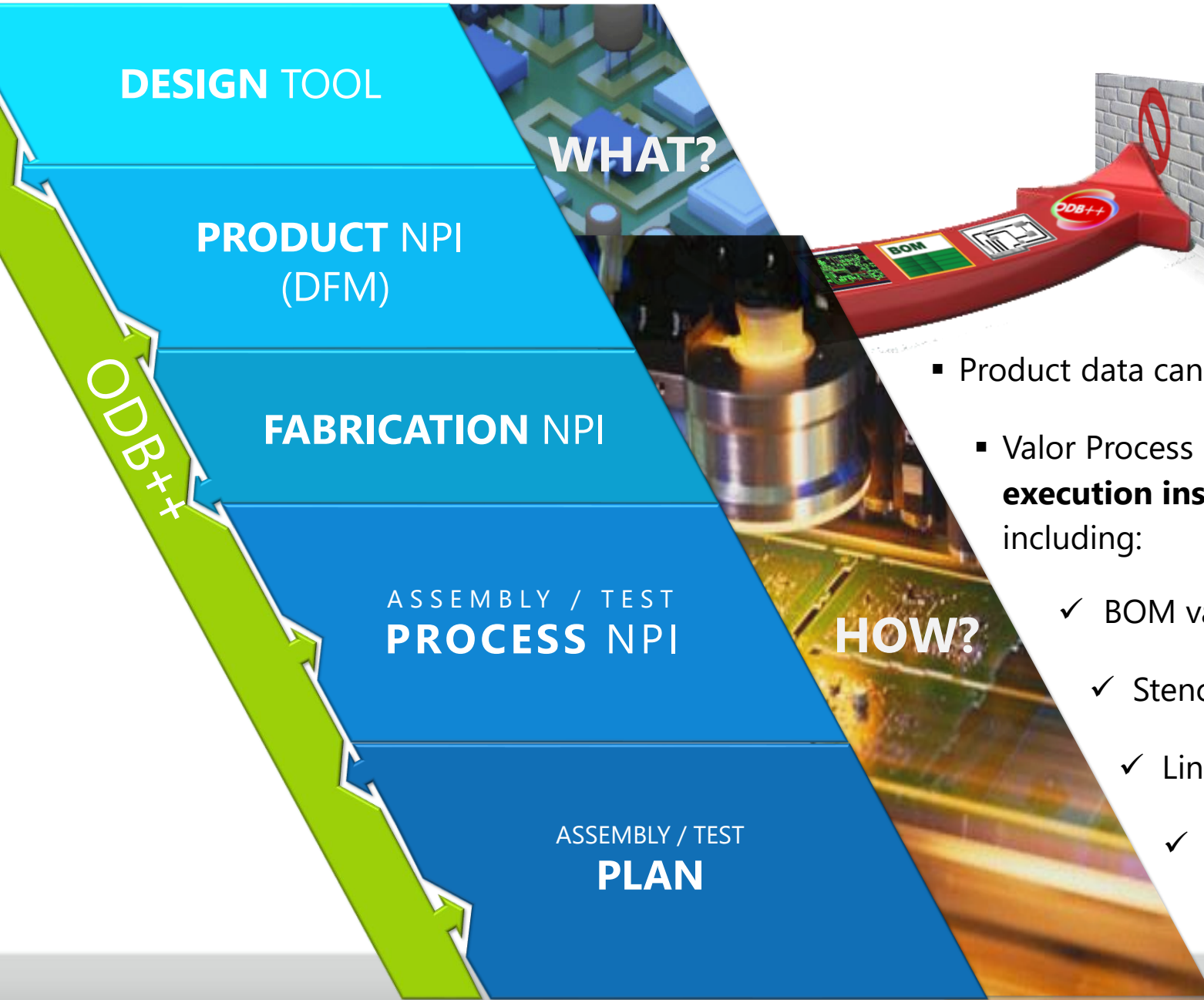


valor

Process Preparation





WHAT?



- Product data cannot be transferred **directly** to the line
- Valor Process Preparation generates **manufacturing execution instructions** for automated and manual stations, including:
 - ✓ BOM validation
 - ✓ Stencil design
 - ✓ Line balancing
 - ✓ SMT, Test and Inspection programming
 - ✓ Generation of documentation / work instructions

HOW?

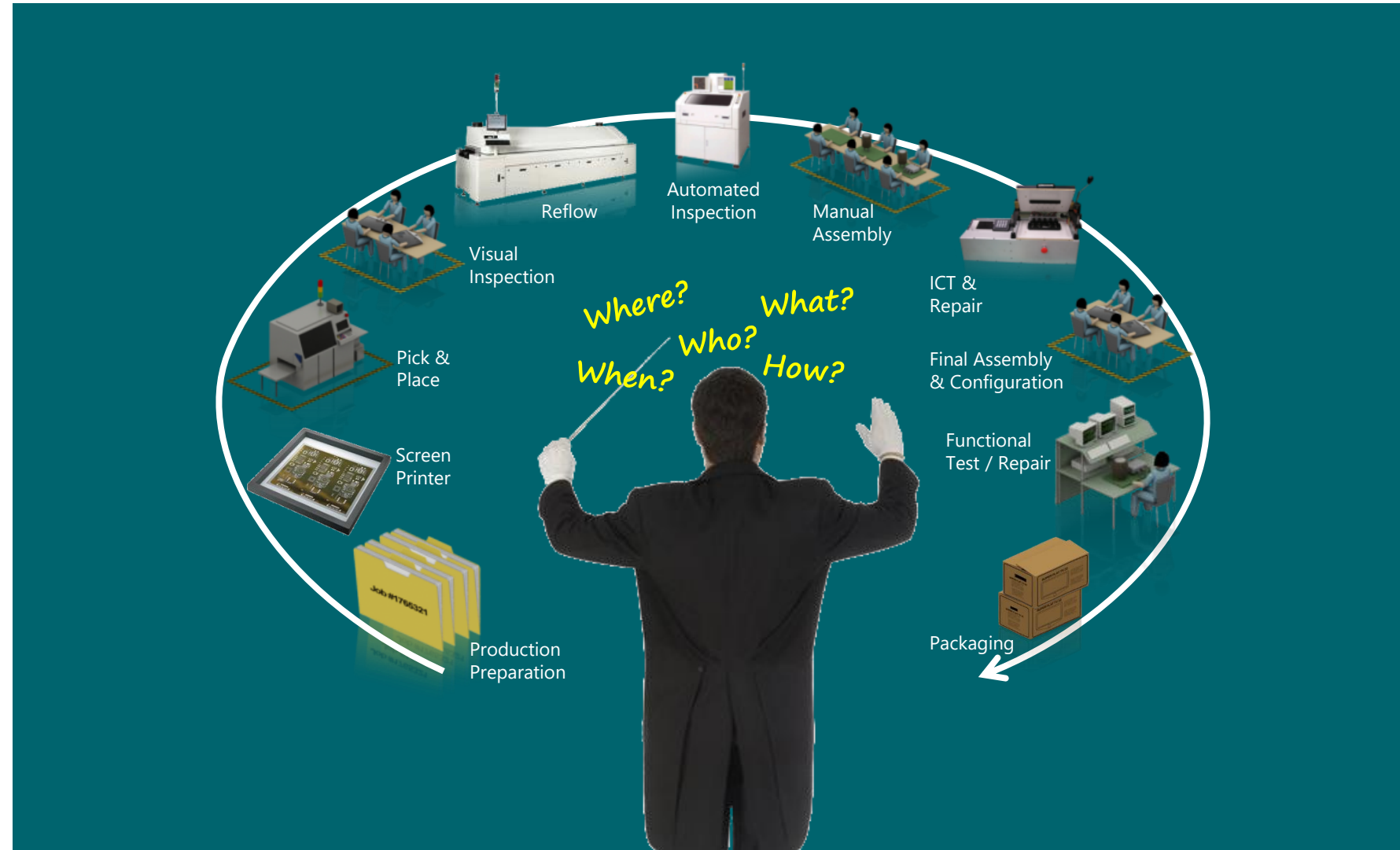
A complete **ANALYSIS, MODELING** and **SIMULATION** environment for maximizing the efficiency of the design-to-manufacturing flow

Accelerate NPI

- ✓ Increase engineering efficiency by using a single tool for all process engineering tasks
- ✓ Eliminate redundant preparation work with Learning Libraries (machine shapes, rotation etc.)
- ✓ Increase efficiency through automation and use of templates (for work instructions, data import parsers, etc.)

