

FabX Case Study

Macro-Micro Schedule Architecture

Possible schedule architecture options:

- Macro-Micro; with tasks that are specific to sub-projects in their own schedules, then these are linked to the master top-level schedule. Good solution, not that hard to implement
- Use touchpoints to link from the sub-project schedules to the top-level schedule. Easy, but lacks early warning. Also works top-down with top-level touch-points driving sub-project tasks
- Integrate sub-project tasks directly into master top-level schedule. Easiest, but limits multi-user use of the schedule

Two different approaches...

- Integrated schedule using fastProject (macro/micro)
 - Single integrated master schedule with micro schedules rolling-up/down (i.e. sub-projects)
 - Changes at the macro level are automatically rolled-down to the micro schedules
 - Changes at the micro level are automatically rolled-up to the macro schedule
 - Enables project team transparency and improved communication around critical cross-team hand-offs
 - Macro and micro critical path analysis (top level across the project or at sub-project level)
 - Early warning, identified future resource conflicts, and increased visibility to all stakeholders
- Independent schedules using fastProject
 - Each PM/team drives independent schedules with their team
 - Manage interface points through alignment meetings with PM on regular basis
 - Changes to individual plans are manually entered at the project level
 - Not fully transparent, extra work for the PM to maintain both Plan

An Integrated Schedule...

- Enables cross-team collaboration, transparency, and early warning of potential problems
- Promotes partnership management model
- Identifies key hand-off interface points so we can manage them together, in advance of problems
- Requires less PM time to maintain schedule database (due to automated rollup/down)
- Provides local PM control of schedule (micro) while giving our management team the ability to manage the critical interface-points across the project (called a lateral-work-system)
- Proven methodology and tools; developed to manage large scale complex fab programs (over 20 years)

Developed for large complex Fab projects

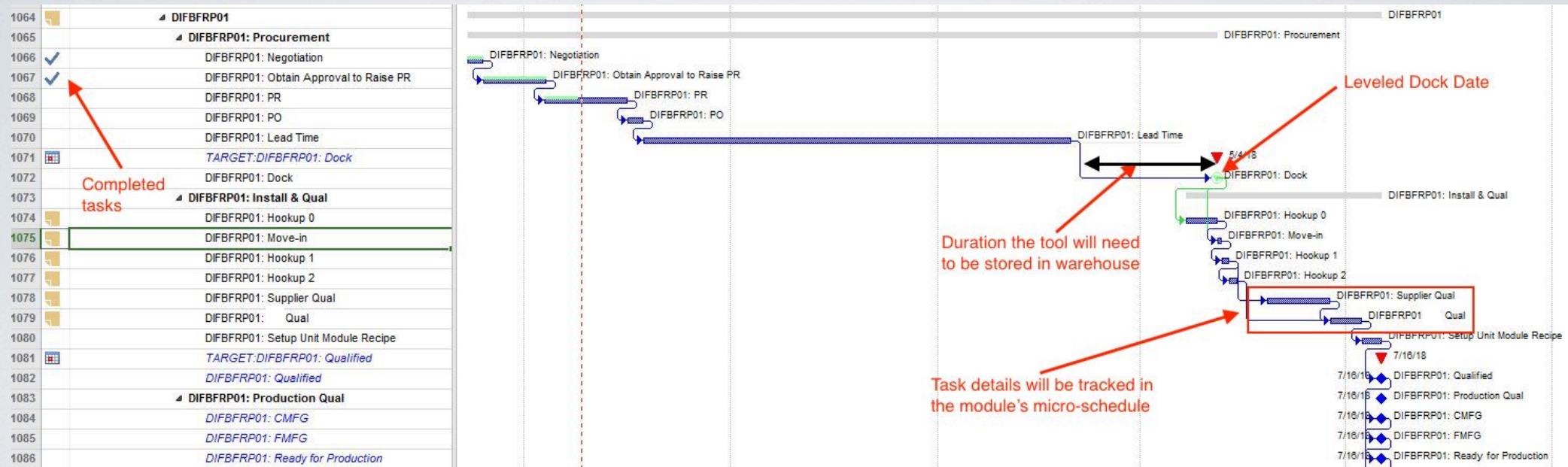
- Ideal for multiple teams with many integrated schedules (i.e., interface touchpoints that need to be managed)
- Automatic information roll-up:
 - Micro projects are inputs to Macro project
 - No need to maintain multiple project schedules
 - Enables independent operation of sub-project schedules, while integrating sub-project (micro) schedules into a summarized master schedule
- Macro schedule provides top level critical path
- Micro schedules are independently managed

