Digital Twin as a Service Software Platform

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WHAT IS THE PROBLEM WE ARE ATTEMPTING TO SOLVE?

How can users collaborate to:

- Build digital twins (DTs) using existing DT components
- Share them
- Provide DTs as Service

How can the DT software platforms:

- Support DT lifecycle
- Scale up rather than scale down (flexible convention over configuration)

WHAT ARE THE EXISTING SOLUTIONS FOR THIS PROBLEM?

- Focus on data from Physical Twins (PTs) to perform analysis, diagnosis, planning etc...
- Share DT assets across the upstream, downstream etc....
- Evaluate different models of PT
- DevOps for Cyber Physical Systems (CPS)
- Scale DT / execution of DT / ensemble of related DTs
- Support for PT product lifecycle

WHAT IS OUR APPROACH?

- Support for transition from existing workflows to DT frameworks
- Create DTs from reusable assets
- Offer DT as a service
- Integrate with external systems
- Separate configurations of independent system components

What is DTaaS?

It is a platform to:

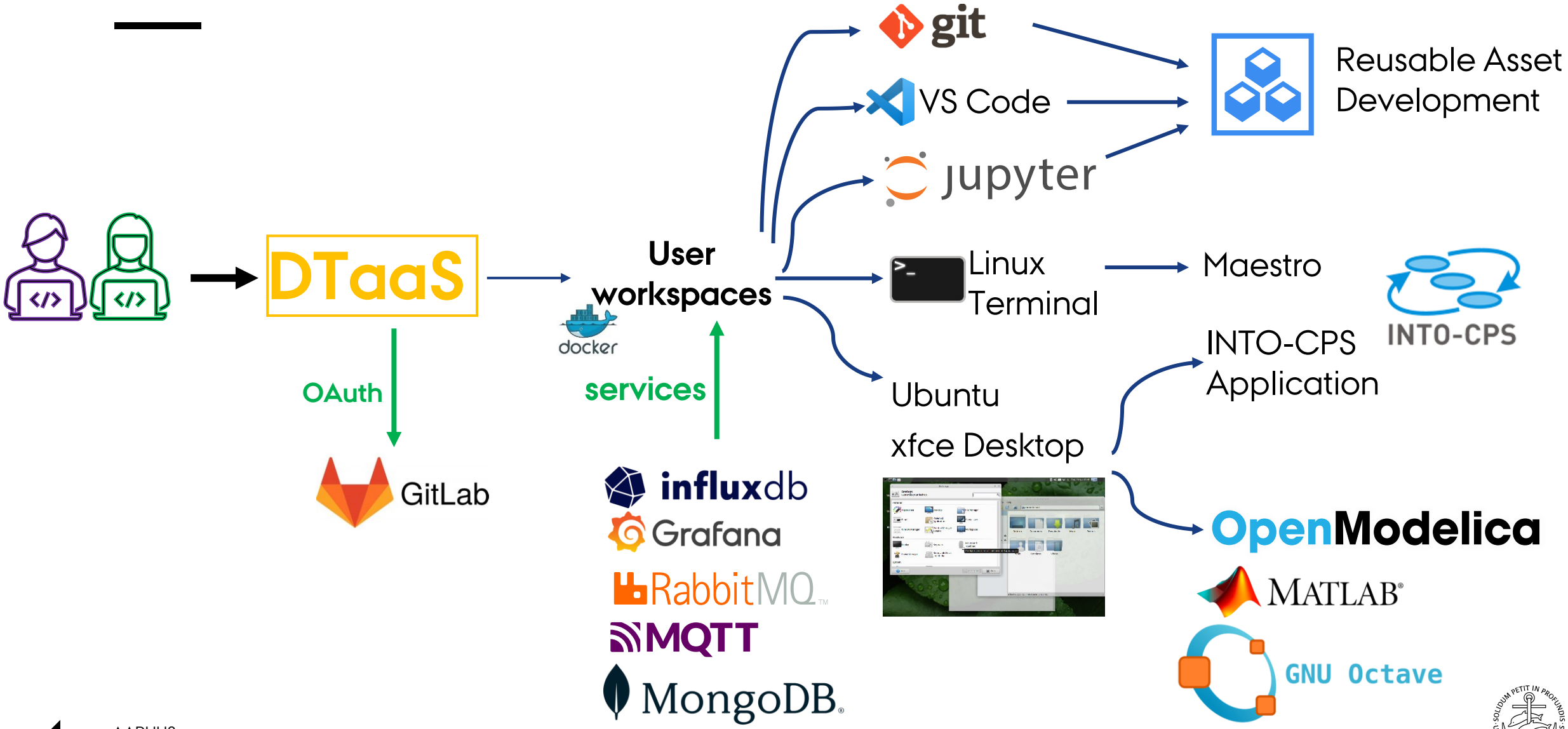
Create, Execute, and Share Digital Twins

