

Mobile User Plane Evolution

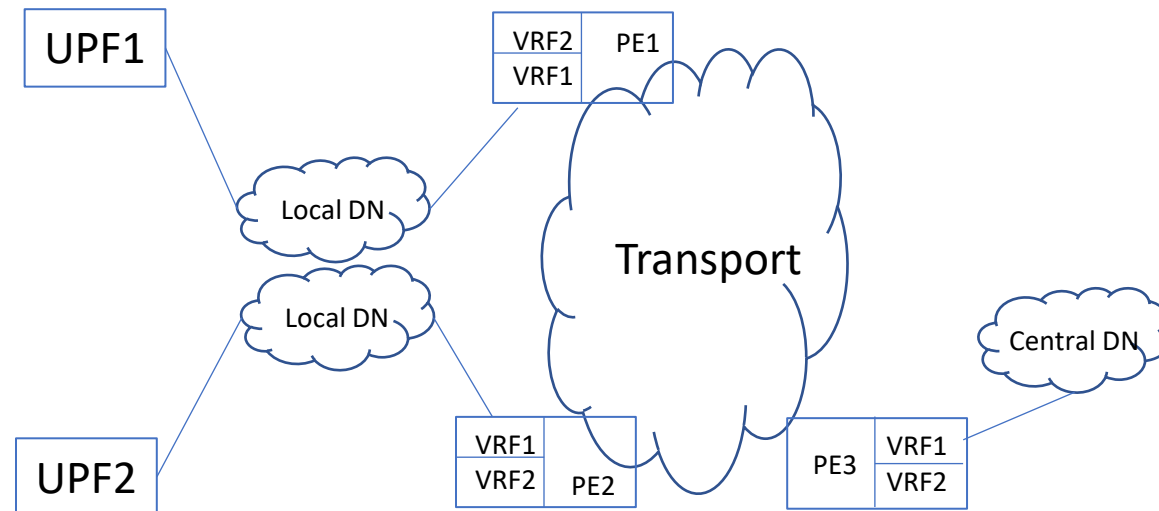
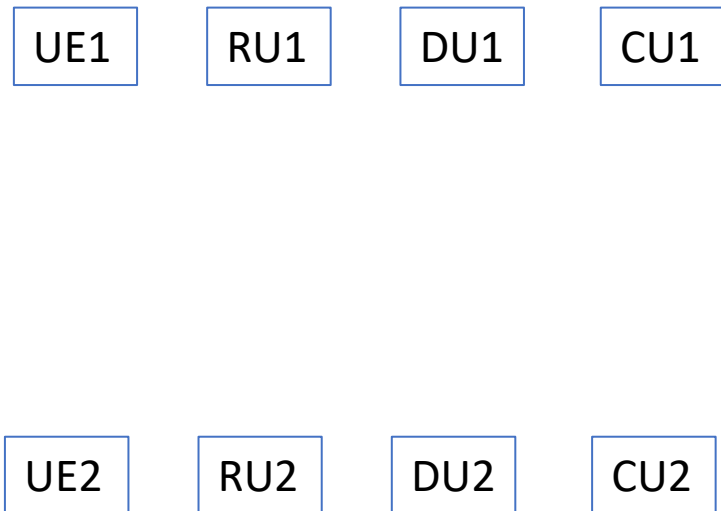
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5G User Plane