FabX Schedule Design

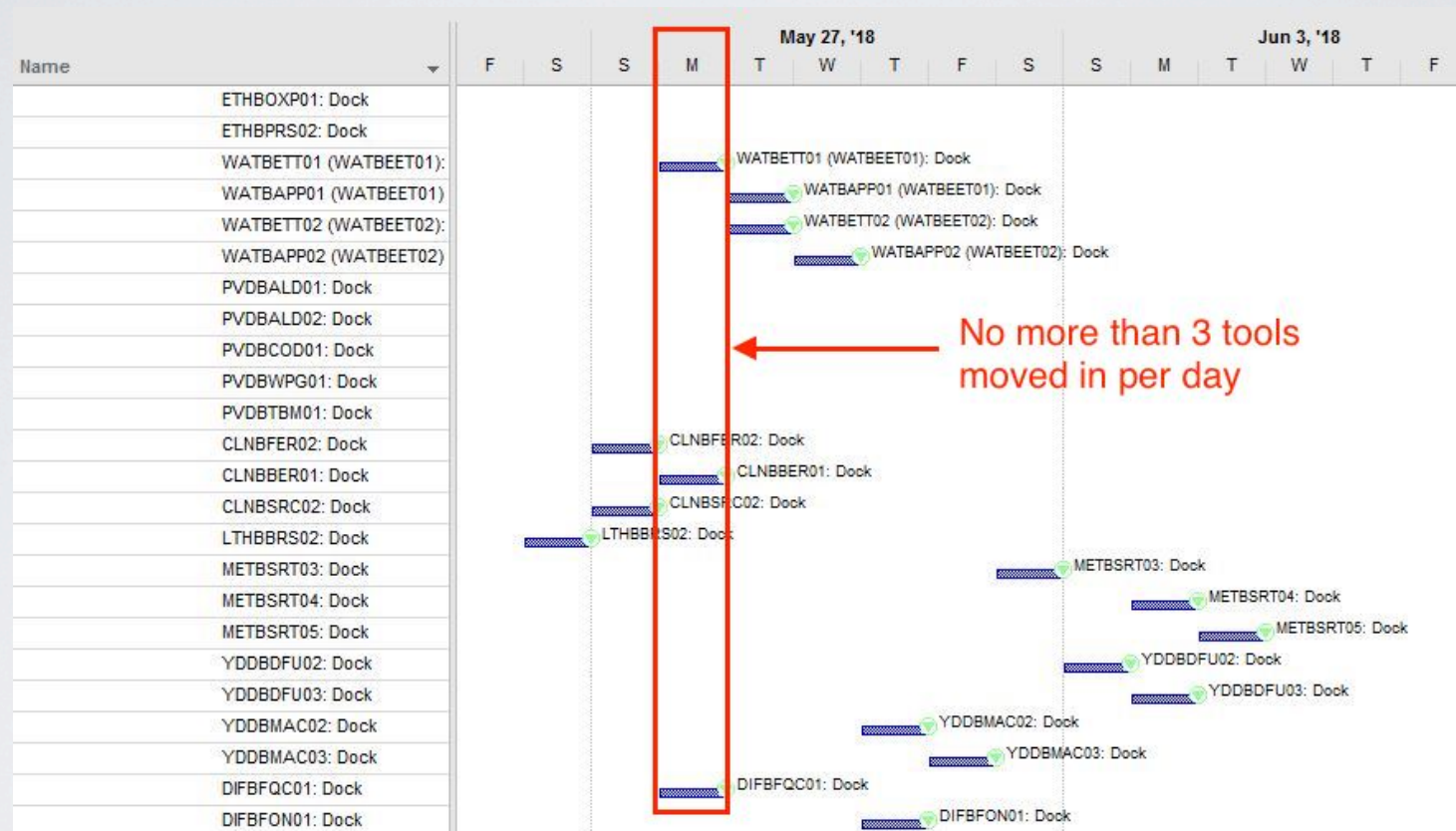
- A series of macro and micro schedules that interact with one another
- Macro schedule provides the top level critical path and summary of module level detail
- Many maintenance functions have been automated through “Importers and Exporters” and tools that move detail information to the macro level and macro changes down to the micro schedules
- Implemented as special code in fastProject (add-on to Microsoft Project), specifically designed for the FabX project

