International Telecommunication Union

What has still to be defined? Network Attachment Subsystem and Protocols

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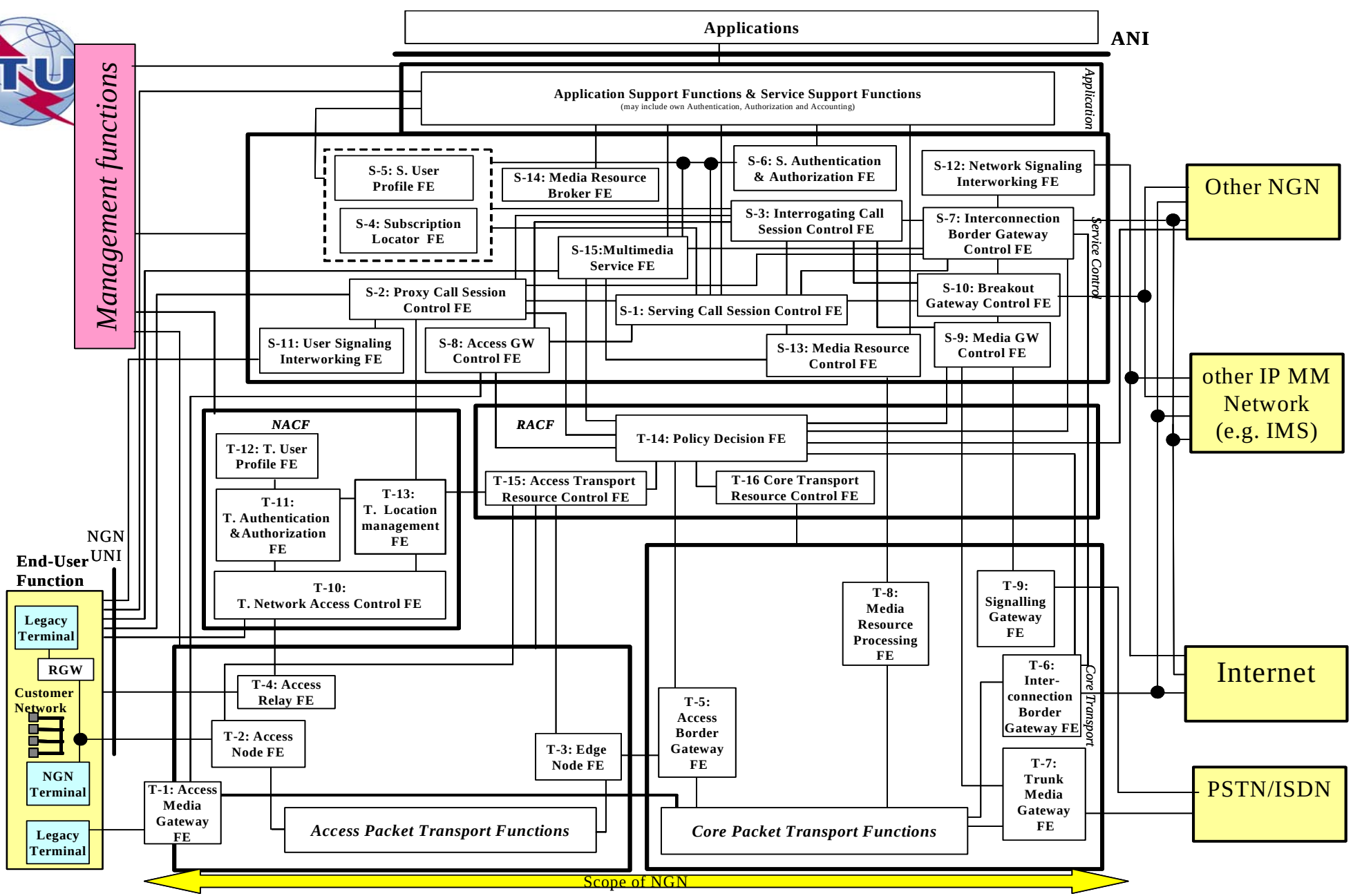

