OMEC towards 5GC

gslab

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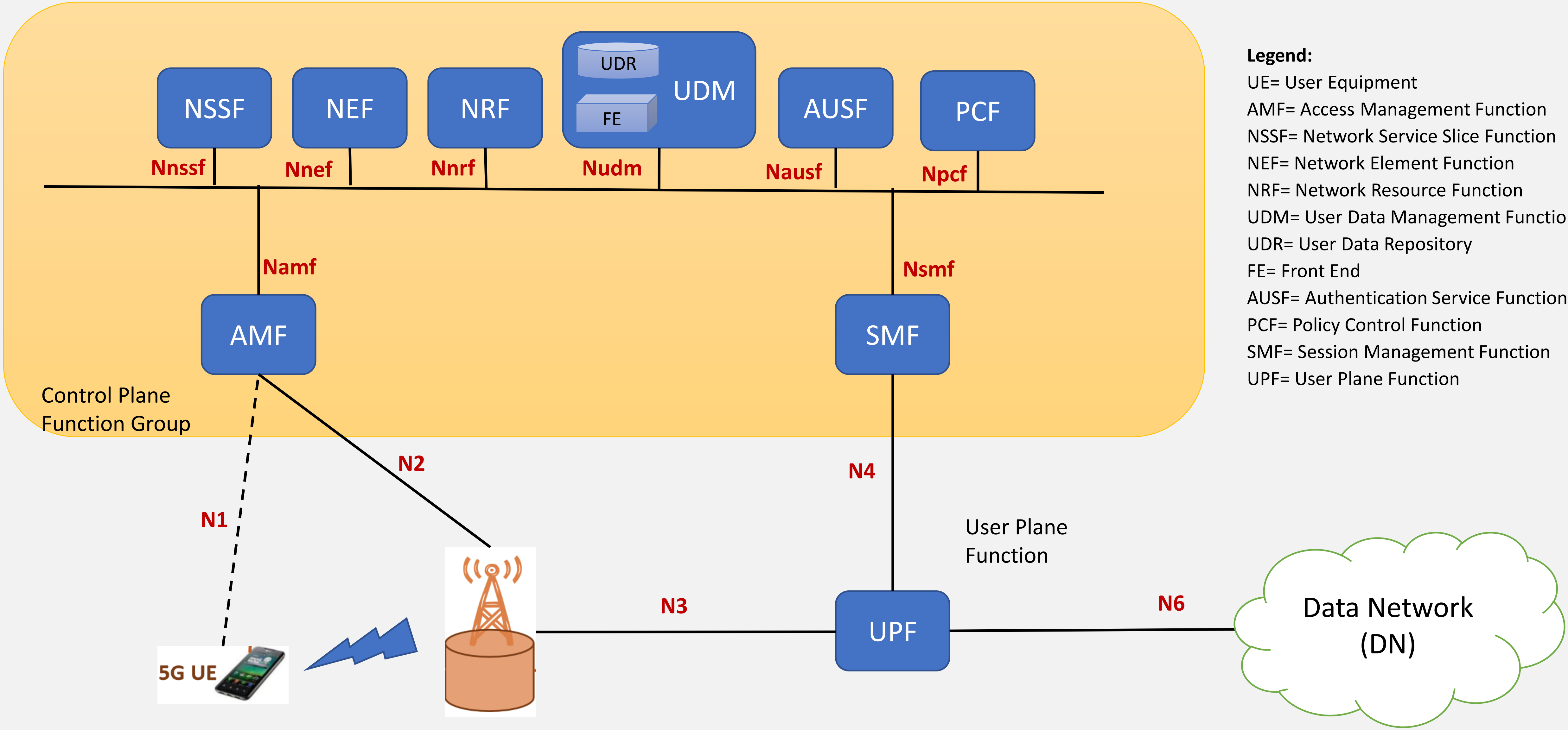
Core Design Considerations

