



# Linux IEEE 802.1ag Utils

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# Outline

- ▶ **What are the Linux 802.1ag Utils?**
- ▶ **Very short intro about IEEE 802.1ag**
- ▶ **How can the 802.1ag utilities be used?**

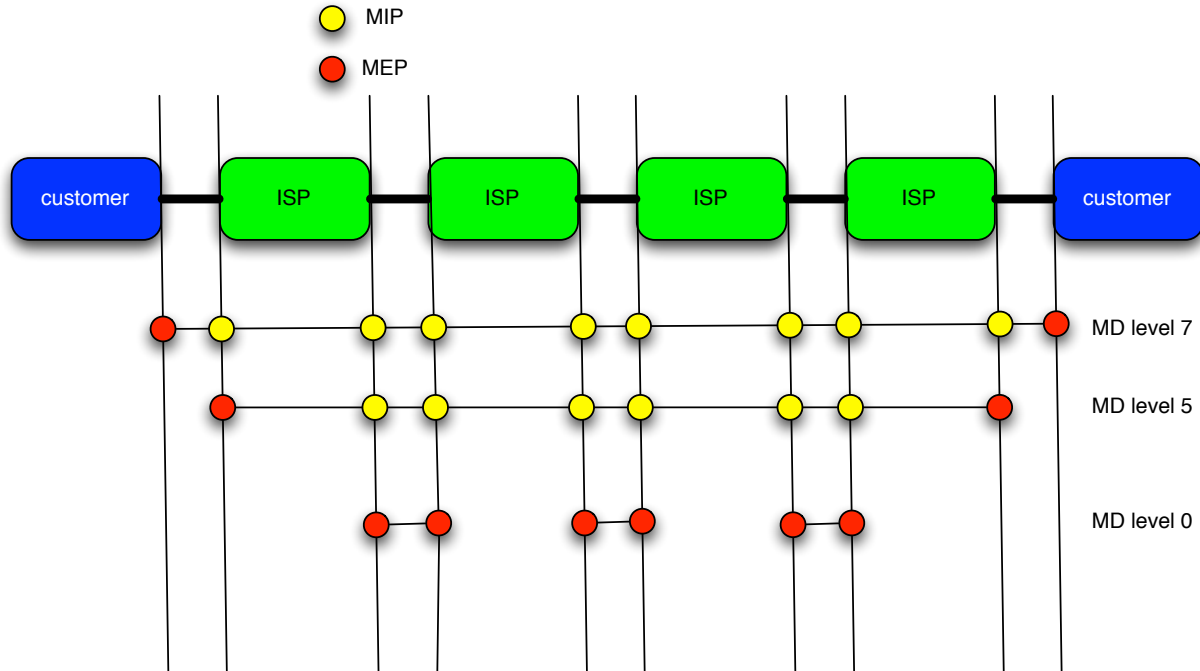
# What are Linux 802.1ag Utils?

- ▶ **Implementation of IEEE 802.1ag on Linux**
  - ▶ L2 ping (LBM) client
  - ▶ L2 traceroute (LTM) client
  - ▶ Daemon sending CC and answering LBM and LTM probes
- ▶ **Open Source (BSD License)**
- ▶ **User space implementation (raw Ethernet sockets)**
- ▶ **Work In Progress**

# Ethernet OAM / IEEE 802.1ag

- ▶ **Terminology**
  - ▶ Operations, Administration and Maintenance (OAM)
  - ▶ Connectivity Fault management (CFM)
  - ▶ Maintenance Domain & Maintenance Level (0-7)
  - ▶ Maintenance End Point (MEP)
  - ▶ Maintenance Intermediate Point (MIP)
- ▶ **OAM types**
  - ▶ CC: Continuity Check (“hello”)
  - ▶ LBM/LBR: Loopback Message/Reply (“L2 ping”)
  - ▶ LTM/LTR Link Trace Message/Reply (“L2 traceroute”)
- ▶ **Normal Ethernet frames, ethertype 0x8902**
- ▶ **Bridges that do not support 802.1ag should forward them like other frames**
- ▶ **Usually configured per VLAN**

