



# Online-Seminar

## Additive Manufacturing Network im Mittelstand

David Swisa & Helmut Zeyn

# Herzlich Willkommen

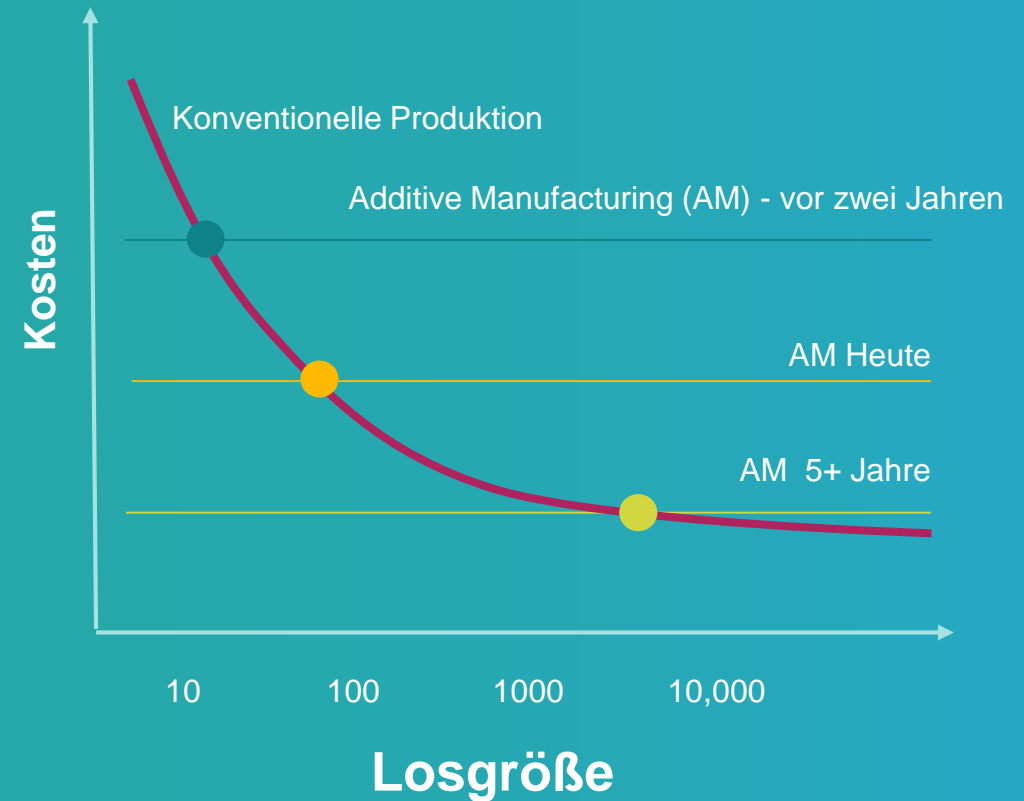
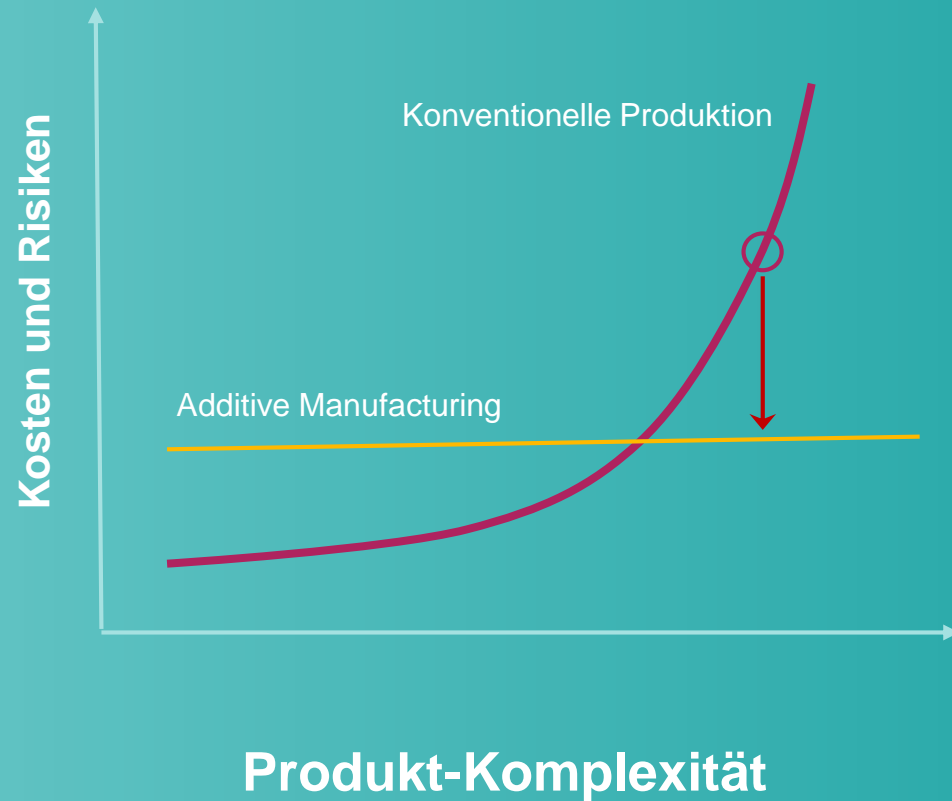


<p><b>Helmut Zeyn</b> Portfolio Development Additive Manufacturing</p>		<p><b>Phone</b> +49 40 23720 514</p> <p><b>E-mail</b> helmut.zeyn@siemens.com</p>
<p><b>David Swisa</b> Business Development Manager</p>		<p><b>Phone</b> +49 89 969793022</p> <p><b>E-mail</b> avid.swisa@siemens.com</p>

# It's time to rethink

EVERYTHING

# Treiber der Implementierung von Additiver Fertigung



# Innovationen – Inkrementeller Fortschritt bringt keinen Wettbewerbsvorteil



# NX – Eine integrierte Lösung für Additive Fertigung

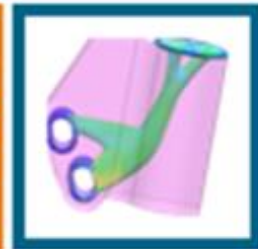
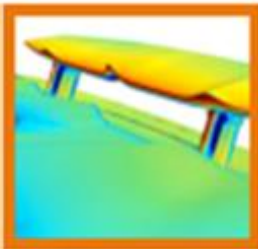
Von Anforderungs-getriebenen Design zum fertigen Produkt

