

R&D/MANUFACTURING CUSTOMER STORY

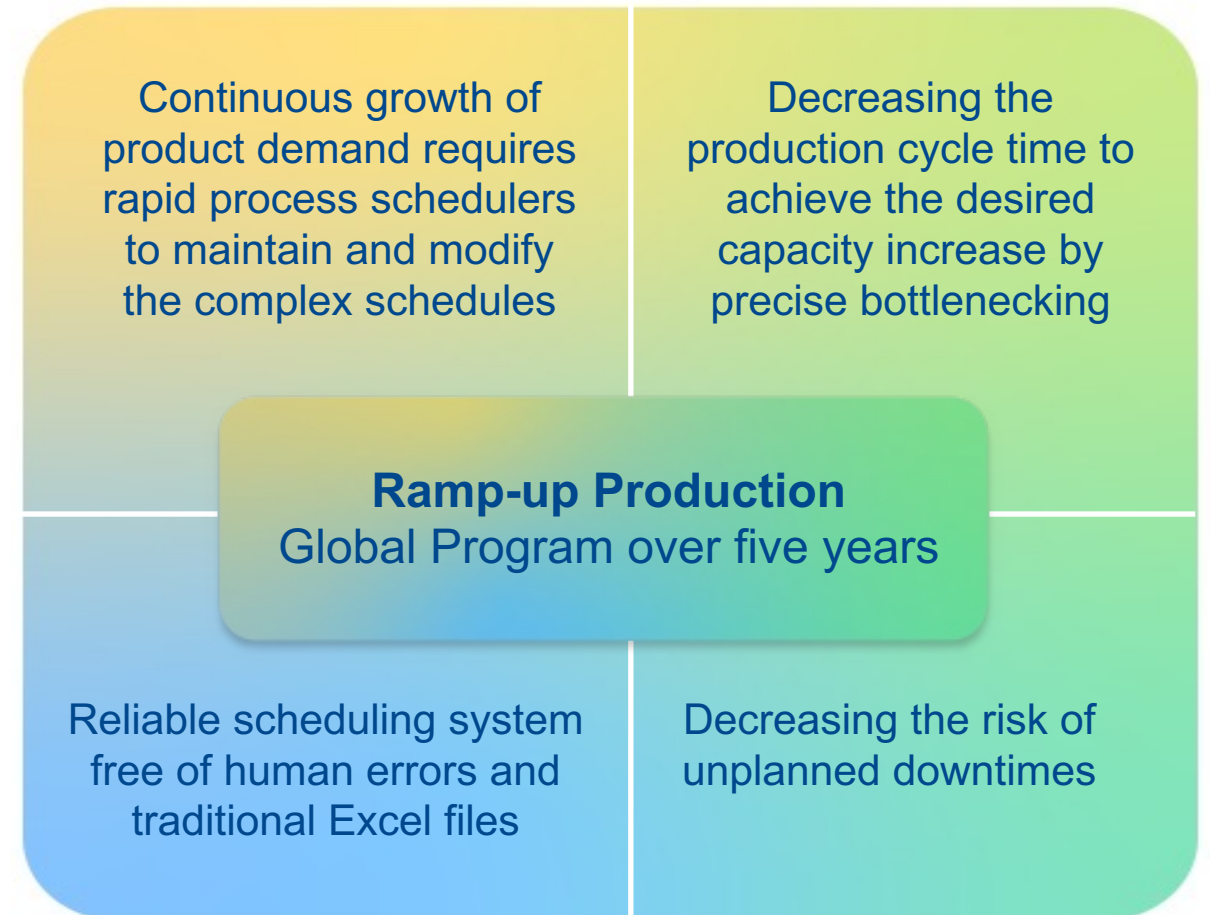
International Pharmaceutical R&D and Manufacturing Company Adopts Real-Time Modeling System as Its North Star for Production Scheduling



