

# End-to-End Quality-of-Service Support in Next Generation Networks with NSIS

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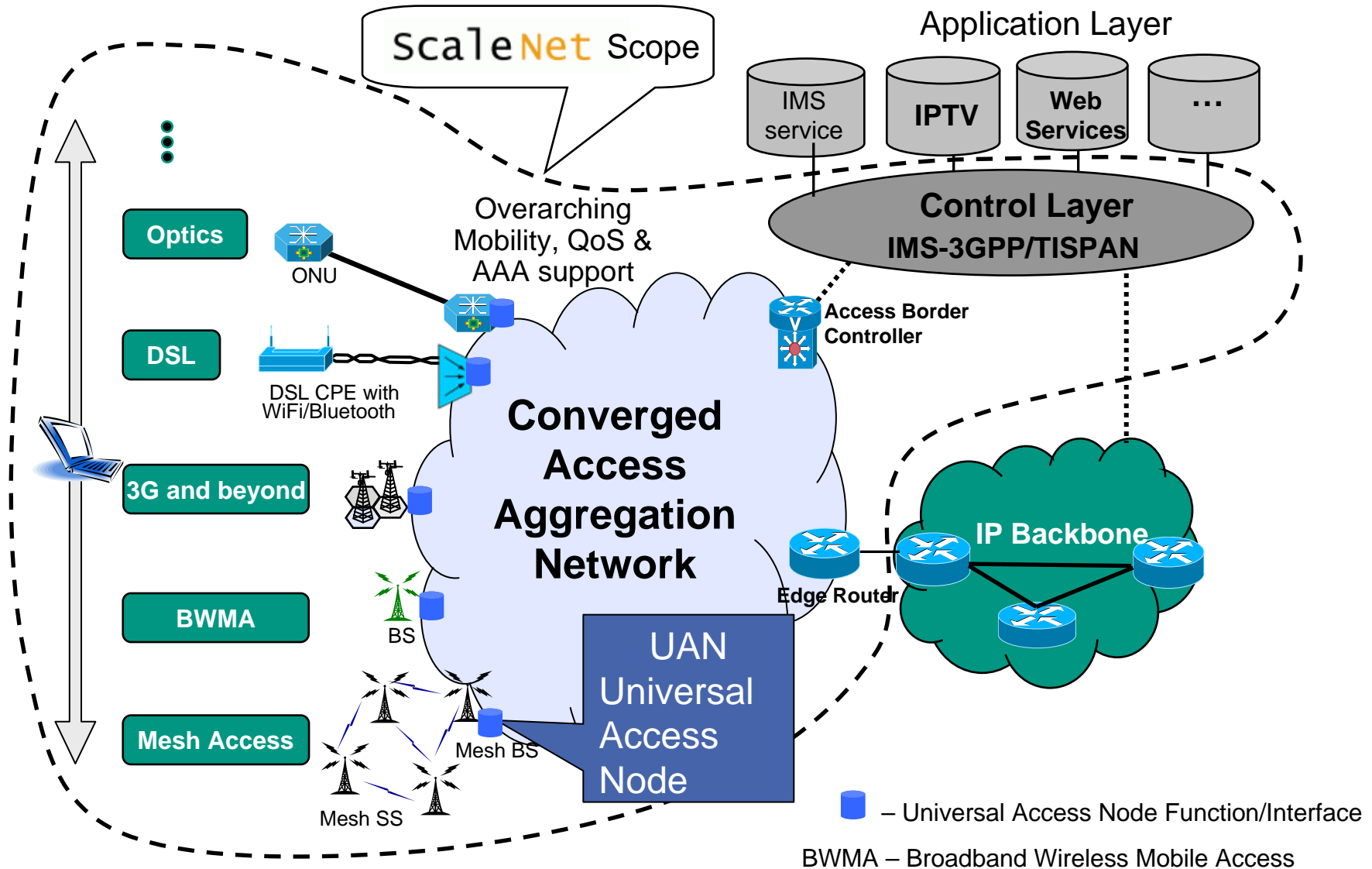
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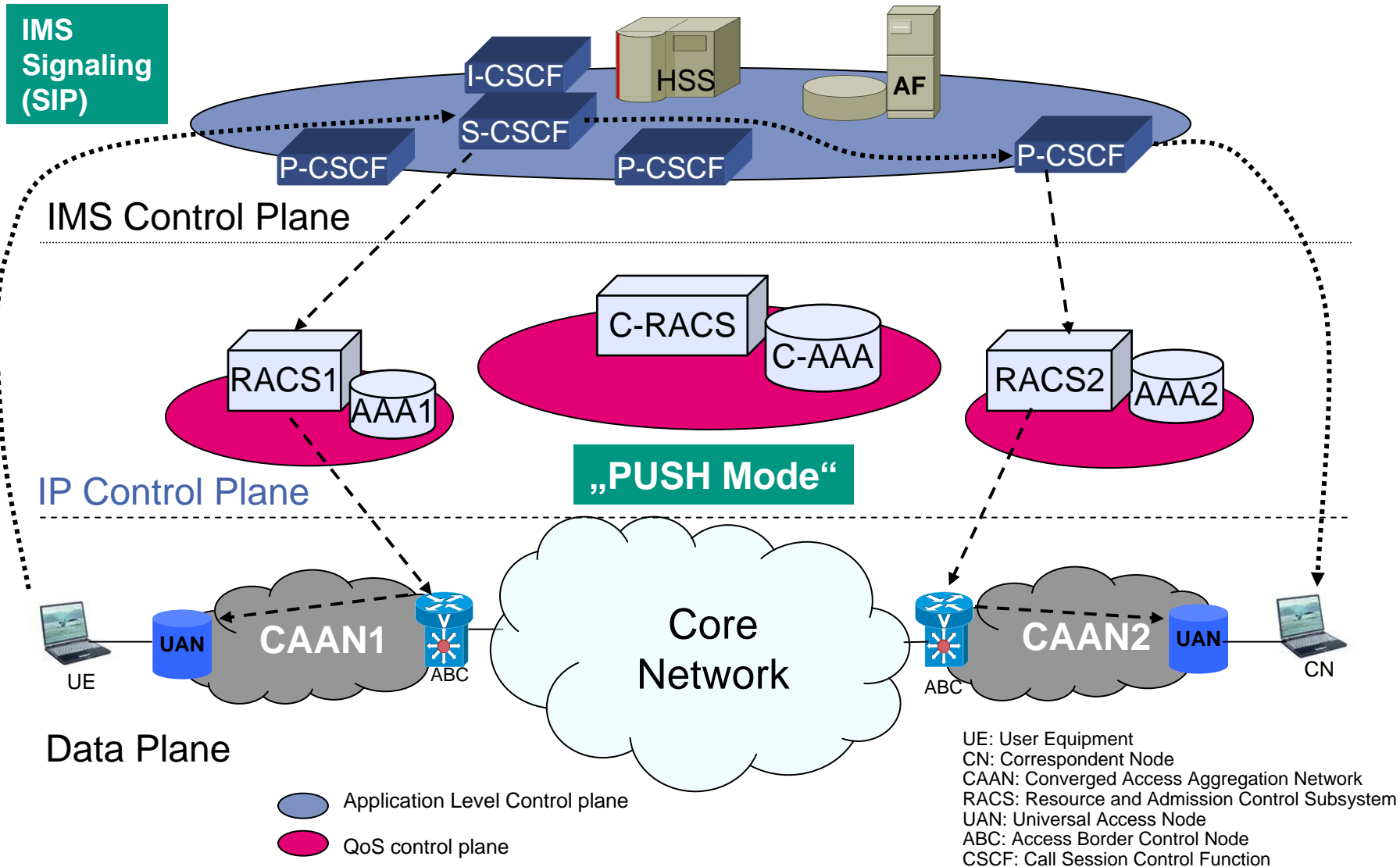
# Motivation