1 - Produkt Design

2 – Produktions Vorbereitung



Anforderungen



Generatives Design



Adaption



Validierung



Pre-Processing & 3D Druck



Nachbearbeitung & Qualität

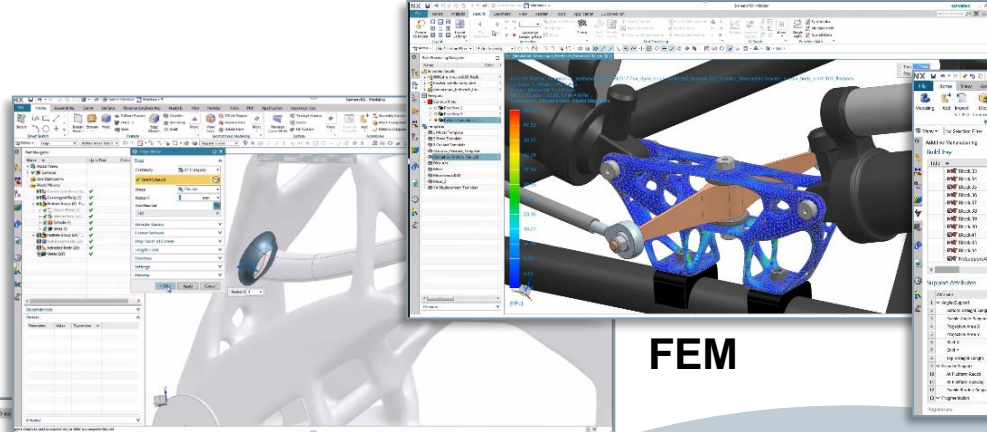


Daten und Prozess Management

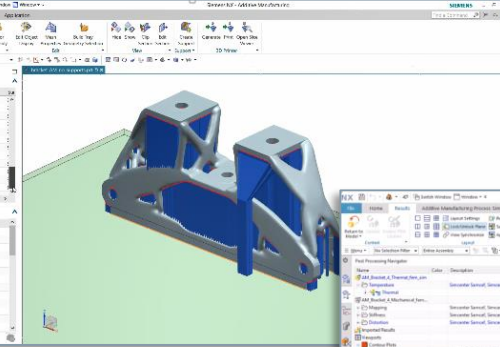
# Sehr unterschiedliches Knowhow erforderlich

**SIEMENS**  
*Ingenuity for life*

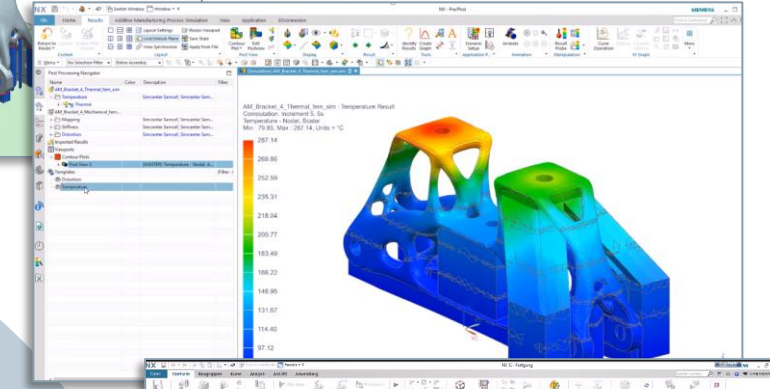
**CAD**



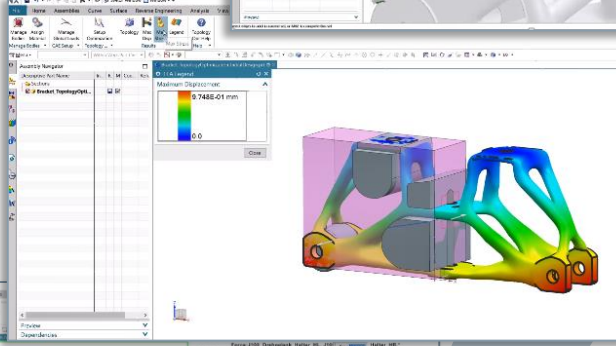
**Druck-Vorbereitung**



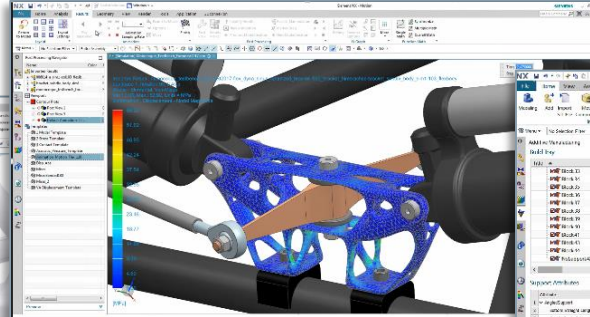
**Druck-Simulation**



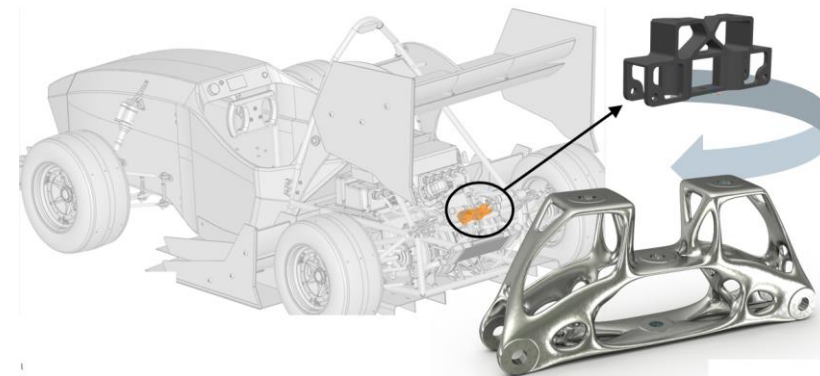
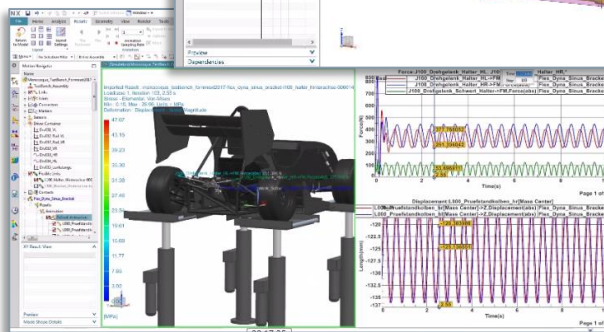
**Topologie-Optimierung**



