UDLR WG - 55th IETF

Experiment draft

draft-ietf-udlr-experiments-00.txt

Emmanuel Duros (eduros@udcast.com)

19.11.2002

Draft-ietf-udlr-experiments-00.txt

- *This document presents various protocols, e.g. layer 2 and layer 3 protocols, which have been commonly used over [RFC 3077] in a satellite environment. This document raises issues for each of these protocols.*

- Integrate:
  - draft-ietf-udlr-multicast-issues-00.txt
  - draft-ietf-udlr-dvmrp-conf-03.txt
  - draft-ietf-udlr-pppoe-00.txt
  - PIM-SM experiments presented at IETF 54 (Yokohama)

- Describe use of other protocols:
  - ARP, DHCP, IGMP, PIM-DM
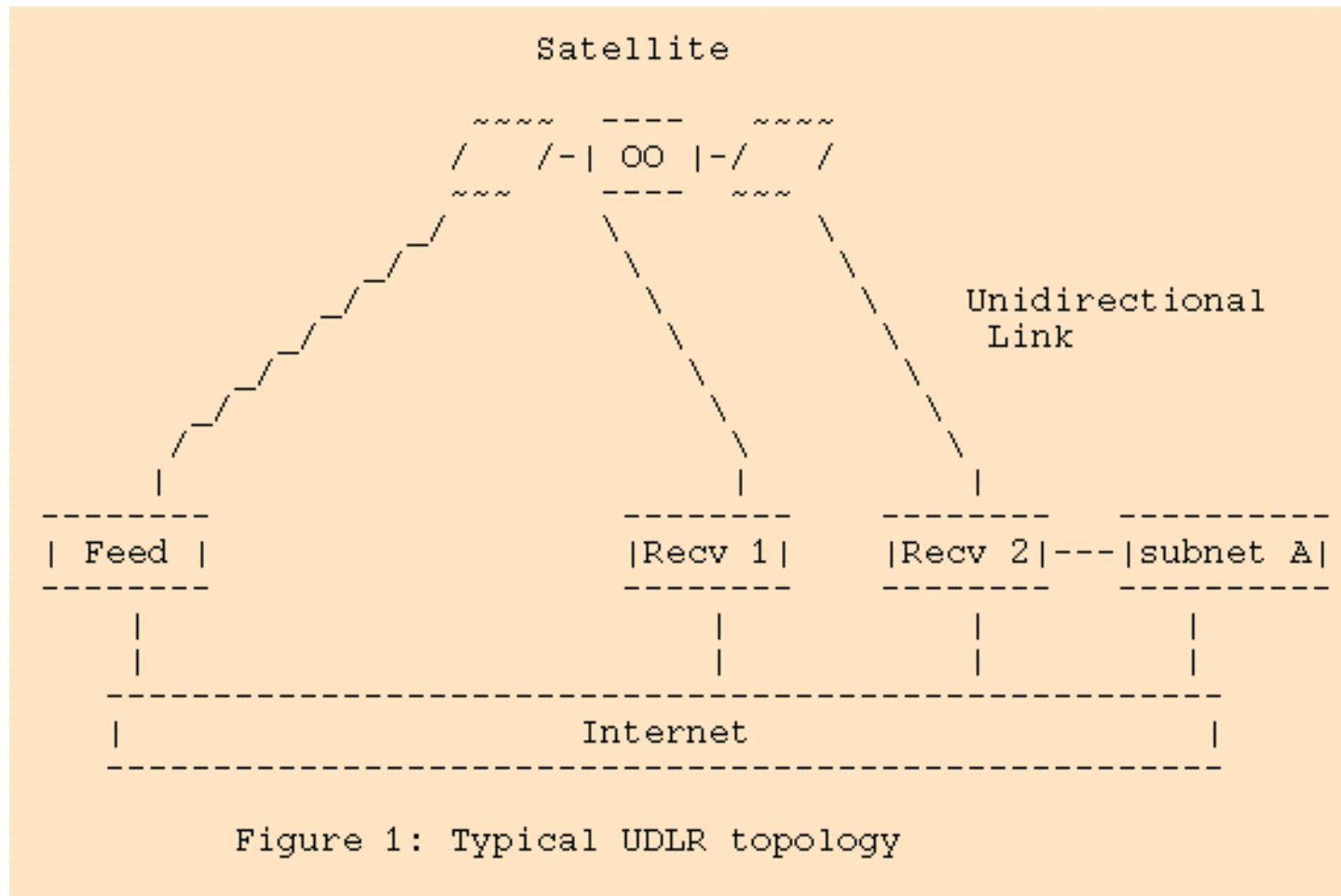
draft-ietf-udlr-experiments-00.txt

- Very first version of the draft !
- Many co-authors (Gorry Fairhurst, Achmad Husni, Amine Lamani, etc.), working on different sections
- Some inconsistencies among sections
- Table of content done but not all section filled yet
- IPv4 based
- On going work, more versions to come...

