# 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 within GLIF?



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# 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


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# Ethernet OAM / IEEE 802.1ag

- Terminology
  - Operations, Administration and Maintenance (OAM)
  - Connectivity Fault management (CFM)
  - Maintenance Domain & Maintenance Level (0-7)
  - Maintenance Entry 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


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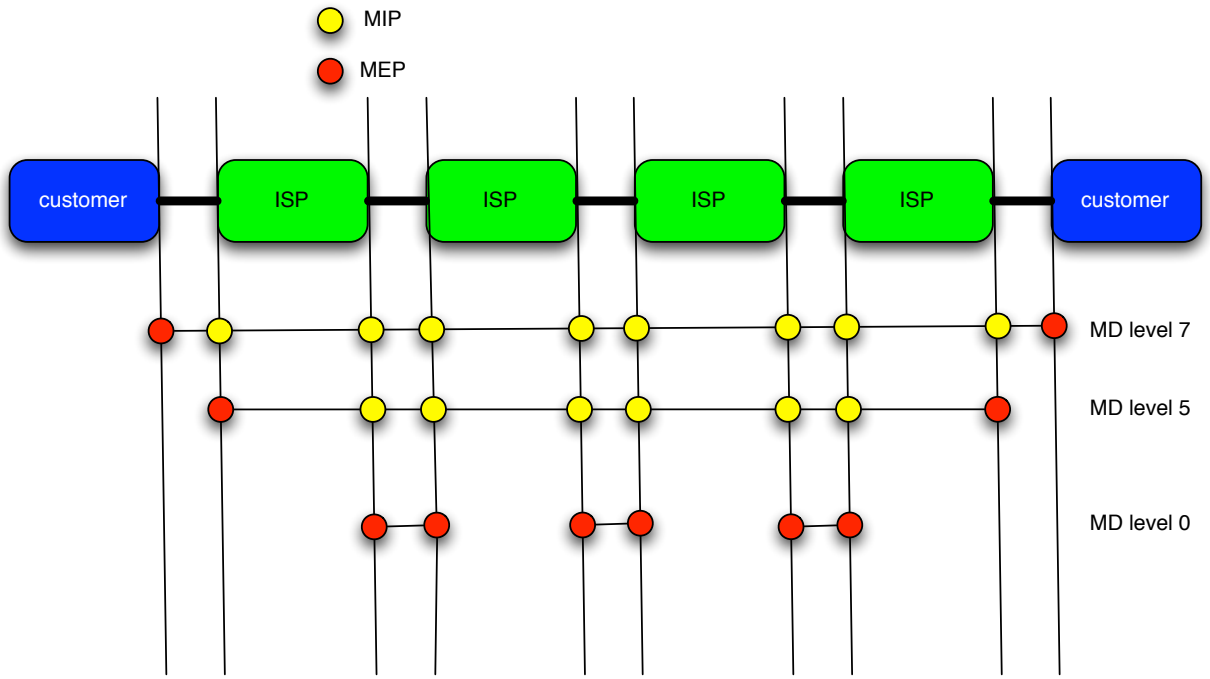
# 802.1ag MEPs and MIPs



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# 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


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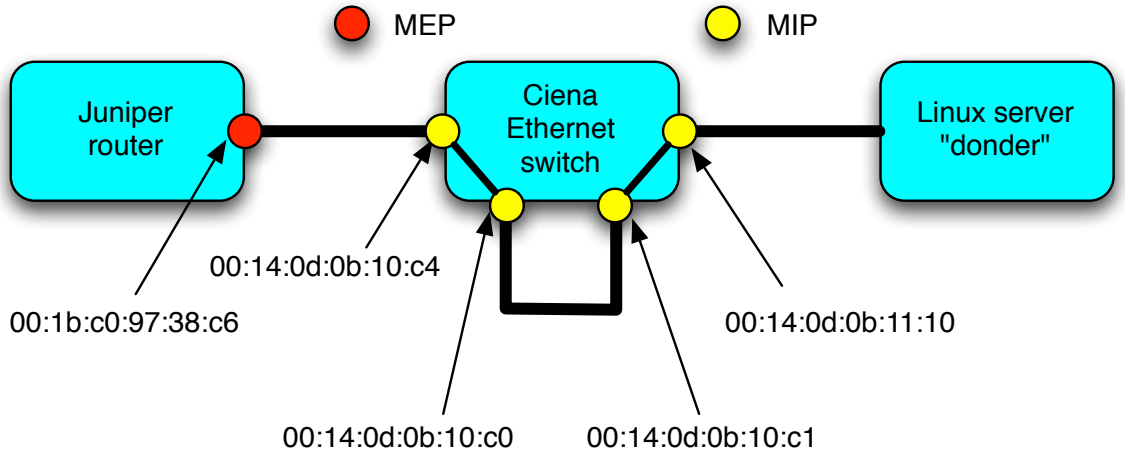
# L2 ping demo




```
root@donder:~# l2ping -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:~#
```



