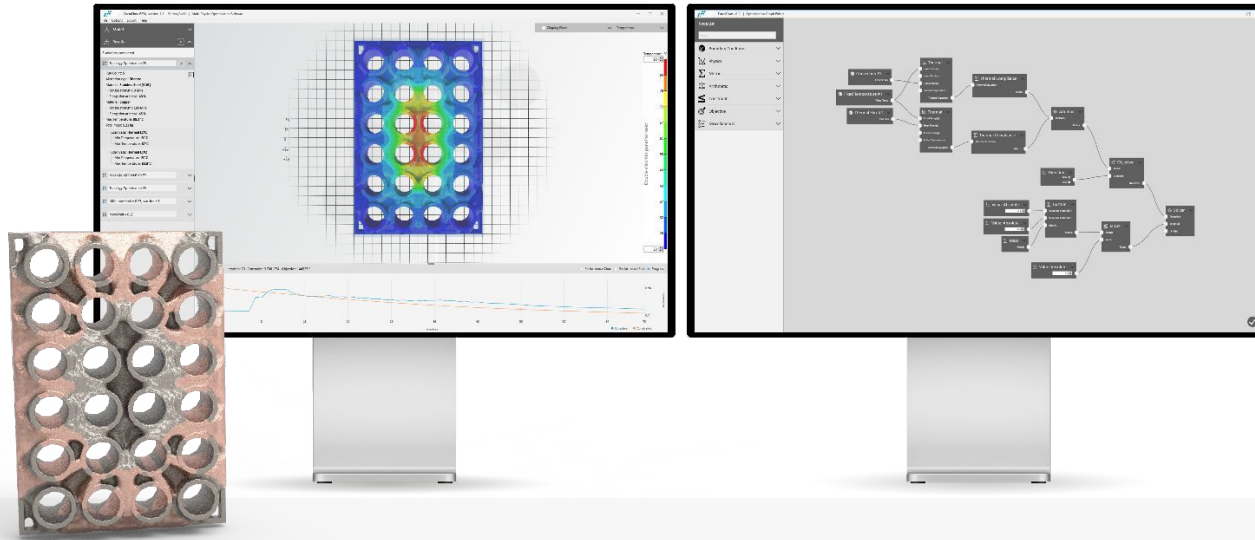




SIMULTANEOUS OPTIMISATION ACROSS THE ENTIRE AM WORKFLOW



Mar 2022

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Introduction

Workflow

Applied

3

5

6

10th November 2021

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50% faster production for LPBF with Zeiss

Extreme cost and weight cutting for Tier-1 aerospace

35% better heat exchange performance in metal AM

Our AI is 2 thousand times faster: Weeks to minutes

Increased sustainability 15x for civil-engineering

Accelerate workflow efficiency by 5x in medical sector

"The ability to allocate multi properties through a product is game changing"

Kees
Senior Engineer



"Cut costs by half... and opened my eyes to what is feasible"

Findhan
Director



"Cost and sustainability objectives could be met"

Neha
Manager





Multi-scale Optimisation Across Digital Thread

Connecting digital workflows end-to-end

Materials and Engineering Simultaneously Optimise:



Lattices for thermal stability and weight



Manufacturable topology for custom objectives



Multiple material grades for performance & cost



Orientation for speed and local part needs

Manufacturing Simultaneously Optimise:



Multiple parameters to reduce cost & meet spec



Vector direction for material performance



Energy density to achieve porosity & sustainability



Hatch patterns for conductivity vs. speed

Quality Simultaneously Optimise:



Multiple physics against quality metrics



Adjust multiple parameters to fix porosity



Real-world physics with IOT



Inter-thread relationships with AI and multi-property



Creating multiple solution sets to choose from: Clients select their ideal solution

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Design & production optimisation

We meet custom goals by allocating design and process variables at multiple scales (material and time).

Output: A solution-set to choose from

Result: Achieve better outcomes faster



Build digital-thread relationships

We build relationships between material, engineering, and production variables on metrics - use existing or new data with our ML/AI capability

Output: Relationships that can be exploited

Result: Trade off speed vs. performance vs. quality



Deploy streamlined workflows

We connect software tools, manual process, and data in a unified end-to-end optimisation workflow.