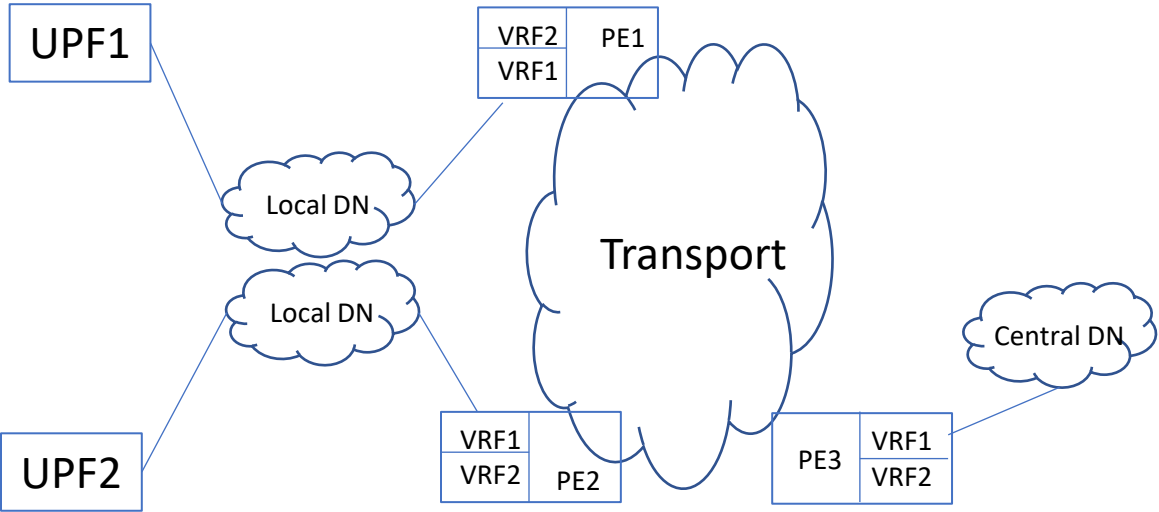
- **Mobile Communication Network (MCN): RAN + CN**
 - **Radio Access Network (RAN)**
 - A network of radio access components (gNB) that terminate the air interface from UEs
 - Decomposed RAN with RU/DU/CU split
 - **Core Network (CN)**
 - The brain of an MCN; to enable and implement mobile services
- **User Plane: data plane that carries mobile user traffic**
 - Spans from UE to RU/DU/CU (RAN) to UPF (CN)
 - **User Plane Function (UPF)** is a NF in CN – like a BNG
 - Routing/switching between UE and the Data Network (DN) – SDN style
- **Distributed UPFs co-located with CUs**
 - For MEC, private 5G, and local Internet peering
 - Requires distributed DN – implemented as VPN (DNVPN)

