

The Science of Possibility

Media Lunch #HM24

23rd April 2024, Hannover, Germany



#OnlyForward

22. - 26. April 2024 | Hannover

ENERGIZING A SUSTAINABLE INDUSTRY

WORLD. LEADING. INDUSTRYSHOW.

Über die #HM24

Altair @ HM24

The Science of Possibility



▶ Unleashing the Power of AI



*Disrupt to Win - with Altair's differentiation:
The **Convergence** of Data Science + Rocket Science*

Jim Scapa, CEO Altair

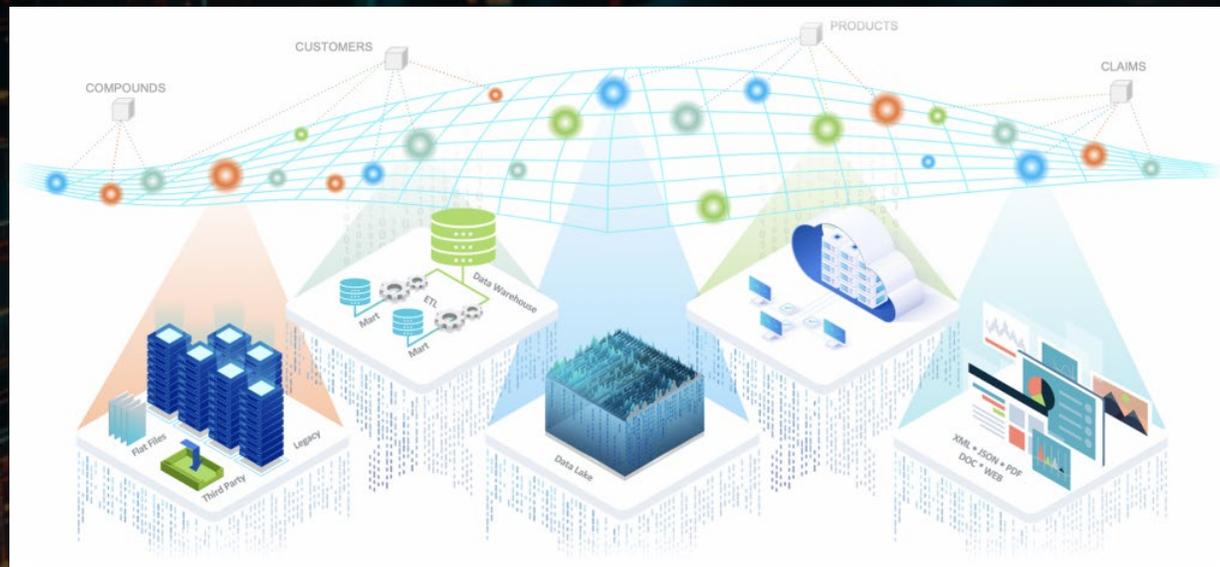
Altair's Vision

Computational intelligence will drive innovation for a more connected, safe, and sustainable future

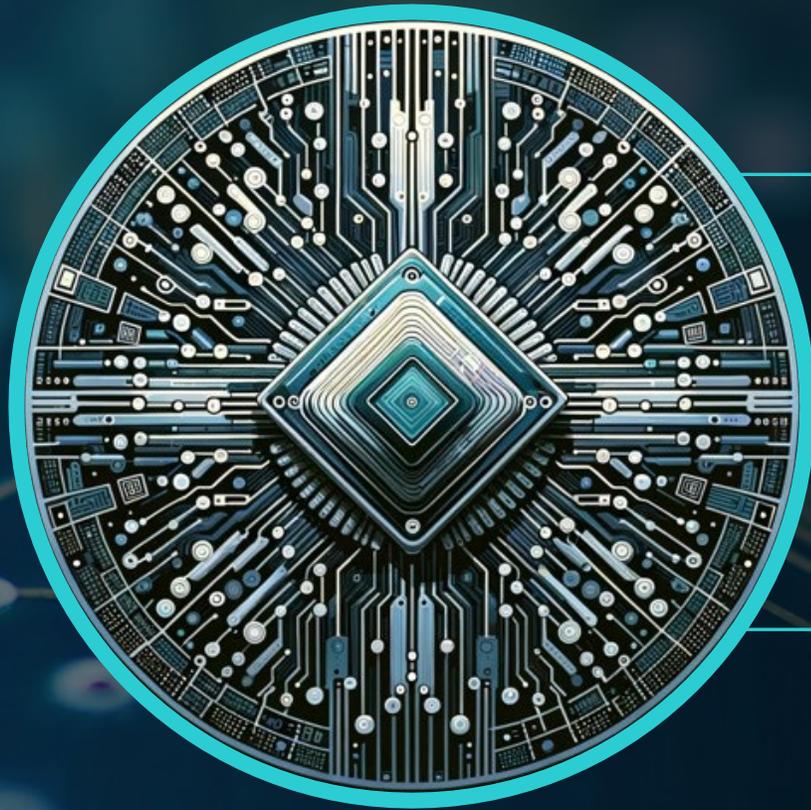
Hot News

Altair acquired the software business and related services of Cambridge Semantics

Knowledge Graph Technology allows a virtual representation of an organization's data, simplifying it and providing important context



AI-Powered Engineering and Business Paradigm Shift



- Computer-Aided Design
- Computer-Aided Engineering
- Computer-Aided Manufacturing

AI-Powered Engineering and Business Paradigm Shift



- Computer-Aided Design
- Computer-Aided Engineering
- Computer-Aided Manufacturing



