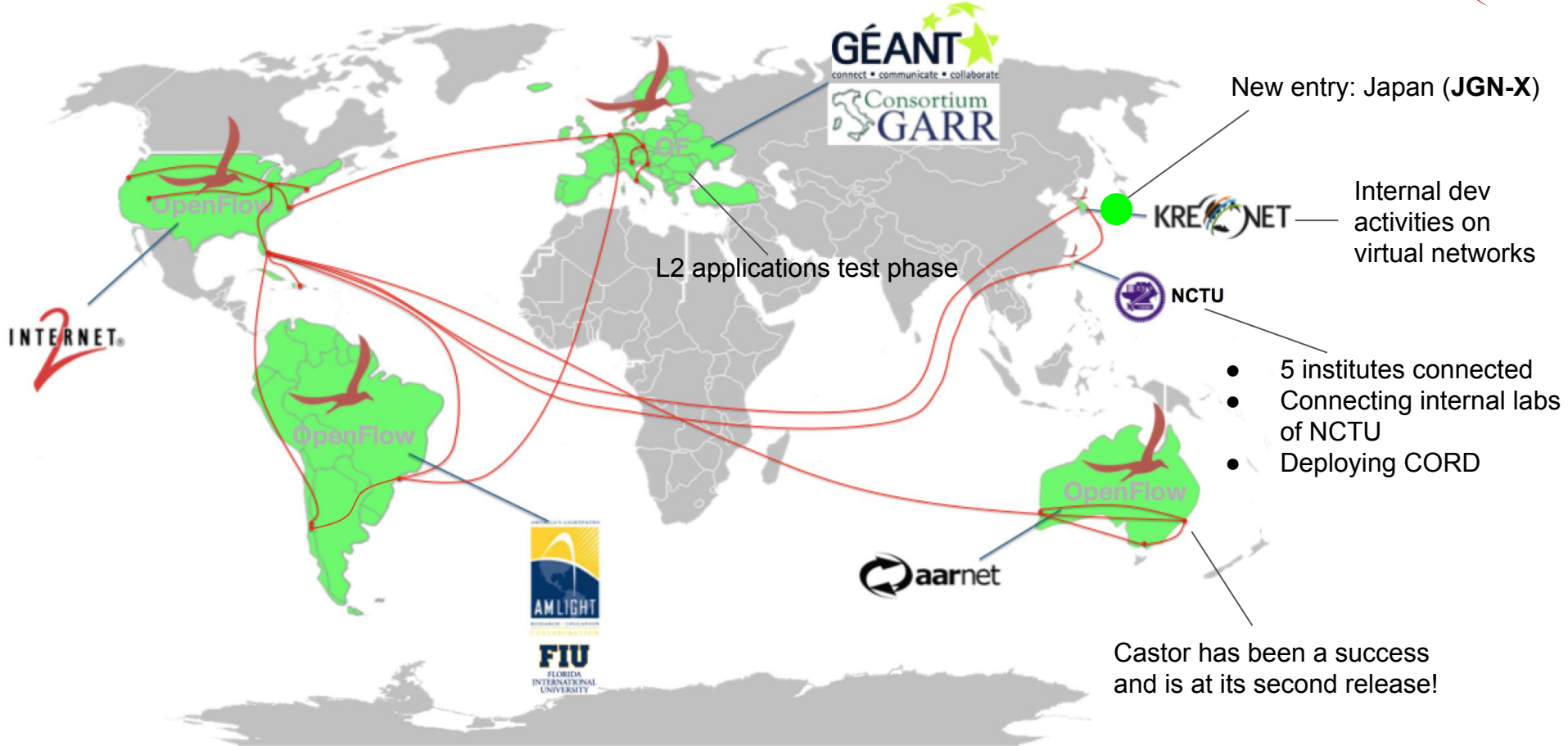




ONOS Deployment brigade

ONS - Santa Clara, Apr 6th 2017

RENs deployment activities updates



Feedback



What RENS ask for

- A simple solution that works
- Layer 0/1: Lambda allocation / OTN
- Layer 2: Connect multiple end-points / BoD
- Layer 3: Internal and International BGP Peering

What SPs ask for

- All above..
- Yang, NetConf support
- Simplify / reduce CAPEX/OPEX in Access and Metro Networks

As always...

