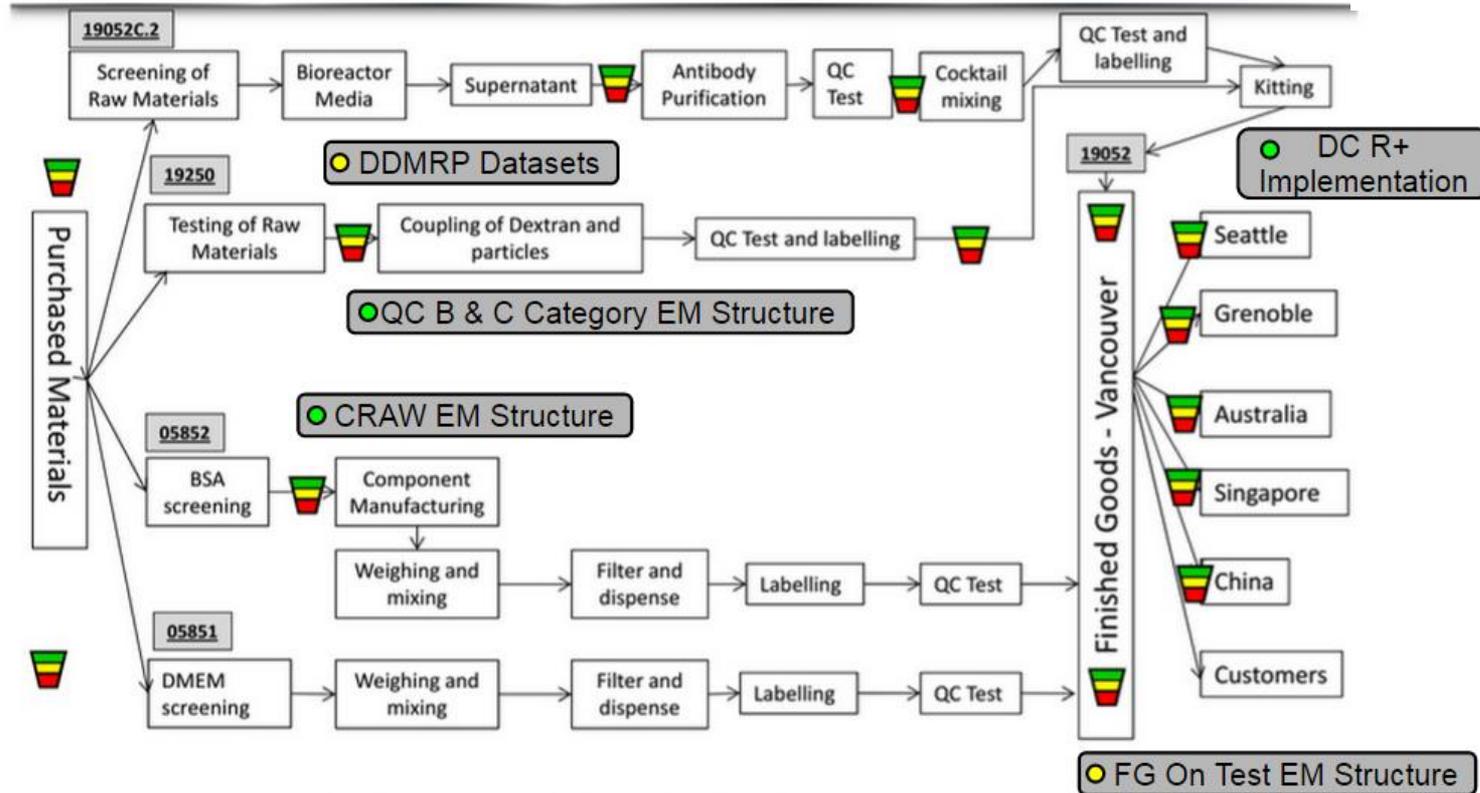
Buffers For Our Distribution Network



Buffers For Our Distribution Network



System Design – BOM Structure



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DRIVING INDUSTRY FORWARD

REPLENISHMENT+ Stats

Raw Materials = 2,800 * In Process = 1,400 * Finished Goods = 4,100

3 R+ Instances	Planning Locations	Buffered Part Locations	Non Buffered Part Locations	Supply Order Lines/Year	Demand Order Lines/Year
North America	24	6,100	27,000	75,000	199,000
Europe	4	1,400	11,500	13,000	60,000
Asia Pacific	4	1,100	14,800	9,000	25,000
Total	33	8,600	53,300	97,000	285,000+

