



SA2 Standards work on Edge Computing

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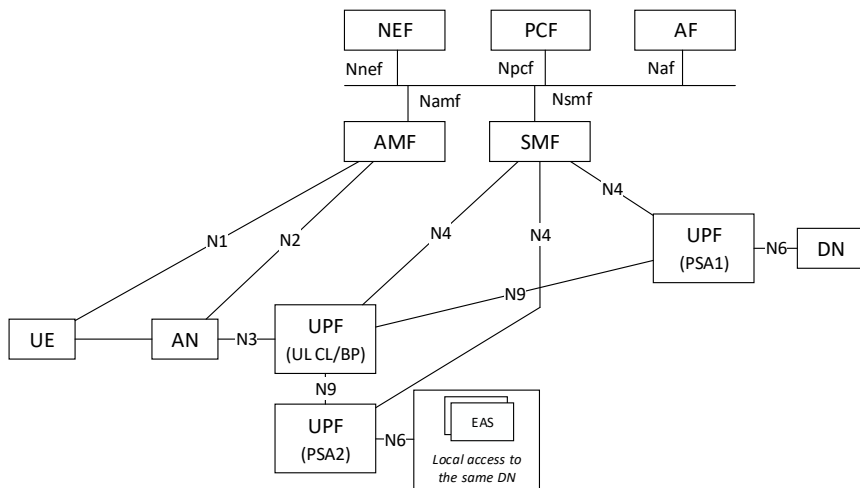
Edge Computing support in 5GC (Rel-15)



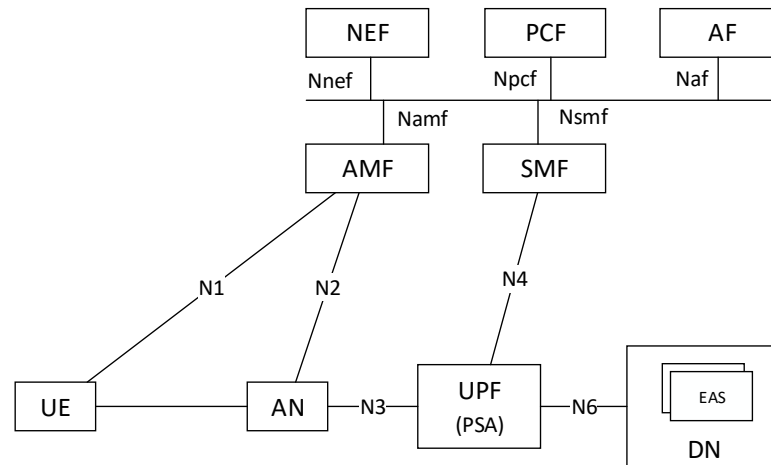
- 📶 **User plane (re)selection:** the 5G Core Network (re)selects UPF to route the user traffic to the local Data Network.
- 📶 **Local Routing and Traffic Steering:** the 5G Core Network selects the traffic to be routed to the applications in the local Data Network. This includes the use of a single PDU Session with multiple PDU Session Anchor(s) (UL CL / IP v6 multi-homing).
- 📶 **Session and service continuity** to enable UE and application mobility.
- 📶 An Application Function may influence UPF (re)selection and traffic routing via PCF/NEF
- 📶 **Network capability exposure:** 5G Core Network and Application Function to provide information to each other via NEF.
- 📶 **QoS and Charging:** PCF provides rules for QoS Control and Charging for the traffic routed to the local Data Network.
- 📶 **Support of Local Area Data Network:** 5G Core Network provides support to connect to the LADN in a certain area where the applications are deployed.

Edge Computing integration with 5GS

Relationship between 5GS and Edge Application Servers (EAS) hosted in Edge Hosting Environment – Both scenarios of accessing EAS with and without Uplink Classifier (UL CL)/BP are considered.