Run Digital Twins as Services

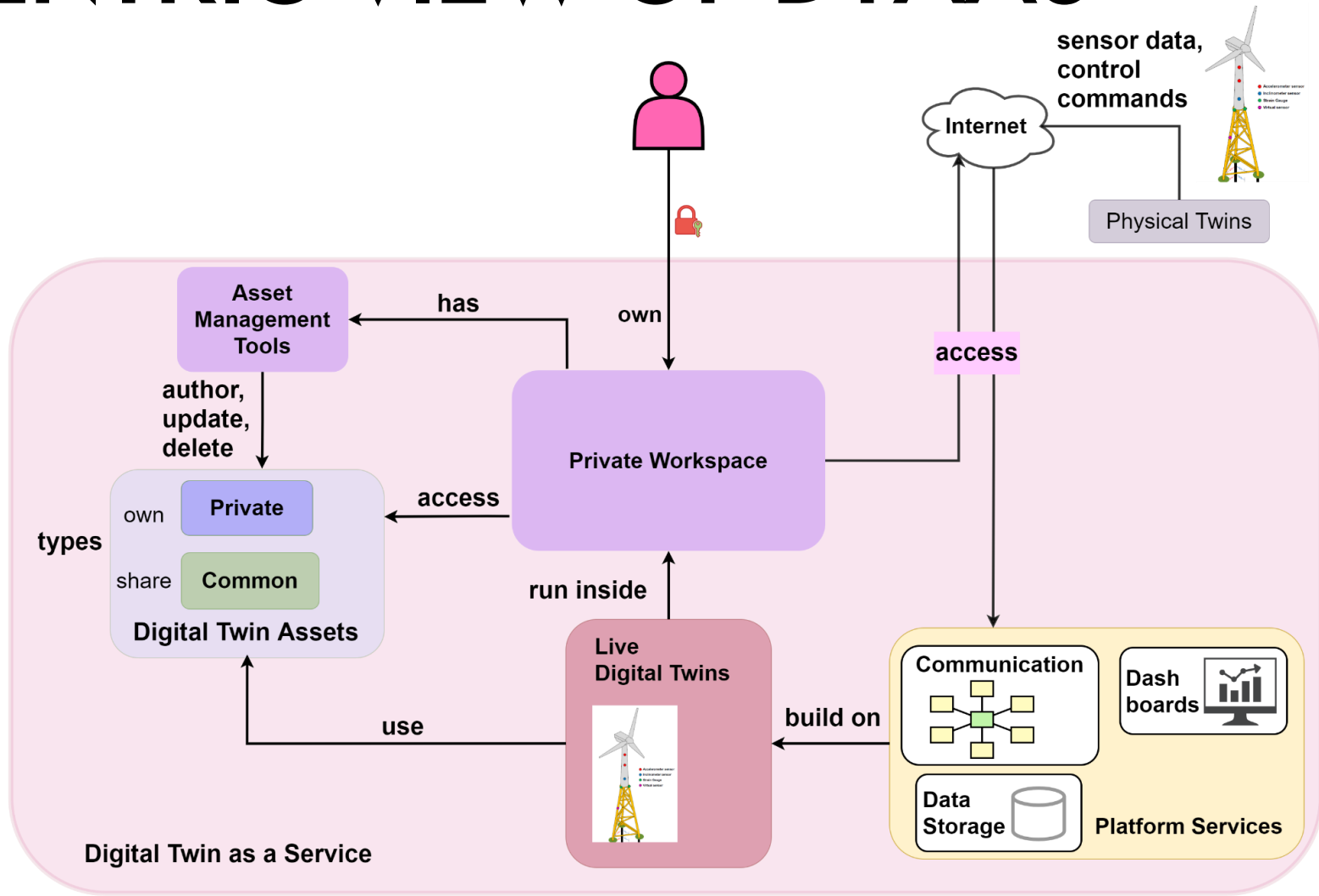
Provides private workspaces

Easy to use: familiar desktop environment

EXISTING FEATURES OF DTAAS

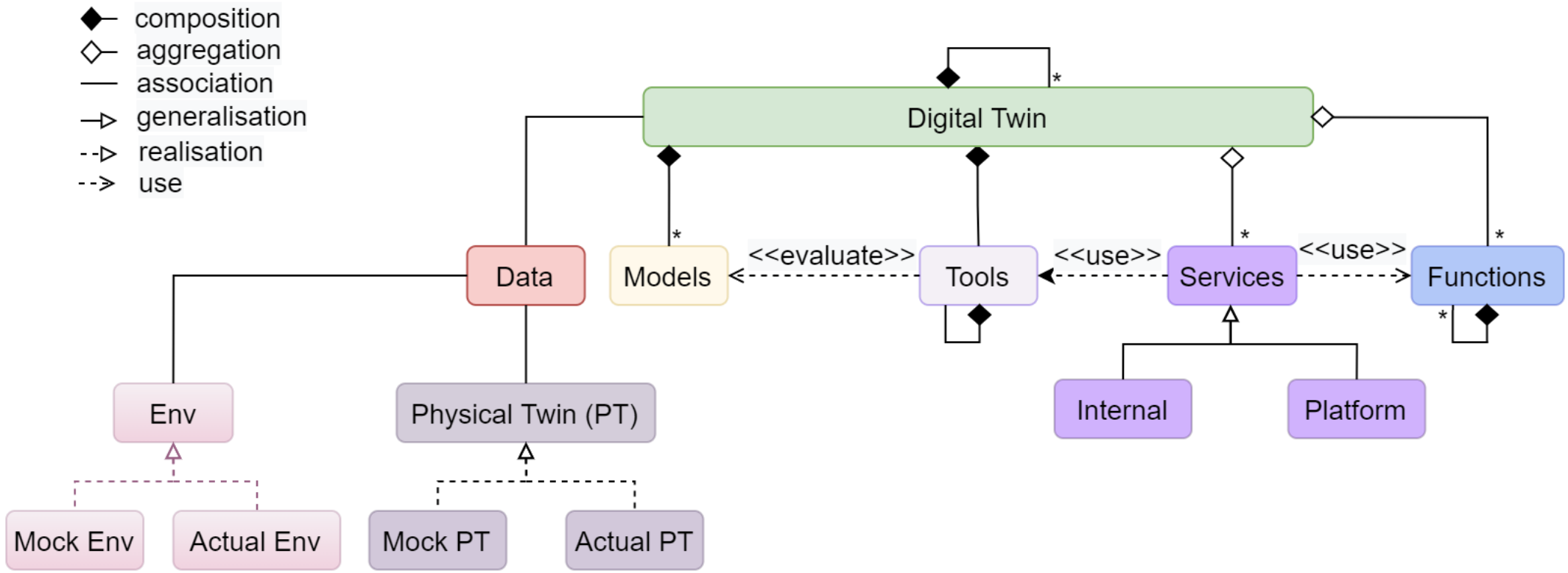


USER CENTRIC VIEW OF DTAAS



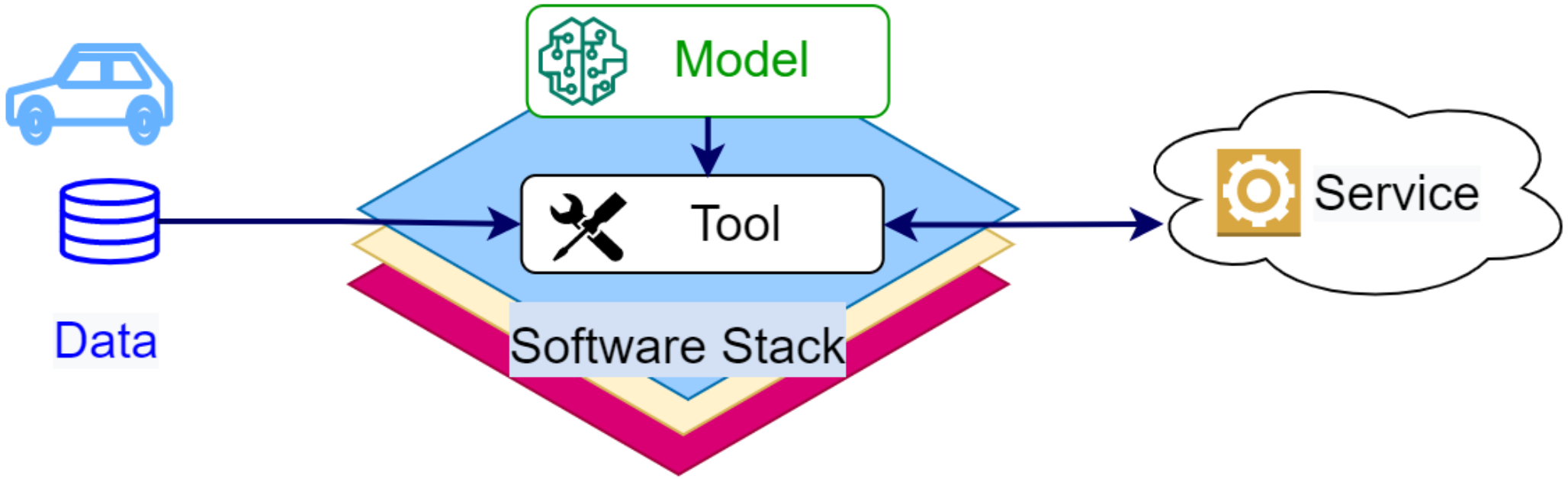
Ref: Jensen, A. M. D., Schoerghofer-Queiroz, A., Ulriksen, M. D., Tcherniak, D., Damkilde, L., Talasila, P., Larsen, P. G., and Abbiati, G., *'Digital twin as a service for damage prognosis of offshore wind turbine foundations'*, Aarhus University, ISMA 2024

