BIOTECH CUSTOMER STORY

Real-Time Scheduling and Debottlenecking Capabilities Accelerate Biotech Ramp Up

CONTINUA PROCESS SYSTEMS

Real-Time Scheduling and Debottlenecking Capabilities Accelerate Biotech Ramp Up

Customer Situation

The driving expectation for manufacturing is to continuously improve year over year. As this customer's facility continued to ramp up production, each minute and every resource became increasingly valuable to optimize in a methodical manner. See how they improved manually-based schedules and created a plan for better utilization of their existing resources.

Moving From Spreadsheets to a Real-Time Scheduling System

What Is RTMS?

- RTMS is a scheduling and capacity analysis tool

How Does RTMS Work?

- RTMS uses a digital model of the facility including the operational tasks, time, constraints and dependencies
- RTMS is connected to source shop floor manufacturing systems (MES & Pi)

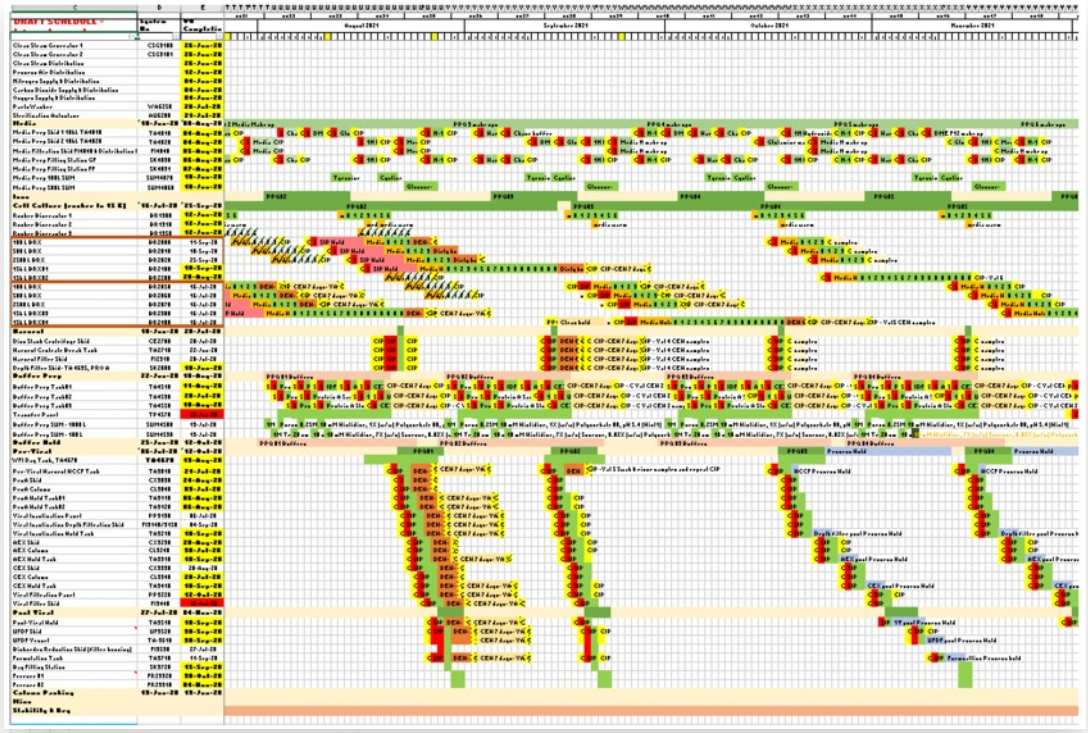
What Are Its Main Capabilities?

1. Always feasible & optimized schedule
2. Real-time schedule with automated shop floor execution updates
3. Capacity analysis tool understands impact of changes and potential improvements

The Value of a Real-Time Scheduling System

BEFORE:

Heavily Human Resource Dependent, Offline, Static, Siloed, Unconstrained Scheduling in Excel