Accessing Edge Application Server with UL CL/BP



Accessing Edge Application Server without UL CL/BP

5GC Connectivity Models for Edge Computing

📶 Distributed Anchor Point:

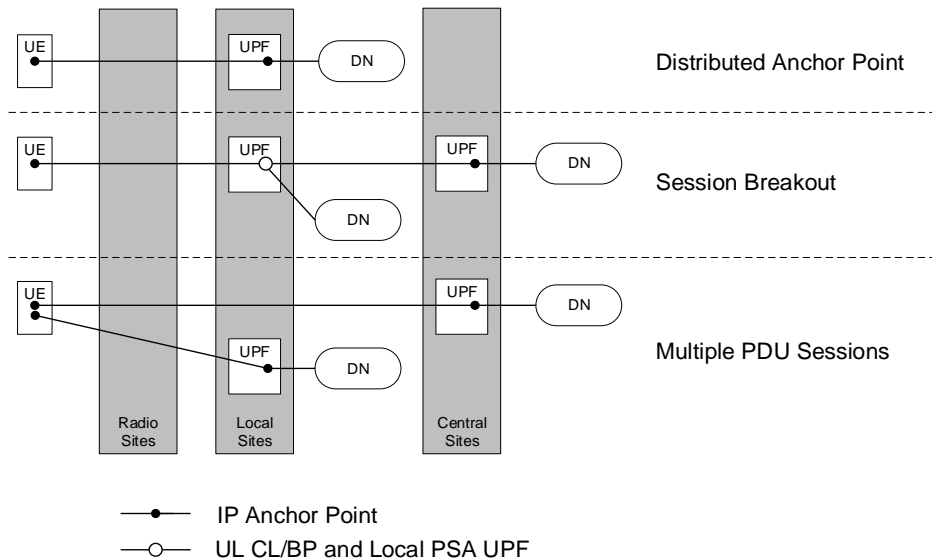
- PSA UPF is in the local site, i.e., close to the UE location
- Re-anchoring (SSC#2 and SSC#3) is used to optimize routing.

📶 Session Breakout:

- C-PSA is in a central site; L-PSA is in the local site
- The Edge Computing application traffic is selectively diverted to the L-PSA UPF using UL CL/BP.

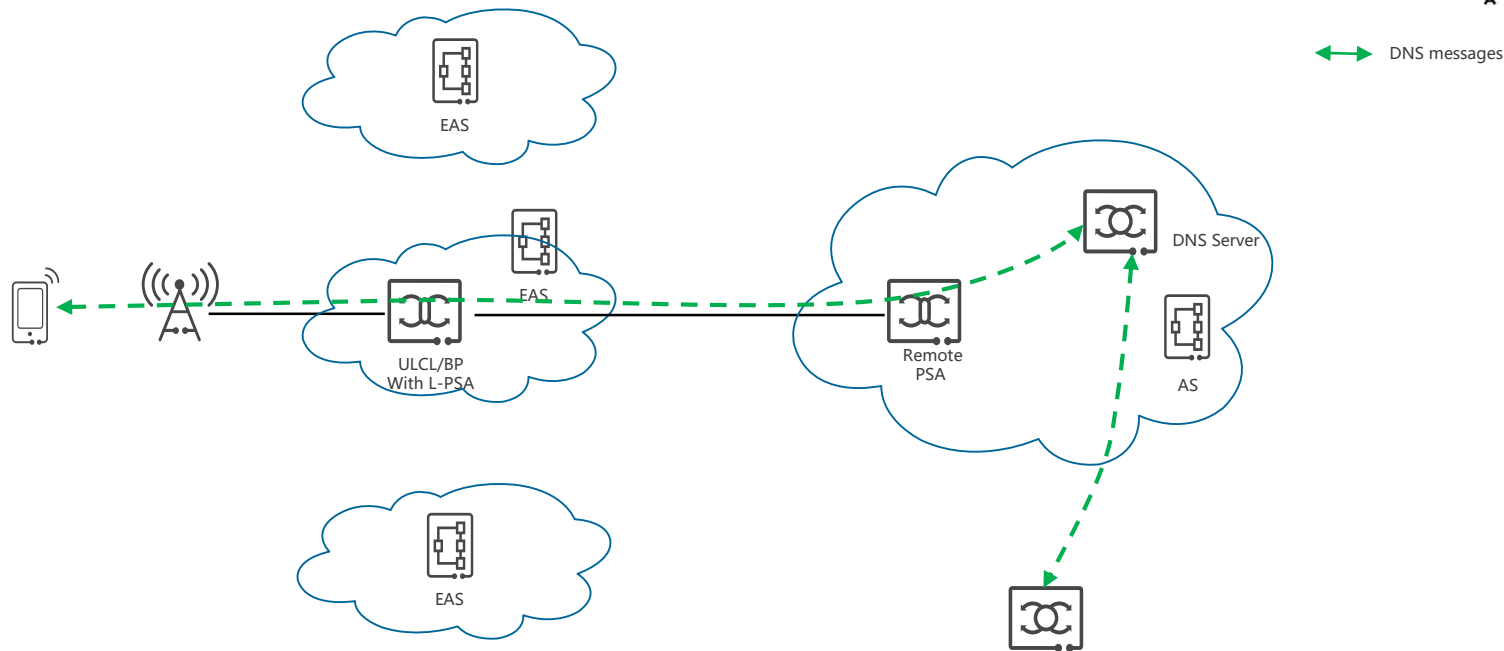
📶 Multiple PDU sessions:

- Edge Computing applications use PDU Session with a PSA UPF in the local site. The rest of applications use PDU Session with C-PSA UPF.
- The L-PSA UPF may be changed due to e.g., UE mobility and using SSC mode 3 with multiple PDU Sessions.



5GC Connectivity Models for Edge Computing

KI#1 Discovery of Edge Application Server



Discovery of IP address of Edge Application Server (EAS) deployed in Edge Hosting Environment in case application layer solutions are not applicable.

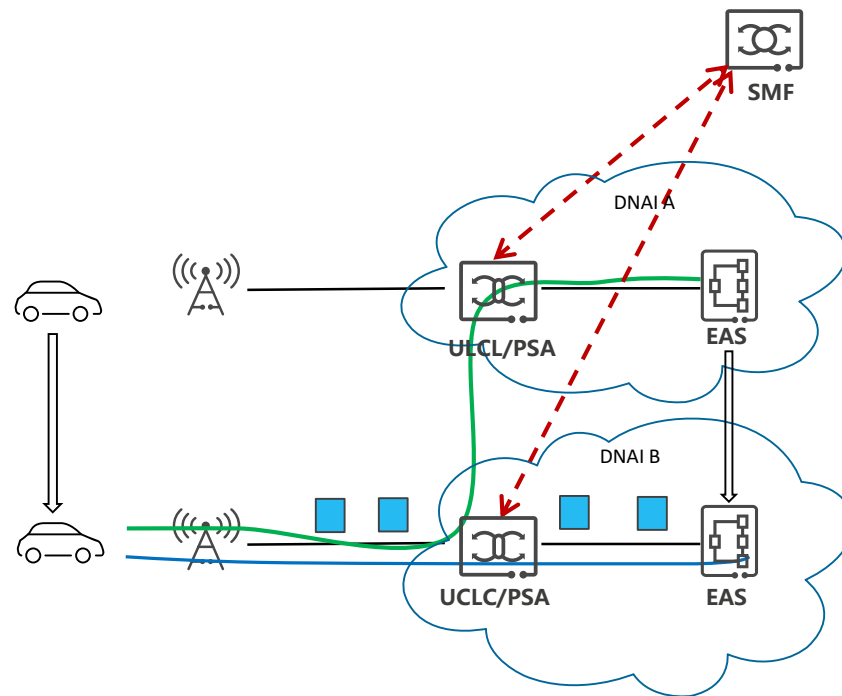
KI#2 Edge Relocation

📶 Edge relocation with UE/EAS IP change.

