Requirements for Interfaces of Network Digital Twin

draft-chen-nmrg-dtn-interface-00

https://datatracker.ietf.org/doc/draft-chen-nmrg-dtn-interface/

Danyang Chen (chendanyang@chinamobile.com) **Presenter**

Hongwei Yang(yanghongwei@chinamobile.com)

Cheng Zhou (zhouchengyjy@chinamobile.com)

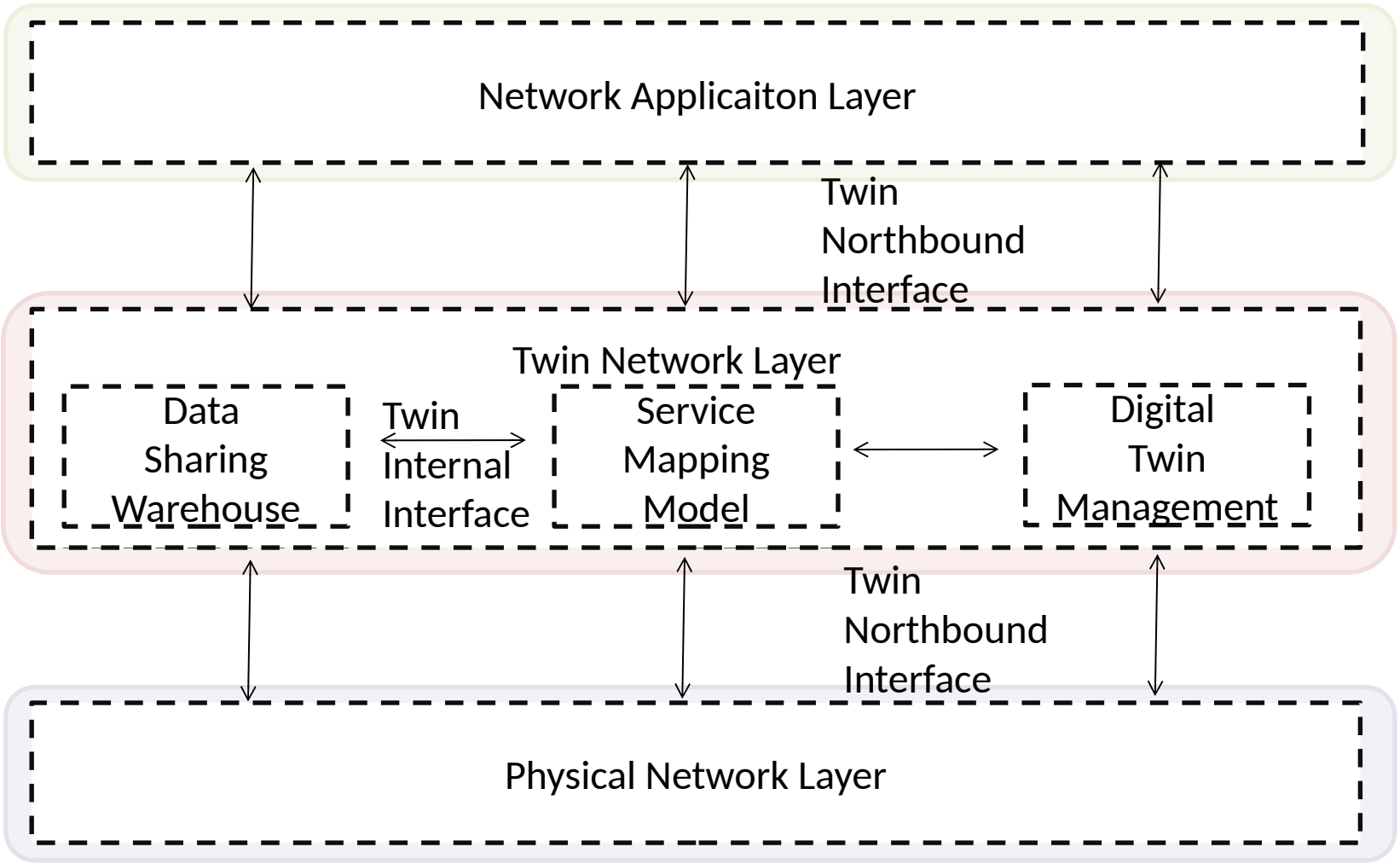
Digital Twin Network

The digital twin network -- "a network system with a physical network entity and a virtual twin, and the two can interact with each other in real time"

