

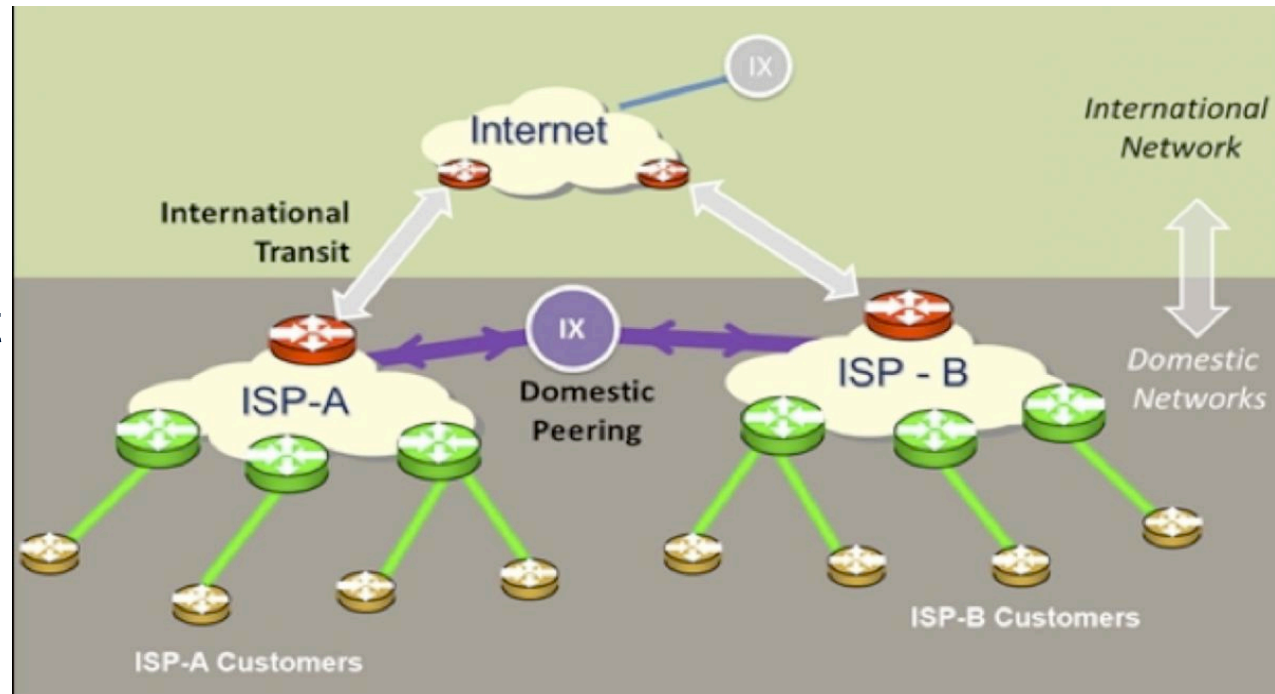
# UMBRELLA: A Resilient SDN Fabric for IXPs