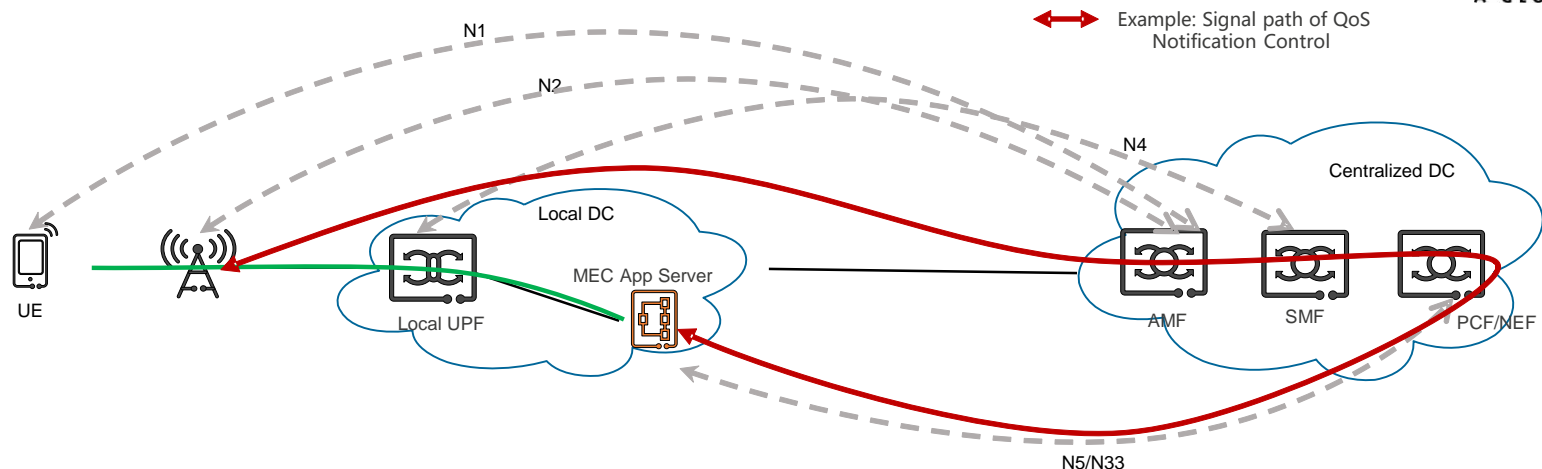
- Non-seamless relocation, how to trigger the UE to connect to the new EAS. (related to EAS re-discovery in KI#1)
- Seamless relocation, proxy-based solution are needed to allow the TCP/UDP connection works between new IPs.

📶 Edge relocation without UE/EAS IP change.

- Non-seamless relocation, already supported by using N6 routing policy.
- Seamless relocation, mechanisms to ensure the packet lossless during edge relocation.



KI#3 Localized network information provisioning



How to efficiently (with a low delay) provide local applications with information on e.g. the expected QoS of the data path;