- **Next Generation Network** architecture as basis for future telecommunication networks [Y.2011]
  - all-IP based
  - end-to-end QoS support
  - support mobility of end-users
- **Fixed/mobile convergence**
  - Transport Stratum
  - Service Stratum
- **IP Multimedia Subsystem (IMS)** plays central role in NGNs → SIP Signaling
- But: real **end-to-end QoS** support for a variety of applications (i.e., also non-SIP based apps)?

# ScaleNet Architecture

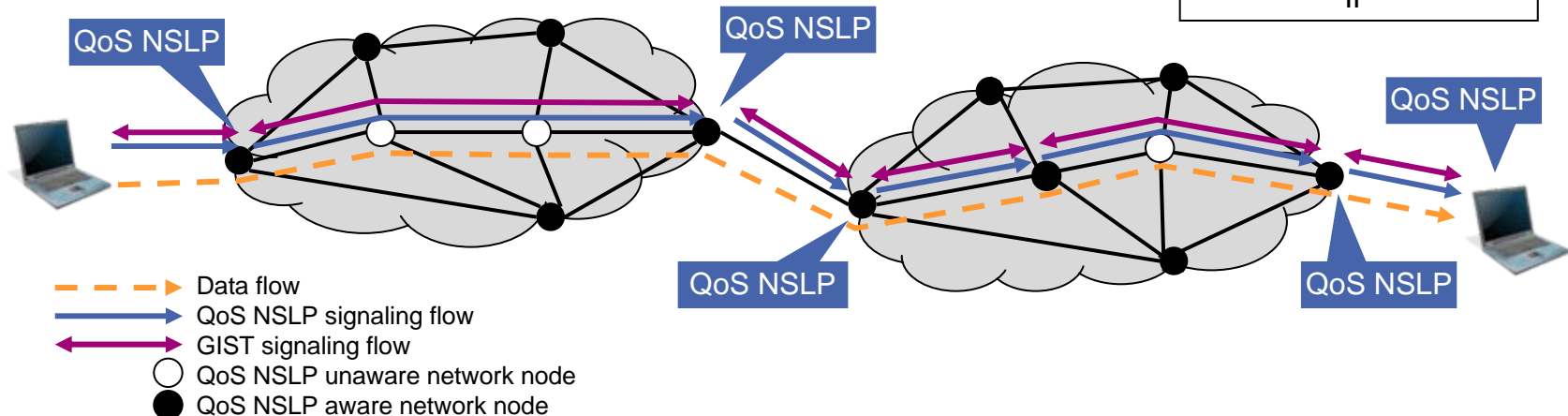
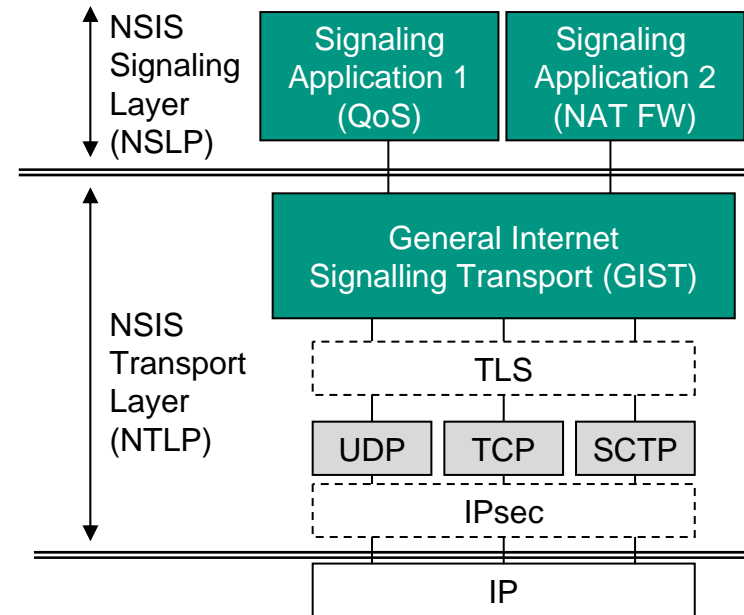


