Some insights about possible future IP over DVB encapsulation

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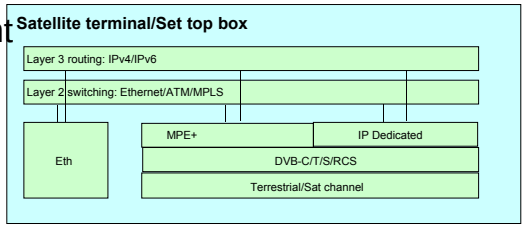
  - Short term : MPE enhancement
  - Long term : MPE replacement
- ADSL-like layer 2/layer 3 internetworking
- IST-Brahms & SATIP6 projects
  - IP-Dedicated Satellite Access Scheme
    - Connectionless mode
    - Subnets
- Conclusion, involvement in IP/DVB group

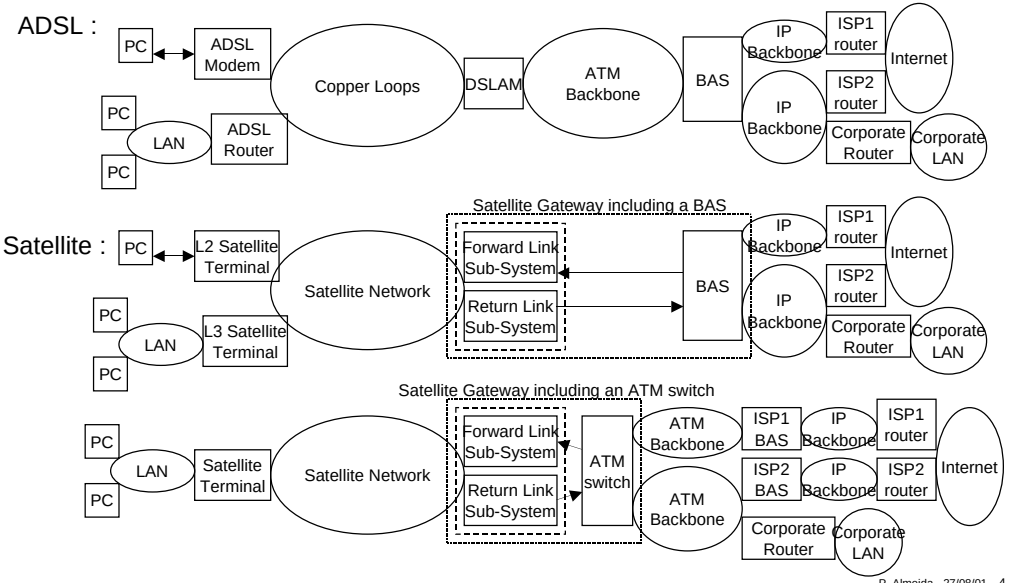
IP over DVB : Short/long term view

- Common stack for both terrestrial and satellite
- Short term : MPE Enhancement
  - Multisource IP multicast
  - Ethernet bridging
  - MPLS
  - Internal studies
    - PPPoE+Multicast
    - MPLS VPN (L2 or L3)



- Long term : MPE replacement
  - Ethernet-like stack
  - Dynamic ARP based address mapping
  - Multicast aware
  - Secure layer
  - IST-Brahms and SATIP6 projects : IP-Dedicated

Short medium term Satellite Access: layer 2/ layer 3 approaches similar to ADSL



IP over DVB : IST Brahms & SATIP6

- IST-Brahms (2000-2001) and SATIP6 (2002-2003) projects
  - Partners: Telecom Italia-Lab, France Telecom R&D, Sintef, University of Roma,...
- Brahms results : IP-Dedicated definition
  - IP/Label mapping
  - S-ARP (Satellite Address Resolution Protocol)
  - Terminal authentication & configuration
  - QoS
  - Multicast Security
- SATIP6 goals :
  - short term system : Internet access and Multicast based on PPPoE/RCS
  - medium term system : MPLS over DVB-RCS
  - long term : IP-Dedicated over DVB-RCS in an IPv6 and NGN context

IP over DVB : IP-Dedicated What & Why ?

