Impacts of Recent Submarine Cable Cuts on Middle East Internet

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Insights from Recent Cable Incidents

- Diversity still very important
  - Increased provider & cable diversity in region has reduced impacts of these cable breaks
- Consensus regional IX still needed
  - Many ME providers still connect to each other via Europe resulting in long latencies
  - Surprisingly, cable failures can result in *reduced* latencies
- Completion of latest cable projects will help
  - **RCN** (Turkey, Syria, Jordan, Saudi Arabia)
  - **JADI** (Turkey, Syria, Jordan, Saudi Arabia)
  - **EPEG** (Germany, Russia, Iran, Oman)
  - Gulf Bridge International Cable System **(GBICS)**
 - **TGN-Gulf Cable**

Latency Counts

- Many online applications degrade in performance or break as latency grows
  - VOIP, MS Sharepoint, Online Gaming
- Some rules of thumb around long-distance latencies
  - ME-London roundtrip is ~100ms
 - Roundtrip across Pacific Ocean is ~100ms

Cable Break Analysis

- Significant Cable Breaks in early 2012
  1. 17 February – 18 March
     - EASSy
     - Europe-India Gateway
     - Sea-Me-We 3
  2. 21 – 25 February
     - Flag FALCON
  3. 25 February – 23 March
     - TEAMS
  4. 3 – 18 March
     - FOG

- Analyze the impacts of these incidents using Routing and Traceroute data
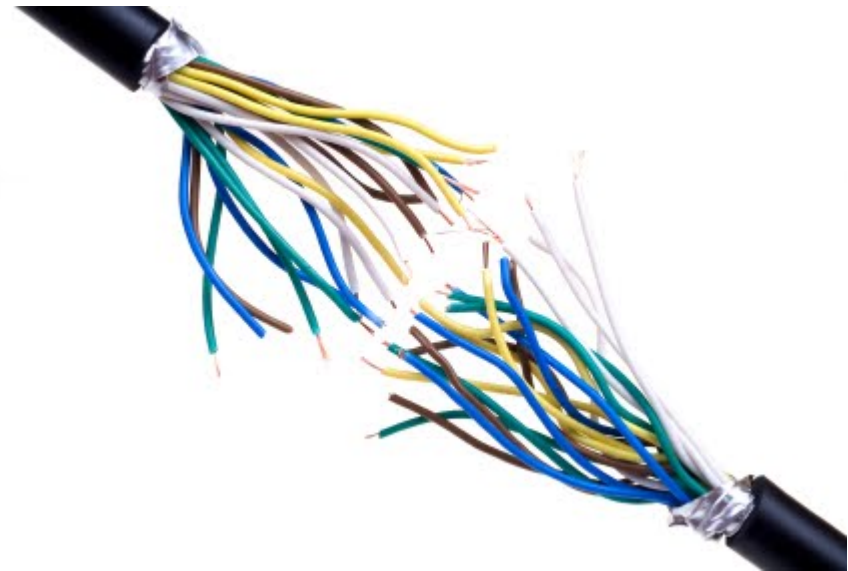
Renesys Traceroute Infrastructure

