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Introducing nDAI

Bridging simulation and machine learning for instant design predictions

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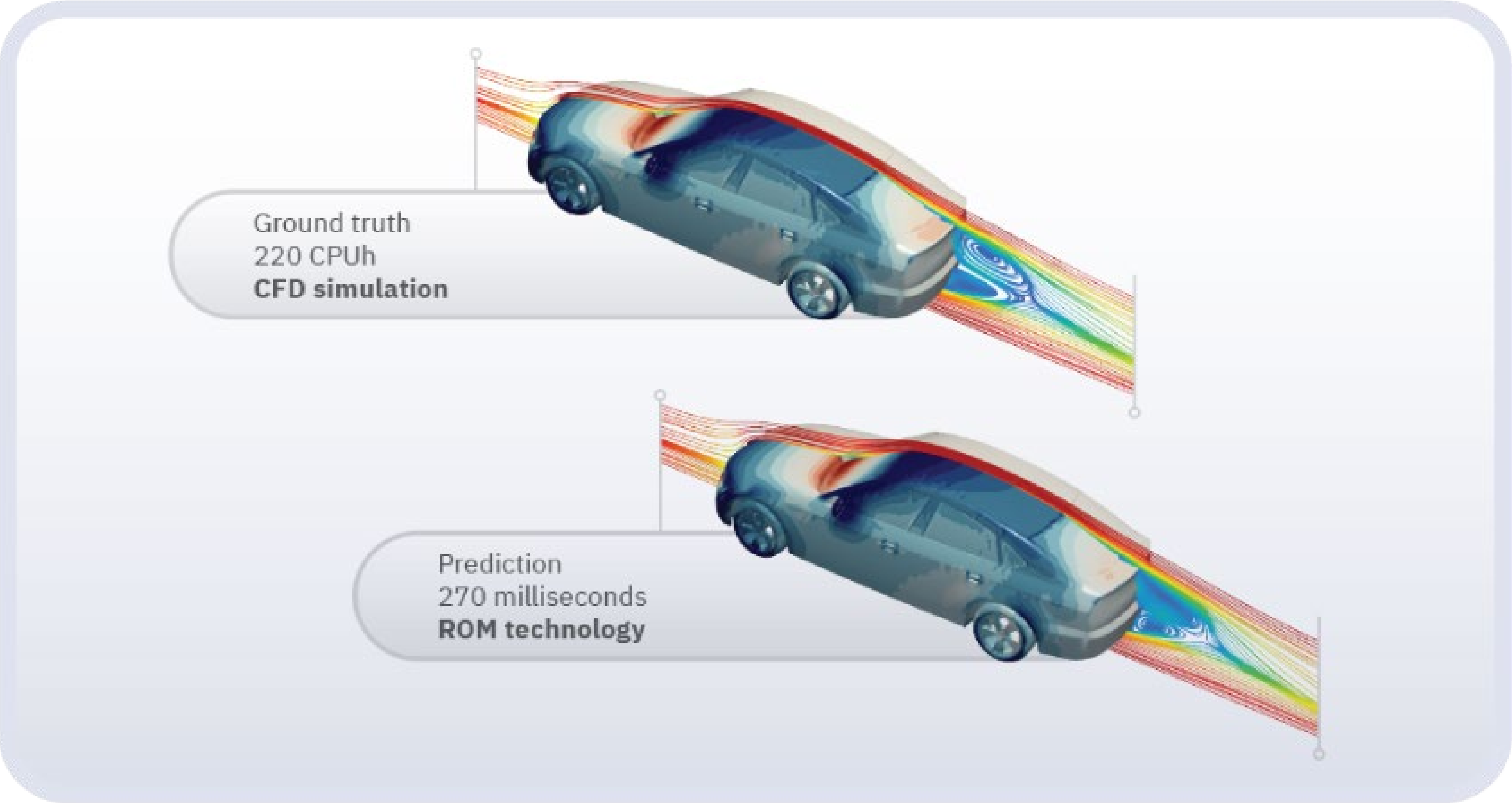
It is about Physics AI



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Engineering is getting tougher

Create better products faster

The need for sharper tools to deliver high-fidelity simulations early in the design process.

