Network Model

07. December 2021
Logical View for one of the OAM functions

SMO OAM
(e.g. NSSMF CN, AN, TN)

To/From other SMO Components
(including NSMF)

Network (Model) Provider
(e.g. RESTCONF/YANG Server)

Abstraction and model translation/mapping layer

Enrichment

Topological Points and Links between domains
(technological – CN, TN, AN; operators, …)
(e.g. SIP, E-NNI, …)

OAM Termination
(e.g. NETCONF/YANG Client)

5G Core
RAN
Small Cells
& Wi-Fi
Packet
Optical
Microwave
Fixed Access

HST WG9 non-confidential contribution
2021-12-07

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Configuration from NB to SB

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Domain specific augmentation

OAM Termination (e.g. NETCONF/YANG Client)

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Why using TAPI Topology?

- It provides the required Abstraction according to requirements gathered by ONAP based on Operator and Vendor input
  Please see: link

- It fulfills the requirements stated in O-RAN WG9 Management Interfaces document (O-RAN.WG9.XTRP-MGT.0-v03.0 – Chapter 6)
  Please see: link

- The functionality was demonstrated to O-RAN in vf2f June 2021
  Please see: link

- TAPI has an Apache 2.0 License
  Please see: link
How it works…

… by mapping :)
Configuration example for WT domain

Domain/use-case specific augmentation on Network Model

NETCONF Server representing a network function
- core-model-1-4@2019-11-27: control-construct
- core-model-1-4@2019-11-27: logical-termination-point, layer-protocol-name = air-interface
- air-interface-2-0@2020-01-21: air-interface-configuration/tx-frequency

NETCONF Server representing a network function
- ietf-microwave-radio-link@2019-06-19: tx-frequency
- ietf-interfaces@2018-02-20: interface
  interface-type = microwaveCarrierTermination
- ietf-system@2014-08-06: system
Leaf definitions for WT tx-frequency

ietf-microwave-radio-link@2019-06-19

leaf tx-frequency {
    type uint32;
    units "kHz";
    mandatory true;
    description
        "Selected transmitter frequency.";
}

/if:interfaces/if:interface/mrl:tx-frequency

air-interface-2-0@2020-01-21

leaf tx-frequency {
    type int32;
    units "kHz";
    default "-1";
    description
        "Center frequency of the transmit channel. The values to be
configured have to exactly match the values listed in the international
agreement referenced in channelPlanID. In case of automated
selection of the transmit frequency this field shall describe the lowest
center frequency selectable.";
}

/core-model:control-construct/core-model:logical-termination-
point/core-model:layer-protocol/air-interface:air-interface-pac/air-
interface:air-interface-configuration/air-interface:tx-frequency
Service Model

Service (path*)

Option #1
... as ordered list of links

Option #2
... as ordered list of hops (e.g. termination points, node-edge-points, interfaces, ...)

Option #3
... as combinations of Option #1 and option #2

Network
Service (path*)

... as ordered list of links

Network

Link (owned-node-edge-point*)

Owned-node-edge-points can have different roles (ROOT, TRUNK)
typedef port-role {
    type enumeration {
        enum SYMMETRIC {
            description "A port that can exchange flows (e.g. distinct packet flows) with any other port(s) in a forwarding entity. The SYMMETRIC role applies to point to point and multipoint to multipoint connection schemes.";
        }
        enum ROOT {
            description "A port that can exchange flows (e.g. distinct packet flows) with any other port(s) in a forwarding entity. The ROOT role is unique to the Rooted Multipoint connection scheme.";
        }
        enum LEAF {
            description "A port that can only exchange flows (e.g. distinct packet flows) with any other ROOT or TRUNK port(s) in a forwarding entity. The LEAF role is unique to the Rooted Multipoint connection scheme.";
        }
        enum TRUNK {
            description "The TRUNK role is unique to the ENNI involved in a Rooted Multipoint connection scheme. It provides a way to extend the concept of ROOT and LEAF bidirectionally across the ENNI without having to create multiple ports (Leaves and Roots) and hairpinning from one to the other.";
        }
        enum UNKNOWN {
            description "Not a normal state. The system is unable to determine the correct value.";
        }
    }
    description "The role of a (conceptual) port of a forwarding entity, e.g. Link, ConnectivityService, Connection, PathComputationService, Path, VirtualNetworkService.";
}

Source: https://raw.githubusercontent.com/OpenNetworkingFoundation/TAPI/v2.3.1/YANG/tapi-common.yang
Thank you!

Questions?