

# NDT: Reconciling ZSM & NMRG Views

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# From 4.1 of ETSI GR ZSM 018 (WIP):

As discussed in clause 4.1 of ETSI GR ZSM 015 [i.1] a **Digital Twin (DT)** is a virtual replica of a real-world system. That replica may model the composition, state, attributes, behaviours and other aspects of the physical twin. A Network Digital Twin (NDT) is a DT whose physical counterpart is a real-world communications network, or some part of one.

There have been different views expressed in the industry over time concerning the extent and nature of functions encompassed by an NDT. **But all NDT use cases that have been considered are based fundamentally upon modelling to determine the expected outcomes, impacts and effects of prospective operations, processes or changes. Such modelling is thus the essential function of NDTs.** An NDT management service reflecting this is defined in Clause 8.0.

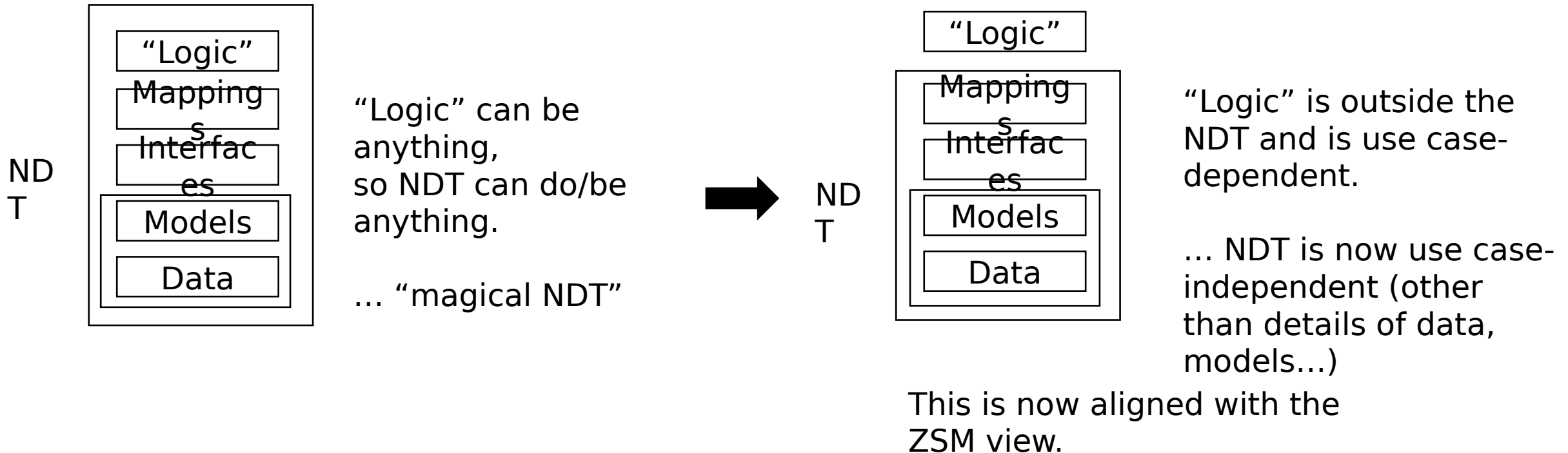
**Information about the outcomes and effects of prospective operations, actions or changes - determined by NDT-based modelling - may be used to guide operational decision-making, including within automation-supporting closed loops. The precise nature and context of such decision-making, and in general the precise role of an NDT, vary among NDT use cases.** Use case-dependent detailed functional architectures may be represented by “composing” NDT services with other management services, per the ZSM architectural principles of flexible modularity and composability ETSI GS ZSM 002 [1] clauses 4.2.1 and 4.2.9. This is illustrated in Annex A.