• AI-Enabled Design

• AI-Embedded Engineering

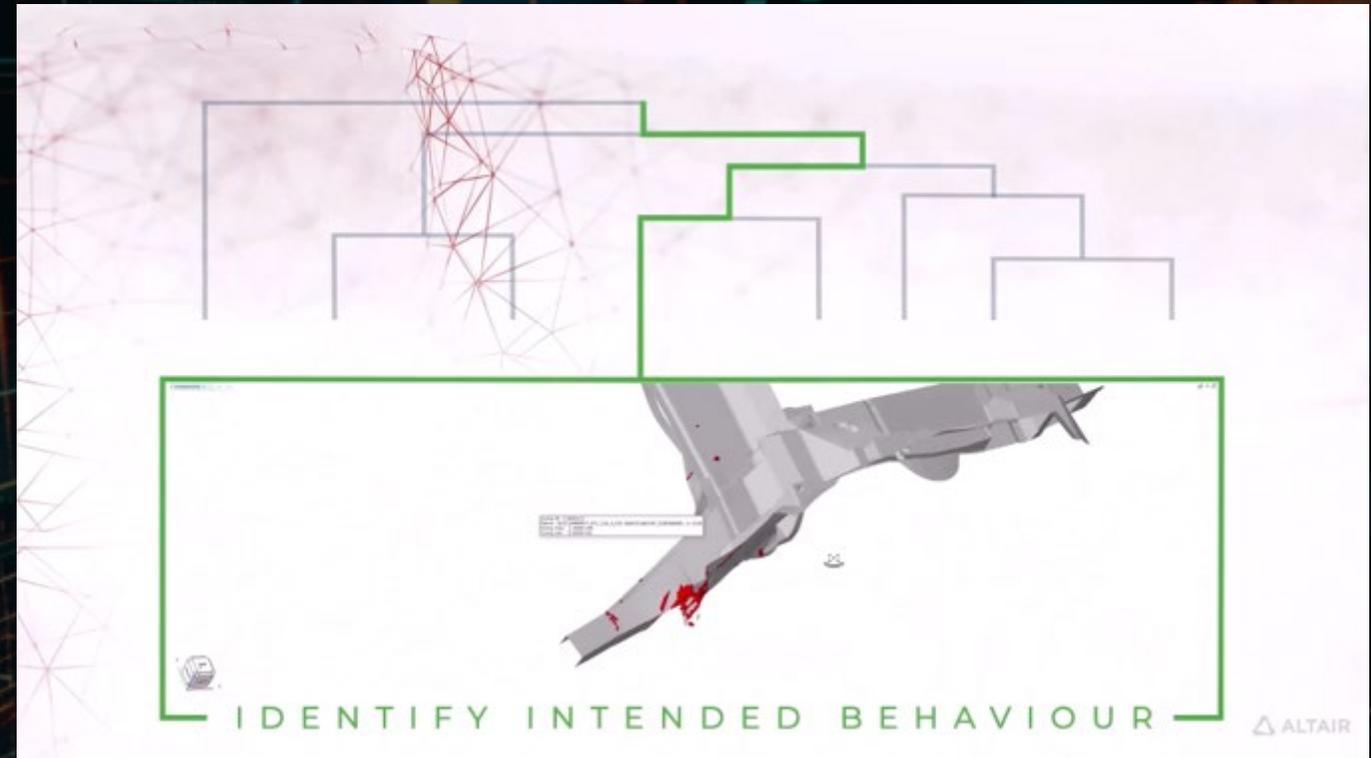
• AI-Augmented Manufacturing

AI Powered Engineering



AI-Enabled Design

Generative Design



AI Powered Engineering

Predictions w/o the need to simulate

AI-Enabled Workflows

The image displays a screenshot of the Altair HyperMesh 2024 software interface. The main window shows a model training configuration dialog box. The 'Train Model' section is set to 'model1' with training data 'dataset1'. The 'Inputs' list includes 'cae.coord', 'cae.part_label', 'cae.coord', 'eddy_viscosity', and 'pressure'. The 'Outputs' list includes 'Flow Solution', 'eddy_viscosity', 'pressure', 'surface_film_coefficient', 'surface_x_plus', 'velocity', and 'wall_shear_stress'. The 'Width' is set to 30, 'Batch size' to 1, and 'Epochs' to 100. The 'Depth' is 3, 'Learning Rate' is 0.001, and 'Patience' is 500.0. The 'Training Script' is set to 'Train Locally'. The 'Restore Default' dropdown is set to 'Altair One : Job - CPU'. Below the dialog, a small 3D model of a turbine component is visible.

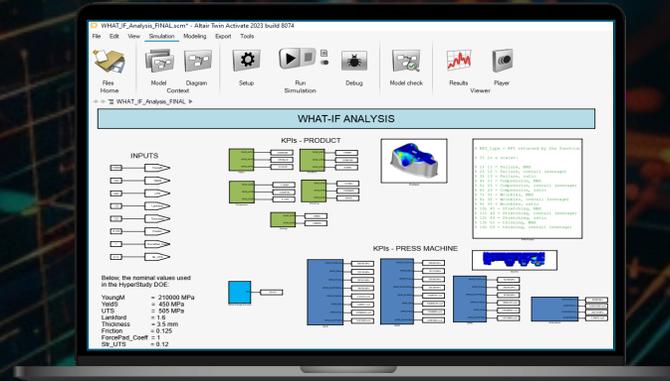
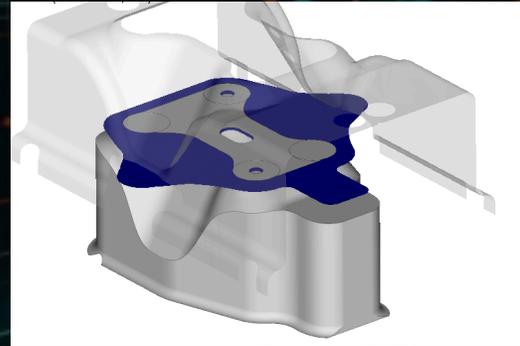
Overlaid on the right side of the HyperMesh window is a web browser window showing the Altair One dashboard. The dashboard includes a 'Submit Job Using:' section with icons for AMS, AcuSolve, EDEM, Feko, and Flux. Below this is a 'Jobs' section with a search bar and a table of job entries. A 'Recent Activities' window is also open, displaying a log of system events such as 'Upload of "test_al.ppsproj" completed at 08-Mar-24 15:09:35 (3.7618387s)' and 'Created "dataset1" at 08-Mar-24 15:09:12'.

