Satellites in Next Generation Networks
QoS issues

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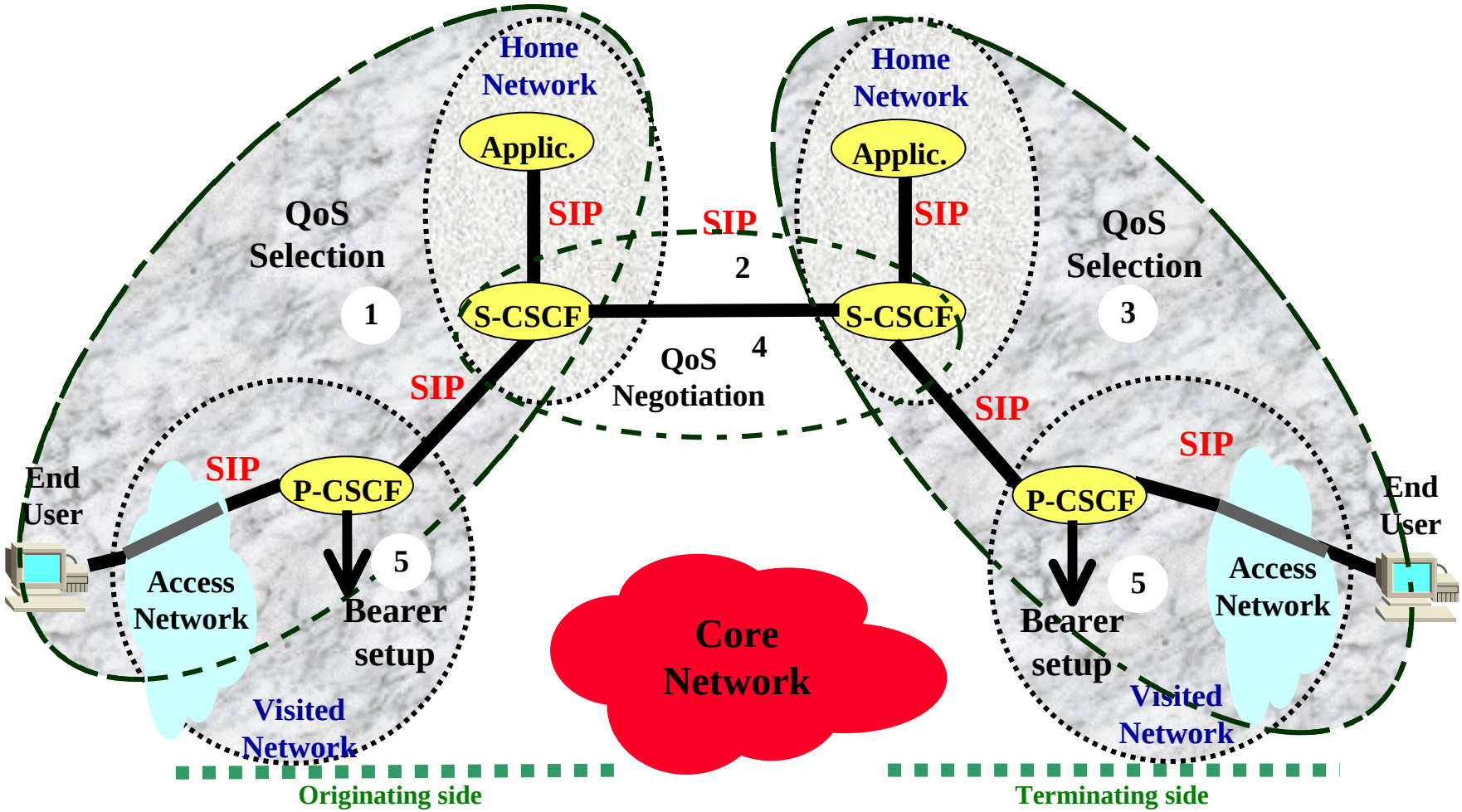
Content

