



# Internet2 Technology Exchange SDN-WG/The Exchange Oct 5/6<sup>th</sup> 2015

## SDN tools at AmLight: an OpenFlow sniffer

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# Outline

- Context
- Motivation
- Features
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- Roadmap

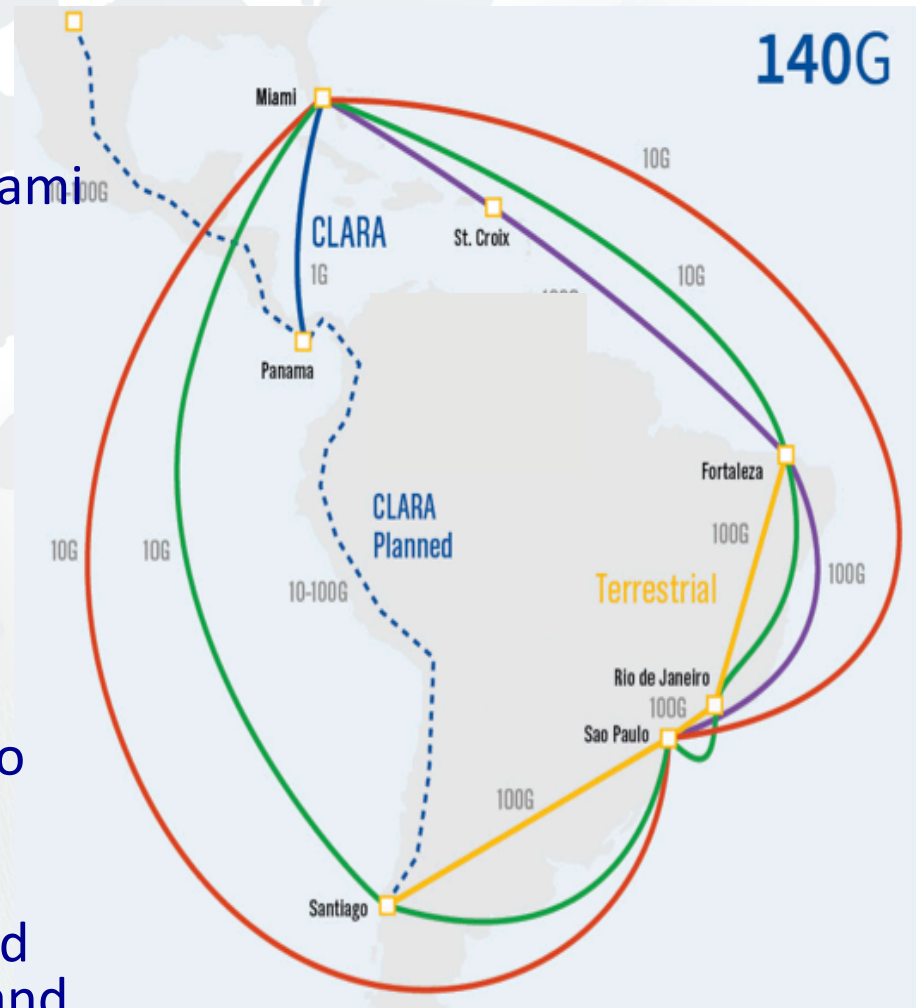
# Context: AmLight

4 x 10G links and two topologies:

