# Test Solution for Convergent Policy and Charging Control

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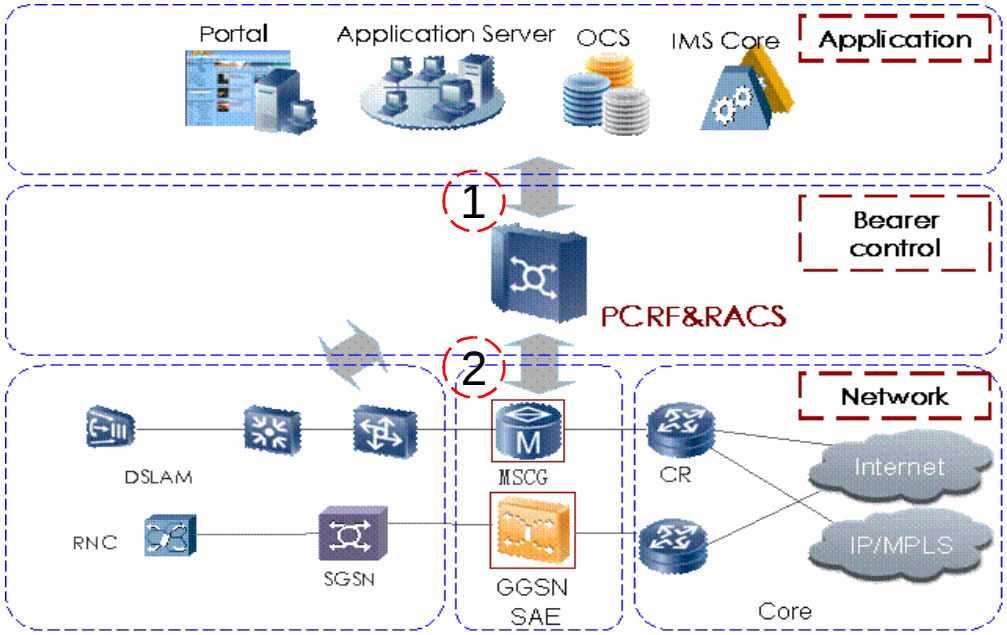
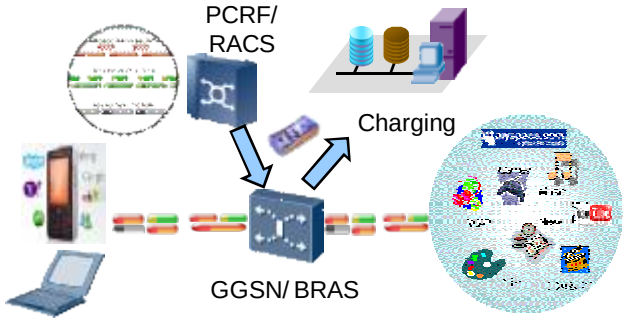
# CPCC : Convergent Policy & Charging Control




① **Convergent Service control** ② **Convergent Policy/Charging control**




## CPCC(PCRF&RACS)

•Policy guarantees the bandwidth control and QoS ; Charging control paves the way to increase income.

•Dynamic control enable the flexibility

## CPCC(PCRF&RACS)

- Support both fixed and mobile network with consolidated interface
- Screen the access layer differences
- QoS control From access to aggregation

**One Platform**

**Unified O&M**

**PCRF&RACS seamless convergence**

# Key Functionalities of CPCC to be Tested

- **QoS control**
  - QoS Policy in fixed and mobile access
  - Traffic priority and Resource admission control
  - Fixed network topology and resource management (optional)
- **Flexible Policy Control capability**
  - Subscription, time, location, service based policy
  - Local subscription information management
  - Customized policy trigger/event, condition, policy action
- **Open Interfaces with other Network elements**
  - Multiple PEP nodes: GGSN, BRAS, DPI BOX, etc.
  - Multiple Application Functions: P-CSCF, Portal, SPR, etc.
- **Other requirements:**
  - High reliability : Equipment Redundancy (Link, Board ) , Network Geographic redundancy
  - Smooth capacity expansion, High performance with High density