- HA, High performances
- Being "Carrier Grade"

The deployment (dev) brigade



Goal

- Create a shared, essential, reliable software stack on top of ONOS, easy to deploy and to maintain
 - to be used in production
- Layer0, Layer 2, Layer 3 functionality
- Integration with widely used standards (MEF, NSI)

Members

- Active participants from all around the world: *academia, RENs, vendors*
- 19 developers
- 33 ML members

Alaitz Mendiola / **University of the Basque Country** / **GEANT**, Brian O'Connor / **ON.Lab**, Chun-Ming Ou / **NCTU**, Carolina Fernández / **i2CAT**, David Whittaker / **CORSA**, Dongkyun Kim / **KISTI/REONET**, Huai-Wen Hsu / **NCTU**, Himal Kumar / **UNSW**, Humberto Galiza / **AmLight**, Itzik Ashkenazi / **Technion - Israel Institute of Technology**, Jeronimo Bezerra / **AmLight-FIU**, Jordi Ortiz / **University of Murcia**, Luca Prete / **ON.Lab** / Pier Luigi Ventre / **CNIT** / **Università Roma Tor Vergata** / **GEANT**, Priyanka Chopra / **Adara Networks**, Raghu Ram / **Adara Networks**, Wei-Cheng Wang / **NCTU**, Wu Shaoyong / **ZTE Corporation**, Yi Tseng / **NCTU**, Yong-Hwan Kim / **KREONET**

Action plan



Ability for both Users and Operators to allocate end-to-end resources.

Orchestrator



CORD

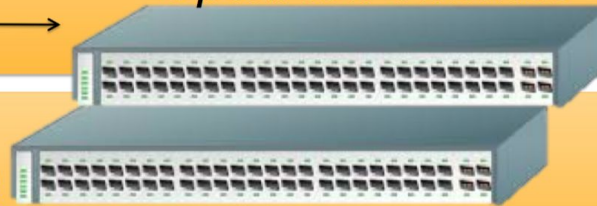
SDN-IP / SDX-L3 / Castor



- International peering
- L3 circuits and best-effort

Layer 3

OpenFlow switches



VPLS / SDX-L2



Broadcast L2 networks on demand

Layer 2



Optical circuits in the Core and for Users

Layer 0 /1



Packet-Optical



Current status

Done

- *VPLS* can provide L2 connectivity between multiple host using different VLANs
 - Encapsulation support (MPLS, QinQ)
 - Easy-to-use CLI
- *Castor*, *SDN-IP*, *SDX-L3* provide L3 connectivity between peers (also in SDX environments)
- PoC: ONOS running on white-box switch

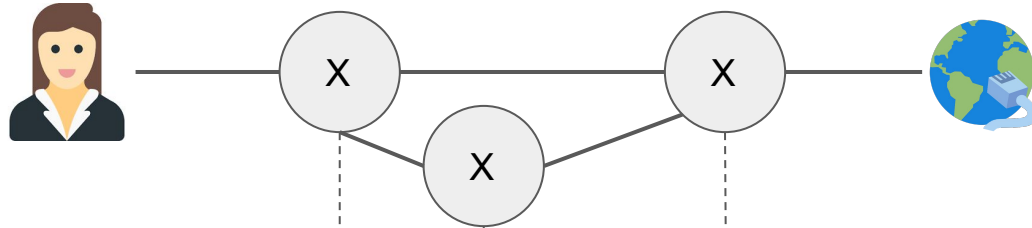
In progress

- OFDPA intent framework compatibility
- Bandwidth allocation and enforcement (both in the intent framework and SDN-IP)
- Intent framework refactoring