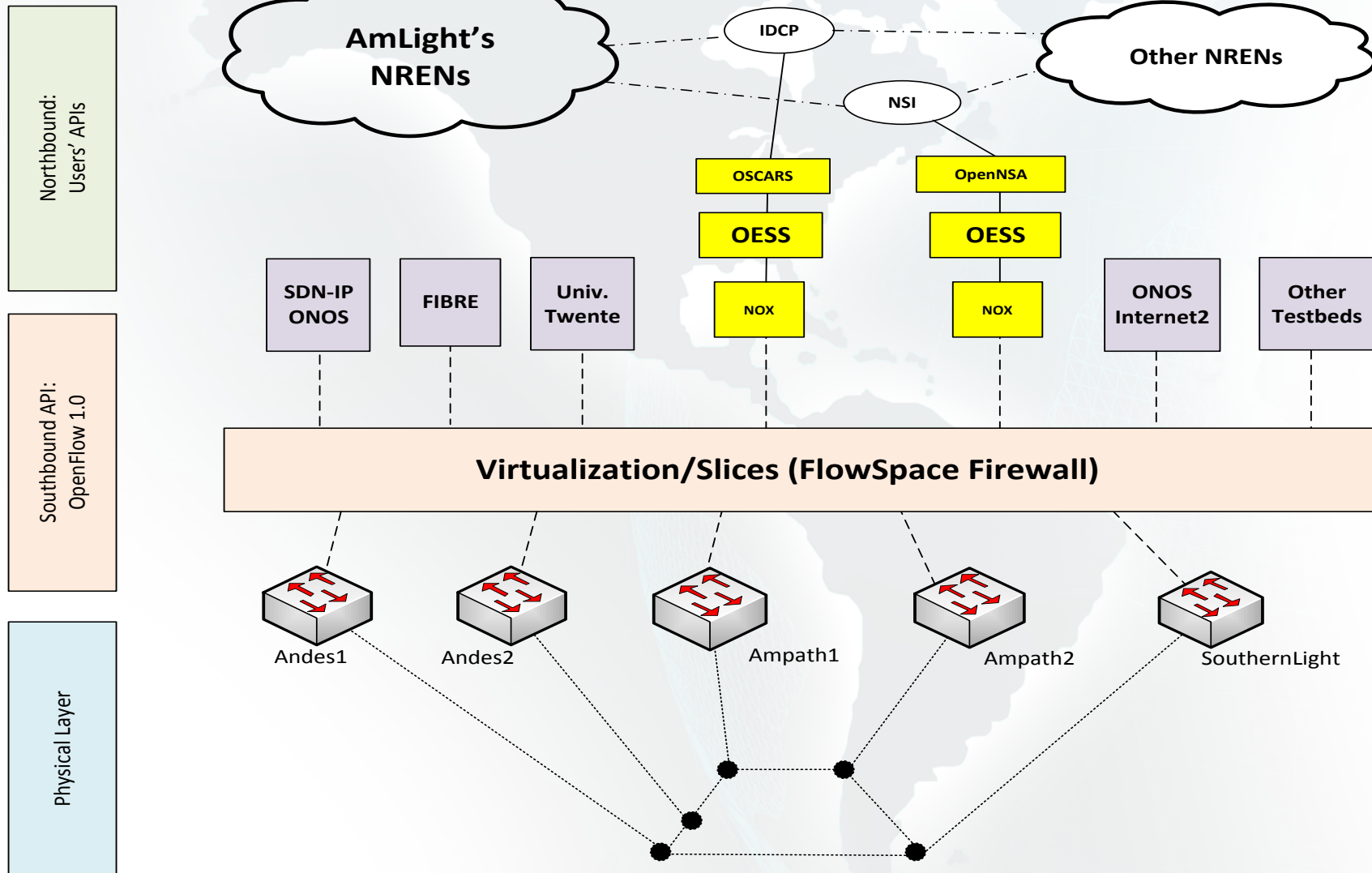
- **SDN ring:** Miami-Sao Paulo-Chile-Miami
  - 20 Gbps of total capacity
  - Full OpenFlow 1.0 and network virtualization support
- **MPLS ring:** Miami-Brazil-Miami
  - 20 Gbps of total capacity
  - Layer 2/3 support

Soon: new **100 Gbps** between Sao Paulo and Miami

Consortium involving FIU(USA), RNP and ANSP(Brazil), RedClara(Latin America) and AURA(Chile)



# AmLight SDN



# Motivation

- As troubleshooting SDN is still complex, a few tools are being developed at AmLight:
  - Testbed Sanitizer (10/06, 9am, Grand Ballroom A)
  - **An OpenFlow sniffer (10/05, 12:10pm, Room 15)**
  - A multi-slice SDN traceroute
  - Integration tools: Zabbix NMS w/ OESS and FSFW
- Why a new OpenFlow sniffer?
  - Wireshark requires X or capture/send and dissector for OF
    - OF 1.0: < 50% dissected
  - Tshark uses Wireshark dissectors
  - There are other tools, but they are not specific for real time and command line OpenFlow troubleshooting (lack of OpenFlow filters)

# Features – Version 0.1



- OpenFlow 1.0 support
- Runs on Linux shell
  - No need for X Windows
- Supports OpenFlow types Hello, Error, FlowRemoved, FlowMod, BarrierReq and BarrierRes
- Colors important user fields
- Easy to install (*install python-pcap && git clone*)
- Supports OpenFlow type filtering using a JSON file
- Converts FlowMods to OVS-OFCTL commands
  - Help “reproduce” some problems
- Apache License