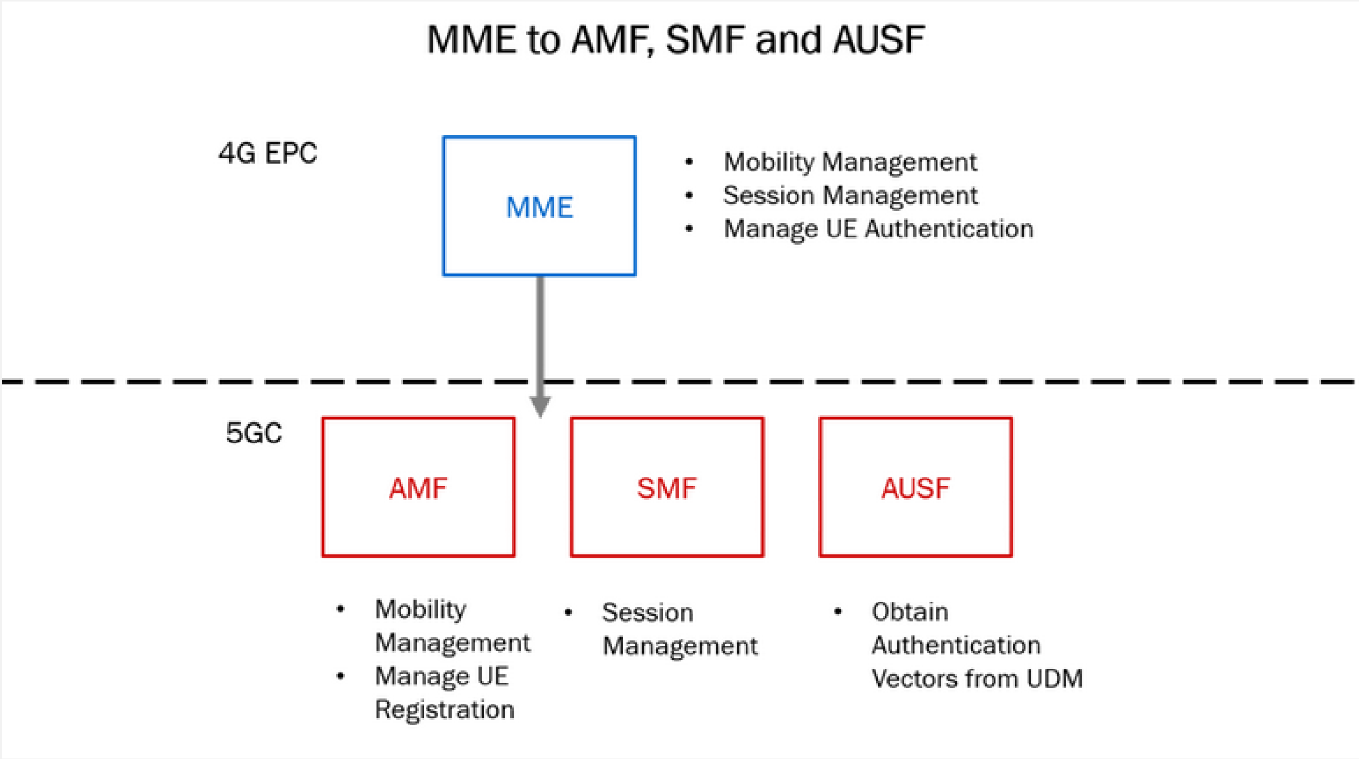
- **Backward & Forward Compatibility**
- **Deployment consideration**
  - **Cloud native**
    - Getting to market faster
  - **Private Cloud/supports multi cloud providers**
    - need to consider/implement all the aspect of the dependent services scalability, ha etc.
- **Performance(TPS,PPS)**
- **Scalability. Horizontal/Vertical**
- **Load balancing/Slicing.**
- **High availability.**
  - restoration procedure
- **Security**
- **Infrastructure monitoring/logging(OSS).**
- **Troubleshooting tools**
- **Micro-services architecture**
  - All the components should be independent and should be loosely coupled.
  - Communication over REST or HTTP/2 or Message Bus (kafka)
  - DB/Cache cluster/replica.
  - Service discovery.