AI Powered Engineering

Real Time Ready Virtual Sensors



AI-Augmented
Manufacturing



AI Powered Engineering



AI-Augmented Manufacturing

Real Time Ready Virtual Sensors

FE SIMULATION

SENSORS

Augrid

**KPIs
ALERTS
CALCULATIONS**

Name	expression
overall	$\frac{1}{n} \sum_{i=1}^n d_i = \frac{1}{n} \sum_{i=1}^n F(x_i, \phi)$, \square $F \left(\begin{matrix} (x_i - \phi(x_i))^2 \\ 0 \end{matrix} \right)$, $x_i > \phi(x_i)$ $x_i \leq \phi(x_i)$
max	$\max(d_i)$
ratio	$\frac{N_{Failure}}{N_{Test}}$

REAL-TIME DASHBOARD

Altair @HM 2024

- Technologies, methods, and examples for **successful digital transformation**
- Highlighting Examples
 - Digital Twins
 - AI-Powered Engineering
 - Simulation Driven Design
 - AI for the Factory Floor





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Altair Inspire, especially in combination with the selectable manufacturing restrictions, enables us to specifically design components for 3D printing and thus make optimal use of the advantages of additive manufacturing.

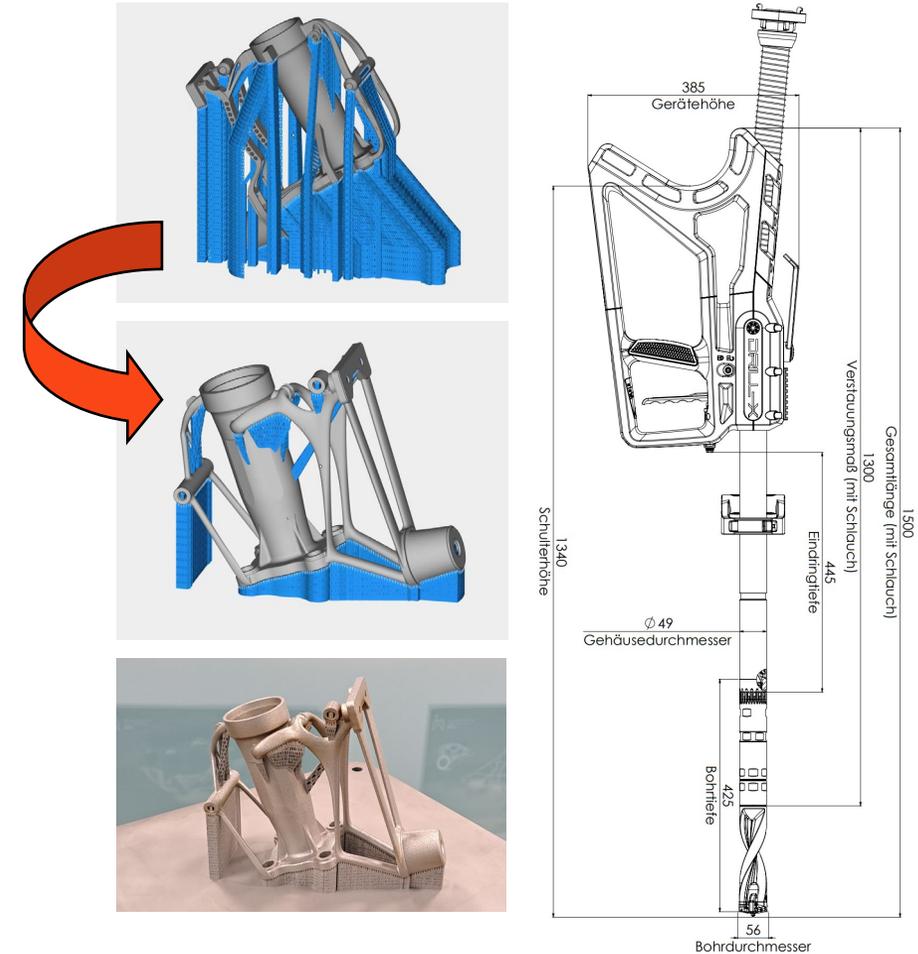
Philipp Schwemberger,
head of additive manufacturing, M&H CNC Technik

Enable Innovative Fire Fighting

Reducing resources, power consumption and production time – improve performance

- *Reduce Printing Time by 35%*
- *Reduce Printing Volume by 45%*
- *Reduced Postprocessing by 50%*
- *Reduced Hydraulic Resistance Loss by 270%*