Increase line utilization

- ✓ Maximize off-line preparation to eliminate on-line trial and error delays



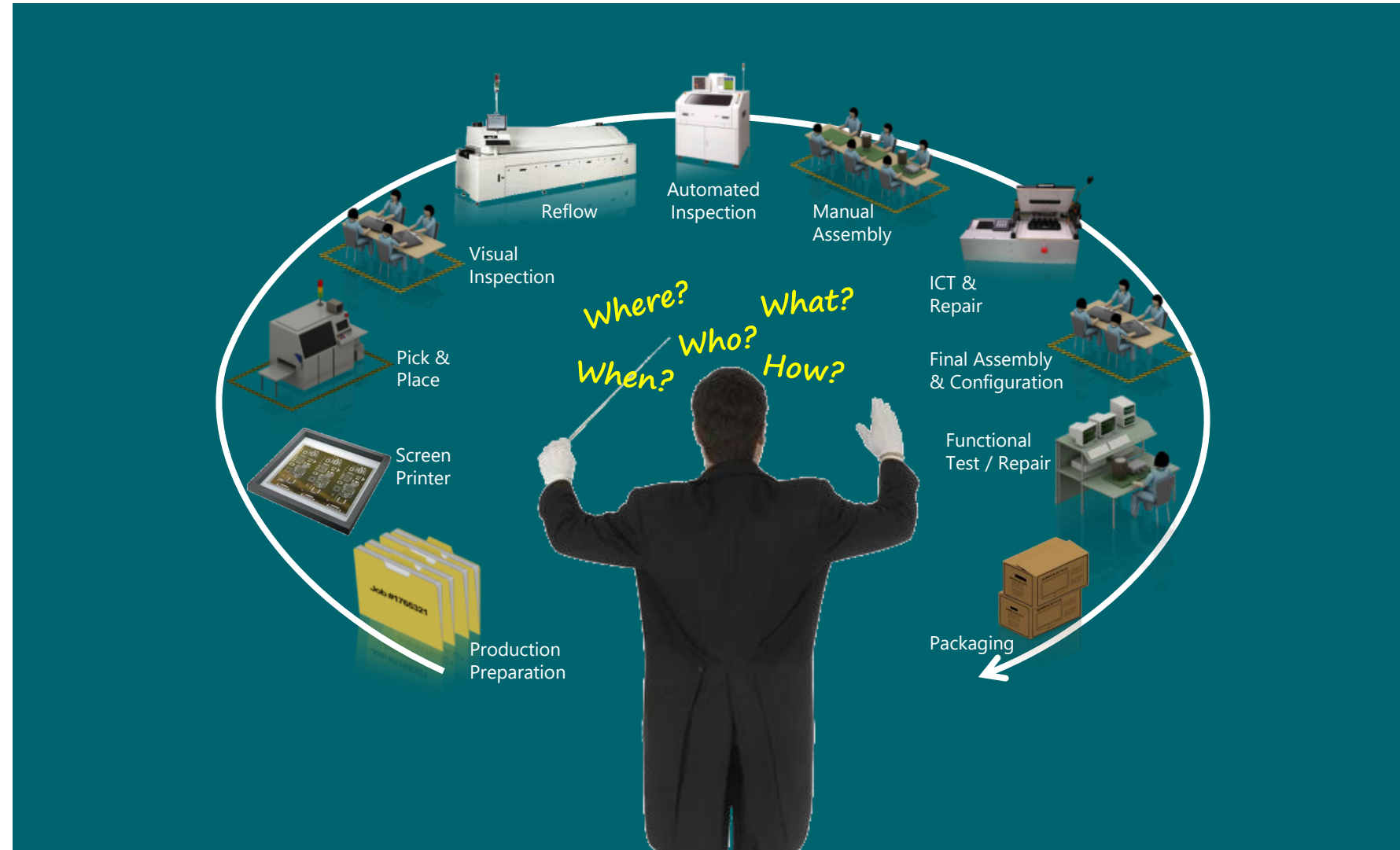
A complete **ANALYSIS, MODELING** and **SIMULATION** environment for maximizing the efficiency of the design-to-manufacturing flow

Preserve manufacturing know-how

- ✓ Consolidate organizational best-practice flows
- ✓ Centralized part libraries incl. rotation neutralization and machine shapes
- ✓ Custom data preparation flows can be defined, enforced, and re-used

Product portability

- ✓ Leverage ODB++ to seamlessly move production between lines and factories – eliminate engineering time and increase quality of end product



Customer testimonials



- ✓ Reduced line setup time by 70%
- ✓ Machine uptime increased by 50%
- ✓ Changeover time reduced from 50 minutes to 13 minutes
- ✓ Annual savings of \$1.4M

24h NPI Express – Milpitas, CA
From idea to validated process

Valor MSS Process Preparation

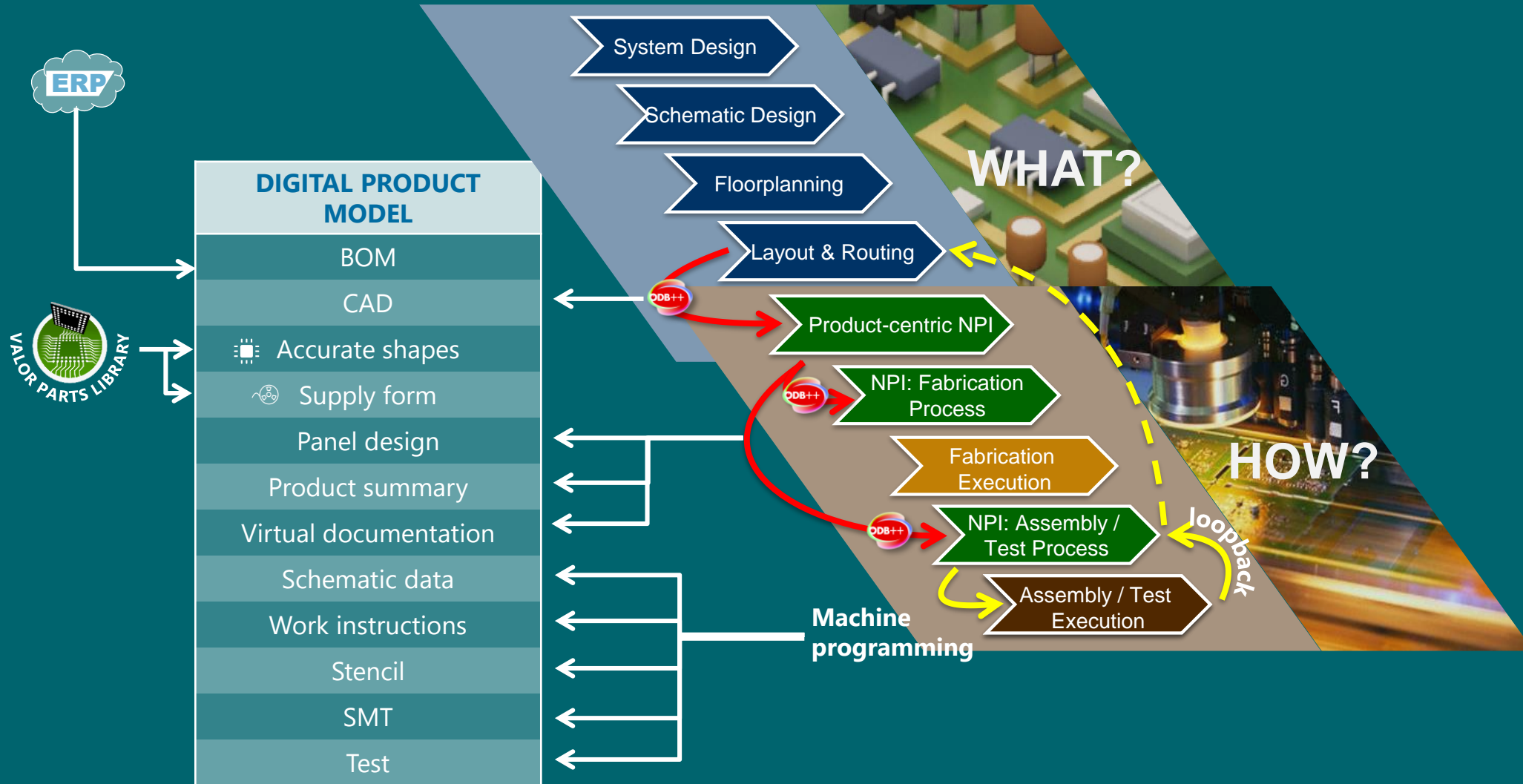
SOLUTIONS FOR YOUR IDEAS

24h NPI Express – Using Valor tools in Germany to prepare work orders for production in the US – saving time and implementing “follow the sun” methodology