Twice/Day = Over 60,000 Part Location Calculations





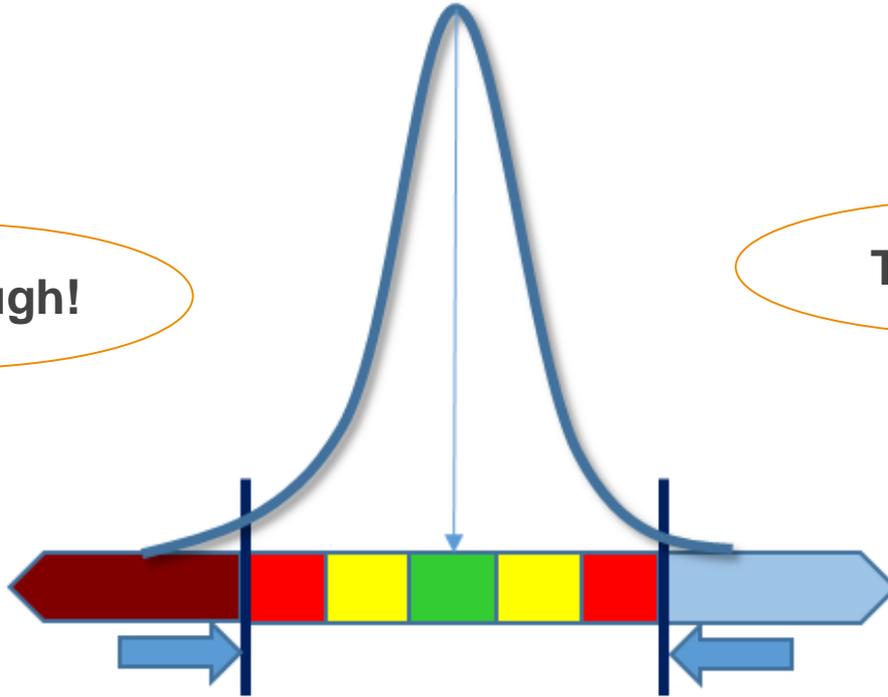
Target = Optimal Inventory Levels



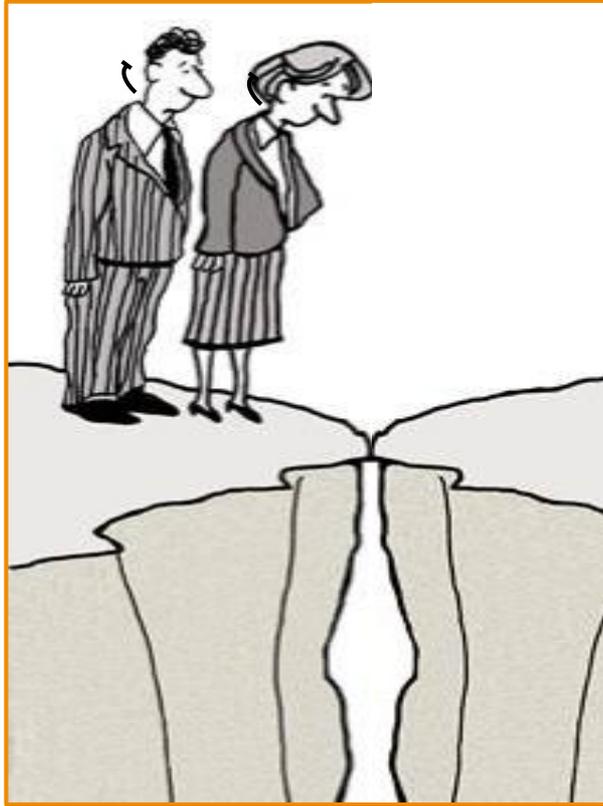
Hunting Down and Controlling the Outliers

Not Enough!

