BIOMANUFACTURING CUSTOMER STORY

0

End-to-End Planning System Incorporates Strategic Considerations



End-to-End Planning System Incorporates Strategic Considerations

Customer Situation

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.

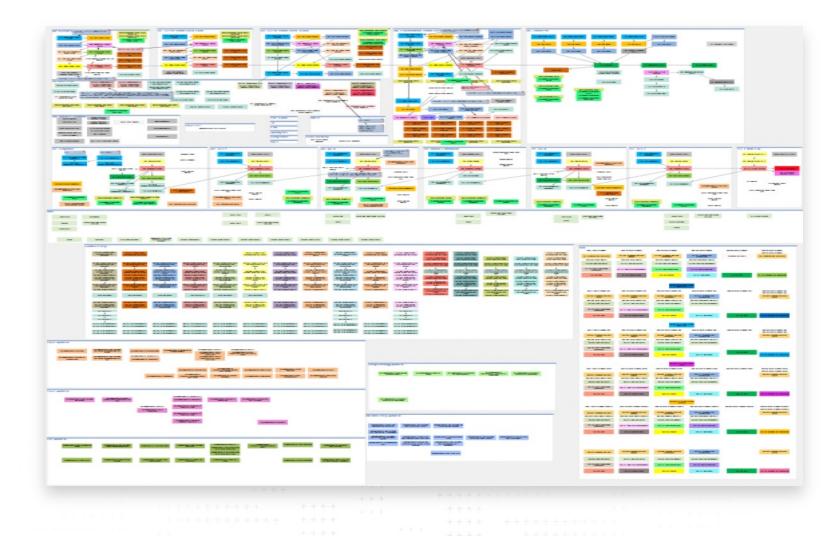
Simulating the Site: A Dream for Various Stakeholders



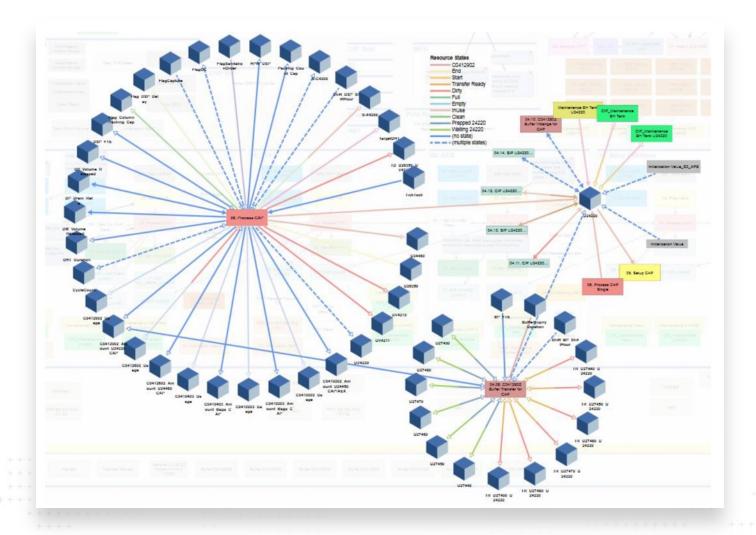
Model Flow Diagram: the End-to-End Process Visibility

- Model Flow diagram is the key element to design all activities that can be regrouped per main process steps
- A model can have thousands of activities and resources that interact with each other to resolve conflicts

Models can be phased based on the level of sophistication needed; here is a phase 1 model



Rotary Dial: Our Designer Can Manage the Model Complexity



- The model has a deeper level of complexity that maps the resources associated with each activity
- Resources can be shared between different activities which can lead to conflicts when scheduling

The graph is showing interaction of 1st Downstream step with all the related resources

The Gantt Schedule View: To Manage Our Operations

- As an output of the model, it gives schedule slots and sequences per custom functional areas
- Shows past, present, future activities and status for an easy review of late activities
- It proposes the best slots for rescheduling activities
- Schedule moves automatically in real time in case of a delay on the critical path via integrations