NGN
In Short

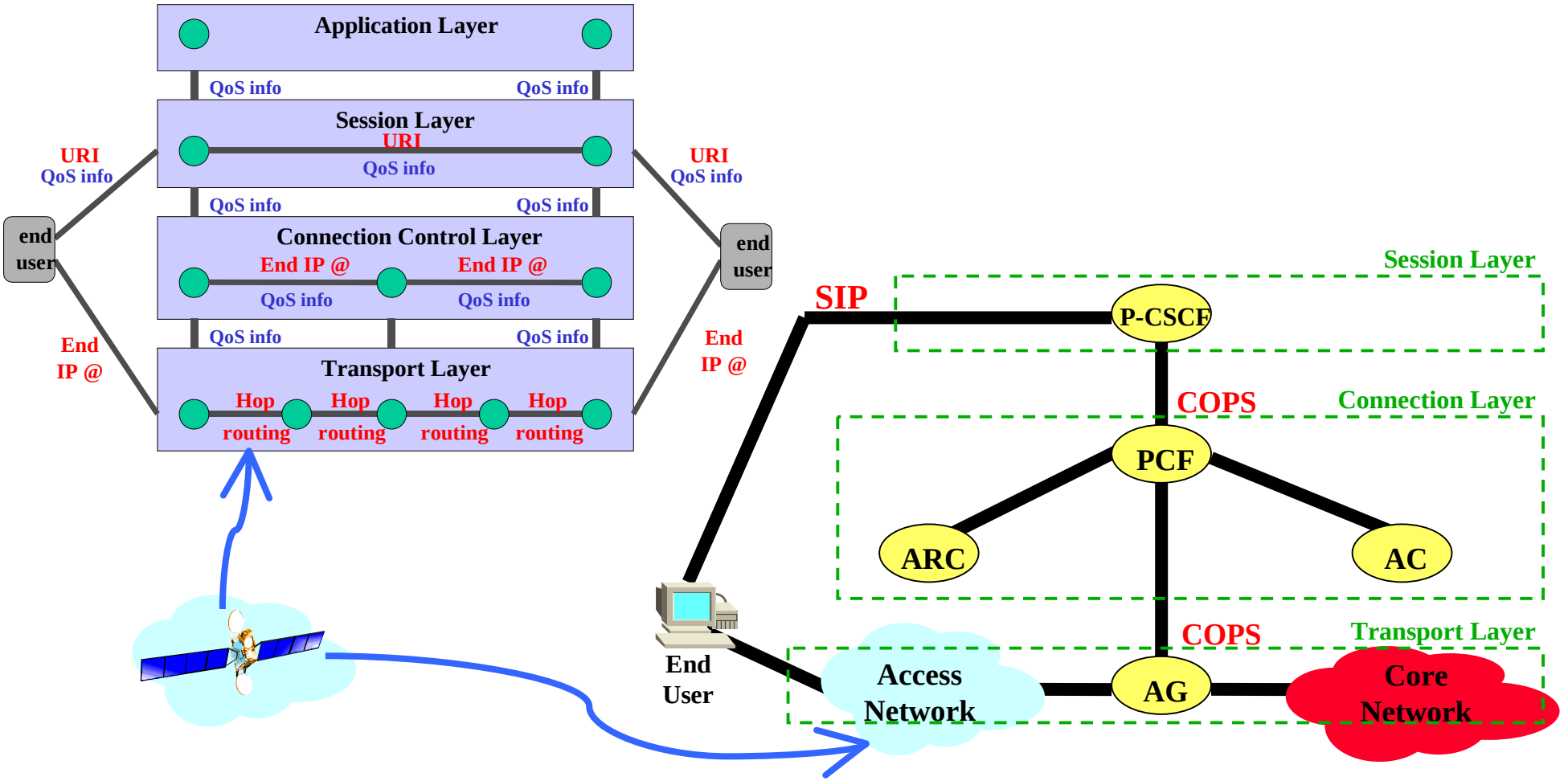
> **NGN (Next Generation Networks) means**
- Uncoupling services and transport provision (like IN)
- Multimedia/multi-services/multi-networks
- Packet-based (IP)
- QoS and security are MUST !