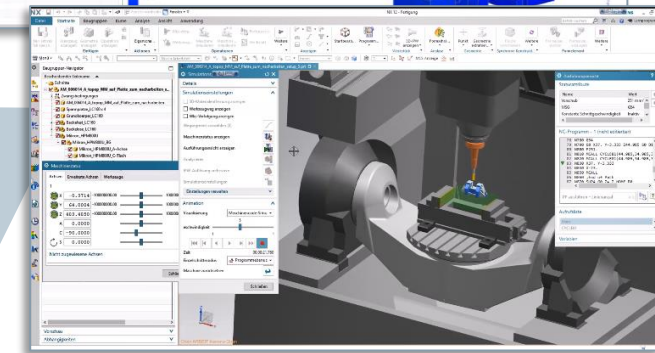
**FEM**



**FEM**



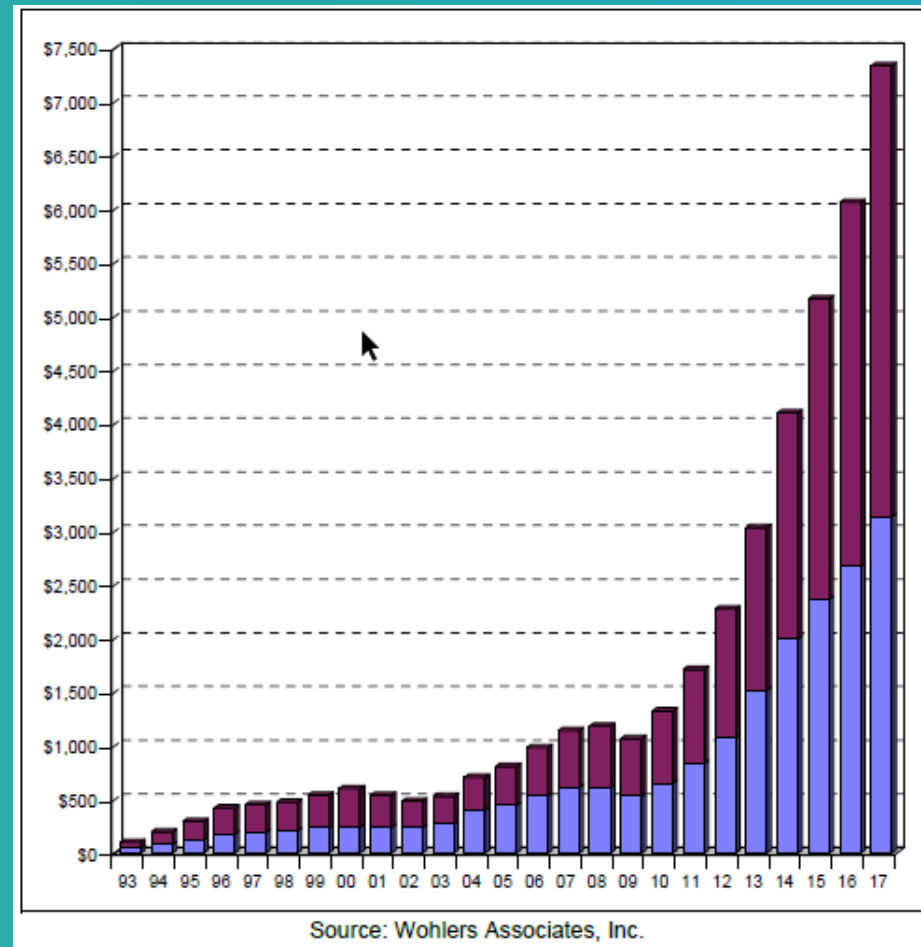
**CAM**



# Stark wachsender Markt für AM

50% der Bauteile werden bei  
Dritt-Firmen gedruckt

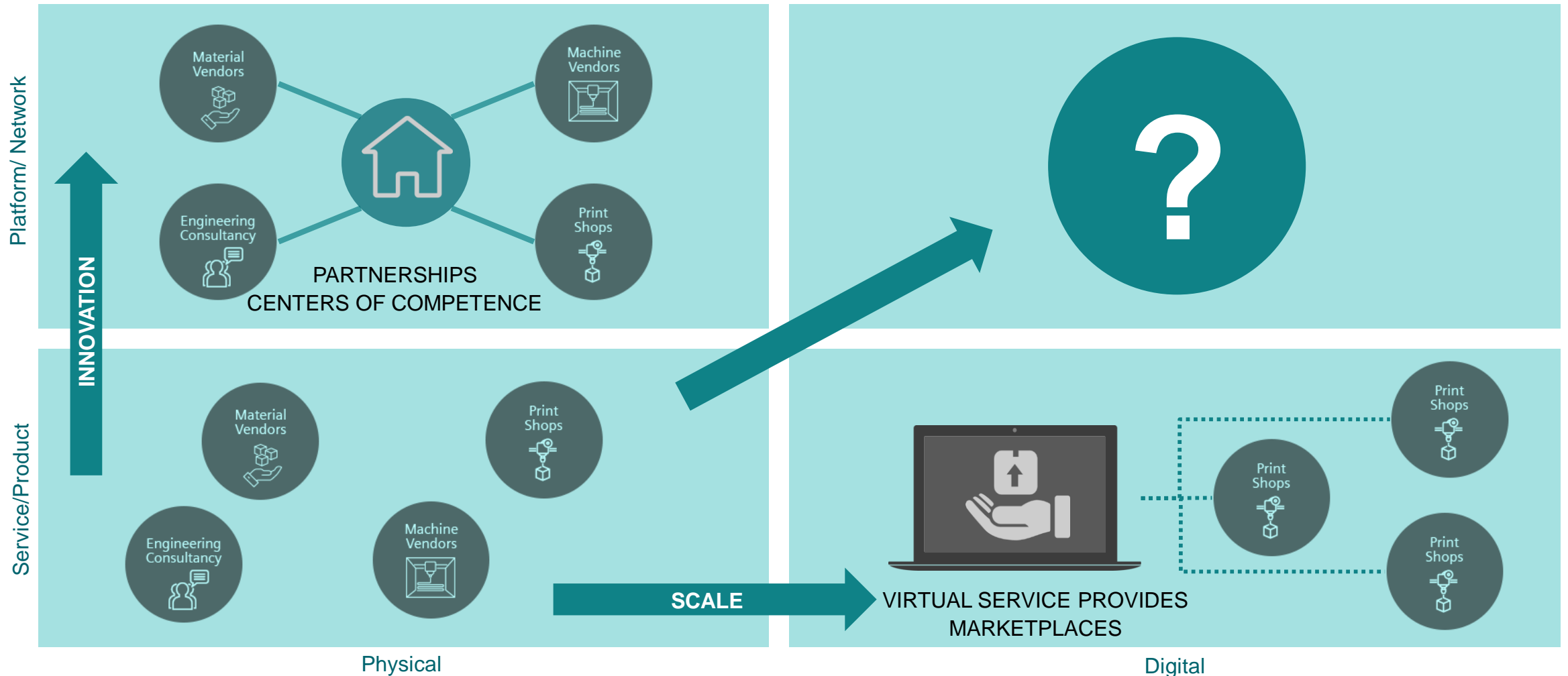
Wie sieht es hier aus?