Business Objectives

Key Drivers for Investment

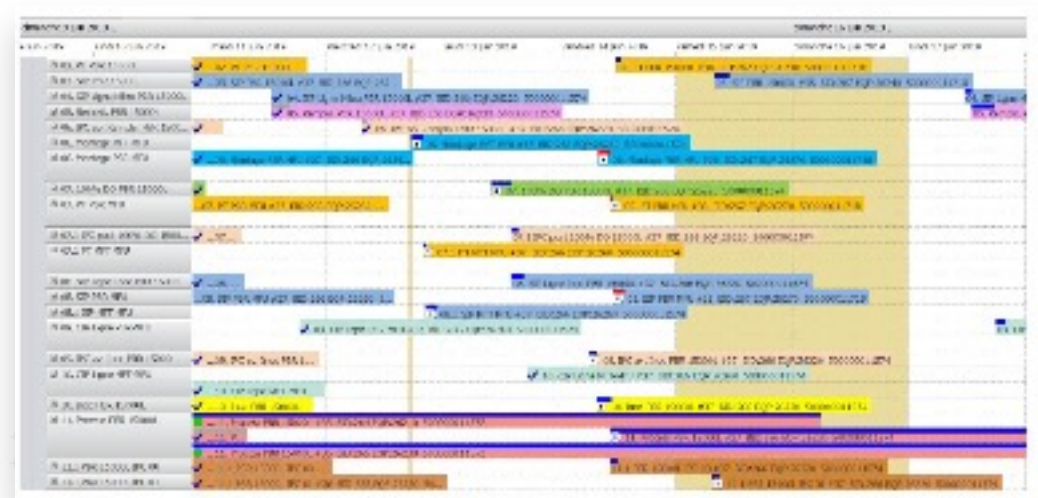
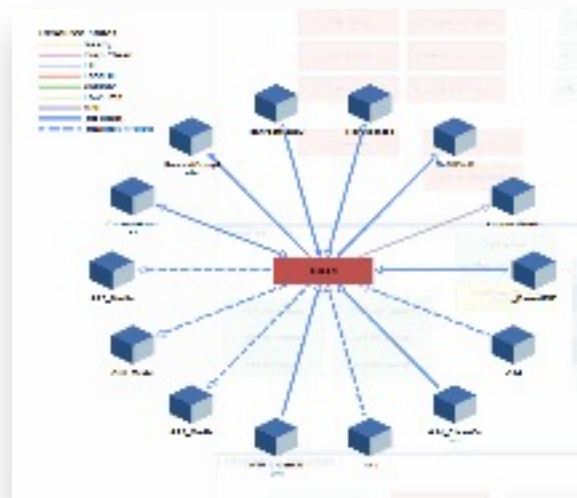
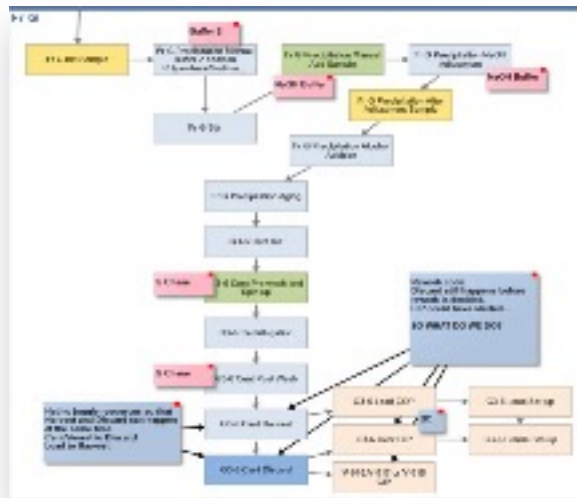
- Addresses complex interconnectional processes
- Allows fast modifications
(with an average of 600 activities for each site)
- Enables highly dynamic schedule updates and predict schedule variation in real time (15min update intervals)
- This IT strategy leads us to the further synergies across the system landscape



Real-Time Modeling System

Graphical scheduling tool replaces old fashioned Excel sheets by offering:

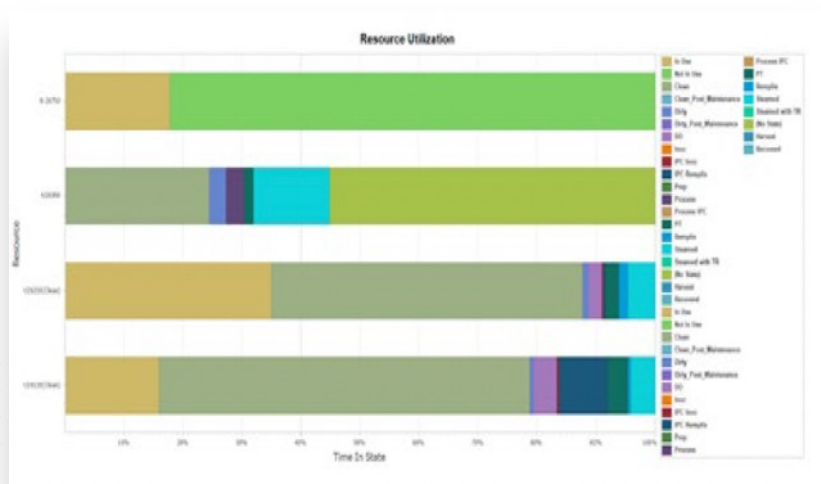
- **Model Flow Diagram:** An easy to build and manage solution that can be shared across facilities
- **Rotary Diagrams:** Easily display conflicts for resources
- **The Gantt Schedule View:** Offer a single source of truth for all operators



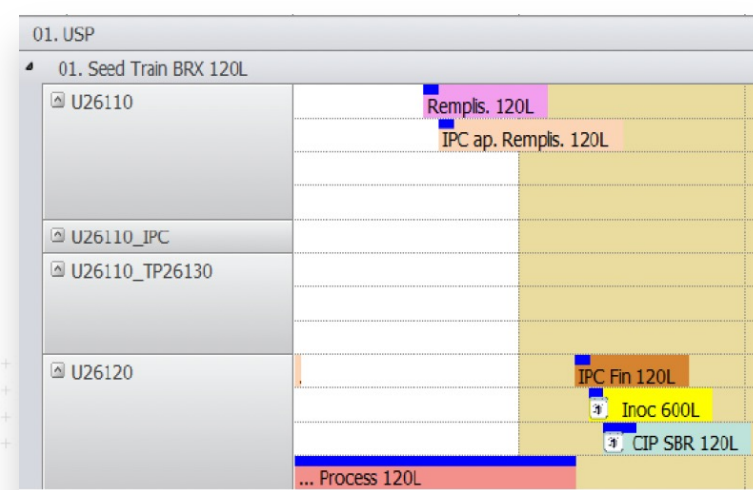
Real-Time Modeling System

Graphical scheduling tool replaces old fashioned Excel sheets by offering:

- **The worklist:** easily assign tasks at shift huddles
- **Equipment availability:** prevent production and maintenance conflicts
- **Equipment capacity utilization:** analyze bottlenecks