Impact of cost, time and expertise

High fidelity simulations are computationally expensive and require skilled engineers who usually work in the pre-production phase.

Organizing simulation data and insights

Designers need access to democratized tools over methods for collaborative data-driven decisions.

Physics AI's strategic role

Shift left

Bring forward the usage of high-fidelity tools in the design process, this implies an increase of cost

Push right

Leverage historical data and insights, apply them directly to accelerate the next project.

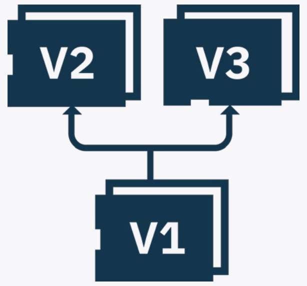
Physics AI adoption barriers

Cultural gap between engineers and data scientists

Engineers struggle to imagine how to integrate ML in their everyday work.

1

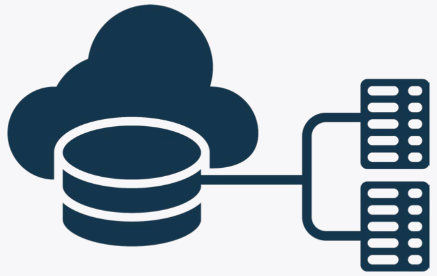
Data is dynamic and requires governance



ML models have a short lifespan, putting the governance over the ML stack is a demanding task.

2

Infrastructure



AI/ML Training requires data to be moved to the right hardware. And trained models should be accessible to other stakeholders.

3

Imagine an AI platform powered by these capabilities

Solver, problem, and data agnostic

- Pure data-driven
- 0D, 1D, 2D, 3D + 1 (time)
- No pre-trained models

Multiple model architectures

- ROM and CNN
- Train and tune ML models
- Compare ML models

Distributed architecture and data federation

- Cloud-based architecture
- Locally, HPC or cloud execution
- Data source from file system / APIs

Governance and democratization

- Traceability of training data
- Versioning
- Model consumption by non-experts

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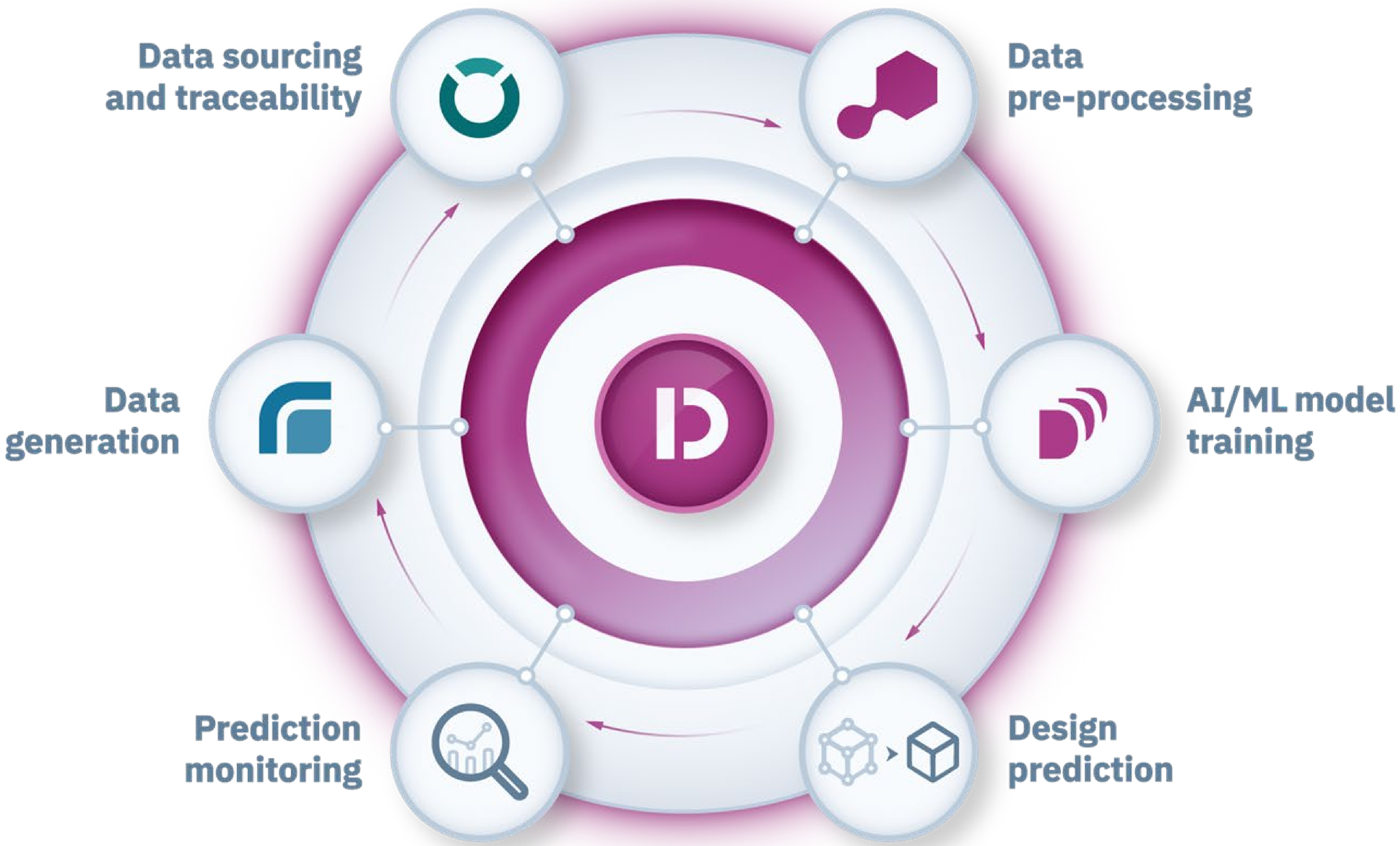
Data sourcing and traceability
Data pre-processing
Data generation
AI/ML model training
Prediction monitoring
Design prediction