**The use - or at least, the potential use - of NDT-generated information within automated operations systems, is what distinguishes NDTs from other simulations and modelling. Such use depends on data and information flow between the NDT and other elements of the operations environment.** This includes:

- a) data and information flow *to* the NDT, to support accurate modelling of the physical network and its use; and
- b) information flow *from* the NDT to other components of operations systems.

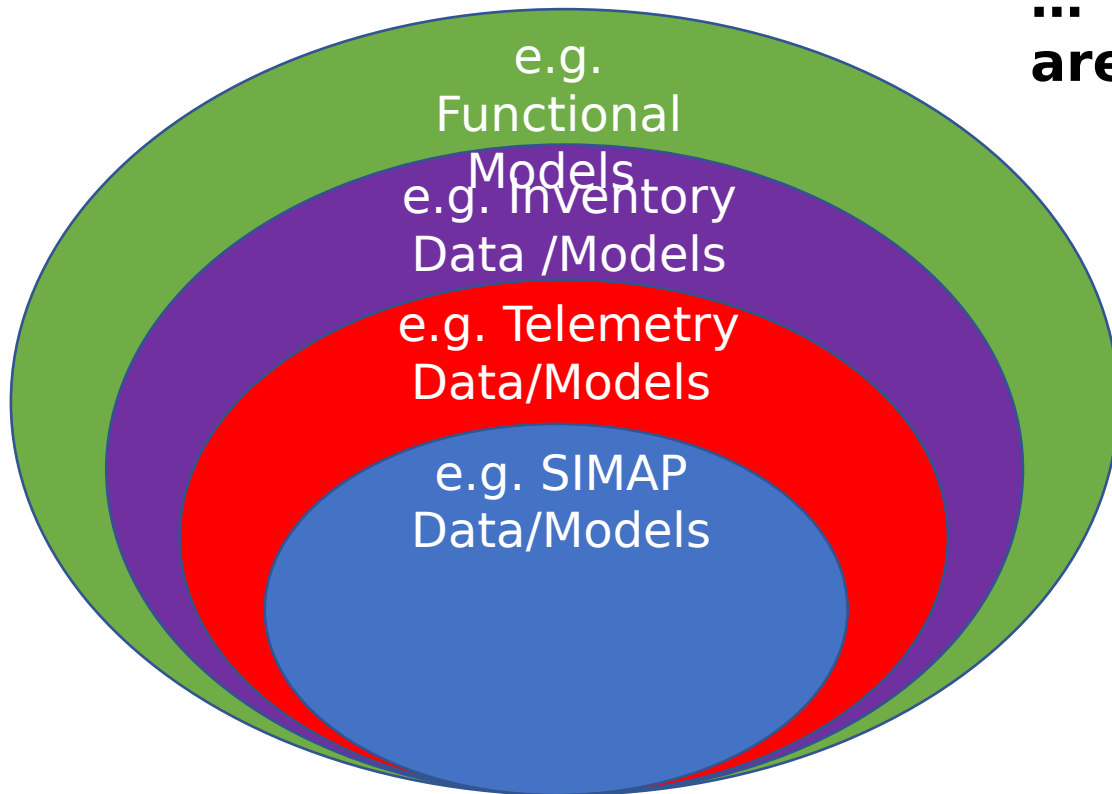
# What is an NDT? Evolution of NMRG draft...

Evolution of view in NMRG NDT Concept and Architecture draft:



# NDT: what data, what models?

“The precise nature and context of (operational) decision-making, and in general the precise role of an NDT, vary among NDT use cases.”



SIMAP = Service & Infrastructure  
Map  
(EKA Digital Map - Per IETF)

**... Therefore, so do the data/models that are needed/useful.**

E.g. a planning operation: explore alternative service and infrastructure resources/topologies: may require only SIMAP data/models

E.g. a service intent assurance closed loop: may also require telemetry data/models

E.g. a global power consumption optimization closed loop: may also require inventory data/models and functional models (power consumption of NEs under particular circumstances) that are coupled to inventory information (NE types/instances)