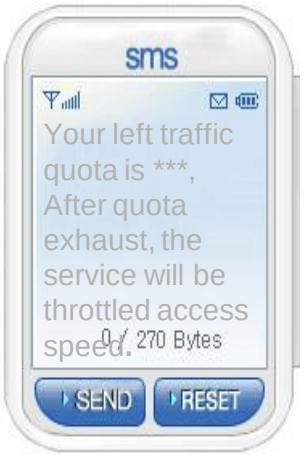
# Test Scenario 1: Fair Usage Policy

**Feature:**

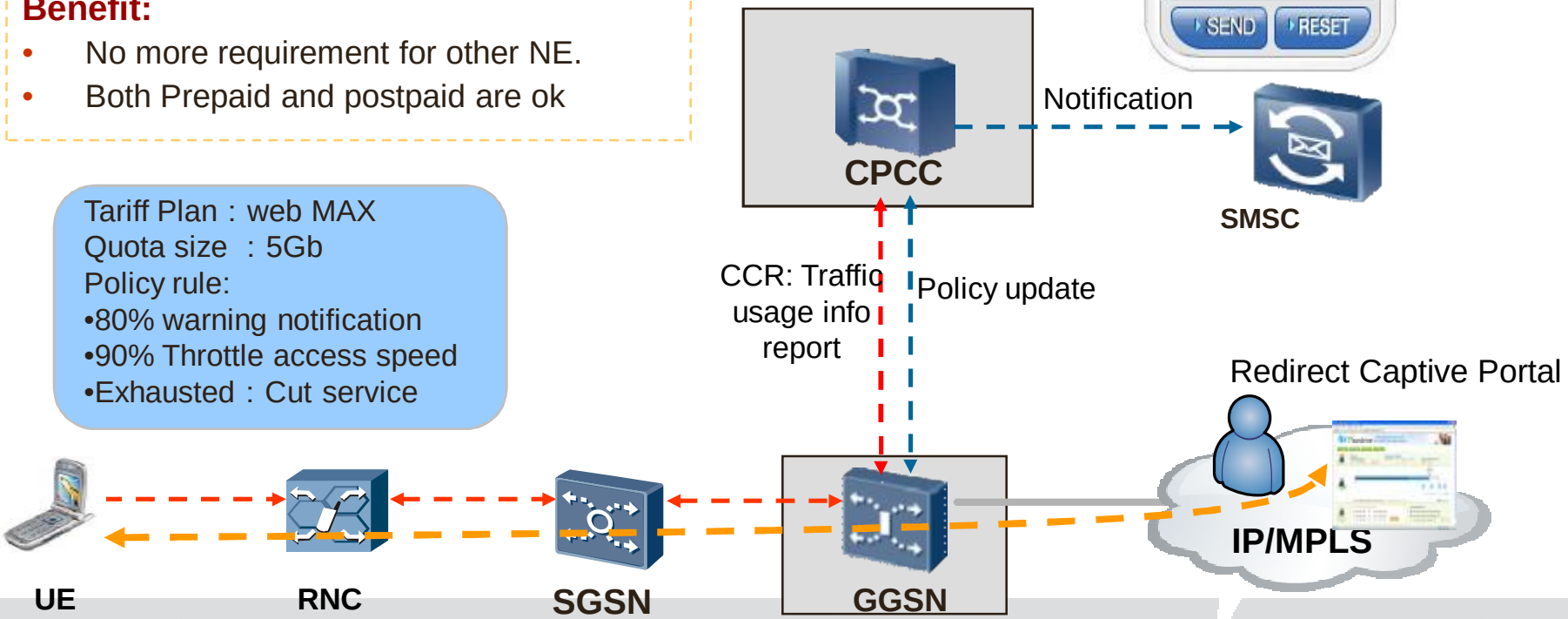
- More than one level usage threshold policy control
- Get volume usage from GGSN
- Cut service and http redirect
- Notification via SMS, Email

**Benefit:**

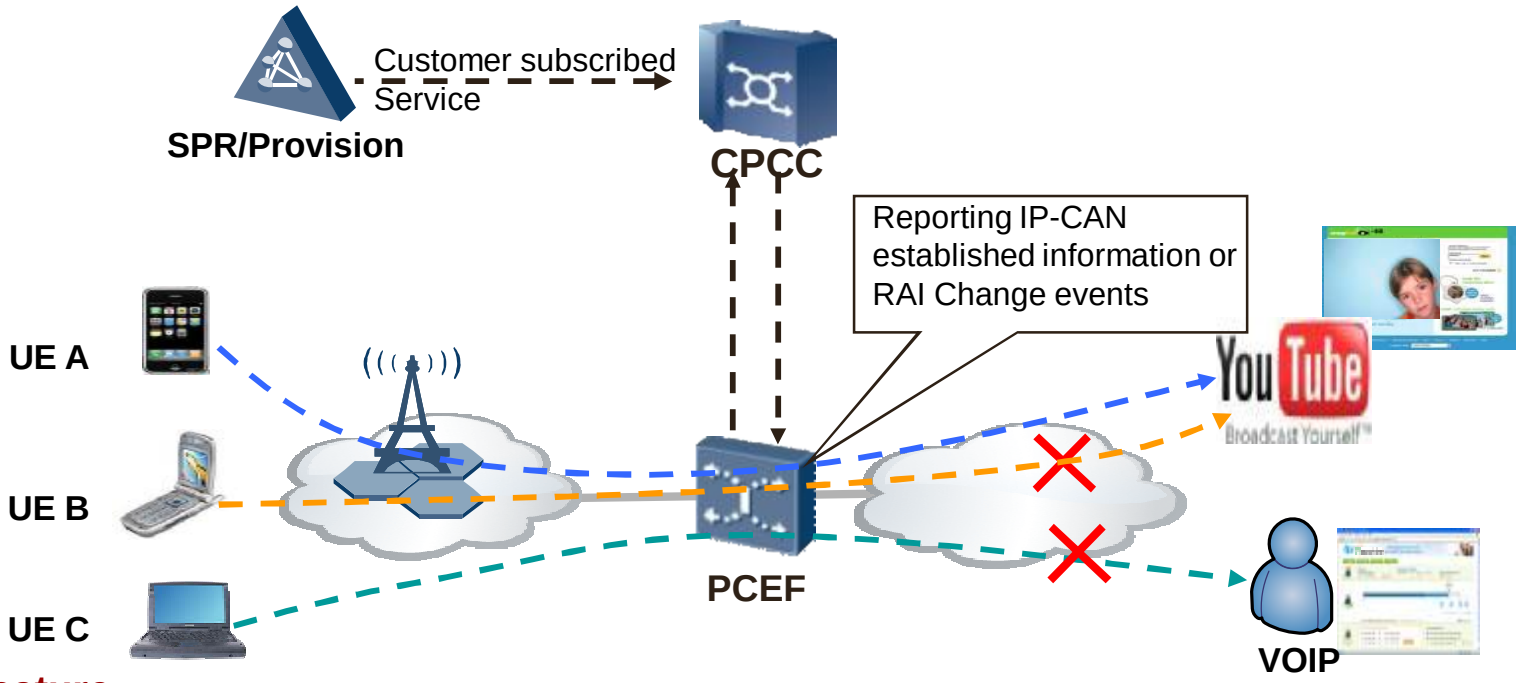
- No more requirement for other NE.
- Both Prepaid and postpaid are ok




Tariff Plan : web MAX
Quota size : 5Gb
Policy rule:
•80% warning notification
•90% Throttle access speed
•Exhausted : Cut service