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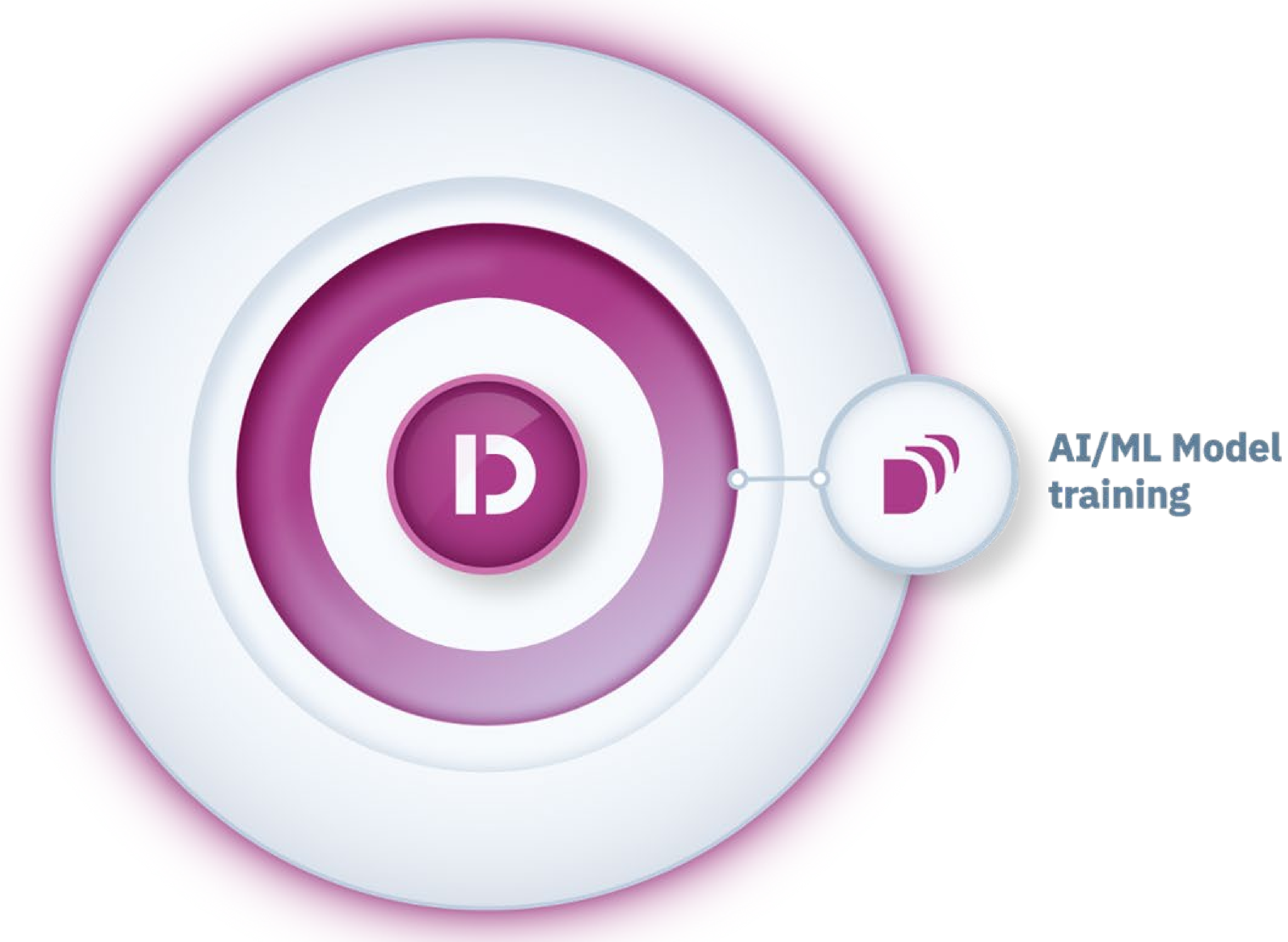
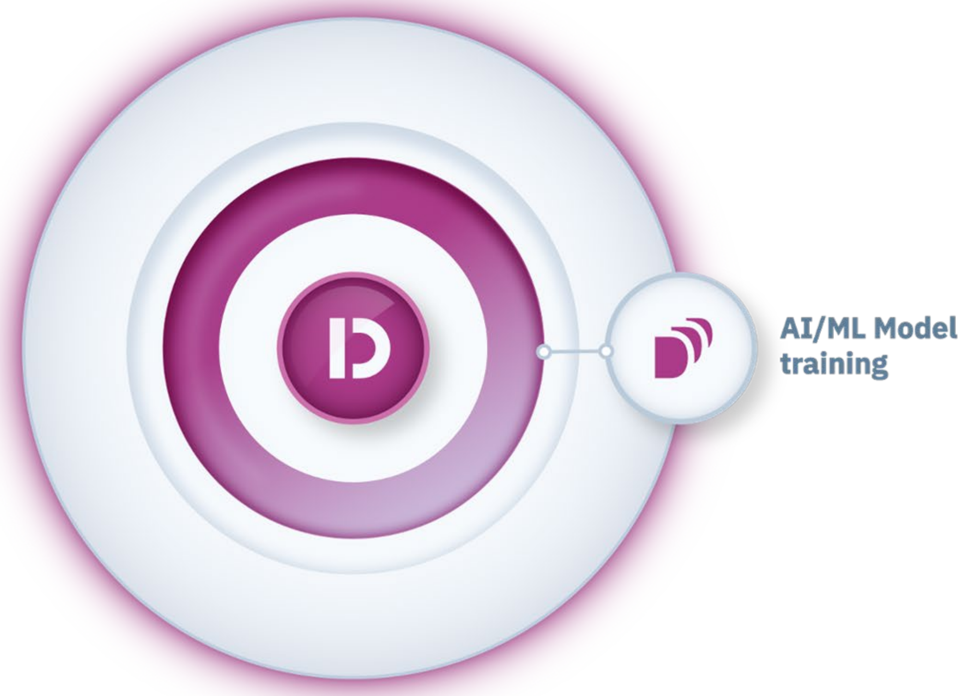
nD Modeler