nche 9 ju	uin 2019 🗸						dimanche 16 juin 2019 🗸					
2019	lundi 10 juin 2019	mardi 11 juin 2019	mercredi 12 juin 2019	jeudi 13 juin 2019	vendredi 14 juin 2019	samedi 15 juin 2019	dimanche 16 juin 2019	lundi 17 juin 2019				
₫ 02.	PT PBR 15000L	✓02. PT PBR 15000L			02. PT PBR	15000L #38 BID:267 EQP:2	26240 500000011718					
₫ 03.	SIP PBR 15000L	03. SIP PBR 15000L #3	7 BID:266 EQP:262				000L #38 BID:267 EQP:2624	0 500000011718				
04.	SIP Ligne Mileu PBR 15000L	🗸 04. SI	P Ligne Mileu PBR 15000L #33	7 BID:266 EQP:26220 500	0000011574			04. SIP Lign				
☑ 05.	Remplis. PBR 15000L	✓ 05. R	emplis. PBR 15000L #37 BID:	266 EQP:26220 50000001	1574			05. Rempl				
☑ 06.	IPC ap. Remplis. PBR 1500	✓	V 06. IPC ap. R									
☑ 06.	Montage MFT MFU		3	6. Montage MFT MFU #37	BID:266 EQP:26260 5000000	11574						
@ 06.	Montage PBR MFU	🗸06. Montage PBR MFU #	37 BID:266 EQP:2626		3 06. Montage	PBR MFU #38 BID:267 EQP	26270 500000011718					
☑ 07.	100% DO PBR 15000L	v		3. 07. 100	% DO PBR 15000L #37 BID:2	66 EOP:26220 50000001157	74					
₫ 07.	PT PBR MFU	07. PT PBR MFU #37 BID::	266 EQP:26260	270 50000011718								
07.	1 IPC post 100% DO 1500	✓07		07.1 IF	PC post 100% DO 15000L #37	7 BID:266 EQP:26220 50000	0011574					
07.1	1 PT MFT MFU			07.1 PT MFT MFU #37 BI	ID:266 EQP:26260 50000001	1574						
08.	SIP Ligne Inoc PBR 15000L	✓08		08. SI	P Ligne Inoc PBR 15000L #37	BID:266 EQP:26220 500000	011574					
☑ 08.	SIP PBR MFU	08. SIP PBR MFU #37 BID:	266 EQP:26260 5		3 08. SIP I	PBR MFU #38 BID:267 EQP:2	6270 500000011718					
08.	1 SIP MFT MFU			08.1 SIP MFT MFU #37 8	BID:266 EQP:26260 5000000	11574						
◎ 09.	CIP Ligne PBR-MFU		09. CIP Ligne PBR-MFU #37		09.							
⊴ 09.	IPC av. Inoc PBR 15000L	✓09. IPC av. Inoc PBR 1			🖲 09. IPC av. Inc	oc PBR 15000L #37 BID:266	EQP:26220 500000011574					
◙ 10.	CIP Ligne MFT-MFU			V	10. CIP Ligne MFT-MFU #37 E	BID:266 EQP:26260 500000	011574					
		 10. CIP Ligne MFT-MFU 										
⊡ 10.	Inoc PBR 15000L	✓10. Inoc PBR 15000L			10. Inoc PBR	R 15000L #37 BID:266 EQP:2	26220 500000011574					
◙ 11.	Process PBR 15000L											
		✓11. P			3 11. Process PBR 15000L #37 BID:266 EQP:26220 500000011574							
0 11.	1 PBR 15000L IPC 00	 11. Process PBR 15000 11.1 PBR 15000L IPC 0 	L #36 BID:265 EQP:26230 5	00000011573	11 1 DBD 15	5000L IPC 00 #37 BID:266 E	DP:26220 500000011574					
		a second and the state of a state of a second state of the second state of the state of the second state of the	1 #36 BID:265 EQP:26230 5	0	TIN FOR IS		000L IPC 01 #37 BID:266 EC	00-26220 500000011574				