# Outputs



```
2015-10-04 22:14:36.263133 190.103.184.135:6633 -> 200.136.88.6:7801 Size: 142
OpenFlow Version: 1.0(1) Type: FlowMod(14) Length: 88  XID: 4959165
4959165 OpenFlow Match - wildcards: 4194300 dl_vlan: 1116 in_port: 4
4959165 OpenFlow Body - Cookie: 0x00 Command: Add(0) Idle/Hard Timeouts: 0/0 Priority: 32768 Buffer ID:
4959165 OpenFlow Action - Type: SetVLANID Length: 8 VLAN ID: 3221 Pad: 0
4959165 OpenFlow Action - Type: OUTPUT Length: 8 Port: 67 Max Length: 65535
ovs-ofctl add-flow tcp:200.136.88.6:7801 "dl_vlan=1116,in_port=4, action=mod_vlan_vid:3221,output:67,"
```

```
2015-09-15 11:10:29.658553 10.0.2.15:44950 -> 190.103.187.35:6633 Size: 126
OpenFlow Version: 1.0(1) Type: FlowMod(14) Length: 72  XID: 2
2 OpenFlow Match - wildcards: 3678453 dl_vlan: 31 dl_dst: 10:00:00:01:20:00
2 OpenFlow Body - Cookie: 0x00 Command: Delete(3) Idle/Hard Timeouts: 0/0 Pri
ovs-ofctl del-flows tcp:190.103.187.35:6633 "priority=32768 dl_vlan=31,dl_dst:
```

```
2015-09-14 19:00:49.591812 190.103.187.35:6633 -> 10.0.2.15:44797 Size: 66
OpenFlow Version: 1.0(1) Type: Error(1) Length: 12  XID: 2
2 OpenFlow Error - Type: BadRequest Code: BadVendor
```

```
2015-09-15 11:10:29.736198 190.103.187.35:6633 -> 10.0.2.15:44950
OpenFlow Version: 1.0(1) Type: BarrierRes(19) Length: 8  XID: 3
3 OpenFlow Barrier Reply
```

# Roadmap

- Version 0.2 – By Nov 15<sup>th</sup> 2015
  - All OpenFlow 1.0 Types will be added
  - Read from Libpcap files
  - Logging specific FlowMod based on match and/or actions
  - Better documentation
  - Better code organization
  - Bugs fixes: “Ubuntu vs VirtualBox: timeout” and “unlock the terminal”
- Version 0.3 – By December 24<sup>th</sup> 2015
  - Full OF 1.3 support
  - Output to log and Libpcap files at the same time
- Version 0.4 - ?
  - Integration with **Flow Space Firewall** (associate Switch with Controller)
  - More filters
  - Full NICIRA/OVS support
  - SSL/TLS support
  - Suggestions??



# Version 0.2



```
2015-09-15 08:33:18.349577 190.103.187.35:6633 -> 10.0.2.15:44835 Size: 362
OpenFlow Version: 1.0(1) Type: StatsRes(17) Length: 308  XID: 4
4 StatRes Type: Flow(1)
4 StatRes Length: 96 Table_id: 0 Pad: 0
4 StatRes  OpenFlow Match - wildcards: 3678447 dl_type: 0x806
4 StatRes duration_sec: 372922, duration_nsec: 889000000, priority: 1, idle_timeout: 0, ha
4 StatRes Type: Flow(1)
4 StatRes Length: 96 Table_id: 0 Pad: 0
4 StatRes  OpenFlow Match - wildcards: 3678447 dl_type: 0x88cc
4 StatRes duration_sec: 372922, duration_nsec: 889000000, priority: 100, idle_timeout: 0, l
4 StatRes Type: Flow(1)
4 StatRes Length: 104 Table_id: 0 Pad: 0
4 StatRes  OpenFlow Match - wildcards: 3678455 dl_dst: 10:00:00:01:20:00
4 StatRes duration_sec: 68231, duration_nsec: 128000000, priority: 32768, idle_timeout: 0,
```

[https://github.com/jab1982/ofp\\_sniffer.git](https://github.com/jab1982/ofp_sniffer.git)