lateralworks >

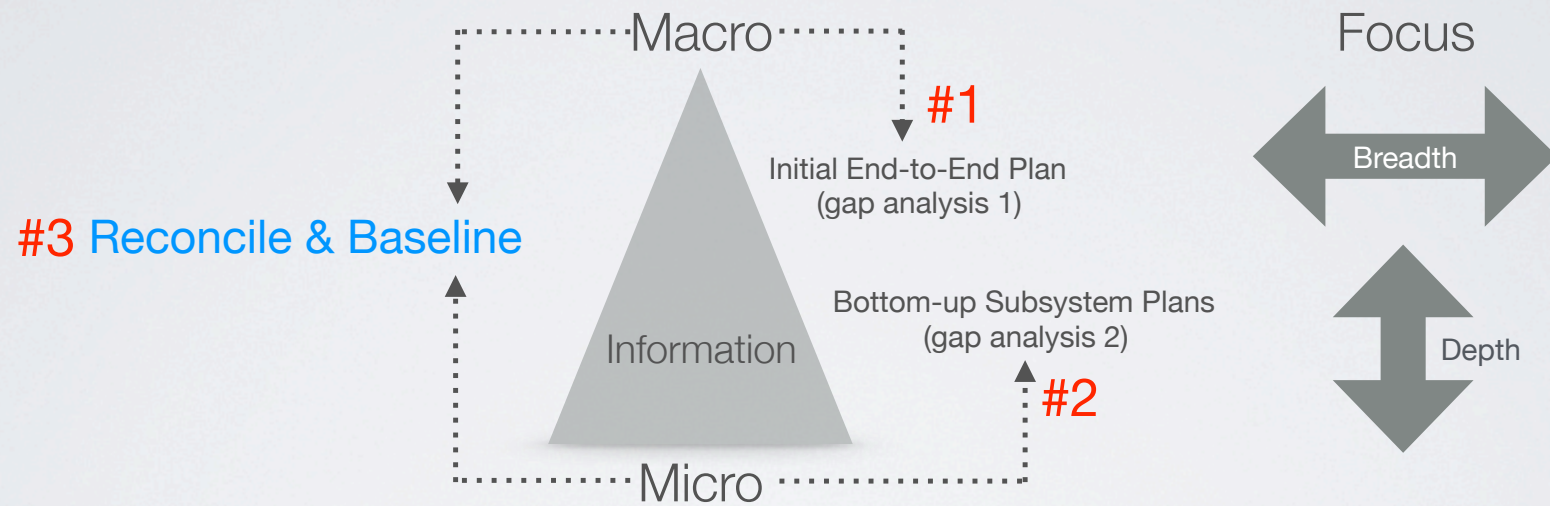
Tool Template



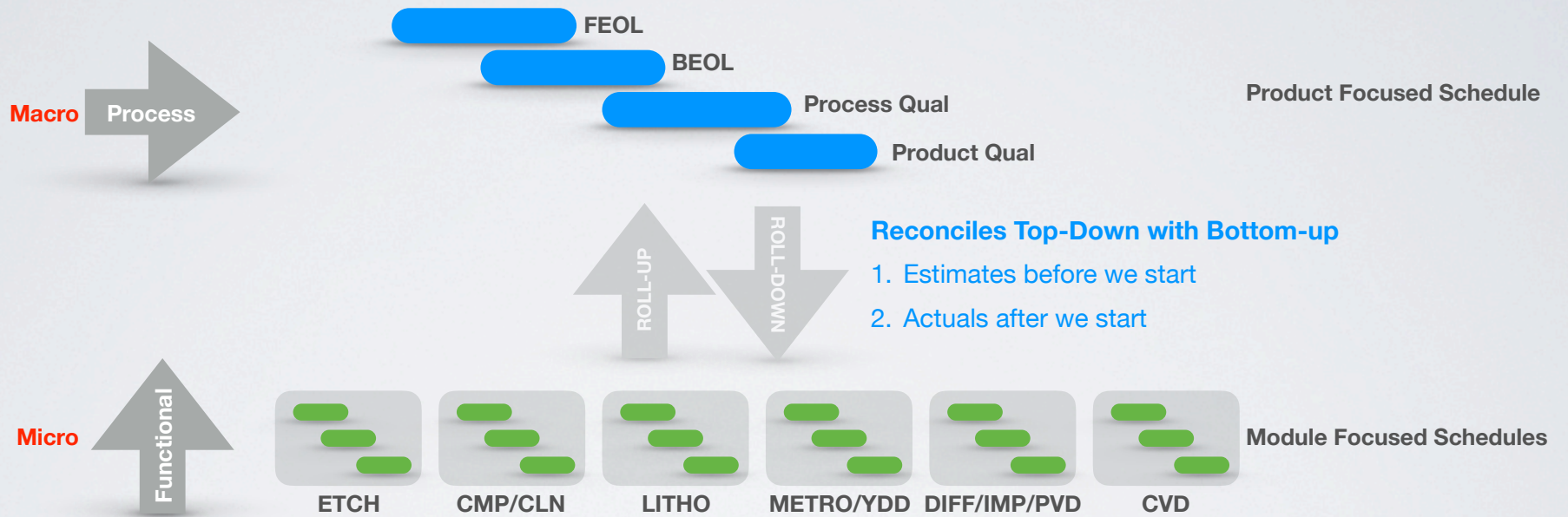
Dock Loading



Macro-Micro Methodology



Process Flow vs Functional Flow



Master (macro) schedule

- Is cross-functional so the tasks flow as a lateral process, the way a project would flow naturally
- Allows the management team to keep their eye on the big picture and look for strategic pull-ins
- Owned by the PROGRAM management team