Applications
ANI
Management functions
Application Support Functions & Service Support Functions
(may include own Authentication, Authorization and Accounting)
Application
S-5: S. User Profile FE
S-4: Subscription Locator FE
S-14: Media Resource Broker FE
S-6: S. Authentication & Authorization FE
S-12: Network Signaling Interworking FE
S-3: Interrogating Call Session Control FE
S-7: Interconnection Border Gateway Control FE
S-15:Multimedia Service FE
S-2: Proxy Call Session Control FE
S-1: Serving Call Session Control FE
S-10: Breakout Gateway Control FE
S-11: User Signaling Interworking FE
S-8: Access GW Control FE
S-13: Media Resource Control FE
S-9: Media GW Control FE
Service Control
Other NGN
other IP MM Network (e.g. IMS)
NACF
RACF
T-12: T. User Profile FE
T-14: Policy Decision FE
T-15: Access Transport Resource Control FE
T-16 Core Transport Resource Control FE
T-11: T. Authentication &Authorization FE
T-13: T. Location management FE
T-10: T. Network Access Control FE
NGN UNI
End-User Function
Legacy Terminal
RGW
Customer Network
NGN Terminal
Legacy Terminal
T-8: Media Resource Processing FE
T-9: Signalling Gateway FE
T-4: Access Relay FE
T-6: Inter-connection Border Gateway FE
Core Transport
Internet
T-5: Access Border Gateway FE
T-2: Access Node FE
T-3: Edge Node FE
T-1: Access Media Gateway FE
T-7: Trunk Media Gateway FE
PSTN/ISDN
Access Packet Transport Functions
Core Packet Transport Functions
Scope of NGN