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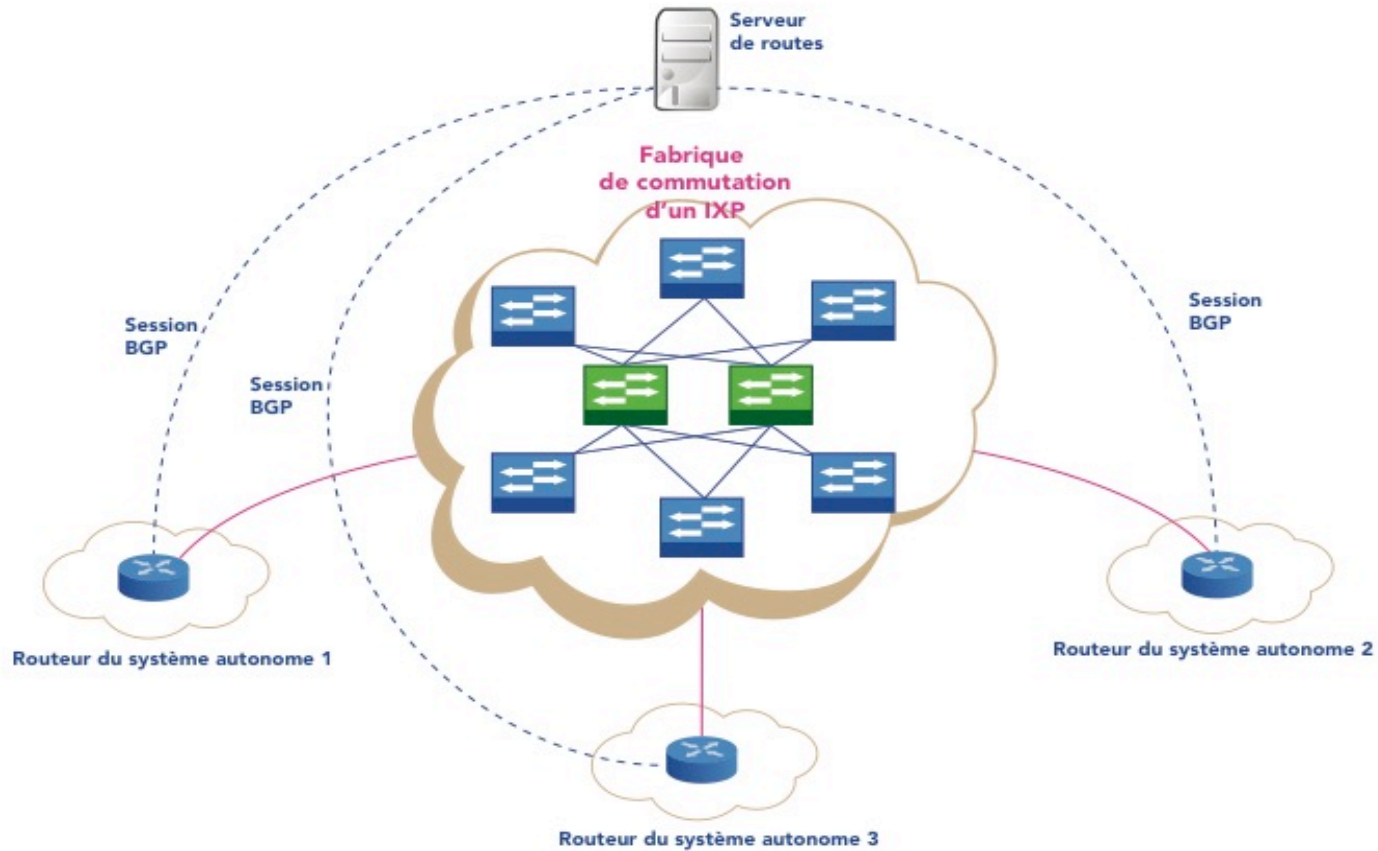
- > What is an IXP?
- > Today IXP switching fabric
- > Operator-Oriented OpenFlow IXP fabric
- > The Toulouse IXP: TouIX
- > Migrating TouIX in TouSIX
- > TouSIX-manager
- > What's next?

# What is an IXP ?

- > An Internet eXchange Point (IXP) is a network facility that enables the interconnection and exchange of Internet traffic between more than two Autonomous Systems (AS).
- > Direct benefit:
  - Lower latency
  - Reduced transit cost
  - Increased security

