Use case and Requirements for ~~SCONE~~ TRONE signaling

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Motivation

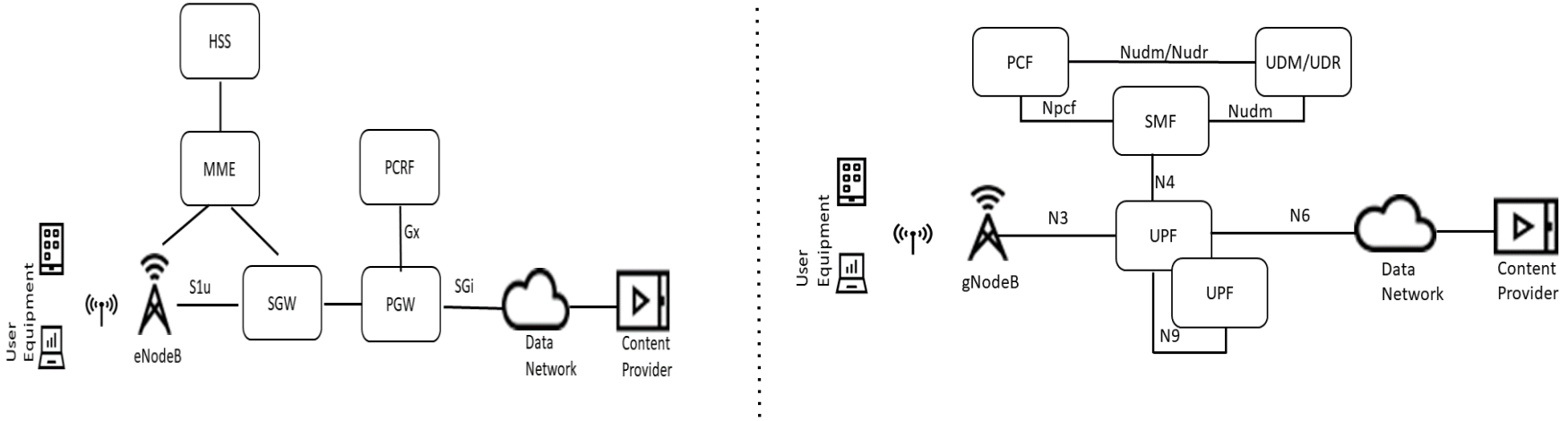
- This Internet Draft addresses one of the core premises of the charter, which is "*establish a mechanism for network elements capable of rate-limiting a UDP 4-tuple to communicate an upper bound on achievable bitrate, termed "throughput advice", to the sender of packets matching the UDP 4-tuple*."

- This draft identifies a potential network element capable of providing the throughput advice, which is the Packet Data Network Gateway or PDN-GW or PGW in the 4G mobile networks and the equivalent NE, the User Plane Function or the UPF in 5G mobile networks

- The draft provides a use case and requirements for TRONE signaling between the end-user application on the User Equipment and the mobile network element

- This draft does not specify what inputs "network element" SHOULD or MUST take into account to determine the throughput advice but the fact that PGW and/or UPF has subscriber plan and Radio Access Type provides the most common case and universality of this input across mobile carriers. There can be other inputs, but document leaves it up to mobile operators to determine any additional input they consider helps their radio spectrum use

