IP over DVB developments in the IETF

IP Workshop (May 2004)
ESTEC, ESA

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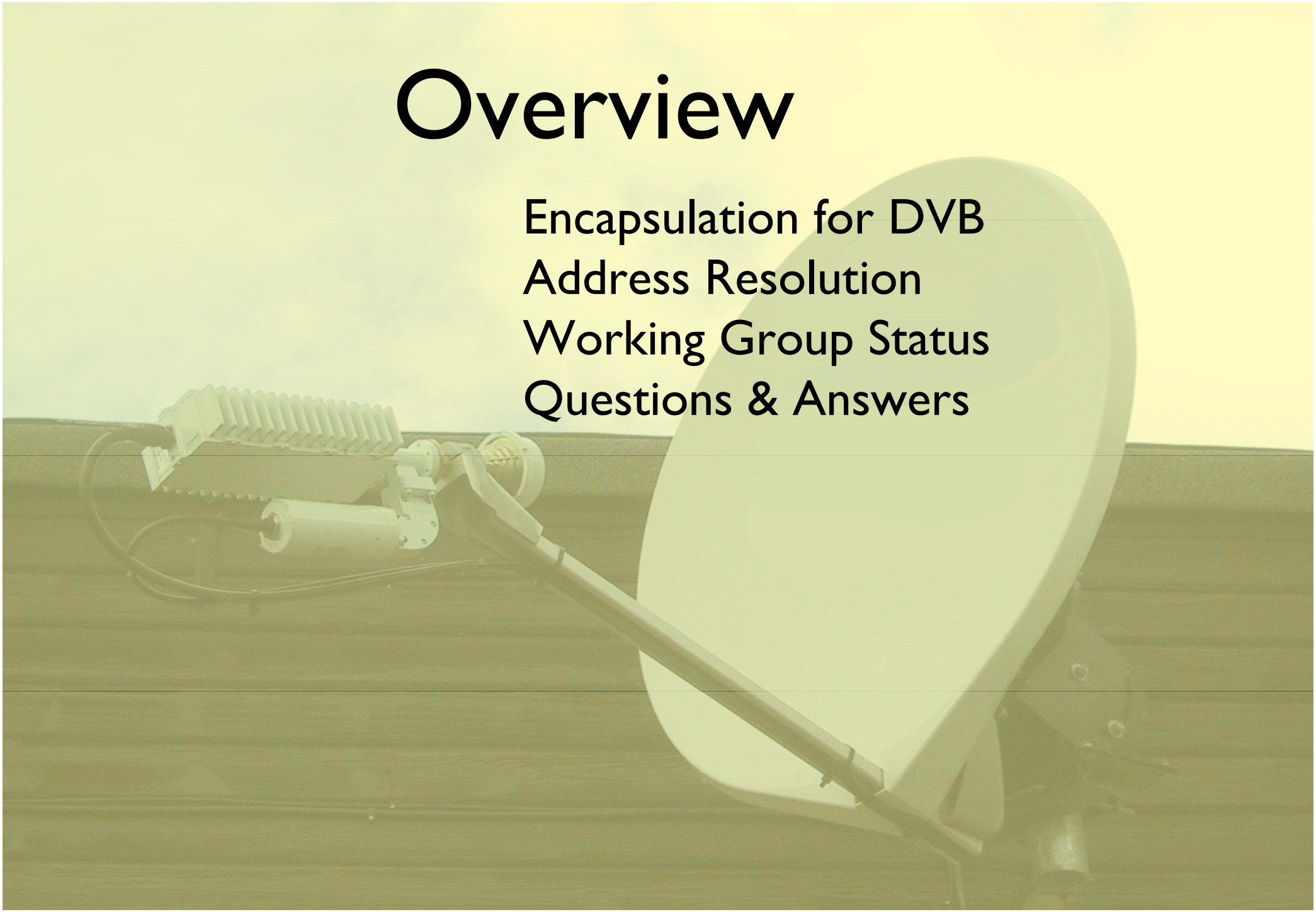
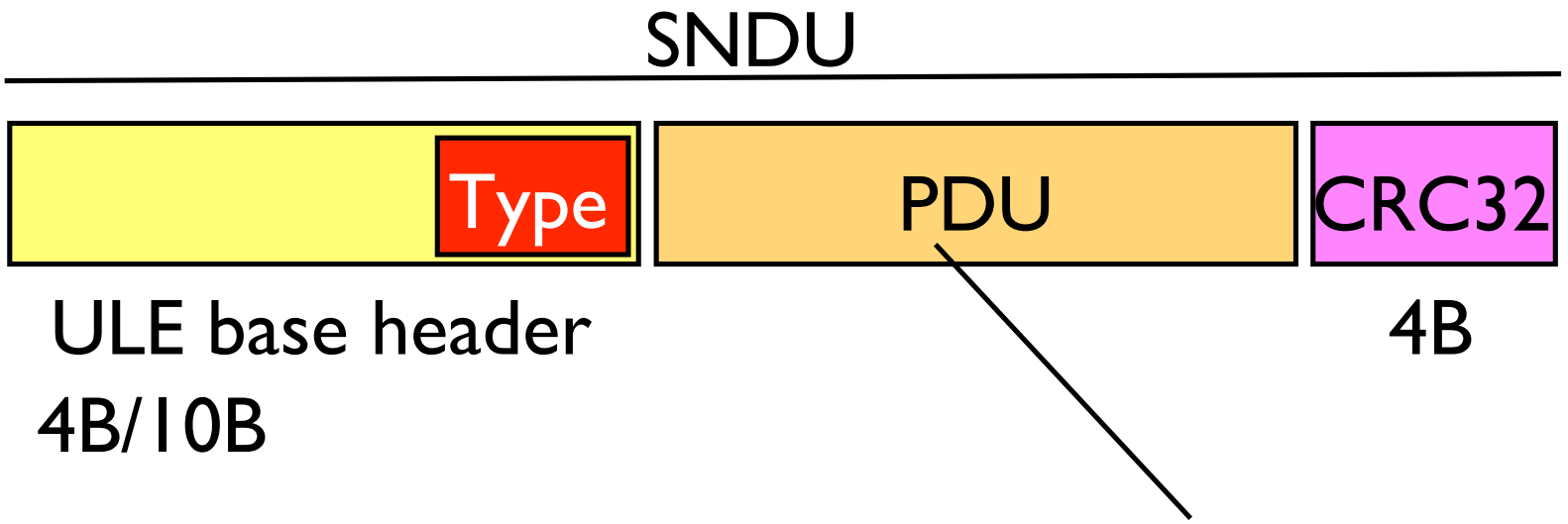
Overview