| Activity | Description | SubID | Start Day | Start Time | End Day | End Time |
|---------------------------|----------------------------|-------|-------------|------------|-------------|----------|
| 05.06.2019 | | | | | | |
| 26110 | | | | | | |
| 10_CP SBR 120L | 04_Remplis_SBR_120L | 200 | mer. jun 05 | 08:00 | mer. jun 05 | 09:30 |
| 30 | 05_PC ap. Remplis_SBR 1... | 200 | mer. jun 05 | 09:30 | mer. jun 05 | 11:00 |
| 26120 | | | | | | |
| CP SBR 120L | 03_SBR 120L_PIC Fin | 205 | mer. jun 05 | 10:58 | mer. jun 05 | 10:58 |
| 01_Seed Train BRX 120L | 10_CP SBR 120L | 205 | mer. jun 05 | 12:40 | mer. jun 05 | 14:10 |
| 05.06.2019 12:40:25 | 02_PT SBR 600L | 200 | mer. jun 05 | 17:19 | mer. jun 05 | 17:49 |
| 26150 | | | | | | |
| 10_CP au. Inoc SBR 600L | 08_PC au. Inoc 600L | 205 | mer. jun 05 | 07:29 | mer. jun 05 | 10:42 |
| 10_CP au. Inoc SBR 600L | 09_Inoc SBR 600L | 205 | mer. jun 05 | 10:58 | mer. jun 05 | 11:19 |
| 11_Process SBR 600L | 11_Process 600L | 205 | mer. jun 05 | 11:19 | ven. jun 07 | 04:00 |
| 11_P SBR 600L_PIC 60 | 07_PC W000 | 200 | mer. jun 05 | 11:58 | mer. jun 05 | 13:28 |
| 26270 | | | | | | |
| 12_CP Ligne SBR 3500L | 12_CP Ligne 3500L | 204 | mer. jun 05 | 10:40 | mer. jun 05 | 12:40 |
| 11_P SBR 3500L_PIC Fin | 07_PC Fin 3500L | 204 | mer. jun 05 | 09:36 | mer. jun 05 | 09:36 |
| 26210 | | | | | | |
| 11_Process FER 15000L | 11_Process FER 15000L | 204 | mer. jun 05 | 10:16 | dim. jun 16 | 03:40 |
| 09_PC au. Inoc FER 15000L | 08_PC au. Inoc 15000L | 204 | mer. jun 05 | 08:01 | mer. jun 05 | 08:22 |
| 10_Inoc FER 15000L | 10_PC 15000L | 204 | mer. jun 05 | 09:36 | mer. jun 05 | 10:16 |
| 11_P FER 15000L_PIC 60 | 07_PC W000 | 204 | mer. jun 05 | 10:50 | mer. jun 05 | 12:20 |
| 26220 | | | | | | |
| 11_P FER 15000L_PIC 10 | 07_PC W010 | 200 | mer. jun 05 | 11:50 | mer. jun 05 | 12:50 |



Phase I Benefits



Advanced Scheduling reflects the current production and automatically adjusts future production



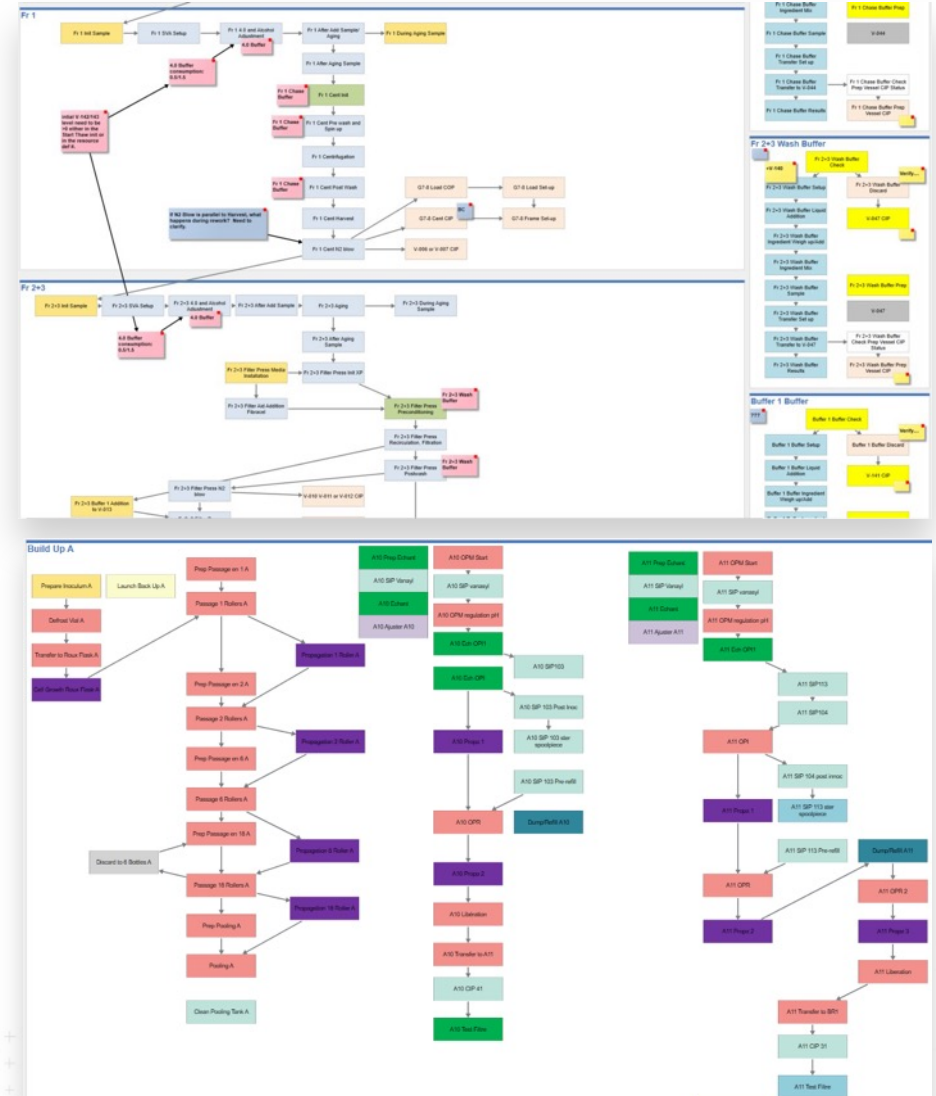
An **Interactive Graphical User Interface (GUI)** allows manufacturing to easily visualize and monitor the production and to create and publish views for activities