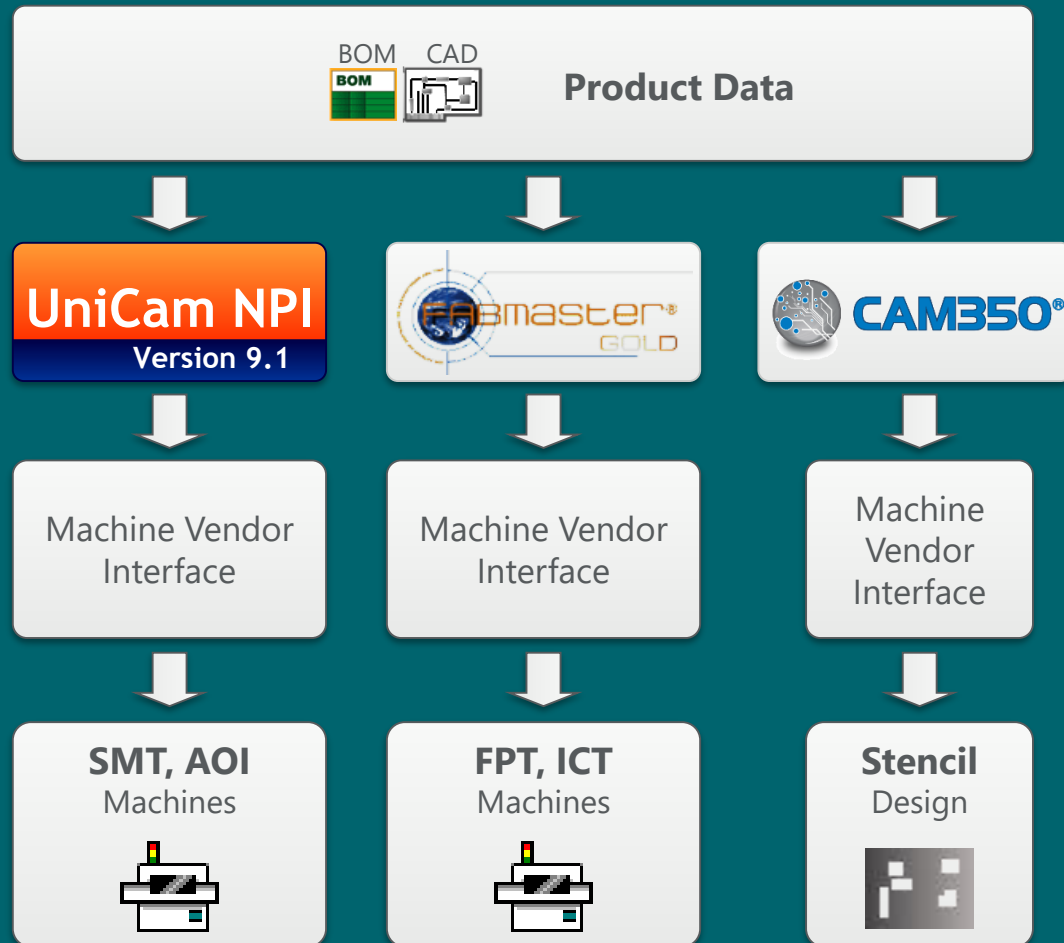


Time from BOM/AVL to production-ready programs and documentation reduced from 3-5 days to 1-2 days