> **QoS for NGN means**
- QoS aware network equipment
- Admission control mechanisms
- Interaction between call signalling, resources management and admission control

NGN
End-to-End QoS



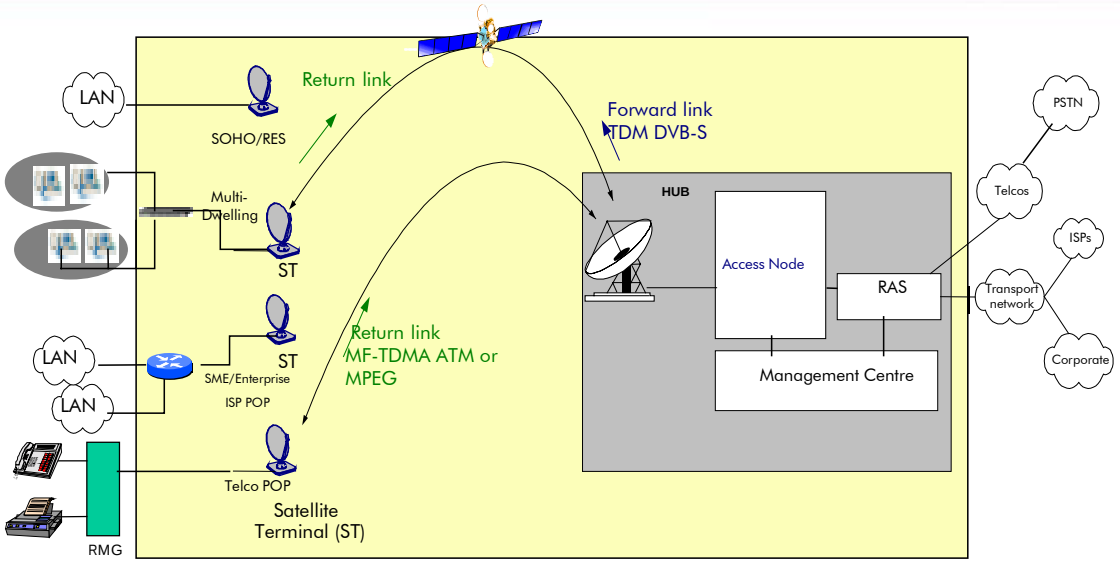
NGN
General Layered QoS Model



Current Satellite Systems
Access Network Architectures

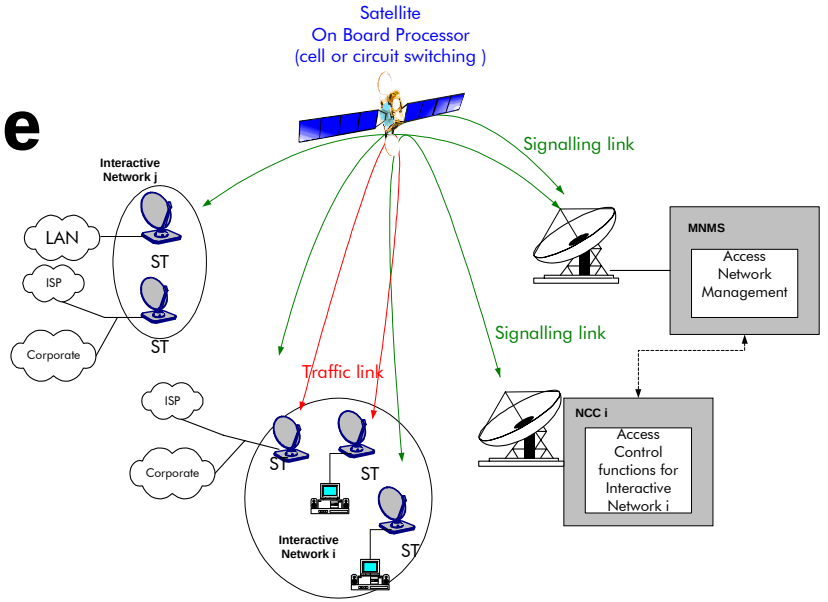
> DVB-RCS architecture

- 2-way multimedia
- IP based
- DVB-S forward link
- MF-TDMA return link
- ATM or MPEG segmentation
- Packet based DAMA