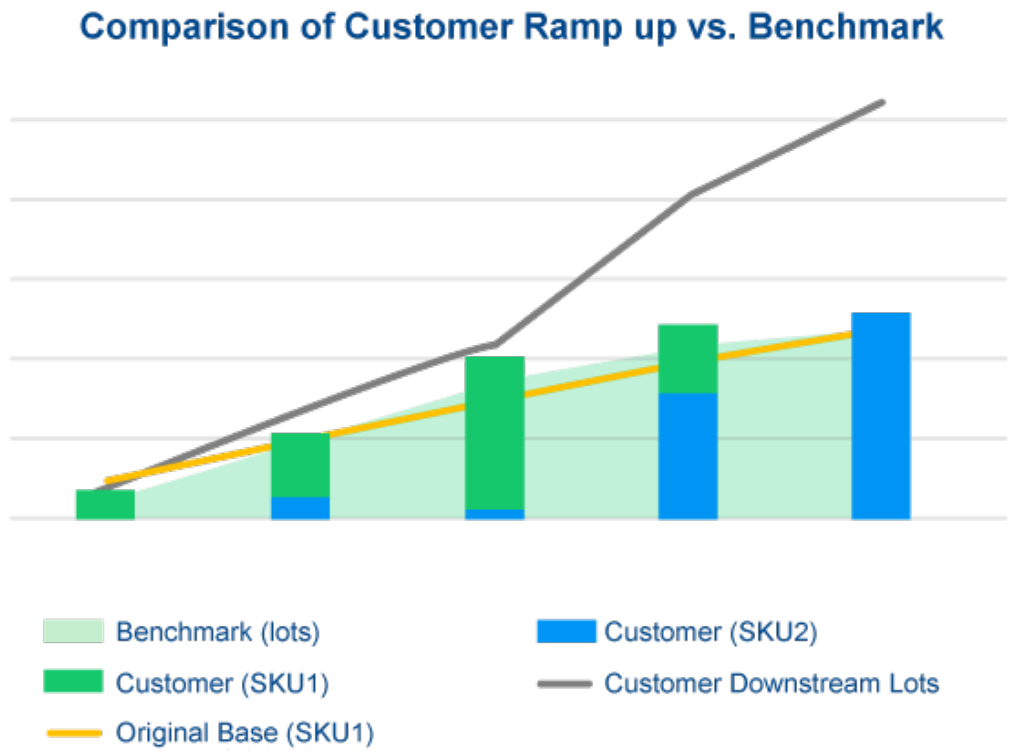
AFTER:

Automatically Generated, Online, Dynamic, Cross-functional, Constrained Scheduling

Customer Facility Ramp Up

The Customer is targeting one of fastest BDS (Bulk Drug Substance) facility ramp ups in history + introduction of new process to support growth BDS products

	Time to Max Cadence	Years post PPQ
SKU 1	Q1 2024	2.5 years
SKU 2	Q1 2025	2 years



EXAMPLE 1

Simplifying Complexity in a Dispensary

Problem:

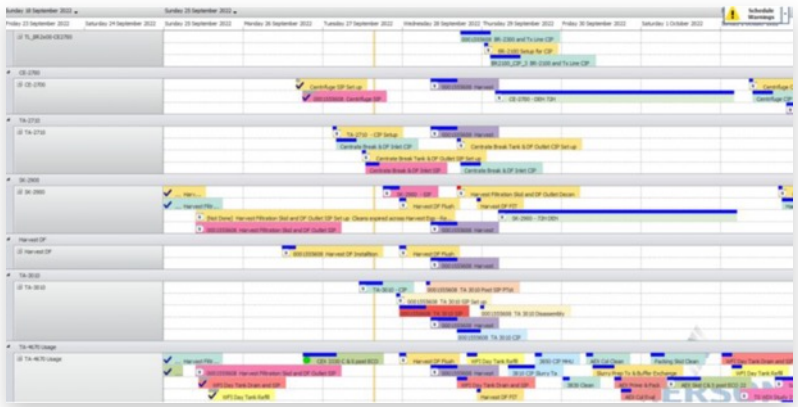
No platform driving a live finite schedule to the dispensary to support materials being dispensed on time, when required in manufacturing.

Simplify Complexity

- 31 BoM's
- 23 materials
- 69 dispenses per batch
- Availability of booths
- Varying material hold times

The schedule needs to detail **when material within each PO needs to be dispensed**

