

Webinar; How electronics assembly companies can speed up NPI's with accurate quoting and advanced process engineering

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Electronics Assembly Software solutions**



Another Webinar ... Why?



Progress is impossible without change, and those who can't change their minds cannot change anything.

George Bernard Shaw



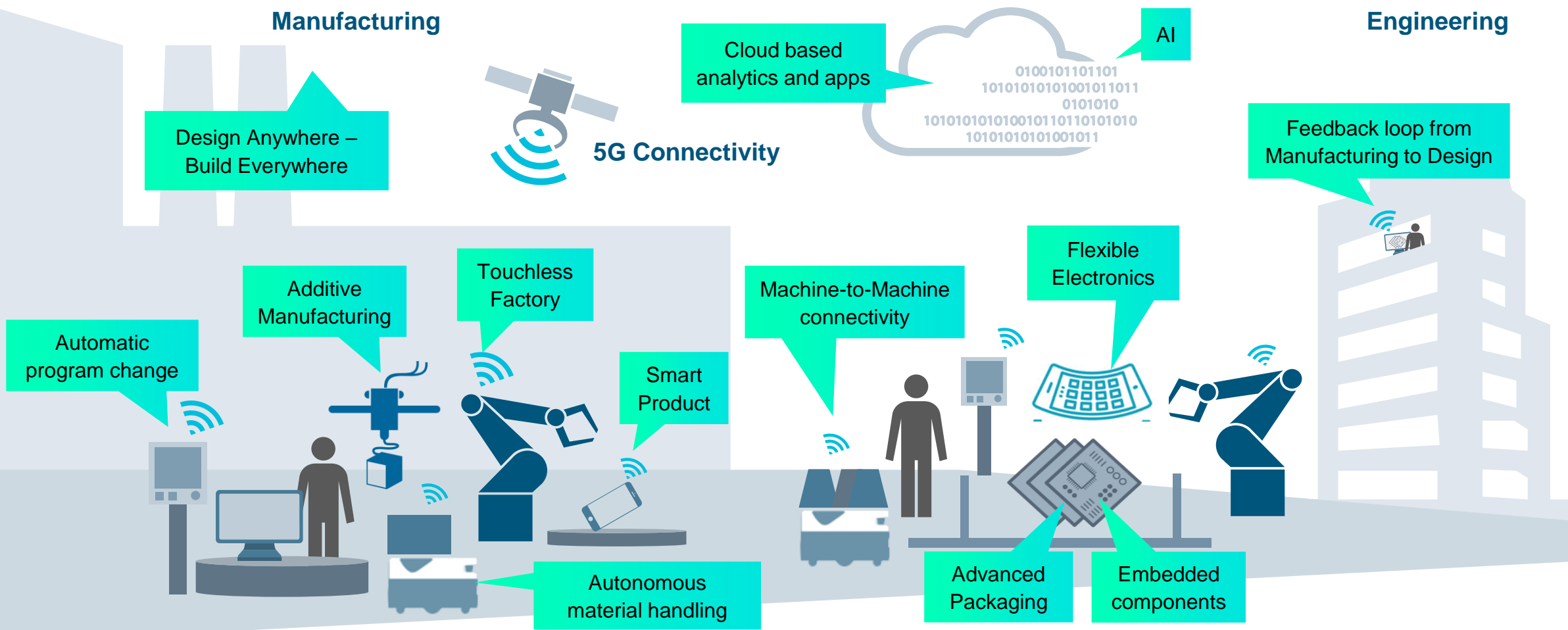
Why How What



Why?

Why?

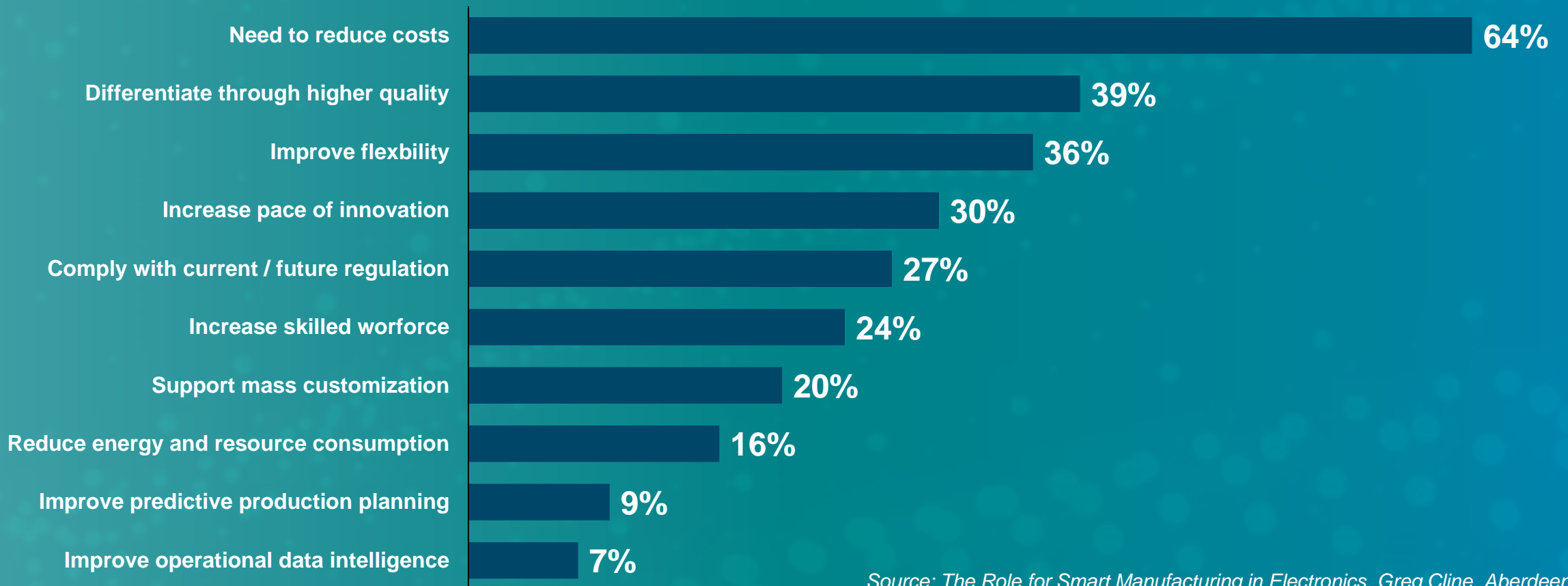
The vision by 2025 – A radical change for manufacturers



Why?

The voice of the analysts for the Electronics Manufacturer

Top pressure on Electronics companies; % of Respondents n = 223

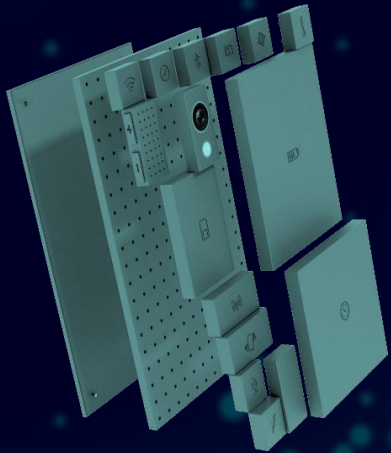


Source: The Role for Smart Manufacturing in Electronics, Greg Cline, Aberdeen 2018

Why?

Modern Manufacturing introduces new Challenges

DELIVERING
LOT SIZE ONE



OPTIMIZING
MATERIAL USAGE



MAKING
DATA USEFUL



COMPLIANCE

ANSI/ISA-95
ISO/TS 16949
IATF 16949
Medical

Why?

Basic Logic if Lot sizes are shrinking?

How to generate enough Throughput to make the numbers in case of smaller lot sizes?

How to quote required Materials at the right price, for sure in times of material shortages?

How to keep Production lines up and running?

More Work Orders and NPI's to get the same volume

More Work Orders means more Quotes

More Work Orders means increased Change Overs

Are *'You'* prepared to quote faster and keep lines running?



How?

Key concerns in Electronics Process Engineering

How to do fast and accurate quoting

How to quickly and accurately introduce new products

How to ensure best performance of your equipment

How to easily move products between manufacturing sites

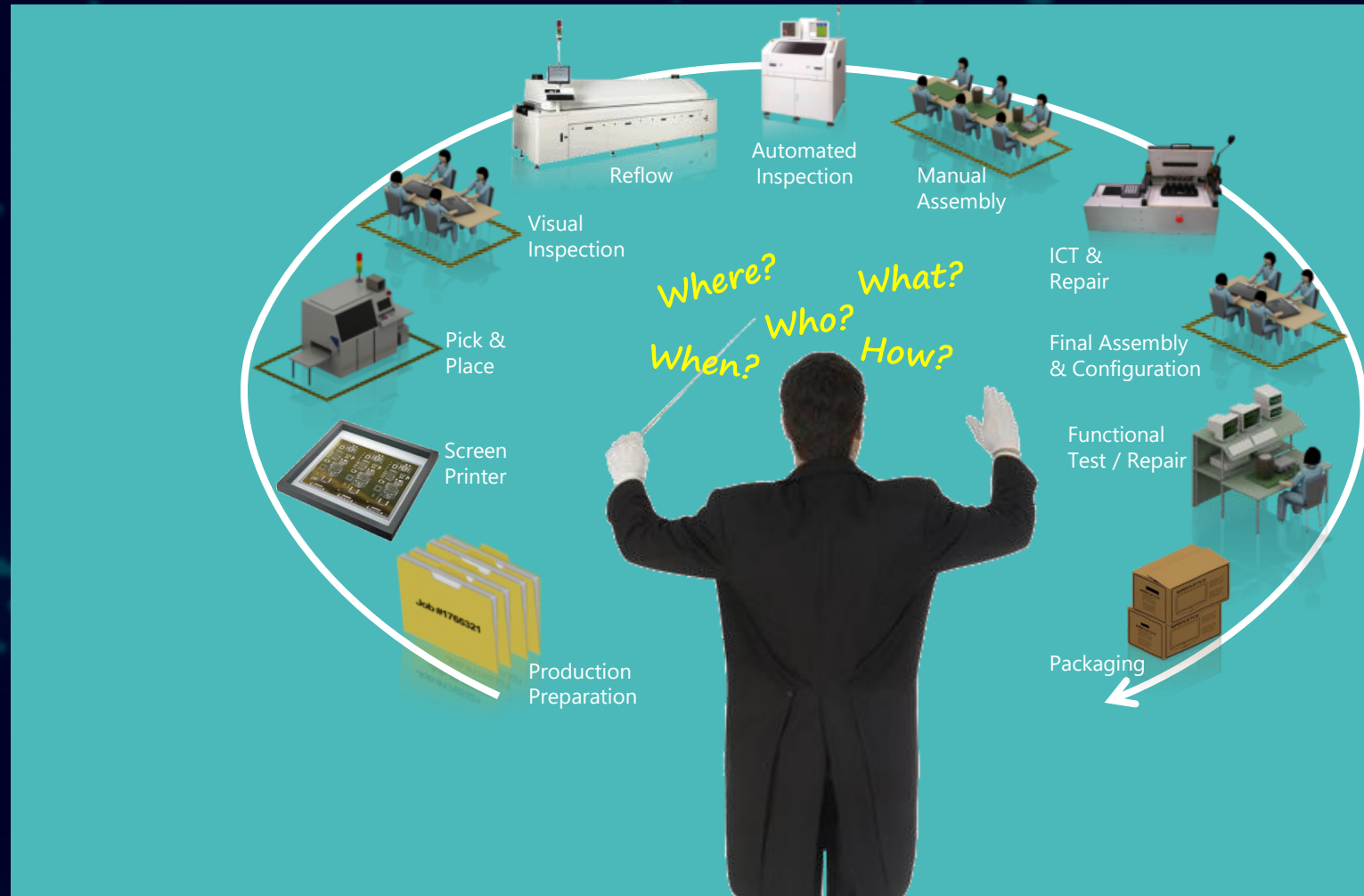
Key concerns in Electronics Process Engineering