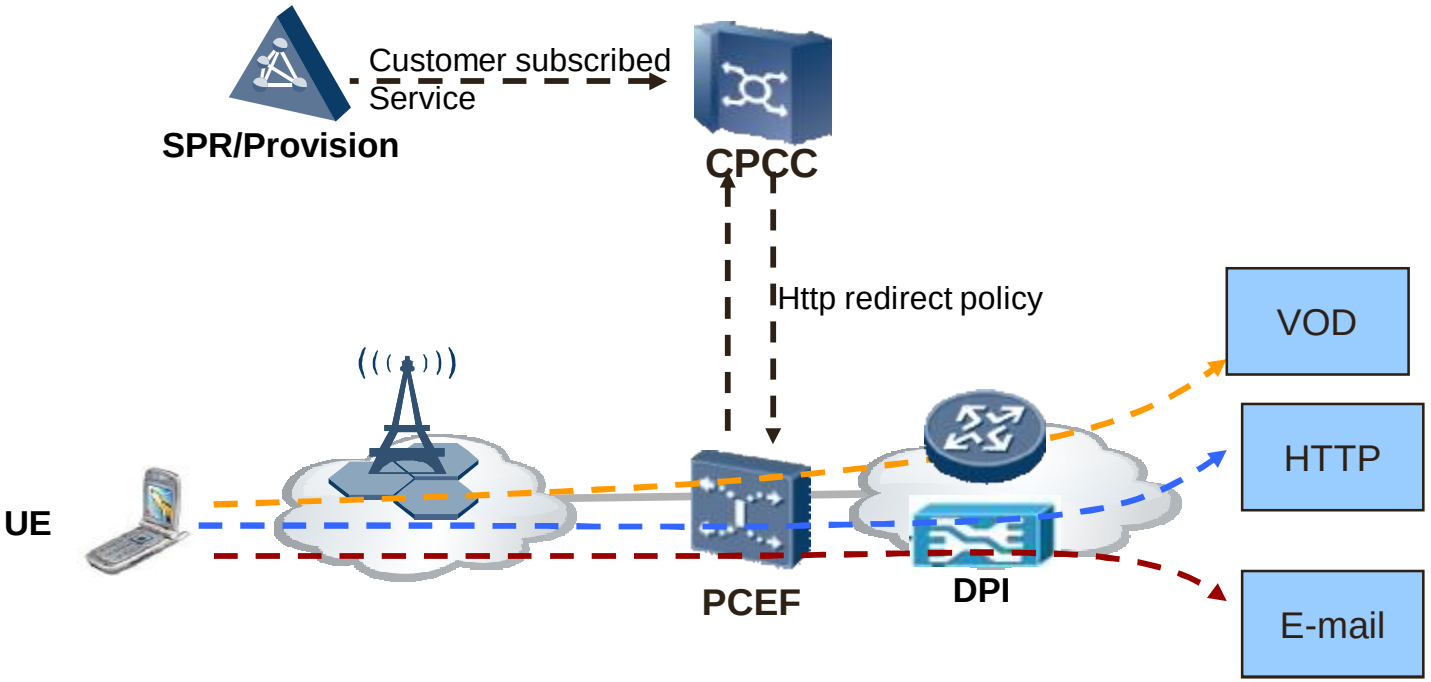
# Test Scenario 2: Content Access Control




**Feature:**

- Service blocking in a given area, perform policy based on location information
- Service blocking over a type access
- Service access authorization based on subscription
- PCEF may support DPI capability for L7/URL filter, and if standalone DPI BOX existed, then CPCC need an interface with DPI BOX