Possibilities in creating digital twins

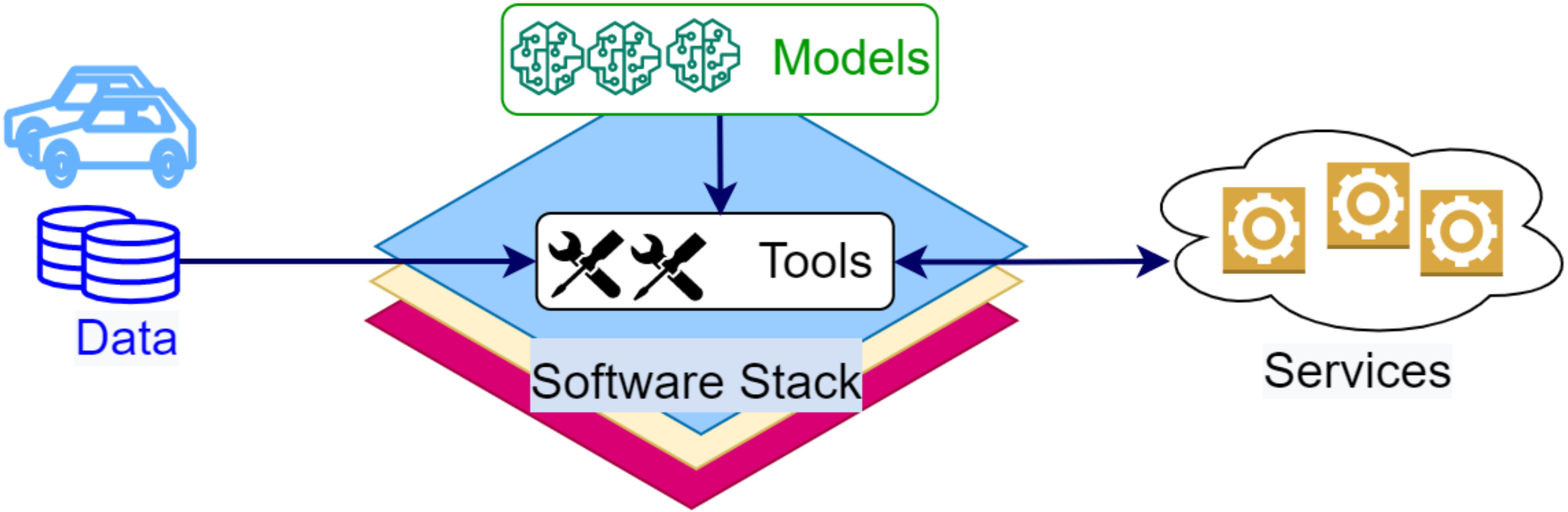


Ref: Larsen, P. G., Talasila, P., & Fitzgerald, J. (2024). Towards the Composition of Digital Twins. In *The Application of Formal Methods: Essays Dedicated to Jim Woodcock on the Occasion of His Retirement* (pp. 103-122). Cham: Springer Nature Switzerland.