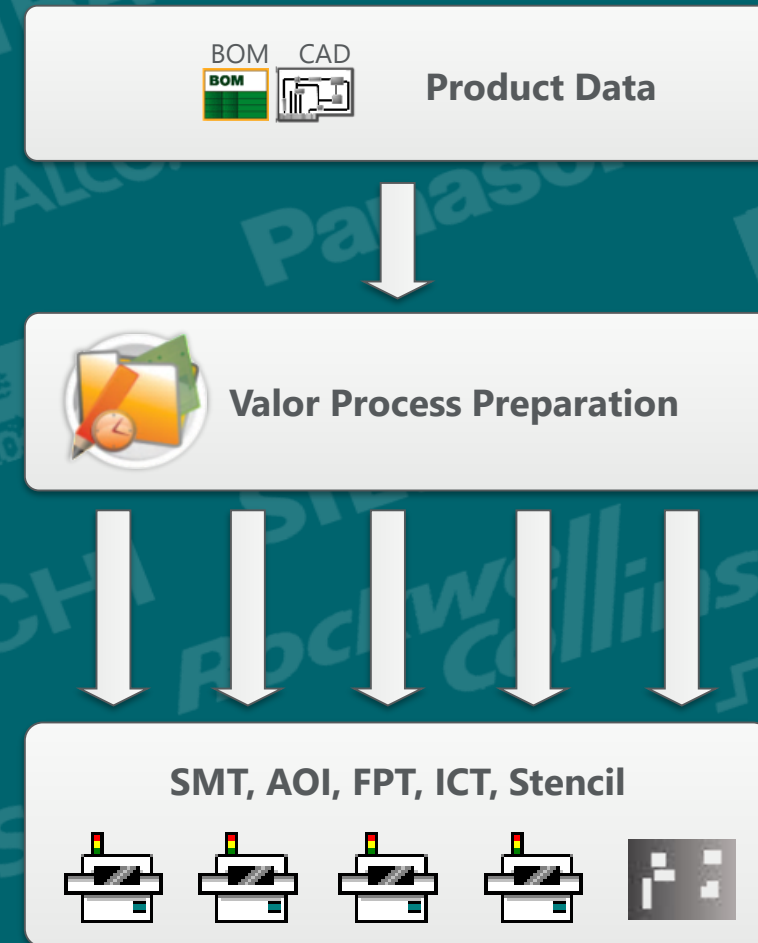
Building the digital product model



Harmonized process through a single engineering tool

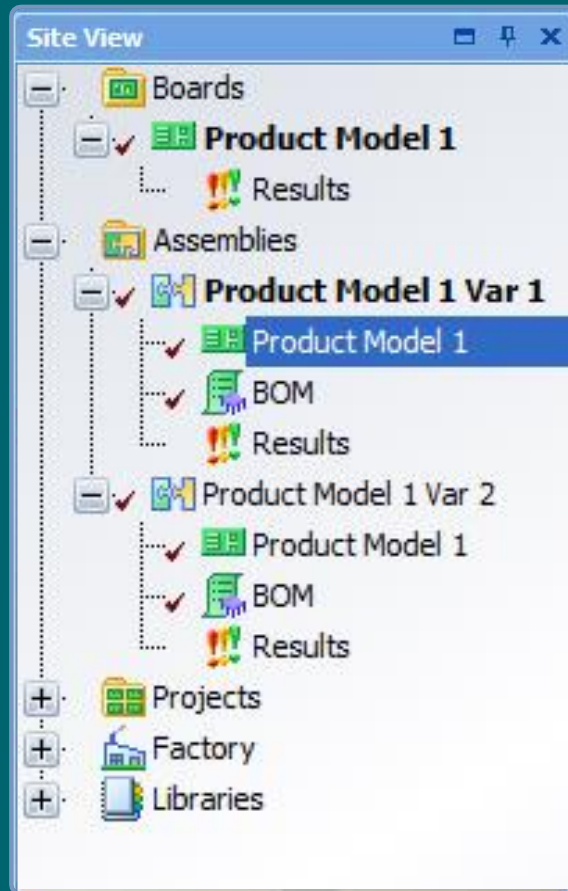


BEFORE: Product model created multiple times

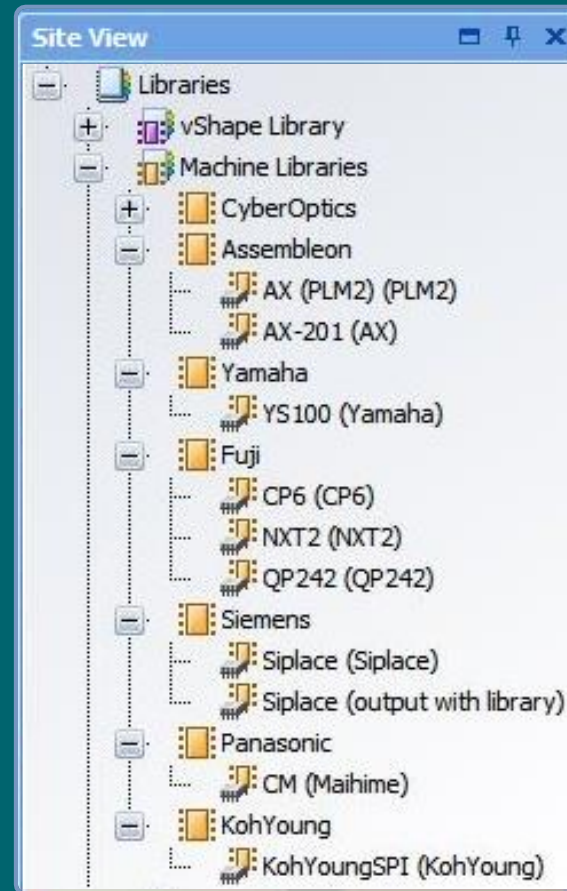


AFTER: Time-to-production reduced by more than 20%

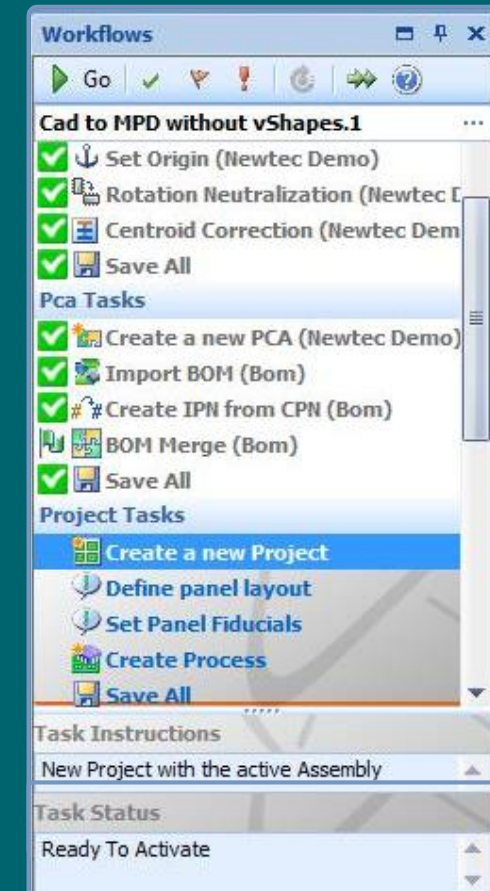
Single data model covers multiple processes and vendor platforms



Hierarchical view of assemblies,
Including support for multiple instances

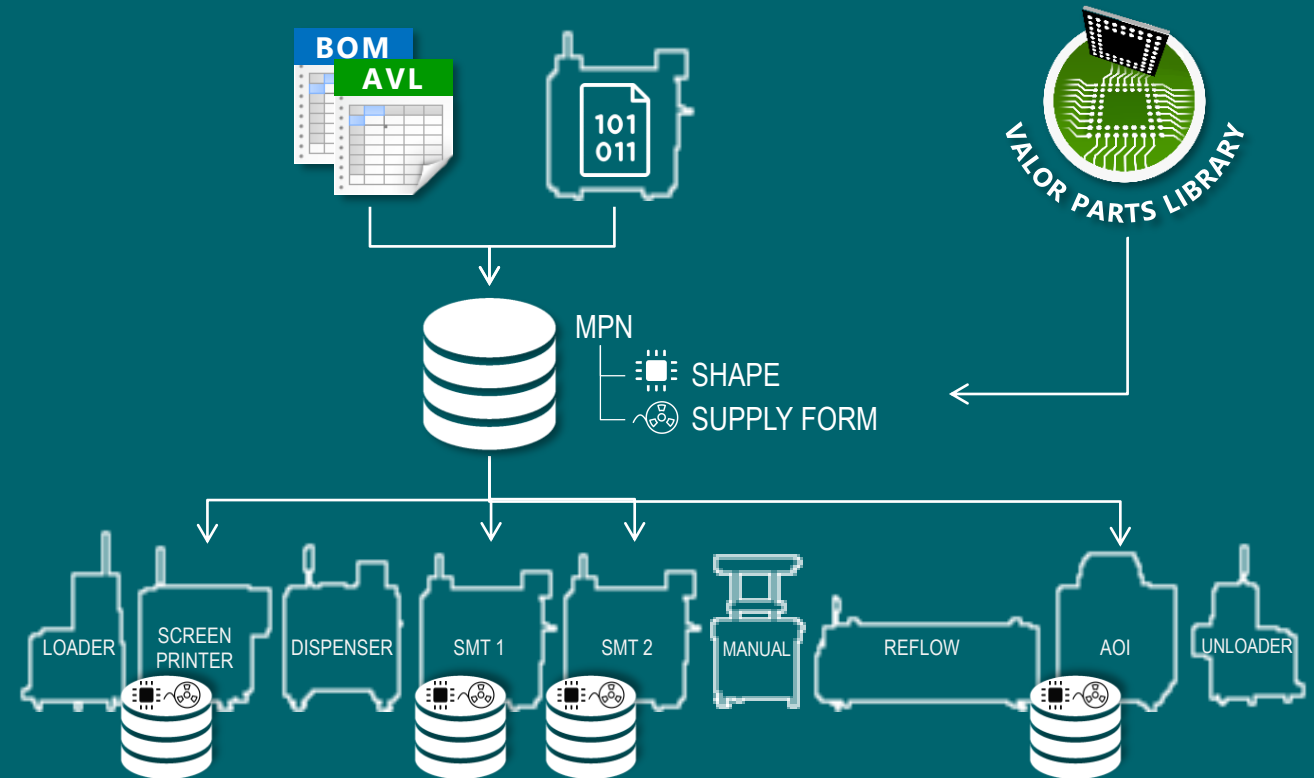
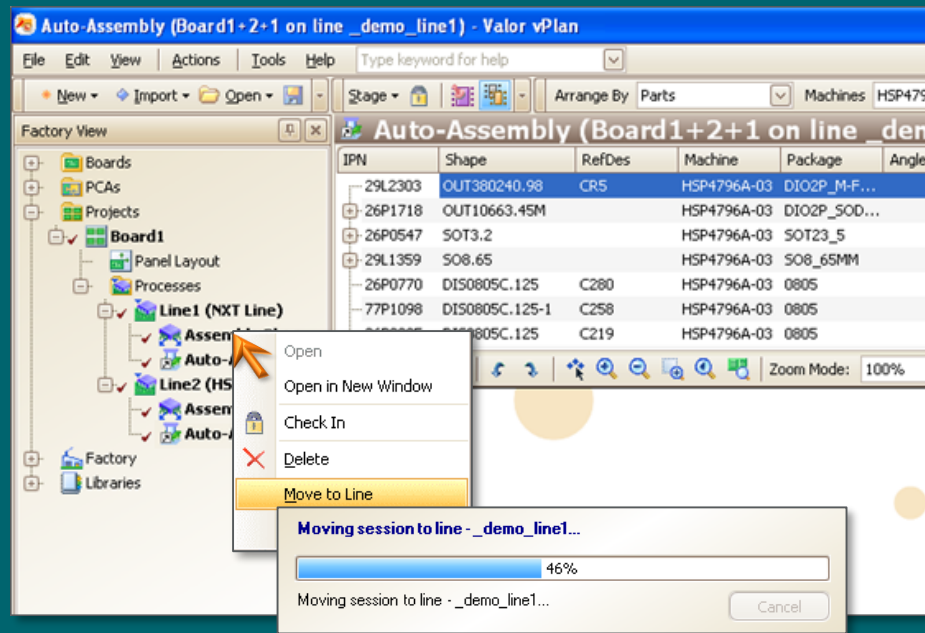