5GC SBA Architecture


NSSF
NEF
NRF
UDR
FE
UDM
AUSF
PCF
Nnssf
Nnef
Nnrf
Nudm
Nausf
Npcf
Namf
Nsmf
AMF
SMF
Control Plane Function Group
N2
N4
N1
User Plane Function
N3
N6
5G UE
UPF
Data Network (DN)

Legend:
UE= User Equipment
AMF= Access Management Function
NSSF= Network Service Slice Function
NEF= Network Element Function
NRF= Network Resource Function
UDM= User Data Management Function
UDR= User Data Repository
FE= Front End
AUSF= Authentication Service Function
PCF= Policy Control Function
SMF= Session Management Function
UPF= User Plane Function

5GC NF compared to 4G LTE Core



MME to AMF, SMF and AUSF

4G EPC

MME

- Mobility Management
- Session Management
- Manage UE Authentication

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AMF

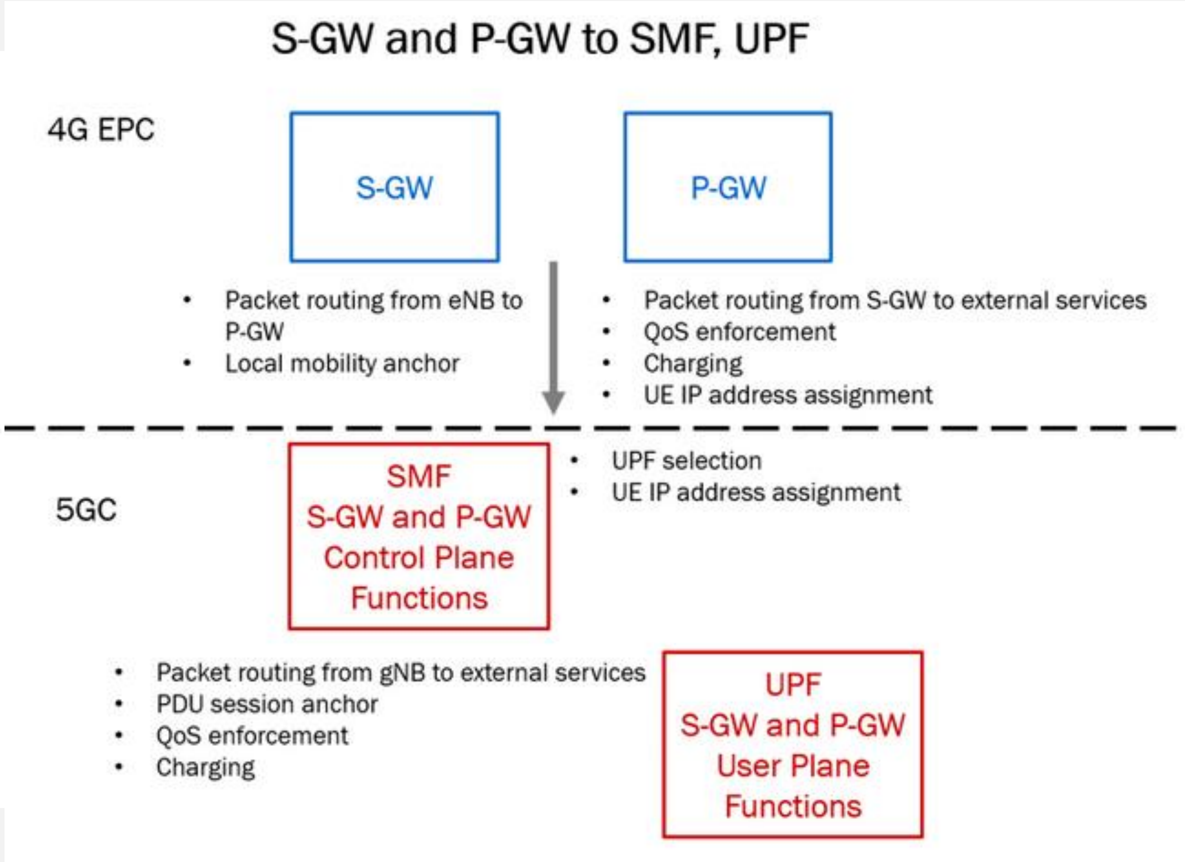
- Mobility Management
- Manage UE Registration

SMF

- Session Management

AUSF

- Obtain Authentication Vectors from UDM



S-GW and P-GW to SMF, UPF

4G EPC

S-GW

- Packet routing from eNB to P-GW
- Local mobility anchor

P-GW

- Packet routing from S-GW to external services
- QoS enforcement
- Charging
- UE IP address assignment

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SMF S-GW and P-GW Control Plane Functions