# IMS and QoS Support



# Next Steps in Signaling Protocol Suite

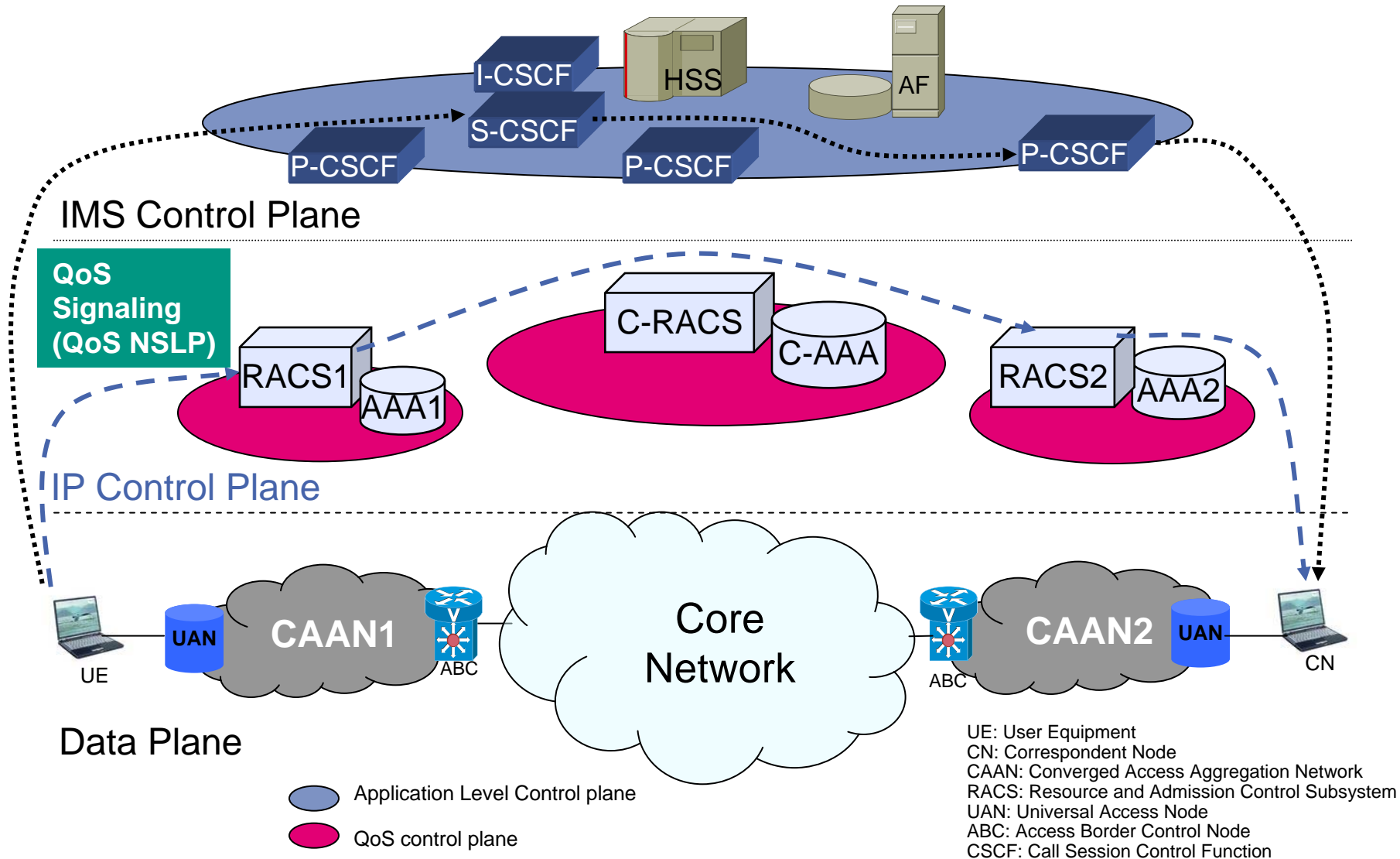
- Two-layer approach developed in the IETF
- QoS NSLP, NAT/FW NSLP
- General Internet Signalling Transport Protocol (GIST)
  - path-coupled signaling
  - signaling node discovery
  - message transport (unreliable, reliable, secure)