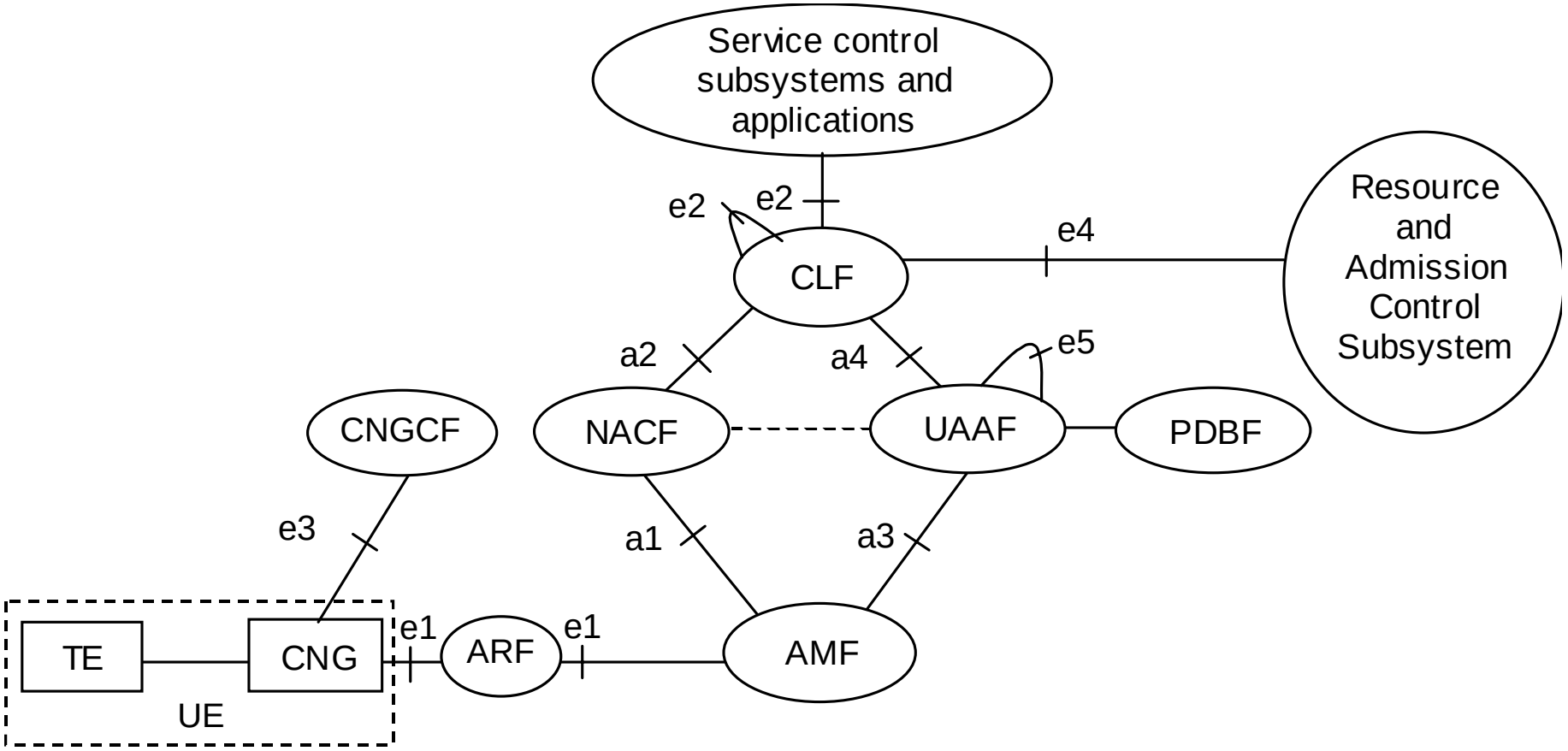
Status of work in ITU-T

- Overall architecture defined
- NASS still not fully defined in ITU-T (ETSI TISPAN have approved a specification)
- SG11 protocol specifications not yet complete
  - Resource & Admission Control protocols most advanced (a number of equivalent interface specifications already approved by ETSI TISPAN)
  - IMS not yet addressed in SG 11 (ETSI TISPAN set available)
  - Draft SIP UNI & NNI profiles being produced by SG11

Network Attachment Control Functions

- Dynamic provision of IP address and other user equipment configuration parameters.
- Authentication of user access network, prior or during the IP address allocation procedure.
- Authorisation of user access network, based on user profiles (e.g. access transport subscription).
- Access network configuration, based on user profiles.
- Location management.

ETSI TISPAN NASS Architecture



NASS Functional entities

- **CNGCF** (Customer Network Gateway Configuration Function) - used during initialization and update of the UE to provide the UE with configuration information (e.g. configuration of a firewall internally in the UE and QoS marking of IP packets) additional to the network configuration data provided by the NACF.
- **ARF** (Access Relay Function) - relay between the CNG and the NASS that inserts local configuration information.
- **AMF** (Access Management Function) - translates the network access requests sent by the UE and forwards requests for allocation of an IP address and possibly additional network configuration parameters to/from the NACF and forwards requests to the User Access Authorisation Function (UAAF) to authenticate the user, authorize or deny the network access, and retrieve user-specific access configuration parameters. If PPP is used the AMF terminates the PPP connection and acts as a RADIUS client if the UAAF is implemented in a RADIUS server.
- **NACF** (Network Access Configuration Function) - responsible for the IP address allocation. Typically implemented as a DHCP or RADIUS server.
- **UAAF** (User Access Authorisation Function) - performs user authentication and authorisation checking, based on user profiles. Communication between UAAFs in different administrative domains is provided by the e5 interface allowing a UAAF-proxy to request the UAAF-server for user authentication and authorization and allowing the UAAF-proxy to forward accounting data for the particular user session to the UAAF-server.
- **PDBF** (Profile Database Function) - contains user authentication data (e.g. user identity, list of supported authentication methods, and authentication keys). It may be co-located with UAAF (the interface between them is not to be standardized).
- **CLF** (Connectivity Session Location and Repository Function) - registers the association between the IP address allocated to the UE and related network location information. The CLF has interfaces to the AF (e.g. P-CSCF) and to the RACS.