Manufacturing Schedule

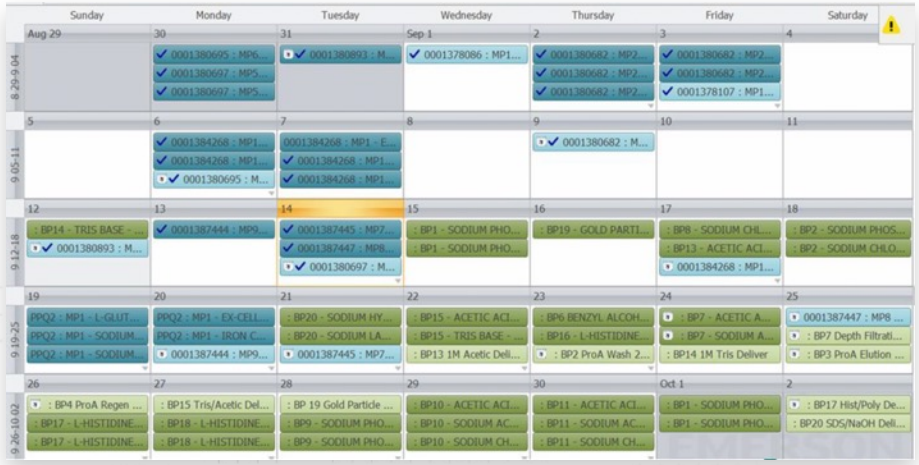


No delays in manufacturing associated with waiting on materials from Dispensary

Dispensing Schedule

Web App Calendar View simplifies planning complex Dispense operations and enables:

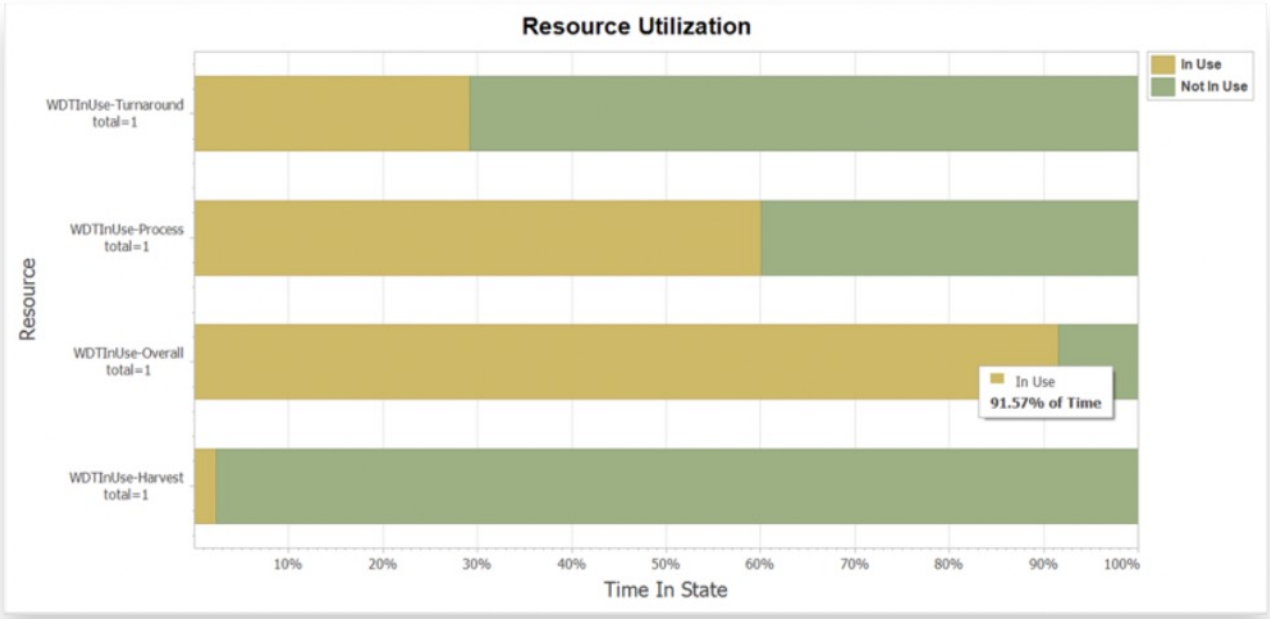
- Rapid response to changes in real time
- Level loading & balancing work