Table of Content

- Presentation of UDL network:
    - Network architecture
    - Characteristics
- Layer 2 protocols
    - ARP
    - PPPOE
- Layer 3 protocols
    - DHCP
    - IGMP
    - Multicast routing protocols: DVMRP, PIM-SM, PIM-DM

Network Topology

- Common to all sections

```
                          Satellite

                  ~~~~      ----      ~~~~
                 /     /-|  OO  |-/     /
                  ~~~      ----      ~~~
              _/             \             \
            _/                \             \
          _/                   \             \   Unidirectional
        _/                      \             \      Link
      _/                         \             \
    _/                            \             \
    |                             |             |
 --------                      --------      --------      ----------
| Feed |                      |Recv 1|      |Recv 2|---|subnet A|
 --------                      --------      --------      ----------
    |                             |             |             |
    |                             |             |             |
 ------------------------------------------------------------------
    |                          Internet                         |
 ------------------------------------------------------------------

        Figure 1: Typical UDLR topology
```

UDLR network characteristics

- Asymmetric routing paths
- Asymmetric multicast capability
- Forward link capacity
- Asymmetric link capacity (Fwd: > Mbps, Ret: < 64Kbps)
- Asymmetric loss environment
- Flat networks
- Subnetwork round trip delay (RTT 300ms)

Layer 2 protocols: ARP

- *A hardware address resolution can be used over UDLR to allow a node, e.g. a feed or a receiver, to discover the MAC address of another node.*

- 3 scenarios:

  - 1) A feed needs a receiver's hardware address

  - 2) A receiver needs the feed's hardware address

  - 3) A receiver needs a receiver's hardware address

- Latency issues:

  - Scenario 1 & 2: Need about 300 ms to obtain MAC address. May be problematic for unicast UDP streams, not others.

  - Scenario 3: Need 600 ms to obtain MAC address. RTT can be reduced down to 300 ms using an ARP server at the feed.

- Large number of receiver issues:

  - Potentially 10th of thousands of receivers

  - ARP table must scale and look-up must be fast !

Layer 2 protocols: PPPOE

- Section not filled Yet

- Yann Codaccioni (France Telecom) is working on it

- Content from draft-ietf-udlr-pppoe-00.txt

- Draft was presented at IETF 52 in Salt Lake city (USA)

- Check out http://www.udcast.con/udlr for slides

Layer 3 protocols: DHCP

- *The Dynamic Host Configuration Protocol (DHCP) provides a framework for passing configuration information to hosts on a TCPIP network, and a mechanism for automatic temporary allocation of network addresses.*

- DHCP server on the feed which distributes IP addresses

- Avoid DHCP server on a receiver: longer RTT and low security

- Receiver MUST detect first presence of a feed (DTCP) before sending DHCP request

- Lease duration issues:

  - Must not be to short to avoid excessive DHCP traffic

  - Must not be to long to quickly redistribute IP addresses

Layer 3 protocols: IGMP

- *IGMP Membership Reports are sent by end hosts to communicate their desire to receive specific IP multicast groups. Multicast routers in the same subnetwork use IGMP Membership Reports to help determine whether IP multicast packets should be forwarded to the subnetwork.*

- Note, with UDLR, a multicast packet sent by a receiver is seen by all nodes

- Query Interval must be greater than the sum of the Max Response Time and the Subnetwork Round Trip Time (RTT = 300ms)

- Necessary to optimize the technique to reduce the number of responses to a Query

- IGMPv3 specific:

  - Provides control over multicast packet forwarded: conserve link capacity

  - hosts MUST send Membership Reports following a Query to indicate the groups they wish to receive: may consume tunnel capacity