- Renesys performs daily traceroutes of the entire Internet from 57 locations around the world.
  - Over 4 million traceroutes into Middle East Internet daily
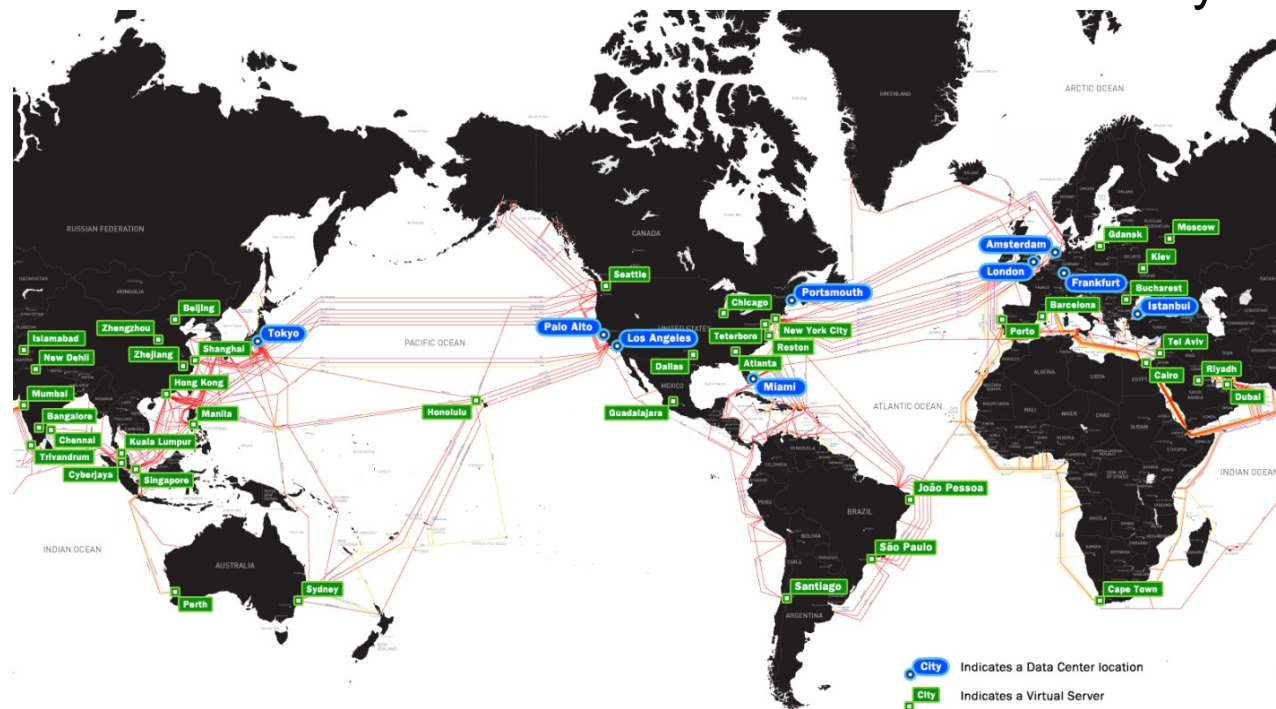
Renesys Traceroute Infrastructure - April 2012 (plus Global Submarine Cable Map)

Note: Some cities host multiple collectors.
Image credit: Telegeography

SMW3 Cable Cut

- SMW 3 owned by consortium of over 40 telecoms.
- Ready for Service: September 1999
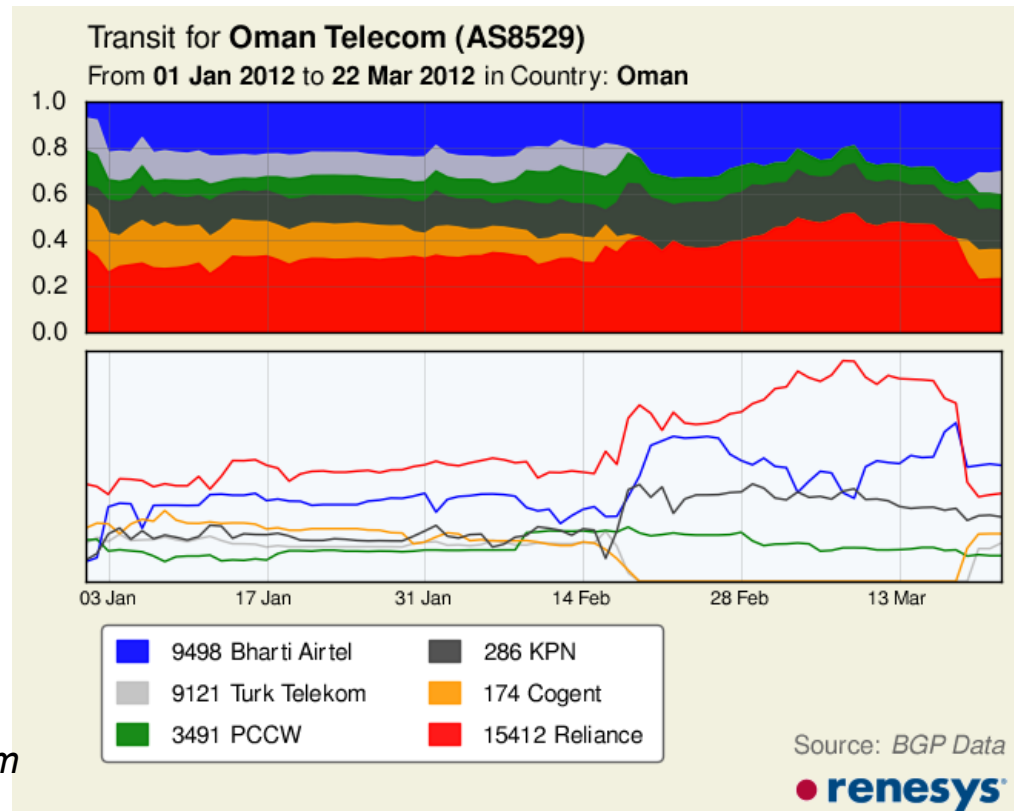- Cable Broken in Red Sea at 07:19 UTC on 17 February 2012