The Gantt chart Upstream view of Suite 4

The Worklist: To Guide the Shop Floor in One Source of Truth

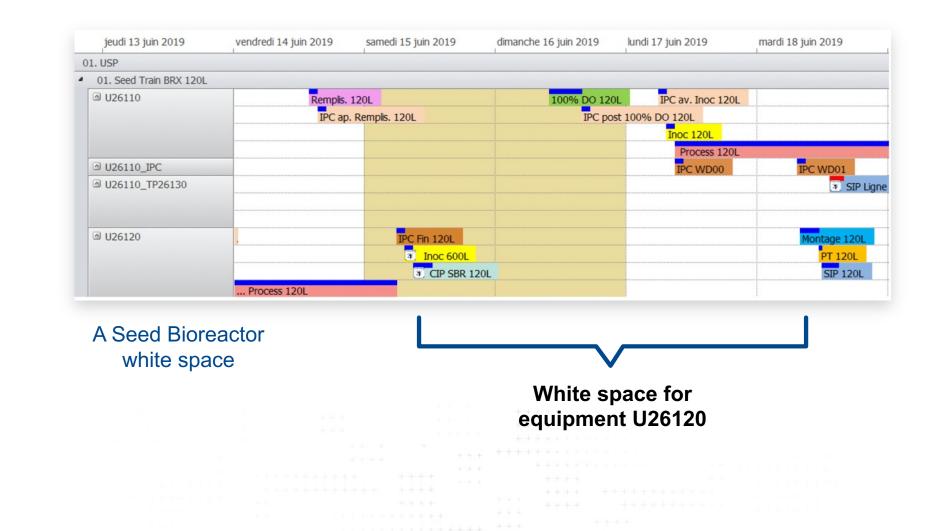
Details		- 4 ×	Ac	tivity	Description	BatchID	Start Day	Start Time	End Day	End Time	Operateurs	RunID
becano		nuto 6t		05.06.2019								
Ś		<u>auto-fit</u>		•								
Record [683 of 1241]				⊿ 26110								
Record [005 01 124				04. Remplis. SBR 120L	Remplis. 120L	266	mer. juin 05	08:00	mer. juin 05	09:30	ABI	\$ 5000000115
Activity:	10. CIP SBR 120L			05. IPC ap. Remplis. SBR 1	IPC ap. Remplis. 1	🍫 266	mer. juin 05	09:30	mer. juin 05	11:00	ABI	\$ 5000000115
Count:	36			₄ 26120								
Description:	CIP SBR 120L			09.2 SBR 120L IPC Fin	IPC Fin 120L	265	mer. juin 05	10:58	mer. juin 05	10:58	МКН	\$ 5000000115
Unit Operation:	01. Seed Train BRX 120		•	10. CIP SBR 120L	CIP SBR 120L	🔹 265	mer. juin 05	12:40	mer. juin 05	16:10	МКН	\$ 5000000115
Start Date:	05.06.2019 12:40:25			₄ 26140								
End Date:	05.06.2019 16:10:25			02. PT SBR 600L	PT 600L	266	mer. juin 05	17:19	mer. juin 05	17:49	MPD/DTA	\$ 5000000115
Duration:	3.50			₄ 26150								
		ו ר		09. IPC av. Inoc SBR 600L	IPC av. Inoc 600L	265	mer. juin 05	07:29	mer. juin 05	10:42	МКН	\$ 5000000115
	e: 05.06.2019 11:44:00			10. Inoc SBR 600L	Inoc 600L	2 65	mer. juin 05	10:58	mer. juin 05	11:19	МКН	\$ 5000000115
Change:				11. Process SBR 600L	Process 600L	265	mer. juin 05	11:19	ven. juin 07	06:00		\$ 5000000115
Notes:				11.1 SBR 600L IPC 00	IPC WD00	265	mer. juin 05	11:58	mer. juin 05	13:28	МКН	\$ 5000000115
Instructions:				⊿ 26170								
Changed By:	(Bio-G Integrations)			12. CIP Ligne SBR 3500L	CIP Ligne 3500L	264	mer. juin 05	10:40	mer. juin 05	12:40	MZU	\$ 5000000115
Last Changed:	05.06.2019 11:52:55			11.2 SBR 3500L IPC Fin	IPC Fin 3500L	264	mer. juin 05	09:36	mer. juin 05	09:36	MZU	\$ 5000000115
Equipment:	4, 26120			₄ 26210								
BatchID:	\$ 265			11. Process PBR 15000L	Process PBR 15000L	264	mer. juin 05	10:16	dim. juin 16	05:46		\$ 5000000115
Cycle:				09. IPC av. Inoc PBR 15000L	IPC av. Inoc 15000L	264	mer. juin 05	08:01	mer. juin 05	08:33	MZU	\$ 5000000115
Product:				10. Inoc PBR 15000L	Inoc 15000L	264	mer. juin 05	09:36	mer. juin 05	10:16	MZU	\$ 5000000115
Current SIM Time:				11.1 PBR 15000L IPC 00	IPC WD00	264	mer. juin 05	10:50	mer. juin 05	12:20	MZU	\$ 5000000115
Media:				⊿ 26220								
Media: PIS:				11.1 PBR 15000L IPC 10	IPC WD10	262	mer. juin 05	11:20	mer. juin 05	12:50	MSE	\$ 5000000115