Digitalize BOM Quoting

Accelerate NPI

Increase line utilization

Product portability



Key concerns in Electronics Process Engineering

Digitalize BOM Quoting

- ✓ Increase efficiency in the process to convert a customer BOM into the Golden Production BOM

Accelerate NPI

- ✓ Fast identification of which materials are available in stock and what to be ordered to execute a work order

Increase line utilization

- ✓ Find where you can buy the missing parts at the best price under the optimal and preferred conditions

Product portability

Key concerns in Electronics Process Engineering

Digitalize BOM Quoting

- ✓ Increase engineering efficiency by using a single tool for all process engineering tasks

Accelerate NPI

- ✓ Eliminate redundant preparation work with Learning Libraries (machine shapes, rotation, stencils for different footprints, etc.)

Increase line utilization

- ✓ Increase efficiency through automation and use of templates (for work instructions, data import parsers, etc.)

Product portability

Key concerns in Electronics Process Engineering

Digitalize BOM Quoting

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

Accelerate NPI

- ✓ Allows fast and consistent machine library data generation and maintenance

Increase line utilization

- ✓ Ability to create family setups to reduce change over time

Product portability

Key concerns in Electronics Process Engineering

Digitalize BOM Quoting

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

Accelerate NPI


- ✓ Allows fast programm portability for any machine platform, including automatic conversion of library data

Increase line utilization

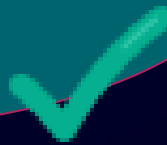
- ✓ Easy assembly project export/import – encrypted for IP protection


Product portability

Key concerns in Electronics Process Engineering

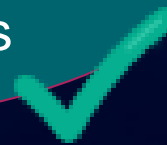


How to do fast and accurate quoting

How to quickly and accurately introduce new products 



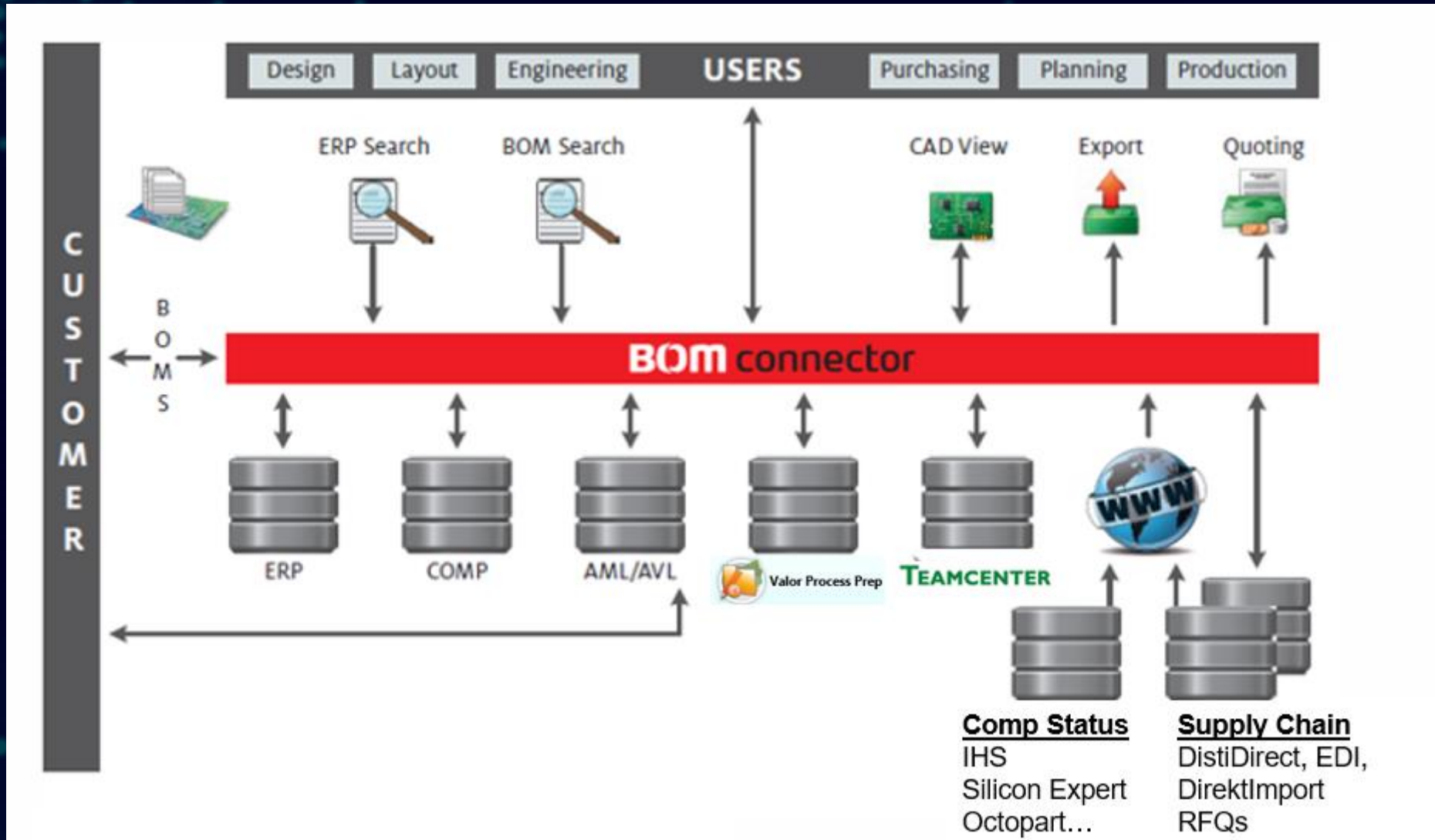
How to ensure best performance of your equipment

How to easily move products between manufacturing sites 



What?

BOM Connector



BOM Scrubber

A scrubber tailored for the electronics market

Reader graphically recognizes patterns and variations

Proper handling of manufacturer part numbers (MPNs)

Export a standard desired format using easy-to-create templates

BOM / PCB Comparisons & Consistency Check

Check BOM for mistakes (quantity mismatch, part mismatch, etc.)

C138-140	CAP	WIMA2220	0U2ZF 63V	10%	WIMA	SMDTC03220QA00K
C163	CAP0612	612				
C182,C184	CAPOL-SM	810	47UF 50V	20%	VISHAY	MAL215371479E3
C183,C186,	CAPOL-SM	605	10UF 50V	20%	VISHAY	MAL215371109E3
C188-190,						
C248						
C185	CAPOL-SM	810	220UF 10V	20%	MAL215374221E3	VISHAY
C249	CAP	603	470PF 50V	20%		
C250	CAP	603	1NF 50V	20%		
C252-255	CAP	603				
D1	ZENER	SOD80C	BZV55C5V6	20%	NXP	BZV55C5V6
D4-27,D34,	BAS21	SOT23	BAS21	?	EBV	BAS21
D41-45						

Filter: BOM A (a) BOM B (b) Same key with different values All

Search: _____

BOM	RefDes	Description	CPN	tol	value	type
Comparison status: The same key with different values						
Key C200						
a	C200		70232001834	1%	01uF	CAP
b	C200		7023201834	1%	01uF	CAP
Key C201						
a	C201		70232001834	1%	01uF	CAP
b	C201		70232001834	1%	1uF	CAP
Key C202						
a	C202		70232001834	1%	01uF	CAP
b	C202		70232001834	1%	1uF	CAP
Key C203						
a	C203		70232001834	1%	01uF	CAP
b	C203		70232001834	1%	1uF	CAP

ERP Integration; How it works is less important than why it is needed

The “how” depends on the ERP system

The “why” does not – it links the ERP system directly into the quoting

It helps the user better locate internal component stock

It helps get information back into the ERP system

Internal Parts	
IPN	Description
100k 0805	
ERP 40519	RES-GEN-100k-125mW-0.1%-0805-SMT
ERP 4525	RES-GEN-100k-125mW-1%-0805-SMT
ERP 3068	RES-GEN-100k-125mW-5%-0805-SMT

Data MPN	
MPN	Manufacturer
ERA6AEB104V	PANASONIC



Clean-up & Validity Checking

Clean-up and enhance the customer BOM with information from the ERP system

Add missing information

Check for obsolete parts

API	MPN	Manufacturer	AR	YE	Description
Requested Mpn: GRM188R71C104KA01D					
✓	GRM188R71C104K...	MURATA	E	M	1.03 Ceramic Capacitor, Multilayer, Cerami... DS
CPN/CPN Revision: 20-575-1003/BC-1					
Requested Mpn: LM4040BIM3X-2.5					
✓	LM4040BIM3X-2.5	National	T		0 Two Terminal Voltage Reference, 1 Ou... DS
CPN/CPN Revision: 20-575-1020/BC-1					
Requested Mpn: 1645150					
✓	1645150	Phoenix Contact GmbH & Co. KG	E	L	0.59 Connector Accessory DS
CPN/CPN Revision: 20-575-1022/BC-1					
Requested Mpn: 16SP270MT					
✓	16SP270MT	SANYO DENKI CO.LTD.	D		0 Aluminum Electrolytic Capacitor, Pola... DS