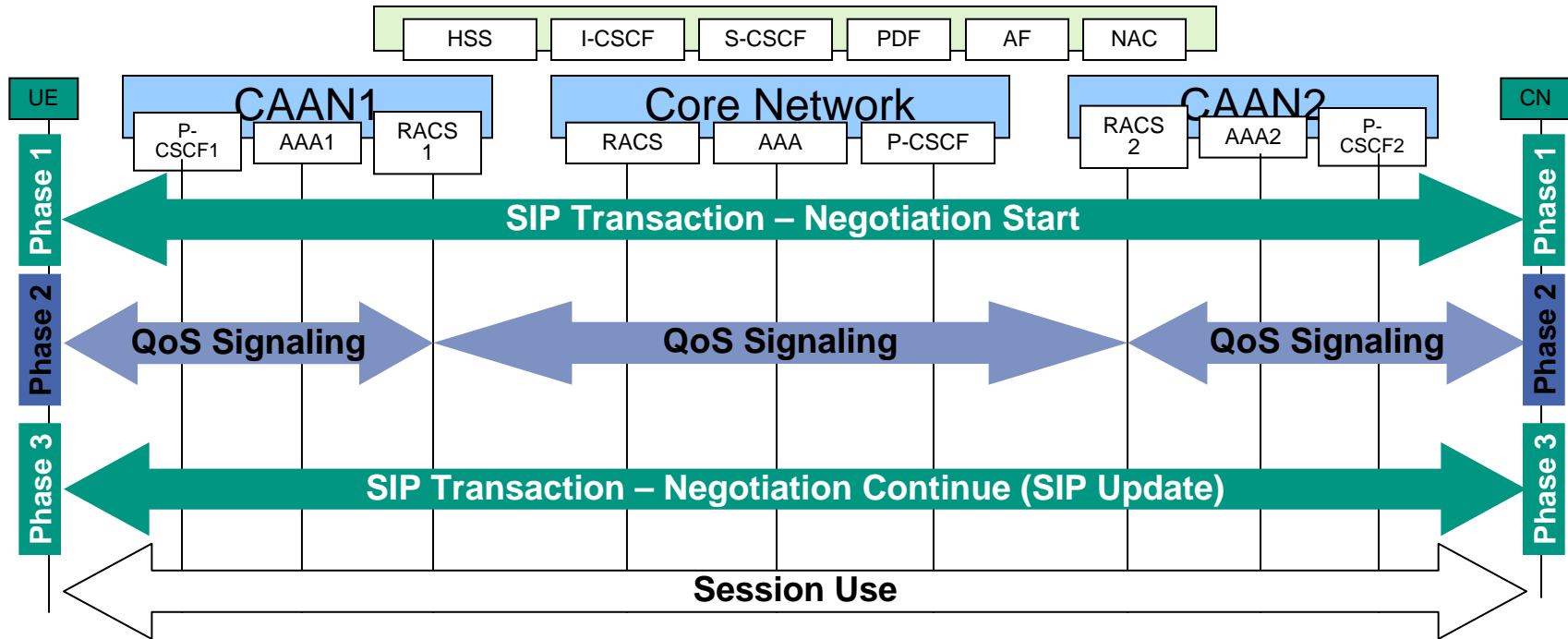
# NSIS Features

- Signaling for IP resources
- Supports other signaling message routing methods
  - e.g., explicit signaling target
- Supports mobility by using a session-id
- QoS NSLP supports sender- and receiver-oriented reservations
- Running code available <http://nsis-ka.org/>
  - also supports mobility, e.g., with MobileIPv6
- Experimental RFCs out soon!

# Coupling of IMS and NSIS



# Coupling IMS and NSIS QoS Signaling



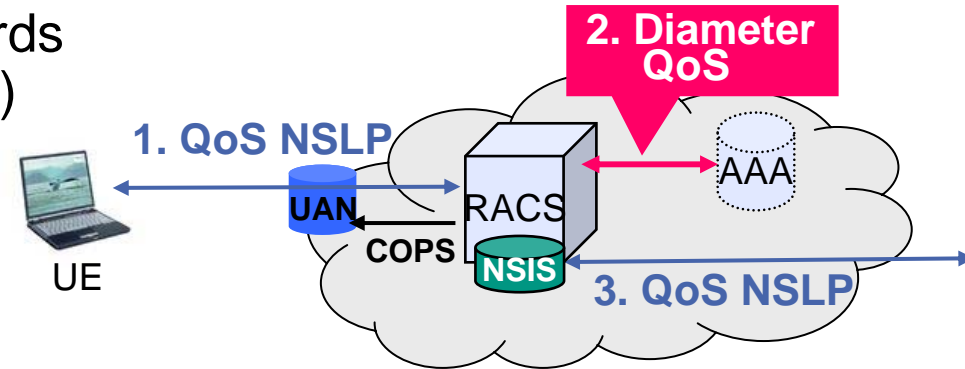
- Coupling of SIP signaling and QoS signaling (RFC 3311/3312)
- Phase 1 – Application Level Signaling, first negotiation
- Phase 2 – End-to-end QoS Signaling
- Phase 3 – Session update: continue when QoS conditions are met



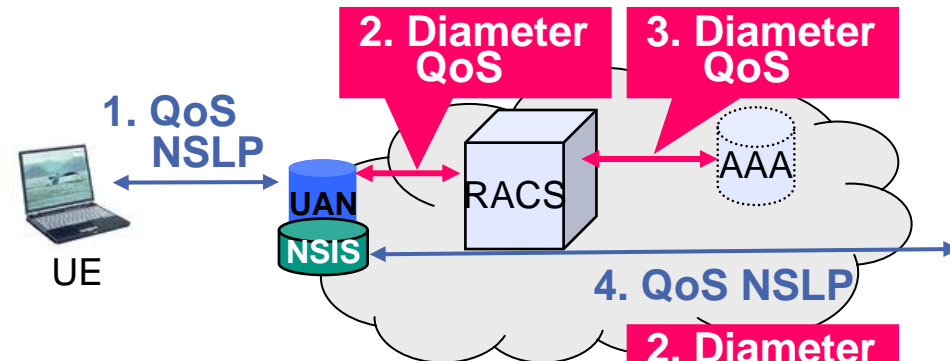
# NSIS deployment possibilities

- Allows for smooth transition towards NSIS capable equipment (routers)