Business Impact: Serial Production Feasibility





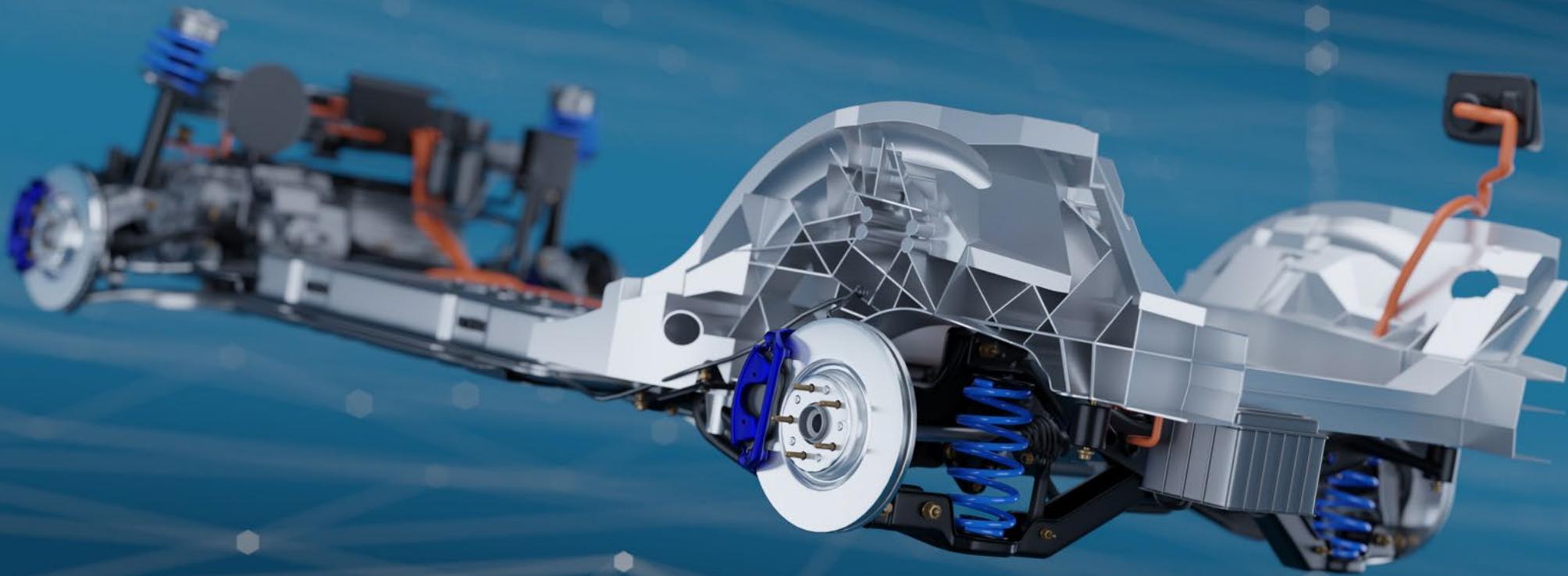
Hydraulic resistance
loss reduced by **270%**