EXAMPLE 2

Finite Schedulers Identified WFI Supply Tank as a Critical Constraint

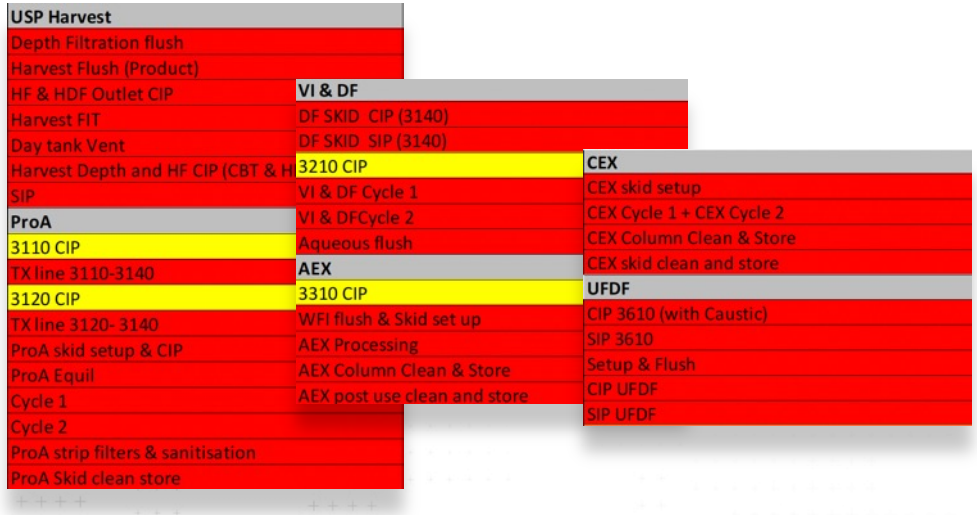
Before (91% Utilization)



37 conflicts identified while WFI Supply Tank is running

Problem Statement:

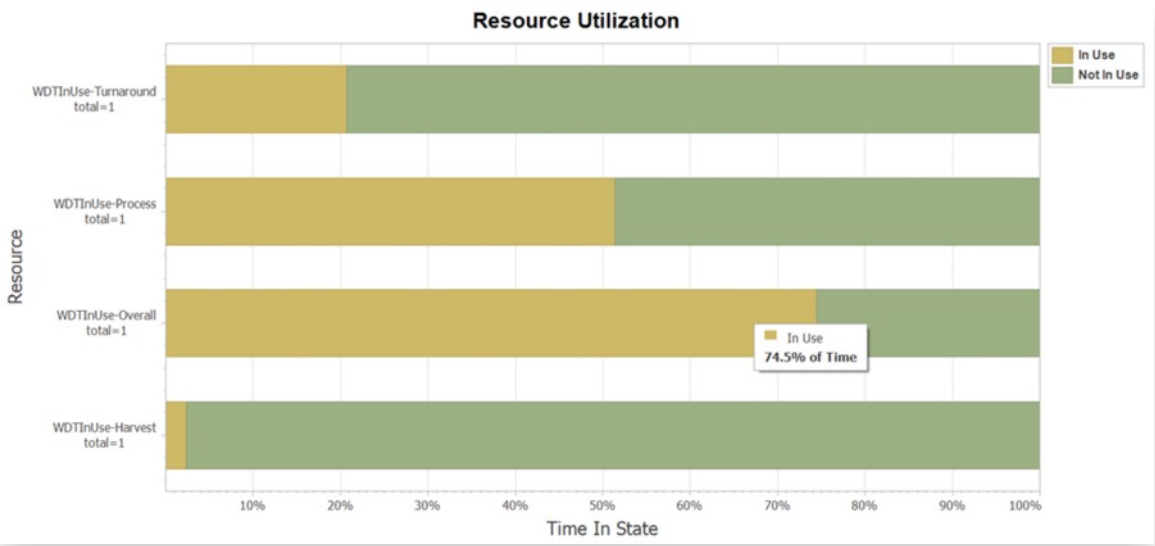
91% WFI Supply Tank Utilization, as Harvest, Chromatography, VIDF, UFDF, Column Packing production recipes cannot run while WFI Supply Tank SIP ongoing, resulting in significant conflicts for production



EXAMPLE 2 (cont'd)

Finite Schedulers Identified WFI Supply Tank as a Critical Constraint

After (74% Utilization)



Decoupling VIDF & Chromatography alleviates capacity constraints for Gen1 process, reducing utilization from 91% to 74%

Solving Using MPS + Digital

1. Worked with GES to identify WFI Supply Tank automation upgrades to alleviate resource constraint for Gen 1 process at no capital cost; decoupling the IDF & Chromatography production recipes removed 7 conflicts and 4 CIP conflicts
2. Initiated MPS project to reduce SIP Turnaround from 13 hours to 6 hours