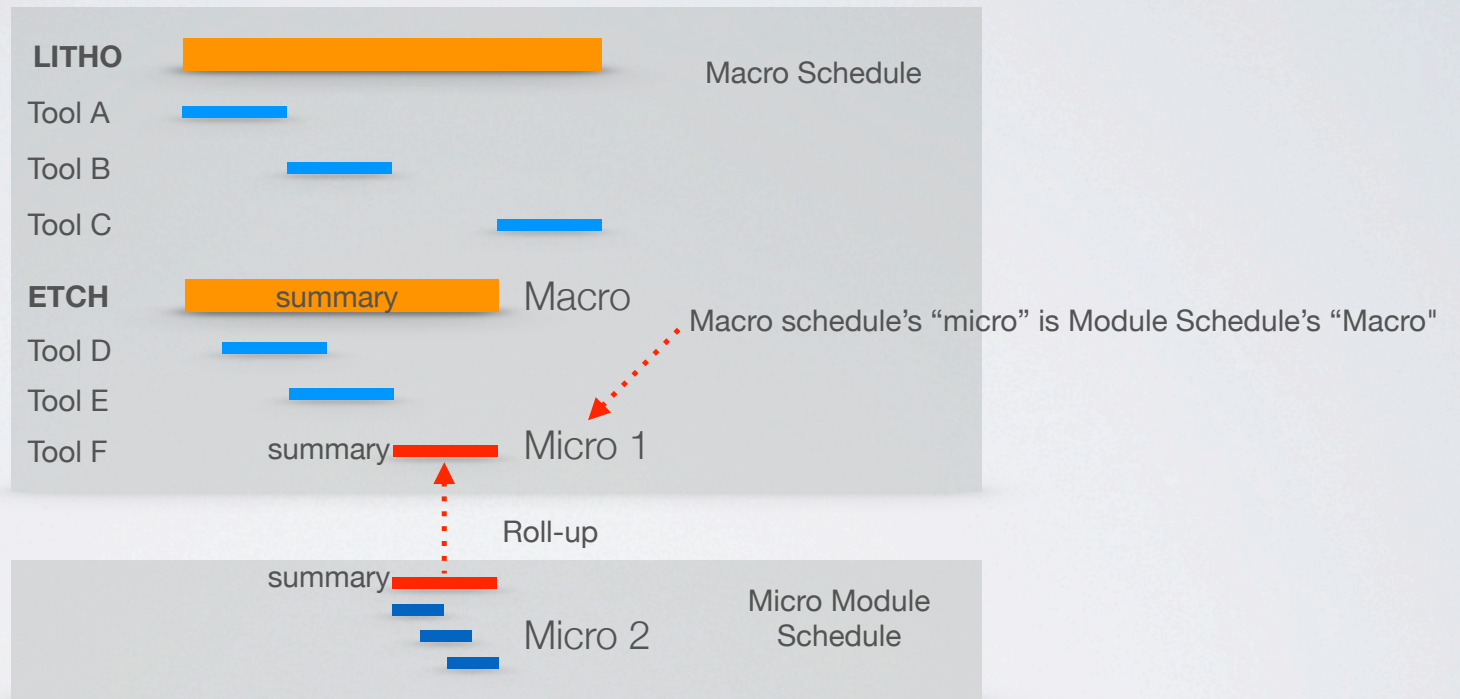
Detailed (micro) schedules

- Are (typically) functional and managed as part of a function
- Independently managed (created, tracked, reported on) without any direct interaction with master schedule
- OWNED by the PROJECT team