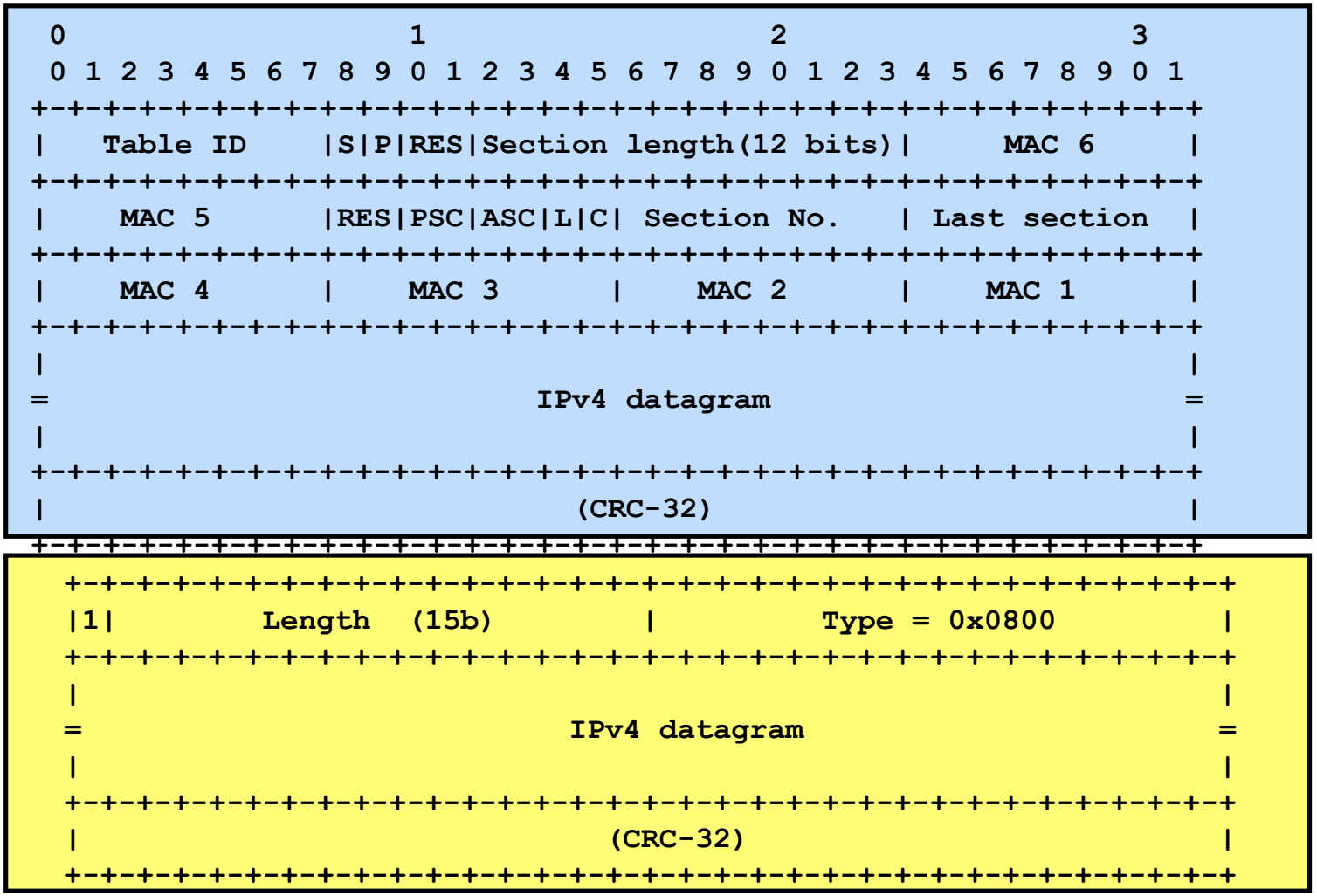
Encapsulation for DVB
Address Resolution
Working Group Status
Questions & Answers