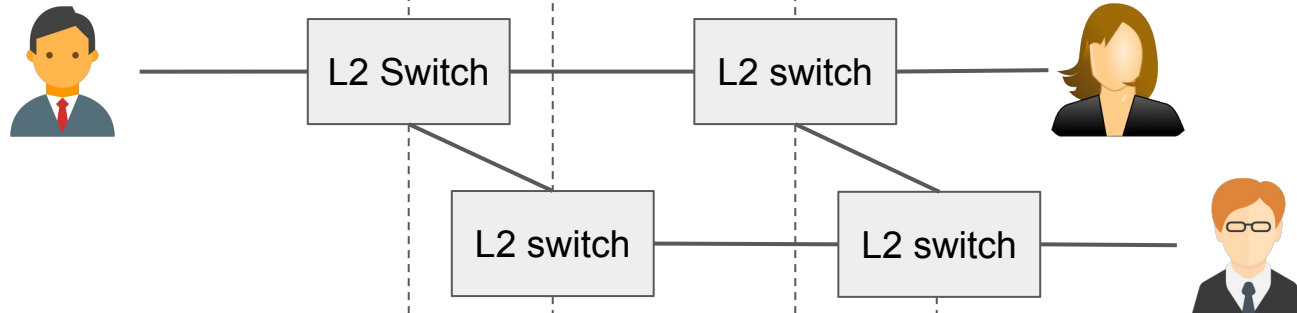
Planned

- Packet-optical integration

Examples: legacy



Best-effort L3

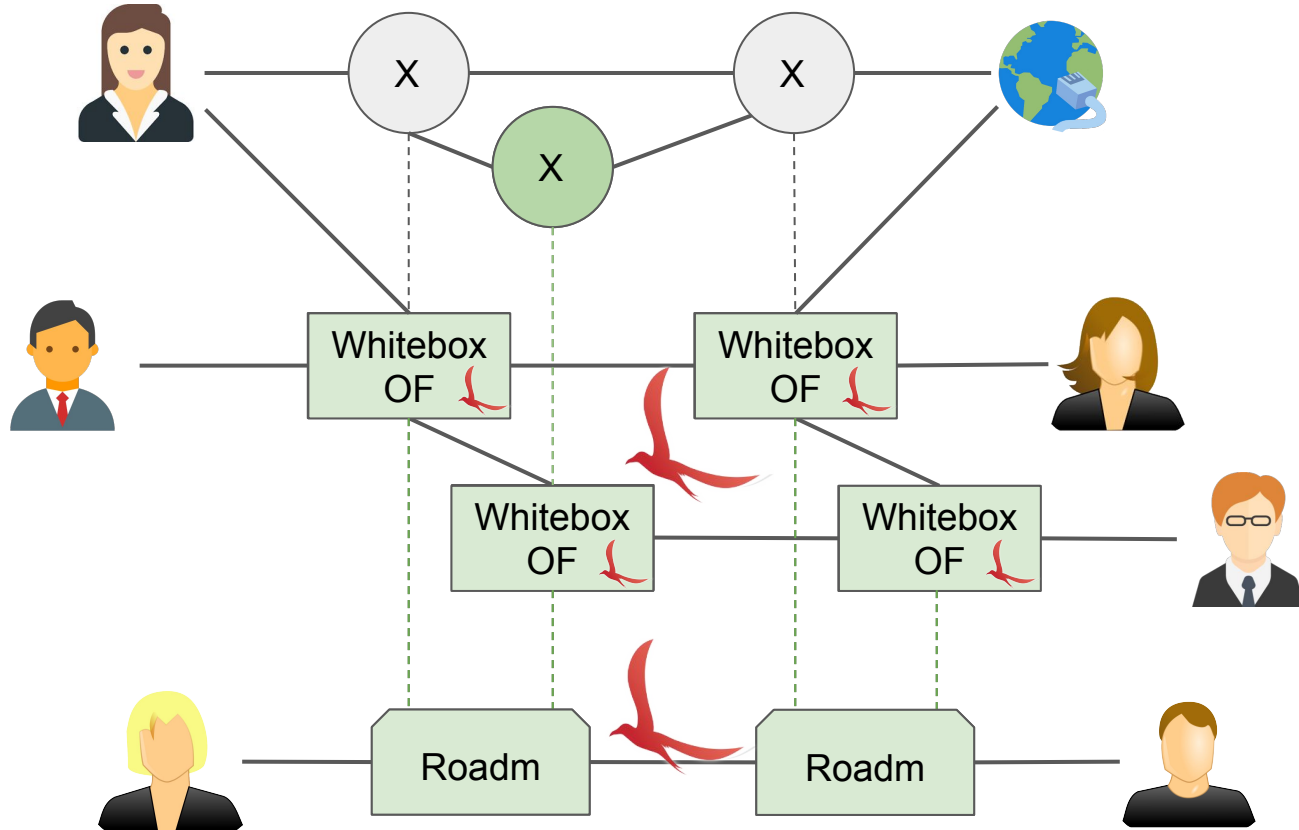


SP/MP L2 circuits



Lambda / L0

Examples: migration to ONOS



Incrementally introduce
white-box switches

ONOS runs on the switch
to provide L2 services

ONOS runs on a **centralized cluster**

Routers get removed
ONOS provides **BGP, L3 services**
using the same switches

ONOS coherently controls both
the **packet and the optical layers**

Conclusions and takeaways



- The brigade is not only deploying, but developing software that can be deployed in a short term in different networks
- In ~4 month the deployment brigade did a terrific job
 - Major modifications to the intent framework
 - VPLS (L2) application
 - Major improvements to SDN-IP (L3)
 - “ONOS in-a-box”
 - Test improvements
 - Field trials
- Missing functionalities that matter
 - In-service upgrade
 - Local recovery from failures, being able to “survive” without controller
- Start simple!
- The involvement of the operations and engineering teams are fundamental
- Help from the community is very welcome!

References



ONOS

- www.onosproject.org
- wiki.onosproject.org

Global deployment powered by ONOS

- wiki.onosproject.org/display/ONOS/Global+SDN+Deployment+Powered+by+ONOS

The deployment and the northbound brigades

- wiki.onosproject.org/display/ONOS/Deployment+brigade
- wiki.onosproject.org/display/ONOS/Northbound+brigade

The Speaker

- Luca Prete / luca@onlab.us