

# DT Core

A Modular Building Block for Digital Twin Data Processing



# Digital Twin Data Processing

*“Predicting product’s behavior in different environments, estimating product’s service needs, providing product service warranty, the usage of real product performance information in new product development – these are just few examples of how **Digital Twin** can provide added value for product users as well as product manufacturers.”*

Business Finland – Digital Twin is the new black

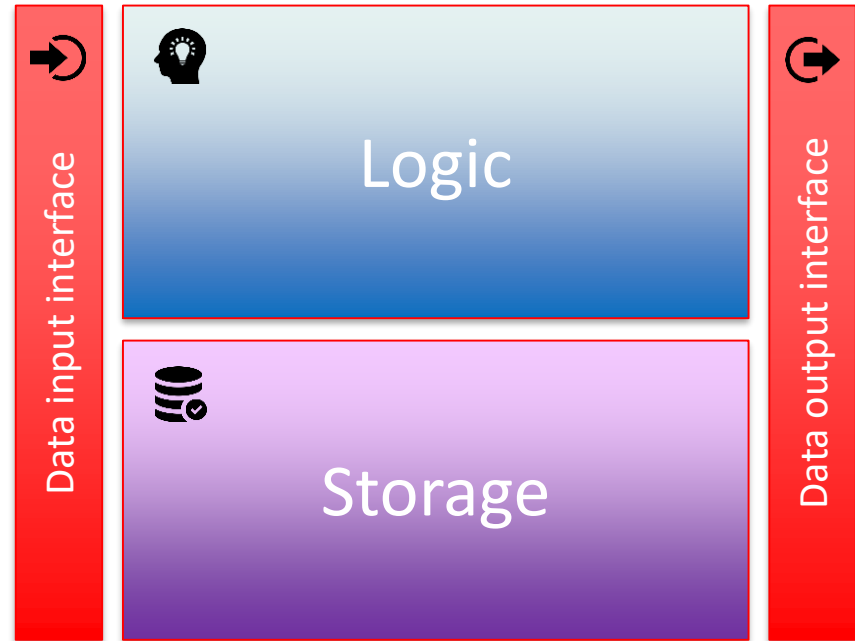
<https://www.businessfinland.fi/en/whats-new/blogs/2019/digital-twin-is-the-new-black/>





# DT Core Overview

- **Modular building block** that represents the state of the physical twin
- **Historical state changes** are stored within itself
- **Data handling and operational characteristics** are modelled inside the Digital Twin
- **Information or data** is accessed through I/O APIs





# Storage Contents

## State descriptive data

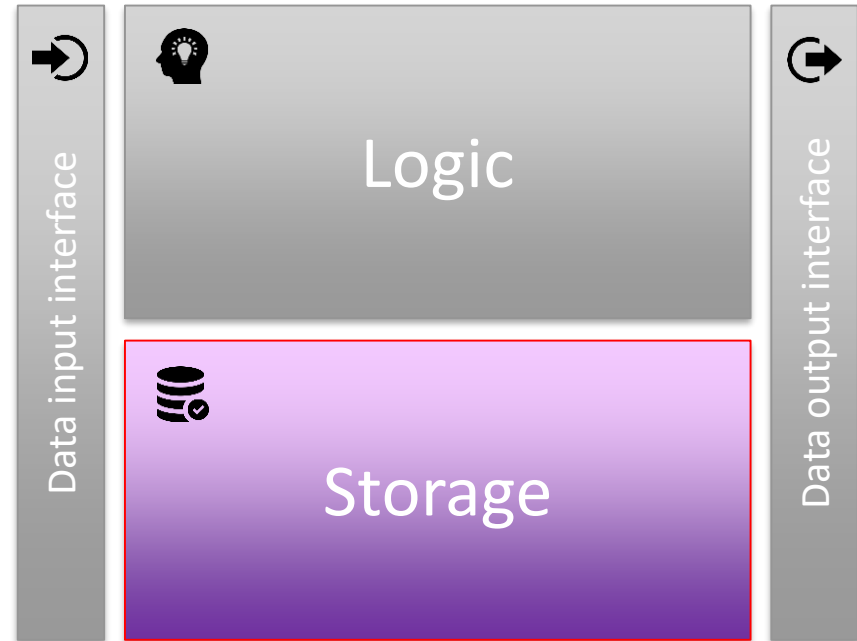
- 3D models
- Hierarchical component structures
- IoT data

