IP over DVB workshop

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IETF background (1/2)

Overview

- IETF is an open standardization community under the umbrella of ISOC
- Membership is by individual not by company
- Membership is free

Structure of work

- IETF work is split into different areas, e.g. Internet, security, routing, general, …
- Each area is managed by Area Directors
- All Area Directors are members of the IESG
- Each area is further split into different Working Groups
- Each Working Group is managed by Working Group Chairs
- The main standardization work is done within WG mailing lists
- Additionally there are 3 IETF meetings per year, in which most of the WGs meet

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IETF background (2/2)

Standardization process

- Internet Drafts (IDs) are the IETF working documents

- Everyone can submit an individual ID at any time

- To become standardized, an individual ID needs to be adopted by an IETF WG as working item (-> WG ID)

- Each WG ID needs to pass a WG Last Call before being submitted to IESG

- IESG can accept a WG ID to proceed to Request for Comments (RFC)

- There are Standards Track RFCs (Proposed, Draft, Internet) and Non-Standards Track RFC (Experimental, Informational, Historic)

- Two independent implementations are required in order to proceed to Draft Standard

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IP over DVB background (1/2)

Early ideas

IETF involvement

- There have been early ideas for new IP over DVB encapsulation techniques, mainly driven by University of Aberdeen / Salzburg

- A requirements document has been drafted for such new encapsulation mechanisms

- With ULE and SE two protocol instantiations have been drafted

- Such new encapsulation mechanisms need to be standardized

- IETF is the appropriate body to standardize any IP issues

- Two BOF sessions have been held to discuss the formation of an IP over DVB WG

- IESG adopted ipdvb as new WG in the Internet area

- Ipdvb WG adopted ULE as WG item

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IP over DVB background (2/2)

ESA involvement

- ESA supported two projects for implementing these new encapsulation mechanisms (requirement to proceed to standard RFC)

- ULE has been chosen for implementation

- Within another ESA study these implementations will be used in trials

- To further support IETF ipdvb WG work ESA kindly agreed to host this workshop

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Why ULE?

Reasons for ULE:

- Support for Ethertype

    arp; Bridging; IPv6; 802.1p/Q; MPLS;

- Lightweight implementation

    Simple, unambiguous, no "hiddens", Interop!

- Efficiency (in some cases)

- Max Frame Size (≥1500 B)

- Control Protocol (AR)

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Scenarios for ipdvb

draft-fair-ipdvb-req-xx.txt

A.Broadcast TV/Radio

B.ISP sharing Broadcast TV/Radio (Hybrid/mcast)

C.IP-only Transparent Star (Hybrid/mcast)

D.IP-only Two-Way networks (e.g. DVB-RCS)

E.IP Point-to-(multi)Point Links (e.g. Core IP)

F.IP Datacast Overlay

• .... Special needs for Regenerative Satellite ?

Differing requirements.... Common Link technology

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Workshop intention

Information

- About open issues around ULE
- About current status of standardization within the ipdvb WG
- About required next steps in IETF

Collection of input

- Requirements of manufacturer, provider, user
- Feedback on previous work
- Expectation on future work

Motivation of contribution

- To contribute to the ipdvb WG activities
- Many flavors of contribution (from following WG mailing list to authoring Internet Drafts)

Initiate collaboration

- With other groups / bodies, e.g. ETSI
- With manufacturer, provider, user

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Course of workshop

Different subjects

- Workshop is separated in different subjects
- At the end there is room for additional subjects

Discussion of subjects

- Each subject is introduced by Gorry, Alain or Wolfgang
- This is only to stimulate discussion
- If available, other slides can be presented for this respective subject
- After the presentations the subject will be discussed among all workshop participants

Important

- Interactive discussion is key!
- Everyones opinion / comment / feedback is important!

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Security on SNDU level

FEC on SNDU level

ULE extension headers

IPv4 / IPv6 address resolution

Use of Adaptation Field

Next steps in IETF ipdvb WG

Applicability of ULE in ETSI BSM

Additional subjects

Security on SNDU level

- Alain -

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ULE Security Reqs

- Sub-Network security mech

  – below IP level (applicable for other proto)

  – above MPEG-2 (for shared PIDs)