What-If Scenario Analysis helps us to immediately see the impact of strategy changes on schedule



Intelligent Built-In Rules allow planners to manually interact with the schedule to make changes based on their experience or new information



Phase II Benefits



Enabling **Real-Time Scheduling** through automatic updates via integration with Global Historian IT System, providing manufacturing execution data for start and end triggers



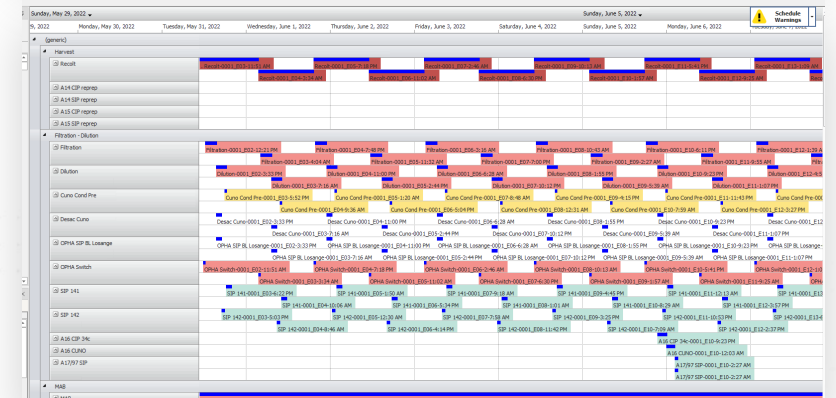
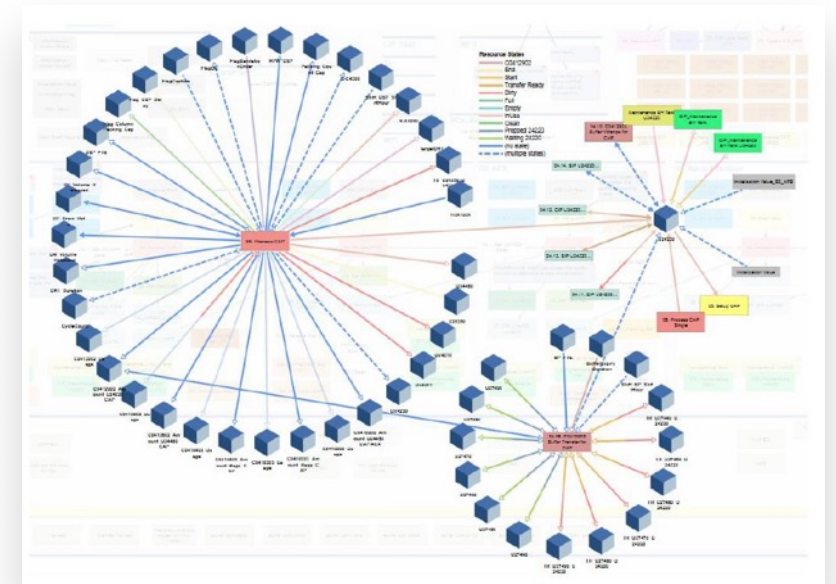
Reduction of scheduling labor cost (less interventions or adjustments needed)