- UPF selection
- UE IP address assignment

UPF S-GW and P-GW User Plane Functions

- Packet routing from gNB to external services
- PDU session anchor
- QoS enforcement
- Charging

Reference : https://www.awardsolutions.com/portal/shareables/what-is-5G/5G-Training-Online/discover-5g-core-network-functions-compared-4g-lte

5GC AMF Reference Model

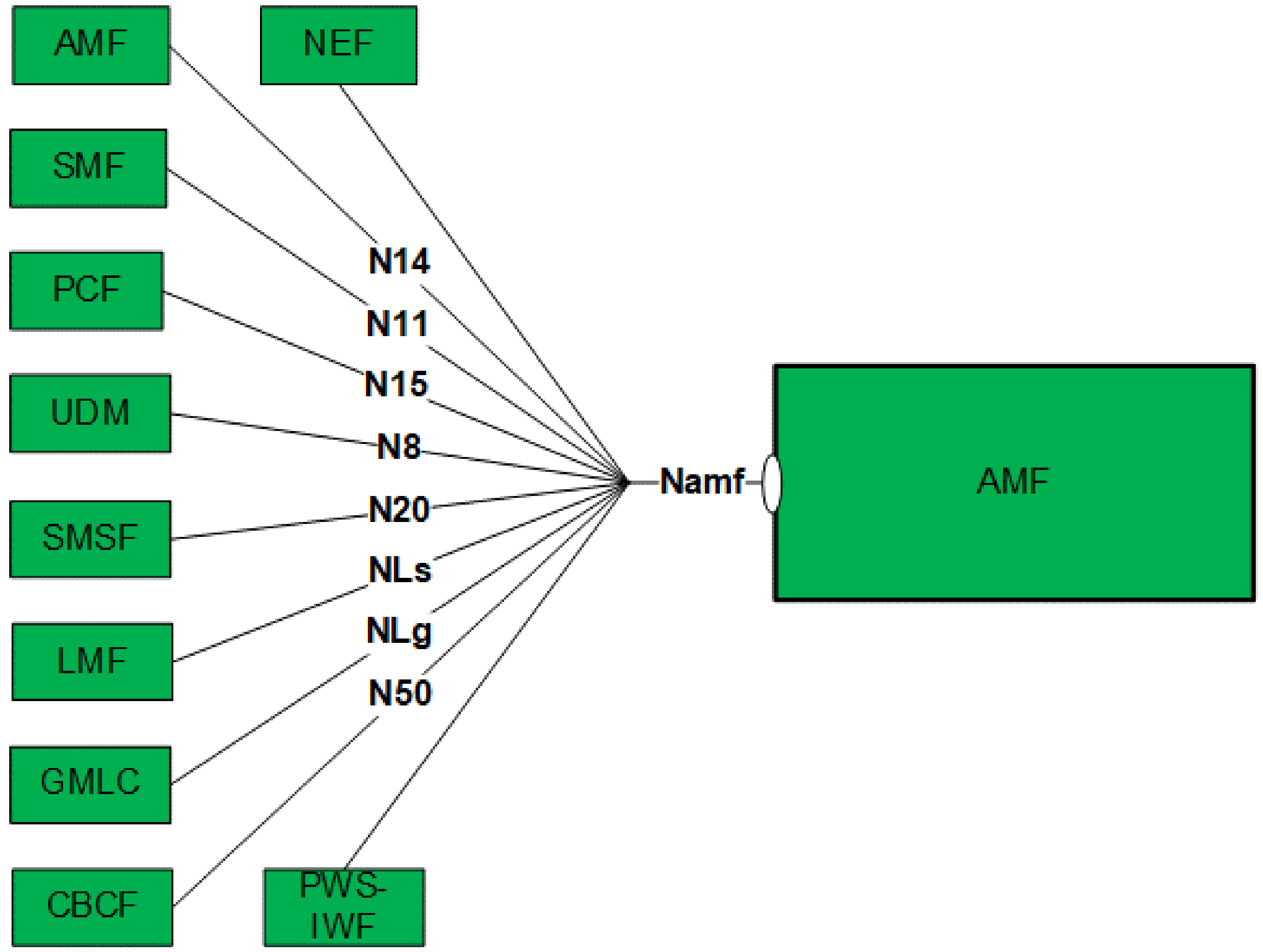
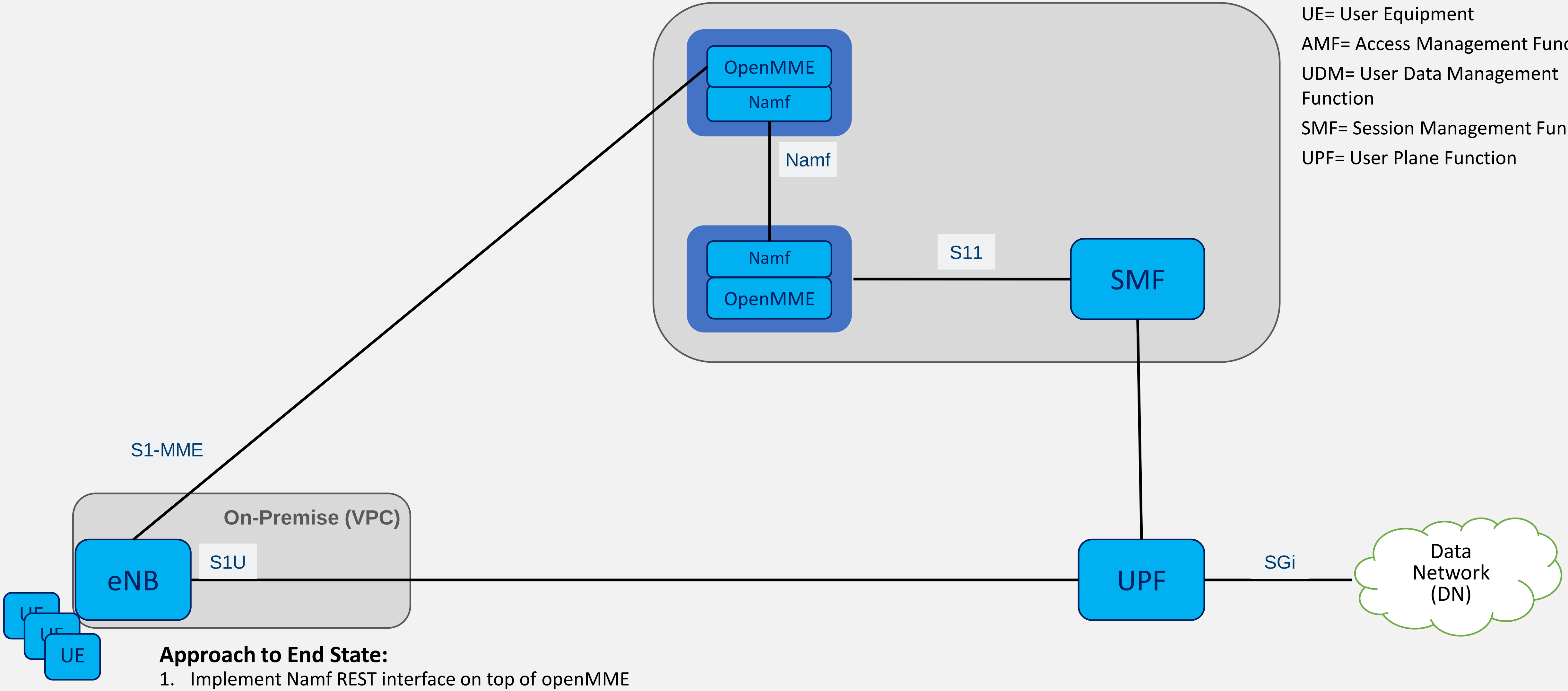