Fast search of the Octopart portal

Confirm MPNs are valid

Copy Octopart description to your BOM

Quickly access the Octopart datasheet directly from BOM

BOM Check	UA	Class	IPN	CPN	Parent CPN	RC	Quantity	RefDes-List	MPN
36				20-575-1033		5	5	U43, U56, U67, U68, U71	ST-MI
32				20-520-1074		1	1	C220	KEME
28				20-520-1006		1	1	R264	VISHA
23				20-575-1038		1	1	U77	Ti: SN
19				20-565-1097		59	59	C16, C18, C22, C23, C25, C26, C27,...	MURA
18				20-565-1102		4	4	C205, C206, C207, C208	AVX: O
18				20-565-1045		2	2	R344, R345	PANA

Manufacturer	MPN	Last update	Pages	Size in Bytes	URL
Texas Instruments	LM339D	2017-06-30 05:39:28Z	36	1423271	http://datasheet.octopart.com/LM339D-Texas-Instruments-datasheet-94061982.pdf
Allied Electronics & Automation					Amplifier, Comparator; Quad Differential Comparator; 36 V; 36 V; SOIC; 0 degC
Verical					Comparator Quad R-R O/P ±15V/30V Automotive 14-Pin SOIC Tube
Texas Instruments					Quad differential comparator 14-SOIC 0 to 70
Win Source Electronics					IC QUAD DIFF COMP 14-SOIC / Quad Single Supply Comparators
Newark					Analogue Comparator, Quad, Differential, 4, 300 Ns, 2V To 36V, 1V To 18V, Soic, 14 Rohs Compliant: Yes
Utmeletronic					Analog Comparators SOIC-14 RoHS
element14 APAC					COMPARATOR QUAD, SMD, SOIC14, 339
Mouser					Comparators Quad Differential
Distrelec					Comparator Operating temperature: 0...70 °C Power supply: 2...30 V Series: LM339 Design: Quad Package: SOIC-14 Packaging: Tube
Texas Instruments	LM339D	2016-07-10 05:35:31Z	38	1409628	http://datasheet.octopart.com/LM339D-Texas-Instruments-datasheet-65712971.pdf
Texas Instruments	LM339D	2015-07-02 05:36:01Z	37	1405907	http://datasheet.octopart.com/LM339D-Texas-Instruments-datasheet-44367881.pdf
Texas Instruments	LM339D	2014-12-05 06:37:03Z	33	1262685	http://datasheet.octopart.com/LM339D-Texas-Instruments-datasheet-36780027.pdf
STMicroelectronics	LM339D	2014-08-18 14:54:46Z	19	790362	http://datasheet.octopart.com/LM339D-STMicroelectronics-datasheet-36993015.pdf
STMicroelectronics	LM339D	2014-06-11 05:52:19Z	33	1262402	http://datasheet.octopart.com/LM339D-STMicroelectronics-datasheet-32026540.pdf

Enrich the BOM to make it the Golden BOM

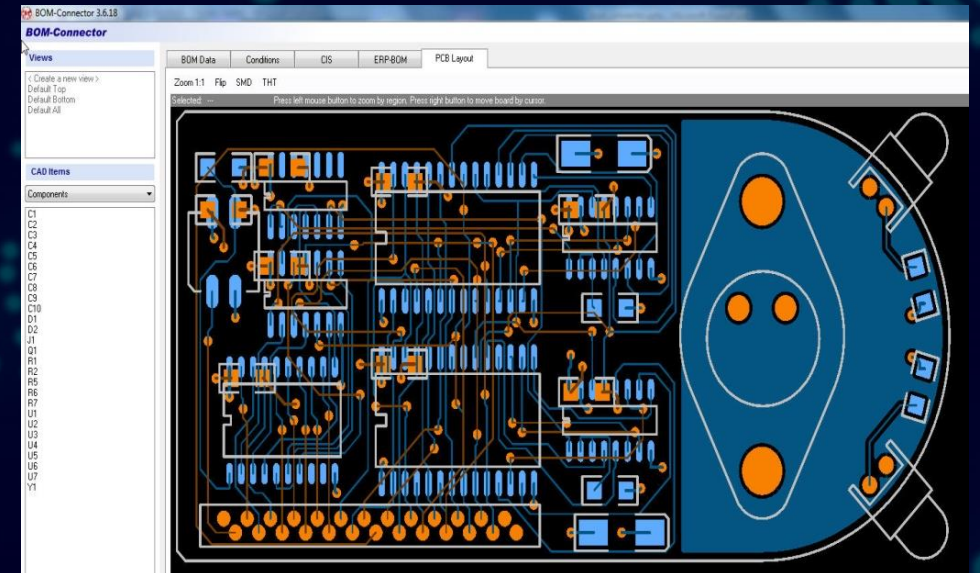
Direct pull of the layout data from within Process Prep

Extract CAD attributes such as Geometry and technology from design and insert into your “Golden BOM”

Cross-link between BOM and design
Check for discrepancies

Export a standard desired format using easy-to-create templates

Viewer can search for comps, nets, pins, etc.



BC-DEMO_KD	CPN	Description	UA	CAD GEOMETRY	Device Type	Value	+Tol	RefDes	TB	PINS	TECHNOLOGY
	20-520-1006	560R 0805 1%	GeomMismatch	0603	Resistor	560	5	R264	B	2	SMD
	20-520-1007	1K27 0603 +1%/-1%		0603	Resistor	1.27K	5	R268	B	2	SMD

Quoting

Get prices from ERP system or directly from your supply chain

DistiDirect checks **real-time** with distributors such as Digi-Key, Arrow, Future Electronics and others (use of company login and preferred Pricing)

Color-coded displays helps sort through multiple search results

“Best Price” function automatically selects the right supplier for your project based on your rules

Check for MPN or SKUs and suggest alternates

Reduce quoting time

Quelle	Bestzeig	Distributor	MPN	Lieferzeit	Bestand	Gebindeart	VE	Min.Menge	Menge	Preis	Menge	Preis	Menge	Preis	Gültig bis	Währung	Beschreibung
ERP		Arrow Central Europe GmbH	NCT7WZU04P6X	0	3.000	3.000		3.000	3.000	€	3.000	0,03840 €				EUR	
ERP		EBV Elektronik GmbH & Co. KG	NCT7WZU04P6X	0	3.000	3.000		3.000	3.000	€	3.000	0,03700 €				EUR	

Quelle	Distributor	MPN	MCODE	Liefer...	Besta...	Gebindeart	VE	Menge	Preis	Menge	Preis	Menge	Preis	RoHS	NCNR	Automat
DistiDirect	Farnell	NCT7WZU04P6X	ON Semiconductor	50	2450	STÜCK (GURTABSCHNITT)		50	0,19500 €	100	0,11100 €	250	0,09500 €			
DistiDirect	Farnell	NCT7WZU04P6X	ON Semiconductor	50	2450	STÜCK (GURTABSCHNITT)		50	0,19500 €	100	0,11100 €	250	0,09500 €			
DistiDirect	Farnell	N27WZU04DF12G	ON Semiconductor	78	5903	STÜCK (GURTABSCHNITT)		50	0,18200 €	100	0,10400 €	250	0,08870 €			
DistiDirect	Farnell	74LVC2G04GW 125	Neperia	78	0	STÜCK (GEGURTET AUF ROLLE - GANZE R...										
DistiDirect	EBV Elektronik	NCT7WZU04P6X	ON Semiconductor	44	108000	SOT363		3.000		100	0,04700 €					
DistiDirect	Digi-Key	NCT7WZU04P6X	ON Semiconductor	35	12000	Gurt auf Rolle (Tape and Reel - TR)						3.000	0,06981 €			
DistiDirect	Digi-Key	NCT7WZU04P6X	ON Semiconductor	35	13956	Gurtabschnitt (CT)			25	0,24440 €	100	0,15810 €	250	0,13092 €		
DistiDirect	Digi-Key	NCT7WZU04P6X	ON Semiconductor	35	13956	Digi-Reel®			1	25 * 0,27440 €	100	* 0,188... €	250	* 0,16092 €		
DistiDirect	Future Electronics	NCT7WZU04P6X	ON Semiconductor		27000	REEL				3.000			3.000	0,04220 €		
DistiDirect	MyArrow	NCT7WZU04P6X	ON Semiconductor	28	12000	REEL				3.000				3.000	0,03804 €	

Components Quoting & Ordering

Send out distributor RFQs with a mouse-click

Link distributor quotes and price lists

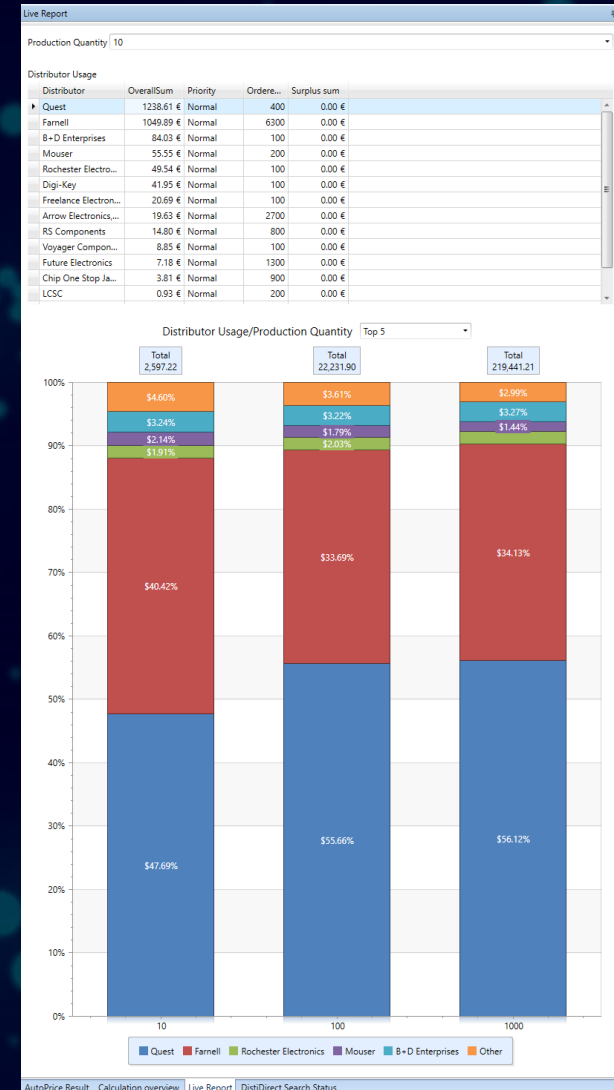
Distributor status maintenance – preferred, “black list” etc.

Purchase quantities and bulk pricing calculated based on production quantities

Distributor report shows breakdown by supplier and assists with consolidation

Support for consignment parts and multiple currencies

Save quotes and prices to the BOM Connector database.