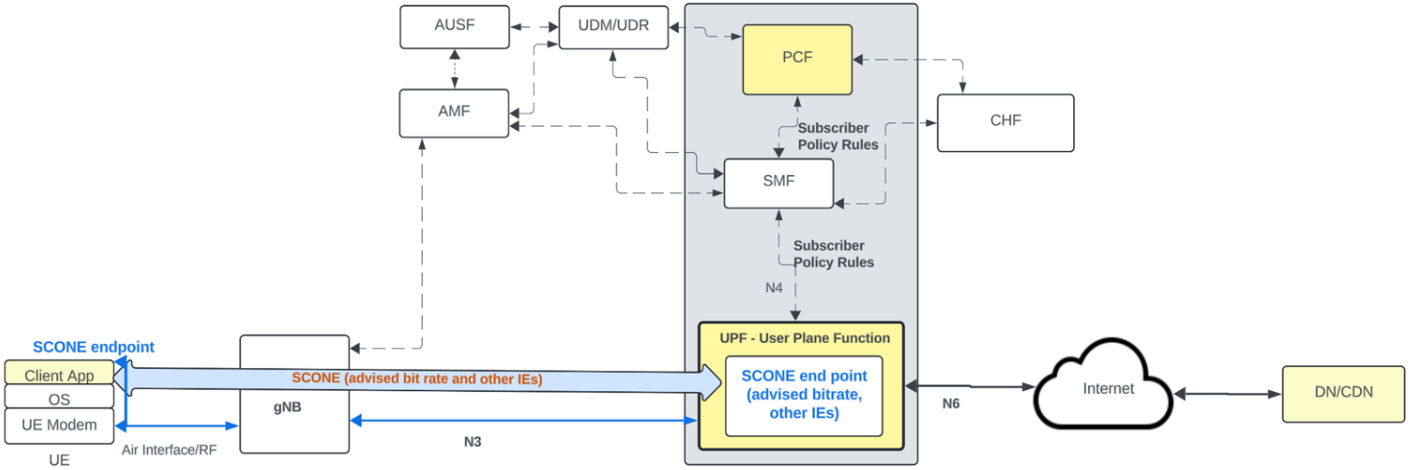
Role of PGW & UPF in 4G/5G networks



PGW (4G) and UPF (5G)

- *Allocation of User Equipment (UE) IP Address/prefix*
- *Routes and forwards packets between the RAN and the DN/Content Provider*
- *Packet inspection*
- *Policy and Charging rule enforcement*
- *QoS handling for user plane, e.g. rate enforcement, Traffic usage reporting*
- *Allocation of UE IP address/prefix*

TRONE Signal between client-app-endpoint and Network-Element: 5G Mobile Network



- UPF is the 3GPP on-path “network element” for routing & forwarding application packets between the UE, the RAN and the internet **(N3 + N6 interfaces)**
- UPF has access to subscriber policy via standard 3GPP **N4** interface
- TRONE signaling would use IP tuples of the flow for which advisory bit-rate is sent
- TRONE signal to be sent over the PDU session (**N3** interface + Air Interface) that is carrying that IP flow

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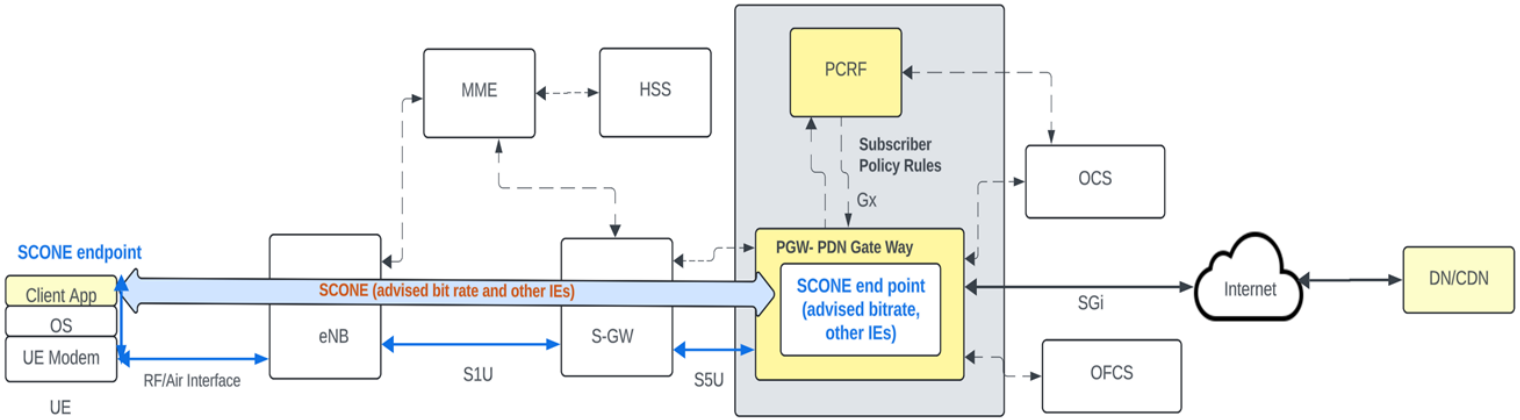
TRONE Signal between client-app-endpoint and Network-Element: 4G Mobile Network