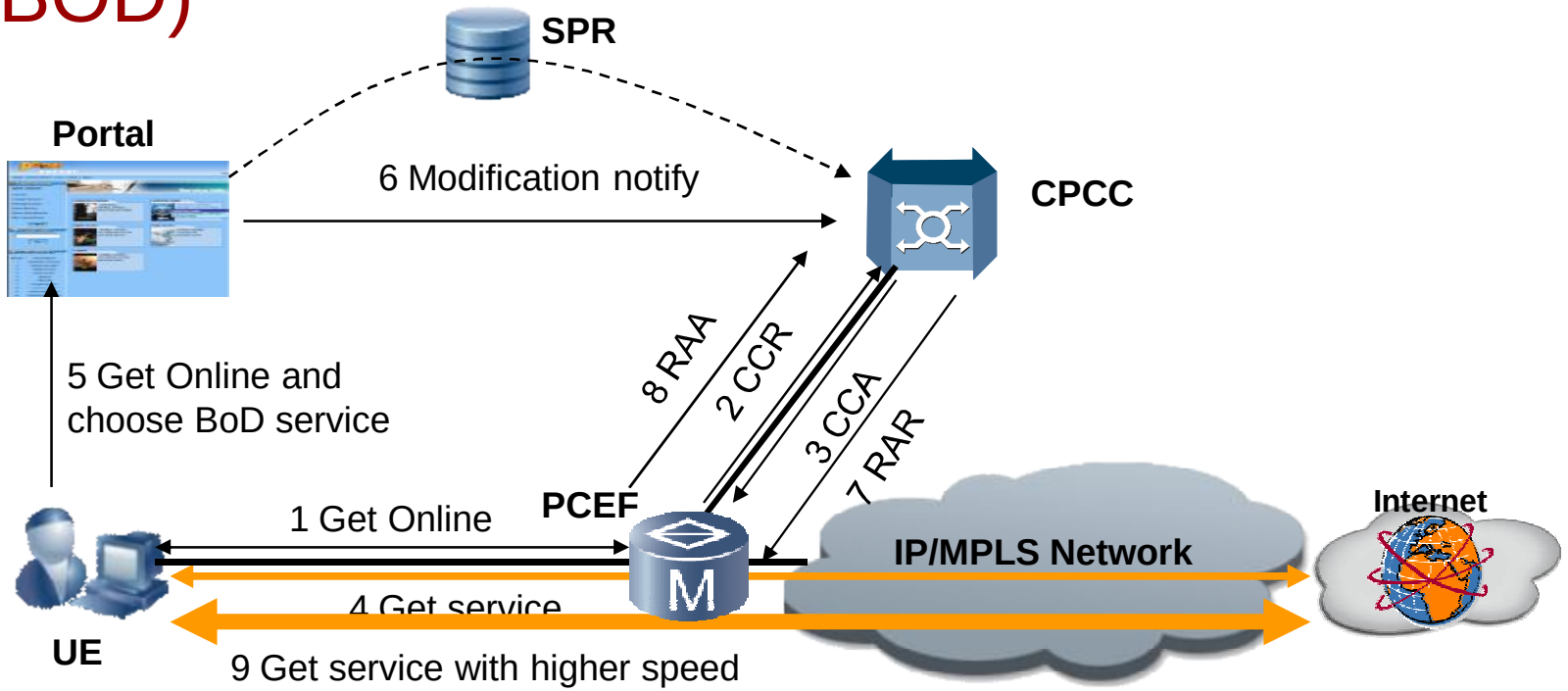
# Test Scenario 3: Service Routing




**Feature:**

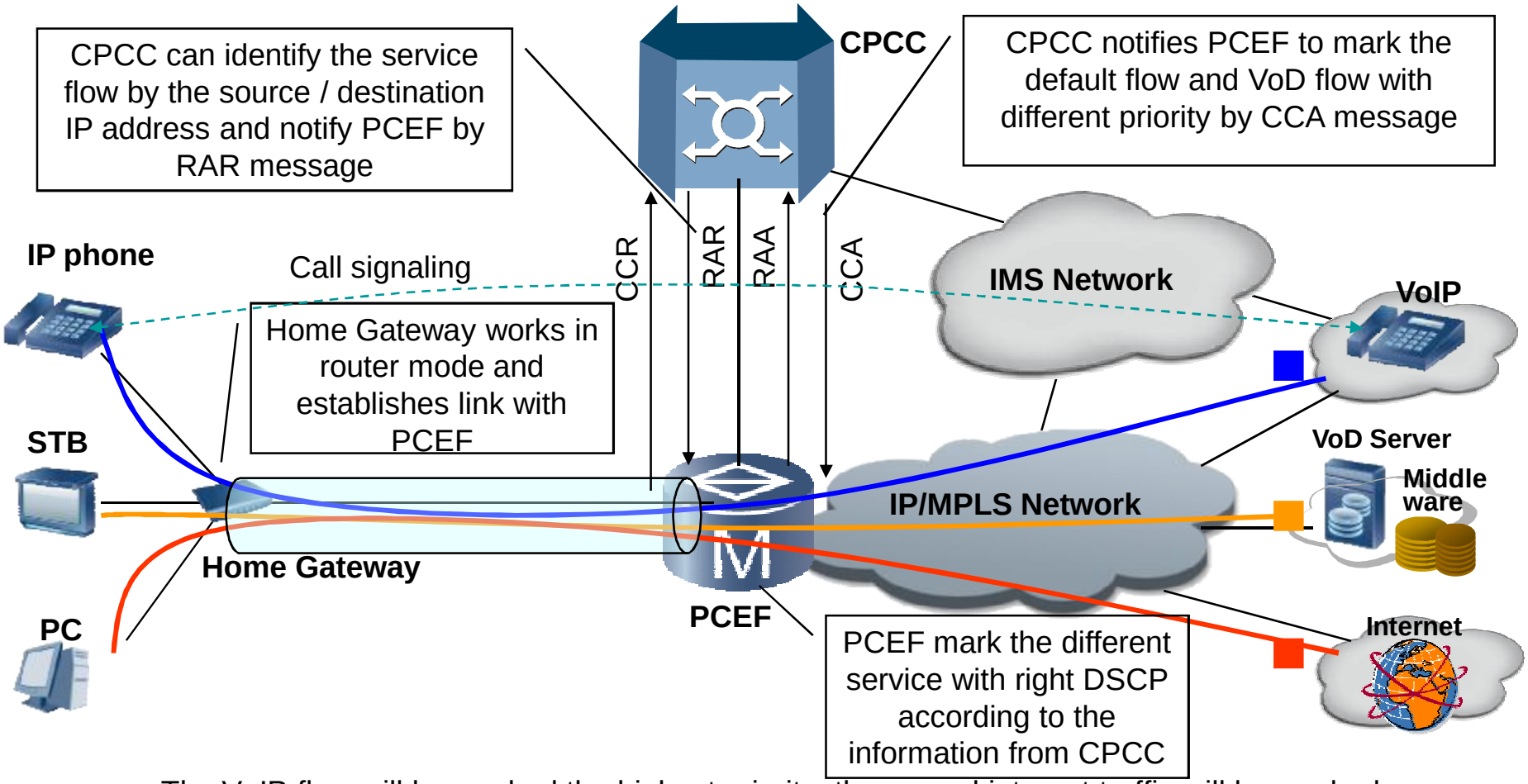
- Extend policy install interface to support HTTP redirect
- Different routing for specific Service through other device
- For some subscribers, their traffic is routed to Acceleration Server to speed up its access

# Test Scenario 4: Self-help Service for Subs. (BOD)




- **Subscriber can change the current service profile via portal**
- **Subscriber can also change the subscription information via portal**