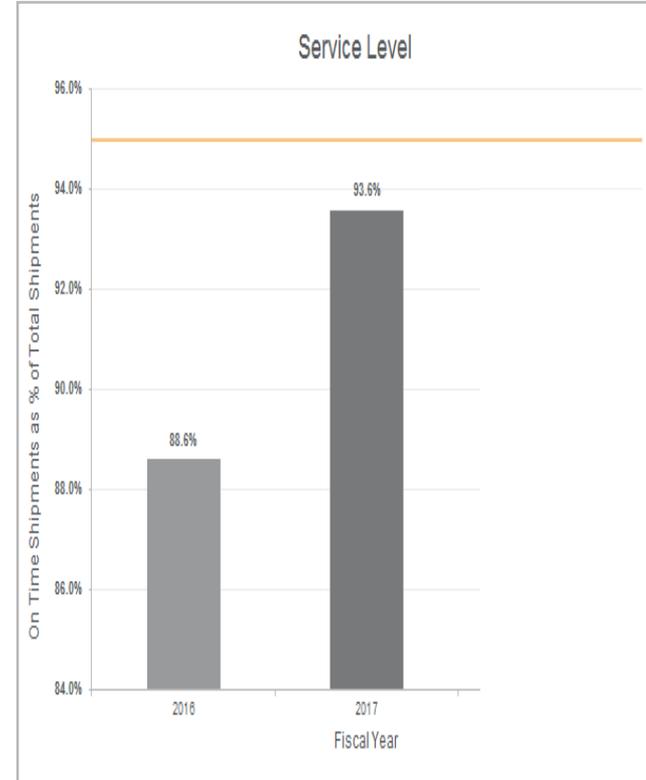
Too Much!



Service Level



The service level for 2017 was 93.6%



We Had Better Planning Signals But...

- We didn't see ourselves as a System
 - Every area schedules, executes and measures themselves independently - including sales and finance.
- Silos couldn't identify, agree on and exploit opportunities for improvement
- Labour intensive processes limits our ability to be reactive
- Lack of data consistency limits metric development



To Further Complicate Matters:

We need to Keep up with Growth

Changes in Scale: Create challenges for existing processes

Increasing Complexity: Creates difficulties to achieve system efficiencies, generate better data & improve metrics

Lack of Visibility: Makes it hard to Improve Service Levels & Optimize Inventory.

Can't change what you don't measure and you can't measure what you don't see!



The Financial Argument - Increase ROI

Δ Visibility \rightarrow Δ Variability \rightarrow Δ Flow \rightarrow

$$\left(\frac{\text{Net Profit}}{\text{Investment}} \right) \rightarrow \Delta \text{ROI}$$

Variability is defined as the sum of the differences between our plan and what happens.

Variability  = Flow 

Variability  = Flow 

Visibility is defined as **relevant information** for decision making.

Visibility  = Variability 

Visibility  = Variability 

A Demand Driven Operating Model

 Visibility

 Variability



2018 Solution Proposal - A Demand Driven Operating Model

Goal

Reduce and Control **Variability** & Reduce **Lead-time**

DDOM Desired Results -

- Identify and decrease internal variation
- Increase service levels with the same cost of operations
- Lower average inventories
- Reduce the time to reliably replenish

