Dedicated Networks API Proposal

Outline

- Background: What is a Dedicated Network?
- Dedicated Network realization options
- Relations to other CAMARA APIs
- Use-Cases
  - Media Production
  - Festival Organizer
  - Enterprise Connectivity

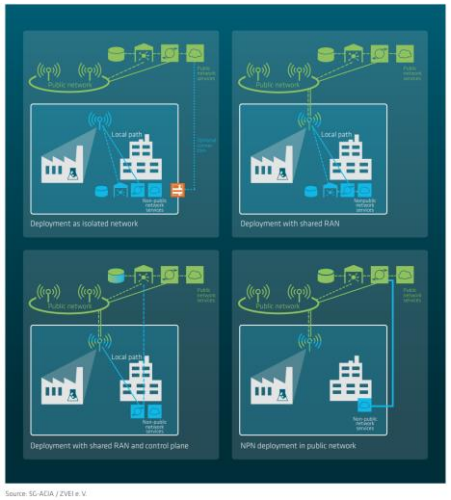
Dedicated Networks

- Fixed and Mobile Networks offer the capability of separating devices in different (logical) dedicated networks.
  - Multiple of these (logical) dedicated networks can exist on the same physical network
  - Dedicated Networks can offer different performance targets, e.g. speed/ latency
  - Dedicated Networks are often only needed for a specific time duration (e.g. one hour) and at specific locations (e.g. the area of a festival)
  - Dedicated Networks separate target traffic from other traffic for enhanced security

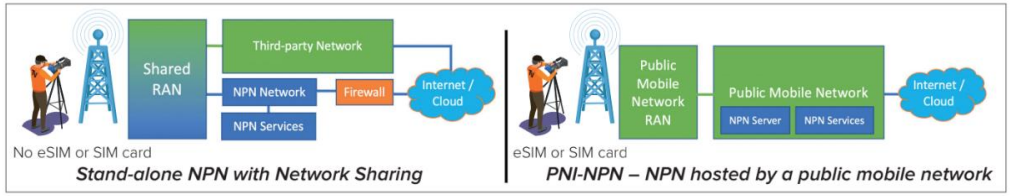
- A dedicated network offers connectivity for multiple devices
  - A device connection activation functionality is included, which allows controlling, which devices are allowed within the dedicated network
  - Connectivity (routing and performance) may be individually managed for each device

Dedicated Networks

- 3GPP TS 23.501 defines "Non-Public Networks"
  - Standalone NPN (SNPN)
  - Public Network Integrated NPN (PNI-NPN)
    - Dedicated DNN or Network Slice instances



Dedicated Networks in 5G-ACIA
Source: WP - NPNs for Industrial Scenarios (Link)



Dedicated Networks in 5G-MAG
Source: Explainer - 5G NPNs for media production in collaboration with third-party networks (Link)

- GSMA OPG.02 v06 (Annex H) defines a "Network Communication Service as a Service"
  - Considers 5G-SA (NS and DNN), 5G-NSA (DNN only) and 4G (APN only)

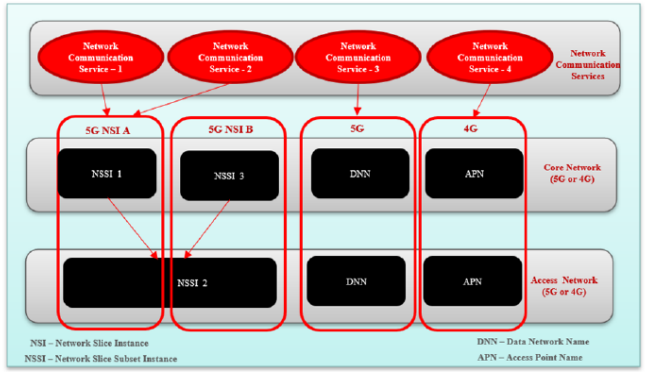


Figure 38: A variety of services provided by multiple network slices [34]

Dedicated Networks in GSMA OPG.02
Source: GSMA Operator Platform: Requirements and Architecture (Link)