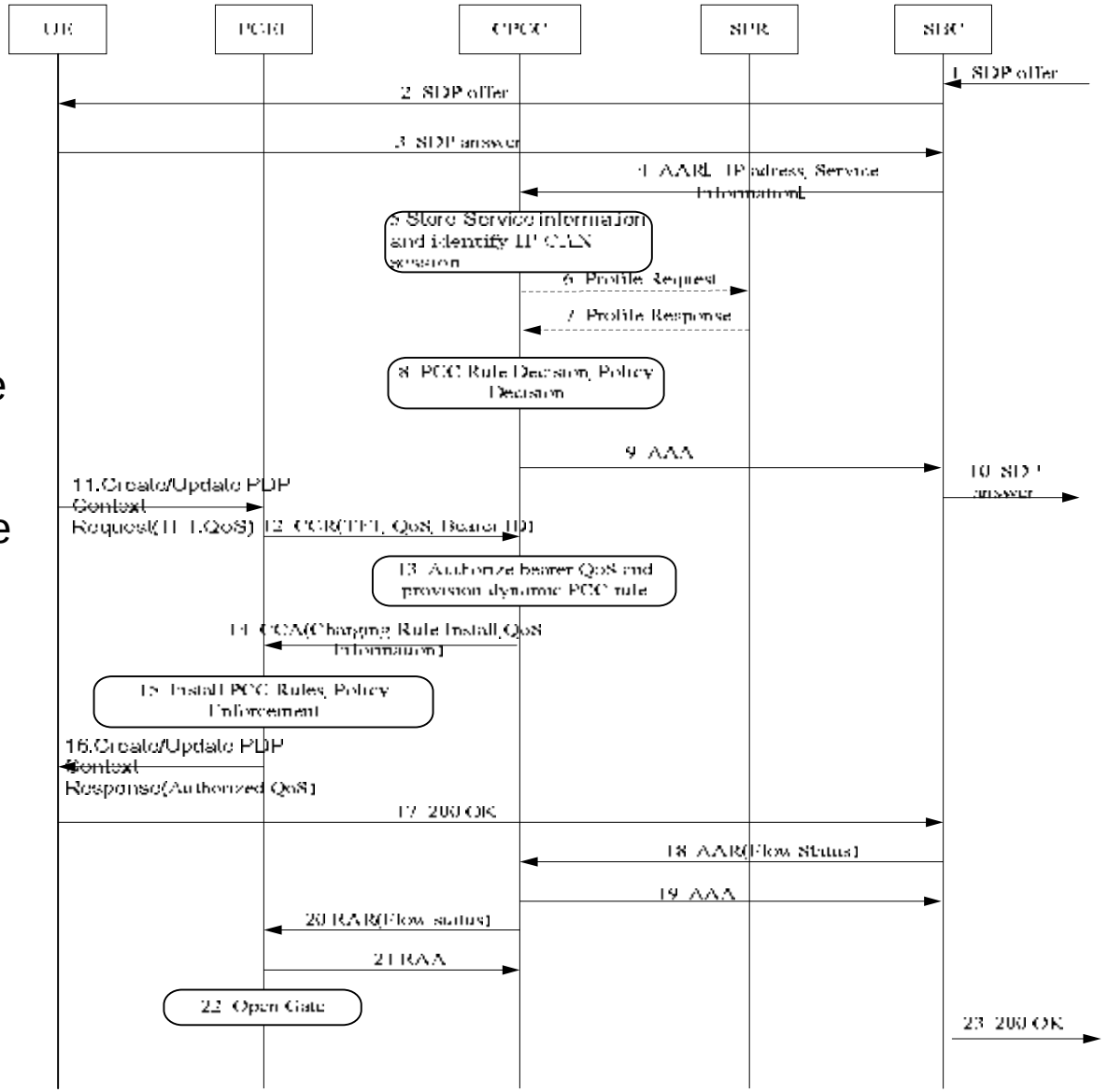
# Test Scenario Case 5: Triple-play Scenario




- The VoIP flow will be marked the highest priority, the normal internet traffic will be marked the lowest priority.
- The VoIP service will be handled first when congestion occurs on PCEF, the VoD and internet traffic will strive for the left bandwidth based on priorities.

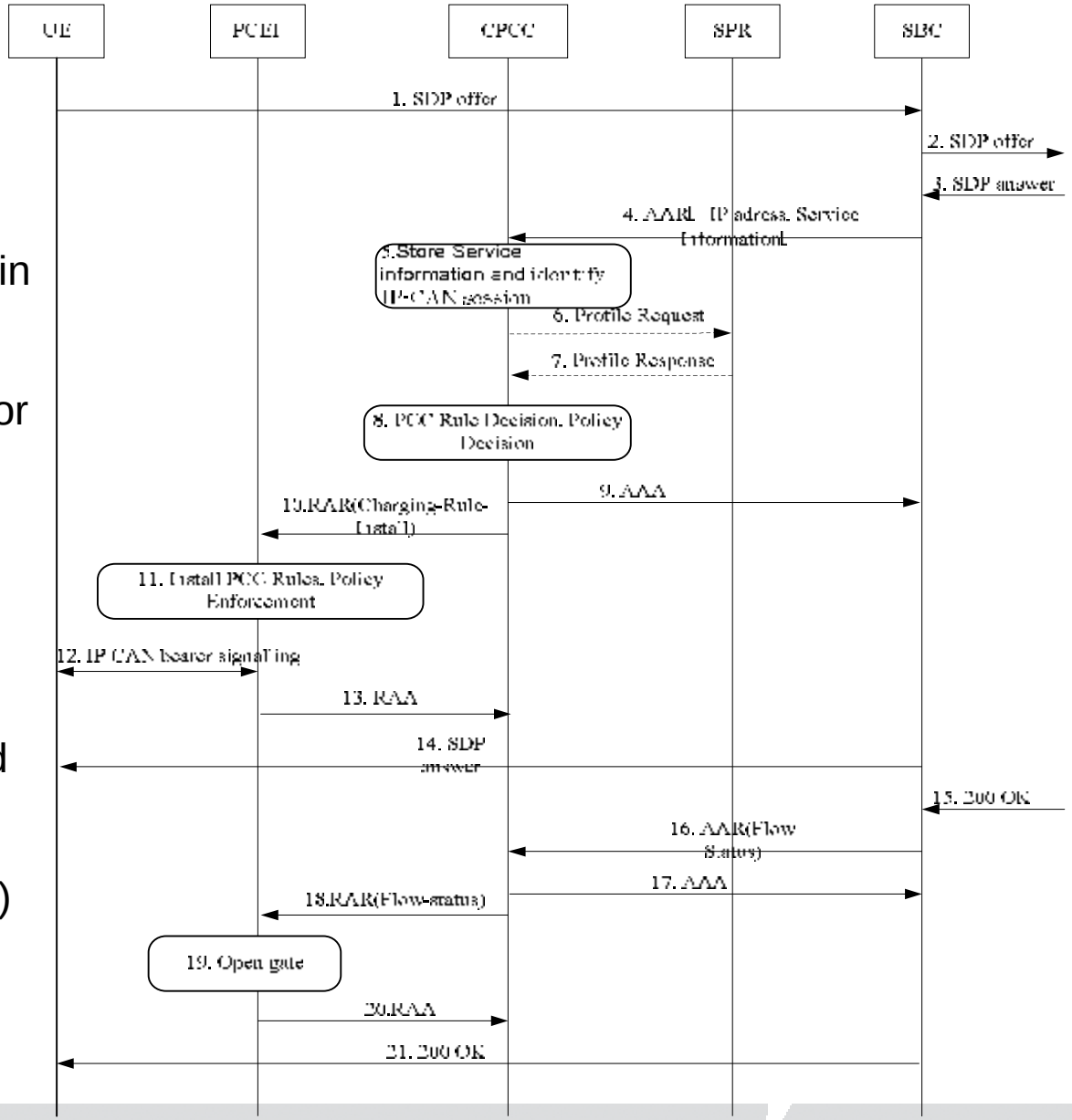
# Test Scenario Case 6: IMS with Pull mode

- PCC Rule Provisioning in PULL mode
- Procedure is only applicable for mobile
- For GPRS, UE requests one or more Secondary PDP Contexts to carry the media flows.
- PCRF use PDP Contexts TFT filters to match service data flow which comes from SBC.