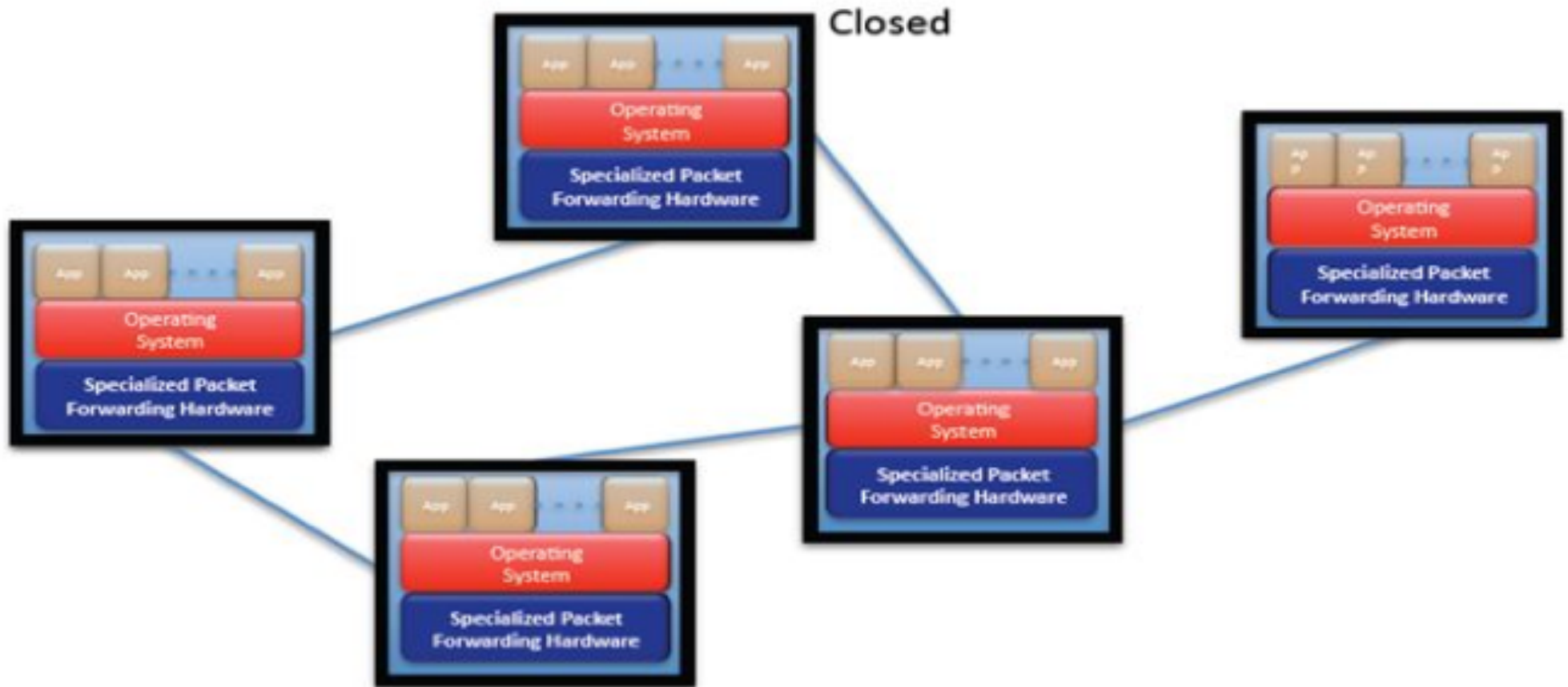


# Today IXP switching fabric

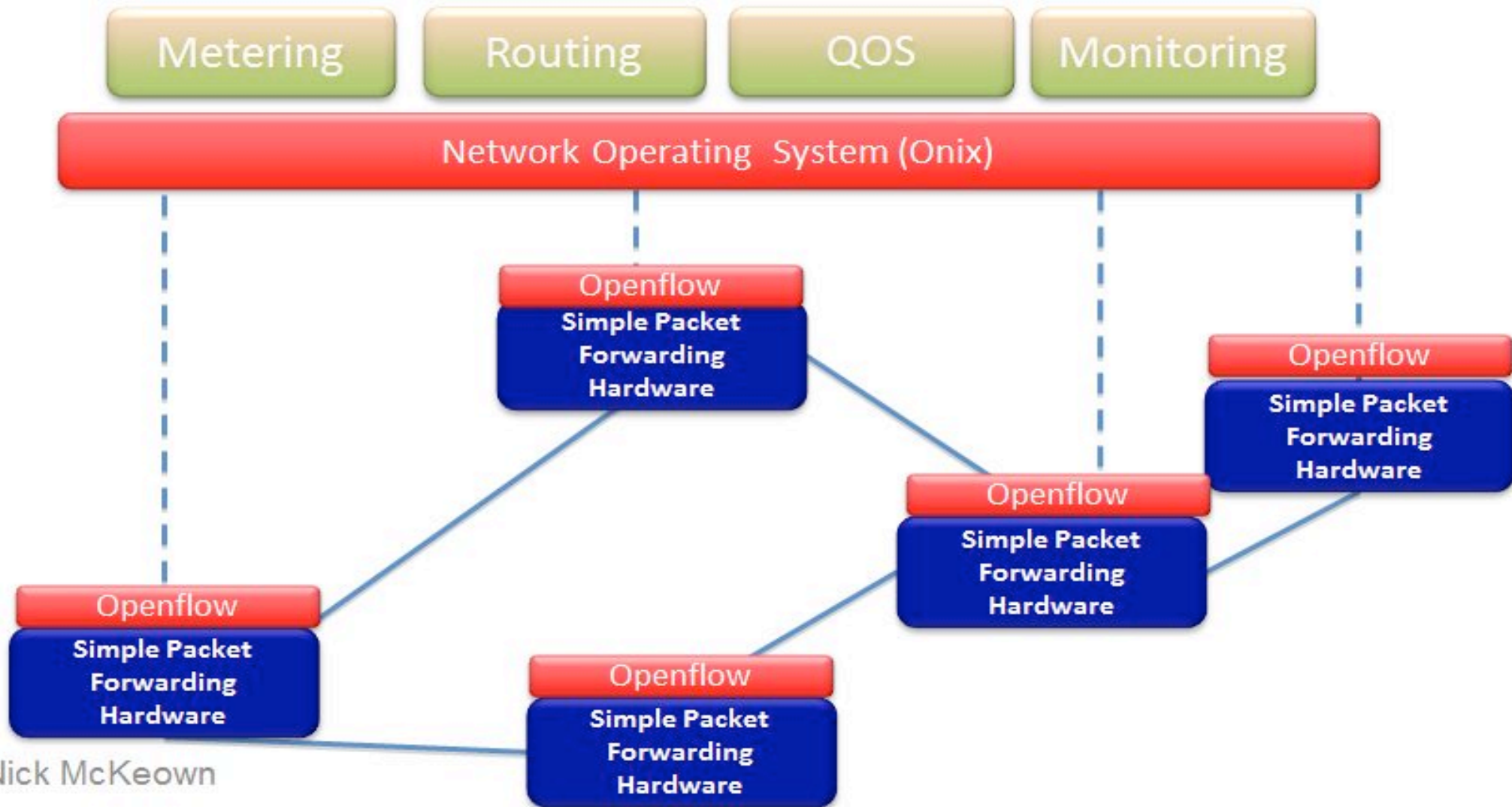


- > IXP switching fabric are shared layer 2 broadcast domain
  - Broadcast traffic can weaken router CPU or even denial the entire IXP
  - Loop free solutions are not perfect
  - Undesired traffic is hard to be kept out
  - Monitoring is too limited or too complex