# Siemens' Additive Manufacturing Network

# How do you scale innovation in additive manufacturing?



**A collaboration platform  
designed to digitalizing the  
end to end industrial  
additive manufacturing  
business processes**





**DECATHLON**

SPORT FOR ALL | ALL FOR SPORT

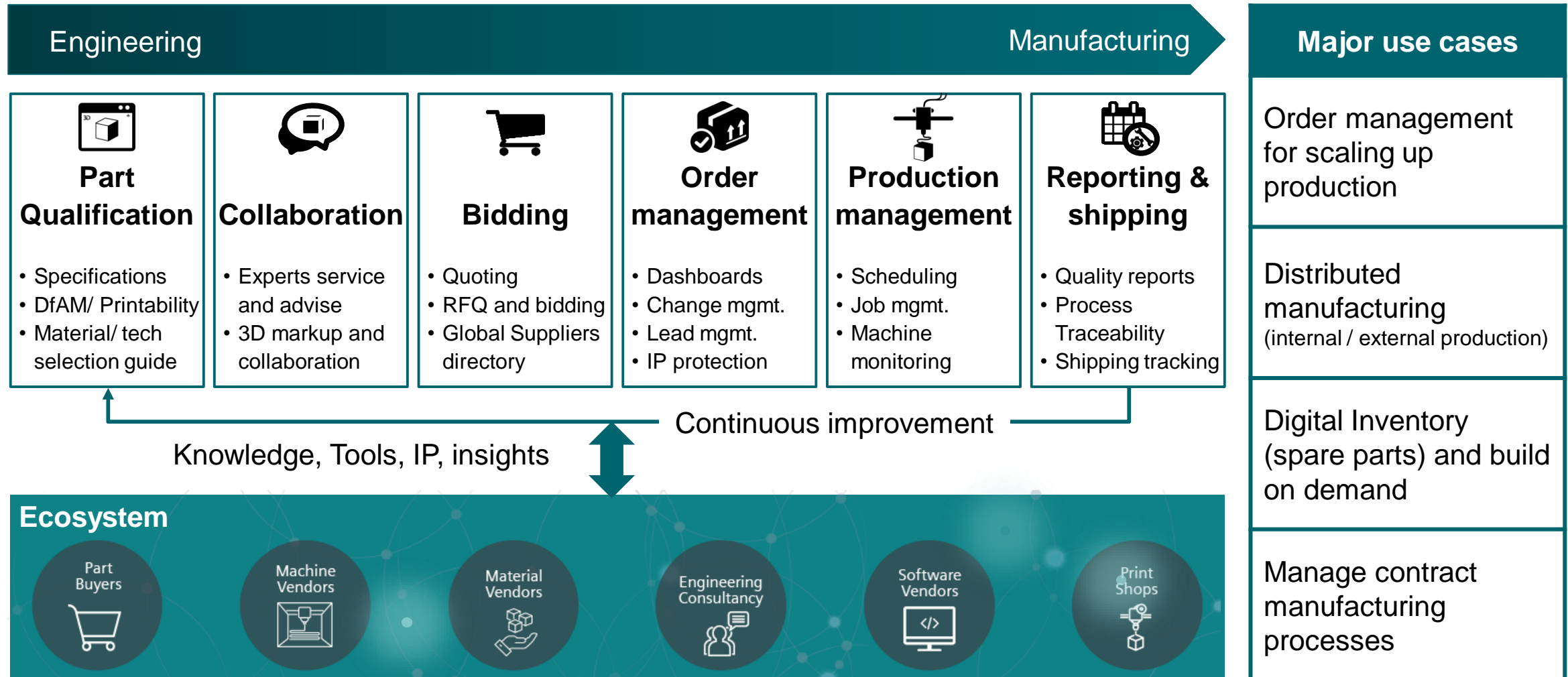
A man with dark hair, wearing a white and blue Decathlon vest over a dark shirt, is seated in a lab. He is looking slightly to the right. In the background, there is a whiteboard with some writing, a bookshelf with books, and a yellow hexagonal sign that says "ADD LAB".

