Digital Twin architectures in manufacturing and ISO23247 standard (II)

[anonymised]

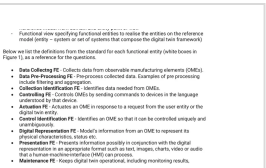
1. Motivation for using ISO23247 standard

Aligned with ISO23247?

What is the value of ISO23247 standard and the Reference architecture with functional view proposed in the standard when realising Digital Twin in practice ? Why architectures need to be compliant with the standard ?

ISO23247_Overview.pdf

GOOGLE DRIVE



Functional view specifying functional entities to realise the entities on the reference model (entity – system or set of systems that compose the digital twin framework)

Below we list the definitions from the standard for each functional entity (white boxes in Figure 1), as a reference for the questions.

- **Data Collecting FE** - Collects data from observable manufacturing elements (OMEs).
- **Data Pre-Processing FE** - Pre-processes collected data. Examples of pre-processing include filtering and aggregation.
- **Collection Identification FE** - Identifies data needed from OMEs.
- **Controlling FE** - Controls OMEs by sending commands to devices in the language understood by the devices.
- **Actuation FE** - Actuates an OME in response to a request from the user entity or the digital twin entity.
- **Control Identification FE** - Identifies an OME so that it can be controlled uniquely and unambiguously.
- **Digital Representation FE** - Model's information from an OME to represent its physical characteristics, status etc.
- **Synchronization FE** - Provides synchronization possibly in conjunction with the digital representation in an appropriate format such as text, images, charts, video or audio that a human machine interface (HMI) can process.
- **Maintenance FE** - Keeps digital twin operational, including monitoring results,

No vendor or architecture will get the whole DT market but still different DTs needs to be able to talk to each other. There need to be a functionality taxonomy etsblished with ver strong definitions to enable interoperbility of diffeent vendors DTs in a echosystem like a shop floor or addetive manufacturing federated systems involving both end users as well as IP owners, distribution companies, finacial enablers etc. — ANONYMOUS

2. Functionalities in the standard not implemented by current architecture.

Plug and Play

Plug and Play neglected in current architecture. Can you explain your answer "Scope driven by stapeln thinking, not functionality"

Plug and play of system components with standardised interfaces for example REST or OPUA or something standardeised. — ANONYMOUS

Plug and Play importance

"Systems Engineering needs this" can you elaborate on your answer

For long living systms there is a need to have a modular architecture that supports systems thinking over the high level systems life cycle. The modules need to have defied interfaces and hopefully as few dependencies to other modues as possible. When technology evelve it shall be possblie to exchange modlues with one generation of technology to a nw technology without redsifn the whole high level system if not wanted. — ANONYMOUS

Data assurance

You rated the importance of Data assurance 3/5 in the survey, which is not in line with the grading from most of other responders 5/5. What is your reflection for this deviation?

It is very important but perhaps I take it for granted. Without it it is no usage of the digital twin — ANONYMOUS

3. Functionalities not captured by the standard.

Continuous Deployment

You rated the importance of Continuous Deployment 5/5 in the survey, which is not in line with the grading from most of other responds 2/5 and 3/5. What is your reflection for this deviation?

My experience is in very long living products like Boeing aircrafts, aircraft carriers, swedish Visby fegatte etc and than a contionous deployment is very important. The DT change over time tgether with is physical twin and the deployment of the DT needs to be done continuasly even under the usage of the physical twin. — ANONYMOUS

4. Other functionalities.

Can u explain more about

"Data lake storage with hot, warm and cold storage. Data streaming with tresholds generating alarms, problem reports and issues." Do you see these as standalone FE or implementations of data storage component ?

We always implement the data lake as a seprate storage but with thight integration to the structured data in the DT. When we move data into the data lake we sometime enrich it with "tags" so the interconnection between the DT and its sensors data history is easy to utilize. — ANONYMOUS

5.Final remarks

Use case ?

We havebeen working with DT technology for : — ANONYMOUS

Energy production and utilization like a large Gas / steam turbine manufacturer where we gather information from many differnet systems as well from the physical control system (using enriched OPC UA). ON Going project — ANONYMOUS

Large producer of of shop floor tools and systems where the production line is managed aas aDT (On HOLD) — ANONYMOUS

Underground subway in France where the DT captures information from the physical twin and combine that information with maintenace and mod & up informtion to decide if there is a need for a problem report eventually generation a work order — ANONYMOUS

DT of a test shop floor of a truck vendor for simulation of planned changes s well as creation of a DT of the produced trucks during production. — ANONYMOUS

DT od a hospital in Eskilstuna where we simulate tye fire and pasgae system and its connection to doors and ventilation system — ANONYMOUS

DT for the Quenn Elisbeth aircraft carrier in UK (and the oter aircraft carrier of the sae class). To prepare maintence alr3ady before the ship gets into harbour — ANONYMOUS