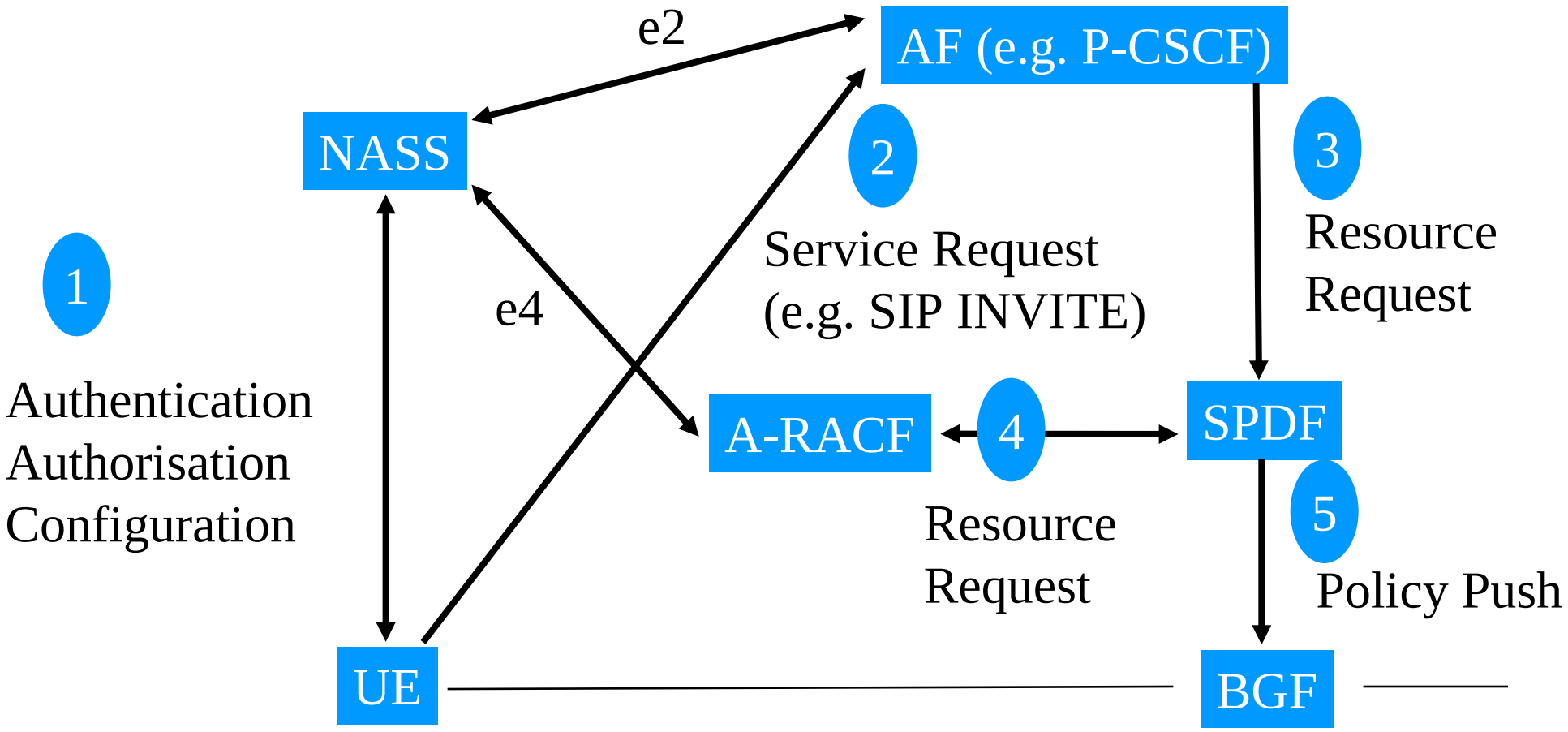
e2 interface

- Enables Application Functions (AF), such as an IMS P-CSCF or a Presence Network Agent (PNA) to retrieve IP-connectivity related session data from the NASS CLF
- Protocol is based on Diameter (RFC 3588)
- The AF can request the following information for a specific subscriber (identified by a globally unique IP address or a subscriber identifier):
  - Subscriber-id;
  - Location information;
  - RACS contact point;
  - Access network type (ATM, Ethernet or Unknown); and
  - Terminal Type.