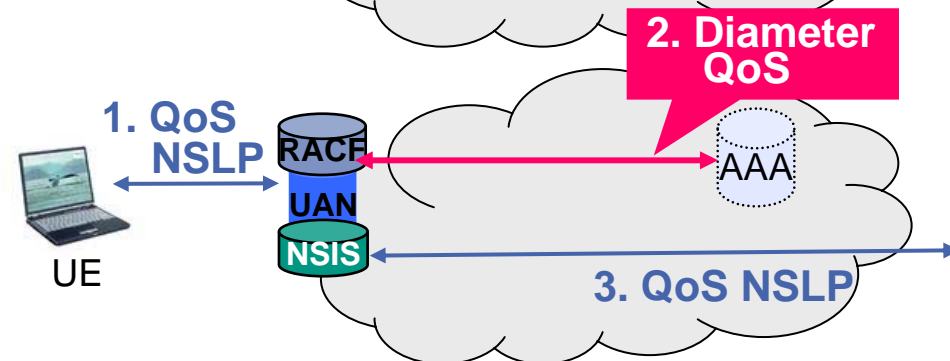
(A) non NSIS-aware UAN, central RACS



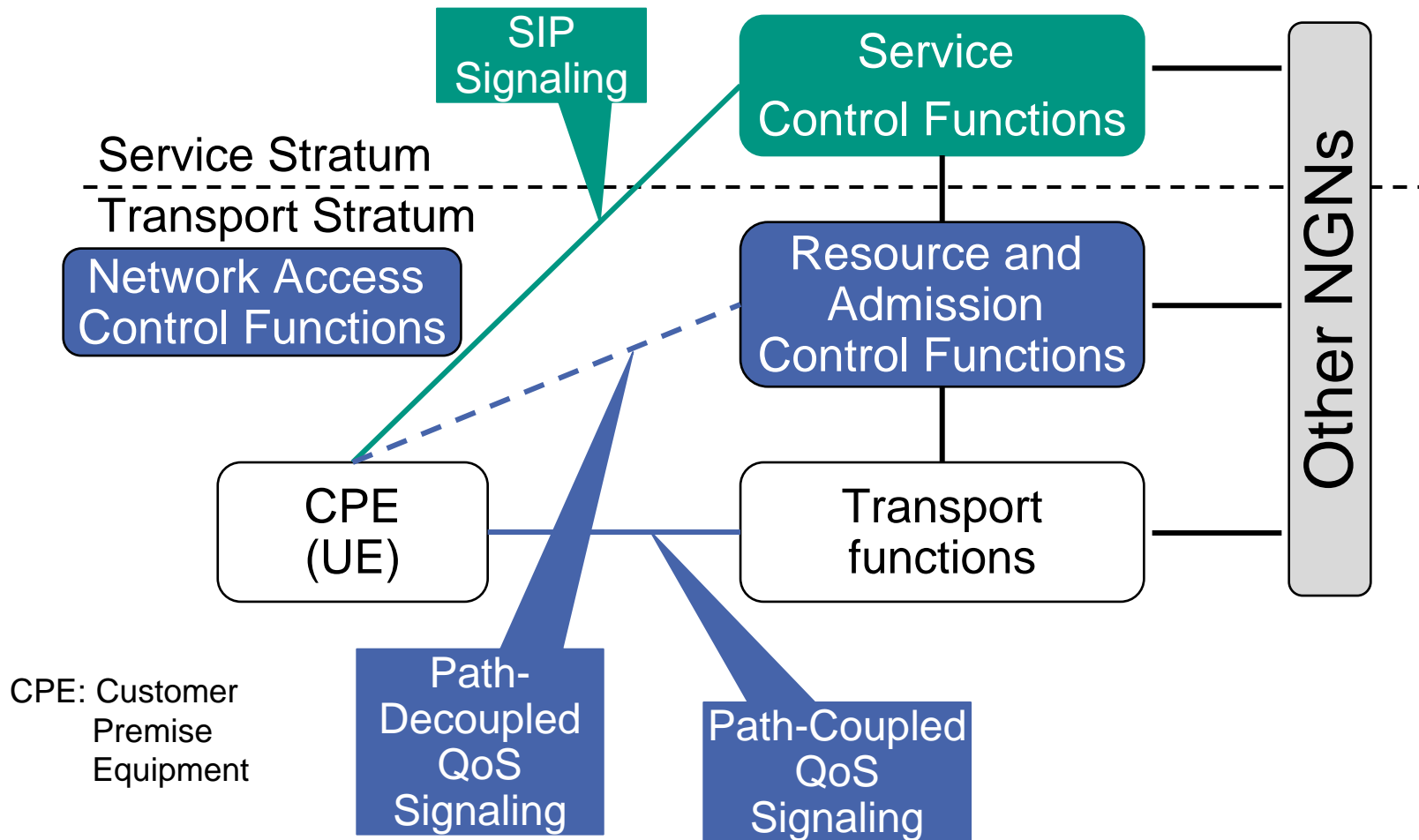
(B) NSIS-aware UAN, central RACS



(C) NSIS-aware UAN, including RACF

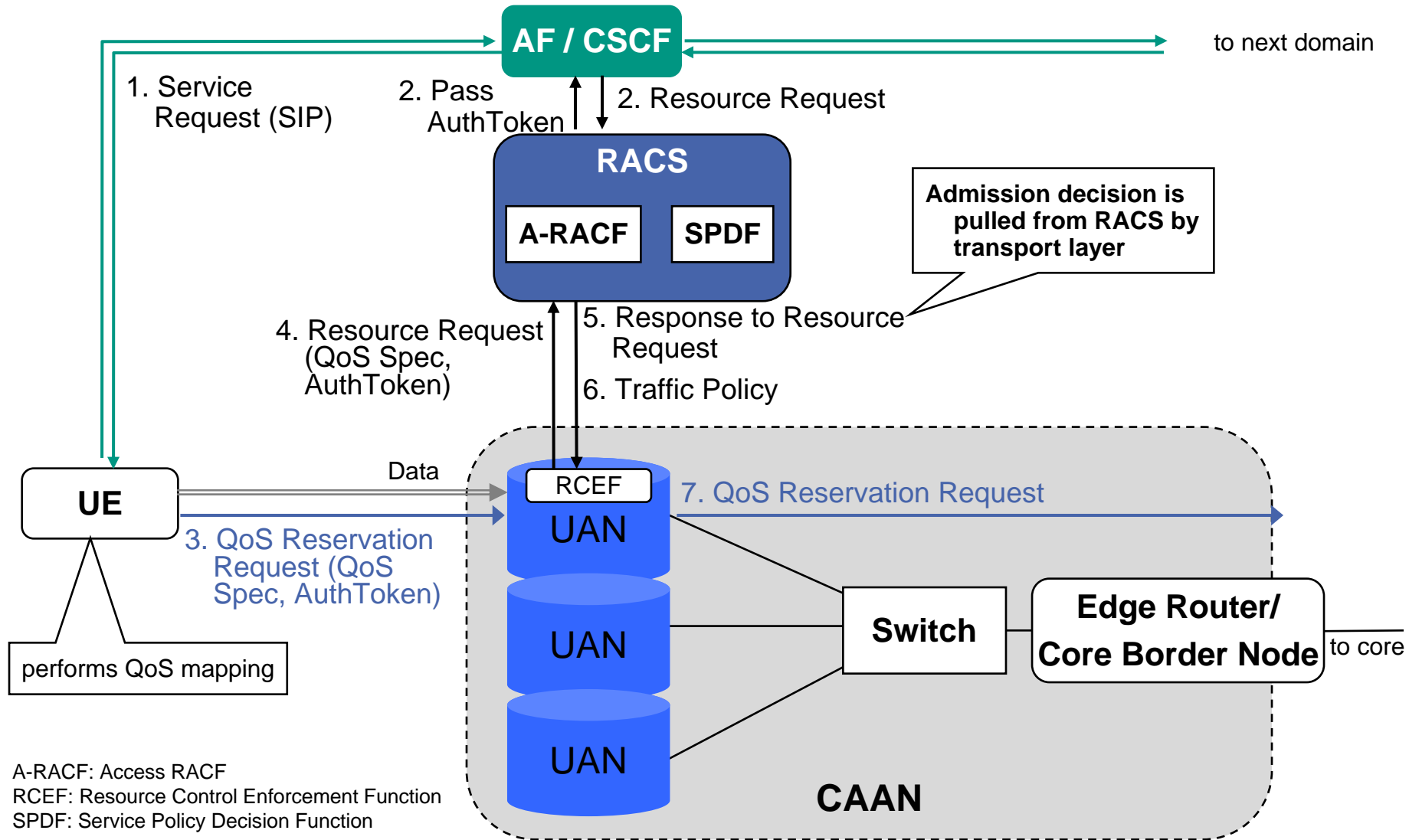


# Resource and Admission Control Function

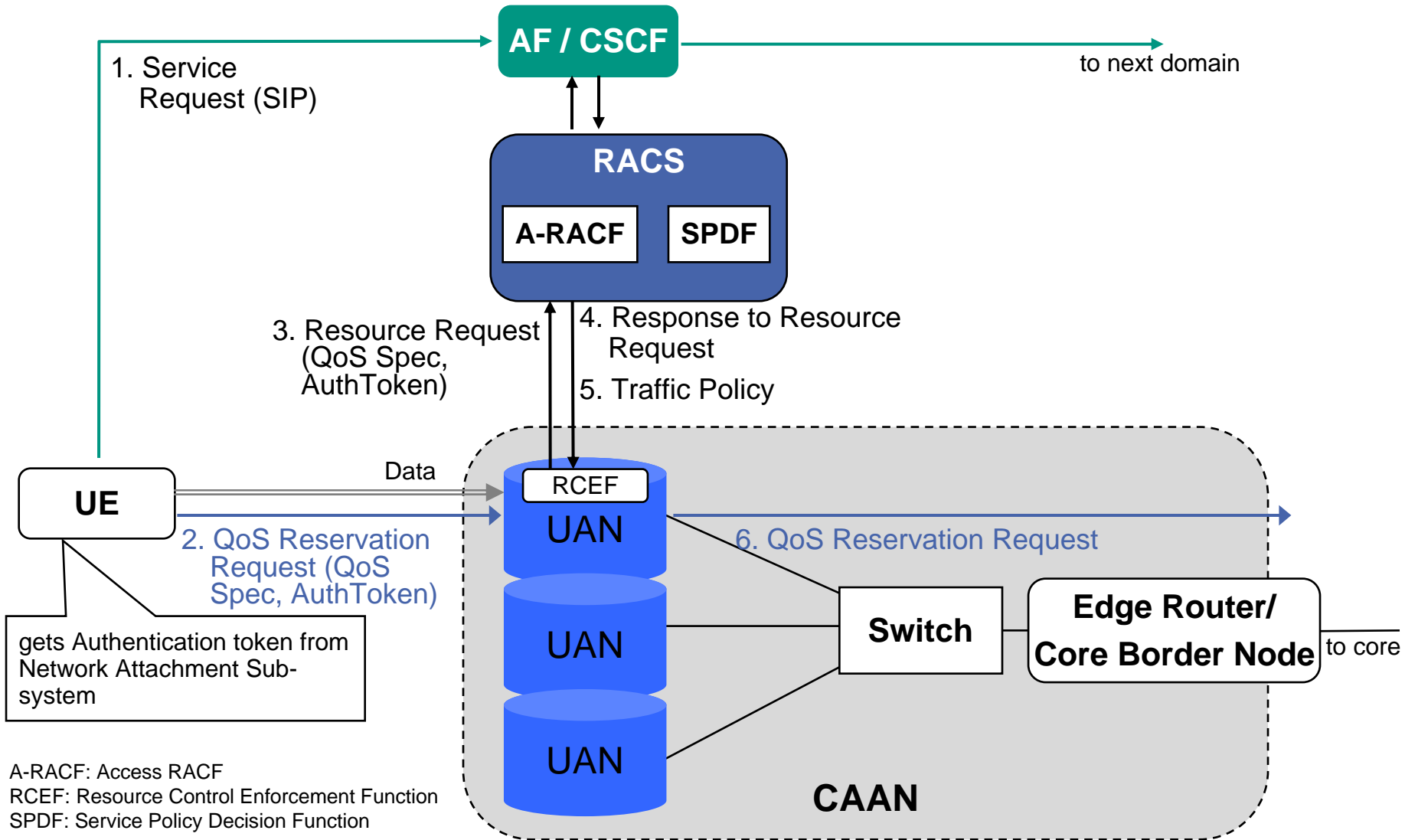


CPE: Customer  
Premise  
Equipment

# NSIS and Pull Mode



# Native NSIS



# UE-based QoS Signaling with NSIS – Benefits

- **Greater Openness, Flexibility, Extensibility**
  - QoS support from the transport stratum for any application
  - will also work for yet unknown future applications
- **Increased Interoperability**
  - works over networks where no AF/CSCF/IMS is available
  - as a standardized solution for QoS reservation
- **QoS Model independence**
- **Closeness to Data Path**
- **More efficient resource usage**
  - reservation aggregation at transport level
- **Real E2E QoS**
  - UE is involved into QoS negotiation, thus local resource conditions may be considered
- **Non-NSIS capable UEs can be also supported**

# Conclusions

- **NSIS-based QoS solution** for NGNs
  - more open, flexible, extensible, ...
  - real end-to-end QoS
  - can be used with or without IMS
- Evaluated parts of the architecture
  - QoS NSLP + **mobility** support → Networking 2009
  - QoS NSLP + session **security** → ICC 2009
- Ongoing work
  - Coupling QoS NSLP with SIP/IMS signaling

# Questions?

# Related Work

- **Daidalos**: QoS broker, lightweight RSVP
- **WEIRD**: focused on WiMax
- **EuQoS**: also NSIS, but no NGN integration considered
- **CHEETAH**: RSVP-TE, focus on circuit switched optical networks, no NGN integration, mobility not considered
- **DRAGON**: no NGN integration