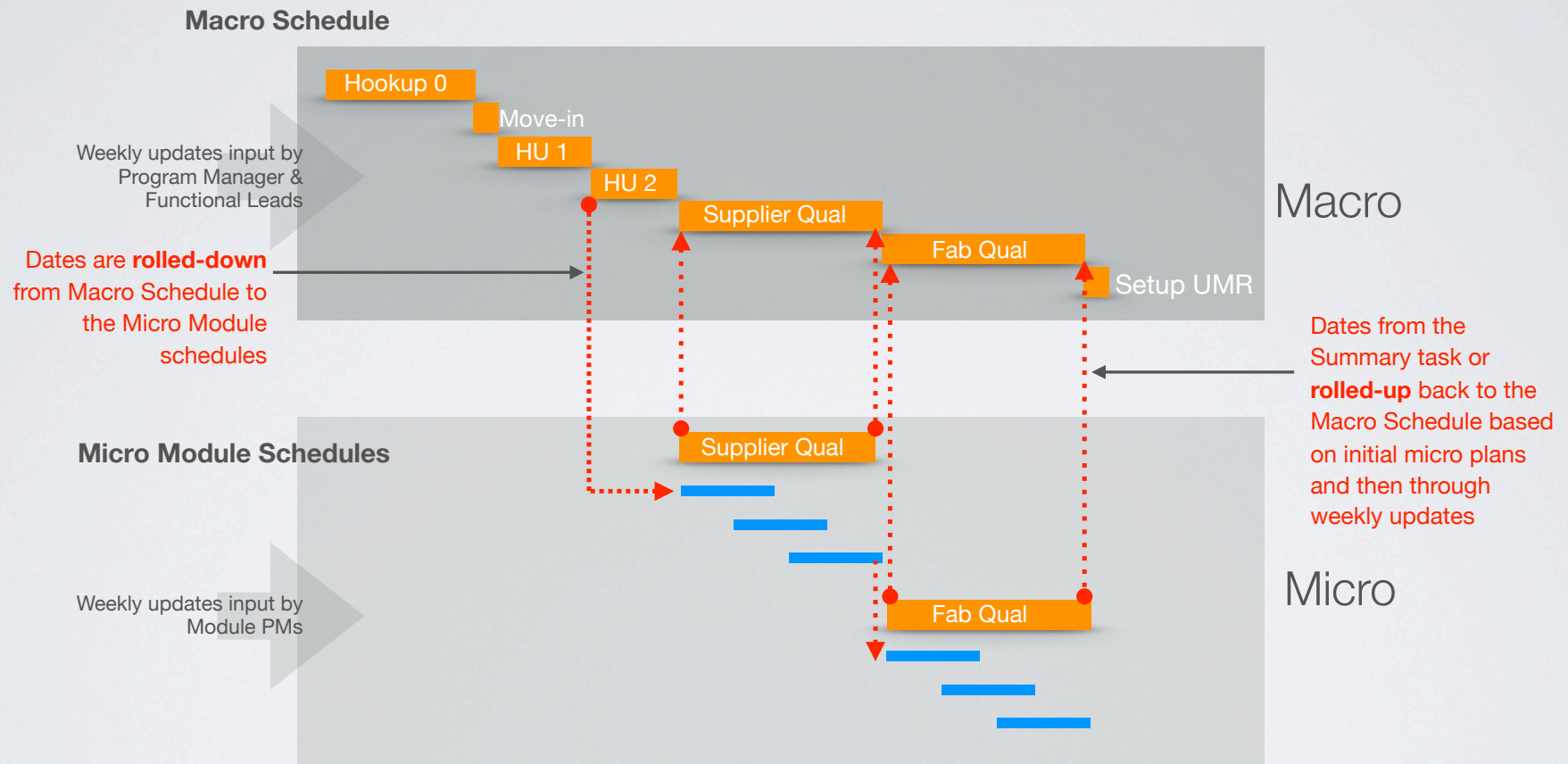
Together

- Top-down bottom-up reconciliation, detailed work is “reported” back to master where micro changes can be seen
- See the cross-functional dependencies (between micro groups)
- Drill down into detail without overloading master schedule with thousands of activities