## Metadata

- Data value ranges, units, ...
- Data meaning

## DT state management

- Prioritization of data sources
- Data processing parameters
- History of state changes
- State prediction





# Processing Logic

## Data refinery methods

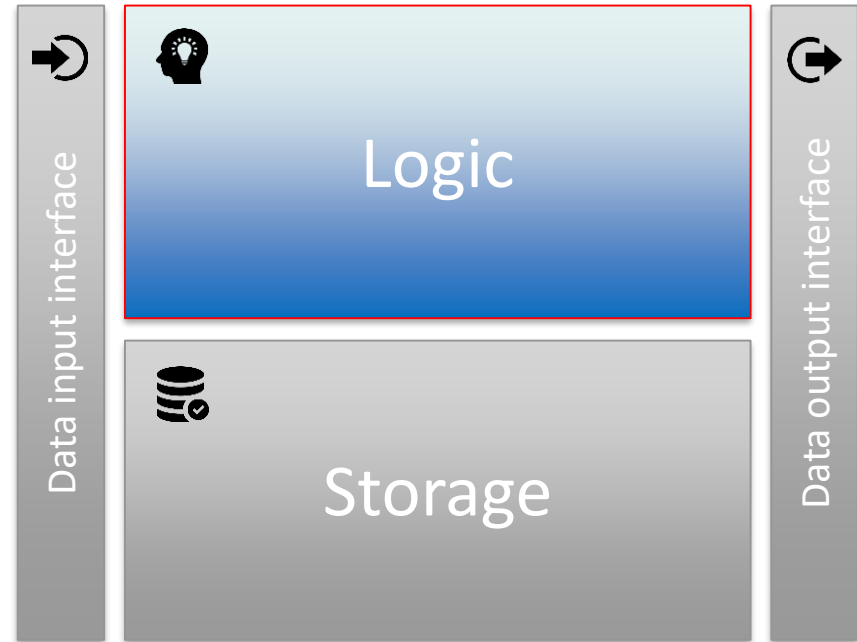
- Inference trees
- AI models

## Application-level logic

- Automatic reprocessing of data
- Signal abnormality detection

## Processing management

- Up-to-date data provision mechanism (e.g. heartbeat)
- Alert changes by human feedback on previous alerts





