

Lightning Talk

The “AluTrace” Use Case: Harnessing Lightweight Design Potentials via the Materials Data Space®

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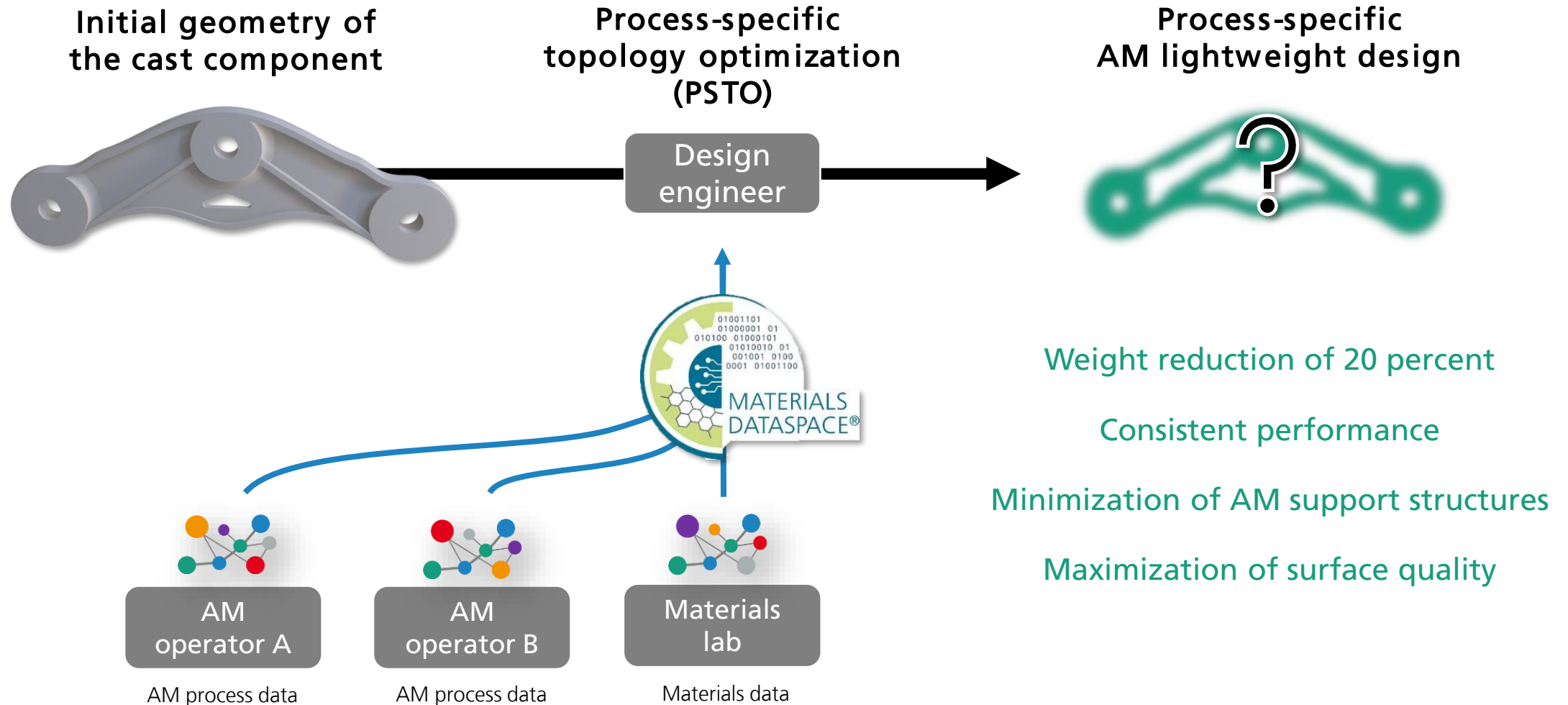
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TRUSTS Workshop: Data Spaces & Semantic Interoperability