Independent Automatic rescheduling of operations per shop-floor changes



Precise debottlenecking and capacity analysis



Integration Experiences and Capabilities

Level 3:
Manufacturing
Lab
Supervisory Control

Level 3.5:
Manufacturing
Lab DMZ

Level 5:
Enterprise - AWS

Site Data Sources
(MES, Historian,
DCS, IOT, OPC
UA Server)

Gateway Connector

Labor System

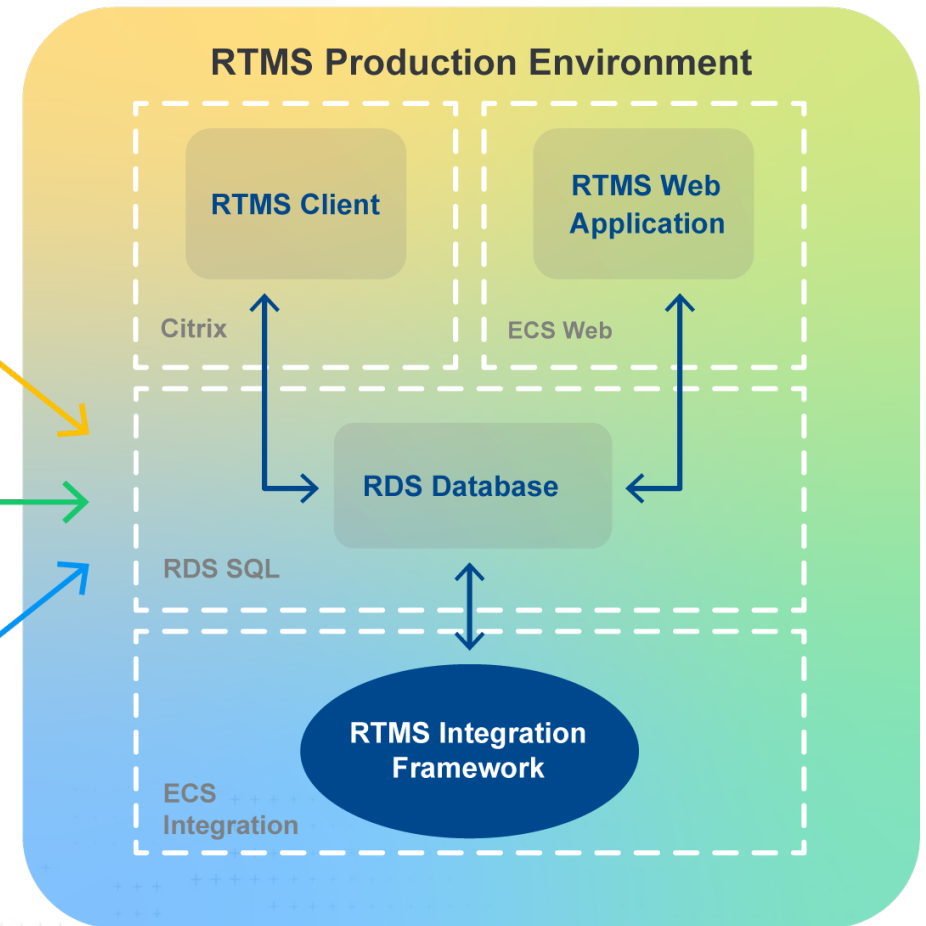
Globalscape SFTP
Data Transfer

Global Historian

odbc connector

ERP

EDB



Summary: Real-Time Modeling System Becomes North Star for Production Scheduling

Project Takeaways

Our real-time modeling tool provided several advantages: operational efficiencies via an easy-to-use interface; ease of use by IT & site resources; scalability via MVP; and continuous improvements. RTMS was deployed in multiple phases allowing for further adoption of the software.