Machine shapes can be
generated on demand



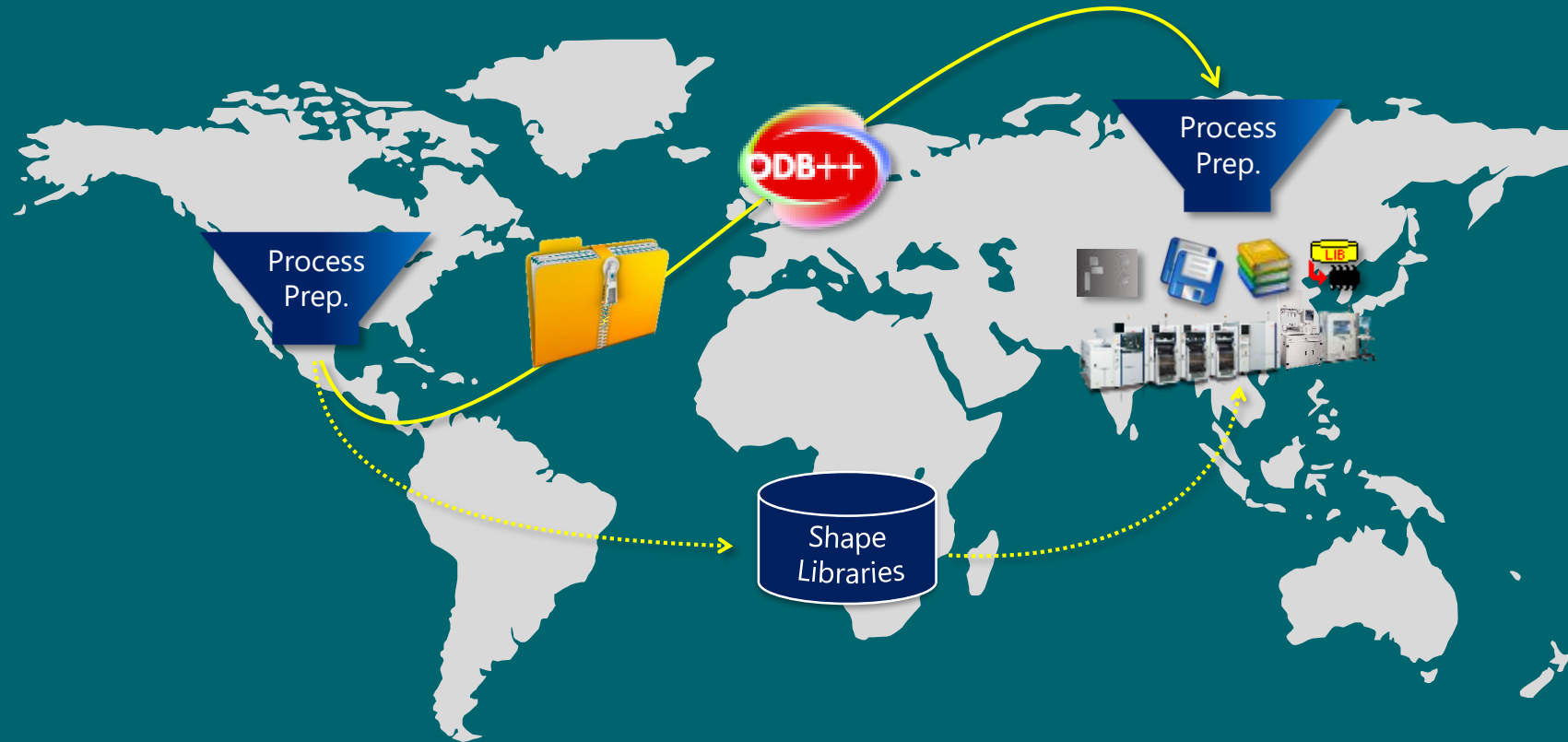
Customizable workflows allow multiple
users to share projects and track their status

Optimize SMT program portability with patented machine shape auto-generation



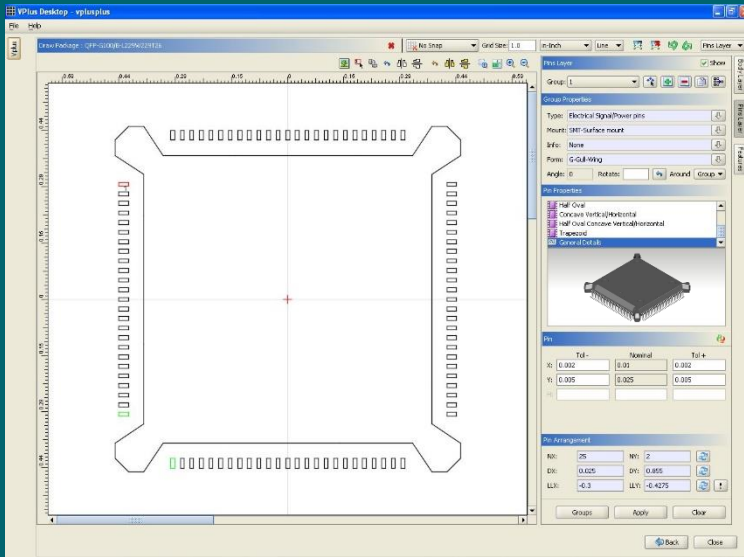
- Part libraries can be created for each machine directly from the Master Parts Library
- Users can create/modify custom parameters to enhance part/shape data
- Native machine programs can also be imported and quickly converted into alternate machine formats

Enable simple work-order portability



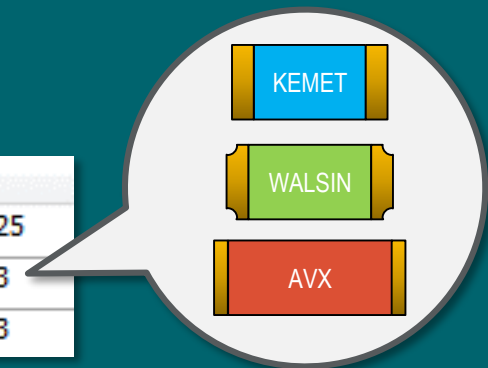
- Single product model can drive all manufacturing of a product worldwide
- Product NPI tasks can be done once at corp. competence centers
- Only process NPI needs to be repeated at each mfg. environment.

Valor Parts Library (VPL)