# Test Scenario 7: IMS with Push mode

- PCC Rule Provisioning in PUSH mode
- Procedure is common for mobile and fixed
- PCC Rule is analogous for mobile and fixed
- How to enforce PCC Rule is access specified (e.g. fixed not support IPCAN bearer signaling)



# RACF in ITU-T

- General view of Next Generation Networks (NGN) in ITU-T
- Resource and admission control functions (RACF)
  - Architecture
  - Example physical realization
  - Protocols and interfaces (including Approved Recommendations)
- Future plans

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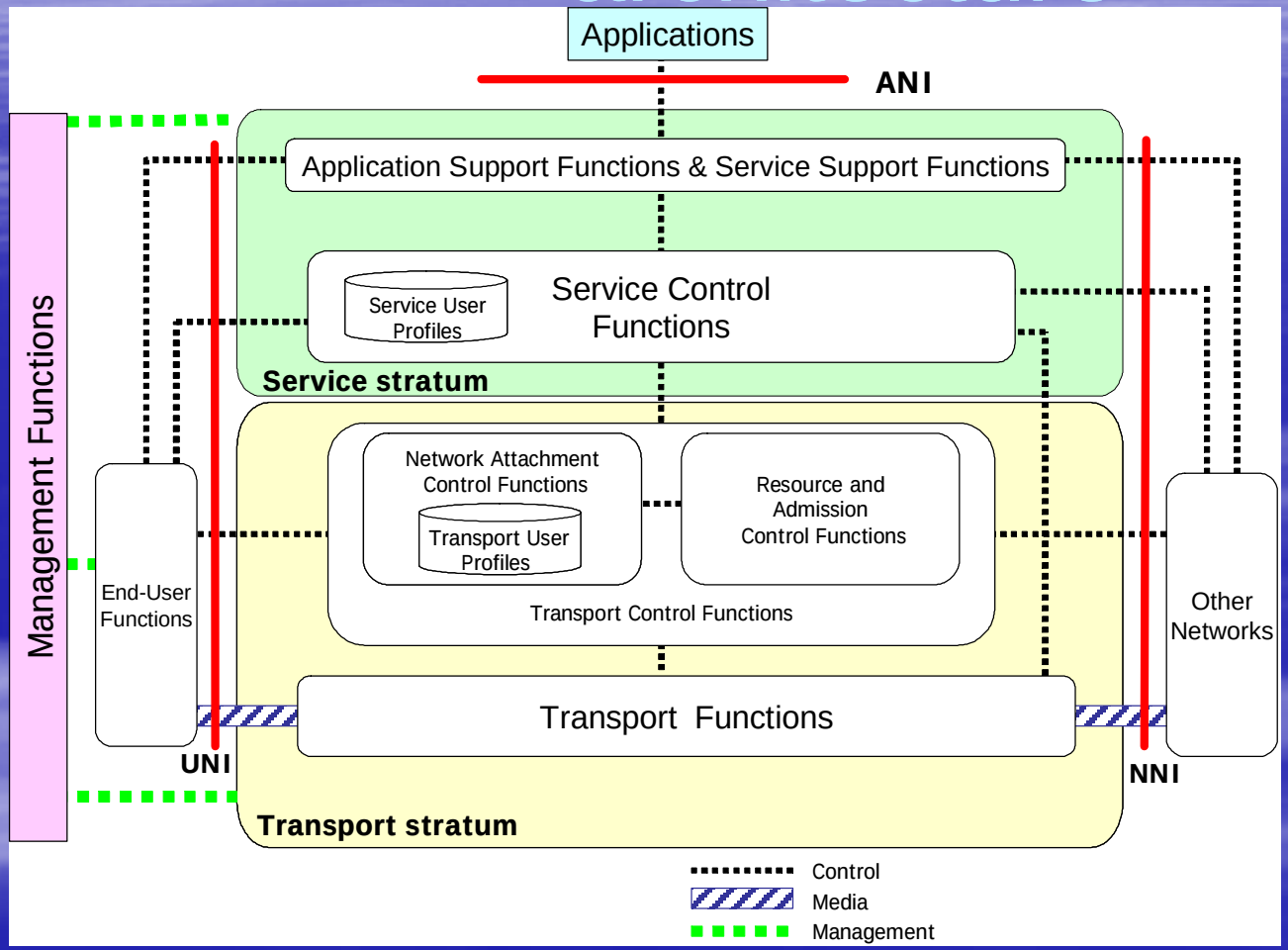
# Schematic view of ITU-T NGN architecture