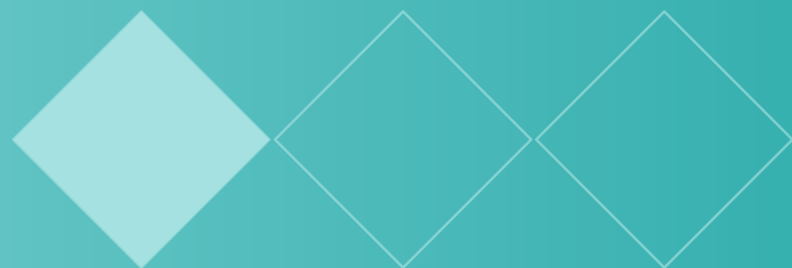
Julien Guillen

Leader additive manufacturing  
Decathlon

# Siemens' Additive Manufacturing Network

## Digitalizing the E2E design to ship business process

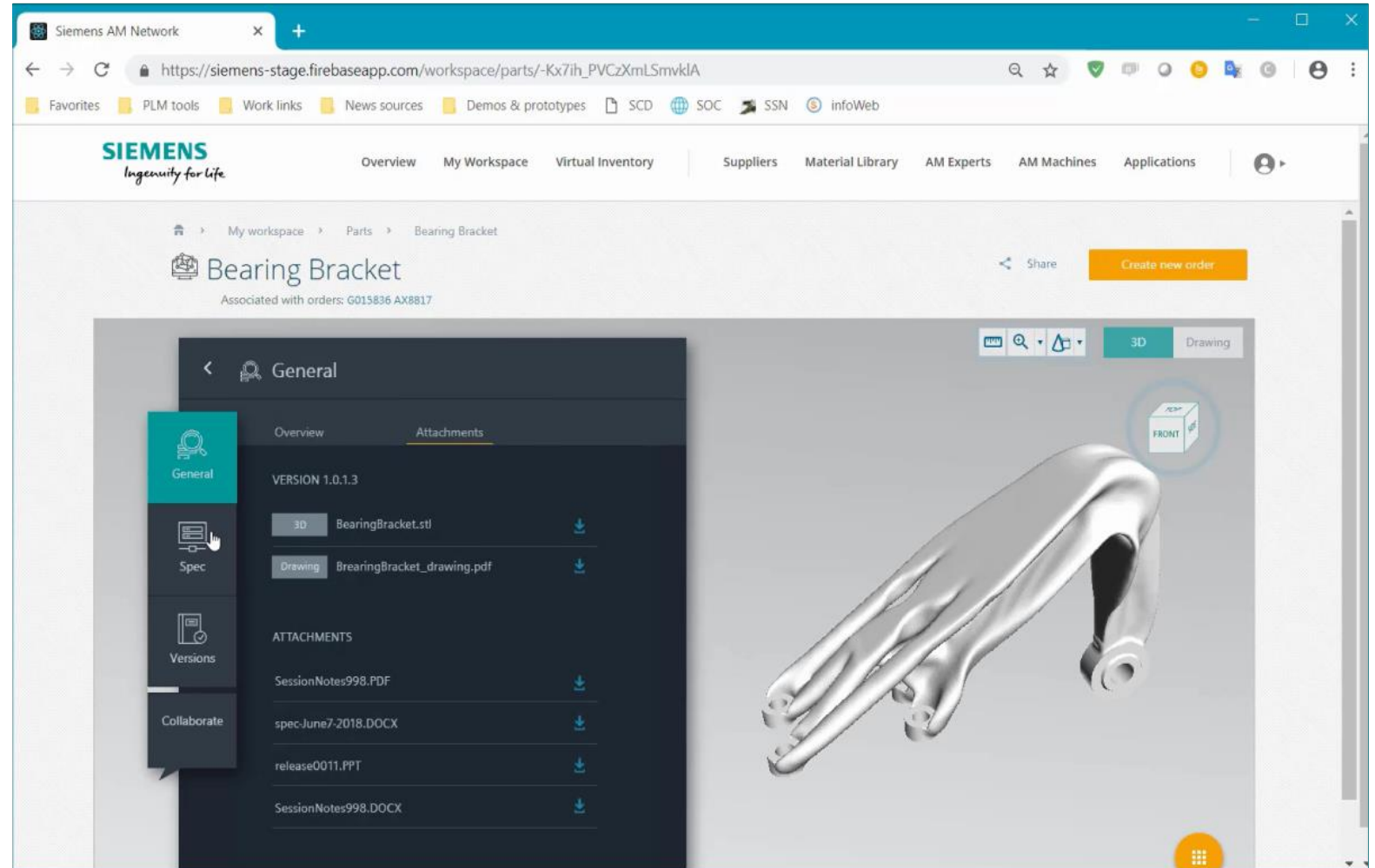




**Amplifying design innovation.**

# Part qualification

Load part and define production SPEC (e.g. technology, material, post process and quality)

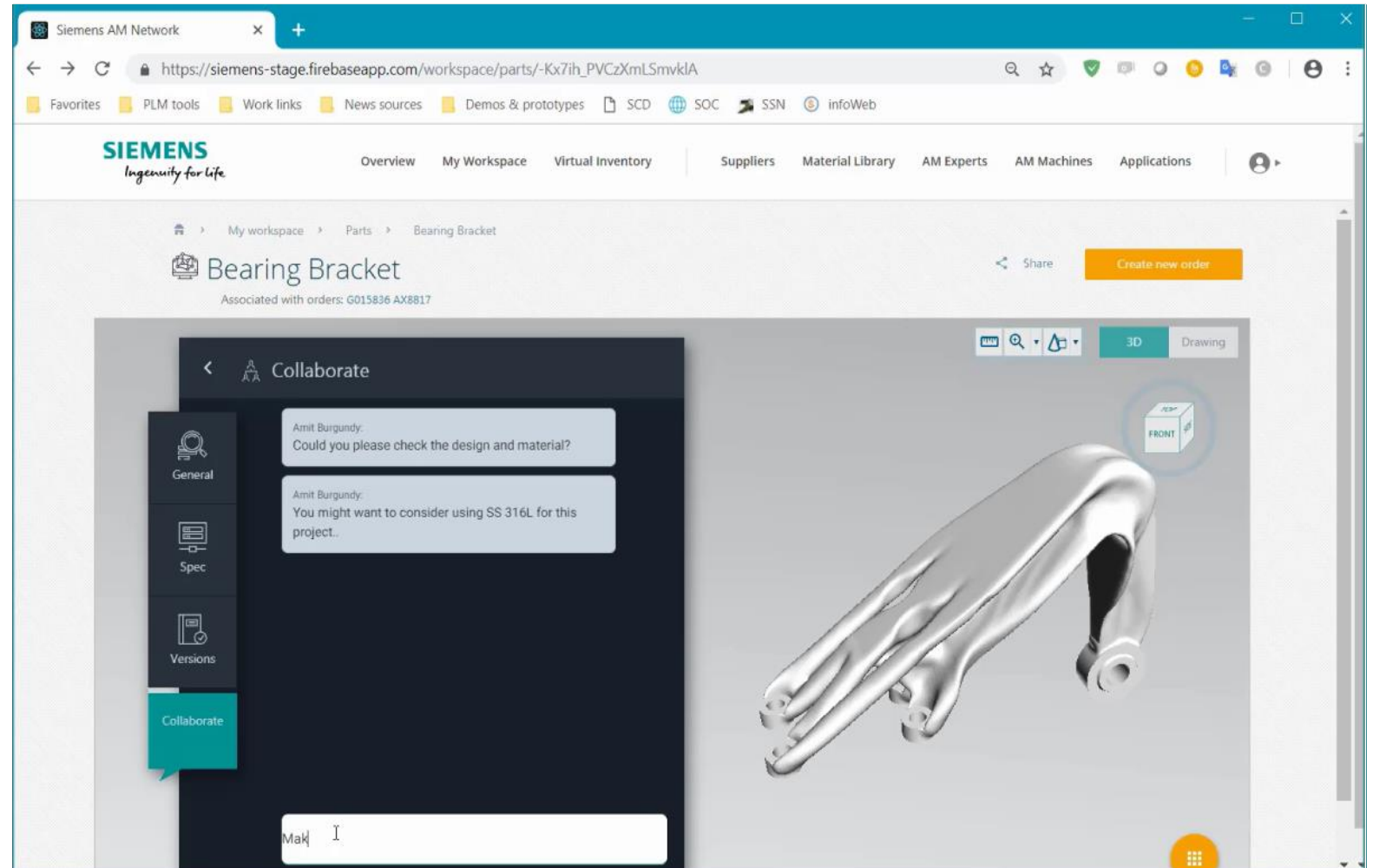


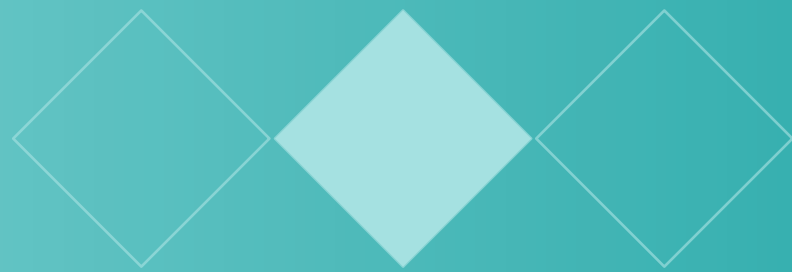


# Collaboration and DfAM



Collaborate with advanced engineering and consultant services and access software tools to validate AM manufacturability





**Distributed Manufacturing.**

# Bidding

Find appropriate suppliers in your network and manage order and bidding process or get automated quotes

The screenshot displays the Siemens AM Network web interface. The browser address bar shows the URL: <https://siemens-stage.firebaseio.com/workspace/orders/new>. The page title is "Siemens AM Network". The main navigation bar includes "Overview", "My Workspace", "Virtual Inventory", "Suppliers", "Material Library", "AM Experts", "AM Machines", and "Applications". The current page is titled "New order AM881724" and shows a progress bar with stages: Draft, RFQ, Proposal, Ordered, Production, and Delivery. Below the progress bar, there is a "Shipment Preferences" section with the address: "Deliver to: Siemens main offices, Kiefholzstraße 44, 12435 Berlin, Germany". The "Parts" section shows a 3D model of a "Bearing bracket" with the following details: Steel, Powder Bed Fusion, Design Validation Prototype, EOS StainlessSteel 316L, L 37.8mm, W 116.9mm, D 78.8mm, and a volume of 183.72cm<sup>3</sup>. The quantity is set to 3. The "Suppliers & Offers" section displays a table of automated quotes from Siemens suppliers.

