

Operational Network Management for IEC/IEEE 60802

NETCONF Usage

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The following figure shows the steps that are typically performed in the scope of the CUC-CNC interaction.

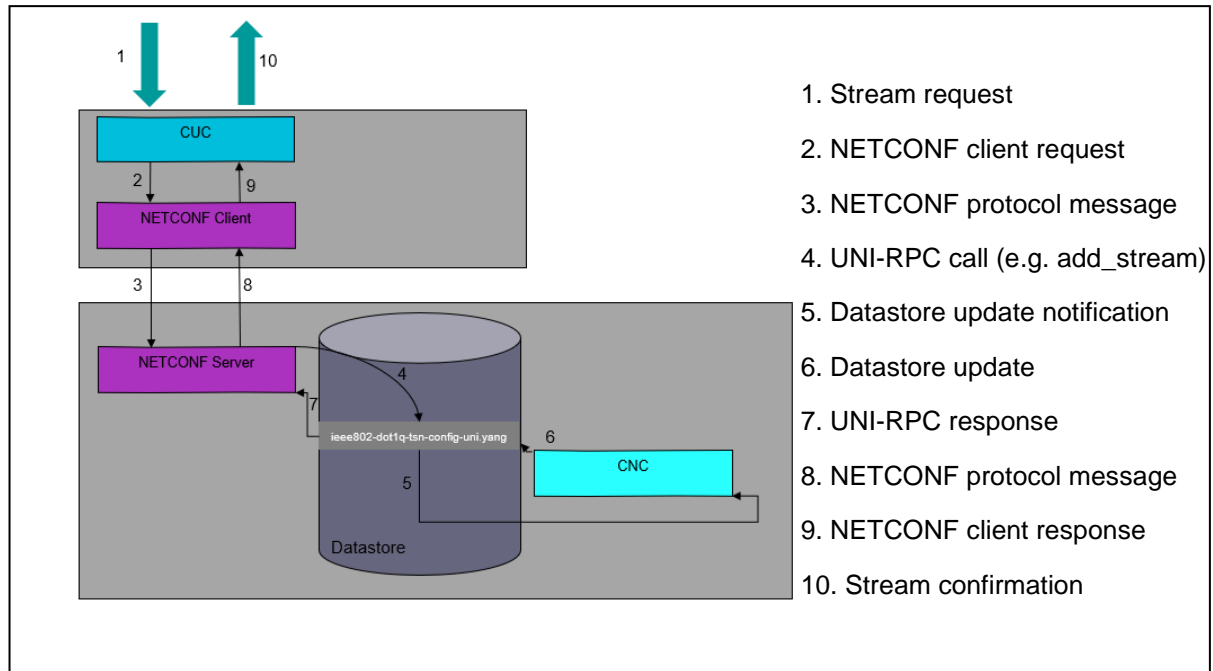


Figure 28 – UNI Service Model

After the computation of the paths and the scheduling and/or shaping configuration has been done, the CNC configures the IA-Stations via NETCONF client. The typical steps that are performed in this process are shown in the figure below.