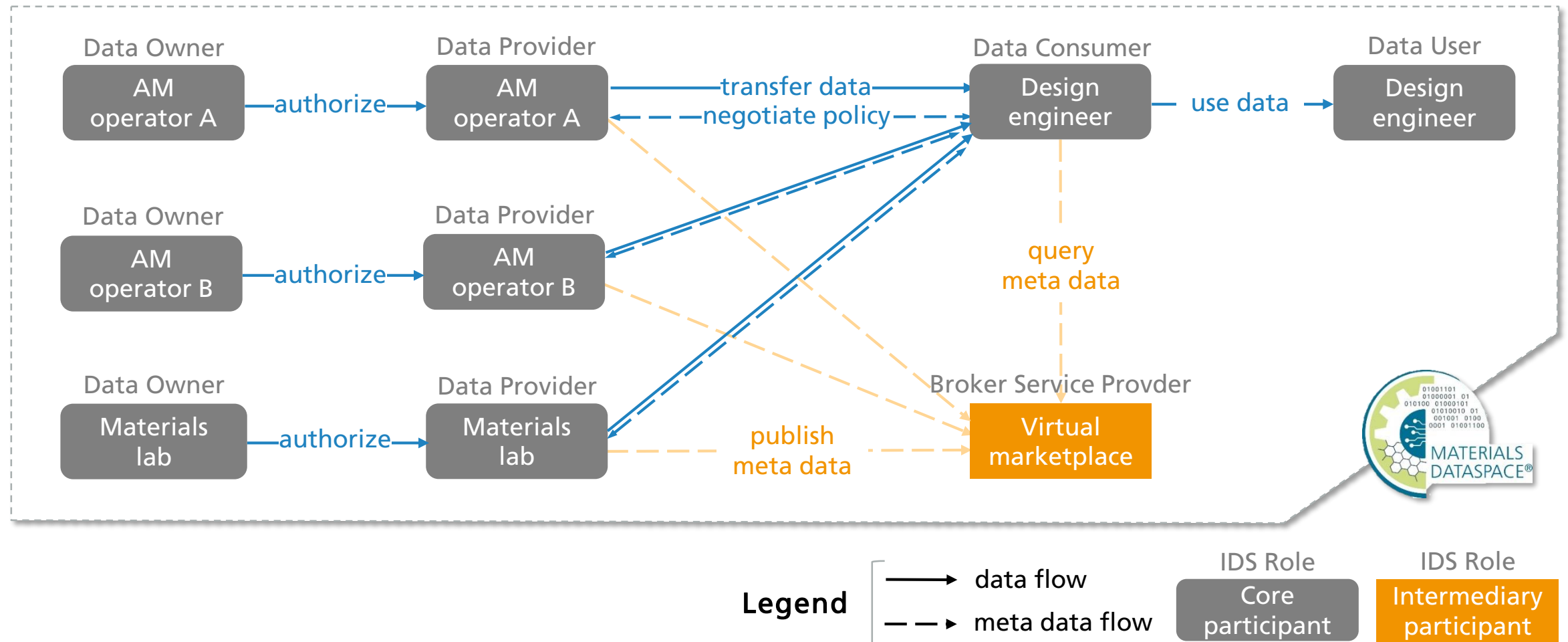
The „AluTrace“ Use Case

aims to optimize a cast component for lightweight design using additive manufacturing (AM)



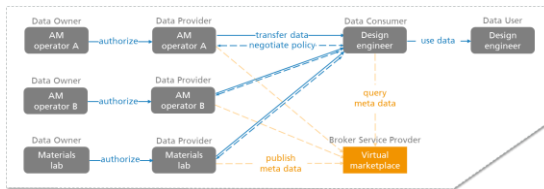
An IDS data space architecture was developed

based on the International Data Spaces (IDS) Reference Architecture Model [1]

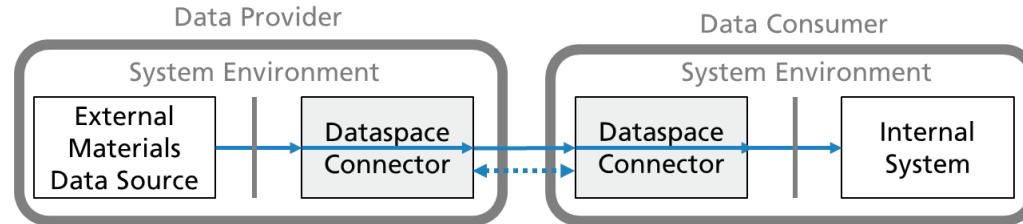


To implement the Materials Data Space®, Dataspace Connectors (DSC) were setup for all actors