Supplier	Location	Distance	Compliance	Lead Time from Purchase Order	Costs	+Shipment Costs	Currency	
SIEMENS <i>Ingenuity for life</i>	Stuttgart, Germany	83km	✓ Materials ✓ Technologies	15 days	1,800.00	+35.00	USD	<a href="#">Submit Purchase Order</a>
SIEMENS <i>Ingenuity for life</i>	Erlangen, Germany	288km	✓ Materials ✓ Technologies	15 days	2,120.00	+35.00	USD	<a href="#">Submit Purchase Order</a>

# Order and production/ job management for manufacturing



Manage incoming RFQs and orders, schedule jobs to machines and monitor job progress on the machine

The screenshot shows the Siemens AM Network web application interface. The browser address bar displays 'https://siemens-stage.firebaseio.com/workspace'. The navigation menu includes Overview, Sales (selected), Planning, Production, AM Machines, Applications, and Company Profile. The main content area is titled 'Sales' and features a filter bar with tabs for RFQs (23), Proposal (4), Orders (54), In Production, and Shipped (24). Below the filter bar is a table listing various sales orders.

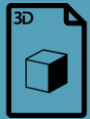
Status	Date received	Customer name	Order#	Required by	Parts included	Total quantity	Quote (USD)	Messages
RFQ <span>New</span>	Dec 14, 2018   Today	Aerospace NG	<a href="#">OR4832976</a>	Dec 28, 2018   In 14 days	1	3	- PENDING ORDER -	<span>2</span>
RFQ	Dec 13, 2018   Yesterday	ABC Automotive	OR3484730	Dec 24, 2018   In 10 days	1	2	1200	
Proposal	Dec 12, 2018   2 days a...	ABC Automotive	OR0045364	Jan 3, 2019   In 20 days	2	10	3300	
Proposal	Dec 12, 2018   2 days a...	Siemens Technik Akademie	OR4563789	Jan 13, 2019   In 30 days	1	5	1250	
Proposal	Dec 10, 2018   4 days a...	Formula 2 Automotive	OR4897657	Jan 5, 2019   In 22 days	3	12	1200	
Proposal	Nov 29, 2018   15 days ...	Custom Implants INC	OR4558988	Jan 12, 2019   In 29 days	1	10	800	
Ordered	Dec 4, 2018   10 days a...	CAerospace NG	OR4649837	Jan 3, 2019   In 20 days	2	8	650	
Ordered	Dec 8, 2018   6 days ago	Custom Implants INC	OR4964078	Dec 21, 2018   In 7 days	2	20	8000	
Production	Dec 14, 2018   Today	Siemens Technik Akademie	<a href="#">OR4090876</a>	Dec 17, 2018   In 3 days	1	2	120	<span>5</span>
Production	Dec 14, 2018   Today	Aerospace NG	OR4303543	Dec 17, 2018   In 3 days	1	5	250	
Production	Dec 14, 2018   Today	Formula 2 Automotive	OR4626349	Dec 18, 2018   In 4 days	2	4	120	

# Reporting - visibility and traceability



Get a dashboard of all your activities and track quality and order status as the manufacturing progresses

The screenshot displays the Siemens AM Network web interface. The browser address bar shows the URL <https://siemens-stage.firebaseio.com/orders/production>. The page features a navigation menu with options like Overview, My Workspace, Virtual Inventory, Suppliers, Material Library, AM Experts, AM Machines, and Applications. The main content area shows a 3D model of a part, its specifications (Steel Powder Bed Fusion, Design Validation Prototype, EOS StainlessSteel 316L, L 37.8mm, W 116.9mm, D 78.8mm, 183.72cm<sup>3</sup>), and a proposed price of \$1,570.00 for a quantity of 3. Below this, the 'Suppliers' section lists 'Materials Solutions' with their address: Unit 8, Great Western Business Park, McKenzie Way, Worcester, WR4 9GN, UK. A 'Production phase' progress bar indicates the current status: In Que, Scheduled, In Print, Post Process, Quality test (highlighted), and Complete. The estimated completion date is 12/14/2018. At the bottom, there is a section for 'Quality test documents' with an 'Upload' button and a list of files: QA919127.PDF and QA919128.PDF. A 'Testing comments' text area is also present.

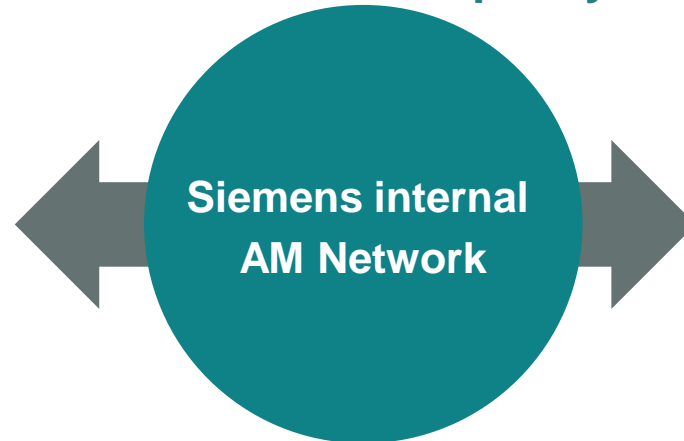


## Engineering teams:

- ✓ Across 7 different divisions
- ✓ Use AM mainly for prototypes and for production jigs and fixtures
- ✓ Look for easy way to order parts using Siemens internal procurement processes



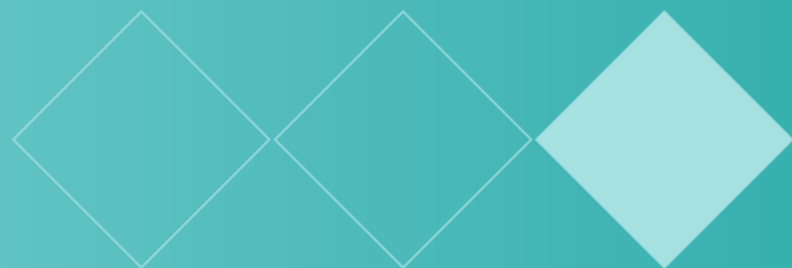
Connecting the internal AM demand with the internal industrial AM capacity