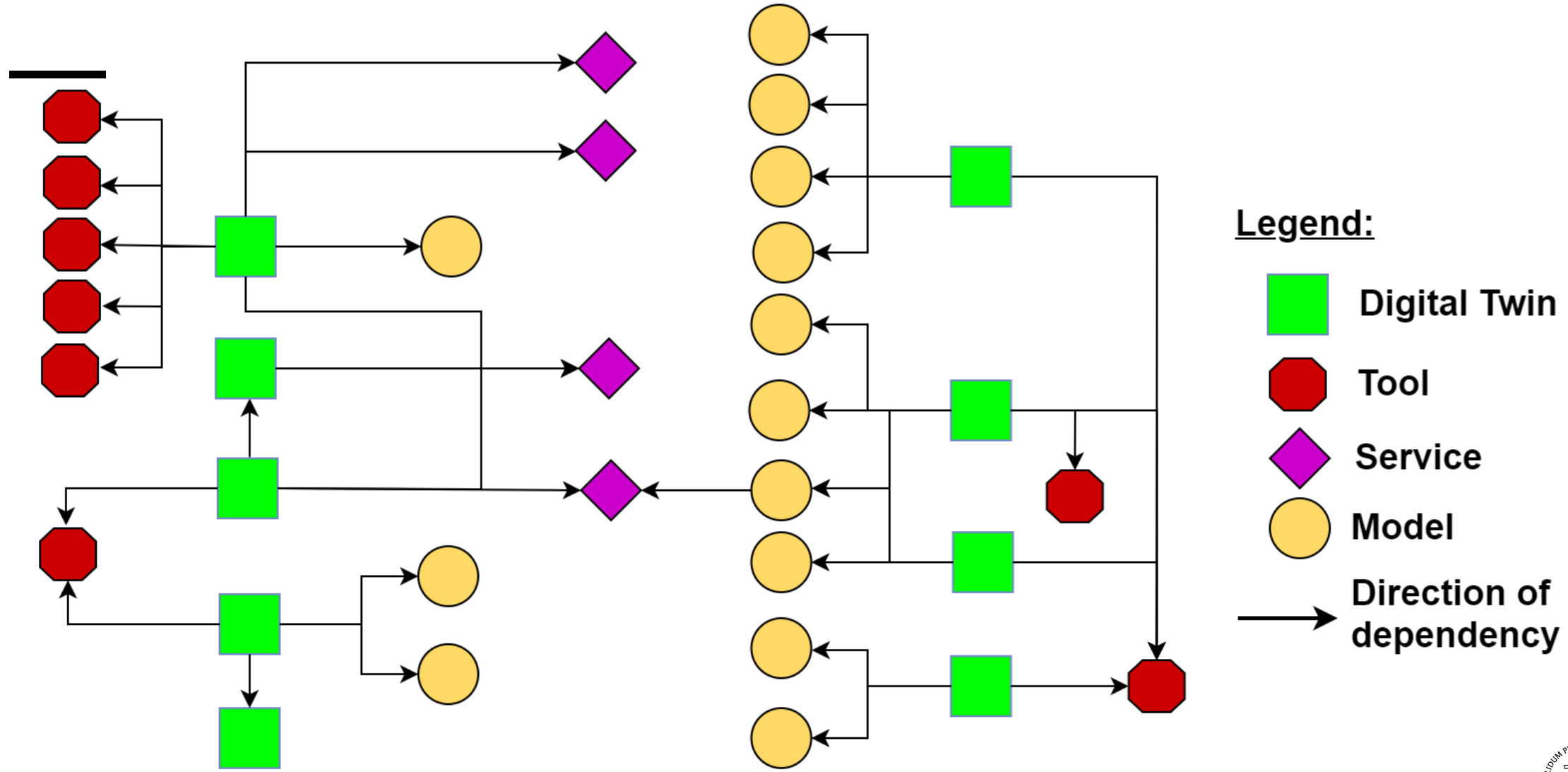
POSSIBILITIES IN CREATING DIGITAL TWINS