Ultra Lightweight Encapsulation (ULE)

ULE Format


SNDU
Type
PDU
CRC32
ULE base header
4B/10B
4B
IPv4
IPv6
MPLS
802.1p/Q
Ethernet (bridging)
etc.

ULE & MPE



MPE
~15 header fields

ULE
3 header fields

50% less overhead when 1 PID per site/multicast group

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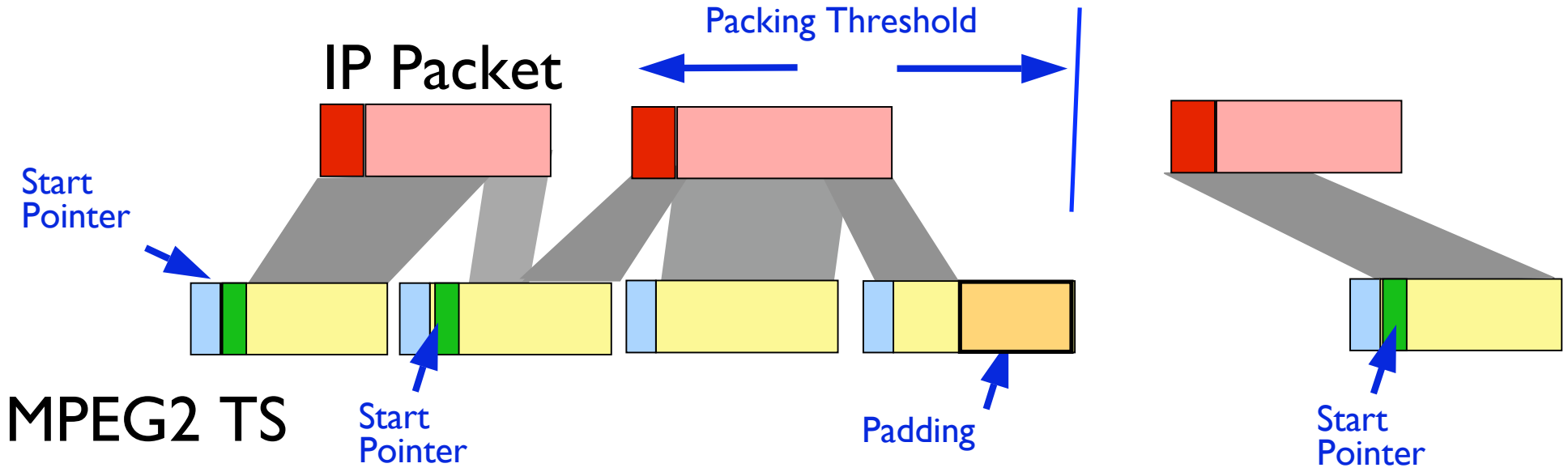
SNDU Transmission



Packing Threshold

- Maximum period to wait before Padding
- Determines transmission efficiency
- Controls QoS of flow