  – protection of subnetwork itself

- Out of scope

  – key distribution

  – cypher/authentication suites

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- Sub-Network security mech
  - below IP level (applicable for other proto)
  - above MPEG-2 (for shared PIDs)
  - protection of subnetwork itself
- Out of scope
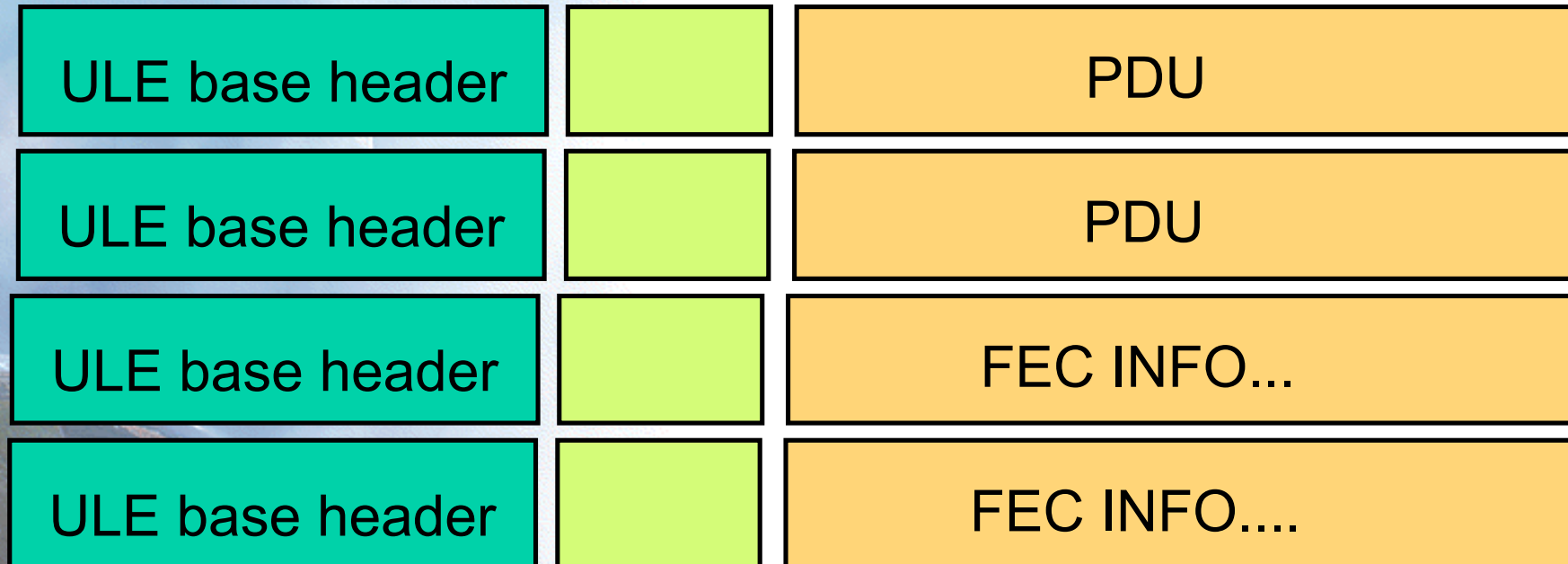 - key distribution
  - cypher/authentication suites

FEC on SNDU level

- Gorry -

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FEC Code Word

ULE base header		PDU
ULE base header		PDU
ULE base header		FEC INFO...
ULE base header		FEC INFO....

- Selection of FEC code
- Selection of Packet Format
- Selection of Interleaving

Is FEC needed / good?

Main Question:
Can this be done in ULE?

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ULE extension headers

- Alain -

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ULE Extension Headers

- Recent Discussion on the list
  - potential need for FEC, Security features
  - others to come ?

- Mechanism needs to be
  - Simple
  - Low overhead
  - Open (definition out of base specs)

- Several propositions

- Questions are :
  - Are Extension Headers needed ?
  - if YES, choose a mechanism

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ULE Extension Headers (Cont'd)

One Propostion has been detailed:

– 1 bit in length field

– Generic format for ext headers

```
+-+----+-+-------+----// ....... //-------+
|P|Type|N|Length |Ext. Header Param Value |
+-+----+-+-------+---// ....... //-------+
```

- P : behaviour indicator (1 bit)

- type field (separate namespace, 7 bits)

- N : next header present (1 bit)

- length (7 bits)

– Extension Header overhead = 2 bytes + data

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ULE extension headers (1/2)

- **Recent Discussion on the list**
  - potential need for FEC, Security features
  - others to come ?

- **Mechanism needs to be**
  - Simple
  - Low overhead
  - Open (definition out of base specs)

- **Several propositions**

- **Questions are :**
  - Are Extension Headers needed ?
  - if YES, choose a mechanism

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ULE extension headers

- An alternative based on TYPE field

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Standard SNDU

ULE base header	PDU

4B

Why extensions?
- QoS?
- Encryption?
- L2 forwarding?