-I-D.irtf-nmrg-network-digital-twin-arch

Four core elements

- Data
- Model
- Mapping
- Interaction



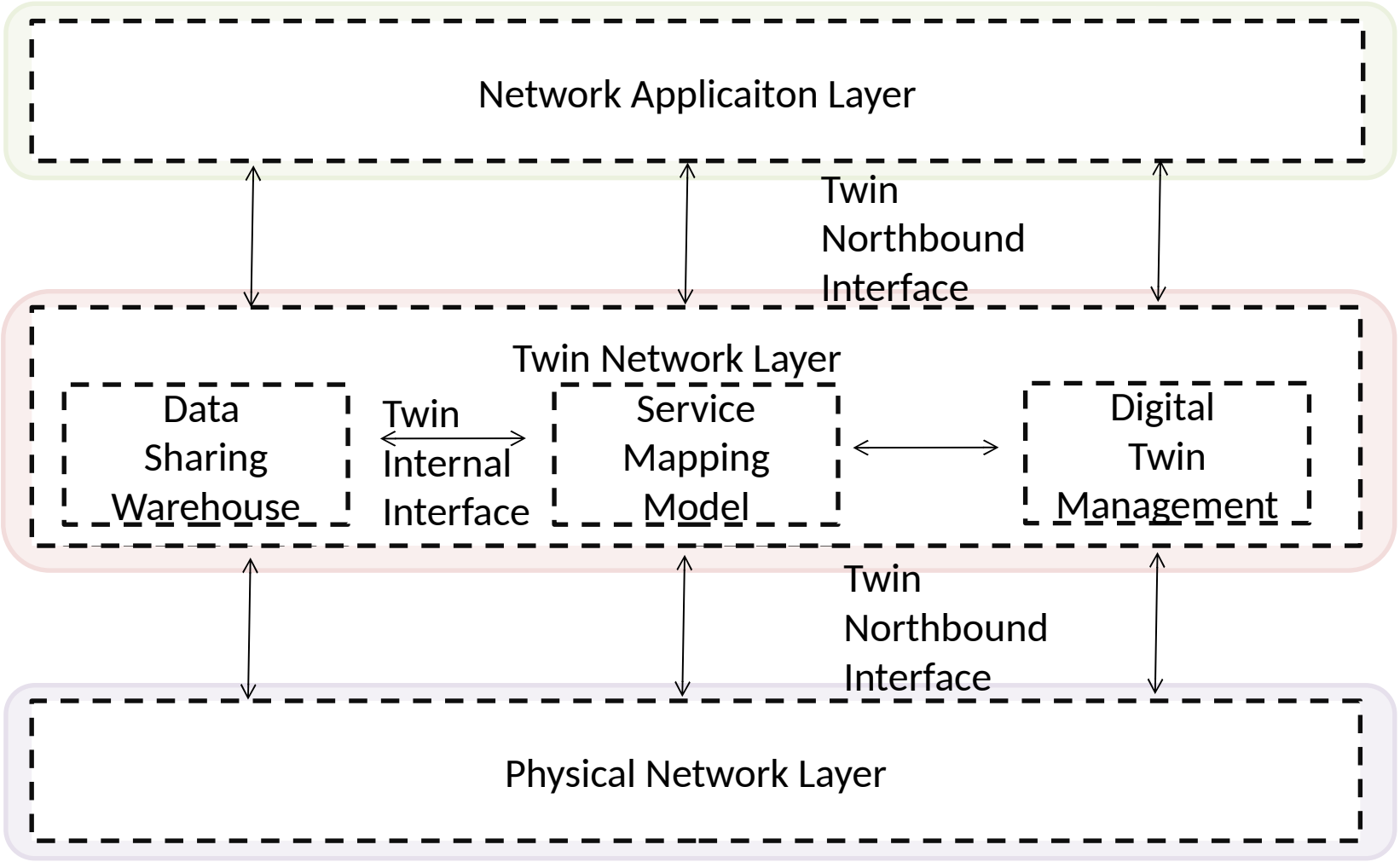
Schematic Representation of DTN Interface