Output: A repeatable workflow that connects your digital thread and specific needs

Result: Save time, max productivity, accelerate dev

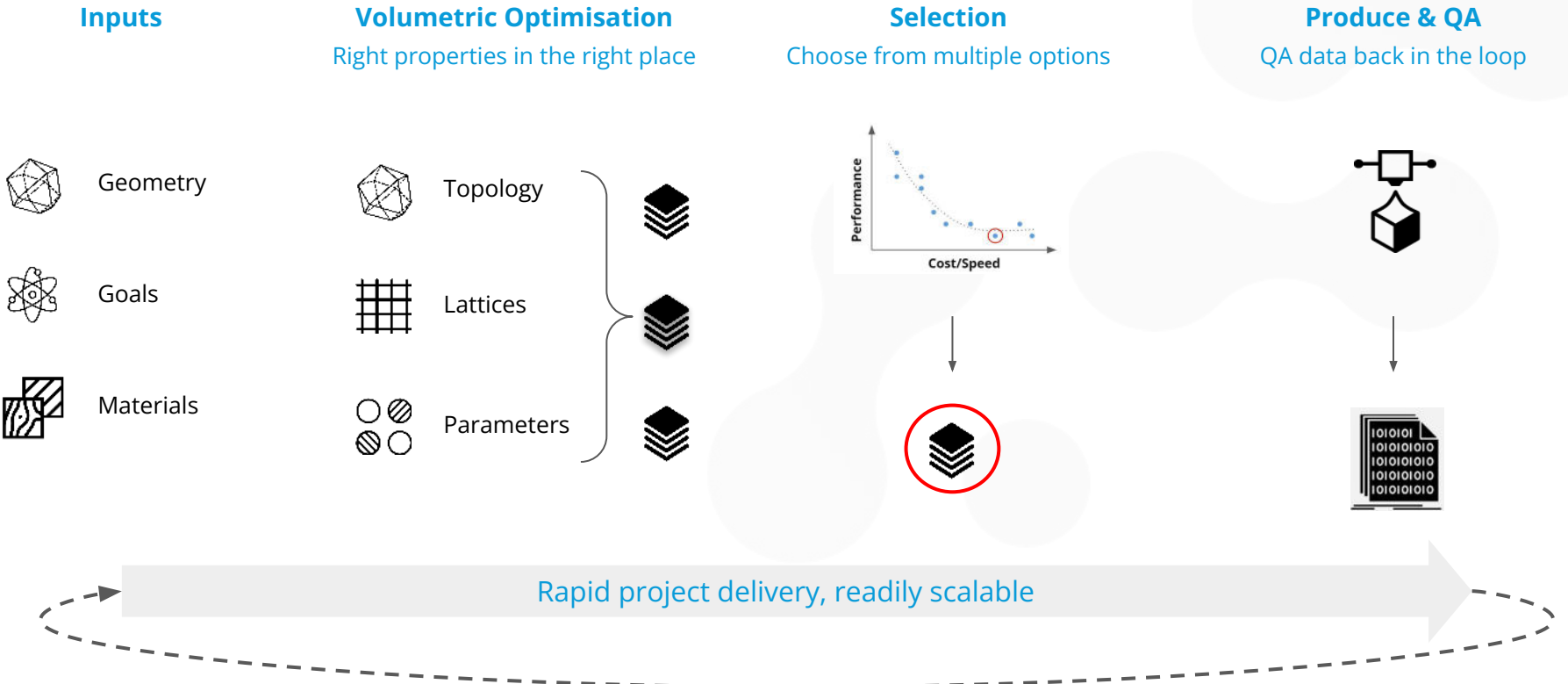


Manufacturing & Materials Strategy

We work with you wherever you are on your development journey, to maximise our ROI

Output: Full strategy and implementation plan

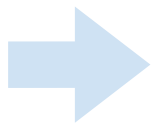
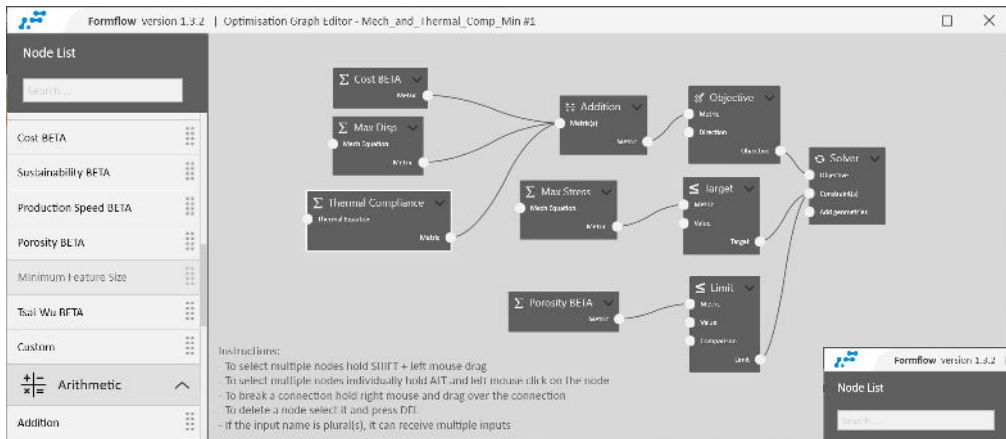
Result: Leading approach to realise value with buy-in