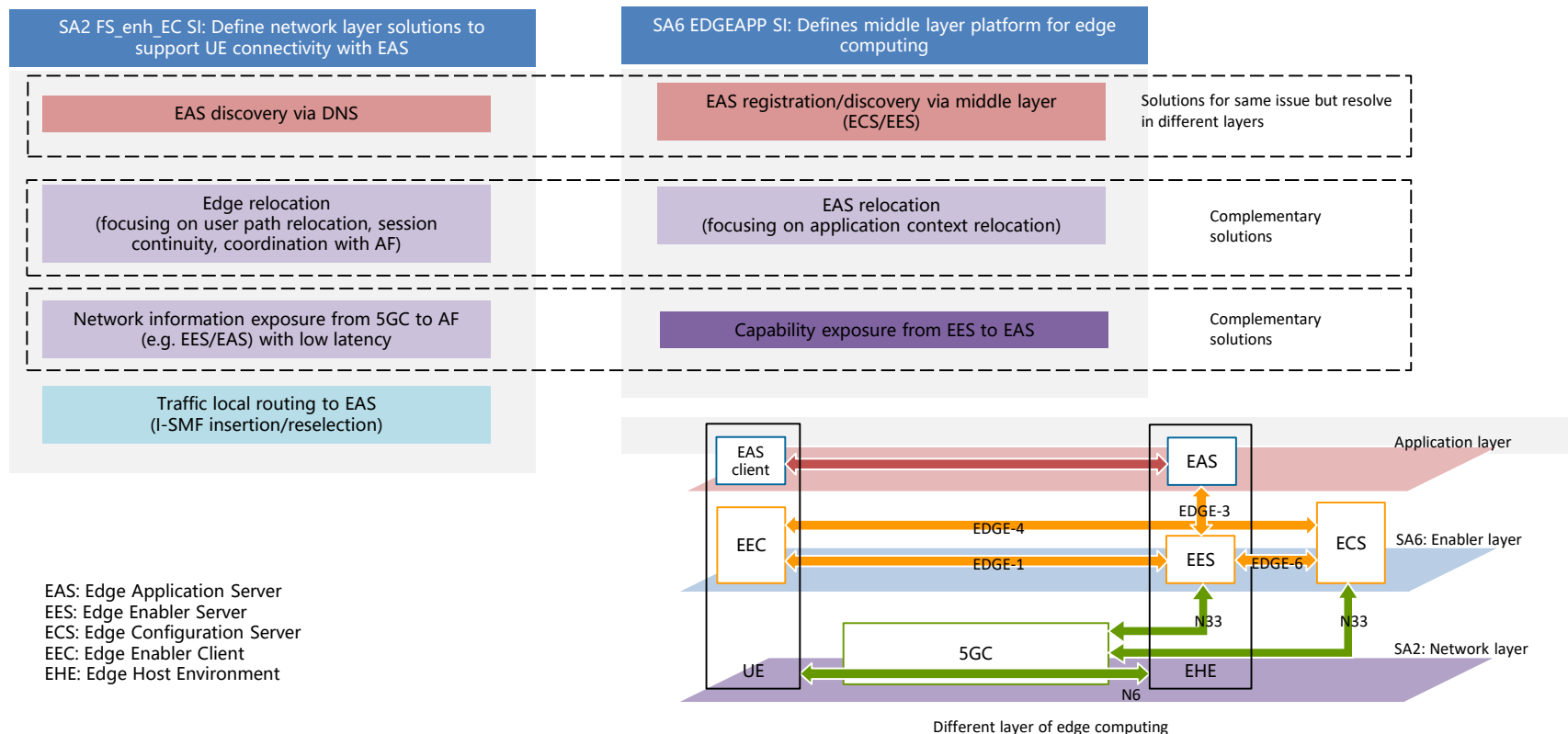
- ✓ Current network capability exposure are based on multiple CP NFs, e.g., AMF, SMF, PCF and NEF. These CP NFs are most likely be deployed at a “high” location to avoid frequently relocation. However, this means current network capability exposure (via AMF and NEF) are relative slow and non-optimized.
- ✓ Some simple applications (e.g., video stream server) are stateless, hence cannot invoke network exposure APIs to get the network information.
- ✓ An localized/enhanced network capability exposure need to be investigated to meet the requirements of MEC APP servers.

KI#5 Activating the traffic routing towards Local DN per AF request



- How to activate the traffic routing towards Local Data Network when the SMF does not support the requested DNAI, or
- For ETSUN case both SMF and I-SMF do not support the requested DNAI in the AF request.

Relationship of SA2 and SA6 EC studies



Current Status

WI Code	Study/Work Item Title	WP	Target Date	WID#
FS_enh_EC	Study on enhancement of support for Edge Computing in 5GC	100%	Dec, 20	SP-200093
eEdge_5GC	Enhancement of support for Edge Computing in 5G Core network	60%	Jun, 2021	SP-201107

- SA2 (Stage-2) normative work is 60% complete. Target stage-2 freeze date is June-2021.
- Stage-3 is expected to finish by Mar-2022.
- Relevant Specifications - TR 23.748, TS 23.548, TS 23.501, TS 23.502, TS 23.503



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