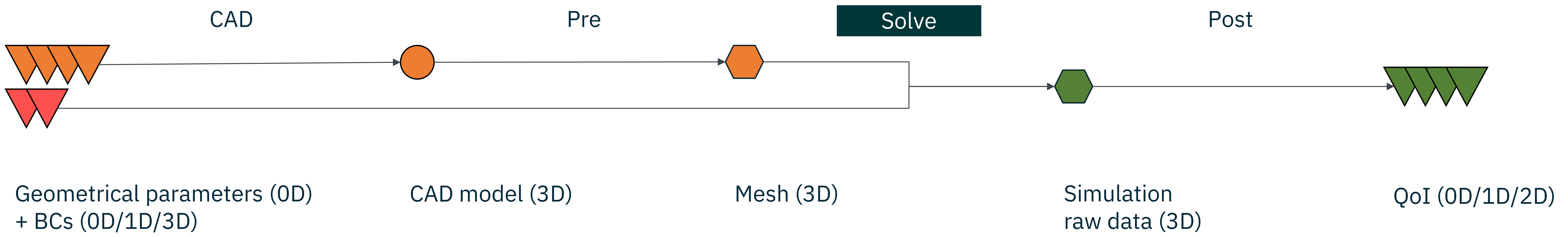


nD Modeler



- How should I approach my problem?
- Which model is appropriate for my scope?
- Do I have enough training data?
- What accuracy can be expected?