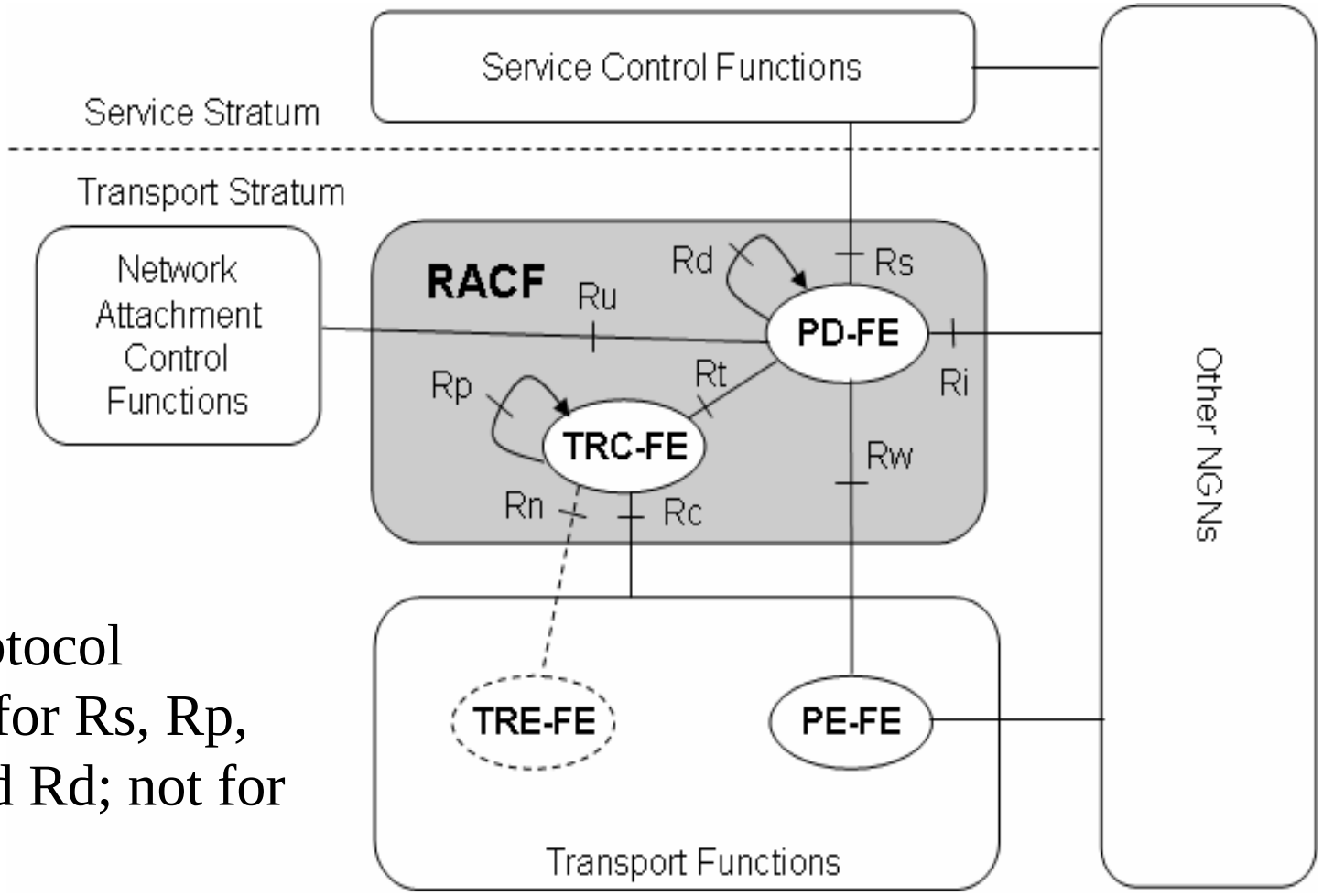
e4 interface

- Enables the exchange of IP-connectivity related session data between the **NASS CLF and the Access - RACF in the RACS**
- The protocol on this interface is based on Diameter
- The following information can be transferred from the CLF to the A-RACF:
  - Initial Gate Setting
  - List of allowed destinations
  - Up-Link Subscribed Bandwidth
  - Down-Link Subscribed Bandwidth
  - QoS Profile Information
  - Transport service class
  - Media-Type
  - Up-Link Subscribed Bandwidth
  - Down-Link Subscribed Bandwidth
  - Maximum Priority
  - Requestor Name
- The Access Profile is **"pushed"** from the CLF to the A-RACF when an IP address has been allocated to a subscriber or in the case of a modification occurring on a profile that has already been pushed to the RACS and **"pulled"** by the A-RACF from the CLF after a restart or upon reception of a resource reservation request associated with an IP-Address for which no record is stored.
- The CLF can also report the loss of IP connectivity enabling the RACS to remove the access profile from its internal data base. This occurs when the allocated IP address is released (e.g. DHCP leased timer expiry) or due to the release of the underlying layer 2 resources.

Outline of NGN QoS Control (ETSI terminology)