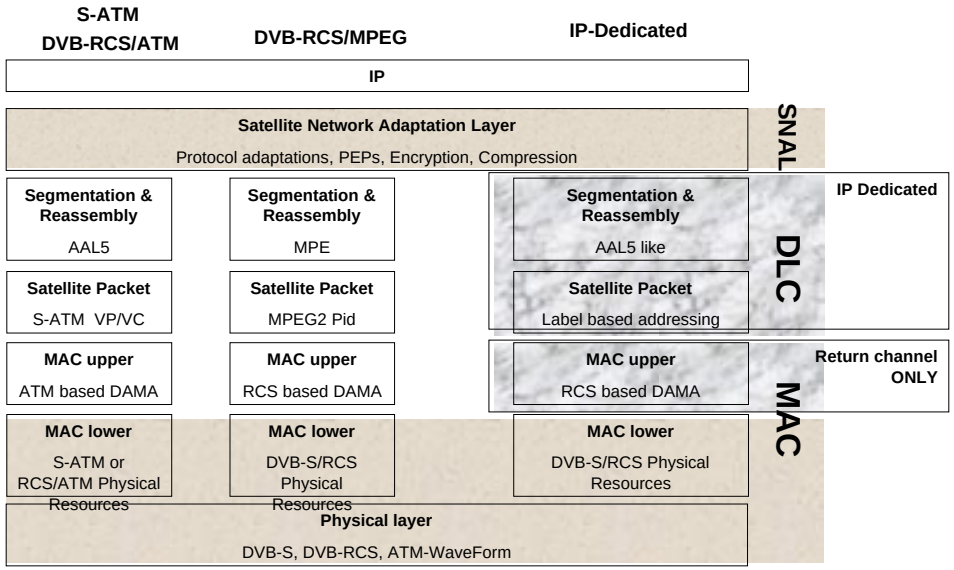
What is IP dedicated ?

- IP dedicated is : A Layer 2 protocol set
  - Optimized for IP (addressing, configuration, management)
  - Optimized for Satellite (natural Multicast and Broadcast)
  - Adapted to both transparent and regenerative satellites
  - Packet oriented access scheme to star and mesh topologies
  - DVB-RCS compatible: ATM or MPEG profiles

Why IP dedicated ?

- There is no ideal solution :
  - ATM : point to point oriented. Difficult multicast. Complex and not widely accepted signalling.
  - DVB-RCS: Dedicated to Terminal to Gateway through transparent system, mesh not specified yet, poor multisource multicast.
  - Some proprietary but limited solutions for transparent systems (VSATs)