> Regenerative Satellite architecture

- Multi-Gateway
- Mesh: direct ST-to-ST
- ATM or MPEG on-board switching
- DVB-S downlink
- DVB-RCS uplink



Current Satellite Systems
QoS

> **Service Level Agreement (SLA)**
  - **Satellite network operator** grants a given bandwidth (usually constant) to each service provider for its pool of STs
  - **Service providers** grant subscribers a per ST traffic contract:
    - Best effort with peak rate
    - Minimum guaranteed rate with a peak rate

> **Static Admission Control**
  - At ST log-on
  - Upon management action

> **Traffic Contract Enforcement**
  - **Return link:** DAMA algorithms using capacity categories defined in DVB-RCS: CRA, RBDC, VBDC, FCA
  - **Forward link:** IP and/or ATM traffic management (policy, shaping) in the Hub

Enhancing the current situation
Expected improvements

> STEP 1 - Adding flexibility & better QoS in the access

- Priority mechanisms between Real-Time and non Real-Time applications according to IP CoS indications (DiffServ DSCP)
- Coupling between IP and MAC processes in ST
- Traffic contract modification of the ST from NMC or upon user's request (e.g. using a Web-based interface)

> STEP 2 - Interworking between access and core NGN enabled networks

- Dynamic admission control based on specific satellite signalling mechanisms
- Dynamic admission control and resource reservation coupled with call signalling protocols (SIP, H323)

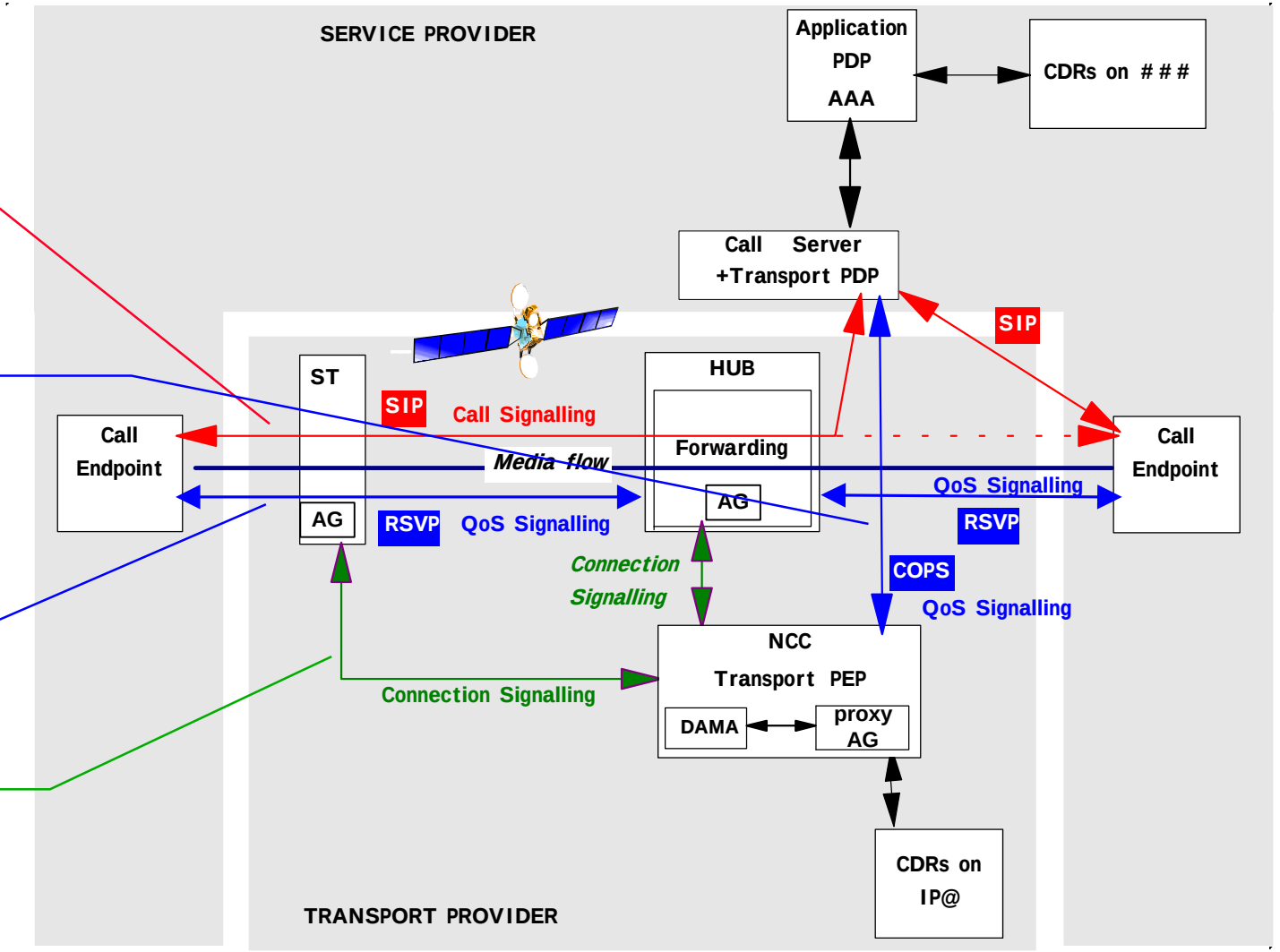
Enhancing the current situation
Star Architecture

