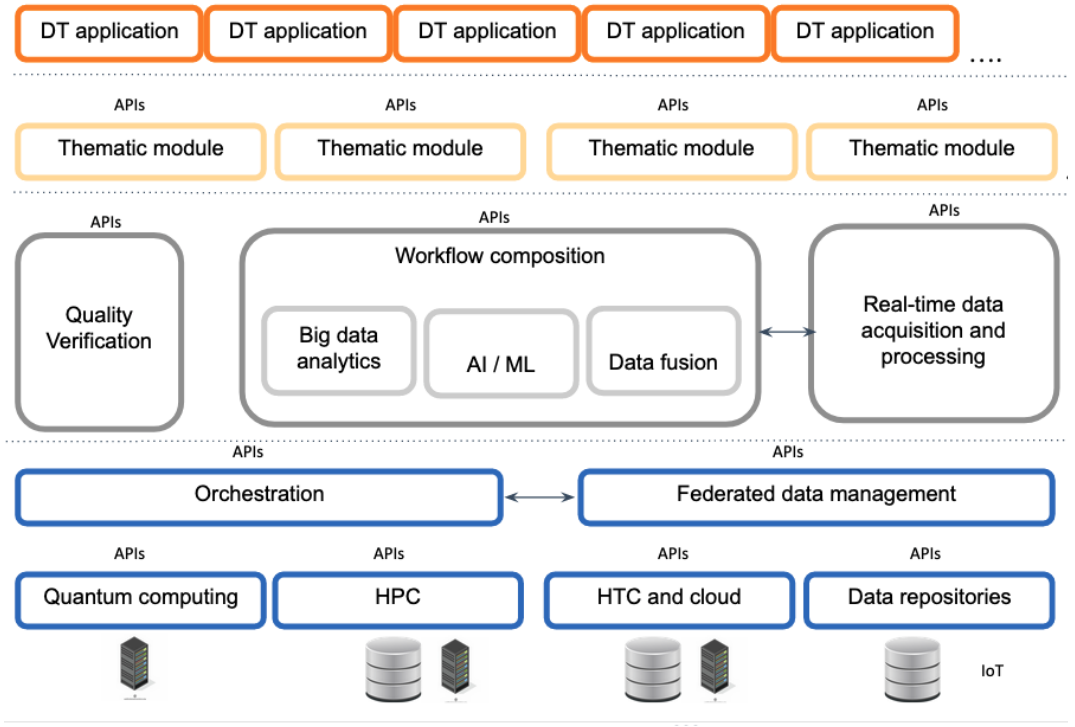
AI for sustainability

AtmoRep fits perfectly with other projects starting in CERN/CERN-IT

EC funded **INTERTWIN** project starts in September 2022 **- AN INTERDISCIPLINARY DIGITAL TWIN ENGINE FOR SCIENCE**

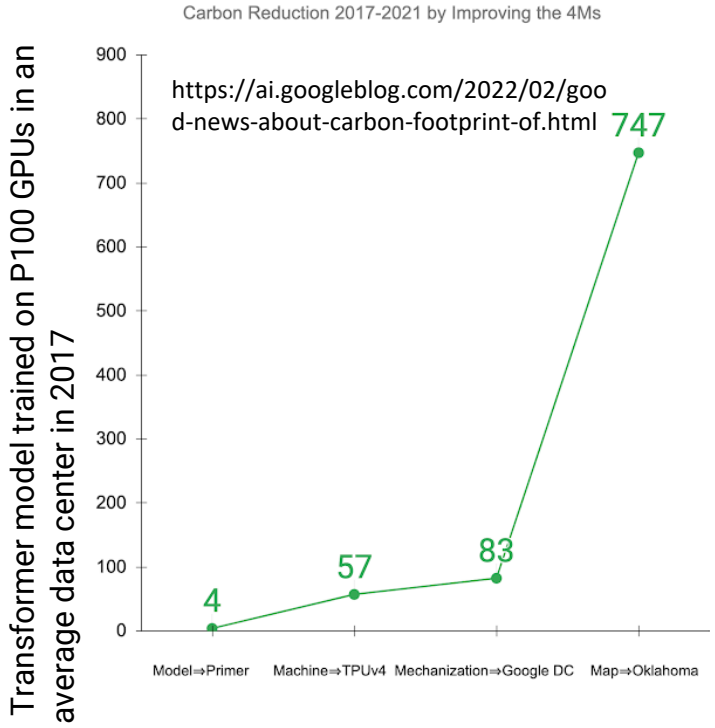
- **Develop full platform for DT development and deployment**
- In particular a **DT for climate studies, e.g.**
  - Climate change future projections of extreme events (storms & fires)
  - Early warning for extreme events (floods & droughts)

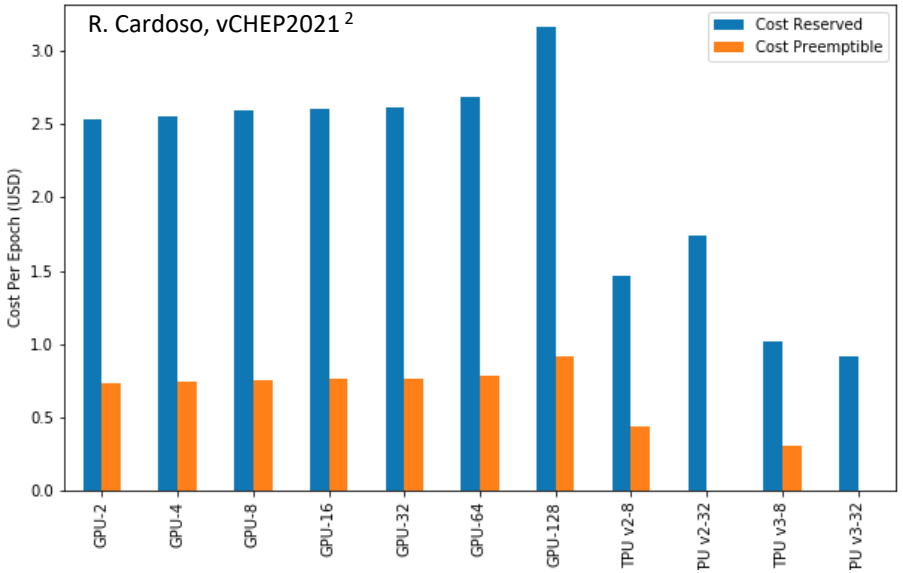
InterTwin platform



Sustainable AI

- Once trained a ML/DL model is far more energy efficient than classical algorithms
- Energy cost of ML/DL training can be very high
- The community is starting to design best practices[1]
  - **Selecting efficient ML architectures** can reduce computation by 3x–10x.
  - **Using processors and systems optimized for ML training**, versus general-purpose processors, can improve performance and energy efficiency by 2x–5x.
  - **Computing in the cloud rather than on premise** reduces energy usage by 1.4x–2x
- **Efficient training strategies** can reduce consumption without reducing performance, in spite of the increasing size of data sets
  - Self-supervision, few-short learning, pre-training
- We propose to leverage openlab expertise on **ML/DL development and training optimization** to develop strategies aimed at reducing ML/DL training carbon footprint[2]





1 Patterson, David, et al. "The Carbon Footprint of Machine Learning Training Will Plateau, Then Shrink." (2022).
2 Cardoso, Renato, et al. "Accelerating GAN training using highly parallel hardware on public cloud." EPJ Web of Conferences. Vol. 251. EDP Sciences, 2021.