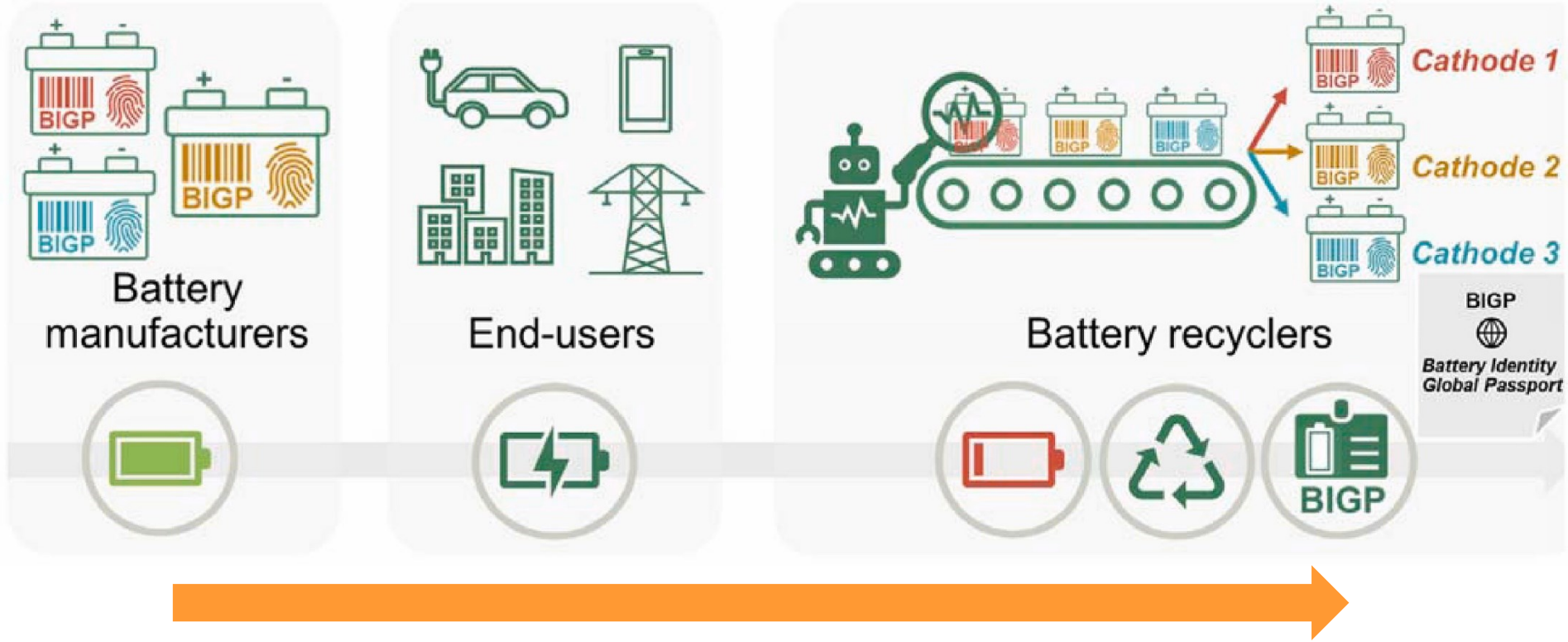
POSSIBILITIES IN CREATING DIGITAL TWINS (2)