- Views can be customized for operators and assigned to specific users on the plant floor
- Team leads can use this view to assign tasks

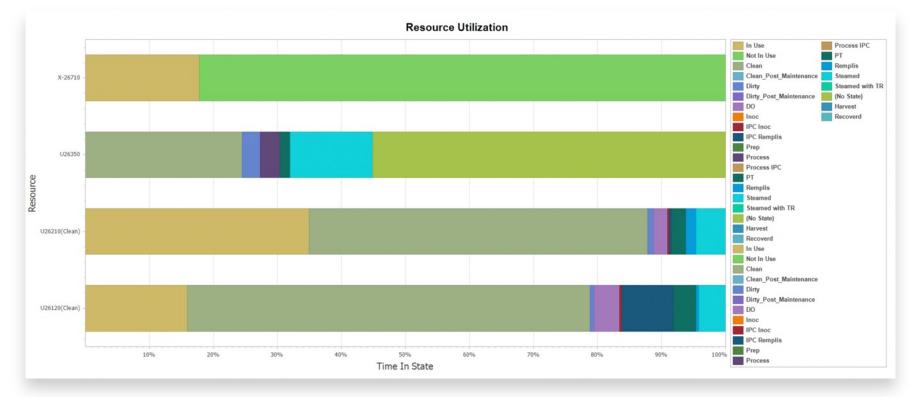
The worklist of Suite 4, actual dates come from MES

For each activity: Displays original planed date and eventual deviations Equipment Availability: To Prevent Production & Maintenance Conflicts

- White spaces indicate equipment's availabilities to facilitate maintenance planner's decisions
- Maintenance teams can grab whitespace manually or automatically assign cleaning activities



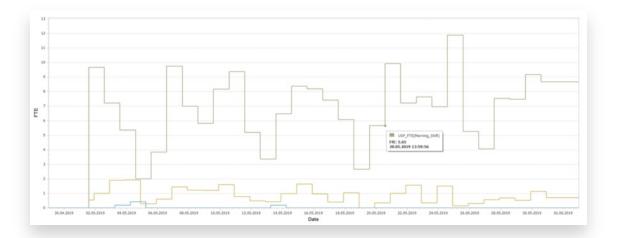
Equipment Capacity Utilization: To Analyze Our Bottlenecks



- Displays the capacity utilization breakdown per state
- They are used for debottlenecking purposes by production and engineering



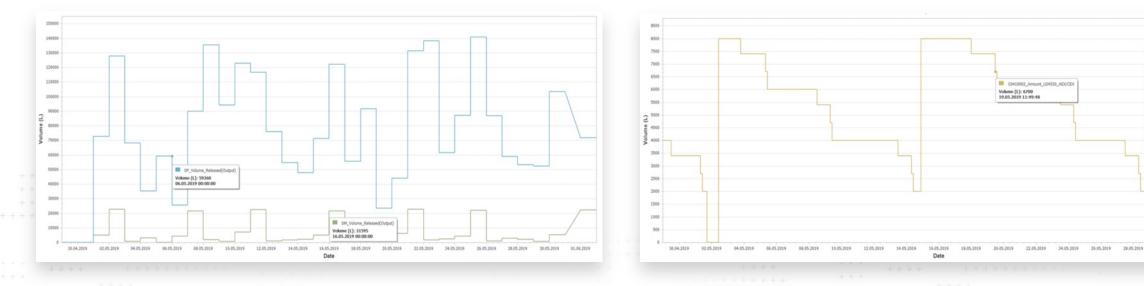
Step Plot: To Manage Our Labor & Utilities Resources



• Manpower, waste, HPW, WFI, Buffer Consumption are modeled as resources per activities

01.06.2019

- The step plot is giving the related forecast consumption
- It is used on a weekly/daily basis to manage workload vs. capacity per teams



Summary: End-to-End Planning System Incorporates Strategic Considerations

Project Takeaways

By creating a single source of truth, the site was able to automatically create a self-driven schedule that is always up-to-date. Shift leads were able to assign tasks to their teams at shift huddles, and maintenance was able to view whitespace windows for various activities.

This led to an optimized production process where everyone knew what to do and when to do it. Once live, the model identified potential process improvement activities.