AMF
NEF
SMF
PCF
UDM
SMSF
LMF
GMLC
CBCF
PWS-IWF
N14
N11
N15
N8
N20
NLs
NLg
N50
Namf
AMF

Figure 4.1-1: Reference model – AMF

OMEC MME to AMF : Phase I


OpenMME
Namf
Namf
Namf
OpenMME
S11
SMF
S1-MME
On-Premise (VPC)
eNB
S1U
UPF
SGi
Data Network (DN)
UE
UE
UE

Legend:

UE= User Equipment

AMF= Access Management Function

UDM= User Data Management Function

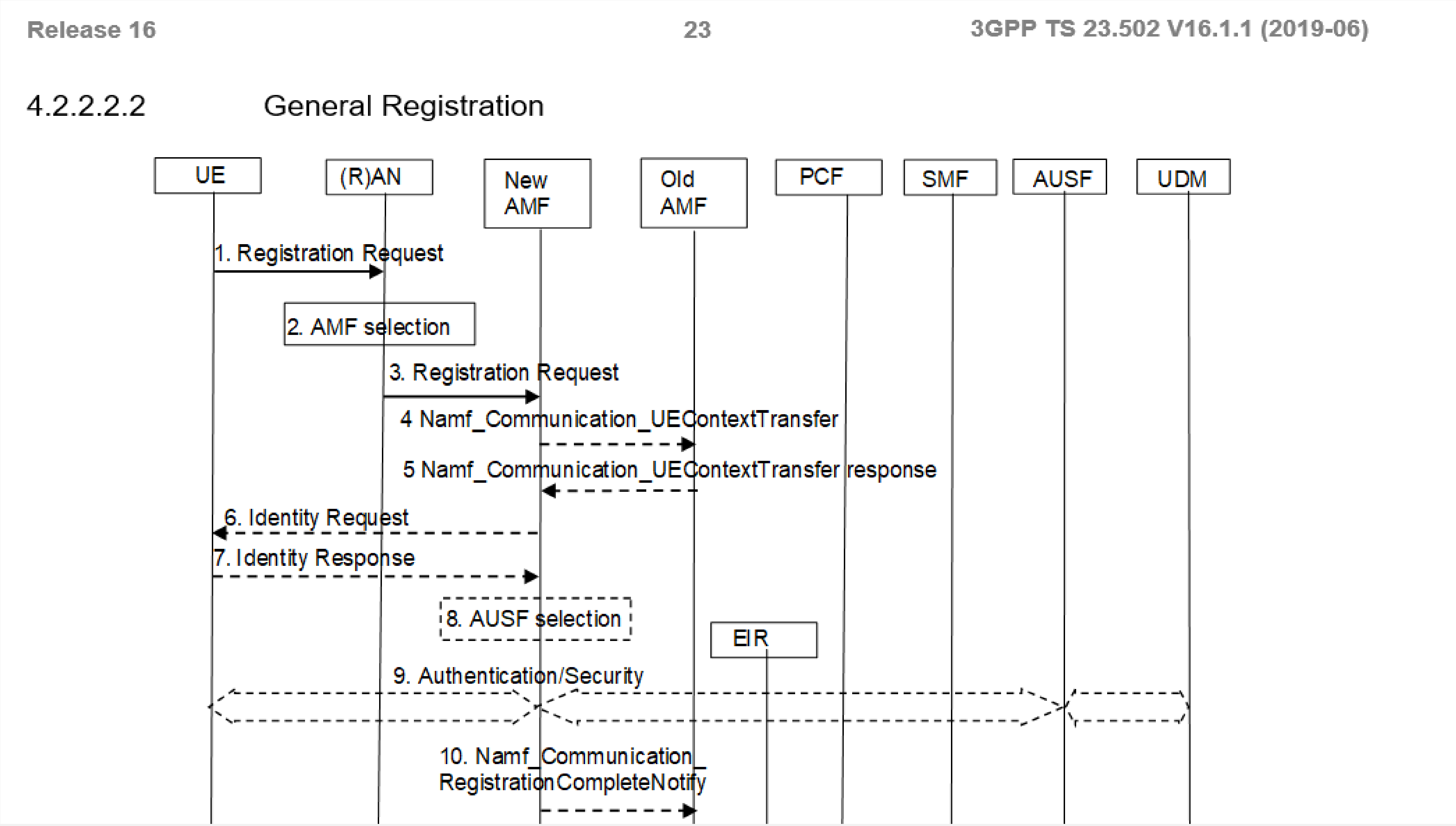
SMF= Session Management Function

UPF= User Plane Function

Approach to End State:

1. Implement Namf REST interface on top of openMME
2. Keep S1-MME/S1AP,S11 unchanged
3. Next phase : implement N1/N2 - NGAP

AMF : Registration flow



Release 16 23 3GPP TS 23.502 V16.1.1 (2019-06)