COMPOSITION OF REUSABLE DT ASSETS

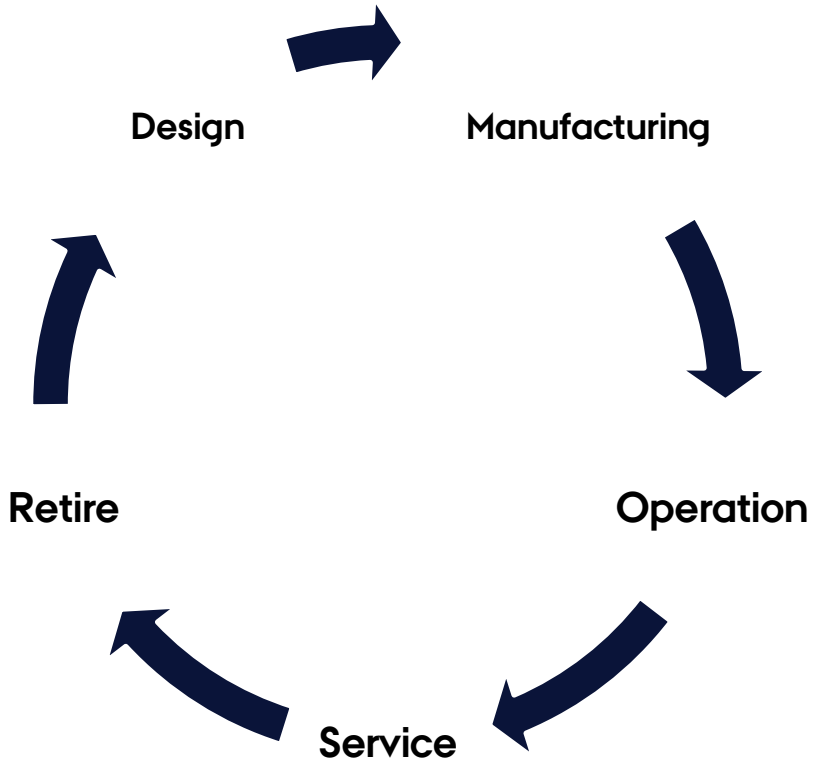


An Example of DT/PT Lifecycle



Ref: F. Naseri, S. Gil, C. Barbu, E. Cetkin, G. Yarimca, A.C. Jensen, P.G. Larsen, C. Gomes, Digital twin of electric vehicle battery systems: Comprehensive review of the use cases, requirements, and platforms, Renewable and Sustainable Energy Reviews, Volume 179, 2023,

A dedicated script/program to represent one lifecycle phase



RELEVANT LINKS

Research Paper

https://doi.org/10.1109/SWC57546.2023.10448890

Docs

https://into-cps-association.github.io/DTaaS/

Software

https://github.com/INTO-CPS-Association/DTaaS/releases

Examples

https://github.com/INTO-CPS-Association/DTaaS-Examples