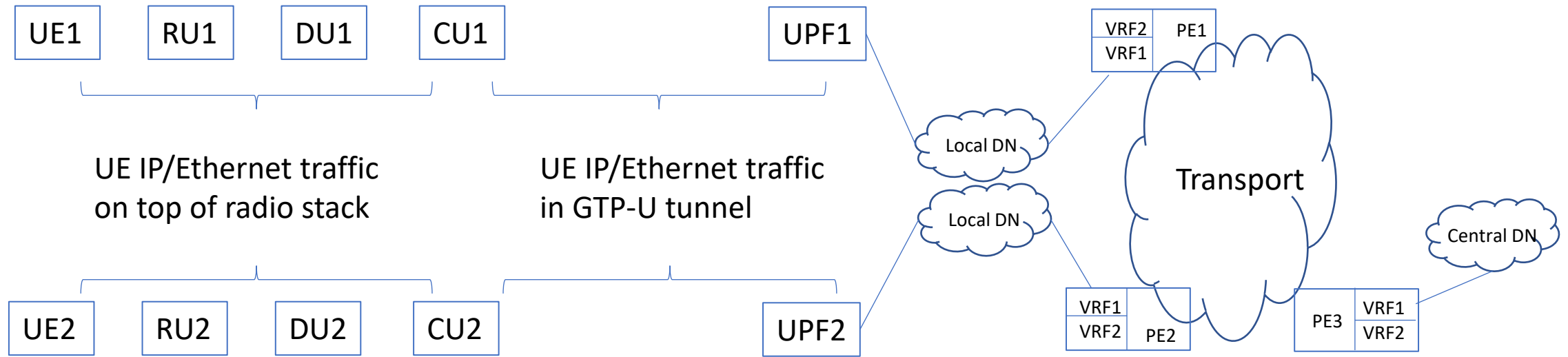


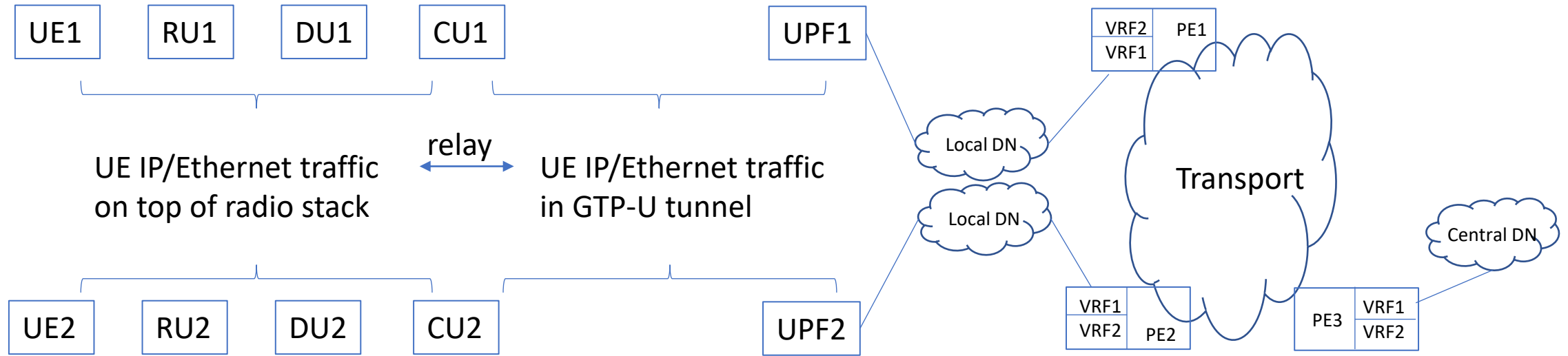
Animation
In use

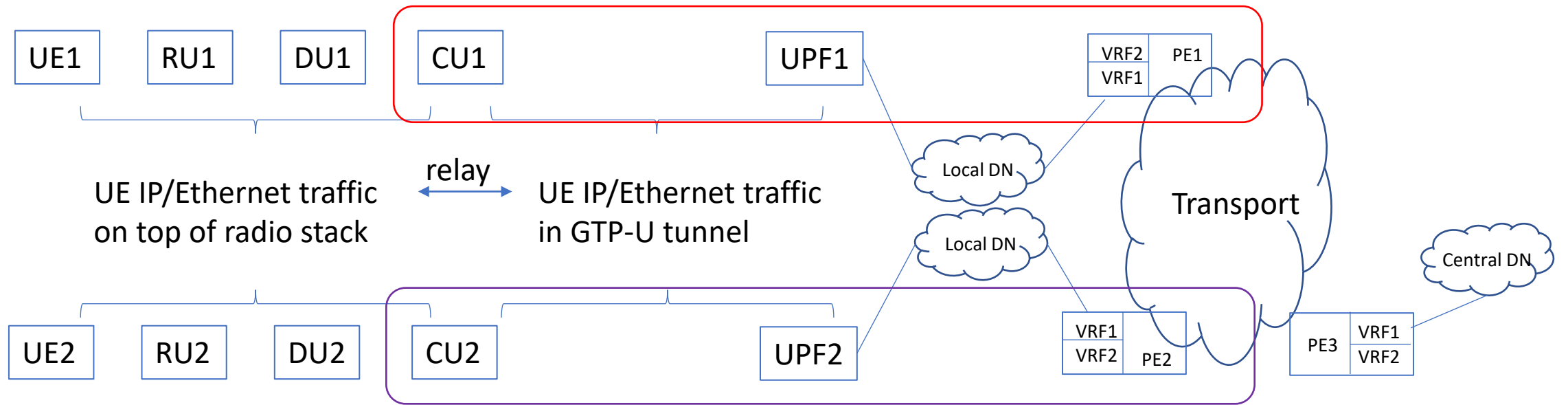