Dedicated Networks – realization options

- The API should be agnostic to the underlying realizations

- Within Cellular networks, it can be realized as
  - (Public Network): A Network Slice (with a DNN) or just with a DNN / APN
  - (Public Network): A new Network Slice / DNN for each Dedicated Network (Dynamic slice creation) or re-used of an existing Network Slice / DNN (usage of a static Slice)
    - It should be transparent for the API consumer, whether resources are re-used or not

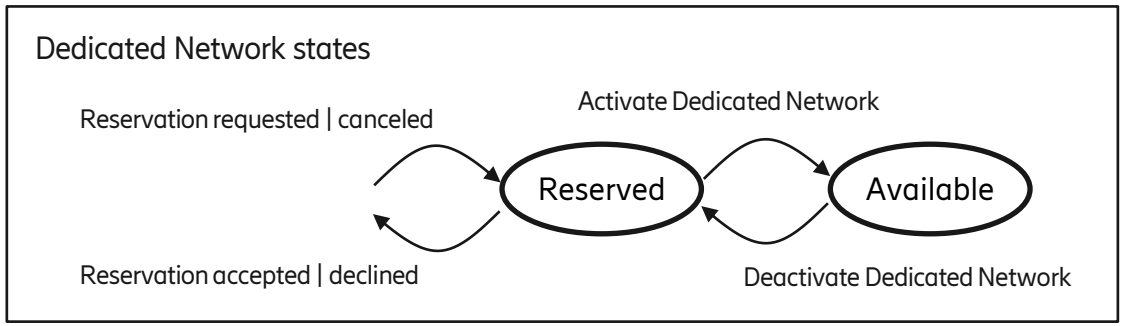
- Dedicated networks can also exist on other networks like fixed networks

Dedicated Network - Lifecycle

Initial Draft

- A dedicated network has different states
  - Reserved:
    - After some assessment, the reservation request (with its input parameters) has been accepted.
    - When the assessment fails, the reservation request is declined, potentially with some change hints
    - The network resources associated to the dedicated network are not usable while the dedicated network is in "Reserved" state
  - Available:
    - At reservation start-time, the dedicated network becomes available in the defined service area and the defined characteristics. Associated network resources are usable for devices within the service area.
    - At reservation end-time, the dedicated network becomes un-available. Associated network resources are not usable anymore for devices inside the service area.

- Devices can be added & removed in reserved and in available state (no practical effect in reserved state, since no network resources usable)



Relation to other CAMARA APIs

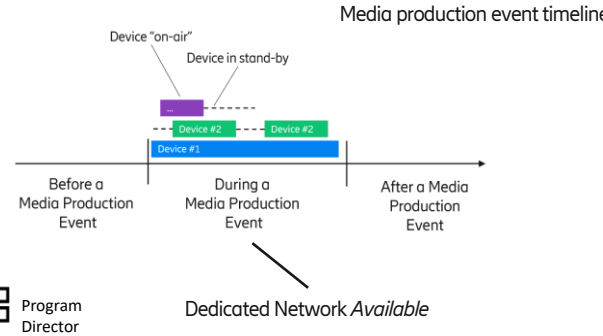
- The relation to the QOD API: The Dedicated Networks API focuses on the reservation aspects in terms of “when”, “where” and “what/how much”. The QOD API focuses on a single device or even a single connection of a device and it be complemented by the Dedicated Networks offering.
- The relation to the Network Slice Booking API can be seen as following: The Dedicated Networks API is agnostic to the underlying network realization and allows usage of different mobile and fixed networks. The Network Slice Booking API requires usage of a Network Slice Instance.
- The relation to the Site to Cloud API: The Site to Cloud API focuses on VPN solutions. It is unclear, whether there is a relation or not.
- The relation to the (proposed) Device Management API is a bit unclear. The Dedicated Networks API includes device activation aspects, controlling whether a device (with a valid SIM) has access to the Dedicated Network or not. The Device Management API influences the Device Subscription State (without defining the meaning of a state).