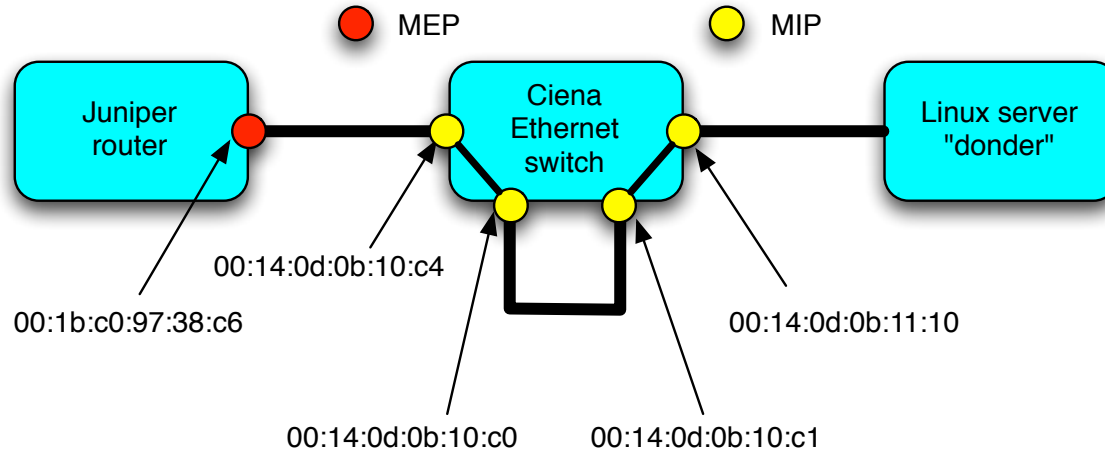
# 802.1ag MEPs and MIPs



# OAM Types

- ▶ **Continuity Check (CC)**
  - ▶ Periodic hello messages
  - ▶ Detect loss of connectivity
  - ▶ Sent by MEP, processed by MEPs
- ▶ **L2 Ping (LBM/LBR)**
  - ▶ Sent manually from CLI
  - ▶ Unicast request, unicast reply
  - ▶ Source MEP, destination MEP/MIP
- ▶ **L2 Traceroute (LTM/LTR)**
  - ▶ Sent manually from CLI
  - ▶ Multicast request, unicast replies
  - ▶ All MIPs in the path reply, until reply from destination MEP

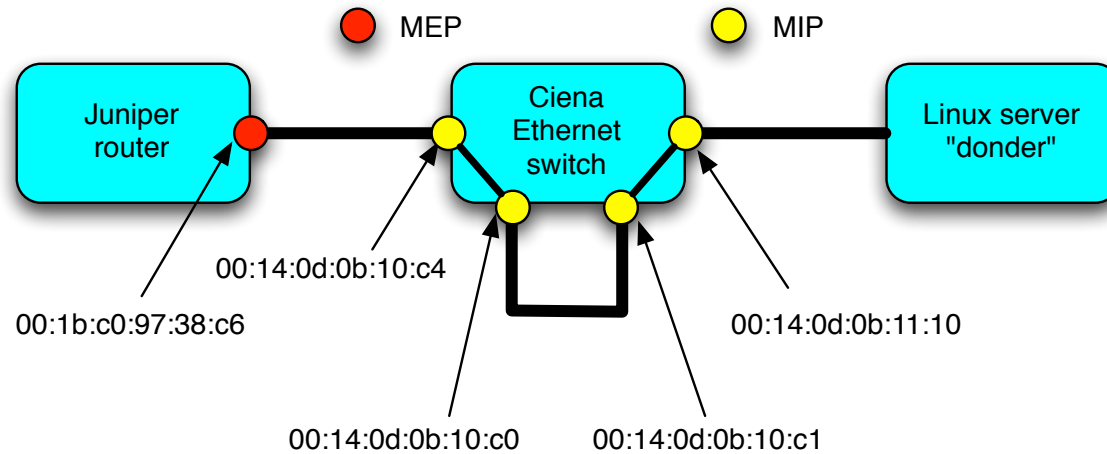
# L2 ping demo



```

root@donder:~# I2ping -i eth5 -v 123 -l 7 -c 10 00:1b:c0:97:38:c6
CFM LBM to 00:1b:c0:97:38:c6
60 bytes from 00:1b:c0:97:38:c6, sequence 477635892, 0.839 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635893, 0.872 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635894, 0.817 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635895, 0.829 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635896, 0.851 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635897, 0.718 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635898, 0.713 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635899, 0.917 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635900, 0.731 ms
60 bytes from 00:1b:c0:97:38:c6, sequence 477635901, 0.713 ms
root@donder:~#
    
```