All actors



Setting up Dataspace Connectors



- + Process and materials data from Materials Science and Engineering (MSE)

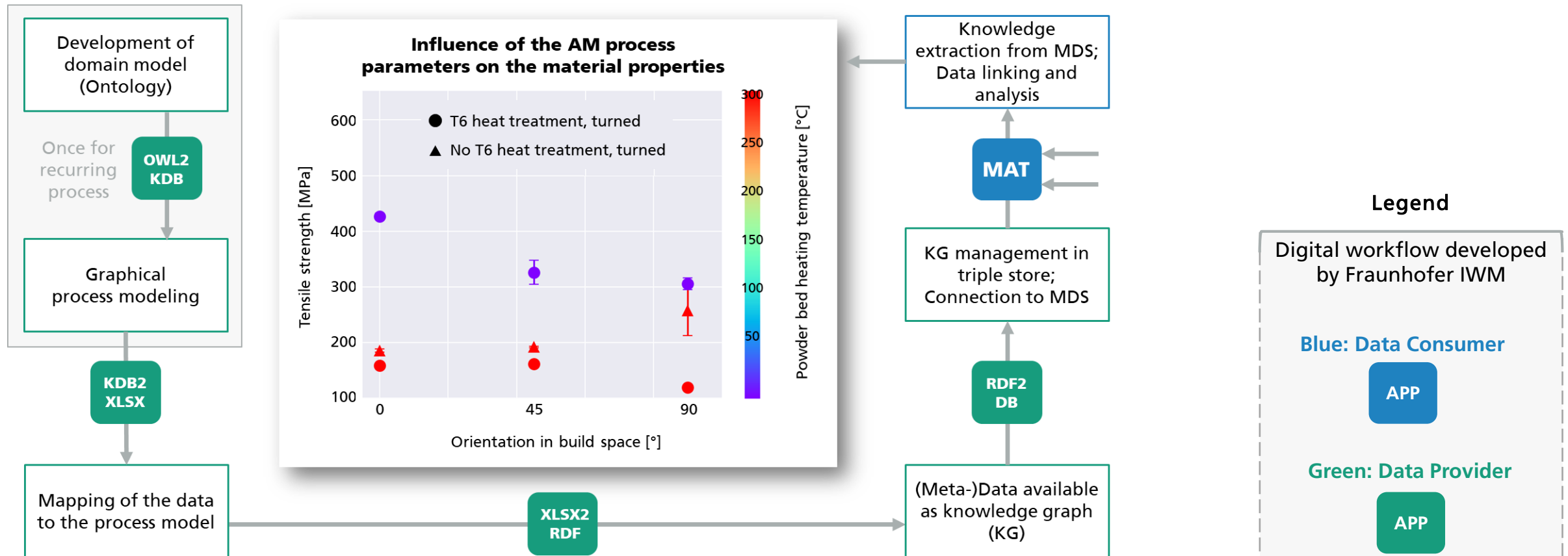
- + Dataspace Connector: IDS Connector to integrate existing software into IDS data ecosystem [2]
- + Data sources: Triple stores with RDF data connected to DSCs
- + Internal system: PSTO application retrieves data via a SPARQL-based data space interface
- + IDS metadata broker: Virtual marketplace to search actors and data
- + IDS identity provider: Certification, authentication and authorization
- + IDS clearing house: Logging of contract agreements and data usage

Materials Data Space® (MDS)



- + MDS initiative funded in 2015 by Fraunhofer MATERIALS [3]
- + Aim: Cross-institutional data sharing along the entire MSE value chain
- + Composed of all IDS connectors involved in the sharing of MSE data

A digital workflow for semantic structuring of MSE (meta) data enables cross-institutional data linking and analysis