# Non SDN configuration



# SDN configuration



Nick McKeown

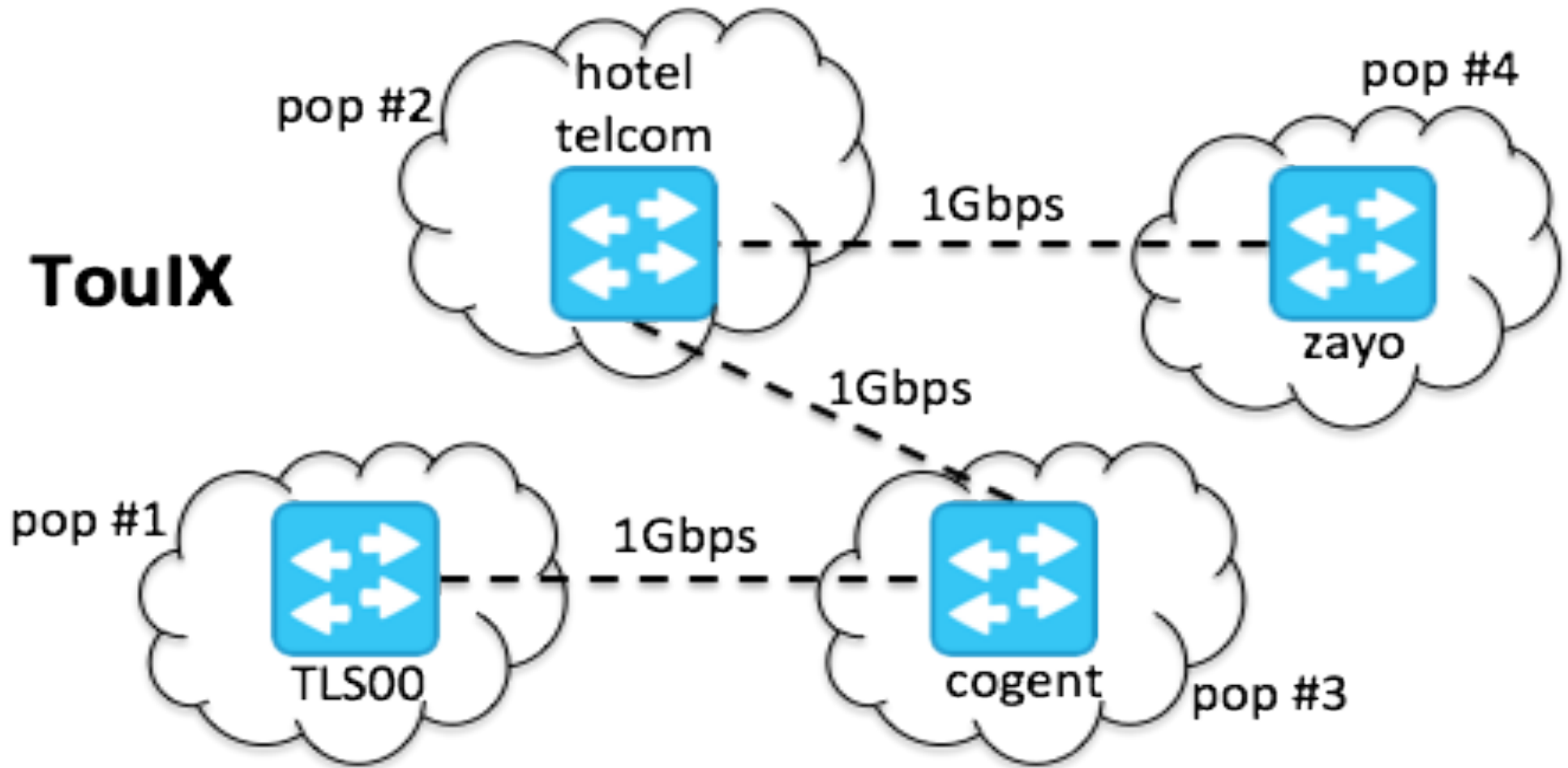
- > No more broadcast and perfect edge filtering
- > Pseudo wire
- > Can run even if the control plane is down
- > Works even without OpenFlow switch in the core
- > Fined-grained monitoring with OpenFlow
- > Link redundancy with group fast failover
- > Scalable for more POPs and IXPs members
- > Open to future applications Oriented IXP customers



# The Toulouse IXP: TouIX

- > Founded in 2006
- > TouIX is an Euro-IX member
- > 4 POPs around Toulouse city
- > 10 active members
- > 300 k IP prefixes
- > Interconnected with France-IX and LyonIX