ITU-T Resource Control Protocol Drafts

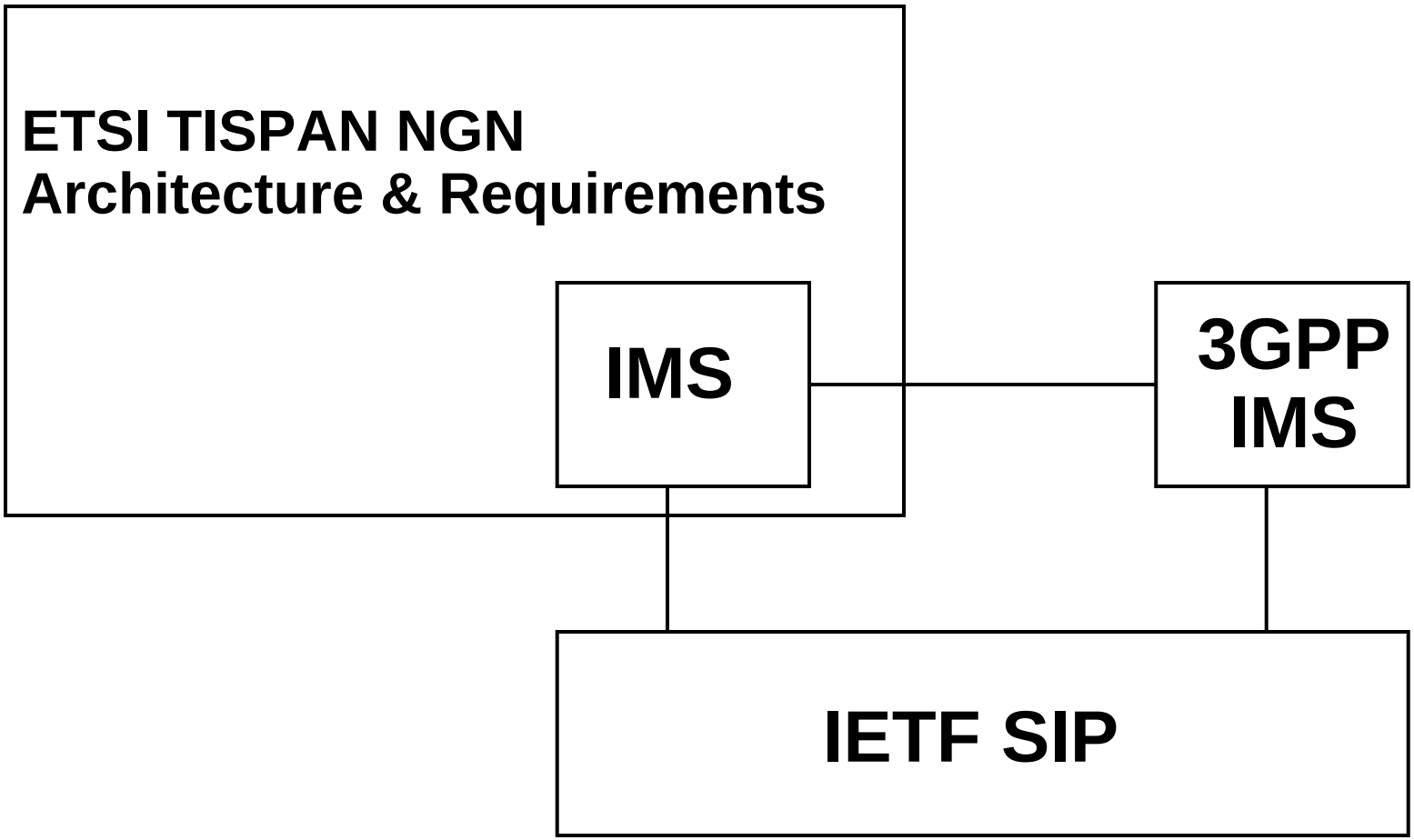


SG11 draft protocol specifications for Rs, Rp, Rw, Rc, Rt and Rd; not for Ri, Rn nor Ru

IMS Background

- 3GPP application of SIP with modifications to support:
  - GSM business model – subscriber of a ”Home” network operator
  - GSM handset capabilities (SIM for authorisation)
  - Not primarily for voice – this is likely to be supported on the circuit-switched domain for some time – but for presence, IM, push-to-talk….
- ETSI TISPAN NGN IMS
  - Fixed network access with ”nomadicity”
  - Ambition to achieve Fixed Mobile Convergence
- ITU-T
  - Moving to adopt IMS as one element of broad NGN
- PacketCable2.0
  - Moving to adopt IMS model – but tailored to cable requirements

ETSI TISPAN NGN IMS – relationship to 3GPP & IETF



ETSI TISPAN IMS Architecture cf. 3GPP IMS

- Addition of the e2 interface in the TISPAN architecture between the P-CSCF and the NASS (Network Attachment Subsystem) Connectivity Session Location and Repository Function (CLF)
- Use of the Gq' interface rather than Gq as in the 3GPP architecture