Part consolidation **27▶1**

Printing volume
reduced by **45%**

Printing time
reduced by **35%**

Post-processing
reduced by **50%**



TOPOLOGY OPTIMIZATION

ENGINEERING DESIGN

RIB SIMPLIFICATION

STATIC AND NVH TARGETS

WEIGHT OPTIMIZATION

CRASH REQUIREMENTS

CASTING INTEGRATION

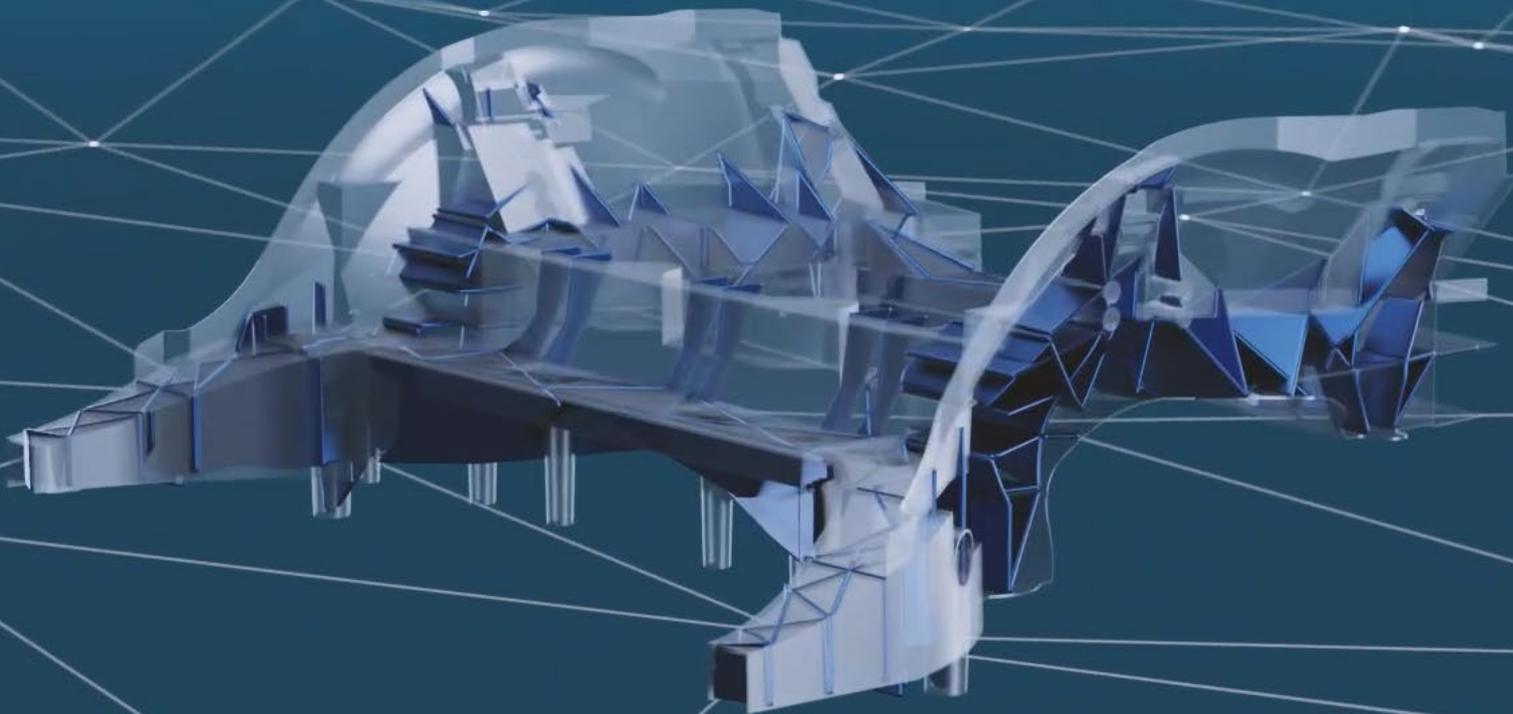
CASTING OPTIMIZATION

GENERAL OPTIMIZATION

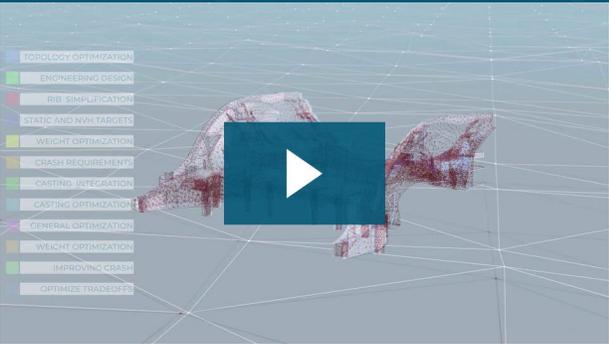
WEIGHT OPTIMIZATION

IMPROVING CRASH

OPTIMIZE TRADEOFFS



Want to know more about Generative AI design?