Image Credit: Telegeography

SMW3 Cable Cut
Impact in Oman

- OmanTel's connection to AMSIX gone resulting in loss of TTnet and Cogent transit (17 Feb – 18 Mar)
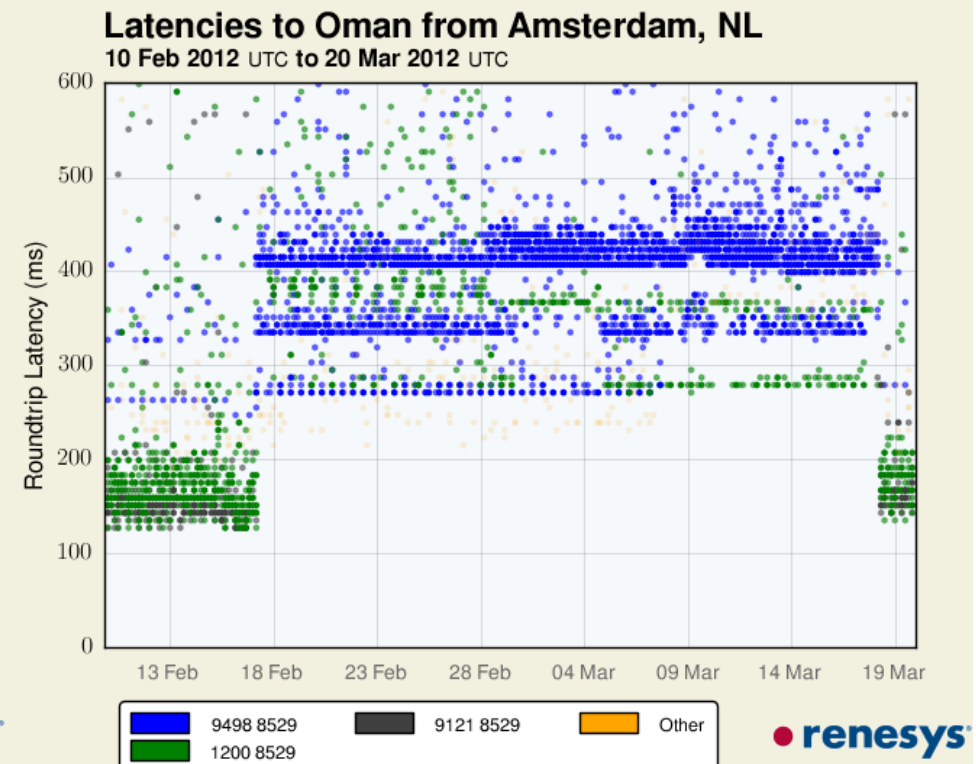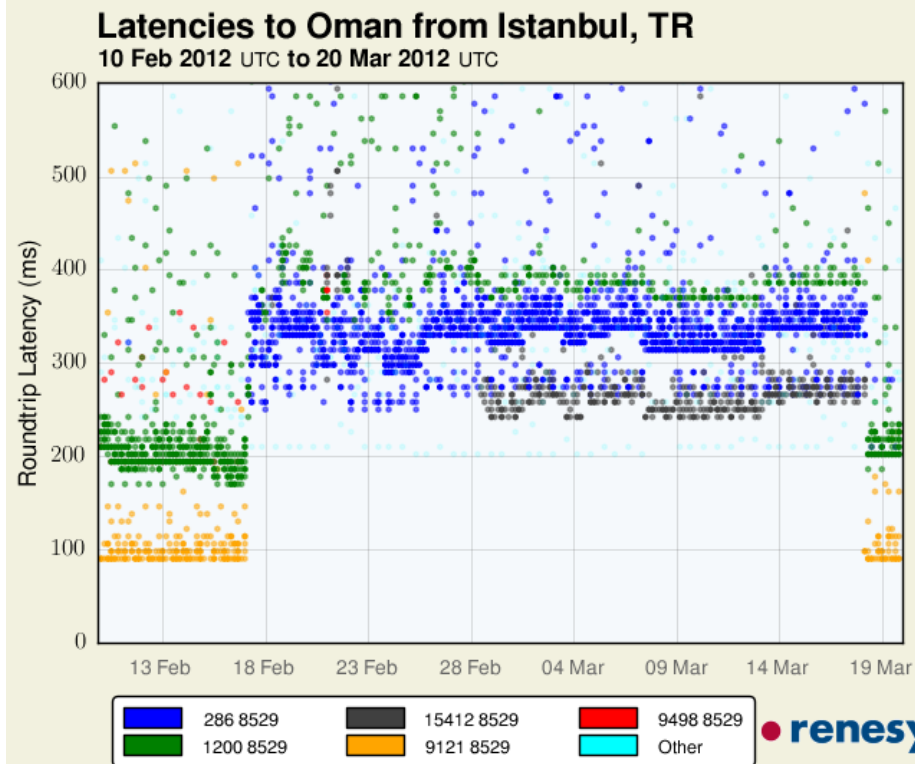- Described in our blog:
  - **Return of SMW3**