Repeatable Workflow: Custom Optimisations

Build your own repeatable workflow and share it across teams and applications

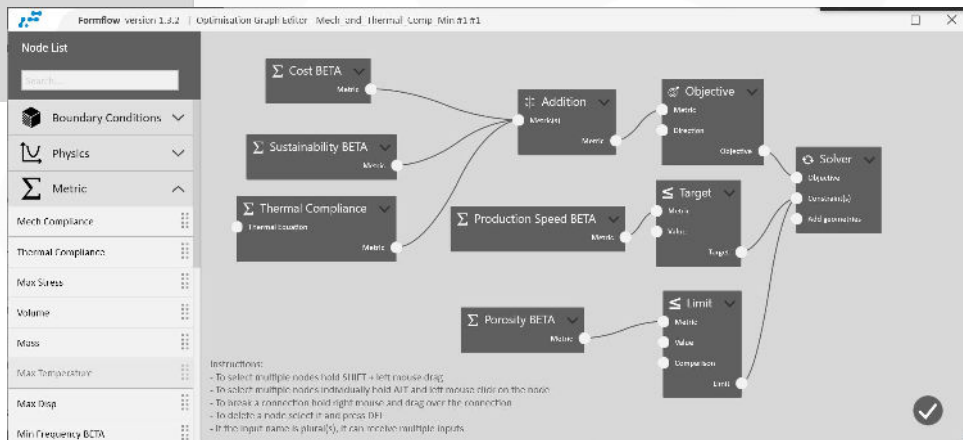


Switch Objectives, Limits & Targets

Repeatable Across Parts



Add Sustainability to Cost
Target Production Speed

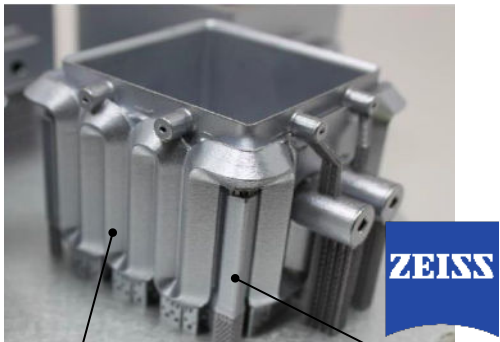




Multi Scale Volumetric Optimisation

Optimise Digital Thread Parameters WITHIN Parts Spatially ACROSS Scales

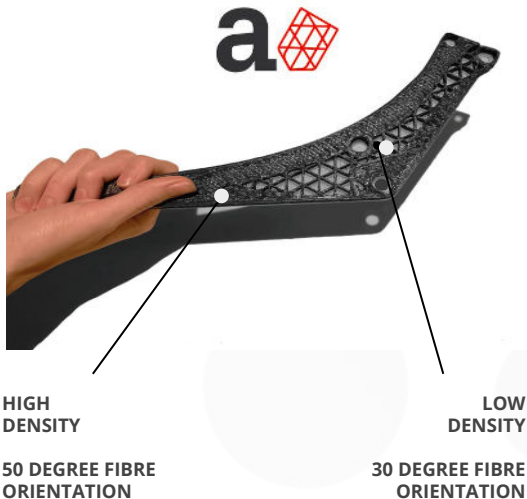
Production: Micro-structures



SLOW
CONDUCTIVE
PARAMETER

FAST
POROUS
PARAMETER

Meta-Material: Lattices & Alignment



HIGH
DENSITY

50 DEGREE FIBRE
ORIENTATION

LOW
DENSITY

30 DEGREE FIBRE
ORIENTATION

Multi-Property: Materials



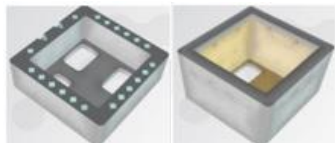
PROPERTY A:
Copper

PROPERTY B:
Steel

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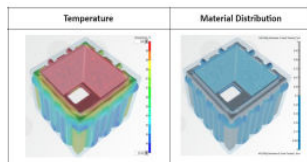
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Inputs



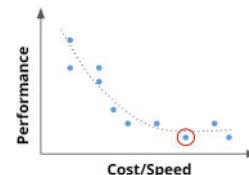
Volumetric Optimisation

Right properties in the right place



Selection

Choose from multiple options



Produce & QA

Parts and data output



Optimisation Goals:

- Minimise cost
- Optimised geometry
- Thermal efficiency



Optimised Process:

- Multiple parameters trade off speed against porosity and performance
- Repeatable workflow



Solution Trade-off:

45% Reduced Mass plus

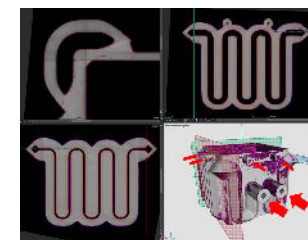
50% Faster Production

Vs.

35% Better Performance

+

Passed QA Inspection



Accelerate innovation.

Improve your production speed

Reduce part mass & cost

Increase product efficiency & sustainability