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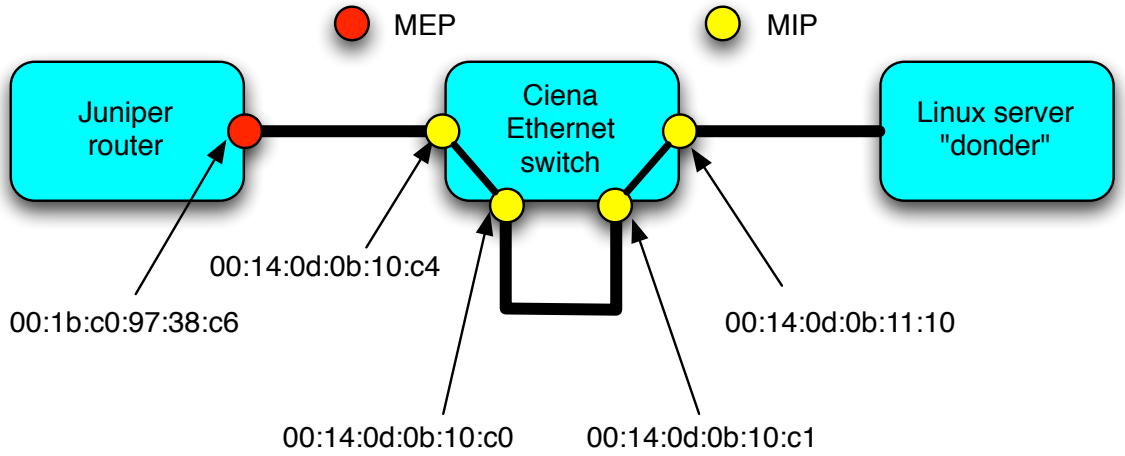
# L2 trace demo




*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:~#
```



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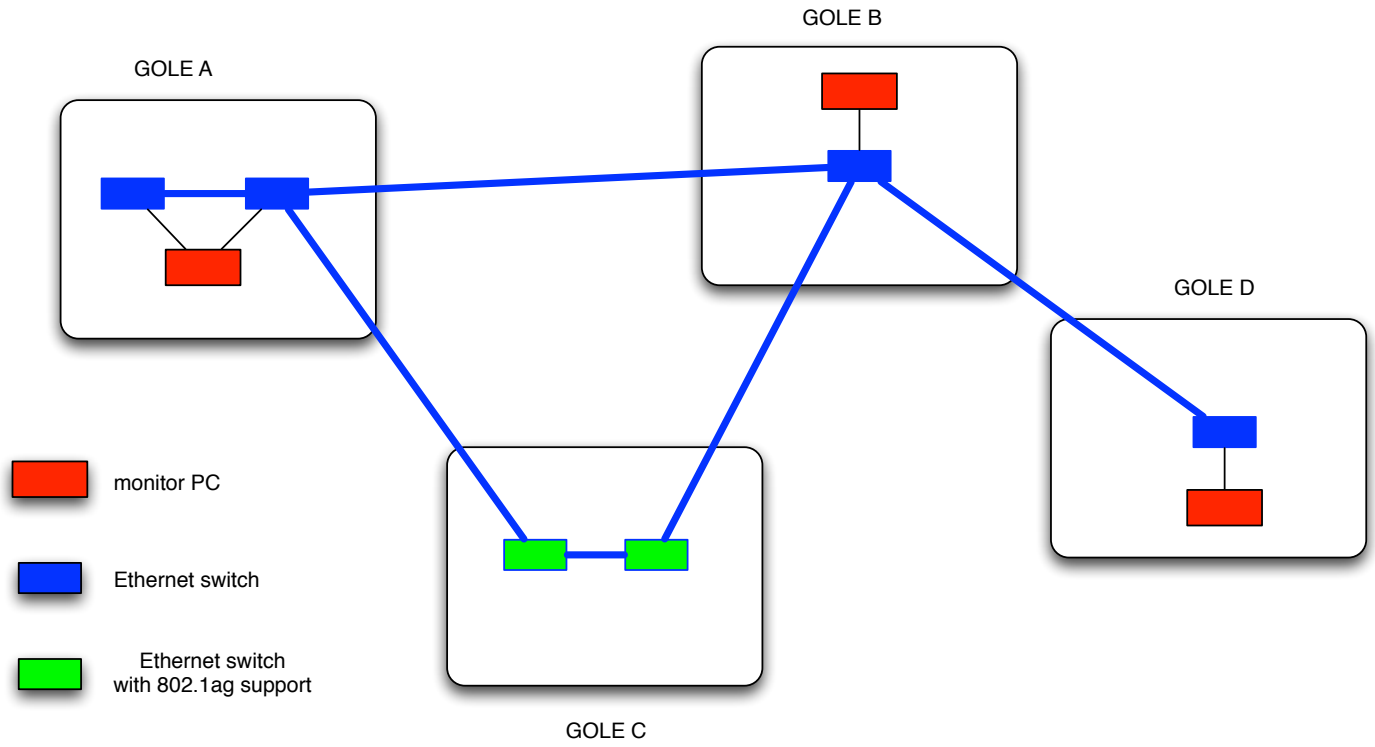
# Possible usage within GLIF



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# 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

- Looking for testers
  - Testing with 802.1ag capable switches
  - Testing with PC connected to non 802.1ag switch
- Please contact me: rvdp@sara.nl

# Comments?

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