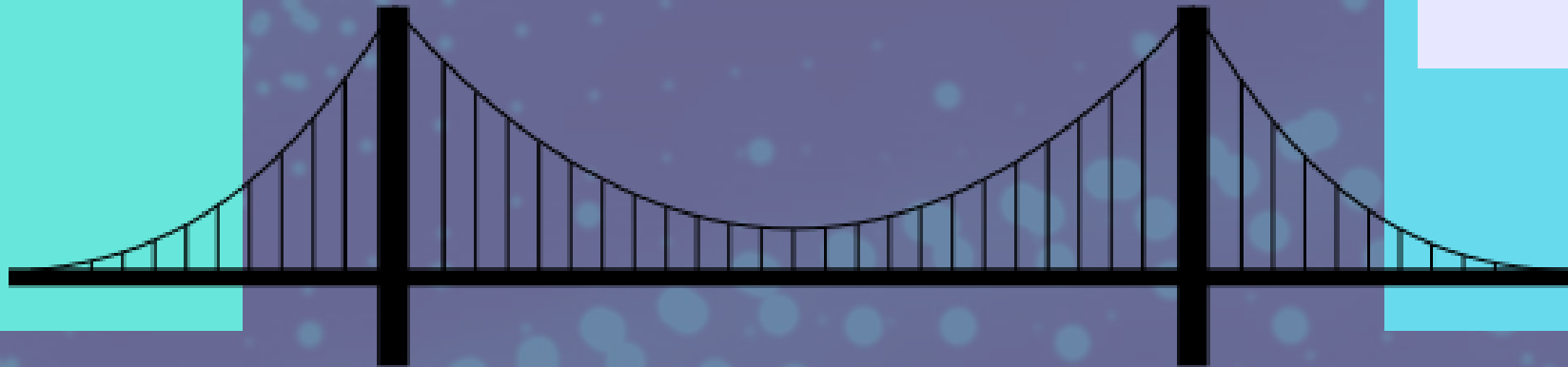
Harmonized process through a single engineering tool

Design

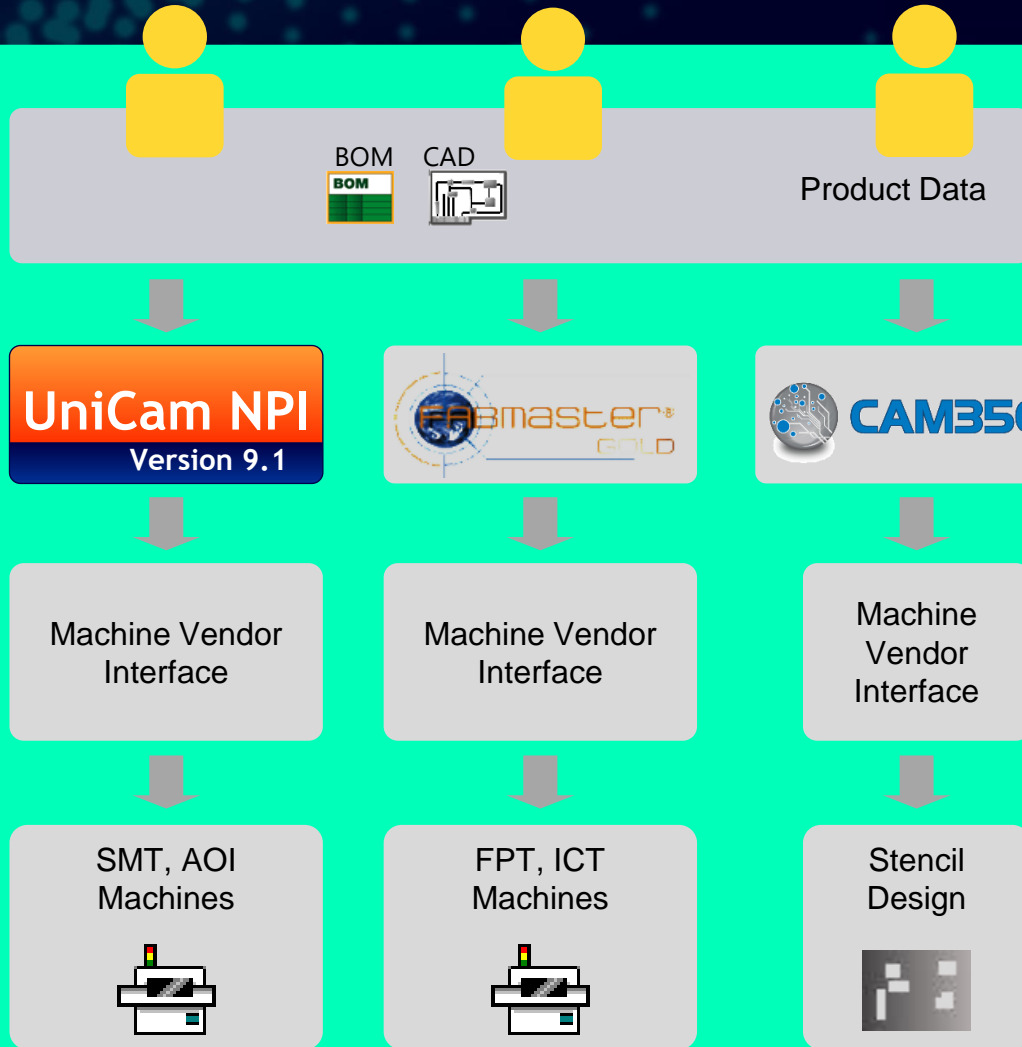


- Product data cannot be transferred **directly** to the line
- Valor Process Preparation generates **manufacturing execution instructions** for automated and manual stations, including:
 - ✓ BOM validation
 - ✓ Stencil design
 - ✓ Line balancing
 - ✓ SMT, Test and Inspection programming
 - ✓ Generation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

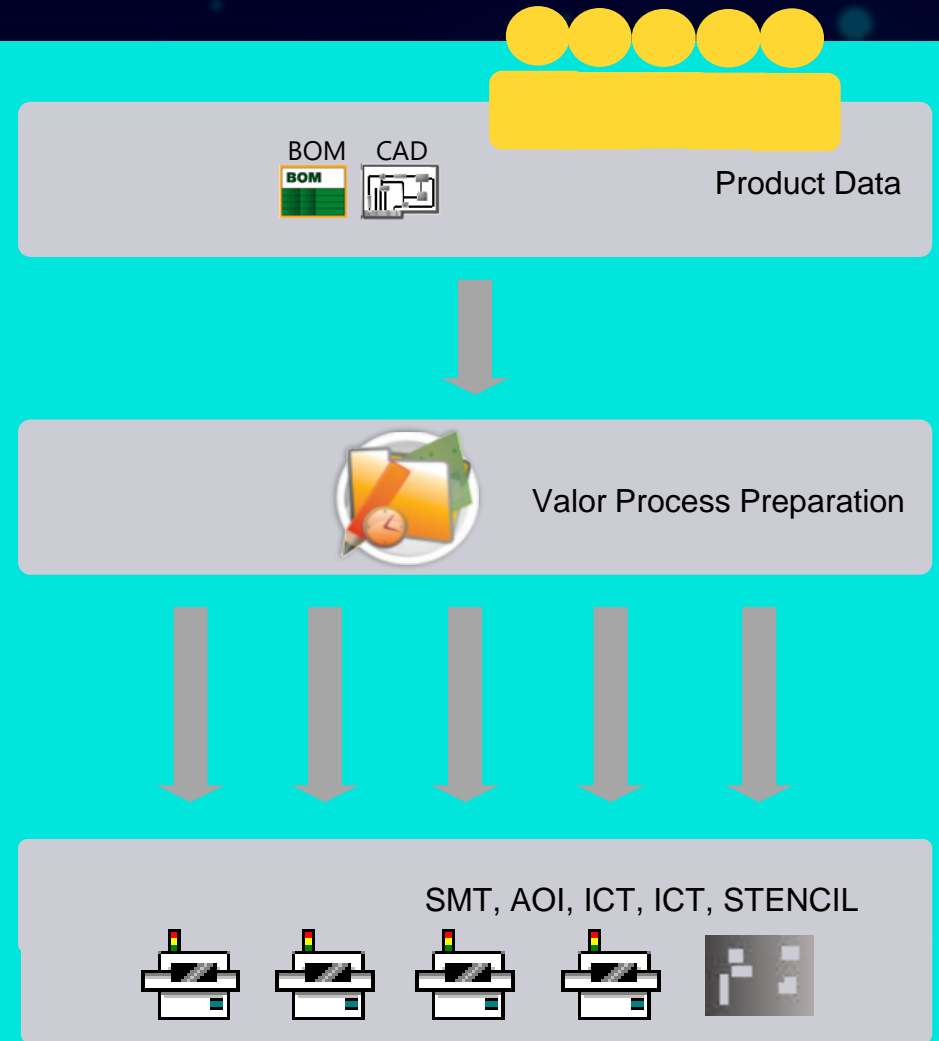
Manufacturing



Harmonized process through a single engineering tool

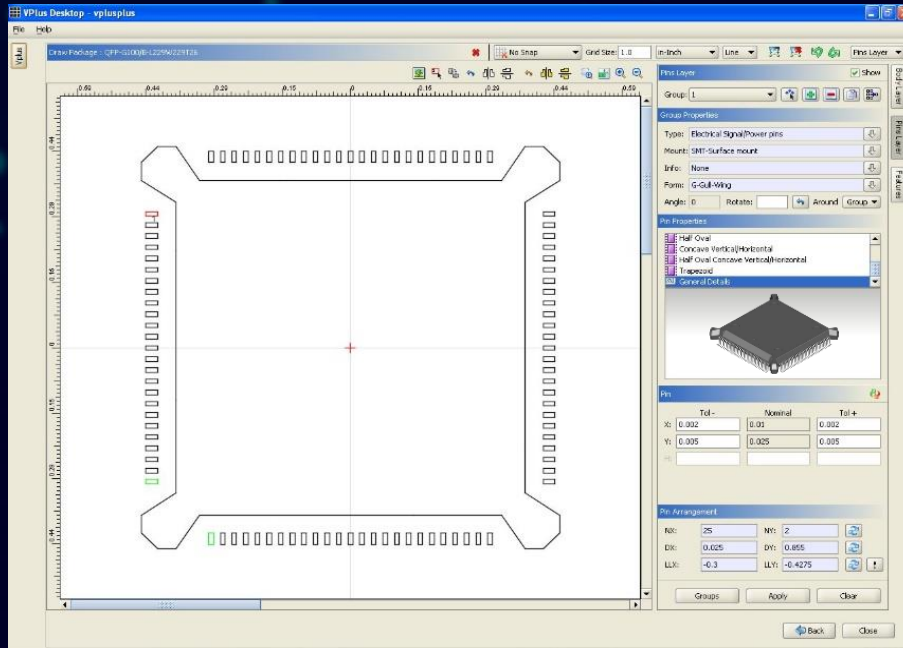


BEFORE: Product model created multiple times



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

Harmonized process through a single engineering tool Valor Parts Library (VPL), Physical Components Library