DTN Interface

Interfaces of Digital Twin Network:

- Twin network southbound interface
- Twin network internal interface
- Twin network northbound interface.

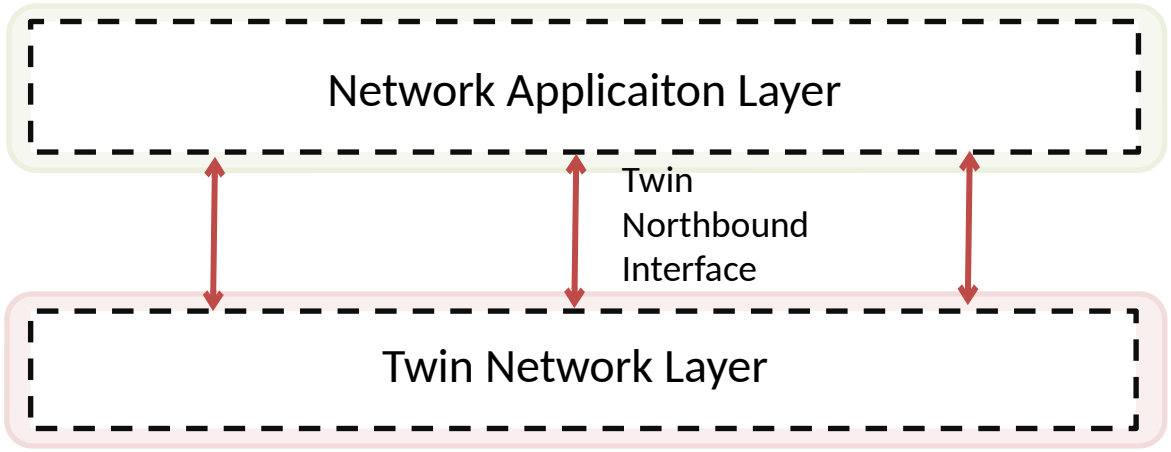
Different interfaces should be able to meet different requirements



Schematic Representation of DTN Interface

Requirements for Twin Northbound Interface

The interface between the network application layer and the twin network layer.



The twin northbound interface can **support the rapid deployment of network application**s such as network operation and optimization, network visualization, intent verification, and network automatic driving with lower cost, higher efficiency, and less impact on live network services.