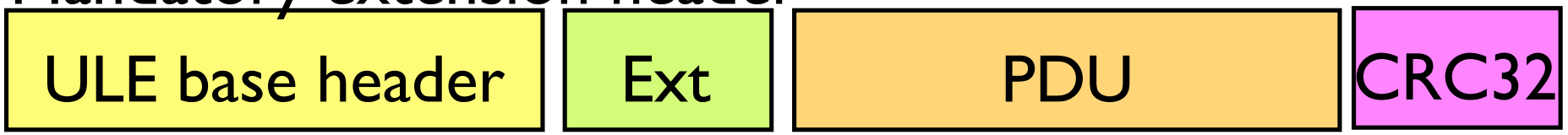
ULE Headers

Standard SNDU

4B/10B

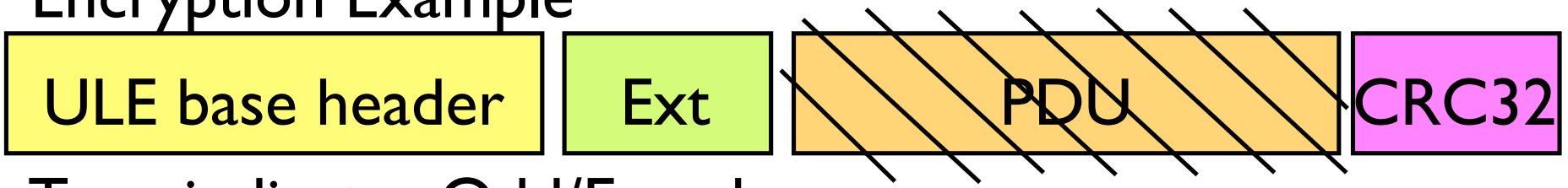
4B

Mandatory extension header



Process or discard PDU

Encryption Example

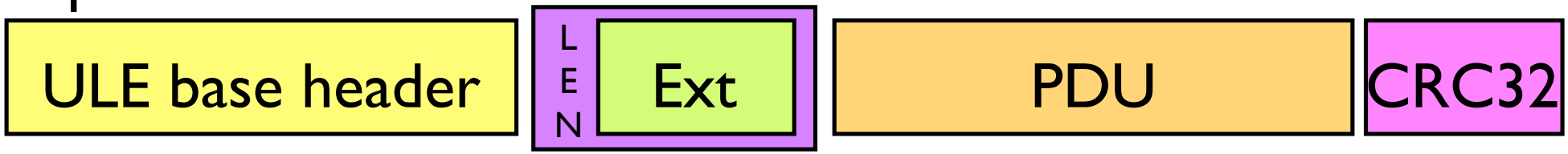


Type indicates Odd/Even key

HELP NEEDED: How big is Encryption Ext?

