

Dual Stack Lite (DS-Lite) B4 Element on Linux

[RFC6333](#) specifies a so called Basic Bridging BroadBand (B4) element on the CPE side. This is about this B4 element.

What I write here is what I learned by figuring making [this NixOS configuration](#). You can use it as a reference. It is tested against a FTTB connection from [Netcologne](#).

WAN Interface

I expect that you have a WAN interface with IPv6 working already.

This can be a PPPoE tunnel or anything else.

Encapsulation

A DS-Lite compatible IPv4-in-IPv6 tunnel implementation under Linux is called `ipip6` in `iproute2`.

You can create such a tunnel with the following Command:

```
ip tunnel add "${TUNNEL_INTERFACE_NAME}" mode ipip6 local  
"${WAN_INTERFACE_ADDRESS}" remote "${AFTR_ADDRESS}" encapslimit none
```

Tunnel Encapsulation Limit

Generic Packet Tunneling in IPv6 allows setting a [Tunnel Encapsulation Limit](#). That limit is passed as Destination Option for IPv6.

Unfortunately to AFTR of my provider Netcologne just throws away packets that contain Destination Options, except they carry ICMP.

The Linux Kernel is setting a Tunnel Encapsulation Limit by default. As a workaround one can set `encapslimit none` at creation of the tunnel. That way, there are no Destination Options set and IPv4 is encapsulated directly.

AFTR Address Discovery

The AFTR address can be retrieved from the AFTR name using the DNS.

Just query the AAAA record for the Aftr name.

```
dig "@${NAME_SERVER}" -b "${WAN_INTERFACE_ADDRESS}" AAAA "${AFTR_NAME}"
+short
```

In this example we make sure we use the providers DNS server and the wan interface. But it is not specified if that is required.

AFTR Name Discovery

You can request the AFTR name on the WAN interface with DHCPv6 using the `aft r_name` option.

With my provider Netcologne the `aft r_name` option was only answered while requesting a prefix delegation along it.

I recommend you to request the providers name server entries right away too, so it is easier to fetch the AFTR address.

The AFTR names operated by Netcologne seem to be the following:

- `aftr01.netcologne.de`
- `aftr02.netcologne.de`
- `aftr03.netcologne.de`
- `aftr04.netcologne.de`
- `aftr05.netcologne.de`
- `aftr06.netcologne.de`
- `aftr07.netcologne.de`
- `aftr08.netcologne.de`
- `aftr09.netcologne.de`
- `aftr10.netcologne.de`

References

- [OpenWrt DS-Lite implementation](#)
- [Netcologne Schnittstellenbeschreibung](#)

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