# Data Interfaces

## Query management

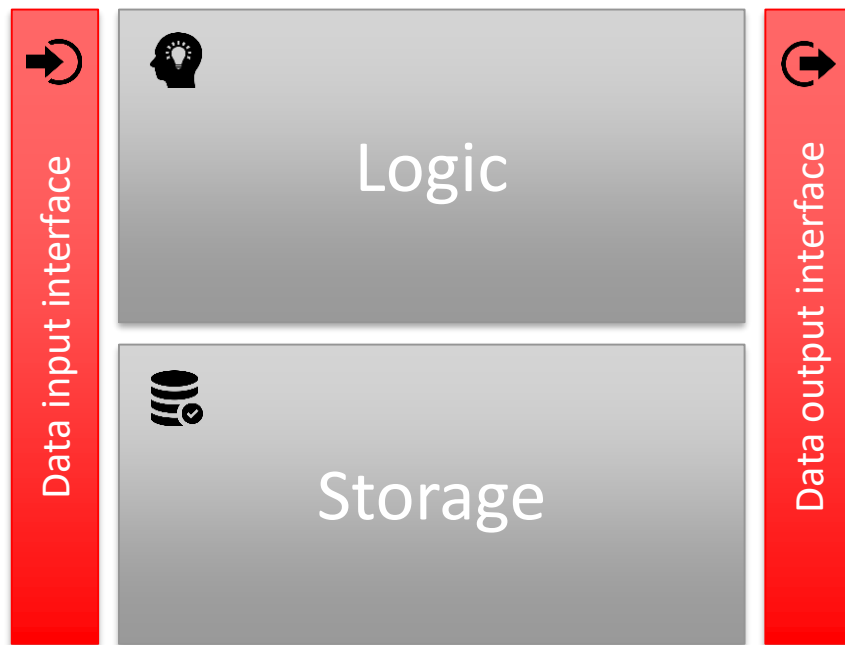
- Multi-protocol support

## Storage management

- CRUD operations
- Stream & batch-based data updates
- Analytics SQL access

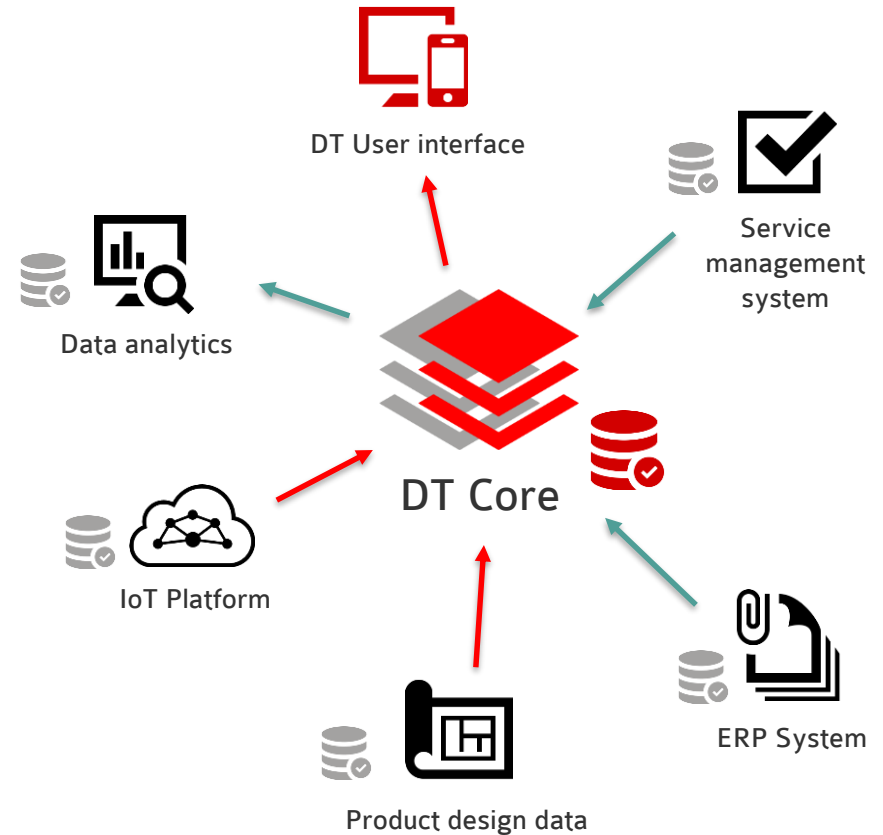
## Secure access

- Authentication
- User management



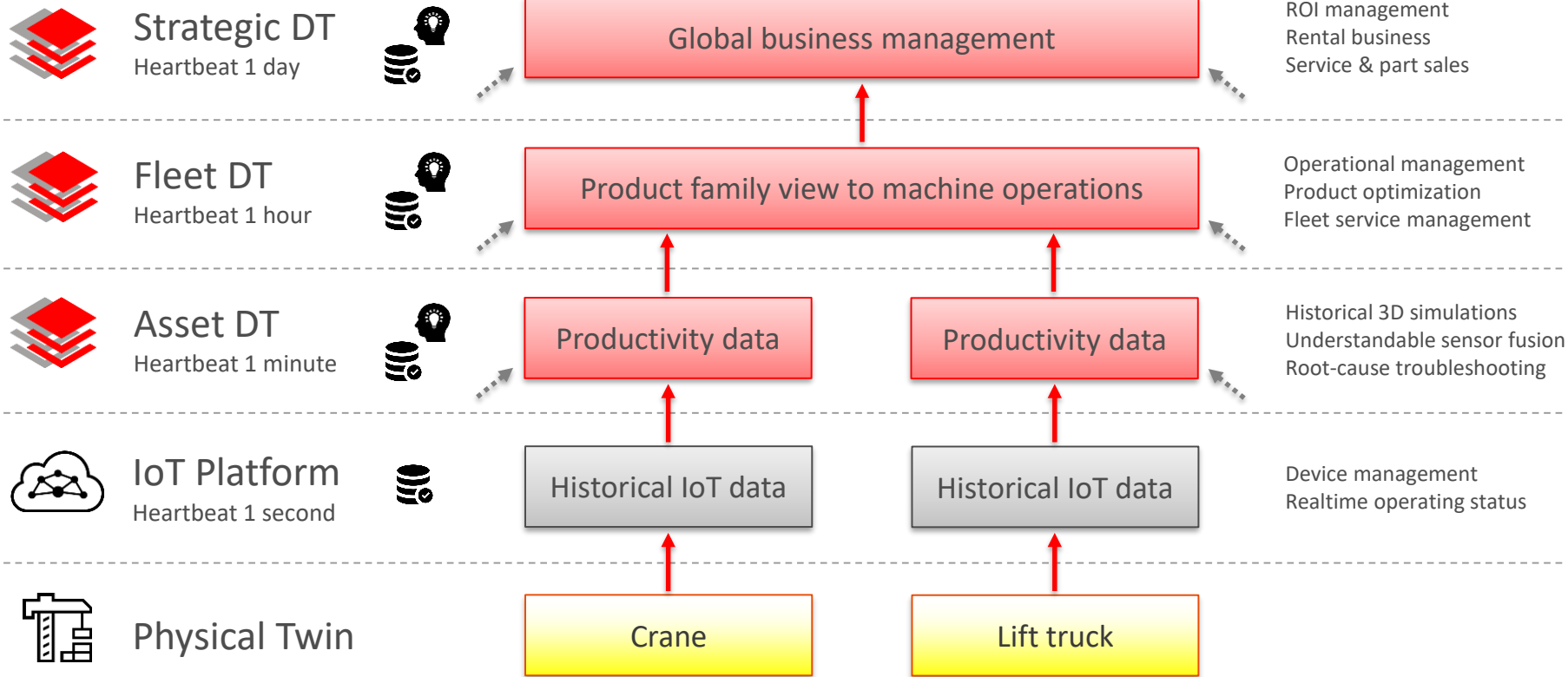
# Data Ecosystem

- DT Core combines the data from multiple sources by **routing data** to the data consumers