Increase Velocity = Improved System Flow



Demand Driven Scheduling and Execution

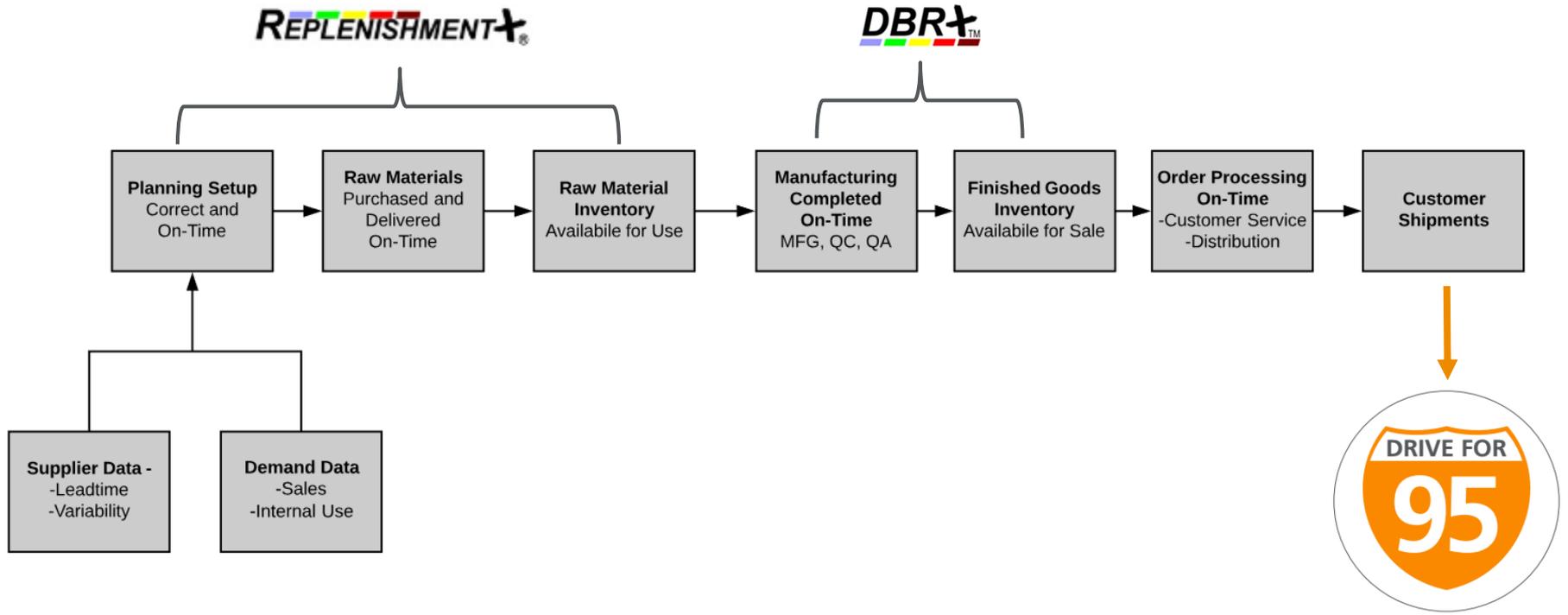


2018 Solution Proposal -

- Complete our DDOM Design model- December 2017
- Began implementation - January 2018
- Developed routings that accurately reflect what we do
- Identified and challenged our policies, work practices, behaviours and metrics which block flow
- Added strategic layers to our BOMs
- Deployed **DBR+**™ as our system scheduling/prioritization/execution tool
- Started to Transact as we act
- Continually Measure, remodel, improve, measure, remodel, improve, ETC.