IP over DVB : IP-Dedicated Protocol stacks



IP over DVB : IP-Dedicated Connectionless mode

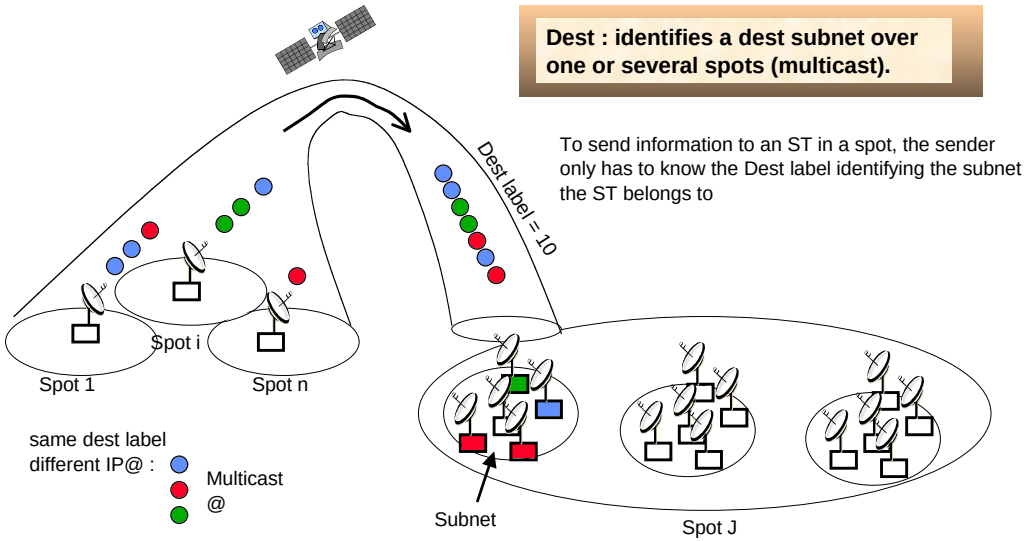
- Received packets are identified and filtered upon L3 IP source/dest header
  - ➔ **connection set up is not required**
- However, a simple L2 filtering is added
  - to **reduce L3 processing**
  - to **allow subnetworking** (VSN*, VPN*, multicast groups)
  - to **allow simple L2 on-board switching**
- In a spot, packets destined to STs* belonging to the same « virtual network », have the same L2 label
  - this « virtual network » is called « **subnet** »
  - the L2 label is called « ***Dest* Label** »

*VSN = Virtual Satellite Network
*VPN = Virtual Private Network
*ST = Satellite Terminal

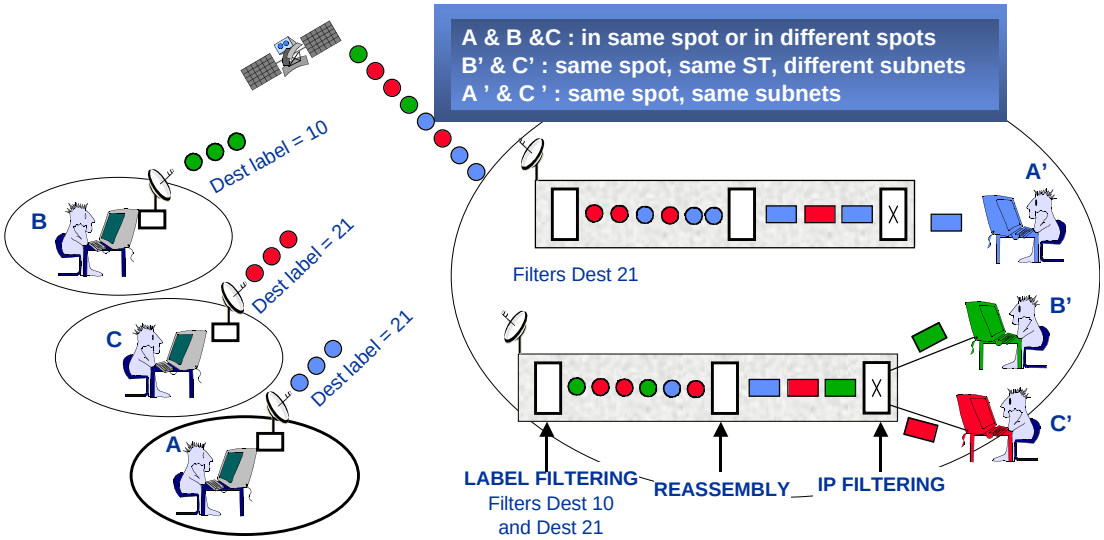
IP over DVB : IP-Dedicated Subnets

- A subnet can be spread over several spots
- A ST can belong to several subnets
- A subnet needs :
  - One Dest label for each destination spot (unicast & inter-spot multicast subnet)
  - One label per L2 multicast configuration (multicast subnet)
- ST proceeds in two steps :
  - L2 : filter packets having Dest Labels corresponding to the subnets the users behind the ST belong to
  - L3 : filter packets upon the IP dest@
    - ➔ *Reassembly is performed thanks to specific fields in the packet header*