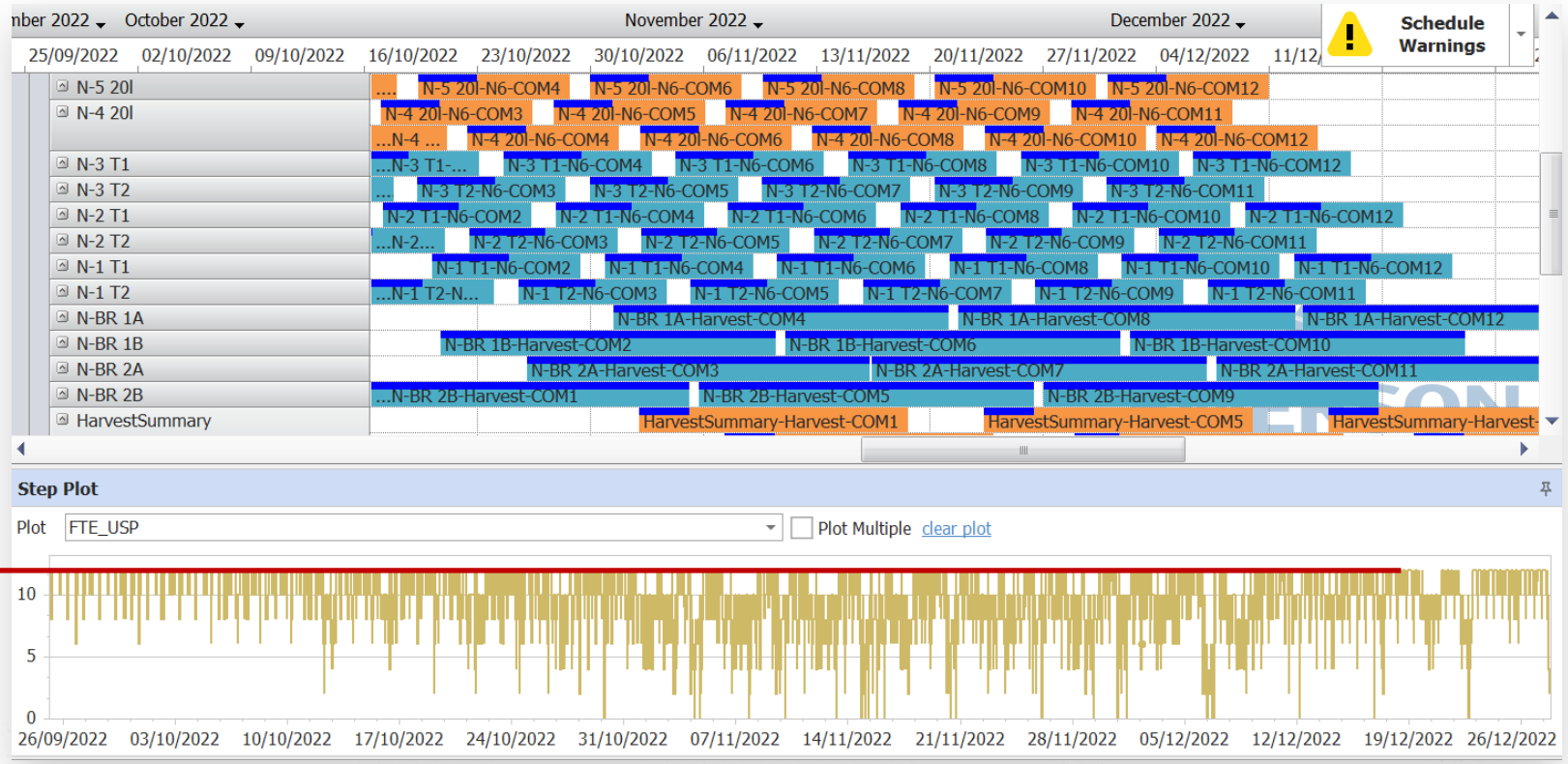
ProA
Cycle 1
Cycle 2
ProA strip filters & sanitisation
VI & DF
VI & DF Cycle 1
VI & DFCycle 2
AEX
AEX Processing
CEX
CEX Cycle 1 + CEX Cycle 2

3110 CIP
3120 CIP
3210 CIP
3310 CIP

EXAMPLE 3

Labor Analysis Gives Us Confidence in Capability to Deliver the Supply Plan With Our Current Staffing

Upstream



12 BPA's

- Helped establish standard times for all activities and update standards based on actual performance
- Allowed to avoid headcount peaks above available labor

Summary: Real-Time Scheduling and Debottlenecking Capabilities Accelerate Biotech Ramp Up

Project Takeaways

Resources, such as labor and WFI, can be a bottleneck when scaling manufacturing. By optimizing and balancing these resources, our scheduling tool can automatically generate an optimized schedule that avoids unplanned downtime and loss of production.

Through proper scheduling and modeling, peaks can be avoided, and production targets can be met!