

Proposed Modifications to Digital Twin Network Concepts and Architecture Draft

(draft-irtf-nmrg-network-digital-twin-arch-04)

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Issues

Draft describes DTN as a modeling engine that can mirror the behaviours of a real and specific network instance (though not all use cases require it to do so)

- This is fine. Integrability in SW-based and potentially automated planning, management and control systems, is a widely accepted objective for DTNs and criterion for their differentiation from “traditional simulation”

However: the presentation of DTN architecture is confusing:

- 1) DTN and use cases of DTNs are “blurred” in inconsistent and confusing ways
- 2) Figure 2 shows DTN as network controller (intent in, control out)
- 3) Described and shown components of DTN support only modeling/analytical capability: not any of the functions that would be needed to support controller function or any of the other DTN use cases described
- 4) Figure 1 is different from Figure 2; its purpose is unclear

Figure 2: DTN as Controller?

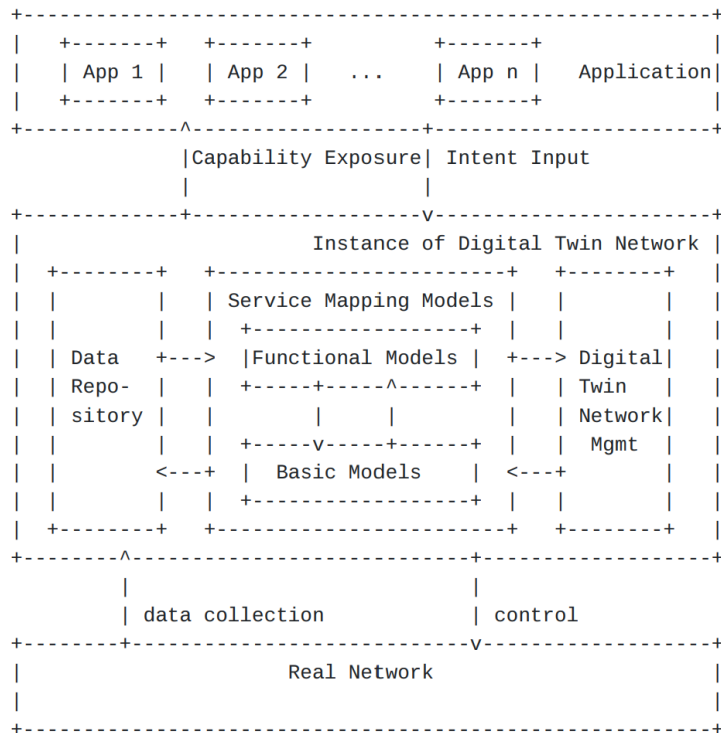


Figure 2: Reference Architecture of Digital Twin Network

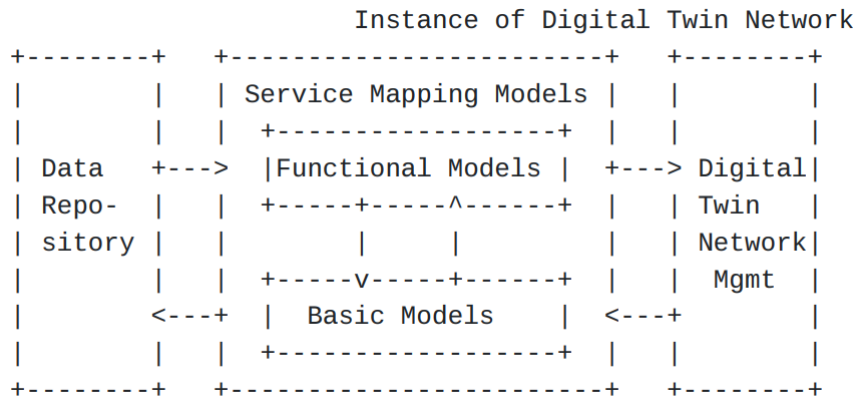
Broadly interpreted as such

- Intent in, control out

But: data, models & management (of data and models) are the (only) illustrated and described constituent functional components of the DTN

- These components constitute a modeling/analytical function
- No intent translation, no sandboxing, no decision making, no control synthesis, no closed loops...