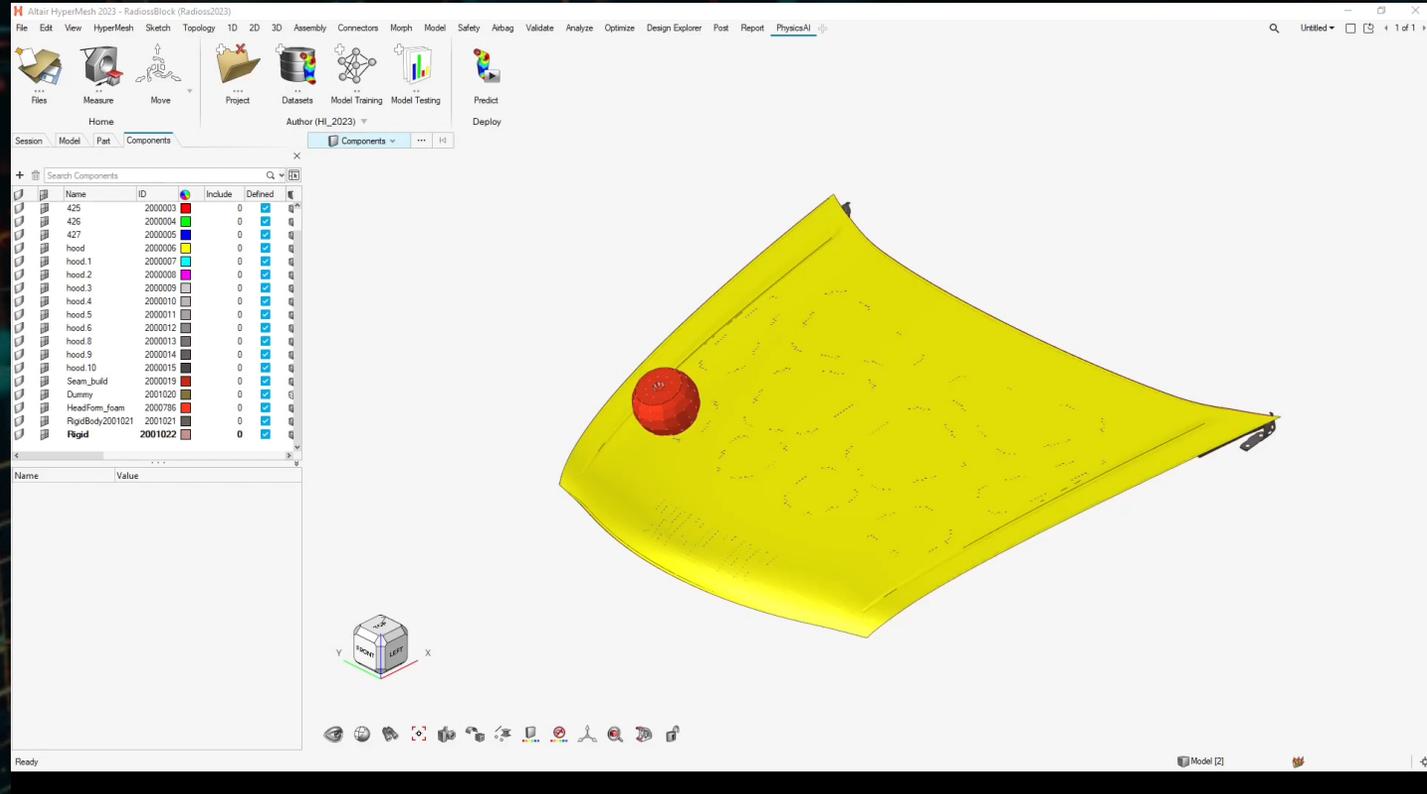


<https://web.altair.com/de/megacasting>

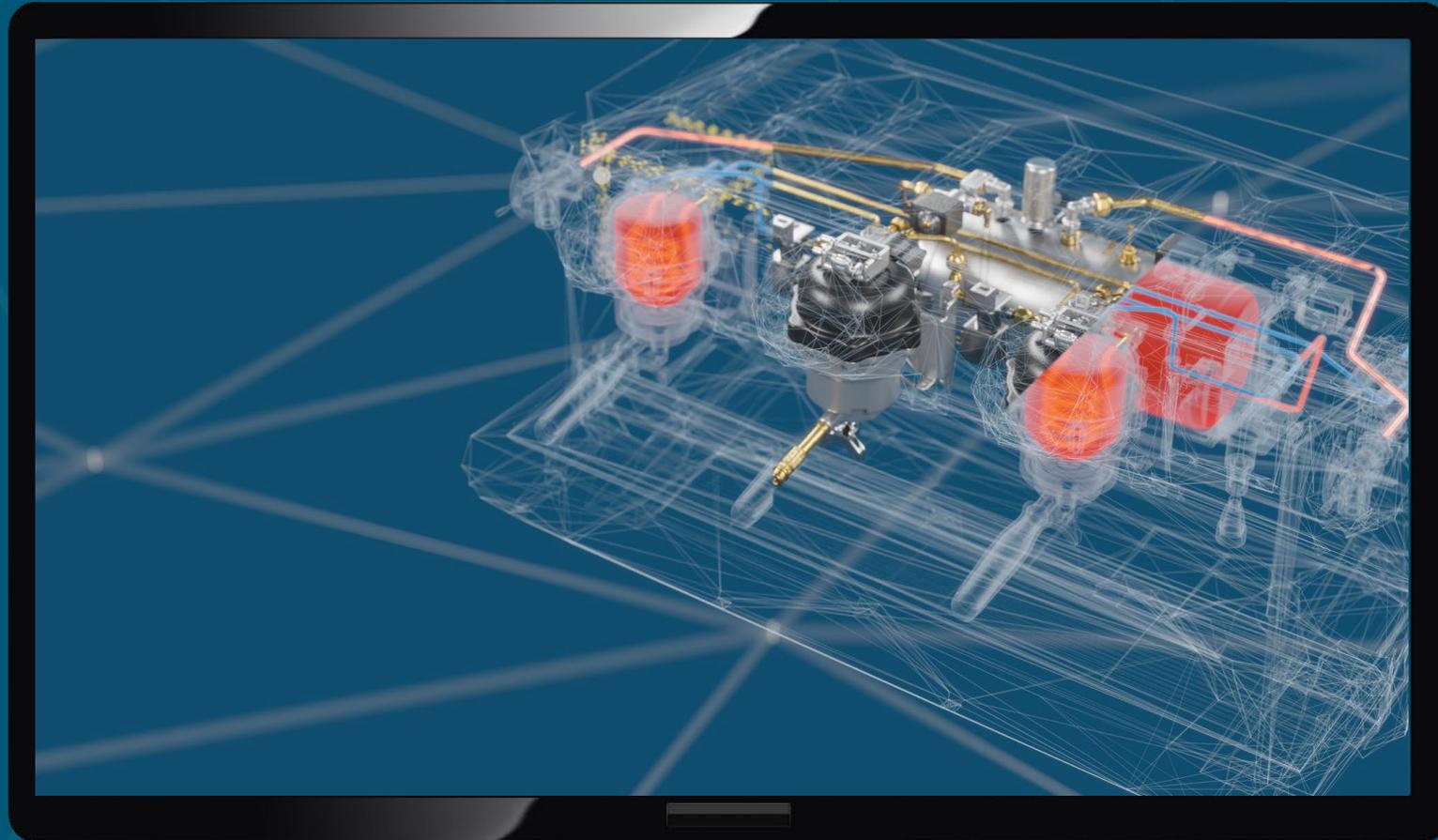
AI Powered Engineering

AI-Embedded Engineering

- *Learn from historical Data*
- *Reduce Simulation Time*
- *Capture & Share Knowledge with other teams*
- *Reduce Development Time*