- All data sources **contain their own data store**
- DT Core stores only **relevant and refined information** and thus does not replace any other systems





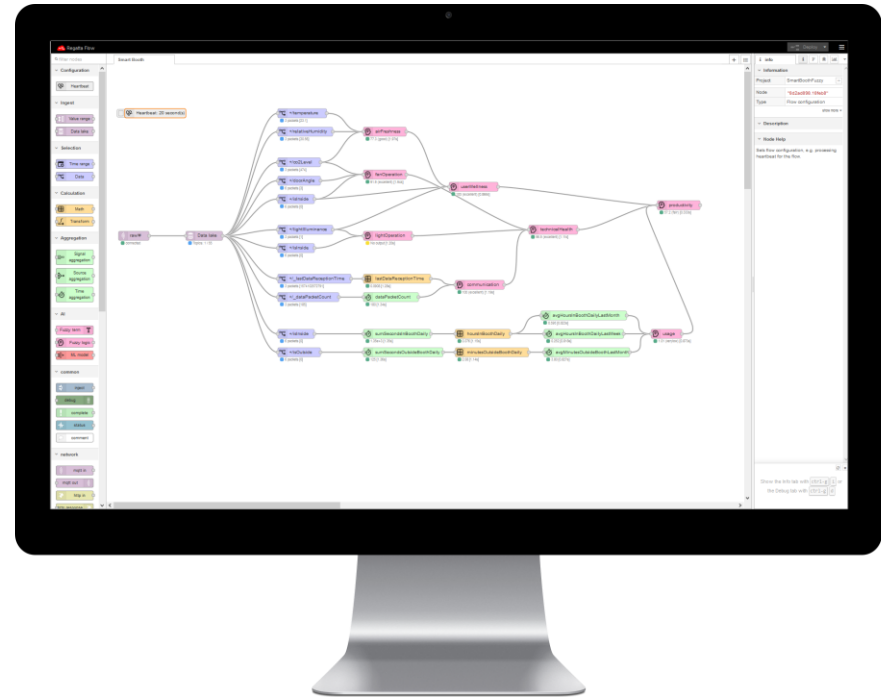
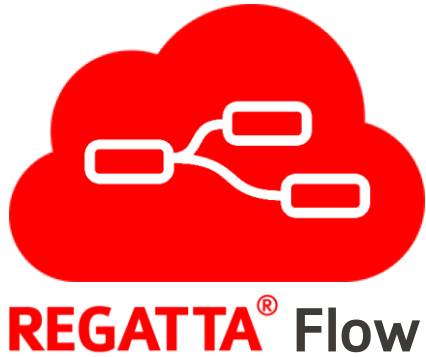
# DT Core Layering







# DT Core in Flow Processing

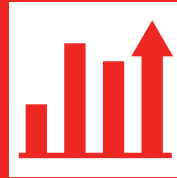


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