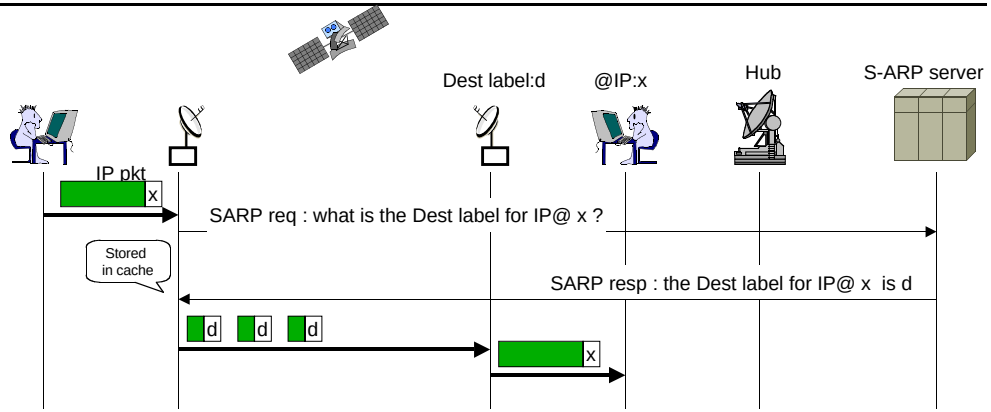
IP over DVB : IP-Dedicated Subnets



IP over DVB : IP-Dedicated Filtering and reassembly



IP over DVB : IP-Dedicated How does ST get the Dest label ?

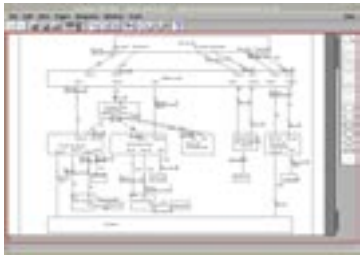


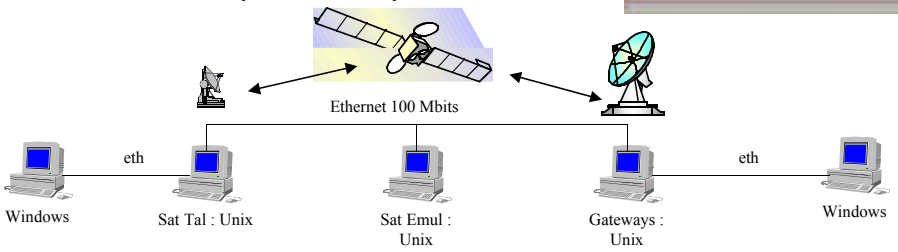
- All STs know the S-ARP server IP@ and associated Dest label
  - preconfigured or loaded at session establishment
- ST maintains a cache (IP@ -> Dest label) to reduce S-ARP requests number
- The S-ARP response can include an IP subnet mask in case the same Label can be used to reach a whole IP subnet : allows to reduce S-ARP signalling

IP over DVB : Brahms demonstrator Objectives

Testbed Objectives & Architecture

- Objectives :
  - Validate IP-Dedicated protocol stacks (SDL)
  - Carry real IP packets at high data rate (>10Mbit/s).





Short/medium term involvement for IP-DVB group

- Check compatibility and optimization (primarily for unicast) for
  - Transparent DVB RCS networking
    - → Routed mode
      - Address resolution protocol for dynamic configuration of the IP encapsulation
    - → Ethernet Bridged 'ADSL like' model
      - minimize overhead consumption
  - DVB S/ RCS MPEG based on circuit switch OBP
    - → Improved addressing capabilities over mesh system

Conclusion

- This presentation aimed at showing the need for two studies:
  - MPE enhancement (short term)
  - MPE replacement (long term)
    - → Ethernet Like layer
    - → Taking advantage of multicast mediums
    - → Native Security
- Some work already done by ASPI on MPE replacement
  - IP-Dedicated (IST-Brahms, IST-SATIP6)
  - Some IPR
- Need for a unique solution
  - Terrestrial & Satellite