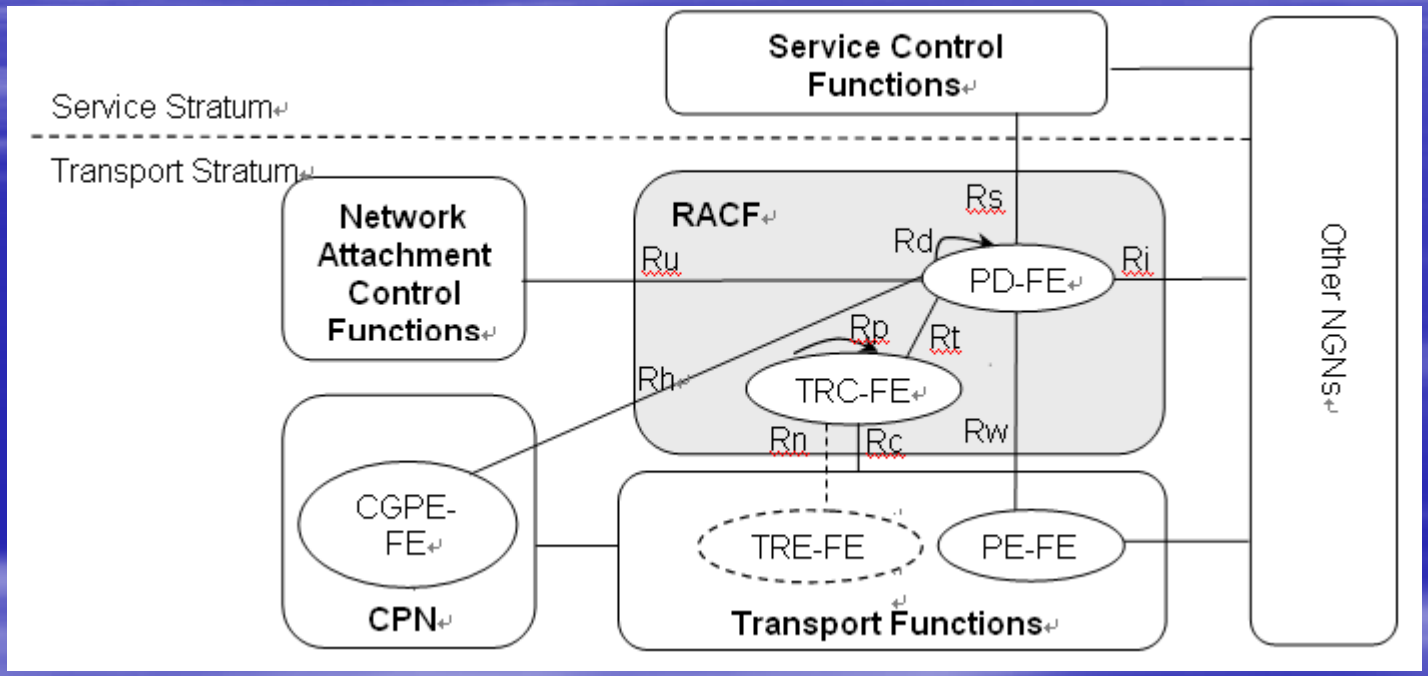

**NOTE: The user network interface (UNI), network network interface (NNI), and application network interface (ANI) should be understood as general NGN reference points that can be mapped to specific physical interfaces depending on the particular physical implementations.**

- **Multi-service, support for fixed-mobile convergence.**
- **Separation of services and transport, QoS awareness, packet transport**

# High level requirements of RACF

- Application-driven (network-independent) real-time control
- Management of transport resources within networks (access or core) and at network boundaries
- Policy-based authorization and allocation of resources supporting
  - Relative and absolute QoS
  - End-user equipment of varying QoS control capabilities
  - QoS-unaware, application-QoS-aware, network-QoSaware
  - Push and pull models for policy control
  - Multiple transaction models for resource authorization, reservation and commitment
  - A combination of resource management methods based on accounting, measurement and reservation
- Dynamic control of NAPTs, firewalls and NAT traversal