## Industrial AM Labs:

- ✓ Increase the utilization of the expansive AM machines
- ✓ Gaining experience of producing AM parts uncommon in their organization
- ✓ Keep funds within the company



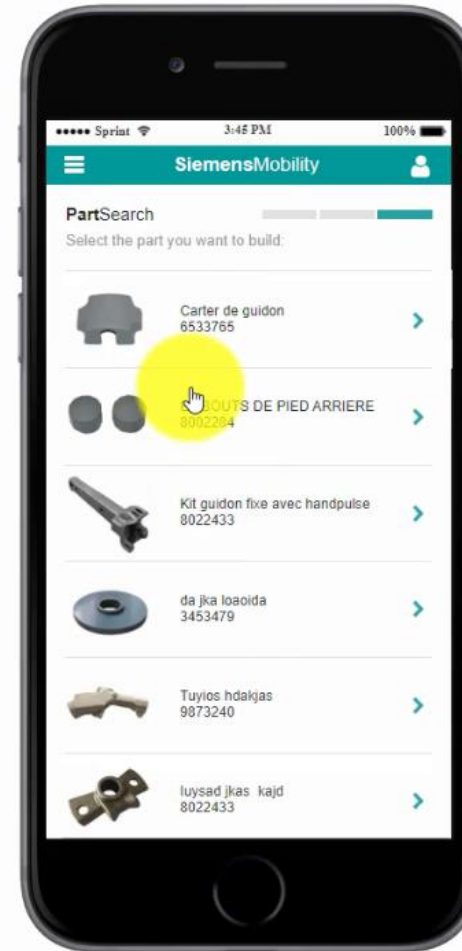


**Transforming business.**

# Transforming business

## Minimize physical inventory

**Digitalize physical  
inventory and  
operations to  
transform  
maintenance  
and service.**





# Accelerating the global adoption of industrial additive manufacturing

## AMNetwork guiding principles:

### 1. Digitalize interaction

Utilizing digital tools and knowledge bases to scale interaction among the network players

### 2. Open ecosystem

the network is open to all industrial AM ecosystem ('vendor neutral')

### 3. Data driven

Knowledge provided by industry expert and analyze industry best practices by the platform

### 4. Safe and secure

IP and privacy protection is paramount



# A growing ecosystem

**SIEMENS**  
*Ingenuity for life*



# Accelerating the global adoption of industrial additive manufacturing

## Siemens' Additive Manufacturing Network

Amplify design innovation

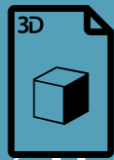
Distribute manufacturing

Transform business



# Join Siemens AM Internal Network!!

## Free registration for imitated time at Hannover Messe!



### Engineering organizations:

- ✓ Manage and track your AM orders
- ✓ Collaborate effectively on your AM design and production within your organization or with external partners
- ✓ Find and work with industrial AM service bureau



### Industrial AM service bureaus:

- ✓ Make your service visible in front of large industrial customers seeking AM parts
- ✓ Manage your incoming orders and provide better service to your customers

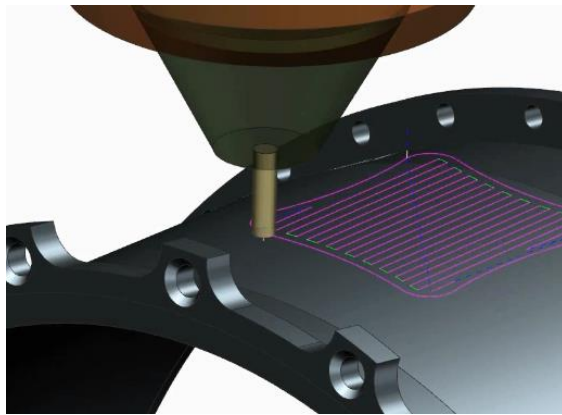
**Contact us: [david.swisa@siemens.com](mailto:david.swisa@siemens.com)**

# Siemens Ökosystem

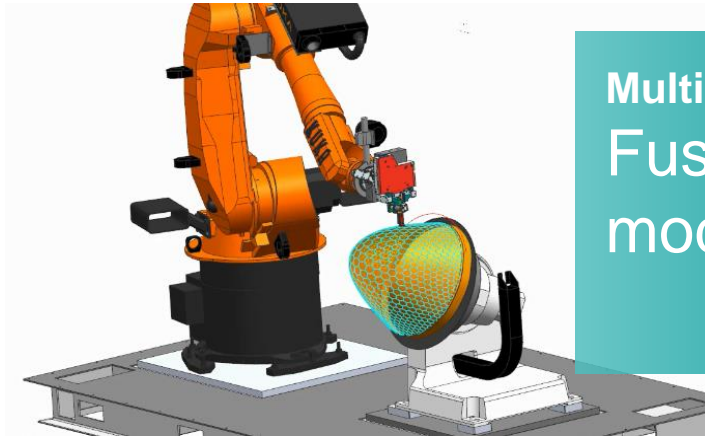
# Industrialisierung der Additiven Fertigung