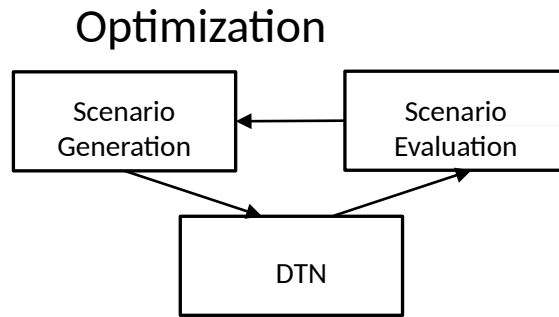
Proposed Representation



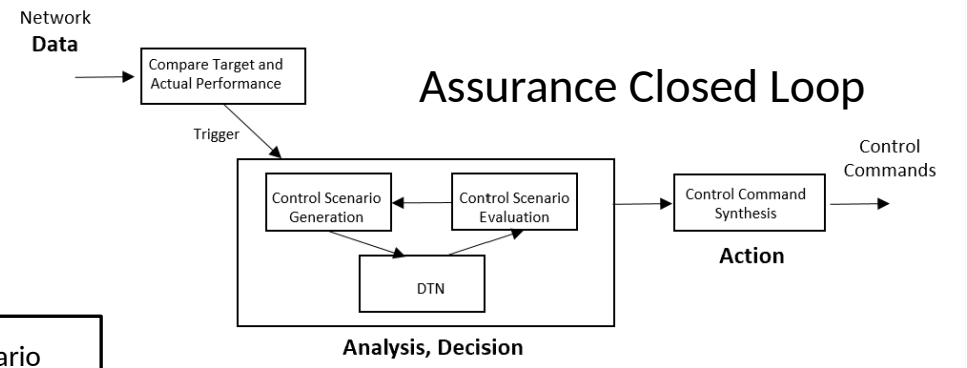
Define DTN by/as its core components



Depict and describe use case implementations by complementing the DTN with other functions or components:



("Sandboxing" within an optimization loop)



This approach mirrors ETSI ZSM015 management services-based description of NDT (same as DTN) and use case implementations

Other Recommendations (I)

Eliminate or correct the references to automatic synching of state from DTN to real network:

- Such synching cannot happen absent decision-making processes, closed loops, etc.
- The general view across industries is that it is *information/data* that flows bi-directionally between twins (vs. uni-directionally to a shadow)
- That *information/data* may be used in control systems that lie in the physical system
- Don't conflate software system functions, if control systems lie in software!

Other Recommendations (II)

Figure 1 needs clarification:

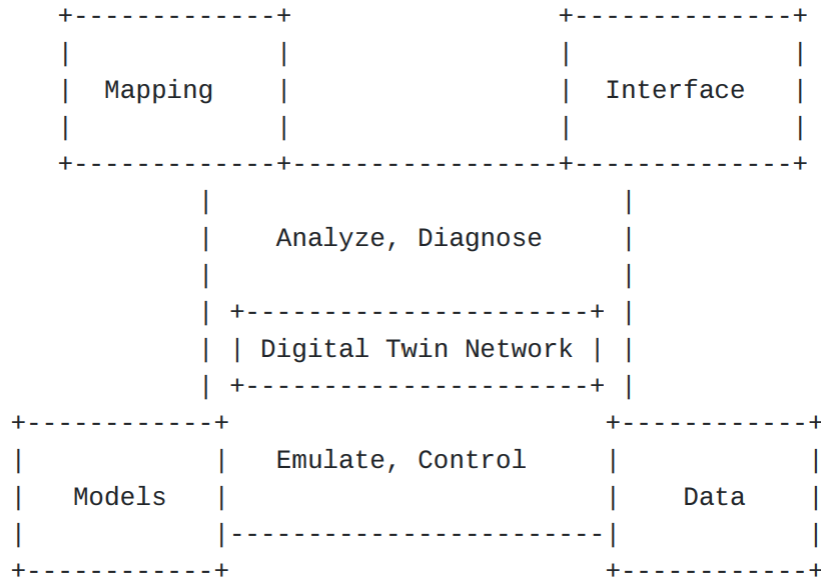


Figure 1: Key Elements of Digital Twin Network

- What is this: Architecture? Concept? Other?
- What is the relationship to Figure 2 (architecture)?
- Model and Data appear in Figure 2 and description of architecture. What about Mapping and Interfaces?
- Are Analyze, Diagnose, Emulate, Control supposed to be “within” the DTN, or “around” it? If around it, then are Models, Data, Mapping, Interfaces in turn around all that?

Thank You
