When IP routing meets SDN and starts going live

**Background**

- Glue of IP routing stacks with OpenFlow
- Controller-centric hybrid IP networks
- Migration path to SDN

**Now: From proof of concepts to value-added pilots and SDN innovation!**

**Highlights**

- Federation of FIBRE islands
- 4 OpenFlow switches (NetFPGAs) and 2 XEN Agents
- Runs RouteFlow experiment on requested slice
- IP routing (OSPF) on sliced topology
- Islands connected through VLANs in existing infrastructure (GIGA network)
- Federation through FIBRE CMF provides unified cross-island experimental setup

**DEMO 1**

**IP-Routed Network on Demand**

**DEMO 2**

**InterVLAN Routing**

**DEMO 3**

**Distributed IX Router**

**Highlights**

- Deploying a distributed routing fabric
- Production traffic in live IXP
- Reduced operational complexity
- Easier to understand
- Aids modification and diagnosis

**Snapshot: 1134 flow entries in each switch**

- 8 flows matching control plane traffic (e.g., ARP, ICMP, BGP, etc.)
- 1 flow entry to drop traffic by default
- 98 flows describing BGP speakers
- 1028 flows representing L3 routes

**RouteFlow**

**FIBRE**

**Datacom**

**RFServer**

**RFProxy**

**Cardigan**

**Pronto 3290**

**Pronto 3780**

**CityLink**

**OpenFlow**

**Datapaths**

**Network Controller**

**Controllers**

**Control Coordination**

**SDN Services**

**RouteFlow Server**

**RouteFlow Client**

**RouteTable**

**RouteTable**

**VPNs**

**Virtual Routers**

**Arp Dec.**

**Stats**

**FIBRE CMF**

**GIGA network**

**RFServer**

**InterVLAN routing logic**

**Router-on-a-stick paradigm**

**Seamless VLAN configuration**

**OpenFlow rules match on destination IP and perform VLAN rewrite actions**

**Partners**

**CNPq**

**USP**

**UFSCar São Carlos**

**RFServer**

**RFProxy**

**Quagga**

**XORP**

**BIRD**

**Quagga**

**XORP**

**BIRD**