# Resource and admission control functions (RACF) - Architecture

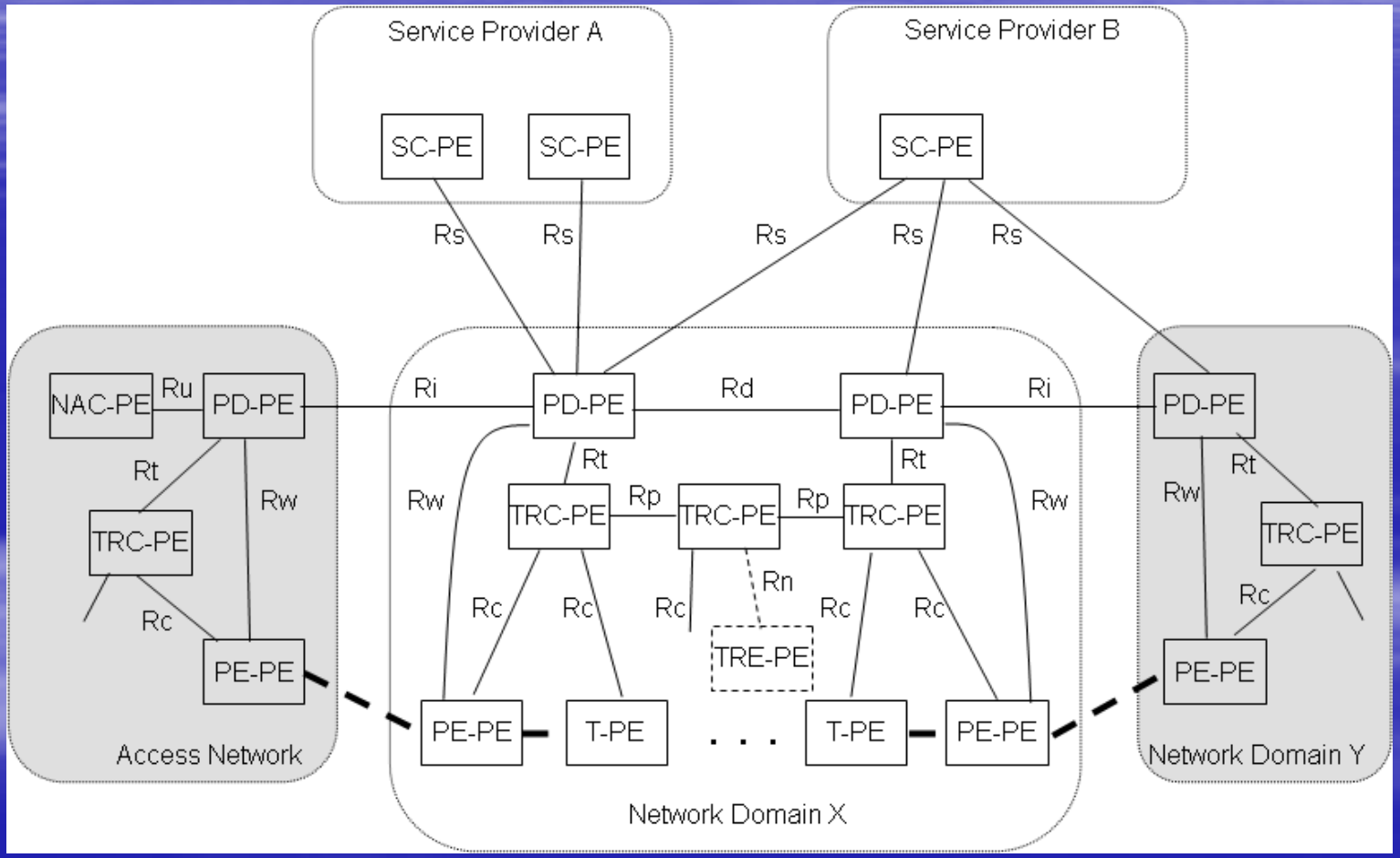



PDF - Policy Decision Function
TRCF - Transport Resource Control Function
BGF - Border Gateway Function
NACF - Network Attachment Control Functions

service-facing, transport technology independent

service-independent, transport-technology dependent, network-segment specific

# Example physical realization of the RACF architecture




**The heavy dashed lines denote packet flows.**

# Protocols and interfaces

| Interface | Supporting Entities | Protocol Base (Note) | Rec. No. | Status |
|---|---|---|---|---|
| Rs | SC-PE, PD-PE | Diameter | Q.3301.1 | Published |
| Rp | Between TRC-PE | RCIP | Q.3302.1 | Published |
| Rw | PD-PE, PE-PE | Introduction | Q.3303.0 | Published |
| | | COPS-PR | Q.3303.1 | Published |
| | | H.248 | Q.3303.2 | Published |
| | | Diameter | Q.3303.3 | Published |
| Rc | TRC-PE, T-PE | COPS-PR | Q.3304.1 | Published |
| | | SNMP | Q.3304.2 | Published |
| Rt | PD-PE, TRC-PE | Diameter | Q.3305.1 | Published |
| Rd | PD-PE to PD-PE (intra-domain) | Diameter | Q.3306.1 | Published |
| Ri | PD-PE to PD-PE (inter-domain) | Diameter | Q.3307.1 | Published |
| Q.QCP | QoS Coordination Protocol | RSVP | Q.3309 | Published |
| Rn | TRC-PE, TRE-PE | Interface is for further study | -- | -- |

NOTES: Diameter: RFC 3588;
COPS-PR: Common Open Policy Service – Policy Provisioning (RFCs 2748, 3084)
SNMP: Simple Network Management Protocol (RFC 3410 and many others)
RCIP: Resource Connection Initiation Protocol, (Q.3302.1/Q.3322.1)

# Future plans

| Draft | Title | Timing for approval |
|---|---|---|
| Q.3308.1 | Draft Q.3308.1: Protocol at the interface between Resource Admission Control Physical Entity (RAC-PE) and CPN Gateway Physical Entities (CG-PE) (CGPE-PE and CGPD-PE ) (Rh/Rh' interface) | 2010-01 |
| Q.3320 | Draft Q.3320: Architectural framework for the Q.332x series of Recommendations | 2010-01 |
| Q.3321.1 | Draft Q.3321.1: Protocol at the interface between Service Control Physical Entity (SC-PE) and Resource and Admission Control Physical Entity (RAC-PE) (Rs interface) | 2010-2Q |
| Q.3322.1 | Draft Q.3322.1: Resource control protocol no. 2 (rcp2), Protocol at the interface between Transport Resource Control Physical Entities (TRC-PEs) (Rp interface) | 2010-01 |
| Q.3323.1 | Draft Q.3323.1: Resource control protocol no.3: COPS Profile, Protocol at the Rw interface between Policy Decision Physical Entity (PD-PE) and Policy Enforcement Physical Entity(PE-PE) | 2010-2Q |
| Q.3323.2 | Draft Q.3323.2: Resource control protocol no.3 (H.248 Rw Profile), Protocol at the Rw interface between a Policy Decision Physical Entity (PD-PE) and a Policy Enforcement Physical Entity (PE-PE) (Rw interface) | 2010-2Q |
| Q.3323.3 | Draft Q.3323.3: Resource control protocol no. 3 (rcp3) | 2010-2Q |

# Future plans (Con't)

| Draft | Title | Timing for Approval |
|---|---|---|
| Q.3324.1 | Draft Q.3324.1: Resource Control Protocol no. 4 (rcp4), Protocol at the interface between a Transport Resource Control Physical Entity (TRC-PE) and a Transport Physical Entity (T-PE) (Rc interface): COPS alternative | 2010-2Q |
| Q.3324.2 | Draft Q.3324.2 : Resource control protocol no. 4 SNMP Profile, Protocol at the Rc interface between a Transport Resource Control Physical Entity (TRC-PE) and a Transport Physical Entity (T-PE) (Rc interface) | 2010-2Q |
| Q.3325.1 | Draft Q.3325.1: Resource Control Protocol no. 5 (rcp5), Protocol at the interface between a Transport Resource Control Physical Entity (TRC-PE) and a Policy Decision-Physical Entity (PD-PE) (Rt interface): Diameter based | 2010-2Q |
| Q.ANCP | Draft Q.ANCP: Use of the Access Node Control Protocol on the Rp Interface | 2010-2Q |
| Q.FlowStateSig | Draft Q.Flowstagesig: Resource control protocol for Flow State Aware Access QoS Control in an NGN | 2010-01 |
| Q.PCNApp | Draft Q.PCNApp: Enhancement of resource admission control to use pre-congestion notification (PCN) | 2010-01 |
| Q.rsctm | Draft Q.rstcm: Signalling flows and protocols for support of IPTV services | 2010-2Q |
| Q.sigafmob | Draft Q.sigafmob: Signalling architecture and signalling flows for mobility | 2010-2Q |

# Thank you

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