

OpenFlow in the access – pushing OpenFlow switches to the last mile



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(Prepared using L^AT_EX and beamer.)

The ALIEN project

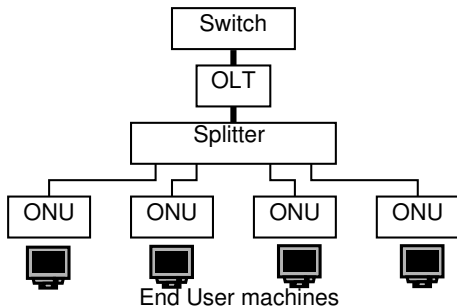


ALIEN – Expanding the availability of OpenFlow

Get OpenFlow working on new types of devices. Expand use of OpenFlow by making it useful for new platforms.

- Programmable platforms – NetFPGA and similar.
- Access networks – e.g. GEAPON and DOCSIS.
- Optical devices – require OpenFlow extensions.

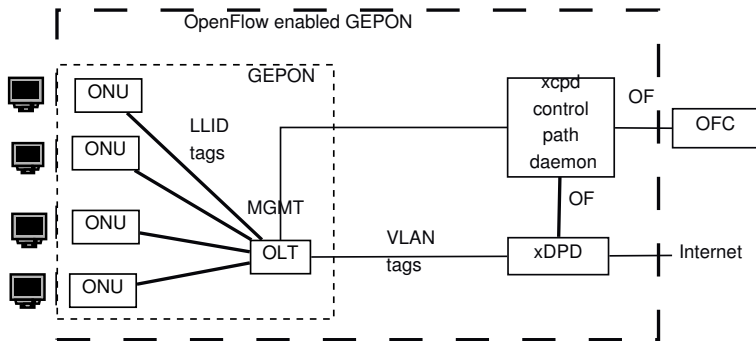
The GEPON (Gigabit Ethernet Passive Optical Network)



Getting OpenFlow on GEAPON

- Want to make whole system of switch, OLT, splitter ONU present as single massively distributed OF switch.
- Problem with making GEAPON OpenFlow capable:
 - Proprietary device, no knowledge of chips or drivers.
 - Not intended as programmable.
 - ONU cheap low power consumer unit.
- Solution:
 - Make use of fact that OLT usually needs switch before it anyway.
 - Give OLT Open Flow capable front end switch (xdpd on NetFPGA).
 - OLT can switch to ONU on VLANs.
 - Use a mapping to VLANs in lower level open flow switch.
 - Controller sees only higher level abstract switch.

The GEPON with OpenFlow



- Note – approach is generic – could work for many access devices.
- Another partner is working on the generic approach of surrounding the non OF device with OF switches.

Other work on SDN

INFLEX – SDN for resilience

Often many paths are available between source and destination. TCP must choose one. Can respond slowly to failures. This approach uses OF to quickly switch from a failed path.

- Assumption machines using INFLEX are in data centre (but failures are outside).
- Packet marking within data centre (at host machines) using OF.
- Routing at egress of data centre based on mark.
- Accepted as: JT Araujo, R Landa, RG Clegg, G Pavlou, “Software-defined network support for transport resilience” IEEE/IFIP Network Operations and Management Symposium, 2014
- Preprint available online from:
<http://www.richardclegg.org/node/59>

Conclusions – OpenFlow work at UCL

ALIEN project

In ALIEN we are working to get OpenFlow working on access networks. We are also testing CCN (ccnx) over the OFELIA testbed over a number of OpenFlow switches. Large-scale OF experimentation.

Other work

We are interested in OpenFlow as a technology which can simplify networking problems such as resilience, multipath and other “traditional” networking problems.