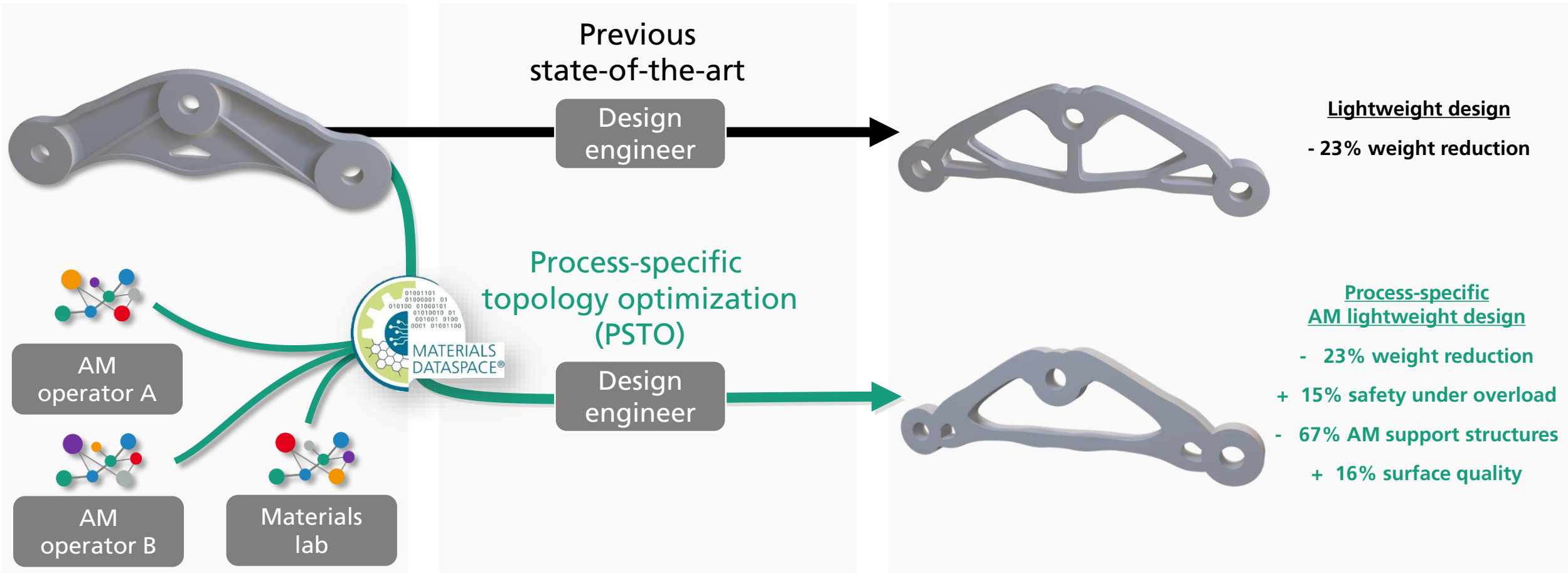
Added Value in the Use Case

Cross-institutional data sharing significantly improves the properties of AM lightweight design using PSTO

Input

Topology optimization

Output



The “AluTrace” Use Case:

Harnessing Lightweight Design Potentials via the Materials Data Space®

Content

Summary

AluTrace UseCase

- The use case aims to optimize a cast component for lightweight design using additive manufacturing (AM)

Data Space Architecture

- An IDS data space architecture was developed based on the IDS Reference Architecture Model.

Materials Data Space®

- Setting up Dataspace Connectors for all actors results in the very first implementation of the Materials Data Space®.

Semantic Interoperability

- A digital workflow for semantic structuring of MSE (meta) data enables cross-institutional data linking and analysis.

Added Value

- Cross-institutional data sharing significantly improves the properties of AM lightweight design when using PSTO.

References

- [1] B. Otto, S. Steinbuß, A. Teuscher, and S. Lohmann, “Reference Architecture Model: Version 3.0,” International Data Spaces Association, 2019.
- [2] Dataspace Connector. [Online]. Available: <https://github.com/International-Data-Spaces-Association/DataspaceConnector> (accessed: Feb. 22 2022)
- [3] *Materials Data Space*. [Online]. Available: <https://www.fraunhofer-materials-data-space.de/> (accessed: Feb. 22 2022).

Thank you for your attention!

Contact

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