Choosing the model domain is not obvious



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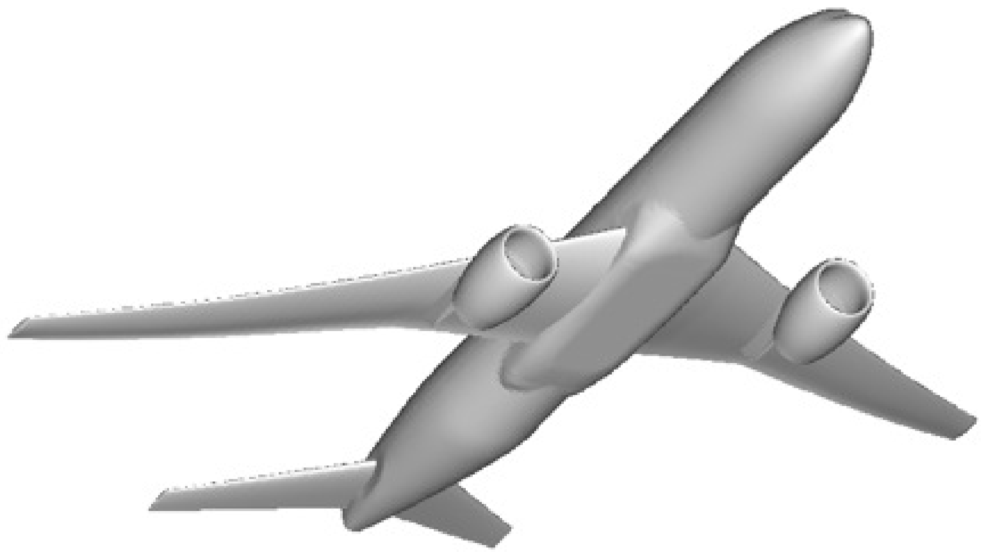