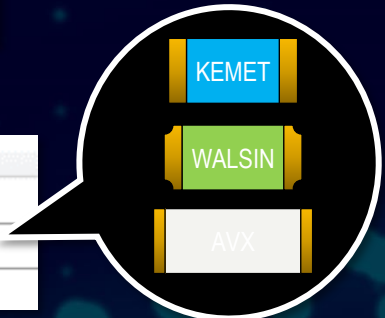


ISO9001-certified library covering over 35 millions part numbers

- Accurate shape data
- Pin contact area
- Component classification (JEDEC)

Enables accurate virtual-prototype build

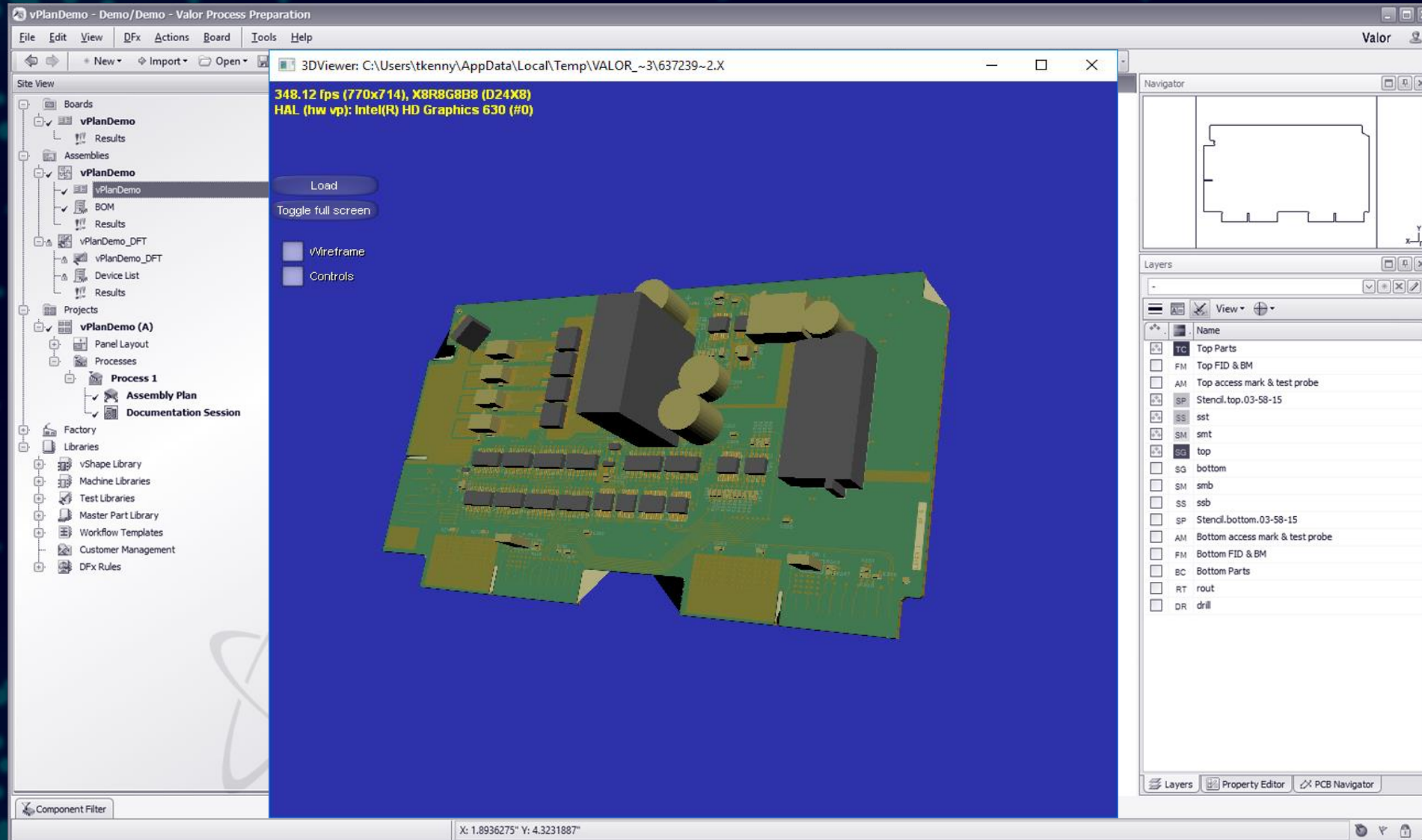
Item	CPN	Manufacturer	MPN	VPL-Package
1	G8316005-244	KEMET	C1210C22K5RAC-LWR	DSO-C2/X-L60W32T25
2		WALSIN	1210B22K5KKCT-CRM	DSO-C2/X-L60W31T3
3		AVX	10125C224KATA2A-KOL	DSO-C2/X-L64W25T3



Shapes of alternate parts in the AVL can be easily compared for inconsistencies

(example: the parts provide the same electrical function, but require different pad layouts)

Harmonized process through a single engineering tool



Harmonized process through a single engineering tool

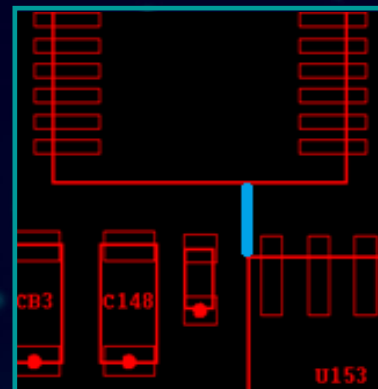
Design for Assembly

Customer Requirements

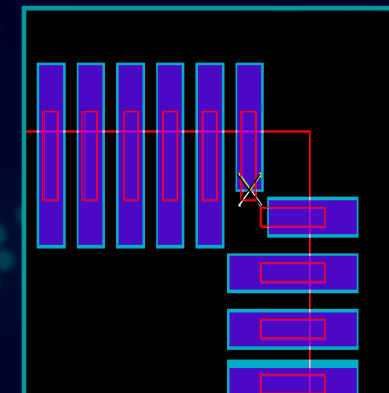
- Concurrent DFM
- Reduction of NPI Cycle Times
- Improved Process Yield
- Improved Quality

Comprehensive Set of Assembly Analysis

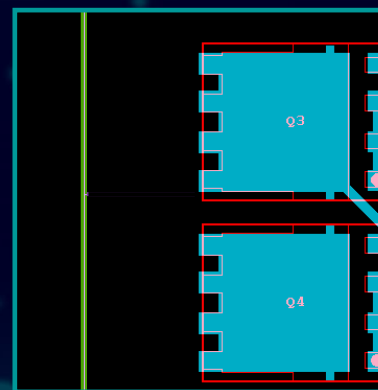
- +400 Assembly Level Checks
- Identifies issues that can affect yield, cost and reliability
- Identifies causers of scrap or extra handling costs
- Utilizes Valor Parts Library to identify solderability issues
- Automated Reporting



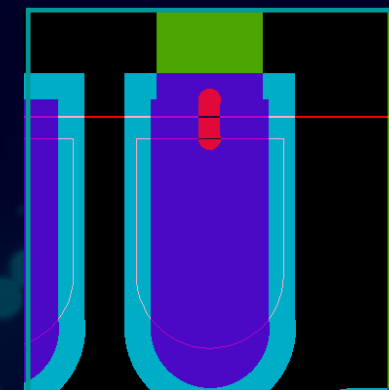
Component clearance requirements vary by type, orientation and placement machine