Session protocol

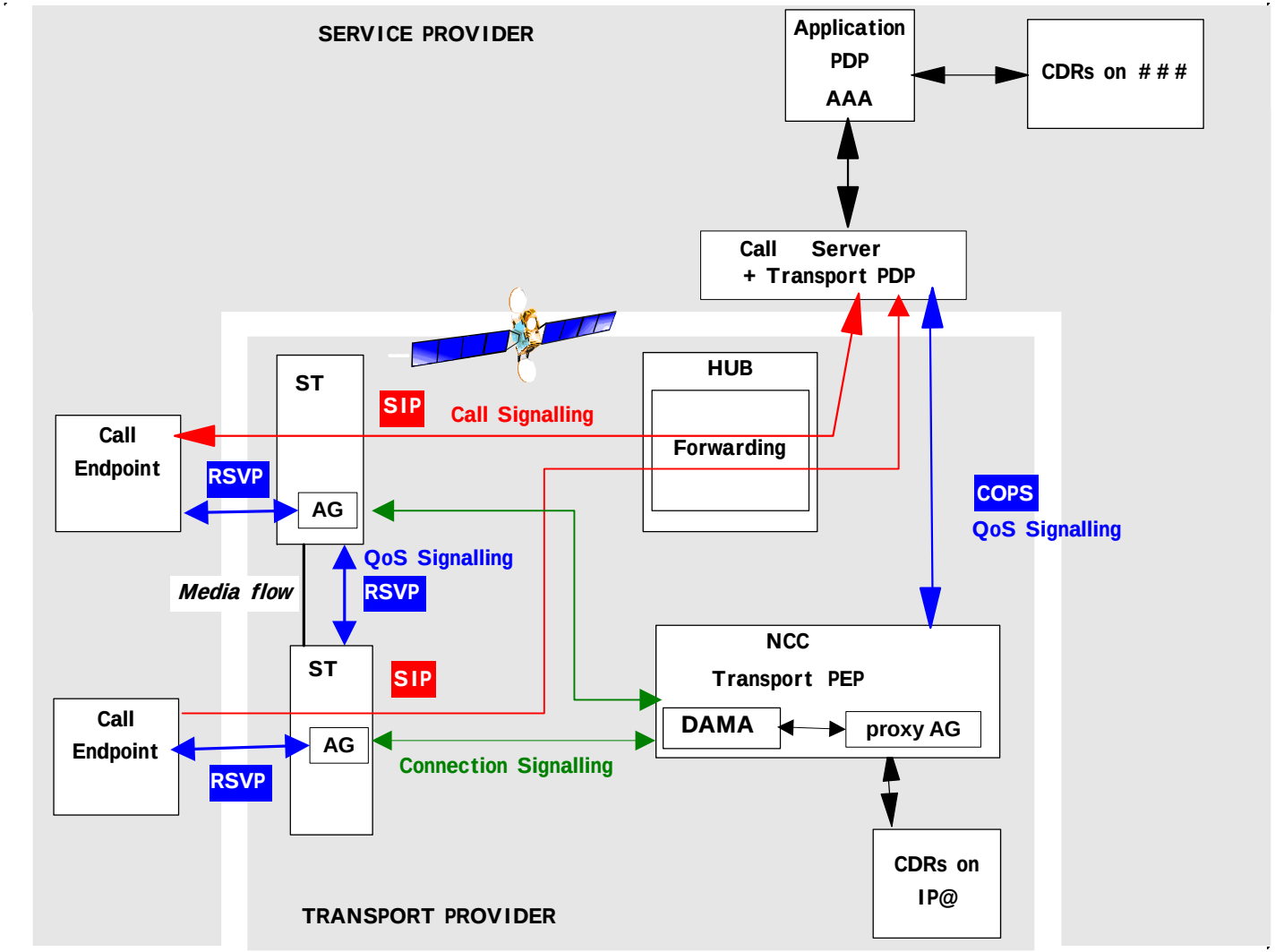
Network transport Policy control protocol

Network transport QoS protocol

Satellite transport QoS protocol (DVB-RCS extension)



Enhancing the current situation
Mesh architecture



Satellite in NGN
Status

> **Current NGN-related terrestrial network activity is huge**
  - Standards : IETF, ITU, ETSI
  - Planned roll-out for Cable, UMTS and DSL access networks

> **Satellite system is weak in NGN picture**
  - Only pure physical/access layer standards (DVB-RCS)
  - No QoS support definition
  - No satellite/terrestrial interworking defined
  - Current proprietary solutions and weak QoS
  - May slow down the up-taking of NGN and their associated services through satellite

Satellite in NGN
Future Activities

> Determine typical **applications/services scenarios** requiring QoS support and their requirements for integration of Broadband Multimedia systems

> Define **QoS architectures**, identify functional entities and interfaces. Analyse call signalling/resources management/ admission control interactions

> Guarantee **interoperability** with terrestrial NGN protocols or propose extensions/profiles. Analyse specific processing or adaptations required in satellite access equipment at adaptation & access layers

> Propose potential **extensions or adaptations** to satellite access standards such as DVB-RCS : transparent +OBP based meshed systems

SATIP6 project

> Funded by EC (IST program)
> Started march 2002, ends april 2004
> Partners : Alcatel Space (leader), France Telecom R&D (F), Telecom Italia-Lab (I), SINTEF (N), University of Roma-Sapienza (I), AQL (F), LAAS-CNRS (F)
> Technical objectives
  - for the short-to-medium term focusing on adaptation of DVB-RCS access for IP services with traditional transparent satellite
    – MPLS based VPN service
    – PPPoE based Internet access
  - for long term in which IPv6 and NGN will be introduced over next generation satellites (regenerative OBP payloads)
    – IPv4/v6 migration
    – NGN QoS
    – multicast optimised security (SatIPSec)
    – IP-Dedicated “connectionless” access over DVB-RCS