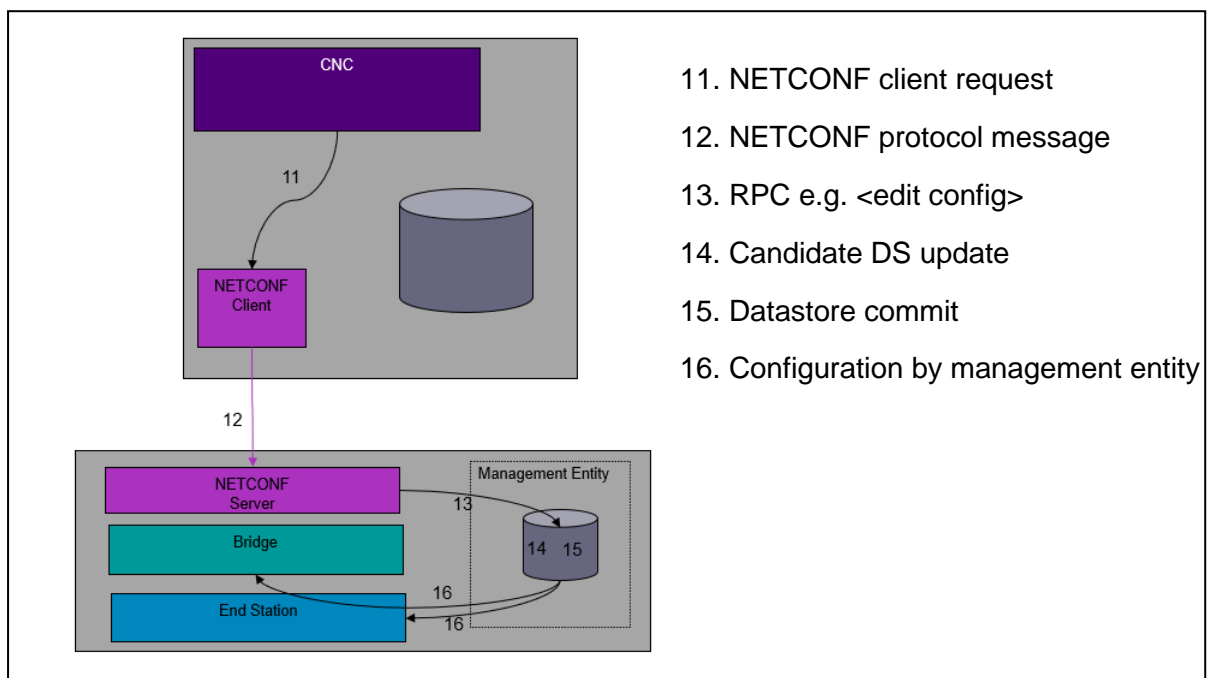


Figure 29 – CNC Southbound

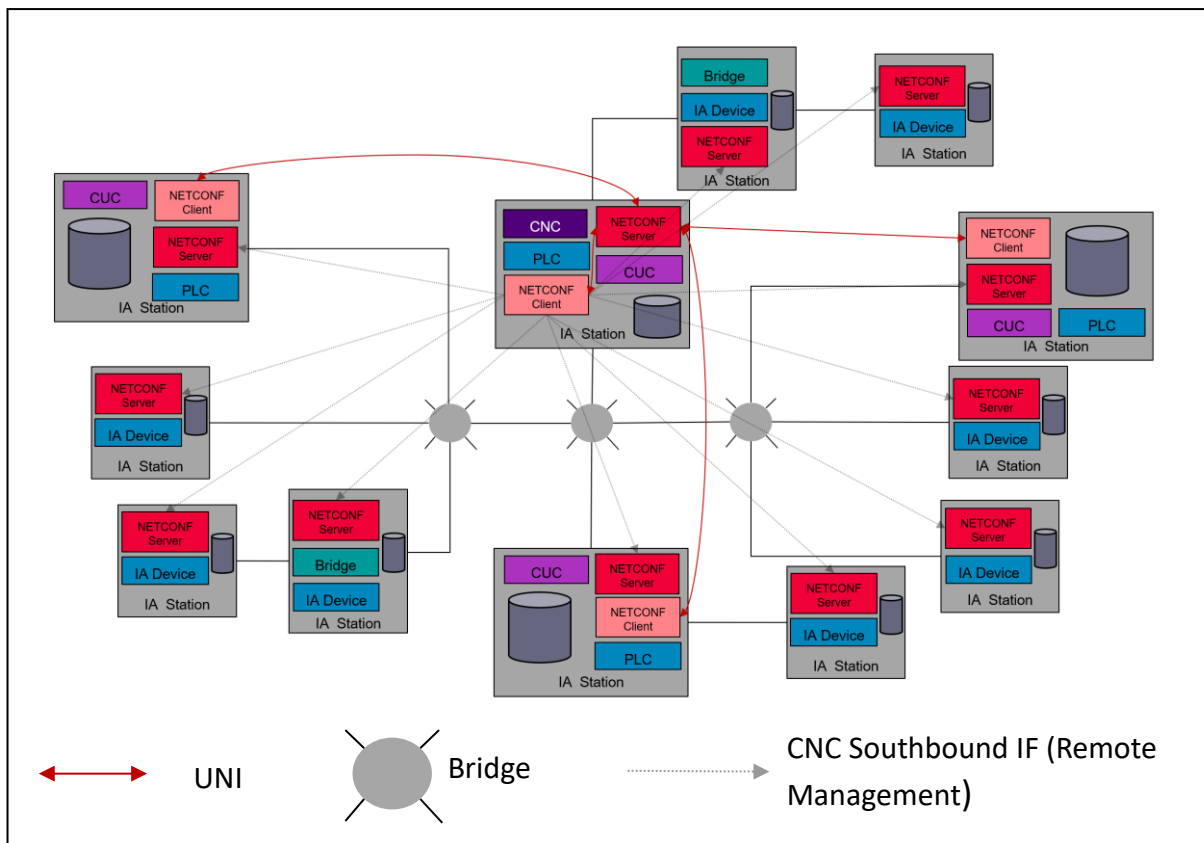


Figure 30 – NETCONF USAGE

Instances of NETCONF servers and clients within a TSN domain are shown in the Figure 30. IA-stations that contain a CNC and/or CUC entity must have both a NETCONF server and a NETCONF client. All other IA stations must have a NETCONF server. NETCONF client at the CUC side is needed for the UNI. NETCONF server at the CNC side is needed to accommodate UNI as well as remote network management of the end stations and bridges that are contained in the same chassis as the CNC entity. The NETCONF client on the CNC side is needed for the southbound interface of the CNC i.e. for the remote management of the bridges and end stations in the scope of stream configuration. All IA-stations must have a NETCONF server to make remote management possible.

The NETCONF server used by the CNC serves multiple NETCONF Clients (CUCs) within a single TSN domain. The requests from multiple clients can occur simultaneously. The number of clients that one NETCONF server must be able to serve at the same time increases in the case of an IA-Stations that belongs to multiple domains. The figure below shows an IA-Station connected to three different TSN domains containing three CNC instances, one per TSN domain, within a single chassis and with a single Management Entity. The number of clients, that the NETCONF server implemented in such IA-Station must be able to serve simultaneously is equal to the sum of CUC entities across the three domains plus the number of additionally entities such as Security Deployment Entity and HMI.