Use-Cases: Media Production

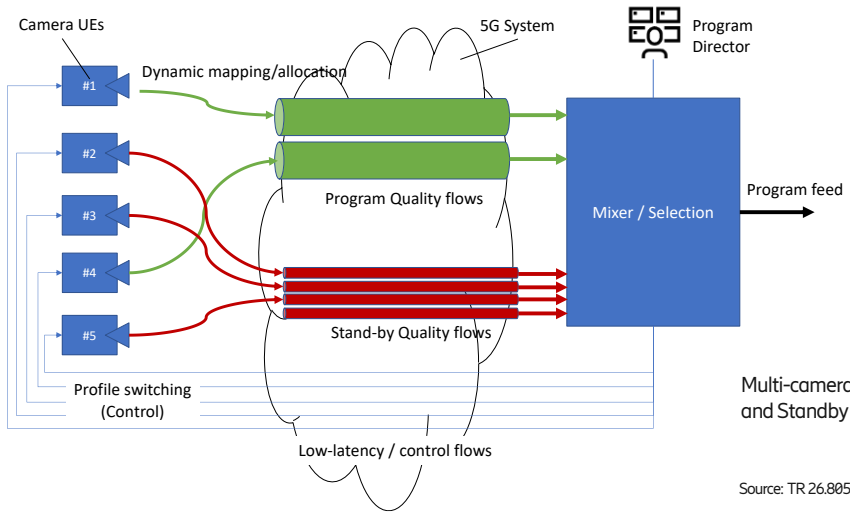
- Multiple Cameras are used within a confined area & time
  - Example: Press-briefing, where a single media producer deploys multiple cameras. The cameras may not be active all time during the event, thus, may not continuously use the same QOD profile.
  - The media producer is interested to obtain a dedicated network from a public network (with an SLA)

- At time of planning
  - The media producer is planning the event, e.g. how many cameras are needed. The media producer knows, "where" (location) and "when" (time) the event will be
  - API Input
    - The needed performance (capacity), service area, service time
    - Expected number of cameras (active, in-active or standby)
  - When accepted: A dedicated network is reserved some time before the event, a dedicated network identifier is returned, e.g. to later connect the devices...

- Only selected / authorized cameras are permitted in the dedicated network (Device Activation)
  - The media producer permits devices (subscription) to access the dedicated network
  - Device are typically prepared before the event.



Source: TR 26.805 Figure 6.4.1.2-1



Multi-camera setup showing current Program Cameras and Standby Cameras

Source: TR 26.805 Figure 6.5.1-1

Use-Case: Festival

- A dedicated network is used to connect devices (like Credit Card readers and CCTV cameras), needed for running the festival
  - Note, the dedicated network is not intended for festival audience
  - The festival organizer is interested to obtain a dedicated network from a public network (with an SLA)
  - The quality of the CCTV cameras can be switched between "matrix view" (low quality) and "single view" (high quality). An according connectivity quality is requested as needed.
- At time of planning
  - The festival organizer is planning the festival, e.g. how many Credit Card readers & CCTV cameras are needed. The festival organizer knows, "where" (location) and "when" (time) the festival will be and is interested getting a dedicated network for enabling the festival
  - API Input
    - The needed performance (capacity), service area, service time
    - Expected number of devices (active, in-active or standby)
  - When accepted: A dedicated network is reserved some time before the event
- Only selected / authorized devices are permitted in the dedicated network (Device Activation)
  - The festival organizer permits devices (subscription) to access the dedicated network
  - Device are typically prepared before the event.

Use-Case: Enterprise connectivity

- A dedicated network is used to connect devices (e.g. Laptops), of employees to corporate services
  - Note, the dedicated network is only intended for the employees, not for guests or others.
  - Different connectivity quality is just needed, e.g. during a video conference. After usage, the connectivity quality is reset.

- At time of planning
  - The Enterprise wants secure access to it's corporate services with an agreed SLA, this is required to work on any 3GPP network.
  - API Input
    - The needed performance (capacity), service area, security level, service time (possibly forever until end of contract)
    - Expected number of devices (active, in-active or standby)
  - When accepted: A dedicated network is reserved at the time indicated by the enterprise

- Only selected / authorized laptops are permitted in the dedicated network (Device Activation)
  - The enterprise permits devices (subscription) to access the dedicated network
  - Device are typically under managed control of the enterprise