# TouIX Old Topology



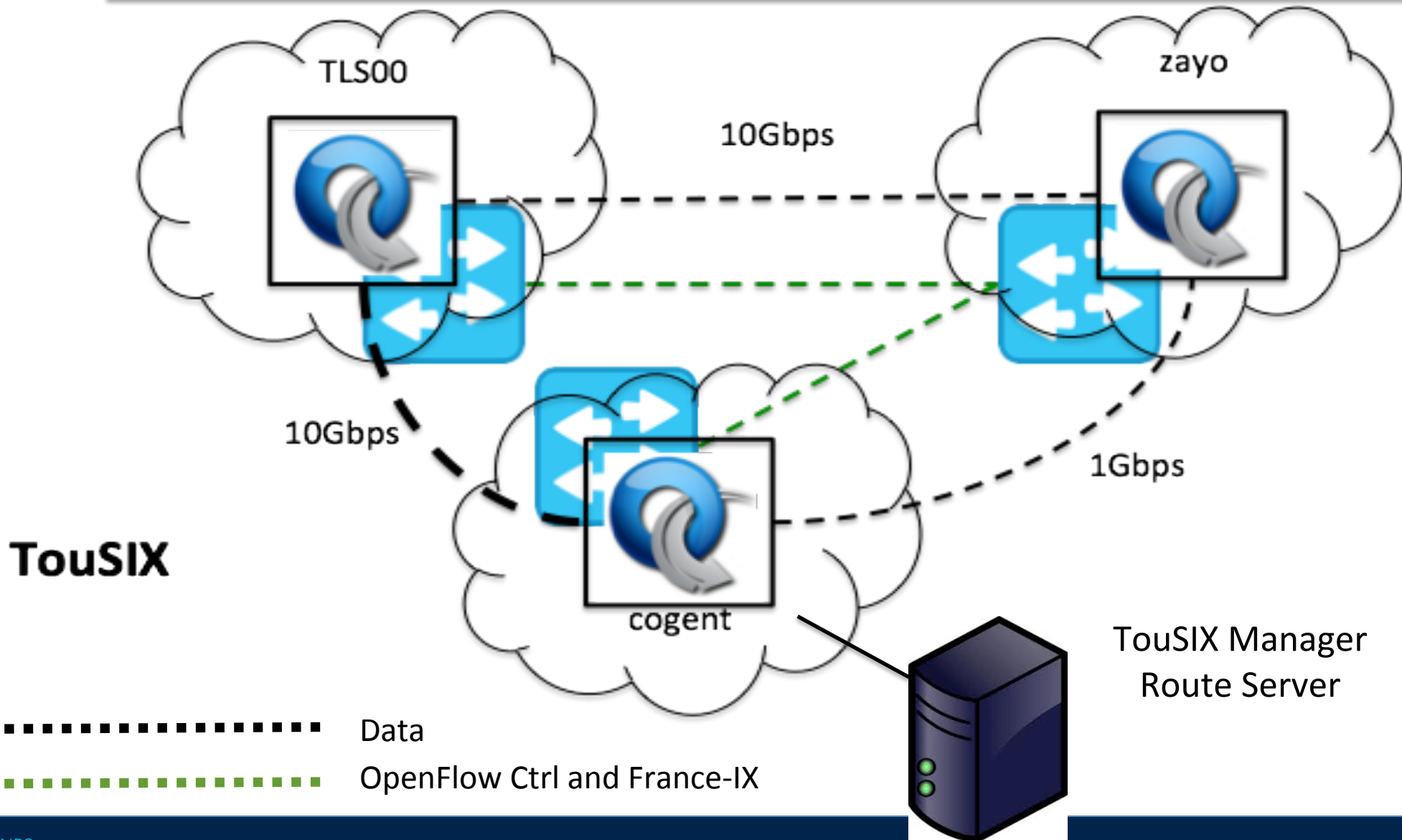
# The Selected OpenFlow Switch

- > OpenVSwitch 2.x
- > OpenFlow 1.3
- Multi-Tables

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*WHITE BOX SDN*

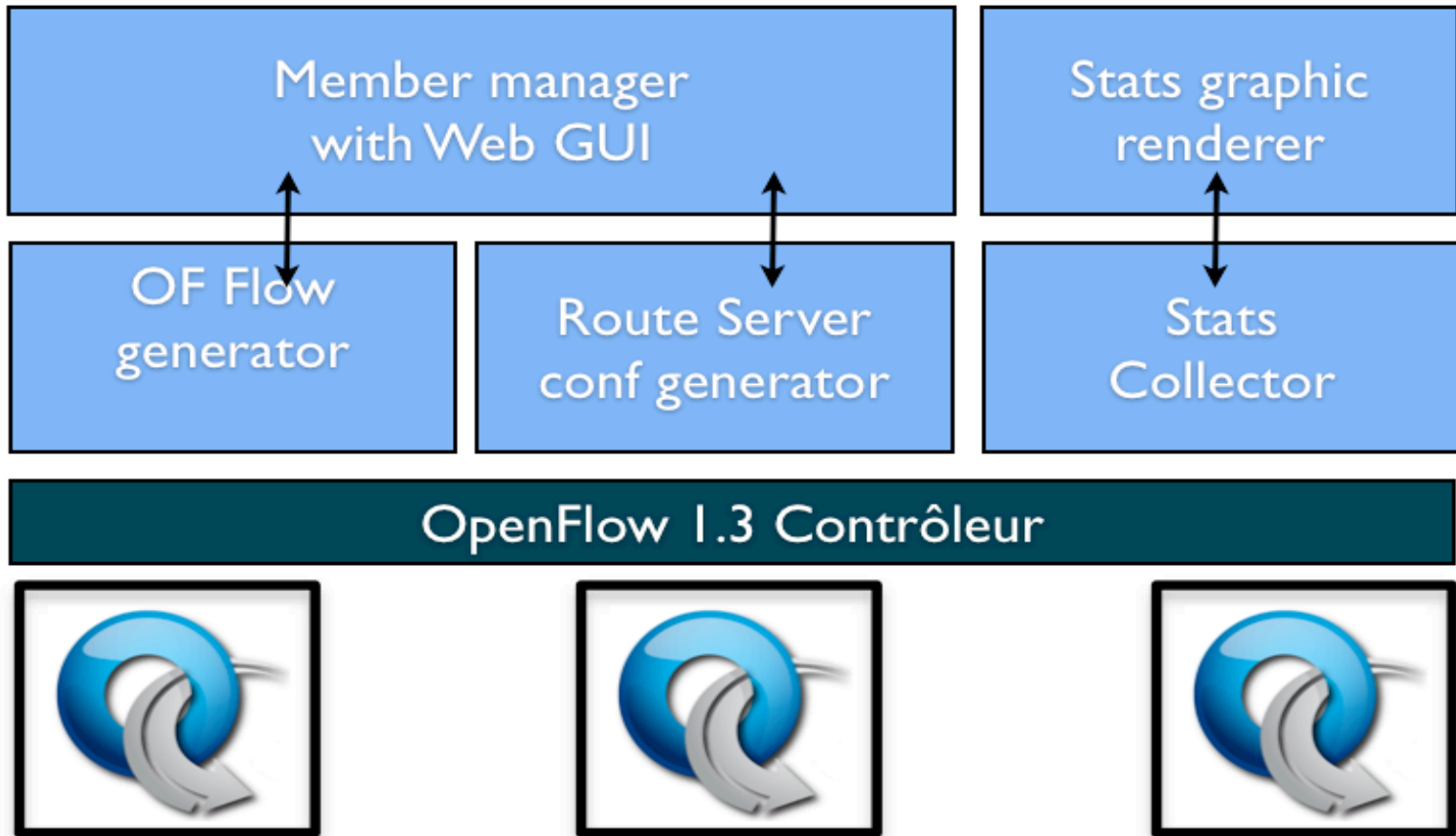


# TouSIX new topology



- > IPv6 ICMPv6 Neighbor Discovery
  - Matching ICMPv6\_ND\_TPA not supported by BCM ASICs in combination with ARP\_TPA matching
  
- ➔ Solutions have been found
- ➔ OpenFlow ASICs need to be improved

# TouSIX-Manager architecture



- > Traffic monitoring interface
- > Member management interface

- > All code can be found at:
- > <https://github.com/umbrella-fabric/TouSIX-Manager>



T O U I X

M A R K E T P L A C E

T O U S I X

- <http://www.touix.net/fr/content/le-projet-tousix>
- Début: février 2016 – 3 ans
  - Scalabilité
  - Monitoring
  - Sécurité
- > Alsatis
- > Covage
- > FullSave
- Inter Media Sud
- Tetraneutral.net
- France-IX



## ENDEAVOUR

<http://www.h2020-endeavour.eu>



Started January 2015 – 3 years

- SDN architecture and mechanisms
- Monitoring infrastructure
- Use cases
  - Autonomous anomaly detection
  - Virtualized private peering (QoS guaranty)