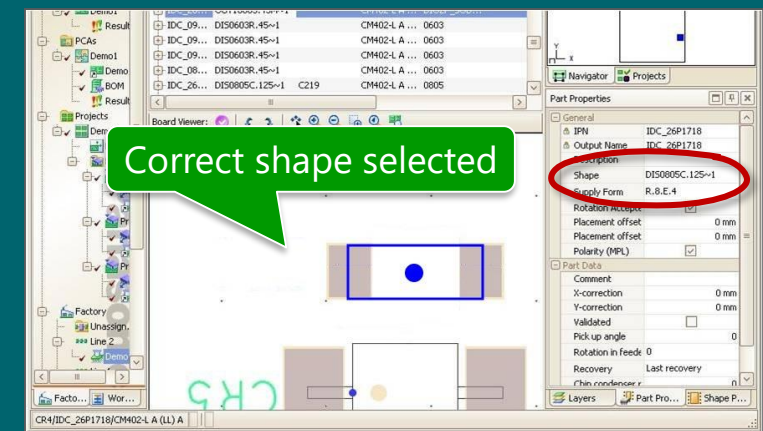
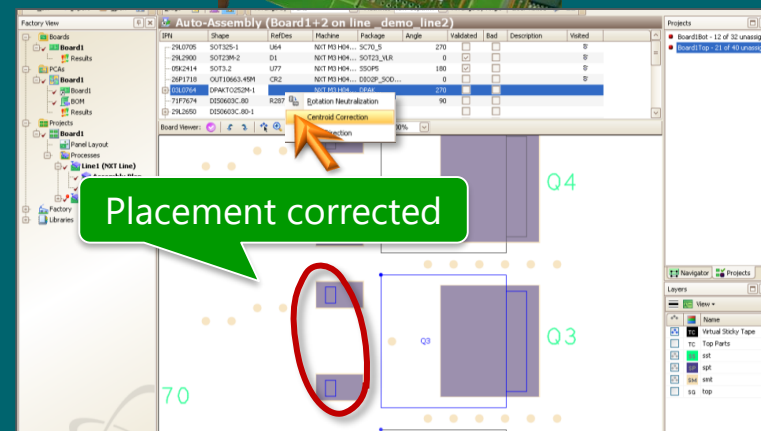
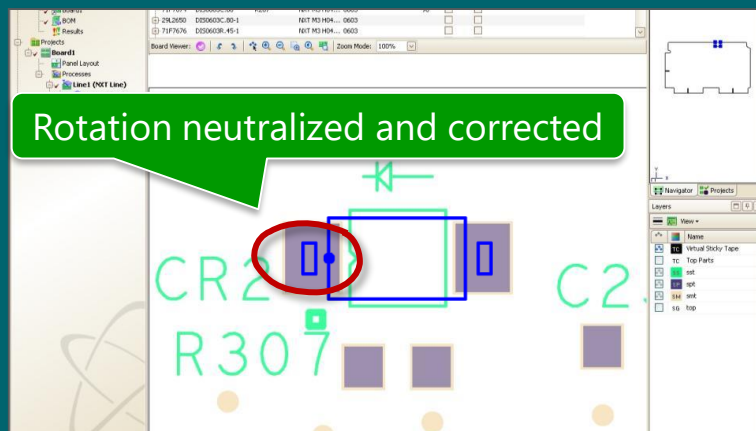
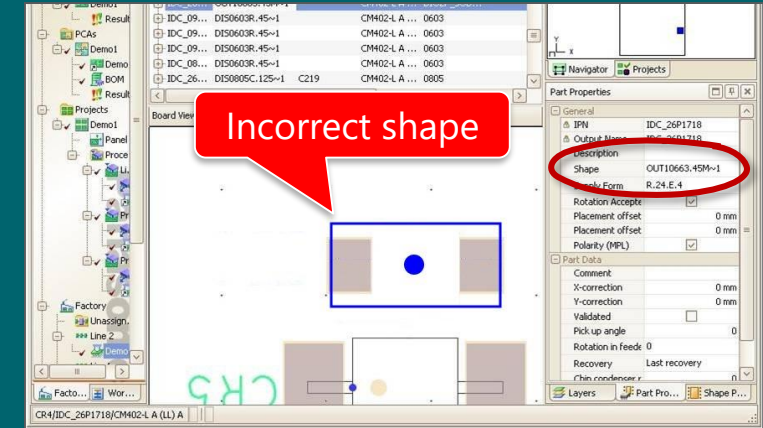
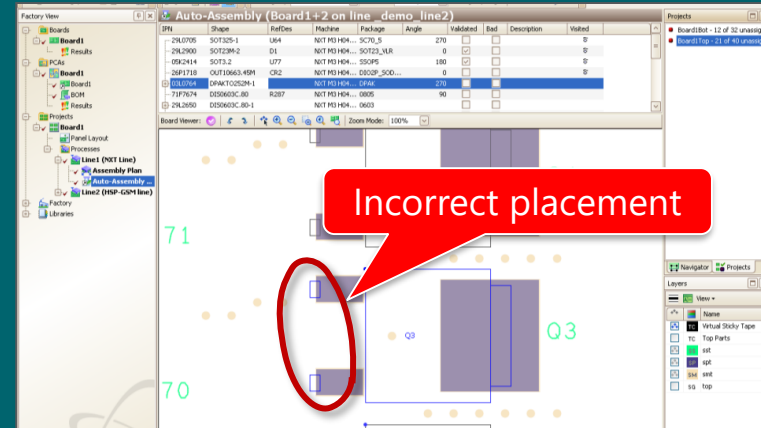
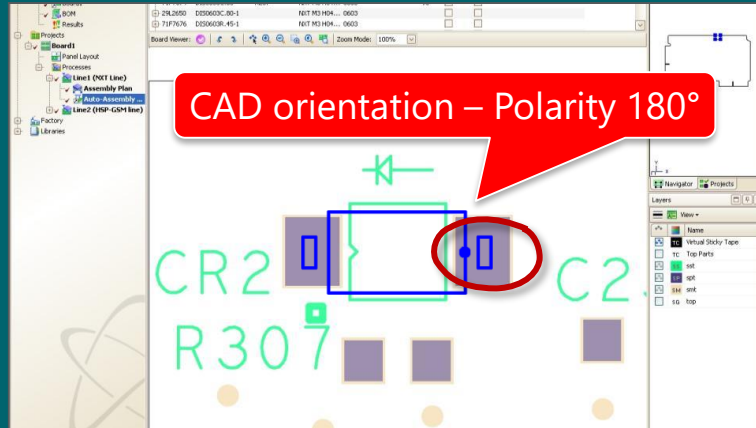
- ISO9001-certified library covering over 35 million part numbers
 - ✓ Accurate shape data
 - ✓ Pin contact area
 - ✓ Component classification (JEDEC)
- Enables accurate virtual-prototype build

Item	CPN	Manufacturer	MPN	VPL-Package	
1	1	G8316005-244	KEMET	C1210C22K5RAC-LWR	DSO-C2/X-L60W32T25
2			WALSIN	1210B22K5KKCT-CRM	DSO-C2/X-L60W31T3
3			AVX	10125C224KATA2A-KOL	DSO-C2/X-L64W25T3



Shapes of alternate parts in the AVL can be easily compared for inconsistencies
(example: the parts above provide the same electrical function, but require different pad layouts)

“Virtual Sticky Tape” – Improve SMT productivity with offline placement simulation



Documentation creation

- Built-in and user-defined templates for static and interactive documentation
- Include any design, product model, SMT, Test, and other production information
- Can include embedded images and files (e.g. JPG, PDF)

Documentation Editor - [Product Model 1 () - Process 1- Manual Assembly - Manual Station 1]

File Edit View Insert Entities Text Arrange Tools Help

Name Station

- ScreenPrinter Set-up
- Reflow Settings
- Polarity Check
- Manual Assembly
 - Manual Assembly - ... Manual Assembly - M
 - Manual Assembly - ... Manual Assembly - M
 - Manual Assembly - ... Manual Assembly - M
 - Manual Assembly - ... Manual Assembly - M
 - Manual Assembly - ... Manual Assembly - M
- QA

Package

Zoom

Name Parts Chosen

Category	Value
Placement Info	
Part Info	
AVL Info	
Package Info	
Placement Assignment	
Customize Info	

Icon IPN Description Quantity RefDes

	10021208	J CMC MBS P48 R1/3.5/3.7SN	1	KN5
	10021563	J CMC MBS P48 B-KEY	1	KN4
	10021564	J HDR2 MBT P14 E1AU 5.84 S2.54	1	JP1
	N901972	LK@FIL PHI FILTER BNK002-01	1	L60
	N902898	@RV1011 VDR-SIOV S20K30 AUTOO	5	V9, V15-V18
Total:			9	

INSTRUCTION:
Wave Soldering Top - 1

MODULE: PB2899500
REVISION: D0
CUSTOMER: GRAMMER EIA ELECTRONICS

Page 16 of 13

Complete testability analysis (DFT) of PCAs

- Identification of high risk areas
- Feedback to design about inaccessible points
- Comprehensive yield analysis to quantify testability

Test Probe Placement Summary

General Info | Nets | Probes

Name	Top	Bottom	Both	Total
All Nets				
Total	3	0	146	149
Accessible	3	0	139	142
Accessible coverage (%)	100	0	95	95
Multiple Pin Nets				
Total	3	0	127	130
Accessible	3	0	124	127
Accessible coverage (%)	100	0	98	98
Single Pin Nets				
Total	0	0	15	15
Accessible	0	0	15	15
Accessible coverage (%)	0	0	100	100