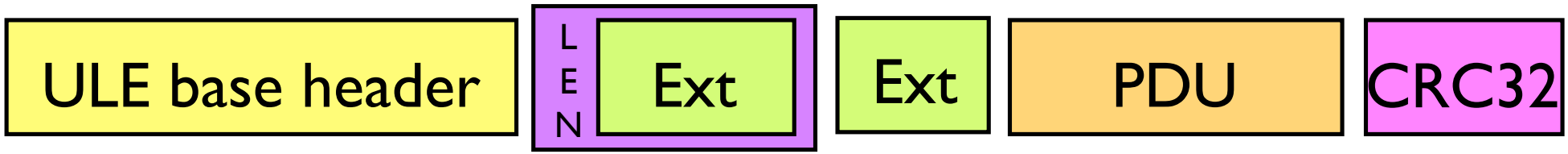
ULE Optional Headers

Optional extension header



Process or ignore extension

Chained extension headers



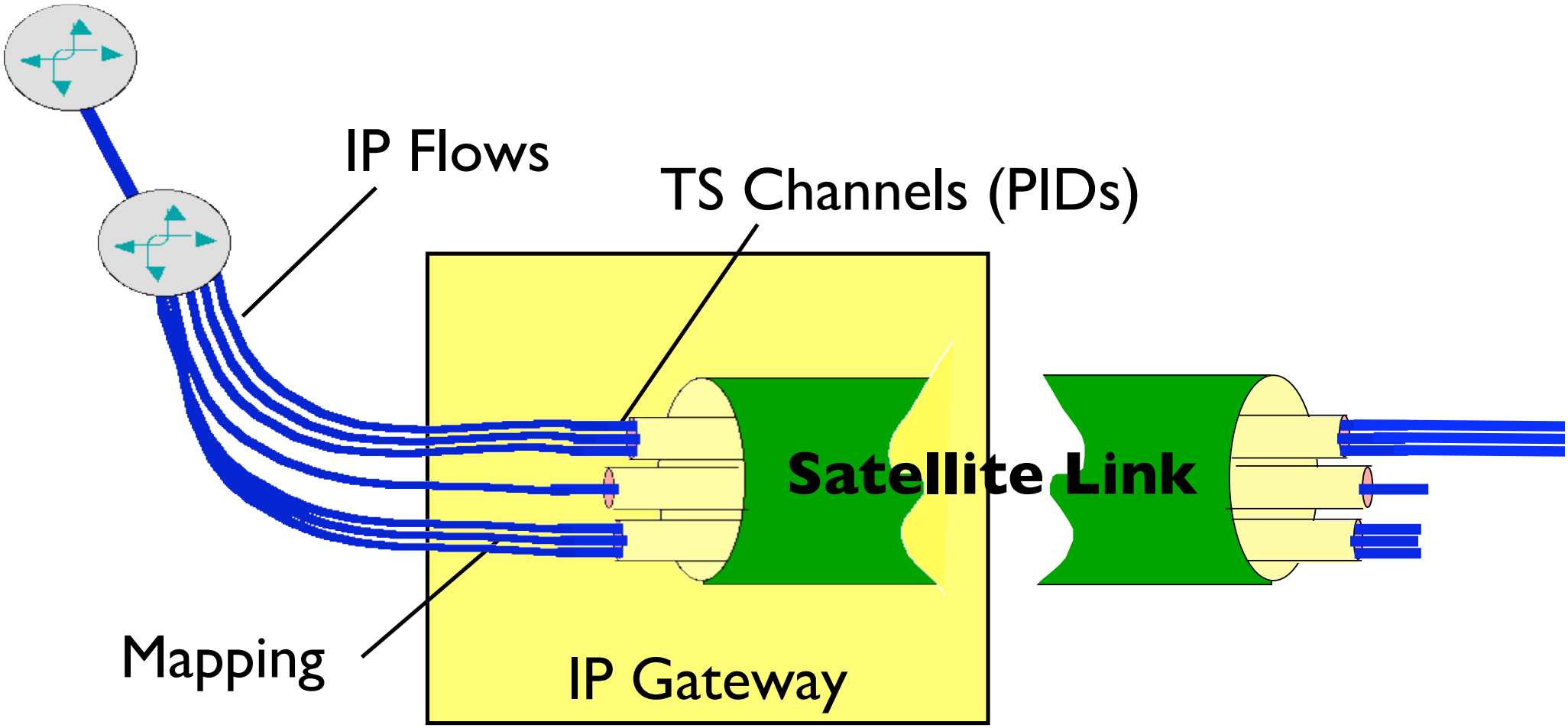
Several extensions possible

ULE Benefits

- Support for Ethertype
  - IPv4; IPv6; MPLS; 802.1p/Q; Bridging; arp; ...
- Lightweight implementation
  - Simple, unambiguous, no “hiddens”, Interop!
- Improved efficiency (in some cases)
- Max Frame Size (≥1500 B)
- Flexibility (extension headers)