Layer 3 protocols: IGMP-proxy

- IGMP proxy implemented at the receiver

- Behave as the multicast end host sending reports

- The IGMP proxy may also implement Proxy Reporting [DRAFT-MAGMA-SNOOPING; DRAFT-MAGMA-PROXY]:

  - only reports which sources and groups need to be forwarded

  - can significantly reduce the number / frequency of Reports
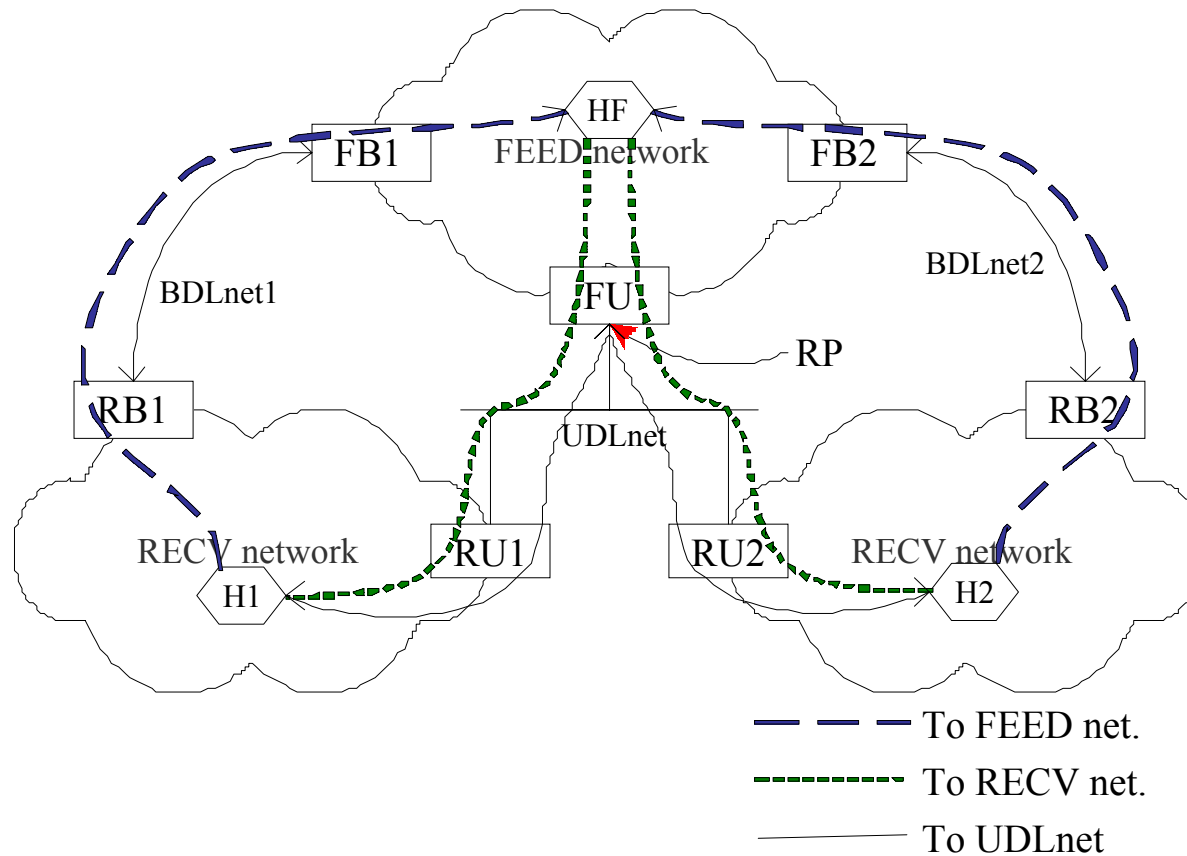
Layer 3 protocols: DVMRP

- Section not filled yet
- Celine Benassy (Alcatel) is working on it
- Content from draft-ietf-udlr-dvmrp-conf-03.txt
- Draft was presented at IETF 54 in Yokohama
- Check out http://www.udcast.con/udlr for slides

Layer 3 protocols: PIM-DM

- Section not filled yet
- On going work

Layer 3 protocols: PIM-SM

Layer 3 protocols: PIM-SM

- RP is the address of the UDL interface of the feed router

- Receivers in receive network never to switch to SPT

- Configure the networks so receive networks reach RP through the UDL
    - Join path uses UDL