- Substitution of the UPSF (User Profile Server Function) for the HSS (equivalent to HSS with HLR stripped out)

ETSI TISPAN IMS cf. 3GPP IMS Release 7

Charging

- ETSI TISPAN NGN Release 1 only supports off-line charging.

SIP Protocol

- UEs may support neither ISIM nor USIM.
- Adds NASS bundled authentication.
- Allows a transport mechanism without a security association.
- Inclusion of Gq' interface to P-CSCF.
- Addition of e2 interface.
- Added capability for the Proxy role for "Rejecting anonymous requests in the Session Initiation Protocol (SIP)" and the status code 433 (Anonymity Disallowed).

TISPAN IMS – Supplementary Service Support

- NGN Cdiv
- NGN CONF
- NGN MWI
- NGN OIP/OIR
- NGN TIP/TIR
- NGN CW
- NGN HOLD
- NGN AoC
- NGN CCBS/CCNR
- NGN ACR – CB
- NGN MCID
- NGN Explicit Communication Transfer
- NGN Presence Stage 3
- NGN Hold corrections/alignment

Summary

- NGN Architecture specifications stable
- Currently, no ITU-T interface protocol specifications finalised but some RACF interface specifications and SIP UNI & NNI profiles should be approved shortly & a number of ETSI and many fundamental IETF specifications are available.