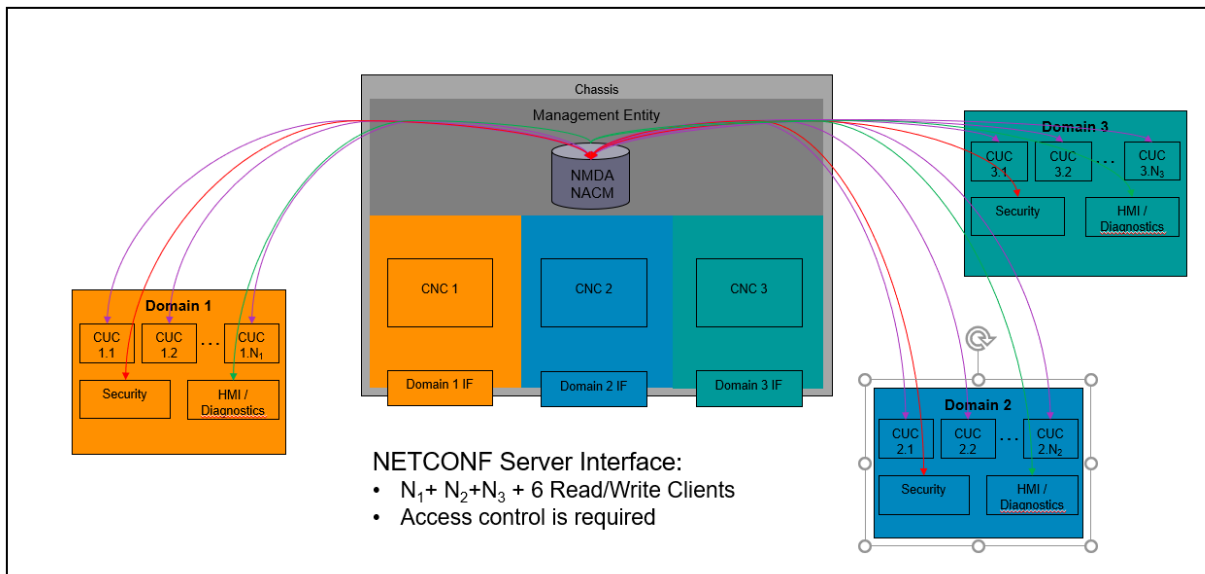


Figure 31 – Multiple CNCs within a Single Chassis

The NETCONF server that is implemented in the IA-stations that contains one or more CNC entities is not the only NETCONF server instance that must be able to serve multiple NETCONF clients at the same time. The following figure shows an IA-Station that implements three end stations that belong to three different TSN domains (one end station per domain) within a single chassis and with a single Management Entity. The NETCONF server from this example must be able to serve at least 9 NETCONF clients at the same time.

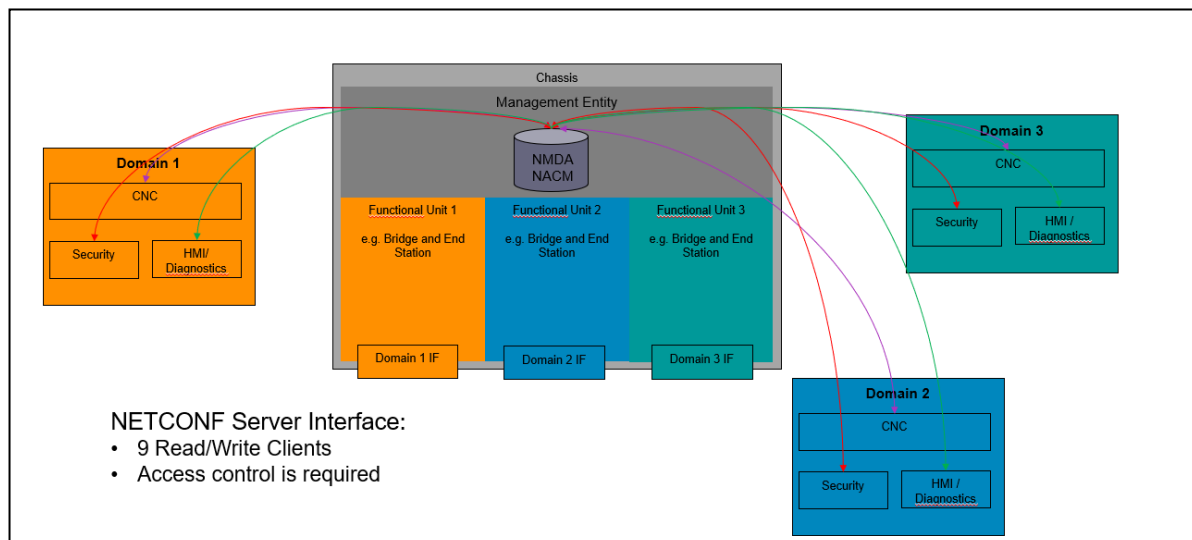


Figure 32 – Functional Units in Different TSN Domains