

5G Fireside Chat Series

Physical Network Function (PNF) relevance in 5G networks

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Agenda

- What is Physical Network Function (PNF)?
- Why automate PNF management in 5G networks?
- PNF pre-boarding & on-boarding in context of automation
- PNF plug and play support
- PNF lifecycle management & control loop creation
- Benefits of PNF automation on 5G deployments



What is physical network function (PNF)?

- PNF (Physical Network Function) is a physical device that **cannot be virtualized as a**
 - Virtual Network Function (VNF) or
 - Cloud Native Function (CNF)
 - E.g. 5G Base stations
- It can also be a physical device that is not migrated to a virtual function (software based)
 - Eg. Legacy Network device (such as router)

Why automate PNF management?

- Why is it important to automate the onboarding of PNFs?
 - PNFs may invariably be part of a Network Service that is offered by Operators
 - There can be many instances of PNFs which means it is difficult to manage them manually
 - PNFs may be migrated to different locations, which means they need to be reconfigured
- Why is it important to support automated configuration of PNFs?
 - Several PNF instances would mean different configurations for each one of them
 - The parameters may change over period of time (Day 0 to Day N), which is difficult if not impossible to manage them manually
- Why is it important to automate the changes in PNF configuration?
 - Changes in the environment (e.g. errors, additional load) may make it necessary to change the configuration of PNF instances
 - This process can be done by creating a control loop in ONAP

PNF pre on-boarding, on-boarding & support for Automation

- **Pre-onboarding PNF**
 - Create and validate vendor's PNF package
 - Contains the descriptor (PNFD) and artifacts for the PNF
- **Onboarding & Design time**
 - Onboarding using PNF Package
 - Upload the package to SDC
- **Run time deployment**
 - PNF Registration (Using PNF Registration Handler)
 - Service Activation
- **Plug and play (Discovery)**
- **Configuration (LCM)**
- **Creating Closed loop**

PNF plug and play support

- **Design Time**
 - PNF Modeling
- **Run Time**
 - PNF Instance Declaration
 - PNF Bootstrapping
 - PNF Discovery through Registration Process
 - PNF Activation

Note: Without Plug and Play, a service provider and their technicians would need to manually create and deploy PNFs into their network. This may entail a high OPEX particularly in a 5G RAN wireless network, where it is expected that there will be approximately 10-fold the number of base stations compared to 4G LTE

PNF lifecycle management & control loop creation

- PNFs can be handled like VNFs (xNFs) since most of the operations are common
- PNFs' LCM operations can be performed using any of the controllers in ONAP using Netconf-XML//RESTCONF etc.
 - Controller Design Tool (CDT) / Application Controller (APPC)
 - SDN-Controller (SDN-C)
 - Controller Design Studio (CDS)
- Control Loops can be created for PNFs similar to VNFs



5G

Thank You

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