## Unterstützte Druck-Technologien

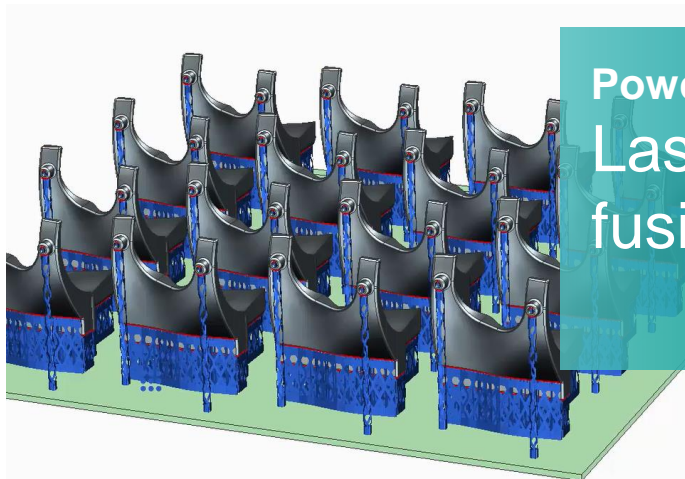
**SIEMENS**  
*Ingenuity for life*



Hybrid additive  
Directed energy  
deposition



Multi-axis  
Fused deposition  
modeling

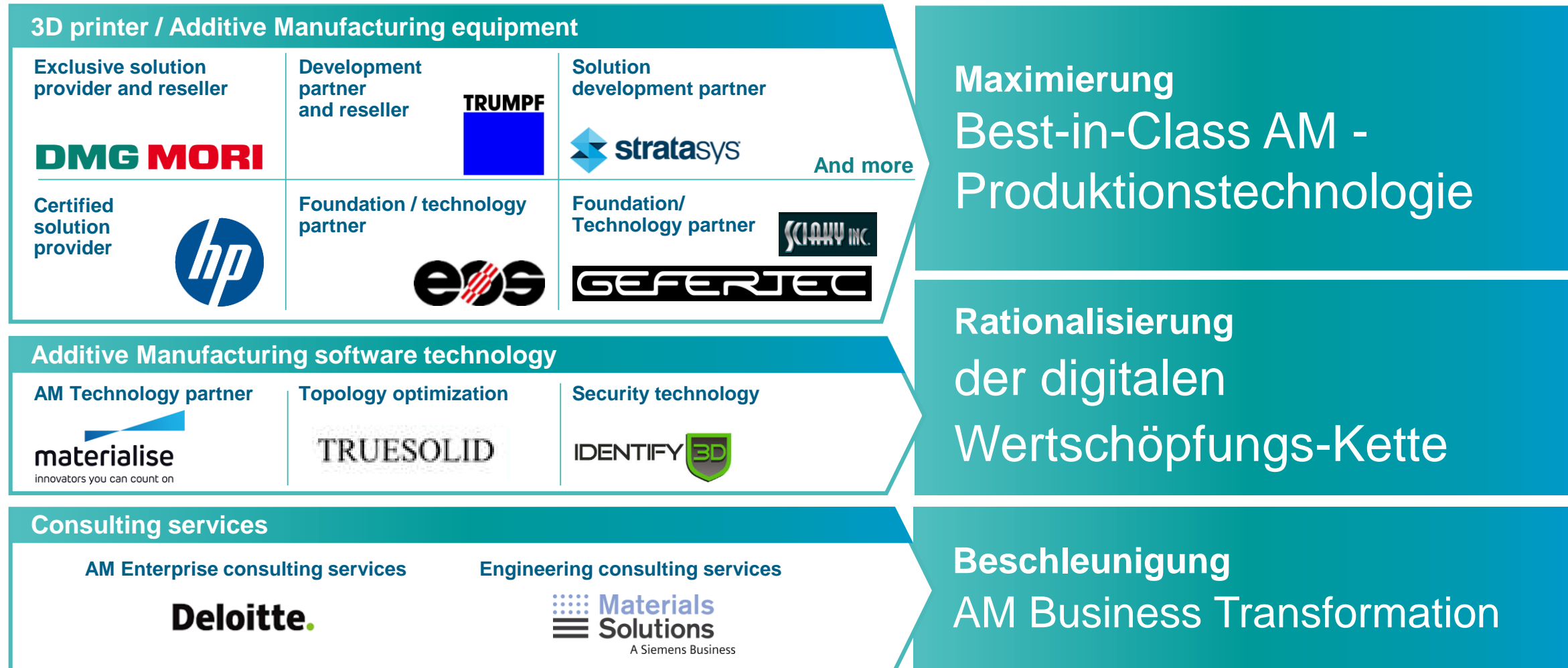


Powder bed fusion  
Laser material  
fusion



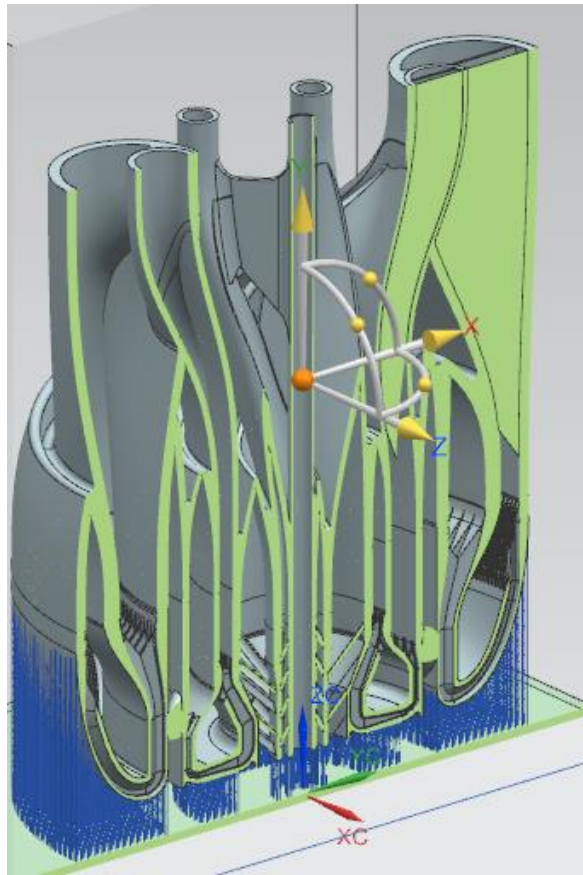
Multi jet fusion  
Agent jetting/  
inkjet technology

# Maximierung des Kundennutzens durch unser Ökosystem von Produktionspartnern



# Siemens ist einer der weltweit größten Anwender in 3D Druck

**SIEMENS**  
Ingenuity for Life



**purmundus**  
challenge 2018  
3rd prize

Jury:  
„High efficient complexity of geometrie“

Unrestricted © Siemens AG 2019

Page 31

Siemens is industrializing additive manufacturing

**SIEMENS**  
Ingenuity for Life



**Materials Solutions**  
A Siemens Business

Unrestricted © Siemens AG 2017  
Page 4 2017.MM.DD

Siemens PLM Software

Fully operational serial production utilizing a digital end-to-end software chain has proven that Industrialization of AM works

**SIEMENS**  
Ingenuity for Life



Unrestricted © Siemens AG 2017  
Page 6 2017.MM.DD

Siemens PLM Software

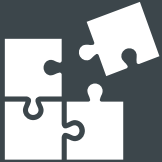
Siemens PLM Software



# Consulting Module

## Kombinierbar nach Ihren Bedürfnissen

Modular Consulting  
portfolio






Key success  
factors






### Understand and ideate



- AM Awareness 
- Sense of Urgency 
- AM Vision 



### Define and pilot



- Value Proposition 
- AM Parts Feasibility 
- AM Process Development 




### Monetize



- Make-or-Buy & Value Stream 
- AM Business Models & Ecosystems 

### Scale



- R&D Efficiency 
- AM Production Requirements 
- Production Planning 

### Digitize



- Solution Landscape 
- AM Data Management 

Siemens is a world class AM user with long year experience

Siemens has excellent know-how in AM processes and materials

Siemens is the leading provider in industrialization of AM – from design to production

# Additive Manufacturing Experience Center Erlangen (Re-opening April)

**SIEMENS**  
*Ingenuity for life*



The Siemens logo is displayed in a white box in the top right corner. It consists of the word "SIEMENS" in a bold, teal, sans-serif font.

**SIEMENS**

*Ingenuity for life*

A teal-colored rectangular overlay box is positioned in the lower-left area of the image. It contains white text and has a faint, semi-transparent grid pattern in the background.

# Vielen Dank

David Swisa  
Helmut Zeyn