UMBRELLA Fabric
OpenFlow SDN
The TOUIX to TOUSIX experience

Marc Bruyère, CNRS
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
An Internet Exchange Point (IXP) is a network facility that enables the interconnection and exchange of Internet traffic between more than two independent Autonomous Systems.

Direct benefit:
- Lower Latency
- Reduce transit cost
- Increase security
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
Today IXP switching fabric

Switching fabric

BGP Session

Autonomous Systems 1 router

Autonomous Systems 2 router

Autonomous Systems 3 router
Today IXP switching fabric

Issues with today IXP fabric

IXP switching fabric are shared Layer 2 broadcast domain

- Broadcast traffic can weaken router CPU or even neutralize the entire IXP
- Loop Free solutions are not perfect
- Undesired traffic are hard to be kept out
- Monitoring is too limited or too complex
Today IXP switching fabric

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Non SDN configuration
Operator-oriented OpenFlow IXP fabric

SDN configuration

Network Operating System

- Metering
- Routing
- QOS
- Monitoring

Openflow
- Simple Packet Forwarding Hardware

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Openflow
- Simple Packet Forwarding Hardware
Operator-oriented OpenFlow IXP fabric

- 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 Customer
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**TouSIX** First OpenFlow European IXP

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What’s next
The Toulouse IXP : ToulIX

Toulouse context
The Toulouse IXP : ToulIX

ToulIX

- Founded in 2006
- ToulIX is an EURO-IX member
- 4 PoPs around Toulouse city
- 10 active members
- 300K Ip prefixes
- Interconnected with France-IX and LyonIX
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What’s next
Migrating ToulX to TouSIX

ToulX old topology
Migrating ToliX to TouSIX

The OpenFlow switch selected

- OpenVSwitch 2.x
- OpenFlow 1.3
  - Multi Table
Migrating TouIX to TouSIX

TouSIX
new topology

OpenFlow Ctrl and France-IX

Data

10 Gbps

 TLS00

1 Gbps

 Zayo

10 Gbps

 Cogent
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What's next
TouSIX-Manager

TouSIX-Manager architecture

- Member manager with Web GUI
- Stats graphic renderer
- OF Flow generator
- Route Server conf Generator
- Stats Collector

OpenFlow 1.3 Controller
TouSIX-Manager

Please join!

All code can be found at:

https://github.com/umbrella-fabric/TouSIX-Manager
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What's next
What’s next

An IXP open to innovation

The following TouSIX members are funding a PhD student to do research

★ Alsatis ★ Inter Media Sud
★ Covage ★ Tetaneutral.net
★ FullSave ★ France-IX
What’s next

ENDEAVOUR

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