

Topology View

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Introduction

For Operation and Maintenance technicians it is important to get a graphical view of the network to perform their tasks - e.g. fault analysis. Therefore, a topology view showing all the involved entities and their associations, connections and end-to-end services should be created.

An abstract topology is defined by nodes and the associations between the nodes, the edges.

In O-RAN case the topology nodes are O-RAN components and functions such as Near-real-time-RAN-Intelligent-Controller, O-CU-UP, O-CU-CP, O-DU, and O-RUs. Component topology.

The components are connected to each other via the different interfaces (A1, E2, E1, F1, O1, X2, ...) and their termination points. Such connections are represented by topology-edges.

Topology in general and especially RAN topologies are quite huge and may contain millions of nodes and edges. It might be beneficial to create different topology views and different representation types (e.g. graph, table) of the same network.

Topology view types

- Geographical
A geographical topology shows sites and the connection between different sites to localize faults and to view expected optimizations in regions. In addition to geographical topology, the 5G coverage could be shown for customers.
- Network topology
A Network topology would show the relationships between the different element (PNFs, devices, managed element, managed functions) of the telecommunication network.

Representation types

Each view can be represented in as tables or as graphs.

- Table views
... shows the details of the topology elements in a structured way. Typically there are different tables for the different elements. Sort and filter mechanisms help to identify the interesting nodes.
 - Nodes
 - Edges
 - (paths, services)
- Graph views
... give humans a nice overview of the complexity of the network. Next to filter mechanisms, zooming and search functions are useful to identify interesting topology elements.

Realization proposal

For the user there should be a single entry point to get access to the different views. The label of this entry point should be called "Topology view". A nice topology icon should complement the entry point.

The UI should distinguish between the different view. Each view should be represented as a Tab in a tab view.

- Geographical
... shows the topology on a map
- Network
... shows different elements of the network
- Layers
... represents the network per layer in a graphical view
- Nodes
... represents all nodes as table view.
- Edges
... represents all edges as table view.
- Services
... represents associations across the different layers and elements.