African operators @France-IX
Traffic distribution
Routes filtering on RS
African operators @ France-IX
Traffic distribution
Routes filtering on RS

- France-IX Paris and Marseille
- France-IX and African operators
- Traffic distribution for African ISPs
- Statistics on routes filtering on RS for African ISPs
France-IX Direct Coverage

9 PoPs in Paris, 3 PoPs in Marseille

Paris:
- 1. Interxion PAR2
- 2. Interxion PAR5
- 3. Telehouse 2

Marseille:
- 1. Interxion MRS1
- 2. Interxion MRS2
- 3. Jaguar Network MRS01

Data Centers:
- 4. Iliad DC2
- 5. Iliad DC3
- 6. Interxion PAR1
- 7. Equinix Telbitrary PAR6 Concorde
- 8. Equinix-Telecity PAR7 Courbevoie
- 9. Telehouse 3
France-IX: Membership Key Facts

+400 Connected Networks in Paris
+70 Connected Networks in Marseille

60% French-based and 40% International Members
Access to French and International content
France-IX and African operators (1/3)

Total of 19 African players connected to France-IX in Paris and/or Marseille (11 in 2017)

9 in Marseille (6 in 2017)
- Angola Cables
- Djibouti Telecom
- Ecoband
- Liquid Telecom
- Mauritius Telecom
- Ooredoo Tunisia
- Seacom
- Telecom Egypt
- WIOCC

14 in Paris (7 in 2017)
- AFR-IX
- Congo Telecom
- Djibouti Telecom
- Dolphin Telecom
- Ecoband
- Guilab
- Gulfsat Madagascar
- Ooredoo Tunisia
- Orange Cote d’Ivoire
- Parabole Réunion
- Telma
- Seacom
- Sonatel
- Zeop/Reunicable
France-IX and African operators (2/3)

5 Remote Peering Partners with presence in Africa

- BICS
- AFR-IX
- Congo Telecom
- Telecom Italia Sparkle
- Angola Cables
France-IX and African operators (3/3)

Depending on submarine cables and the geographic area, Marseille is sometimes the preferred location to exchange traffic for these African operators.
Zoom on France-IX Marseille: distribution of the networks

73 networks connected

- French & International SPs/Operators + Local players: 55%
- CDNs: 20%
- African networks: 12%
- Asia/Middle East: 11%
France-IX Marseille: Traffic by African networks

25% of traffic exchanged in France-IX Marseille
France-IX Marseille: African networks traffic distribution

- Traffic mainly done with international content providers → 65%
- Traffic with major and medium French operators + French content providers → 20%
- Some traffic, non optimized, done with Asian/Middle East carriers > almost 10%
France-IX Marseille: African networks traffic distribution

- Hopefully, no traffic exchanged between African networks in Marseille
  > was around 2% few days ago, almost 0% now
Zoom on Island operators

• Almost all connected @France-IX Paris
  – La Réunion: Zeop Reunicable, Reunion Parabole
  – Madagascar: Telma, Gulfsat
  – Mauritius: Mauritius Telecom

• Reaching Europe and France for different purposes than African operators
  – Access to French CDNs and French operators → 40%

• “only” 40% of traffic with international CDNs
African operators @France-IX
Traffic distribution
Routes filtering on RS

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Securing route servers

France-IX started securing route servers **3 years ago**

Only tagging routes with BGP communities initially

IRR not found

ROA invalid

- 51706:65012 = Prefix has ROA status: VALID
- 51706:65022 = Prefix has ROA status: INVALID
- 51706:65023 = Prefix has ROA status: UNKNOWN
- 51706:65011 = Prefix is present in an AS's announced AS/AS-SET
- 51706:65021 = Prefix is not present in an AS's announced AS/AS-SET

Done using a combination of our DB, bird, PeeringDB some scripts and tools like bgpq3, NTT DB

Every member was able to filter by himself... but this is not enough to have a secure Internet Exchange...

Strict filtering started **18 months ago**: filtering by default “IRR not found” or “ROA invalid” routes
Statistics on route filtering: IRR and RPKI
Global statistics on route filtering: ROA/RPKI deployment

- Filtering **9%** (MRS) and **6%** (PAR) of routes, mainly “IRR not found”

- Only **11%** (MRS) and **15%** (PAR) of routes have an ROA valid… growing but not enough, the rest are ”ROA unknown”
Statistics on route filtering with African countries
Statistics on route filtering with African countries in Marseille

- 10% of the routes (9400 routes) received by RS are from African networks
  - Less than 6% of these routes are tagged as “IRR not found”
  → Better ratio than global prefixes received by RS

- Few “ROA valid” routes, but growing → 5% → Lower ratio than global prefixes received by RS (11%)
Example of “IRR not found” issue

Solved by updating PeerindDB!
RS filtering: 2 important things to do!!

- "IRR not found" issue:
  - Maintain ROUTE objects @RIR DBs
  - Maintain peeringdb up-to-date

- ROA/RPKI deployment: Sign your routes
  - It takes few minutes and this will help to have a more secure internet
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