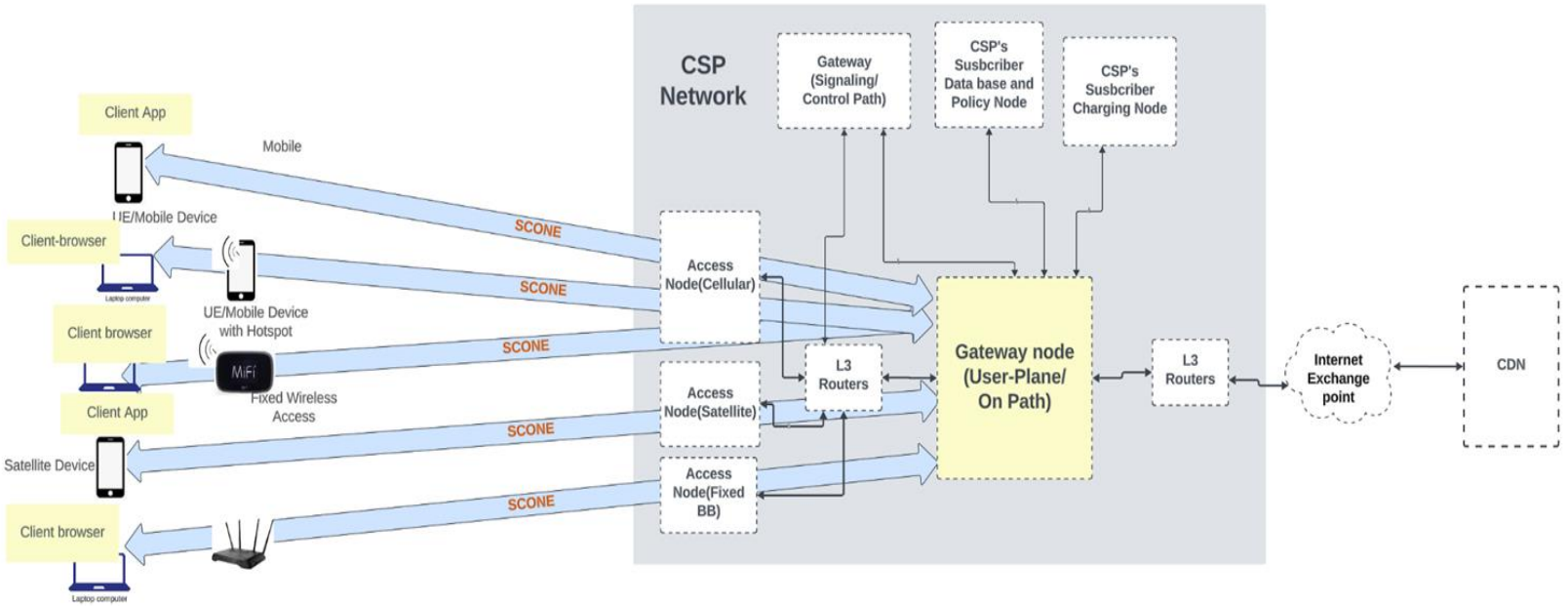


PGW provides similar functionality in the 4G network

Requirements

- TRONE signal MUST be a client-application endpoint initiated to assist the network element (UPF/5G or PGW/4G) with the implicit flow detection
- UPF/P-GW SHOULD send "throughput advice" and other metadata using on-path TRONE signaling to the client-application-endpoint based on subscriber data-plans
- Client-application endpoint SHOULD send acknowledgement receipt of throughput advisory signal from the network element using the TRONE signal
- TRONE signaling MUST NOT require changes to how a CSP determines its video policy for a given flow. (No dependency between a CSP’s video policy and the TRONE protocol)
- Dynamic update - "throughput advice" MAY change during the ongoing flow and UPF/PGW SHOULD be able to send "throughput advice" to client-application-endpoint as soon as possible
- Applications SHOULD self-adapt the video flow max bit-rate to "throughput advice" value
- TRONE signal MUST be extensible to networks beyond 4G/5G network

TRONE Generic Architecture (Access Agnostic)



Yes, can be extended beyond mobile networks

Questions to SCONE working group

- Is the working group interested in using this document as a use case and requirements?
- Is the working group interested in adopting this document as a working group document?

Thank you