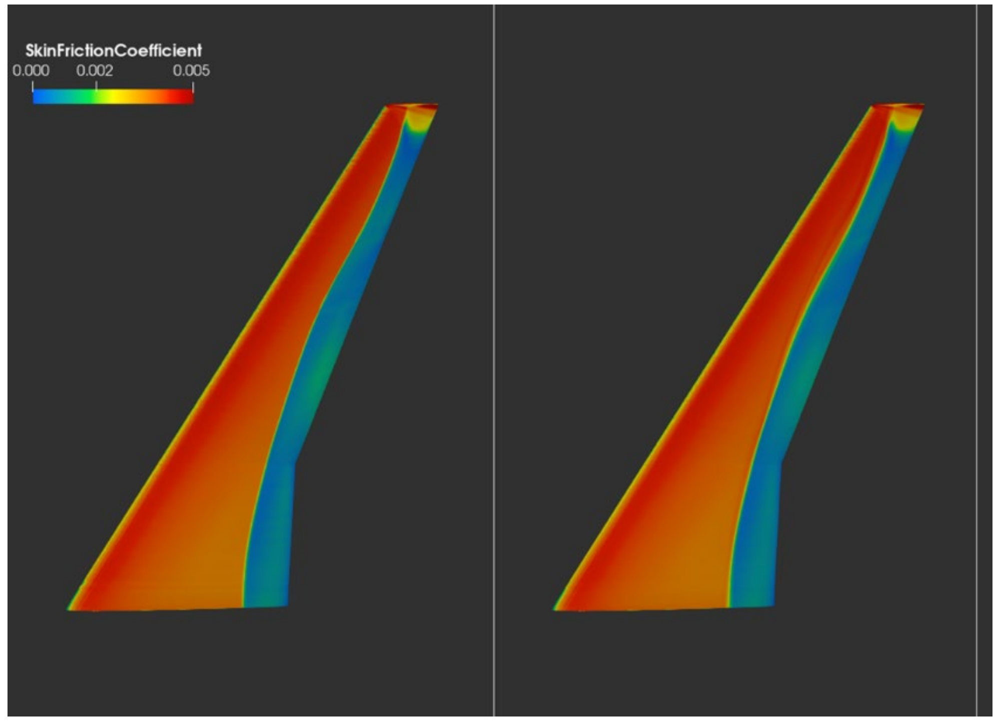
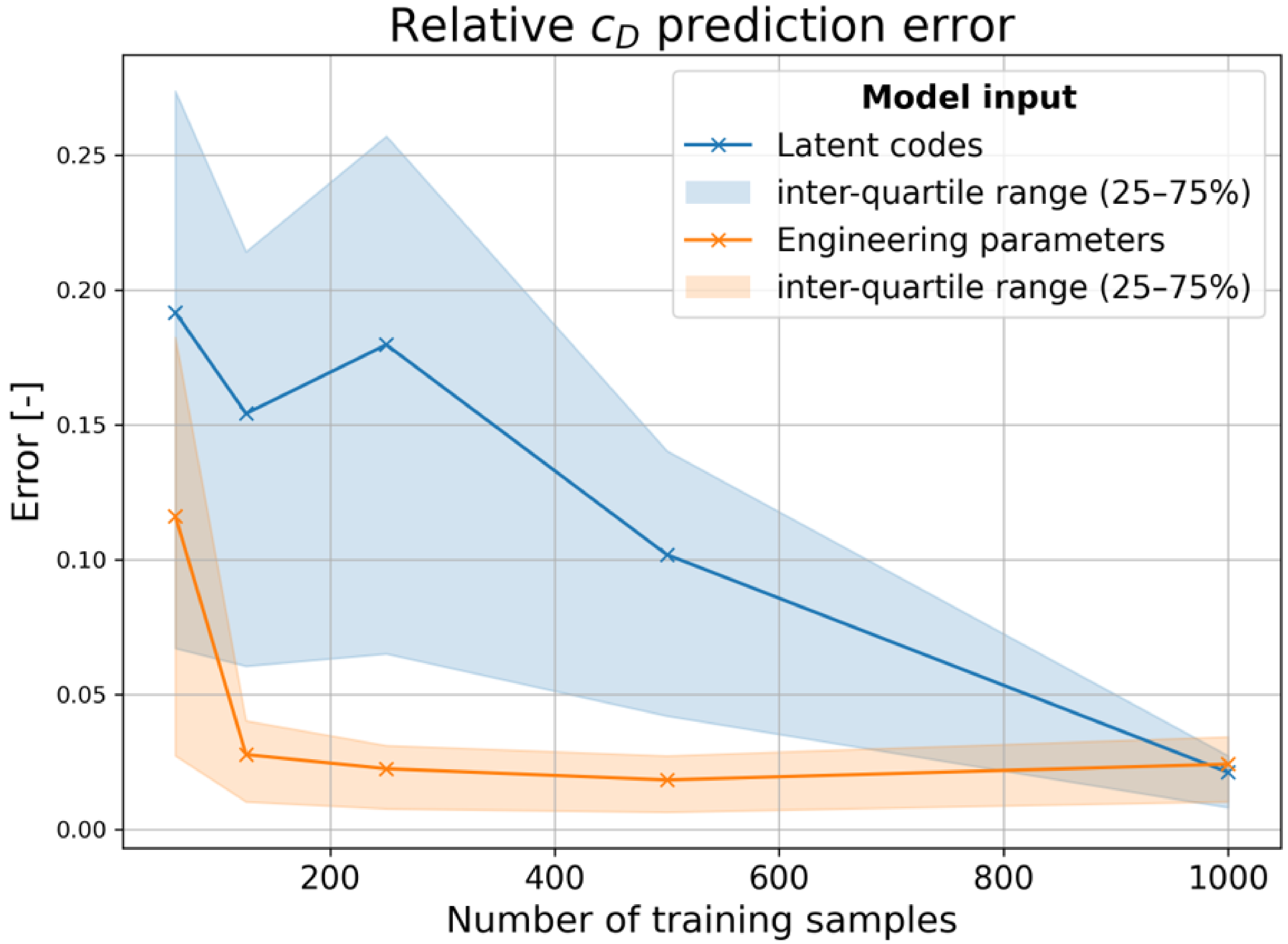
Choosing the model architecture is not trivial