Macro-Micro Roll-up



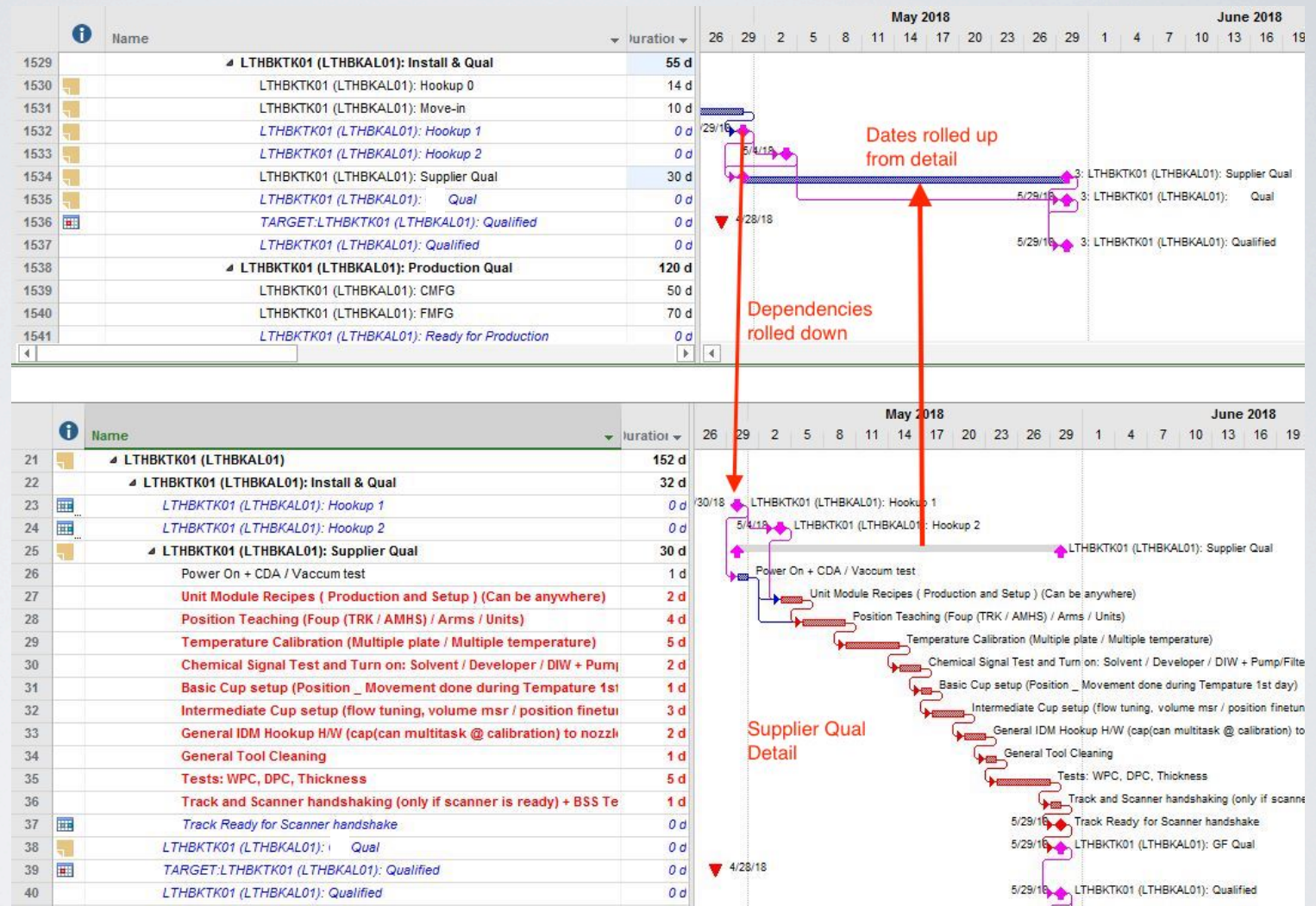
Automatic Information Roll-up

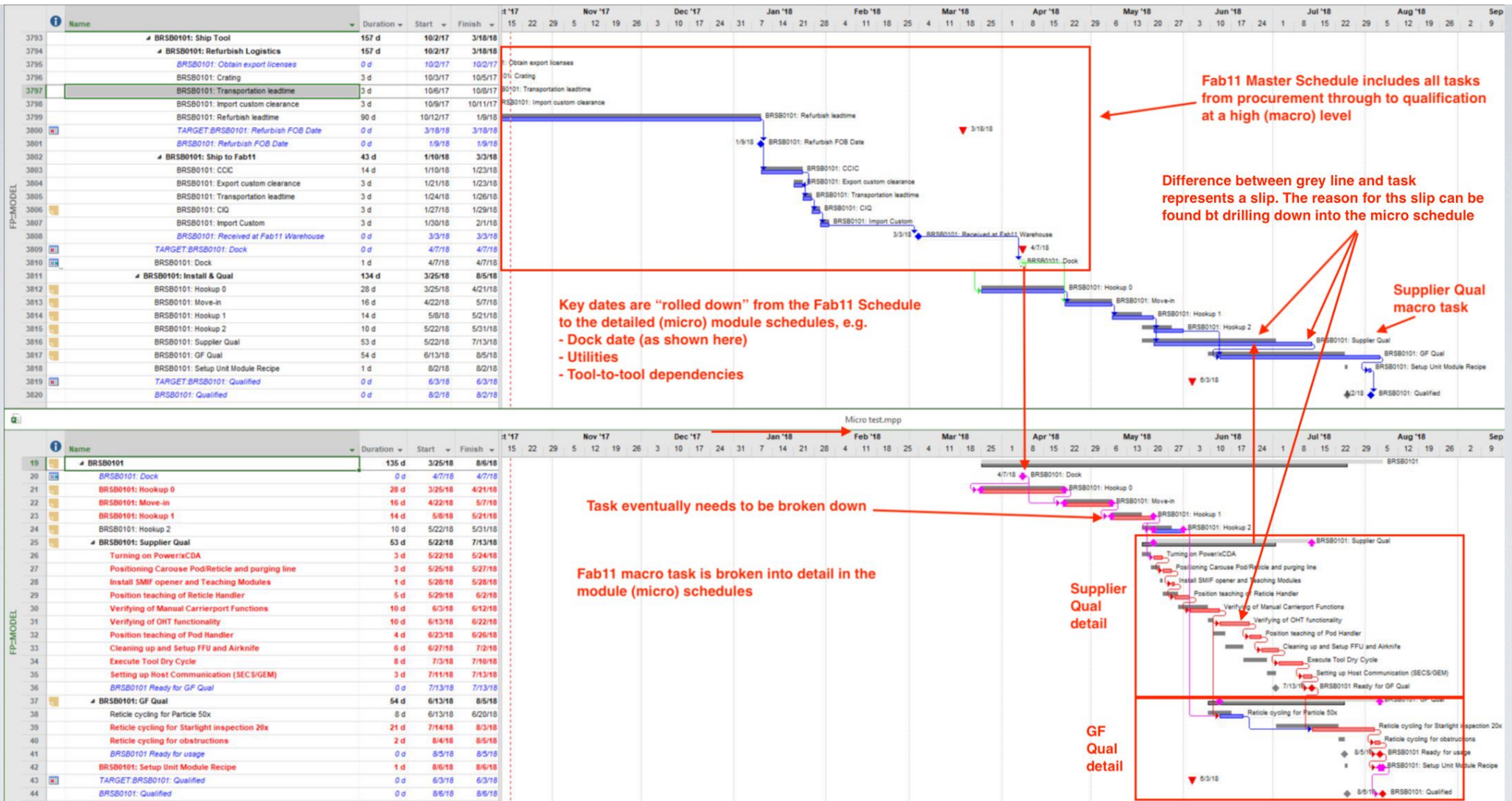


Macro
(Integrated Schedule)

Automatic Roll-up

Micro
(Litho Module Schedule)





Utilities Matrix Importer (FUM)

Source FUM Spreadsheets

Gases	Gas 1	Gas 2
Tool A	X	X	
Tool B		X	
Tool C	X		X
.....			

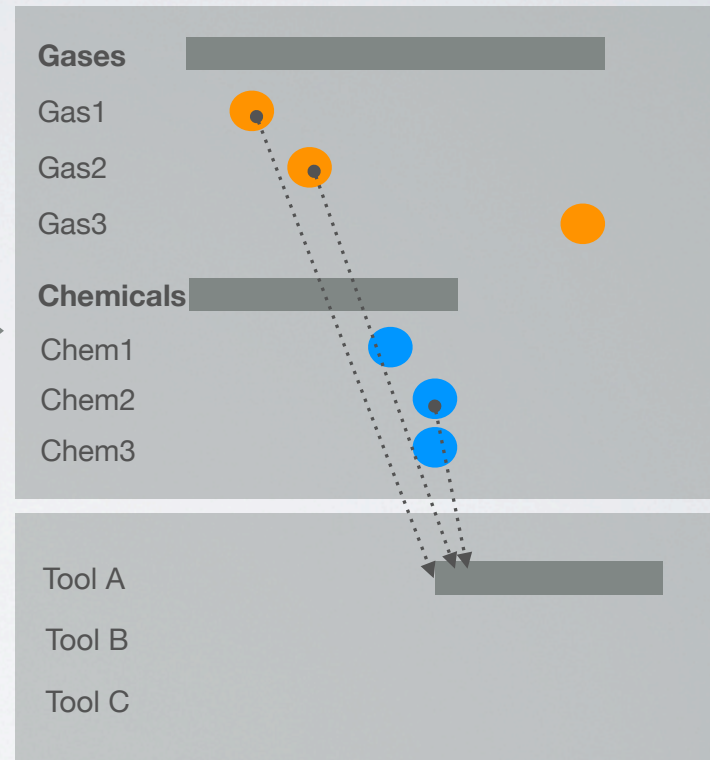
Chem	Chem 1	Chem 2
Tool A		X	
Tool B	X		X
Tool C			X
.....			