Mandatory extension header

ULE base header	Bridge	PDU

Optional extension header

ULE base header	L E N	Ext	PDU
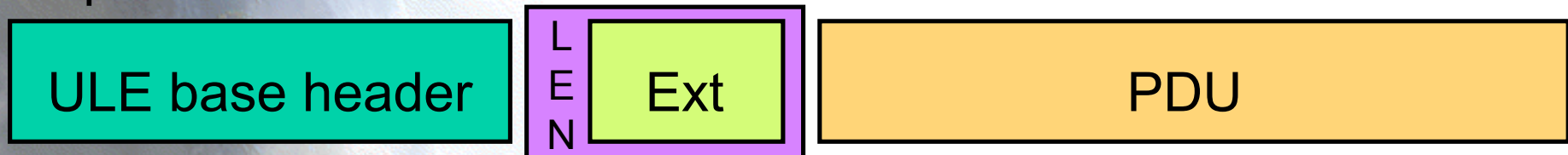
IPv4 / IPv6 address resolution

- Wolfgang, Gorry -

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IPv4 / IPv6 address resolution   Existing mechanisms

IETF IPv4 address resolution

- Use of ARP
- Use of DHCP4
- Manually

IETF IPv6 address resolution

- Use of IPv6 Neighbor Discovery
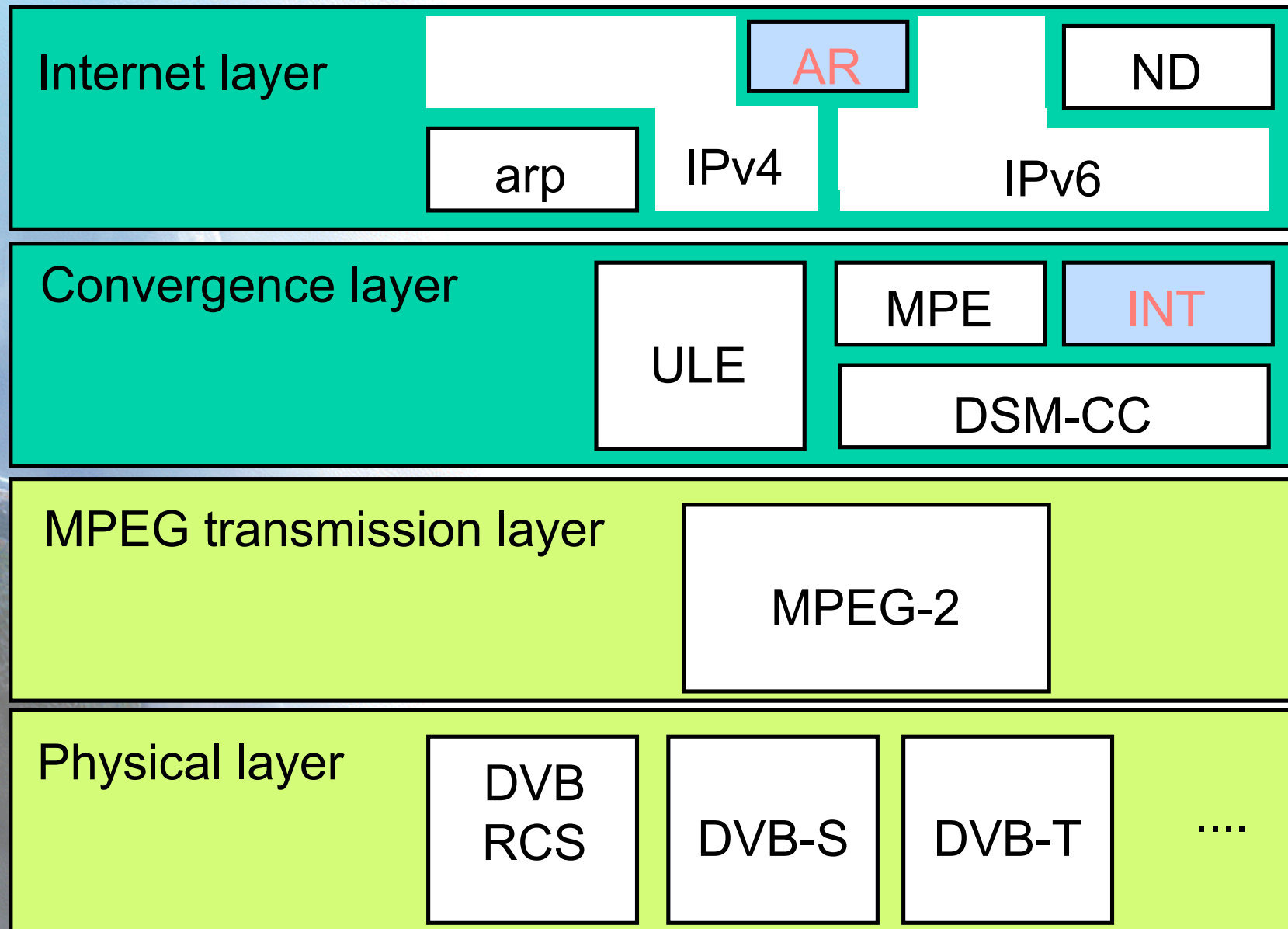- Use of DHCP6
- Manually