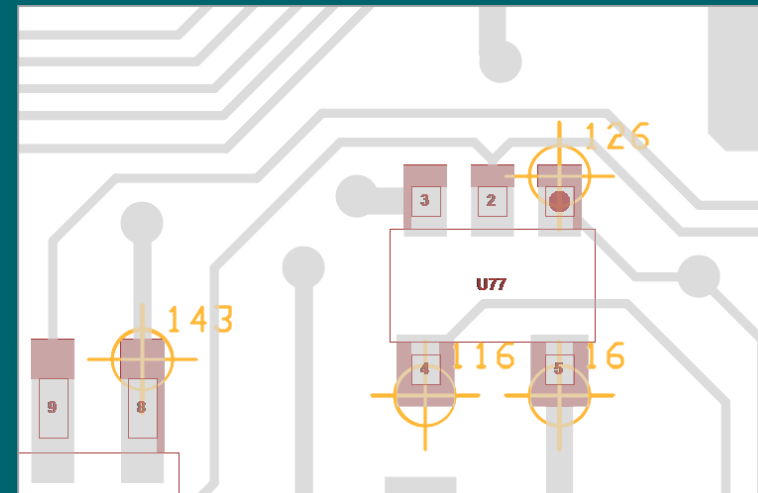
Go to Results | View Report... | Close

Test Probe Placement Summary

General Info | Nets | Probes

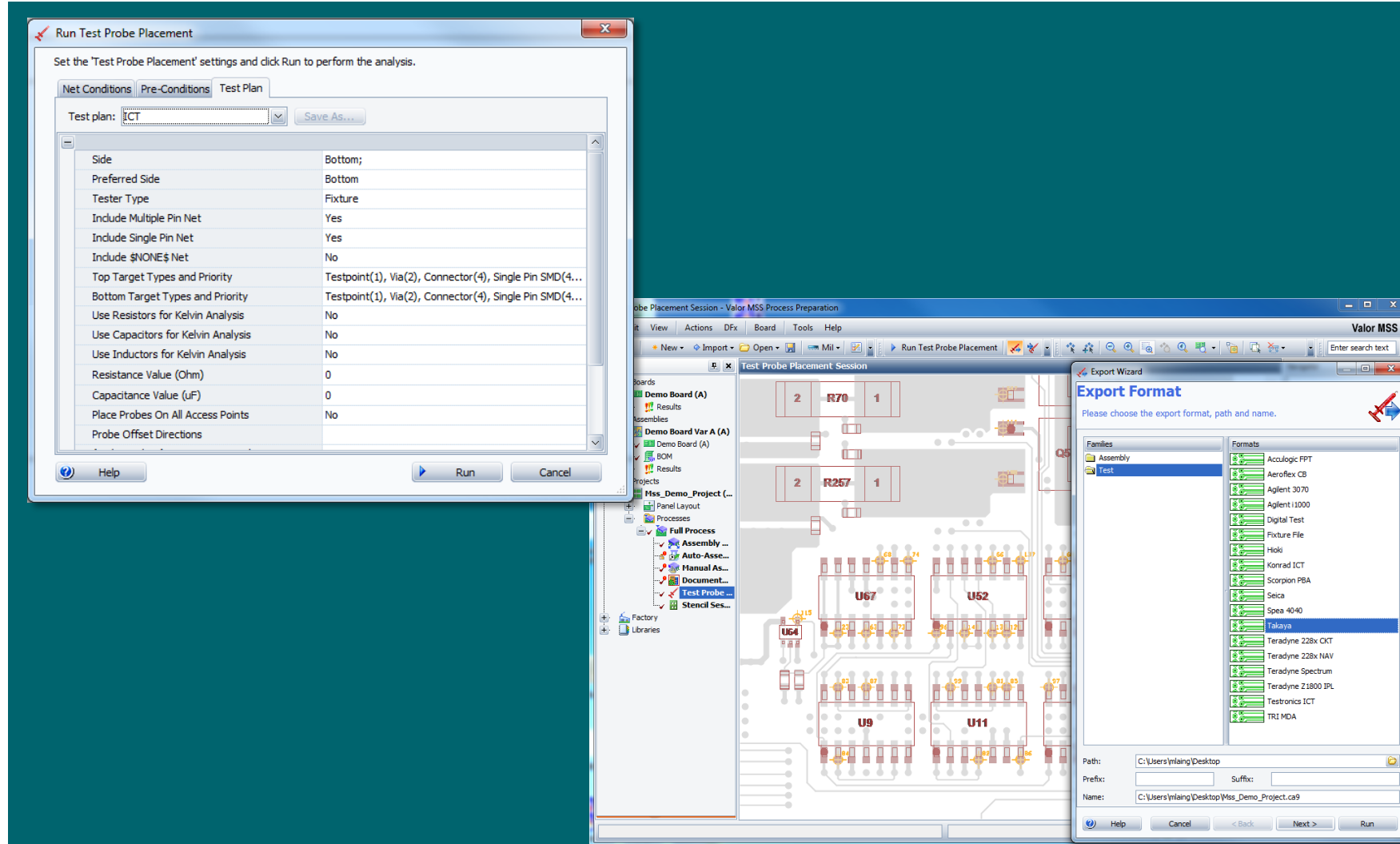
Name	Count	Coverage
Placed probes	928	99 %
Unplaced probes	6	1 %
Nets not probed	6	2 %
Nets partially probed	0	0 %
Nets completely probed	311	97 %
Nets not analyzed	3	1 %

Go to Results | View Report... | Close



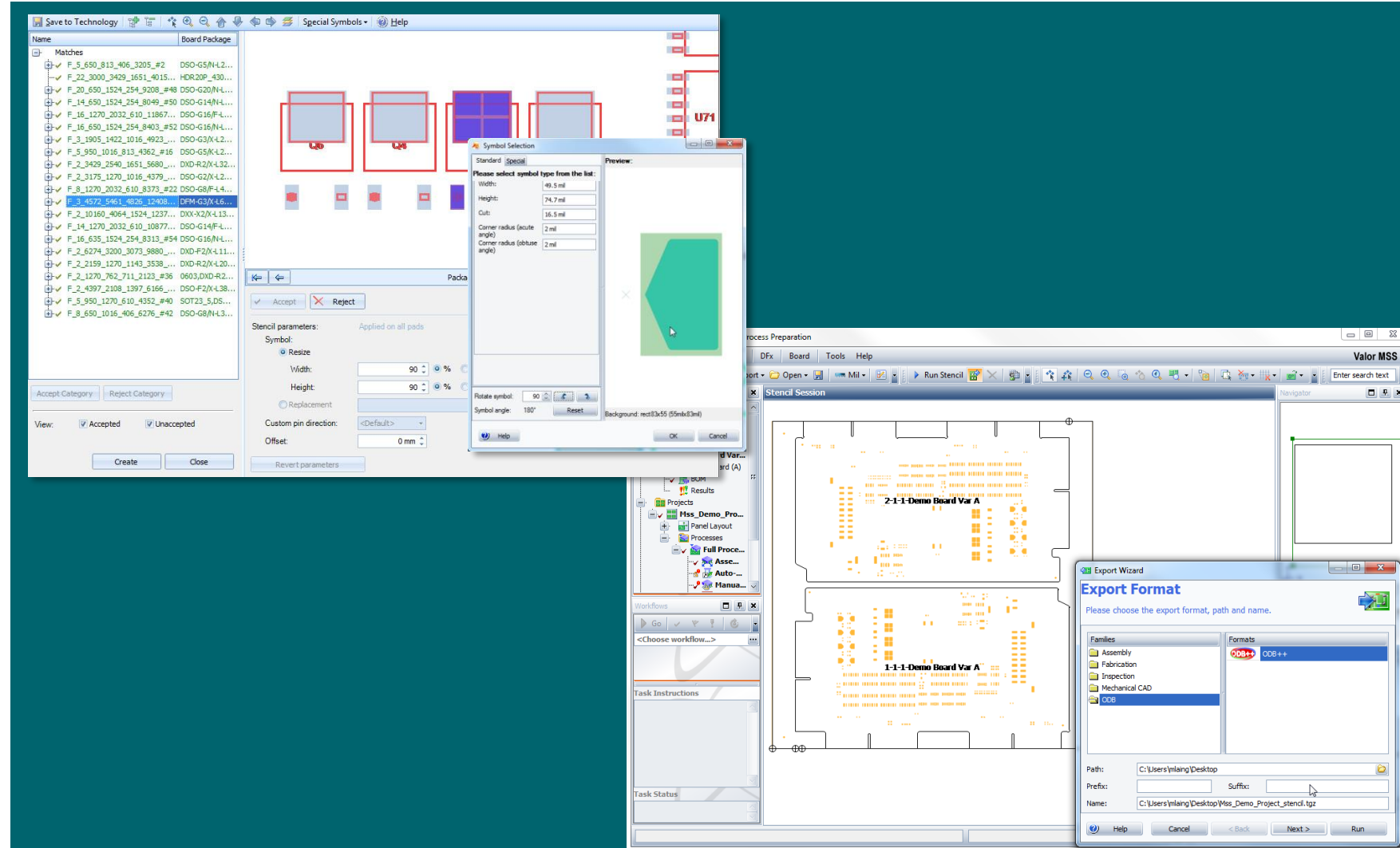
Tester and inspection programming

- Automated test probe selection and positioning based on available access to each electrical node
- Full reporting of placements including reason codes for inaccessible points
- Leading industry tester formats supported
- AOI & AXI tester programming
- Programs take into account the location of AOI/AXI machines on the line and components that should be placed up to that point



Stencil design

- Automatically create stencils from product model
- Customizable rules and aperture properties
- Output to ODB++ or Gerber 274X



Value-Add Services

❖ Valor Process Preparation deployment service

- *Lean Process* consulting - Get the tools implemented and fine-tuned to YOUR environment
- Customization and fine tuning of machine shape auto-generation rules

❖ Process automation

- Leverage Valor Process Preparation's comprehensive API to streamline data flow from design to manufacturing

❖ Manufacturing Cost Simulator & Quote Builder

- Uses data available from Valor Process Prep. to generate accurate manufacturing cost simulation
- Based on BOM, factory cost model and design complexity
- Optional: integration to 3rd-party component cost providers (e.g. SiliconExpert, DigiKey)