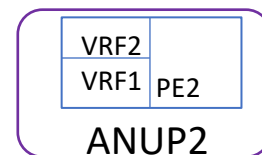
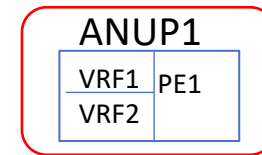
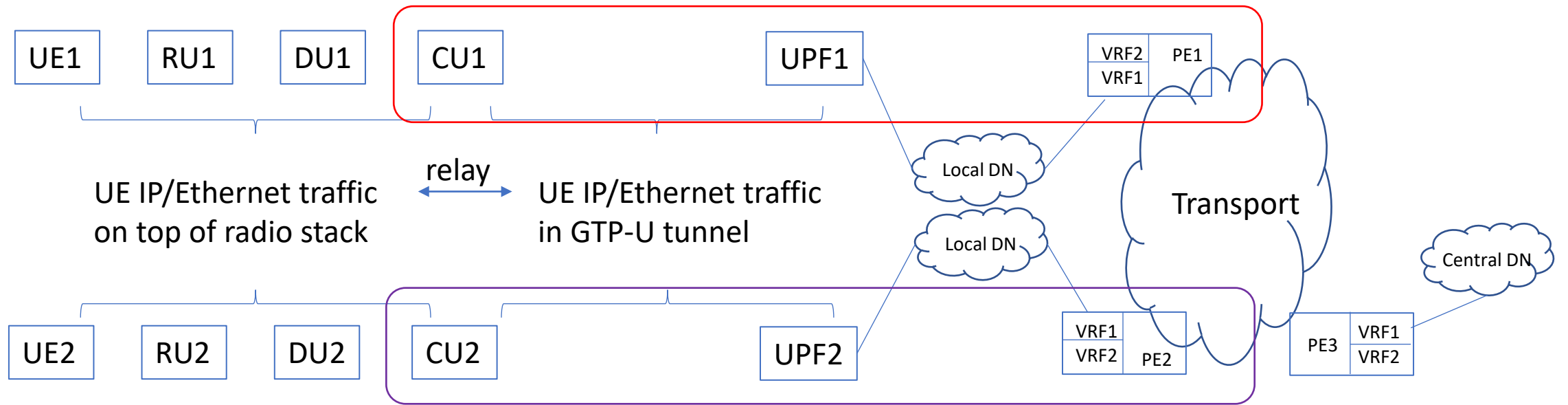
UE IP/Ethernet traffic
on top of radio stack