Metrics in our Demand Driven Operating Model



The Demand Driven Operating Model Improvement Cycle

Too much or too little

Change the buffer

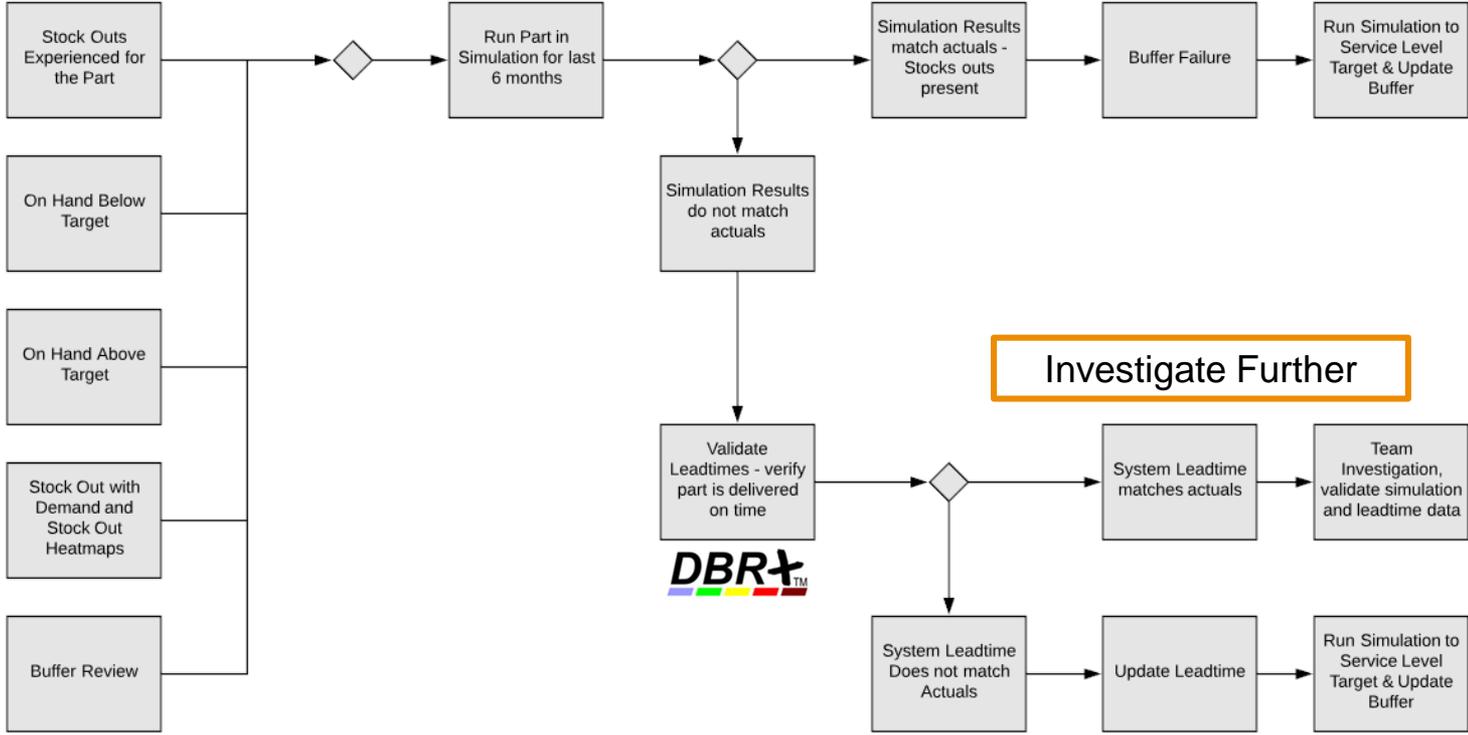
Investigate Further

Update the Lead-Time

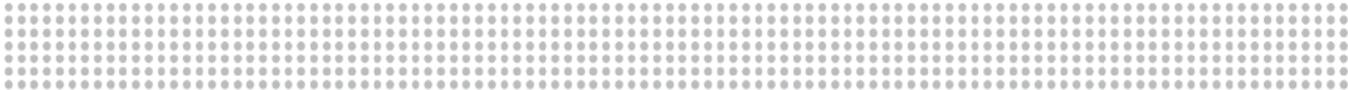


REPLENISHMENT+

DBR+



Benefits of Our New Demand Driven Operating Model



Visibility!!!

- **Resource Schedules are System Schedules:** Shows all work orders, when they are due, their priority, their load and status. All resources are synchronized by priority to support the Drum schedule.
- **Resource and System Load Graphs:** Show amount and age of backlog and all future load for every resource.
- **Capacity and Execution Status Visibility:** Allows us to make labour re-allocation and overtime decisions and longer term capacity investment.
- **Accurately Measured Metrics:** We see the status of work. We can drill down to who is responsible for taking action and drive accountability.
- **Improvement Process:** We measure and trend operational results weekly. We have the ability to identify when, what, and where to remodel.



Visibility!!!