Address Resolution

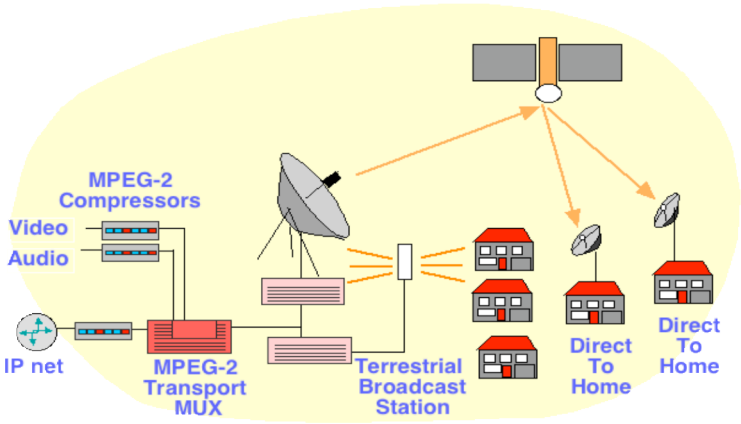
IP Gateway

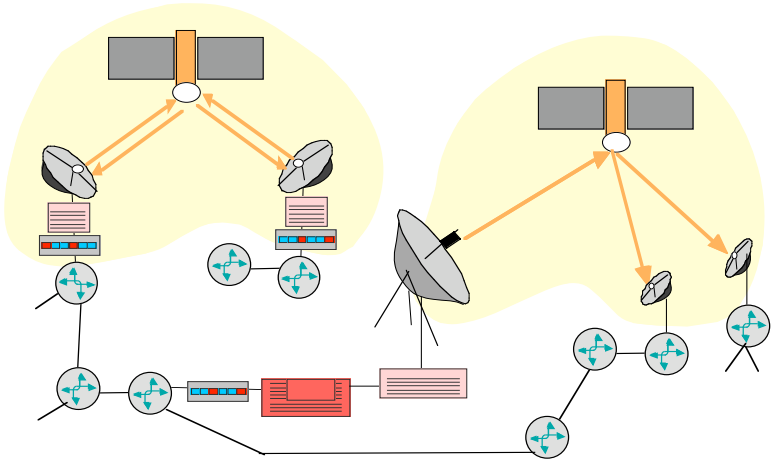

IP Flows
TS Channels (PIDs)
Satellite Link
Mapping
IP Gateway

Two approaches

For broadcast TV networks

- AR below IP
- Broadcast - technology dependent





For data networks

- AR above IP
- Technology independent

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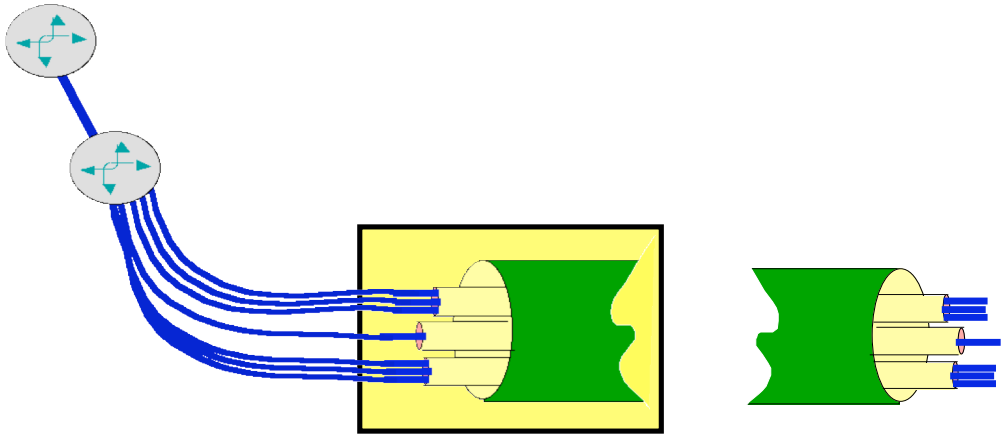
Two methods complementary

DVB Address Resolution



DVB INT

- Internet Notification Table (INT)
- MPEG-2 Control Plane
- Suited to broadcast / content distribution

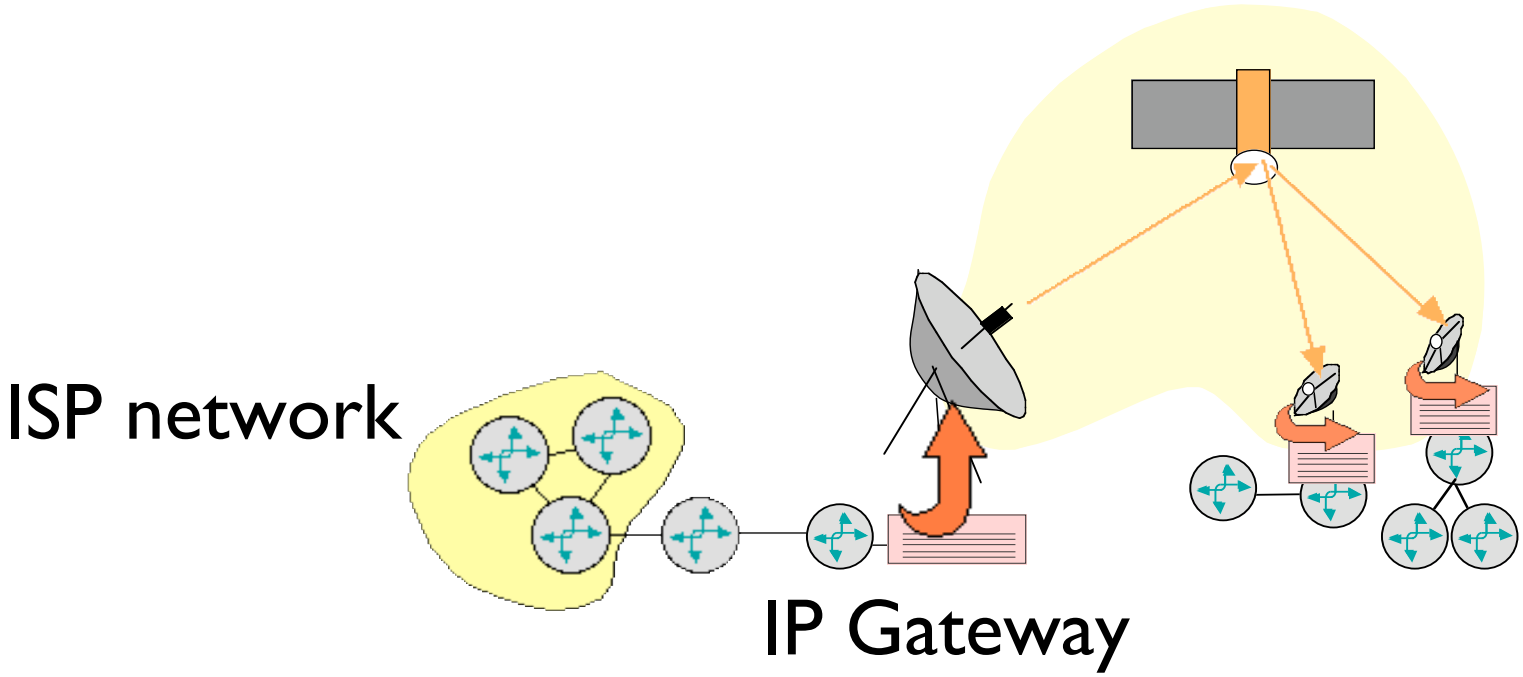
Issues

- Only resolves IP prefix/MAC -> PID
- Must be implemented in driver
- DVB-RCS, ATSC, not using this