- All tools in FUM matrix are in schedule
- All GAC are in schedule

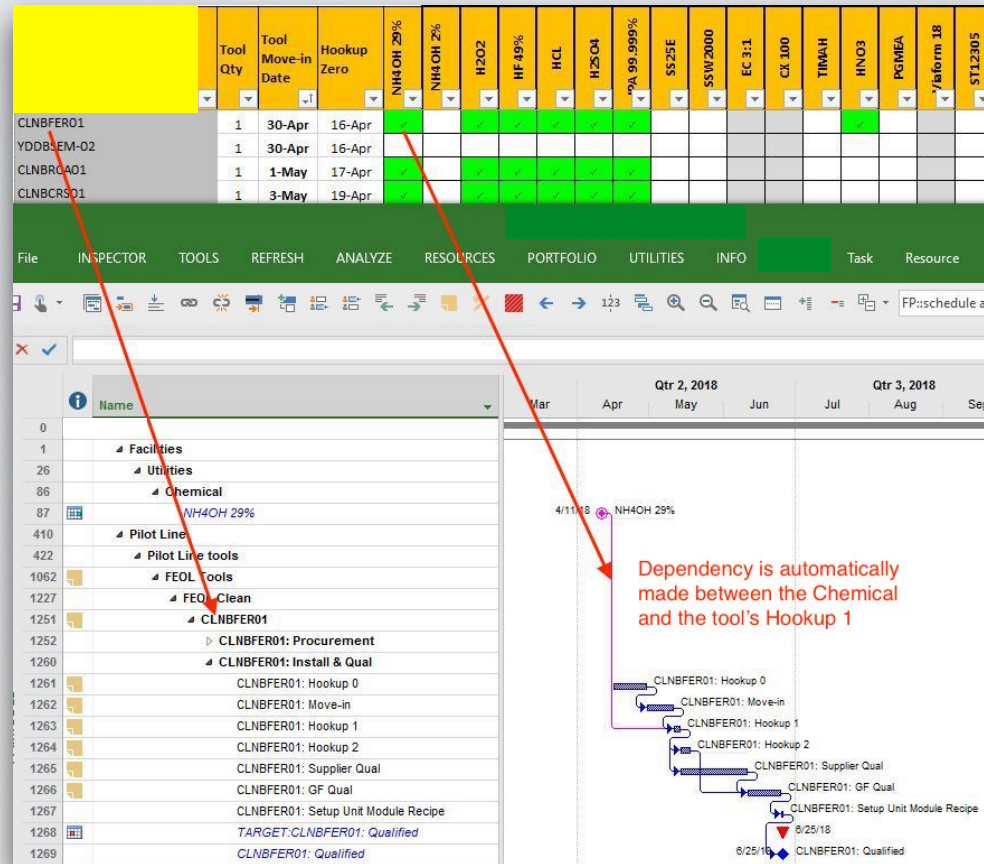
Import SW

Checks for inconsistencies

Macro Schedule



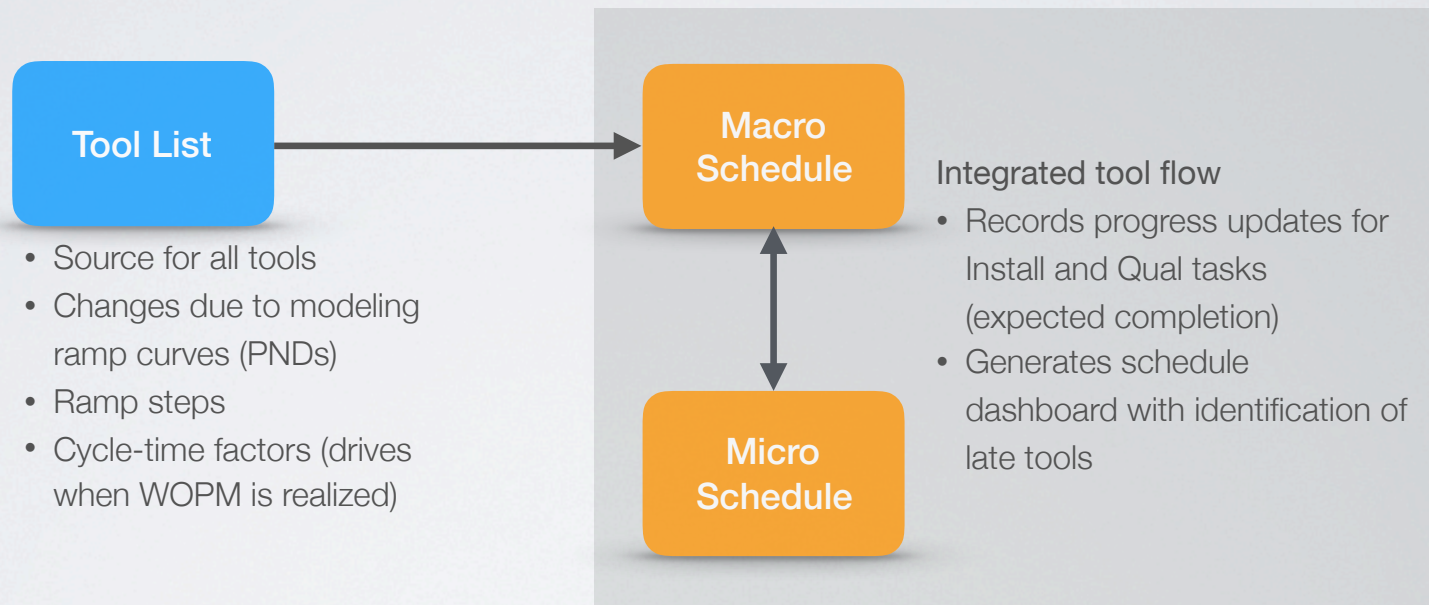
Utilities Matrix Importer (FUM)