# L2 trace demo



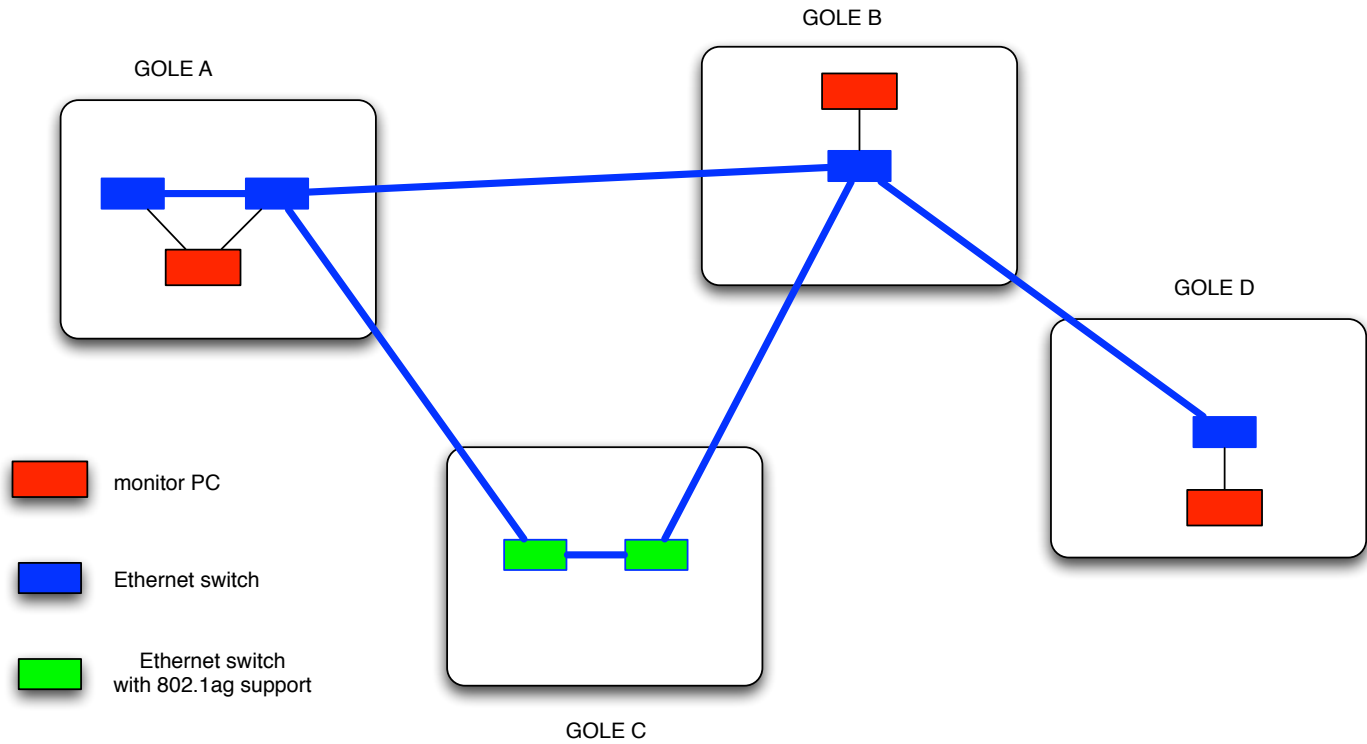
*I do not understand this Ciena behaviour yet*

```

root@donder:~# l2trace -i eth5 -v 123 -l 7 00:1b:c0:97:38:c6
Sending CFM LTM probe to 00:1b:c0:97:38:c6
ttl 1: LTM with id 1784875395
    reply from 00:14:0d:0b:10:c1, id=1784875395, ttl=0, RlyFDB
ttl 2: LTM with id 1784875396
    reply from 00:14:0d:0b:10:c4, id=1784875396, ttl=0, RlyFDB
    reply from 00:14:0d:0b:10:c1, id=1784875396, ttl=1, RlyFDB
ttl 3: LTM with id 1784875397
    reply from 00:14:0d:0b:10:c4, id=1784875397, ttl=1, RlyFDB
    reply from 00:14:0d:0b:10:c1, id=1784875397, ttl=2, RlyFDB
    reply from 00:1b:c0:97:38:c6, id=1784875397, ttl=0, RlyHit
root@donder:~#
  
```



# Possible Usage



# Implementation status

LBM (L2 ping)	alpha
LTM (L2 trace)	alpha
Daemon (CC, LBR, LTR)	Not yet started

- Beta release planned in May 2011
- First release planned in Summer 2011
- Also looking at porting to BSD
  
- Looking for testers
  - Testing with 802.1ag capable switches
  - Testing with PC connected to non 802.1ag switch
- Please contact me: [rvdp@sara.nl](mailto:rvdp@sara.nl)



# *Comments?*

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