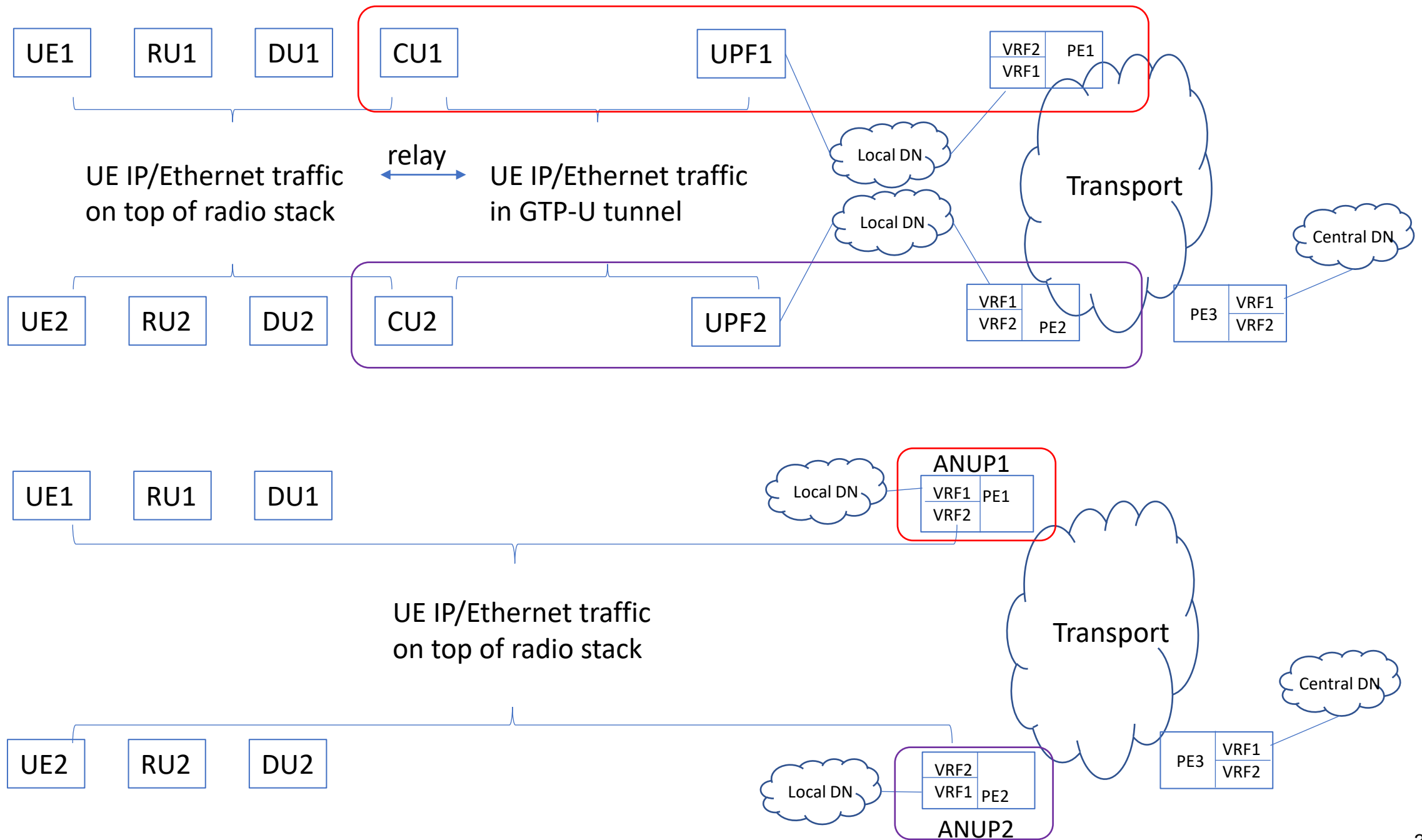










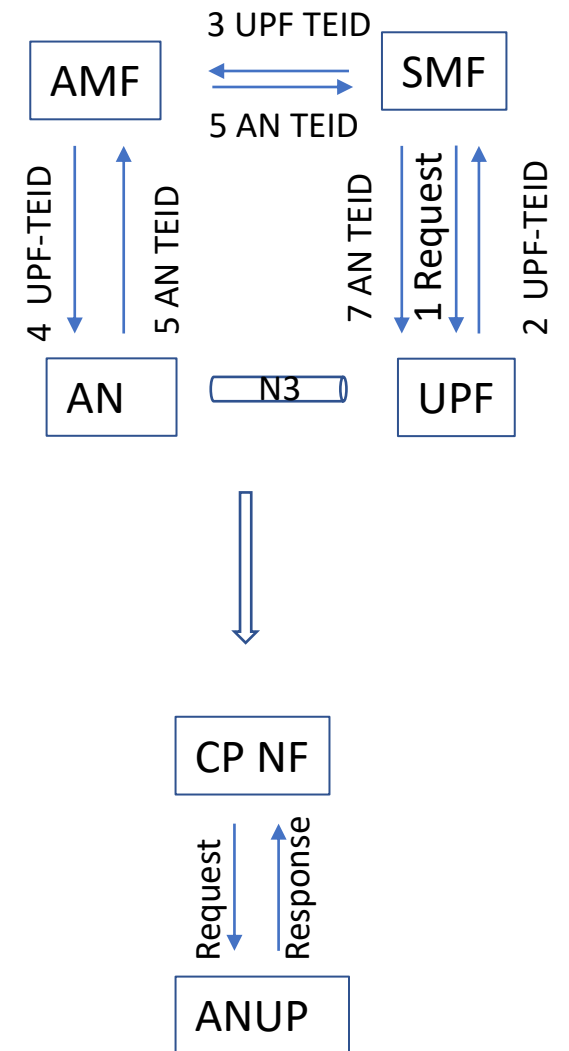


Integrating gNB-CU and UPF

- ANUP: AN (gNB-CU) and UPF functions integrated into a single NF
 - Optionally with DNVPN PE function integrated
 - Integration when desired/feasible, separation when required
- A router/switch with wireless/wired connections
 - 3GPP/wireless technologies for wireless access, just like:
 - IEEE technologies for Ethernet connection to a router
 - WIFI technologies for WIFI connection to a router
 - IETF/IEEE/wireline technologies for the rest:
 - Routing/switching
 - VPN/EVPN/whatever features/services as currently in wireline world

Advantages

- Simplified signaling and optimized data plane
 - No more N3 (GTP-U) tunneling
 - The need for N3 tunneling was due to central UPFs
 - 7-step signaling involving 4 NFs and 3 interfaces reduced to 2-step signaling
- Unified architecture for wireline/wireless
 - A router/switch with wireless/wired connections
 - Many 5G special features/procedures are not needed anymore or can be greatly simplified
 - MEC, 5MBS, LAN-type services, etc.



Will 3GPP Accept Integrated ANUP?

- It seems a natural evolution
 - To people familiar/friendly with IETF/wireline technologies
 - But a big paradigm shift on 3GPP/wireless side
- But the work is to be done in 3GPP
- Trying to get support from mobile operators
 - Socializing the idea first among their IETF/wireline people on mobile side
- Will bring to 3GPP if we get enough support
 - The work is on 3GPP not IETF side