Design Complexity Factor	Rating
1. Single sided	
2. Double sided	
3. For each 200 placements per side	
4. For each 5 BGA's per side (>0.8mm pitch and >25mm ²)	
5. For each 3 uBGA's per side (<0.8mm pitch and <25mm ²)	
6. > 8" in the X dimension	
7. > 8" in the Y dimension	
8. For each 2 LGA's per side	
9. For each 10 QFN's > 10mm ² per side	
10. For each 5 QFN's < 10mm ² per side	
11. For each 10 QFP's > 20mil pitch per side	
12. For each 5 QFP'S < 20mil pitch per side	
13. Finish consideration (Enig > HASL > Silver > OSP)	
14. RoHS consideration	
15. Layer count / copper weight	
16. Rigid flex PCB	
17. Press fit connectors (count / type)	
• 1-5 Easy	
• 6-10 Intermediate	
• 11-15 Difficult	
• 16+ Very Complex	
18. Component density (parts/square inch)	
Total	

#1 in support

- SupportNet - Open to all customers under support:

- ✓ TechNotes
- ✓ Best Practices
- ✓ Tutorials
- ✓ Quick Tips
- ✓ Software distribution portal
- ✓ Marketing Materials
- ✓ Support requests from customers

- Mentor IDEAS:

- ✓ Easy way to provide feedback and improvement suggestions
- ✓ Vote to affect the priority of proposed enhancements

The screenshot displays the Mentor Graphics SupportNet interface. At the top, there's a navigation bar with tabs for Overview, Troubleshoot, Downloads, Reference, Service Requests, and System Admin. Below this, the 'MY PRODUCTS' section lists 'Valor NPI' with sub-links for 'Valor ODBG Interface for Board Station' and 'Valor Parts Library (VPL)'. A 'Navigating SupportNet' banner encourages users to find, download, and troubleshoot. The main content area is split into 'Product Highlights' (with news about Xpedition release VX and Solaris (SPARC) platform support) and 'Troubleshoot' (with a dropdown for 'Select Troubleshooting Task' and a 'RECENTLY PUBLISHED' list of articles). A 'Downloads' section shows 'CURRENT RECOMMENDED RELEASES'. Below the main content, there's a navigation bar with 'PRODUCTS', 'SOLUTIONS', 'SUPPORT', 'TRAINING & SERVICES', and 'COMPANY'. The 'MENTOR IDEAS' section is active, showing a search bar for 'Mechanical Analysis' and buttons for 'Post Idea', 'Vote', 'Comment', and 'Blog Home'. A word cloud of technical terms is visible, and a 'Welcome, Ivai' login notification is present on the right. At the bottom, a 'Centre of Pressure as Part of a Parametric Study' article is partially visible.

Virtual lab

The screenshot shows the landing page of the Valor Process Preparation Virtual Lab. At the top, the Mentor Graphics logo is visible. The main heading is "Valor Process Preparation Virtual Lab". On the left, there is a vertical navigation menu with icons for "CONNECT TO LAB", "LAB MATERIALS", "TIME REMAINING", "EXTEND SESSION", "HELP", and "CHAT/CONTACT US". The central content area features a large blue button that says "Connect Now" with a checkmark icon, and the text "Your virtual lab is ready". Below this, there are two informational sections: a "Tip" section with an information icon and a "Having trouble with your virtual lab?" section with a question mark icon. At the bottom, there is a footer with site navigation links and contact information.

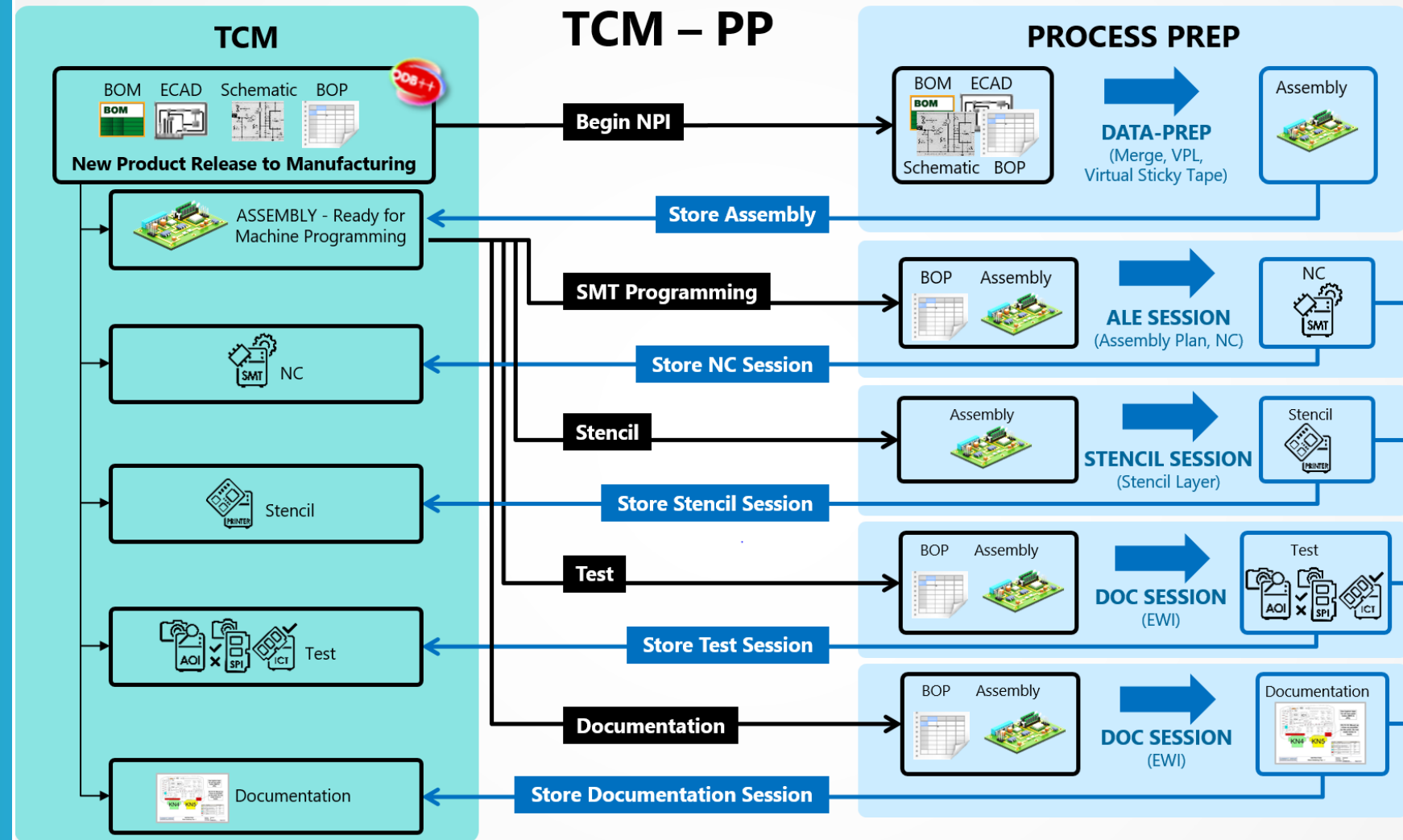
The screenshot displays the Valor Process Preparation VLab software interface. The main window shows a detailed PCB layout with various components and layers. On the left, there is a hierarchical tree view showing the project structure, including "Boards", "Assemblies", "Projects", and "Libraries". On the right, there is a "Layers" panel with a list of layers and checkboxes. The interface is titled "Valor MSS" and includes standard software menus like "File", "Edit", "View", "DFx", "Actions", "Board", and "Tools". The status bar at the bottom indicates the current file path and coordinates.

<http://tinyurl.com/ValorPPlab>

The screenshot shows the "Valor Process Preparation Evaluation Guide" document. The title is prominently displayed at the top. Below the title, there is a sub-heading "Virtual Labs: Valor Process Preparation". The guide lists several topics covered in the tour, including "Introduction to the Virtual Labs", "Client Tour", "Centralized Data Preparation and Library Management", "In-Circuit Test Programming", "Flying Probe Test Programming", "Stencil Design", "SMT Programming", "SMT Move to Line and Auto-Generation", and "Work Instructions". The Mentor Graphics logo is visible in the bottom right corner of the document.

Integrated to TCM as the process repository

- Increase manufacturing planning efficiency by leveraging Teamcenter Manufacturing as the overall process repository
- Prepare process plans for New product Introduction (NPI)
- Identify the impact of design changes on box build lines
- Deliver updated work instructions





HARMAN

BUSINESS CHALLENGE

- Improve NPI time and cost
- Standardize engineering flow
- Improve global manufacturing flexibility

BUSINESS RESULTS

40%

ENGINEERING
TIME SAVED

2X

FASTER
NPI

\$0.4M

ANNUAL
SAVING

Thank You