4.2.2.2.2 General Registration

UE
(R)AN
New AMF
Old AMF
PCF
SMF
AUSF
UDM
1. Registration Request
2. AMF selection
3. Registration Request
4 Namf_Communication_UEContextTransfer
5 Namf_Communication_UEContextTransfer response
6. Identity Request
7. Identity Response
8. AUSF selection
EIR
9. Authentication/Security
10. Namf_Communication_RegistrationCompleteNotify

OMEC MME to AMF : Phase II

Legend:

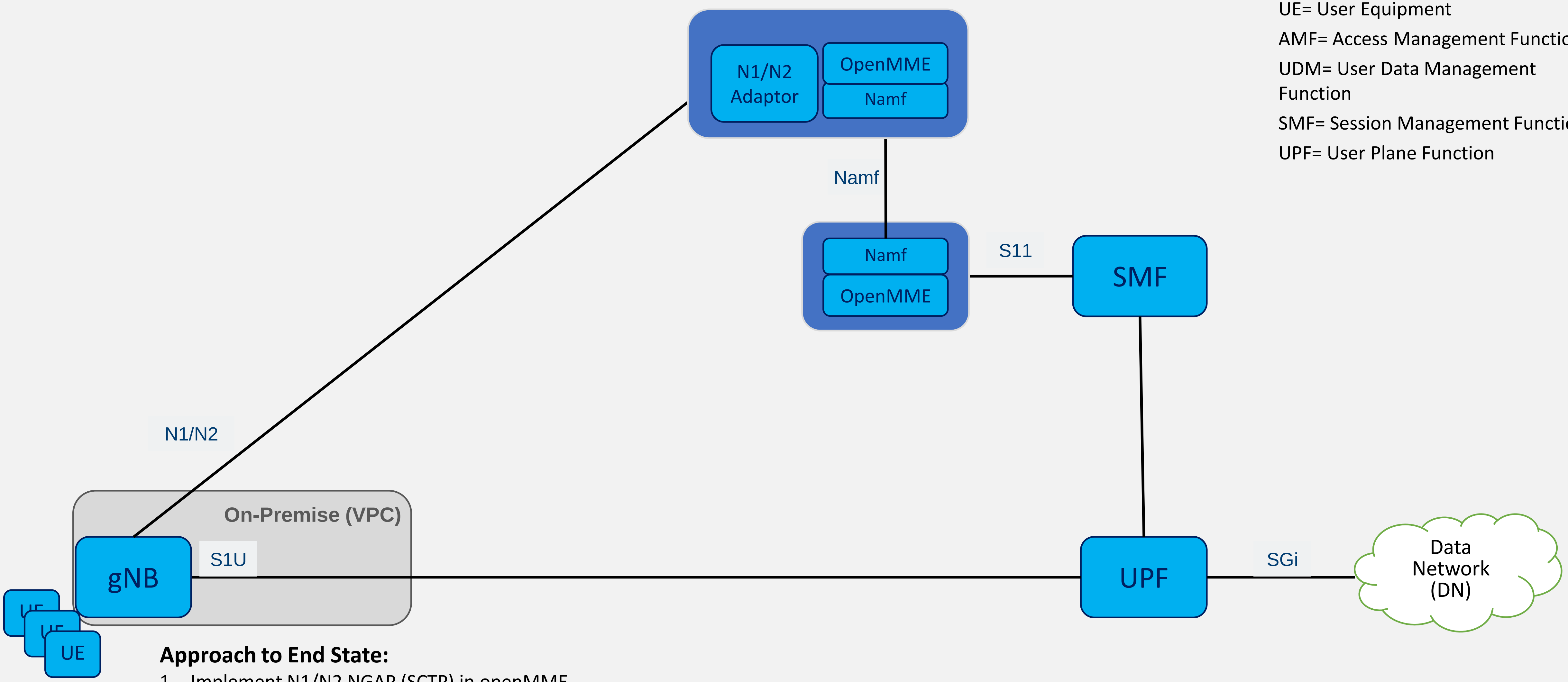
UE= User Equipment

AMF= Access Management Function

UDM= User Data Management Function

SMF= Session Management Function

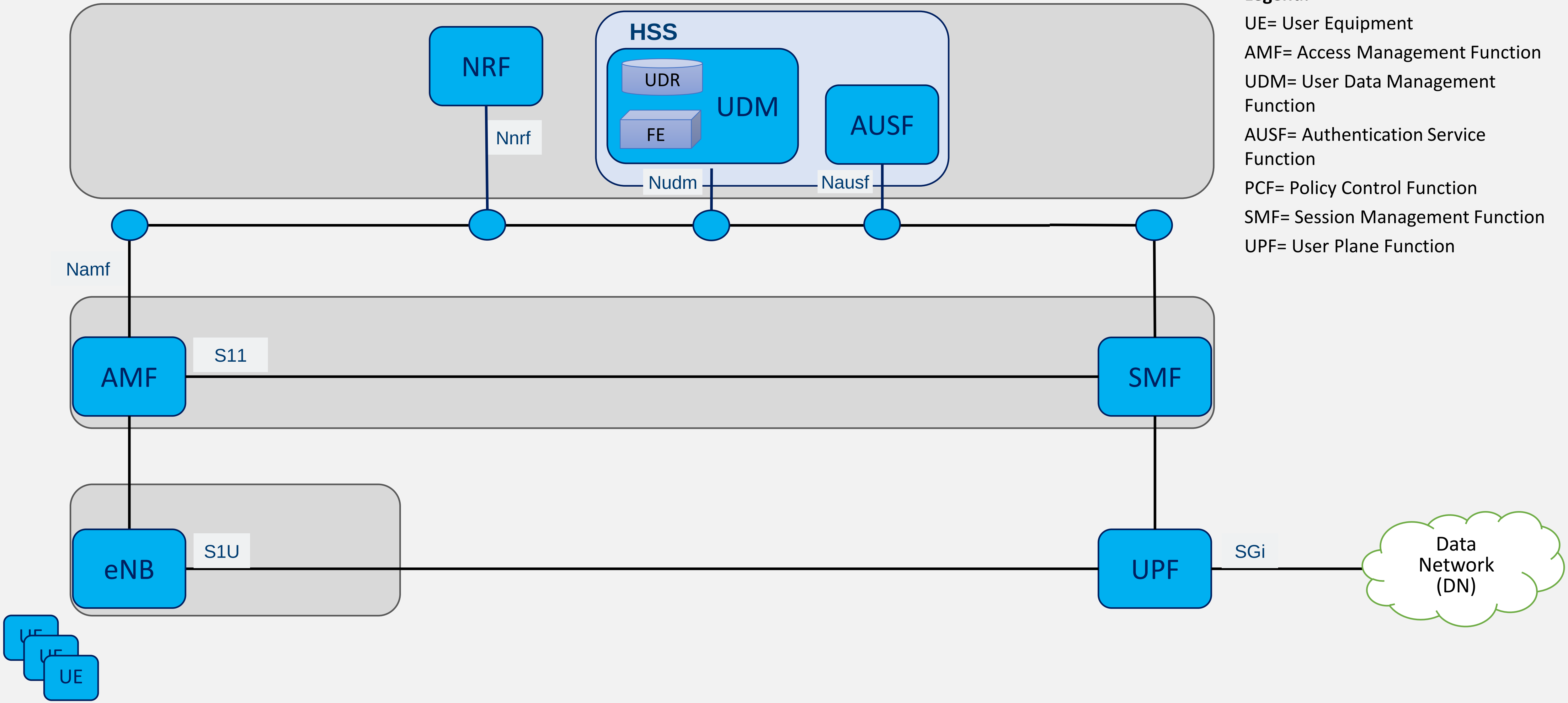
UPF= User Plane Function


N1/N2 Adaptor
OpenMME
Namf
Namf
Namf
OpenMME
S11
SMF
N1/N2
On-Premise (VPC)
gNB
S1U
UPF
SGi
Data Network (DN)
UE
UE
UE

Approach to End State:

1. Implement N1/N2 NGAP (SCTP) in openMME
2. Keep S1-MME/S1AP,S11 unchanged

OMEC HSS,DB to AUSF,UDM : Phase III


NRF
HSS
UDR
UDM
FE
AUSF
Nnrf
Nudm
Nausf
Namf
AMF
S11
SMF
eNB
S1U
UPF
SGi
Data Network (DN)
UE
UE
UE

Legend:

UE= User Equipment

AMF= Access Management Function

UDM= User Data Management Function

AUSF= Authentication Service Function

PCF= Policy Control Function

SMF= Session Management Function

UPF= User Plane Function

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