Most Importantly:

- **Demand Driven:** All activities and priorities are triggered based on Actual Demand with inventory and service levels determining relative priorities in Real Time!
- **Now our Demand Driven Operating Model is the foundation for our DDS&OP process. Operations, Sales, Quality, and Finance are on our modeling team making Data Driven Decisions.**



The Journey



Over the past two years, we have demonstrated success with DDMRP using R+ as the Planning tool.

- Increasing our Service Levels

Service Level	Service Level	Quick Facts		
TTM - 20	Week - 21	Period	Orders	Ship Lines
93.1%	95.9%	TTM-20	94,221	196,818
		Week-21	1,996	4,429

The Journey Continues

- Increasing Service level



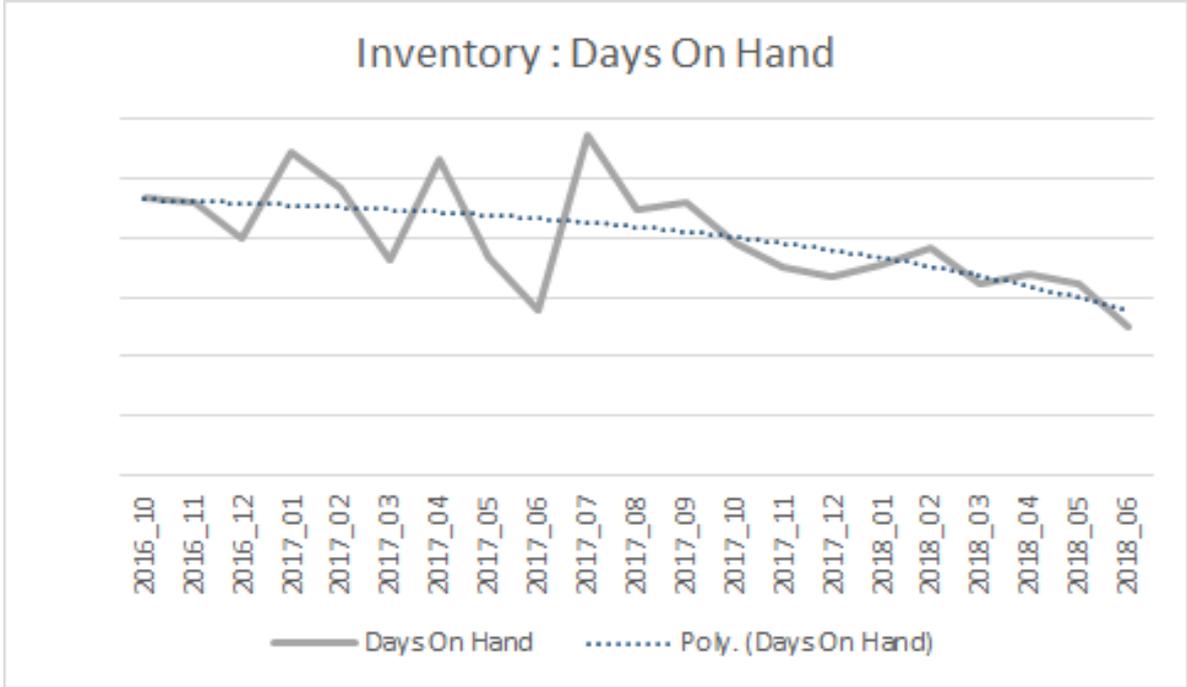
The Journey Continues

- Velocity Gains = Decreasing Inventory

Inventory Value May 25, 2018 \$ 24,561,433	Days on Hand April 30, 2018 193 Change -7.9%	Inventory Growth (FY over FY) May 25, 2018 13.1%
28% Increase in Sales		

The Journey Continues

- Decreasing Inventory



What We've Learned on our Journey

- Secure executive sponsorship and a champion
- Understand the scope of applicability and expected benefits
- Choose an implementation partner that knows how to apply DDOM
- Train everyone!!!
- Make sure the BOM definition in your system is accurate
- Routings must follow Flow and your Process
- Strong data team – ability to run trending calculations and validate settings
- Focus on data quality
- Plan for the transition – Train, Test, Communicate, & Support Everyone
- Commit Early and Hard!!!

- Just Do It -



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