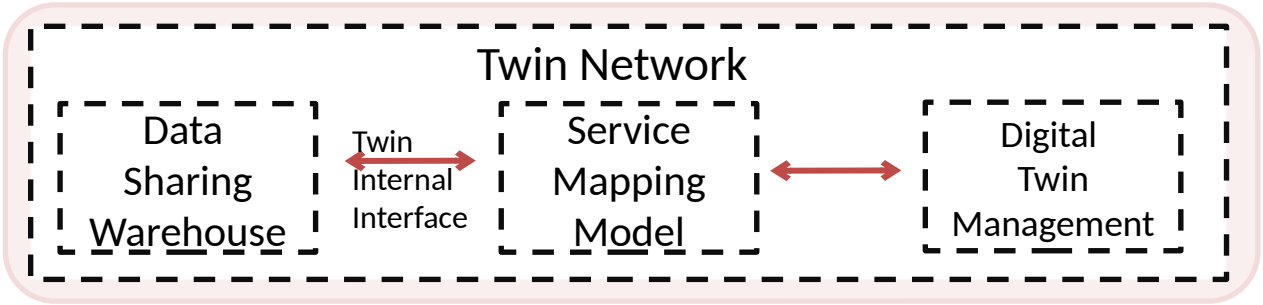
Characteristics

- Openness: meet the business requirements of different network applications and can be input to the twin network layer
- Scalability: the continuous development of the network is bound to introduce new network applications
- Portability: the same or similar requirements of various applications in the network application layer may be deployed on different twins
- Flexible deployment: reduce deployment time and cost

Requirements for Twin Internal Interface

The interface within and between the three subsystems: data sharing warehouse, service mapping model and digital Twin management

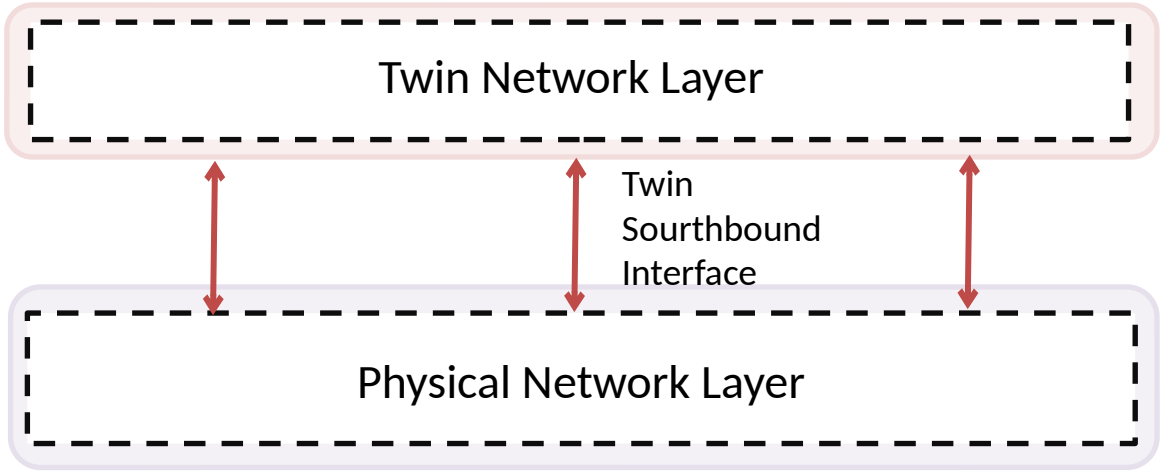
Characteristics



- Unity: Each subsystem in the twin network layer should be able to provide the same data format and data service for other subsystems through the internal interface of the twin layer
- Adaptability: The twin network layer must interact with the network application layer and the physical network layer, and should be well adapted to various network devices and interfaces
- Portability: the data model instances must be able to be provided and deployed through different internal interfaces of twin layers
- Flexible and extensible: In order to shorten the implementation time of functions, the implementation of functions inside the twin layer should be simplified as soon as possible

Requirements for Twin Sourthbound Interface

The interface between the twin network layer and the physical network layer.



Control updates are delivered from the twin southbound interface to the physical entity network, and various nes in the physical entity network exchange network data and control information with the twin network layer through the twin southbound interface.

Characteristics

- Information interaction capability:collect the information of different physical nes or network devices, and send the configuration information of the twin network to the physical network for execution
- Real-time: the information collected and uploaded from the physical entity network and the configuration information sent from the twin network to the physical network must have certain real-time
- Compatibility: must be compatible to ensure the reliability of information collection and configuration delivery

Next Steps

- Add suggestions on the applicability of common protocols.

  Analysis of different common protocols for different interfaces

- Add security considerations.

- **Looking forward to the comments, suggestions and questions.**

Thanks!