Tool Dashboard Exported from Schedule

Tool ID	Module	Negotiation + CEPD	Obtain Approval to Raise PR	PR	PO	Leadtime	Hookup 0	Target Dock Date	Dock Date	Move-In Date	Hookup 1	Hookup 2	Supplier Qual Tier 1	Qual Tier 2	Tool Required Date	Tool Release Date
CLNBCST02	CLEAN	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/11/2018	5/11/2018	5/11/2018	5/14/2018	5/17/2018	5/21/2018	5/28/2018	6/11/2018	6/12/2018	6/12/2018
CLNBCST01	CLEAN	6/12/2017	7/10/2017	7/31/2017	8/7/2017	12/5/2017	4/19/2018	4/19/2018	4/19/2018	4/22/2018	4/25/2018	5/7/2018	5/6/2018	5/14/2018	5/15/2018	5/15/2018
CLNBFER01	CLEAN	6/12/2017	7/10/2017	7/31/2017	8/7/2017	1/19/2018	4/29/2018	4/29/2018	4/29/2018	5/10/2018	5/13/2018	5/17/2018	6/10/2018	6/24/2018	6/25/2018	6/25/2018
CLNBSRC01	CLEAN	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/10/2018	5/10/2018	5/10/2018	5/13/2018	5/16/2018	5/20/2018	6/6/2018	6/13/2018	6/14/2018	6/14/2018
LTHBBS01	METRO	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	4/19/2018	4/19/2018	4/19/2018	4/29/2018	5/2/2018	5/7/2018	5/22/2018	6/5/2018	6/15/2018	6/15/2018
METBCDS01	METRO	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	4/27/2018	4/27/2018	4/27/2018	4/30/2018	5/3/2018	5/7/2018	5/18/2018	5/23/2018	5/24/2018	5/24/2018
METBTHK01	METRO	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	4/19/2018	4/19/2018	4/19/2018	4/22/2018	4/25/2018	5/7/2018	5/10/2018	5/15/2018	5/20/2018	5/20/2018
YDDBMIC01	YDD	6/12/2017	7/10/2017	7/31/2017	8/1/2017	12/29/2017	6/24/2018	6/3/2018	6/3/2018	6/28/2018	7/2/2018	7/9/2018	7/14/2018	7/17/2018	6/27/2018	7/18/2018
DIFBFRP01	DIFFUSION	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/4/2018	5/4/2018	5/4/2018	5/6/2018	5/9/2018	5/13/2018	6/23/2018	7/7/2018	7/16/2018	7/16/2018
IMPBHEI01	IMPLANT	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/2/2018	5/2/2018	5/2/2018	5/6/2018	5/9/2018	9/1/2018	6/23/2018	9/22/2018	8/24/2018	9/23/2018
METBQTX01	METRO	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	4/25/2018	4/25/2018	4/25/2018	4/28/2018	5/1/2018	5/7/2018	5/16/2018	5/21/2018	5/31/2018	5/31/2018
METBSRT01	METRO	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	4/20/2018	4/20/2018	4/20/2018	4/23/2018	4/26/2018	5/7/2018	5/5/2018	5/10/2018	5/11/2018	5/11/2018
METBSRT02	METRO	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/11/2018	5/11/2018	5/11/2018	5/14/2018	5/17/2018	5/21/2018	5/26/2018	5/29/2018	5/30/2018	5/30/2018
YDDBMAC01	YDD	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/30/2018	5/30/2018	5/30/2018	6/2/2018	6/5/2018	6/9/2018	6/20/2018	6/25/2018	7/5/2018	7/5/2018
YDDBMAC02	YDD	6/12/2017	7/10/2017	7/31/2017	8/7/2017	2/3/2018	5/31/2018	5/31/2018	5/31/2018	6/3/2018	6/6/2018	6/10/2018	6/21/2018	6/26/2018	7/5/2018	7/6/2018

Data Sources





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