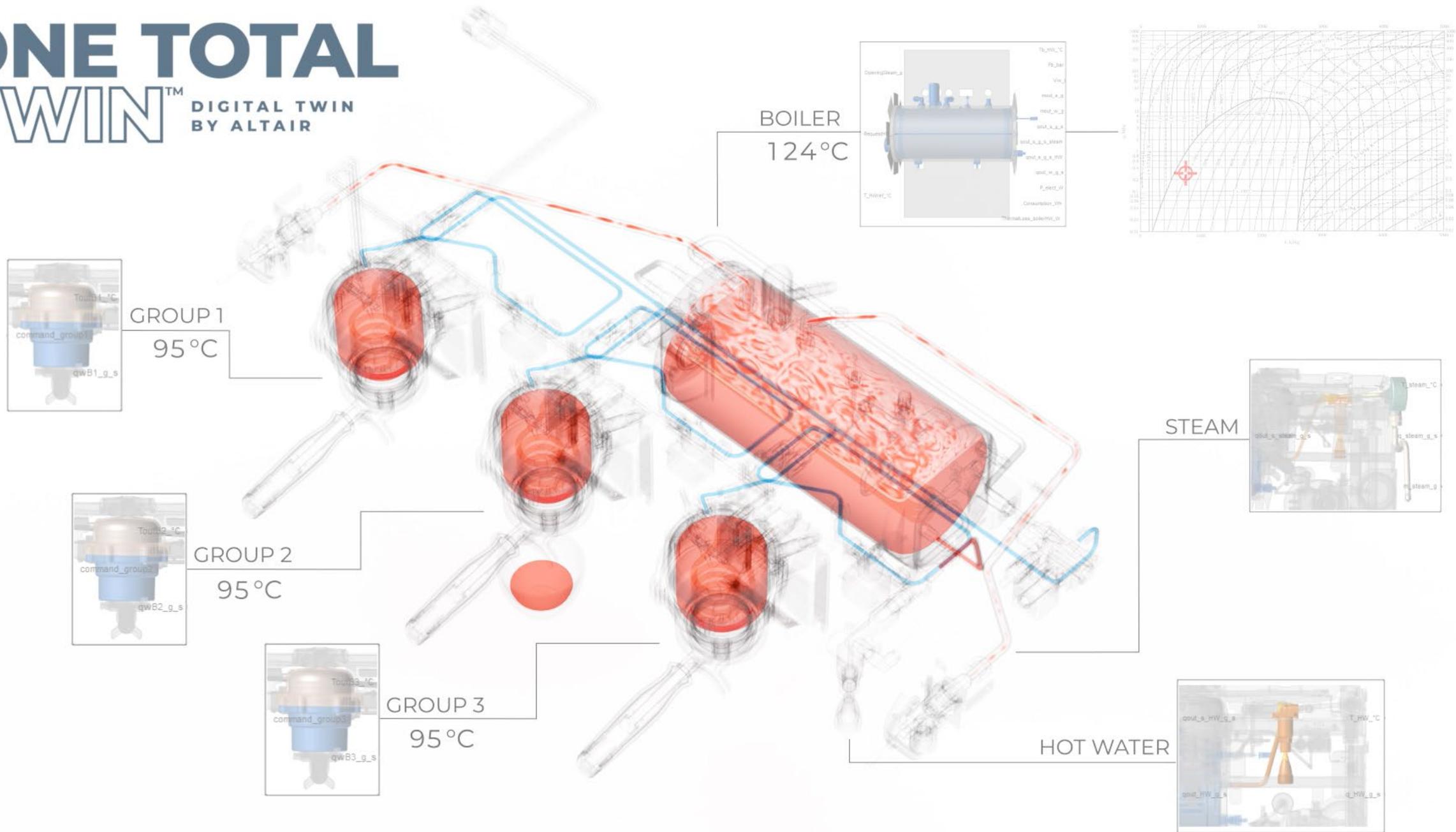


Digital Twin

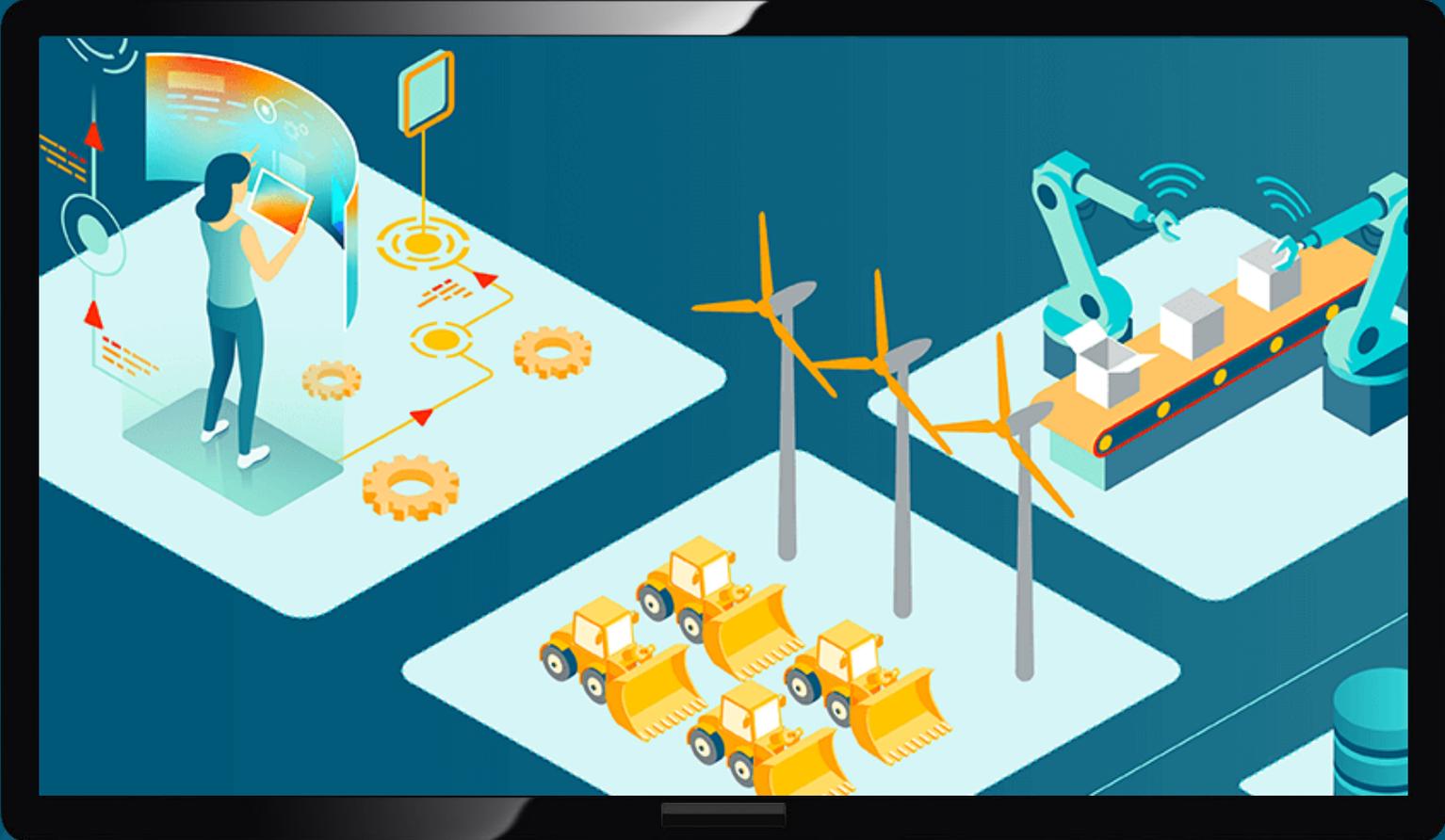


ONE TOTAL TWIN™

DIGITAL TWIN
BY ALTAIR



AI for the Factory Floor



The Digital Factory - A blueprint for AI

Application scenarios and the necessary building blocks



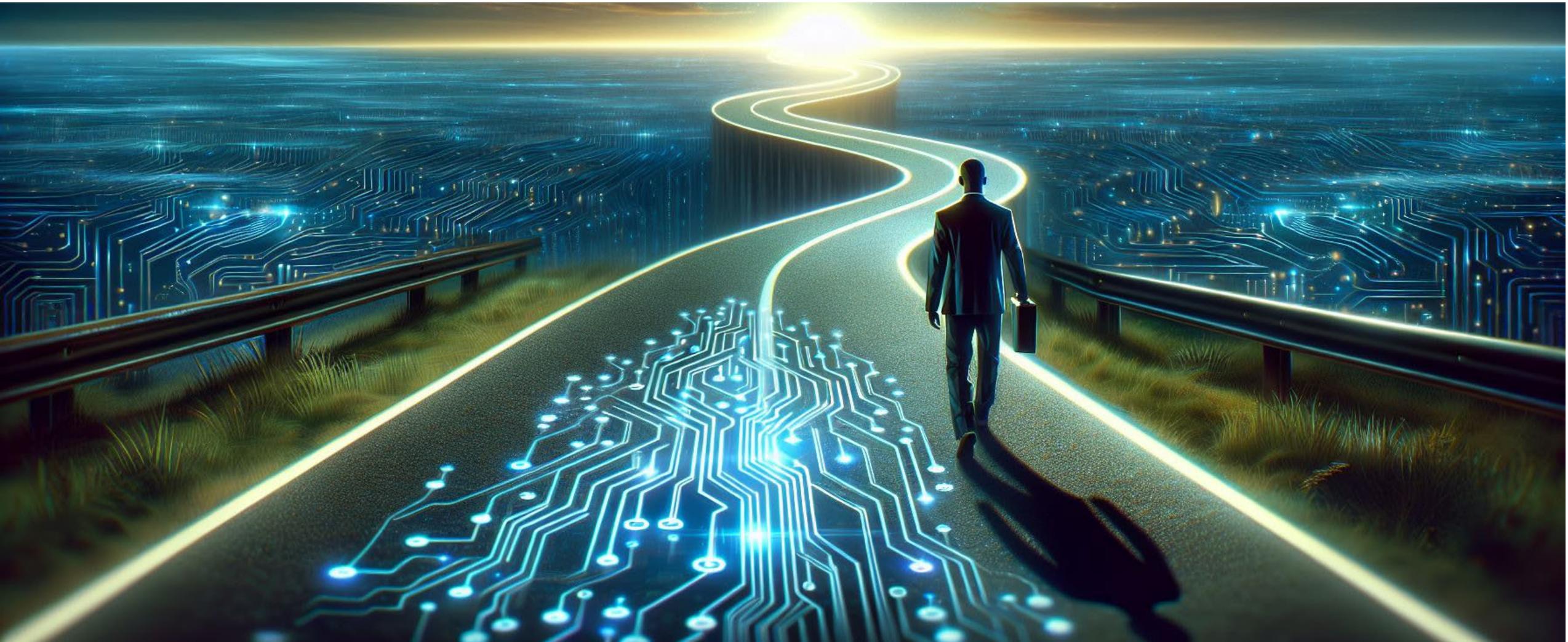
Partnership for Progress

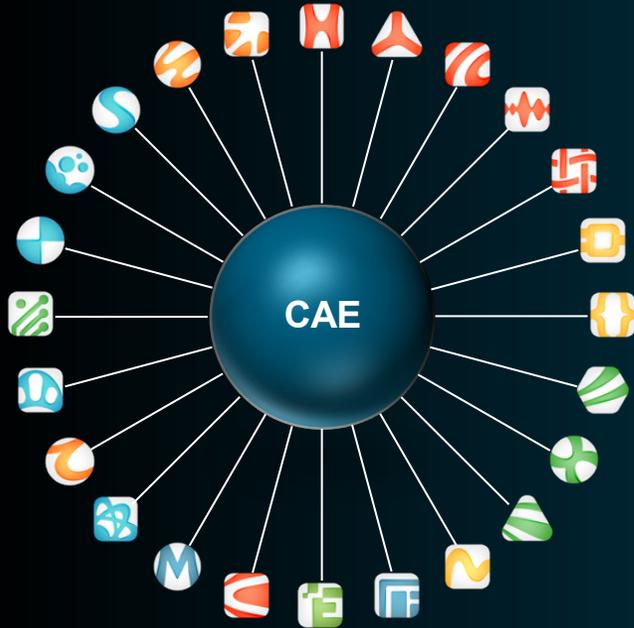
- Engineering Brilliance
- Redefining Speed to Market
- Sustainable Growth

ALTAIR

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Engineer the Future: Your AI-Driven Journey Begins Here, Now!





Generative Automated Visual Coding

New App

Churn Distribution

Churn over Time

Column	Importance
Init Plan	0.264
Day Charge	0.222
Day Mins	0.222
Whirl Plan	0.116
End Mins	0.1
End Charge	0.1
Whirl Message	0.1
Init Mins	0.083
Init Charge	0.083
Init Calls	0.051

Data Engineering Model Building Model Ops Operationalize

Analytics App Development Collaboration Governance Trust & Transparency

Complex Scheduling

High-throughput Scheduling

Storage-aware I/O Scheduling

Migration + Automation

I/O Monitoring, Profiling

Portals & Remote Viz

HPC Management

Dependency Awareness

License Monitoring & Management

Containerization

Cloud Bursting

Cost Controls & Budgets

ALTAIR HYPERWORKS
Platform for Simulation Driven Innovation

ALTAIR RAPIDMINER
Platform for AI Driven Innovation

ALTAIR HPCWORKS
Platform for Compute-Driven Innovation



Turnkey Physical Appliances

Turnkey Virtual Appliances

ALTAIR ONE
The Gateway to A Digital Enterprise