Pin overhanging soldermask can cause solder bridging



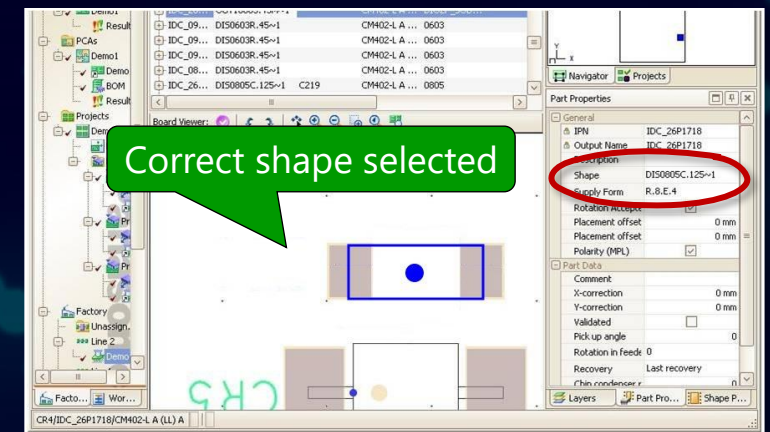
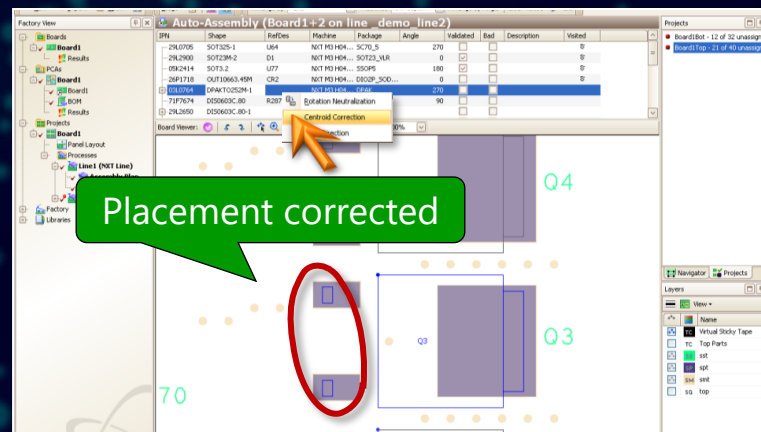
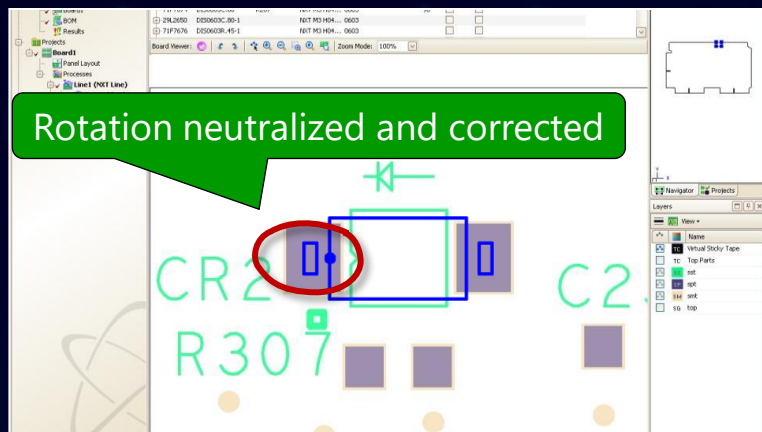
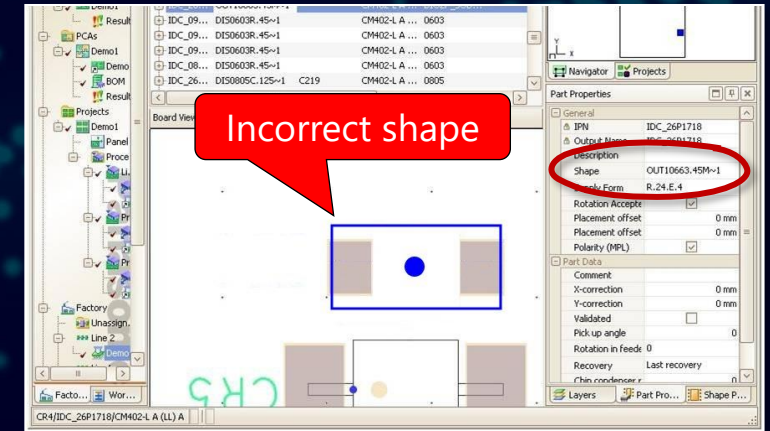
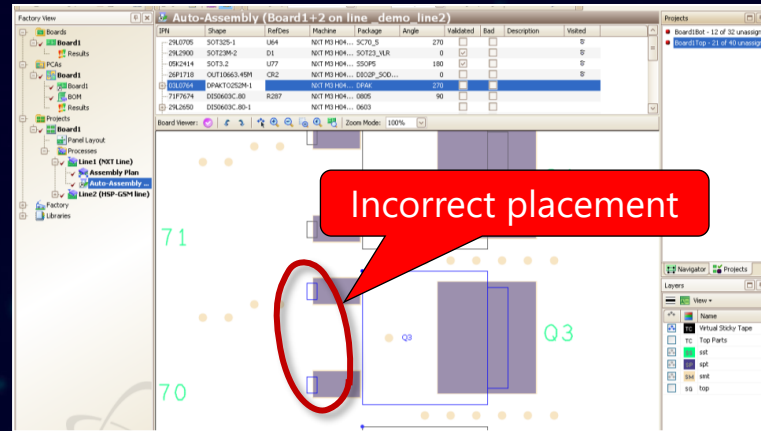
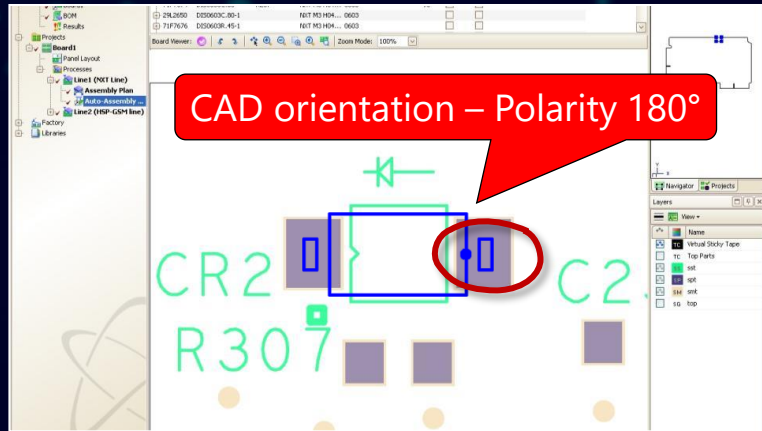
Footprint too close to conveyed edge can be damaged by SMT gripper



Insufficient heel distance will lead to a weak solder joint

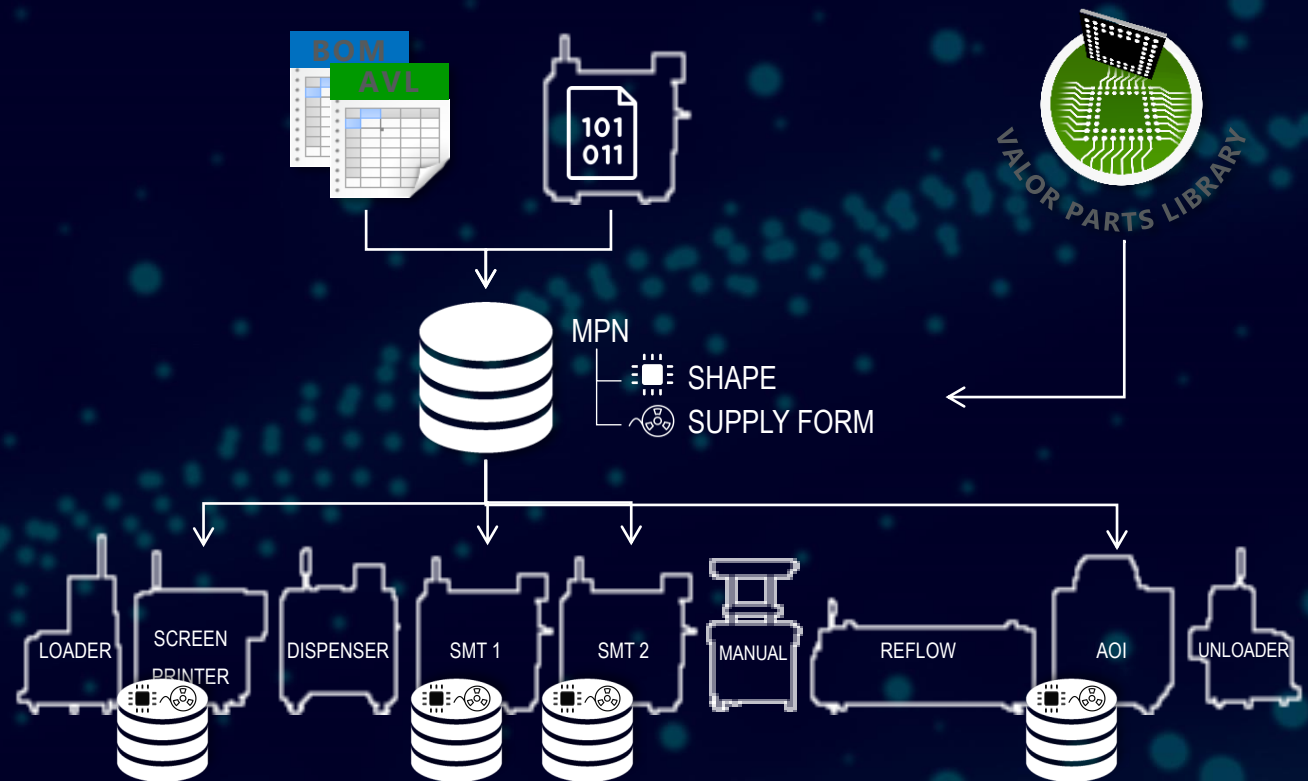
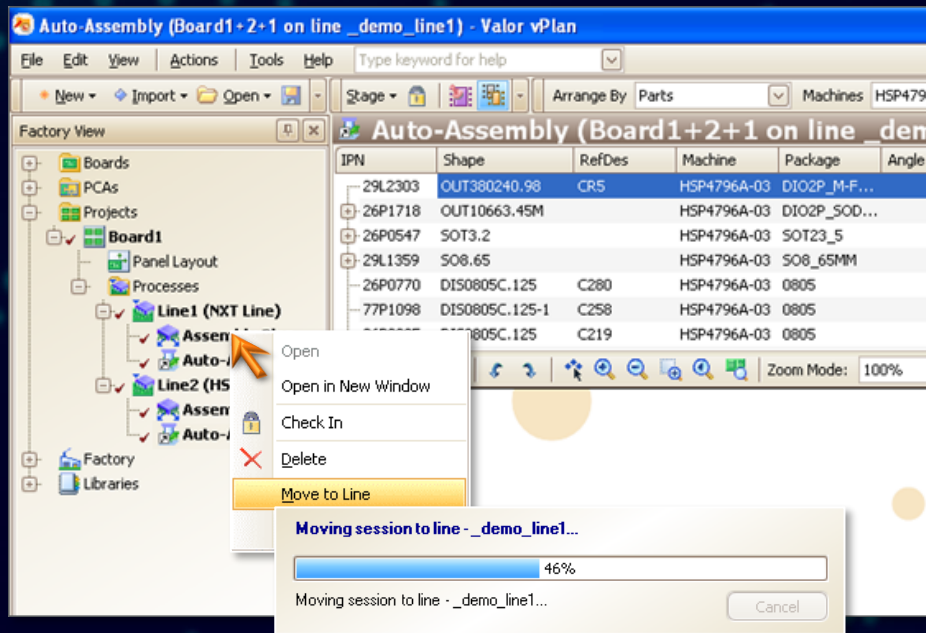
Harmonized process through a single engineering tool

“Virtual Sticky Tape” – Offline placement simulation



Harmonized process through a single engineering tool

Auto Shape Generation of Machine Libraries



Part libraries can be created for each machine directly from the Master Parts Library

Native machine programs can also be imported and quickly converted into alternate machine format

Users can create/modify custom parameters to enhance part/shape data

Harmonized process through a single engineering tool

Advanced Panel Design

Panel Design Stages

Prepare Steps | Panelization | Panel Tools

Boards count: 1, Material utilization: 66.1% ...

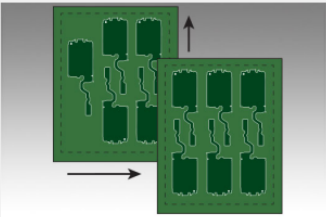
Optimize by fabrication panel size

Back | Apply

Optimize by fabrication panel size

- Set the fabrication panel size (Width, Height) and the range of the number of parts to place inside an assembly panel (Min, Max).
- Set the assembly panel rail sizes.
- Set parameters relating to the board and the assembly panel (Moat Size, Orientation, etc.).

The method creates an optimal assembly panel for the specified fabrication panel dimensions, within the constraints imposed by the other parameters.