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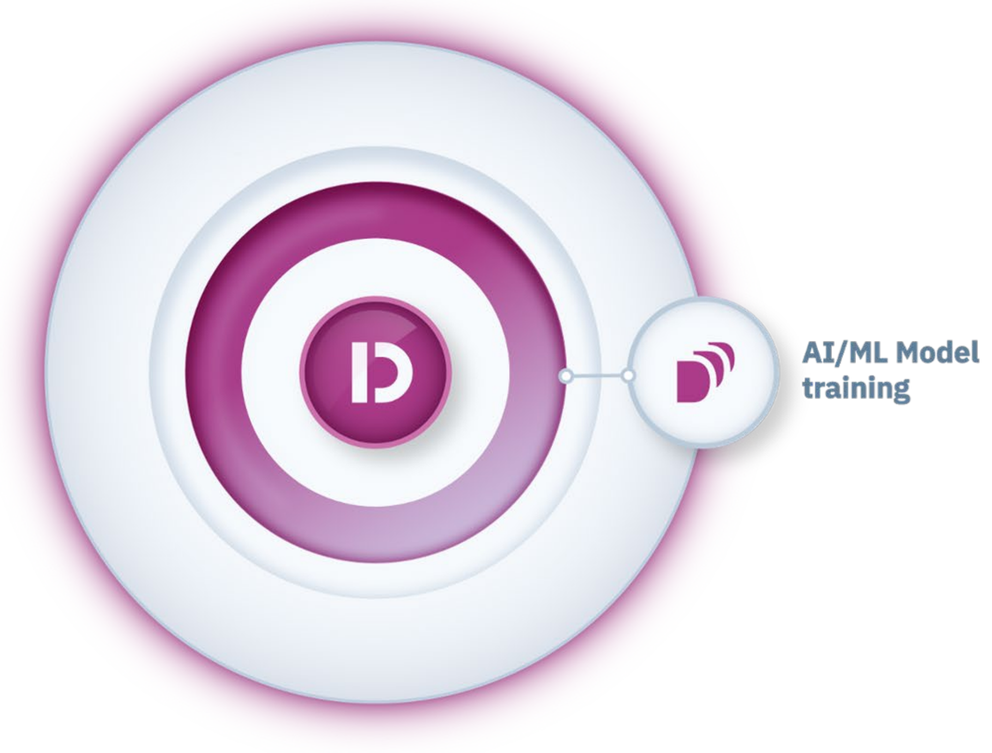
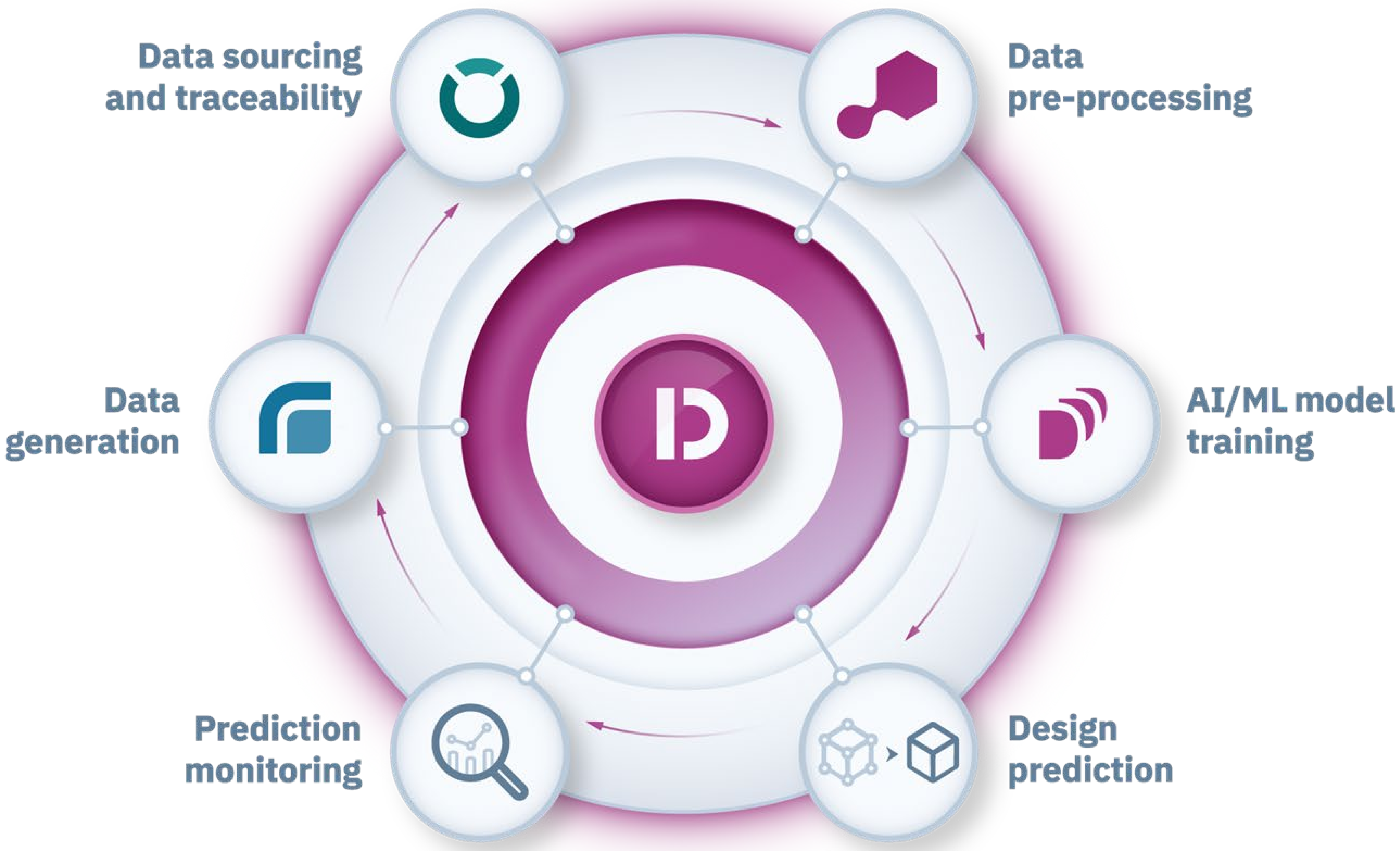
nD Modeler



- Train, validate and track surrogates.
- Compare different ML architectures
- Quantify accuracy-efficiency trade-offs
- Deploy the trained model for production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Looking forward and conclusion

What’s coming next

Mimic integration

Streamline the interaction
nD Modeler – mimic for
data preparation

Preprocessing automatic included
during inference

Geometric Deep Learning

From data warehouses
to data lakes

Native CAD integration

nDAI in VOLTA

Governance of models

Traceability of data and processes

Execution at scale

Committed to deliver impact

Sustainable engineering
Time-to-market
Exploit enterprise knowledge

Democratization
Breaking silos
Improve collaboration

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Thank you

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