Address Resolution

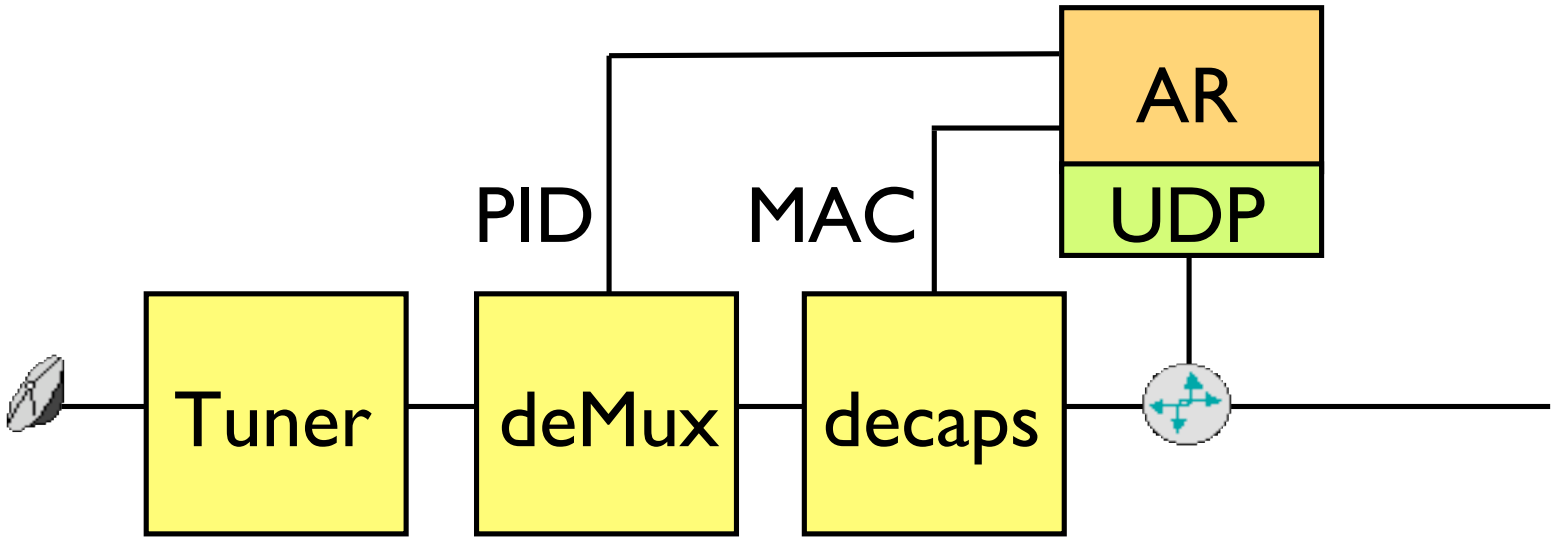
IP-based approach

AR Distribution



- PIDs are basis of Multicast Scaling & QoS Provision
  One PID -> One Receiver filter& Reassembly engine
  IP Gateways Multicast AR information over IP
- Used at Receivers (to set filters)

AR *above* IP



Ensures a technology agnostic solution

Portable driver code

Can resolve other relevant parameters

Encaps; MTU; Priority; Packing Threshold; ...

Closer integration with IP networking

New protocol required

Sample XML Syntax

```
<dvb_spec>
 <system>
  <header
system_name="unicast_example"
    revision="0"/>
  <body_address  addrType="4"
      dest="139.133.204/24"
      PID="215"
      encaps="ULE"
      rate="512000" />
 </system>
 </dvb_spec>
```