Fabrication Panel Size: Width: 18.0" Height: 24.0" PCBs in Assembly Panel: Min: 3 Max: 7

Fabrication Panel Margins: Top: 0.25" Bottom: 0.25" Space Between Assembly Panels: 0.25"

Left: 0.25" Right: 0.25"

Rail Size: Top: 0.1" Bottom: 0.1" Left: 0.1" Right: 0.1"

Board: Moat Size: 0.1" Gold Plated Edge: None Orientation: Horizontal or Vertical Component Overhanging: Ignore components

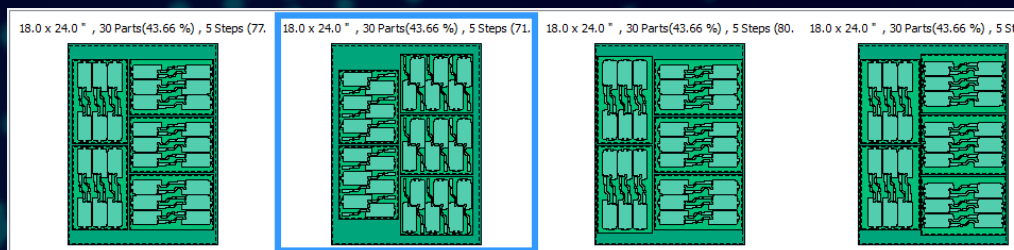
Supplier of Fab. Panel	Size of Fab. Panel	Margins (Top,Bottom,Left,Right) of Fab. Panel	Total parts in Fab. Panel	Material utilization of Fab. Panel	Array dimension of Fab. Panel	Total Steps in Fab. Panel	Array utilization of Fab. Panel
1	18.0 x 24.0 "	0.25,0.25,0.25,0.25 "	30	43.66 %	1 x 2, 1 x 3	5	77.12 %
2	18.0 x 24.0 "	0.25,0.25,0.25,0.25 "	30	43.66 %	1 x 2, 1 x 3	5	71.19 %

Advanced PCB Assembly panel design capabilities including editing, breakaway-tabs and copper balancing

Automated nesting of shapes to optimize material usage

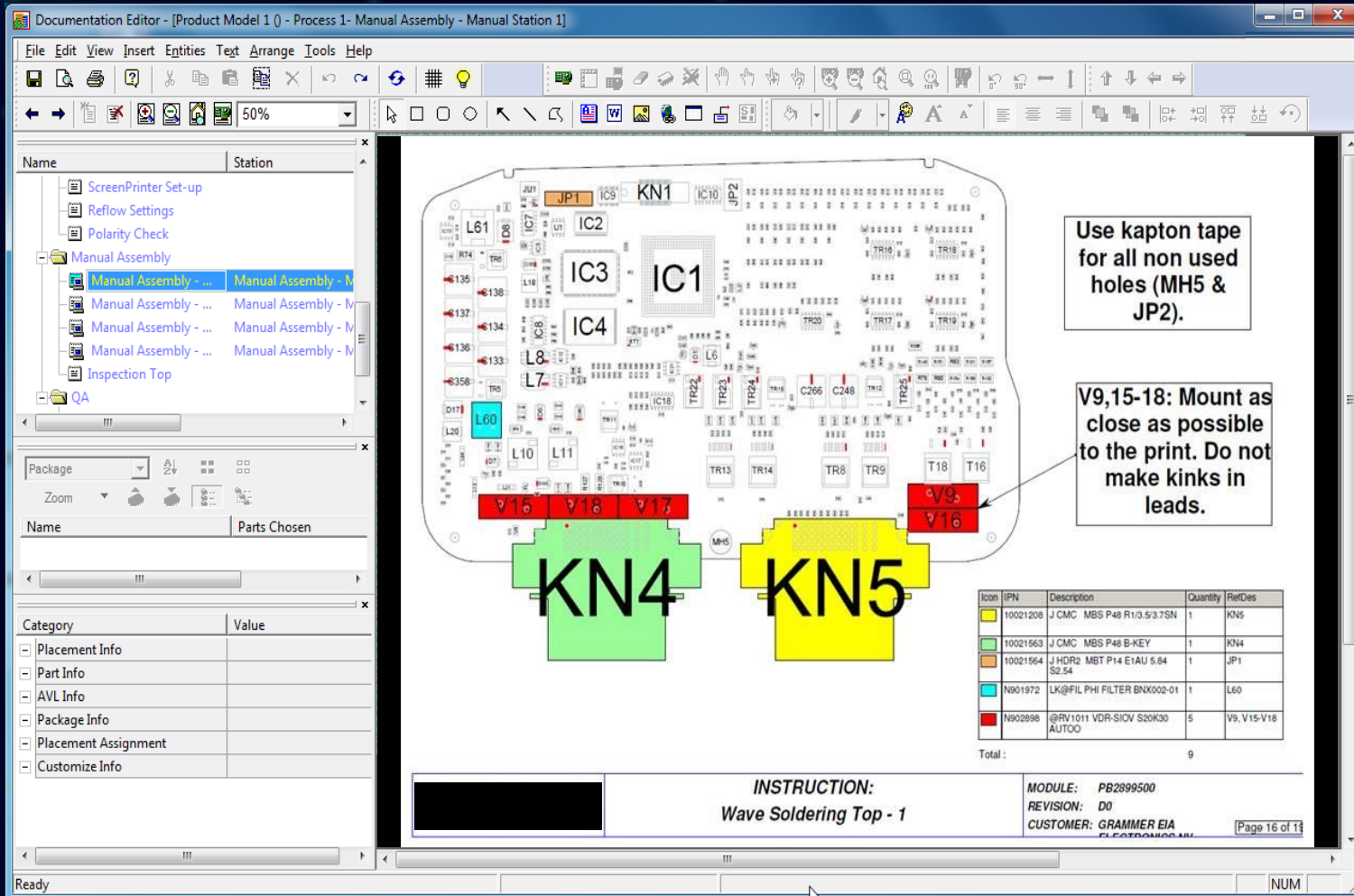
"Step-and-Repeat" capability

Dimensioning



Harmonized process through a single engineering tool

Documentation creation



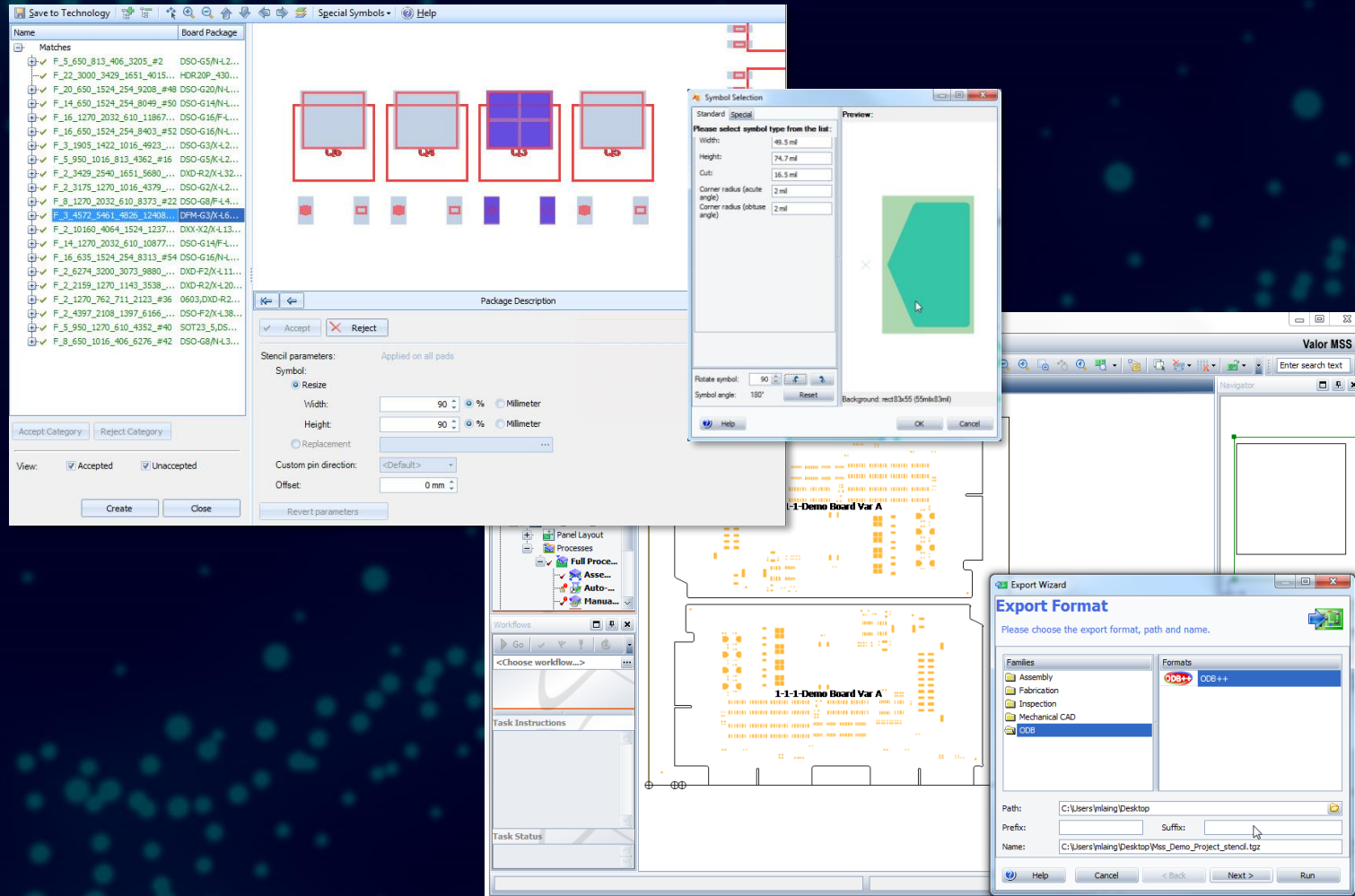
Built-in and user-defined templates for static and interactive documentation

Include any design, product model, SMT, Test, and other production information

Can include embedded images and files (e.g. JPG, PDF)

Harmonized process through a single engineering tool

Stencil design



Automatically create stencils
from product model

Customizable rules and
aperture properties

Output to ODB++ or Gerber
274X

Harmonized process through a single engineering tool

Complete testability analysis (DFT) of PCAs

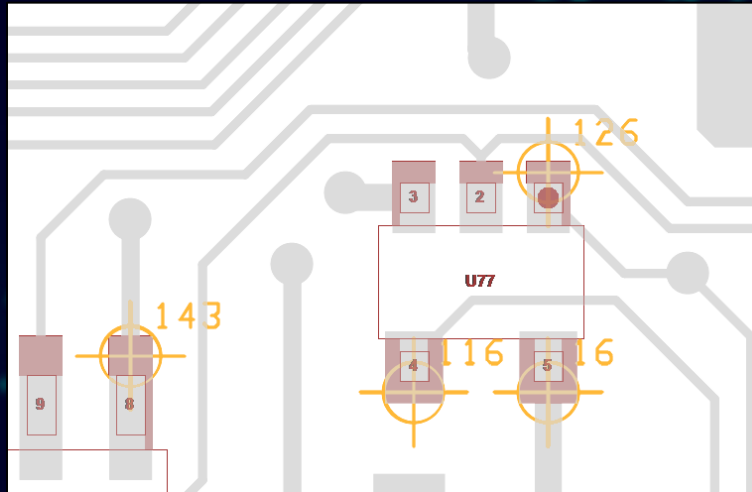
Name	Top	Bottom	Both	Total
All Nets				
Total	3	0	146	149
Accessible	3	0	139	142
Accessible coverage (%)	100	0	95	95
Multiple Pin Nets				
Total	3	0	127	130
Accessible	3	0	124	127
Accessible coverage (%)	100	0	98	98
Single Pin Nets				
Total	0	0	15	15
Accessible	0	0	15	15
Accessible coverage (%)	0	0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