Address resolution on MPEG2 networks

- Mapping IP addresses to PIDs / MACs
- Use of tables
- Manually

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IPv4 / IPv6 address resolution Goal

Ipdvb WG

First ideas

- Need to come up with IPv4 / IPv6 address resolution mechanisms for MPEG2 networks

- Address resolution similar to IPv6 ND would be beneficial for many scenarios

- However, address resolution will depend on satellite architecture

- IPv6 ND approach / ARP requires bi-directional links

- UDLR could make some architectures appear bi-directional

- Tables could be used on uni-directional architectures

- What is the potential of DHCP?

- Is ULE able to contribute to address resolution (e.g. specific extension headers, …)?

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Internet layer

AR ND

arp IPv4 IPv6

Convergence layer

MPE INT

ULE DSM-CC

MPEG transmission layer

MPEG-2

Physical layer

DVB RCS DVB-S DVB-T ....

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Why AR above IP?

Information about IP network

e.g. PID; QoS; rate; D=1, ROHC, IPCOMP...**

Known at sender

To configure Receiver

May also be used within mpeg2 net.

OAM simple

Multicast address follows natural scoping

Easily ported (as other UDP-based applications)

Needs to be extensible

Information about Receiver

e.g. NPA/MAC Address

Initially known at Receiver

Existing protocols...

** Requires bilateral agreement with receiver

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Use of Adaptation Field

- Wolfgang, Gorry -

Use of Adaptation Field

Status

Structure of work

- Currently ULE excludes the use of the Adaptation Field

- Recently a requirement for Adaptation Field Support has been raised on the ipdvb list (e.g. for carrying information in DVB-S/RCS networks)

- What are the exact use cases for the Adaptation Field together with ULE?

- Are these use cases already standardized / implemented?

- Are there alternatives for these use cases to avoid the usage of the Adaptation Field?

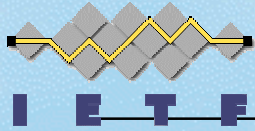- What is the impact on ULE if the Adaptation Field needs to be supported?

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Adaptation Field??

MPEG header	AF	ULE SNDU

- Primary MPEG-2 use is "Timing Synch"
- Is this needed for ULE?

Next steps in IETF ipdvb WG

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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)
   Dynamic Unicast & Multicast

   -

draft-fair-ipdvb-req-04.txt

- draft-ietf-ipdvb-ule-00.txt (replaces draft-fair-ipdvb-ule-02.txt)
- draft-fair-ipdvb-ar-00.txt (aged, to be re-updated)
- Internet Drafts are available at http://ietf.org

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Timing

	Propose / Adopt	Last Call
Spring 2004	Adopt *ULE* Adopt *Requirements* Propose *L2 Resolution Mechanisms*	
Summer 2004 **San Diego IETF** **1-6th August**	Adopt *L2 Resolution Mechanisms*	*Requirements (?)*
Autumn 2004 **Mpls??? IETF** **7-12th Nov**	Adopt *Resolution Protocol?*	*ULE (?)*
2005	More *Resolution IDs?*	*Resolution Mechanisms* *Resolution Protocols*

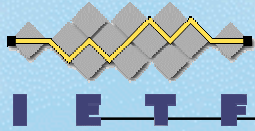UNIVERSITY OF ABERDEEN   6WIND   IABG

Vision?

- An <u>IP-centric</u> view

- IPv4 <u>and</u> IPv6

- diffserv, tunnels, IPSEC, mobility, autoconfig, etc

- <u>Integrated</u> part of NG IP networks

  - Must receivers always be full MPEG-2 capable?

  - DVB-video/IP/DVB-Transport?

- Address <u>Resolution</u> / L2 capability related to IP Flows

  - First: Map IP to INT (and PSIP in ATSC?)

  - Second: New dynamic protocol AR over IP

- Framework common to <u>ETSI/BSM</u>

- BSM-ID -> NPA address

- QID -> QoS Class

- Virtual Port -> IP network

- Address Resolution over IP allowed (via SI-SAP)

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Any other topics

to be discussed?

Area: Internet

Charter: http://www.ietf.org/html.charters/ipdvb-charter.html

Chair: Gorry Fairhurst <gorry@erg.abdn.ac.uk>

Mailing list: ipdvb@erg.abdn.ac.uk

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

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

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

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