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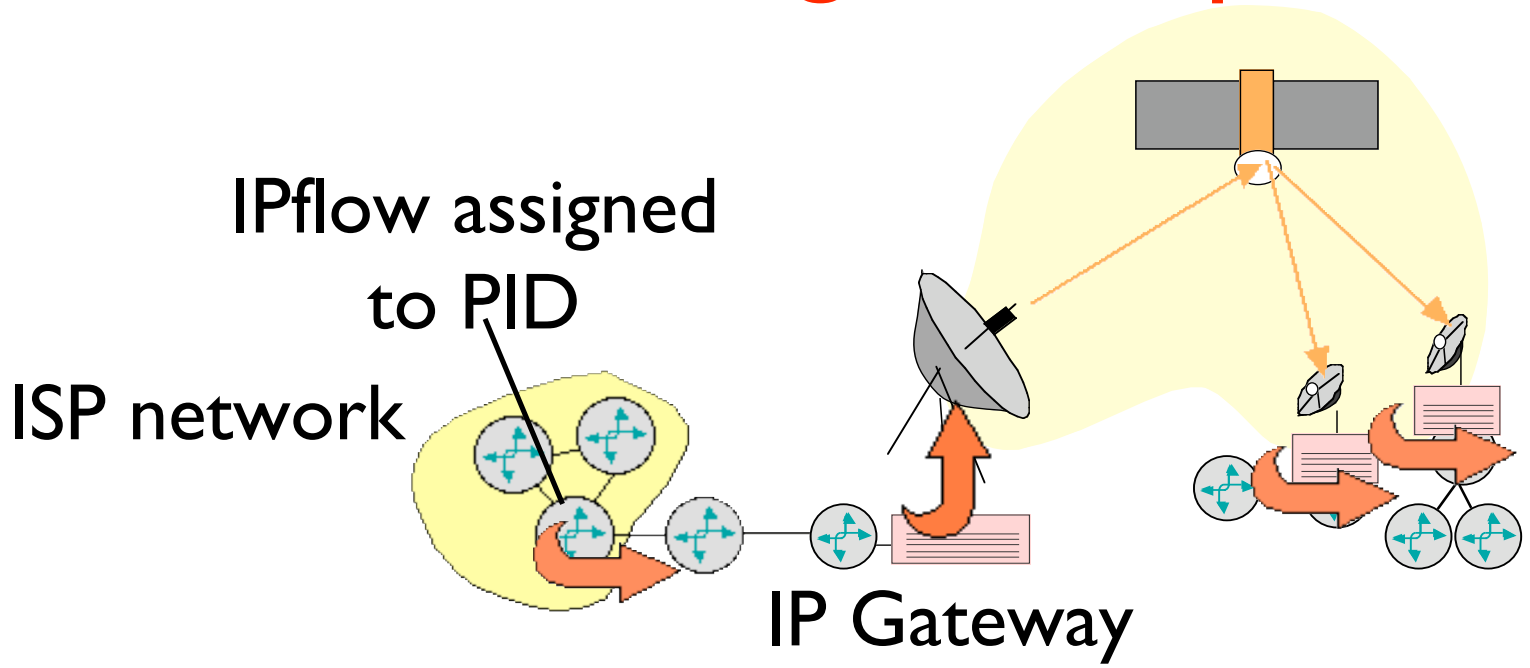
RFC3076; RFC3470

Extending AR to provide QoS



PIDs are basis of Multicast Scaling & QoS Provision

One PID -> One Receiver filter& Reassembly engine

Assigned by *ISP*

ISP selects which specific PIDs carry which IP flows

IP Gateways may verify/assign use of parameters

AR Summary

Stage 1: Identify what exists and what is needed

Informational document (INT; MMT; PSIP; etc.)

Stage 2: Specify AR Syntax

Table-based (QoS; Policy options; Auth; etc.)

Stage 3: Specify AR Distribution

UDP-based/User-space implementation (e.g. RIP, ND)

Some configurations require INT

AR tables can be built from INT

Working Group Status

Working Group Charter

1. **Architecture/Requirements** (INFORMATIONAL)

2. **Encapsulation for MPEG-2 TS - ULE** (STANDARDS TRACK)

3. **Address Resolution Mechanisms for IPv4/IPv6** (INFORMATIONAL)

4. **Address Resolution Protocol(s)** (STANDARDS TRACK)

READING:

ID's available at http://ietf.org

draft-ietf-ipdvb-ule-01.txt

draft-fair-ipdvb-req-04.txt

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Summary

An IP-centric view

Flexible encapsulation (ULE)

- IPv4 and IPv6
- diffserv, tunnels, IPSEC, mobility, etc
- extensible

Auto-configuration of Receiver (AR)

- assign capabilities to flows (PIDs)
- traffic engineering for ISPs


Questions & Answers

WG co-ordinates

Charter: http://www.ietf.org/html.charters/ipdvb-charter.html
Chair: Gorry Fairhurst <gorry@erg.abdn.ac.uk>

To subscribe to mailing list :

subscribe ipdvb at majordomo@erg.abdn.ac.uk

Archive: http://www.erg.abdn.ac.uk/ip-dvb/archive

Next IETF: August 2004, San Diego....

Acknowledgments

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University of Aberdeen

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