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 %

Identification of high-risk areas

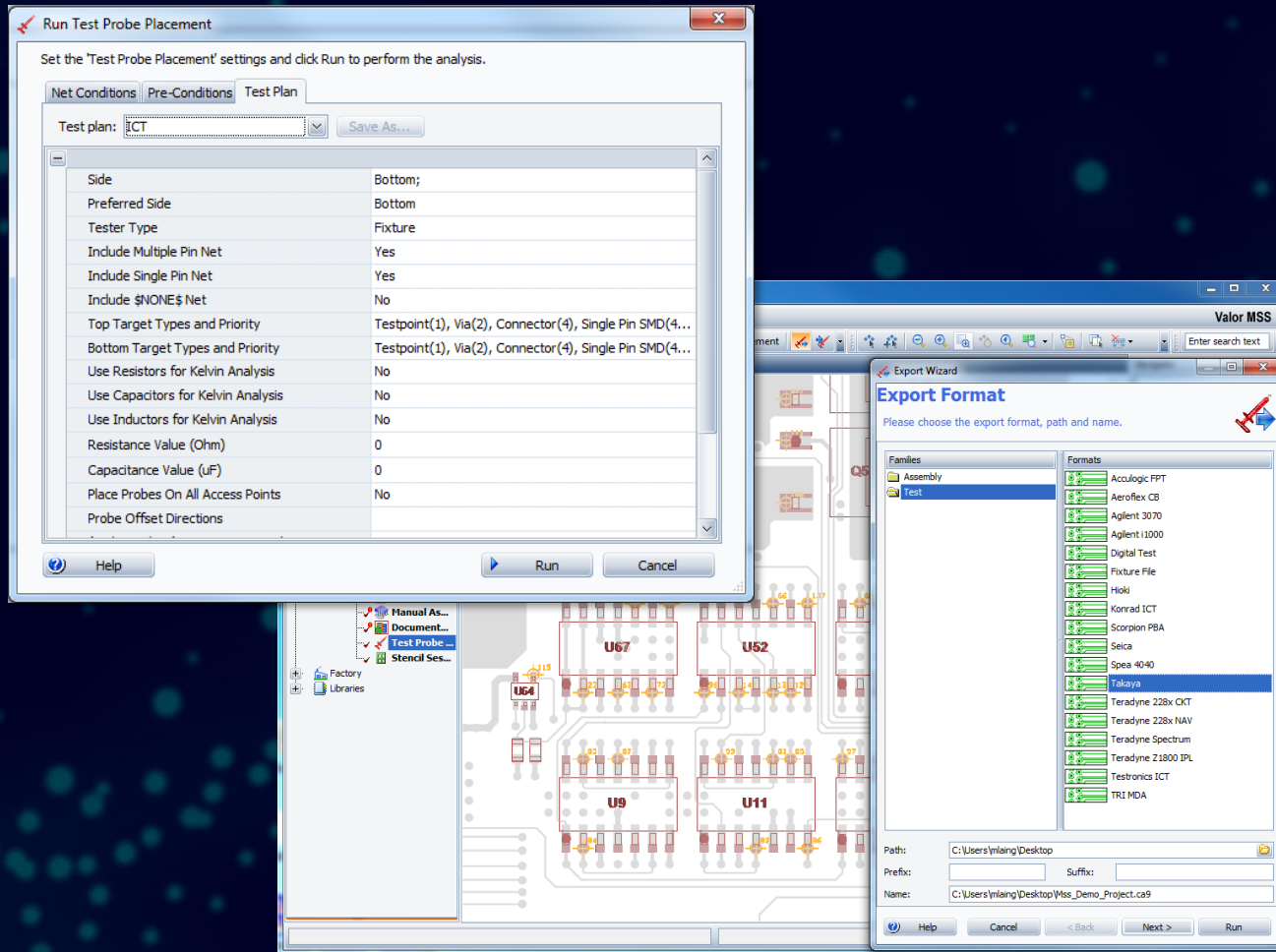
Feedback to Design about inaccessible points

Comprehensive yield analysis to quantify testability



Harmonized process through a single engineering tool

Tester and inspection programming



Automated test probe selection and positioning based on available access to each electrical node

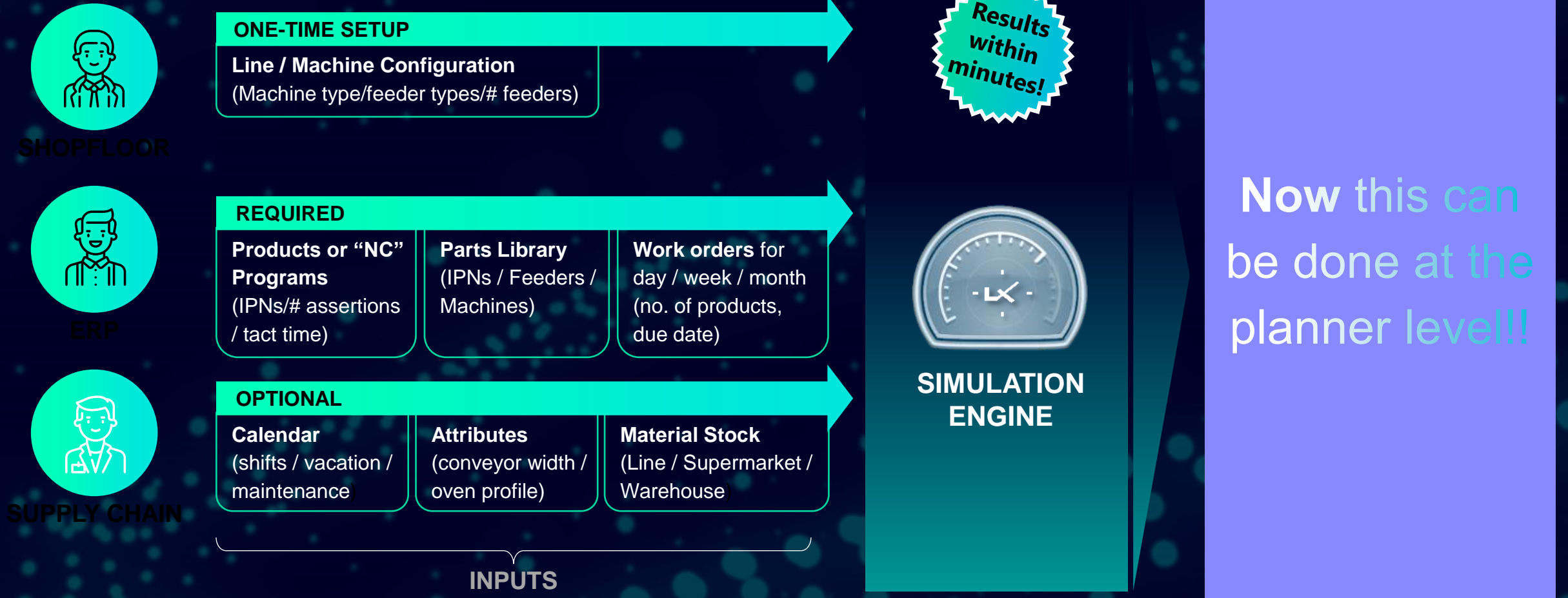
Full reporting of placements including reason codes for inaccessible points

Leading industry tester formats supported

AOI & AXI tester programming

Planning and Scheduling Optimization

Enabling accurate scheduling at the planner level; Family Setups



Summary

Digitalize BOM Quoting

- Optimize time for quoting to avoid making it the bottleneck
- Increase quoting accuracy by direct Supply Chain connection

Accelerate NPI

- Decrease engineering lead-time and effort using single tool
- Eliminate redundant work with Learning Libraries & Automation

Increase line utilization

- Increase through-put making first time right machine programs and rules driven automatic machine shape generation
- Increase asset utilization looking for family setups

Product portability

- Increase flexibility with easy conversion of machine programs and machine libraries from one machine brand to another
- Secured project exchange between different production sites



| Customers talk ... Does it work?



Solution
Valor Process Preparation
Valor BOM Connector
Valor Parts Library

Adopt automation solutions from Siemens to help quicken preparation times and streamline the quotation process.



Layout errors and incorrect assemblies

+10%

Accelerated SMT process

+30%

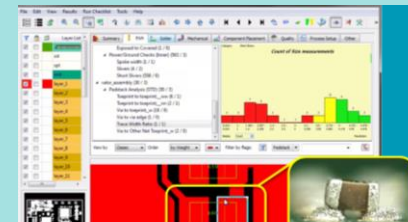
Stencil preparation quicker



SOLUTION

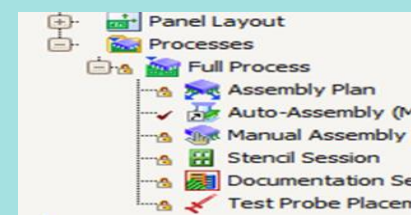
Improved NPI time and cost, standardized engineering flow and tools, and improved global manufacturing flexibility

INTEGRATED SOLUTION: LEAN NPI



Manufacturability Analysis

40% ENGINEERING TIME SAVED



PCB Process Planning

50% NPI TIME SAVED

\$0.4M ANNUAL SAVING



Phuntronix

SIEMENS
Ingenuity for life

Solution

Valor Process Preparation

The entire NPI process runs smoother, more effective and much faster.

“We won 50% of our time. What we use to do in 2-3 days, we can do in 0,5-1 day, and half the manpower is required: operators that were used for repetitive tasks can now shift to more specialized tasks.”

Minno de Roo, Director, Punthronix



+50% NPI process speed



25% reduced downtime



30% shorter lead time

What is next? Think About this ...

80% of manufacturing costs are materials

Good material management system can reduce material inventory with 1 to 3%

But... supply chain prices can vary up to 30%

So ...If 250K€ investment to reduce material inventory and save 1 to 3% on material cost, is a valid ROI argument

How about investing less than 20K€ to reduce 10% on material cost?



To improve is to change and to be perfect is to change often.

Winston Churchill

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