Image computed from data from Renesys' Market Intelligence

Transit for **Oman Telecom (AS8529)**
From **01 Jan 2012** to **22 Mar 2012** in Country: **Oman**

Legend:
- 9498 Bharti Airtel
- 9121 Turk Telekom
- 3491 PCCW
- 286 KPN
- 174 Cogent
- 15412 Reliance
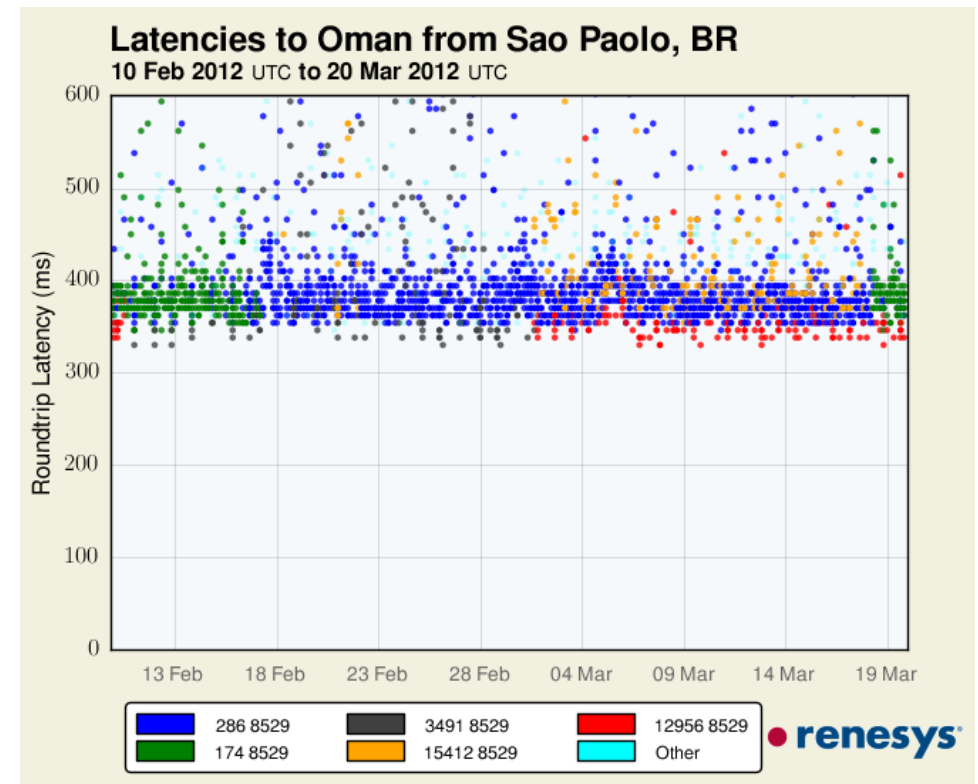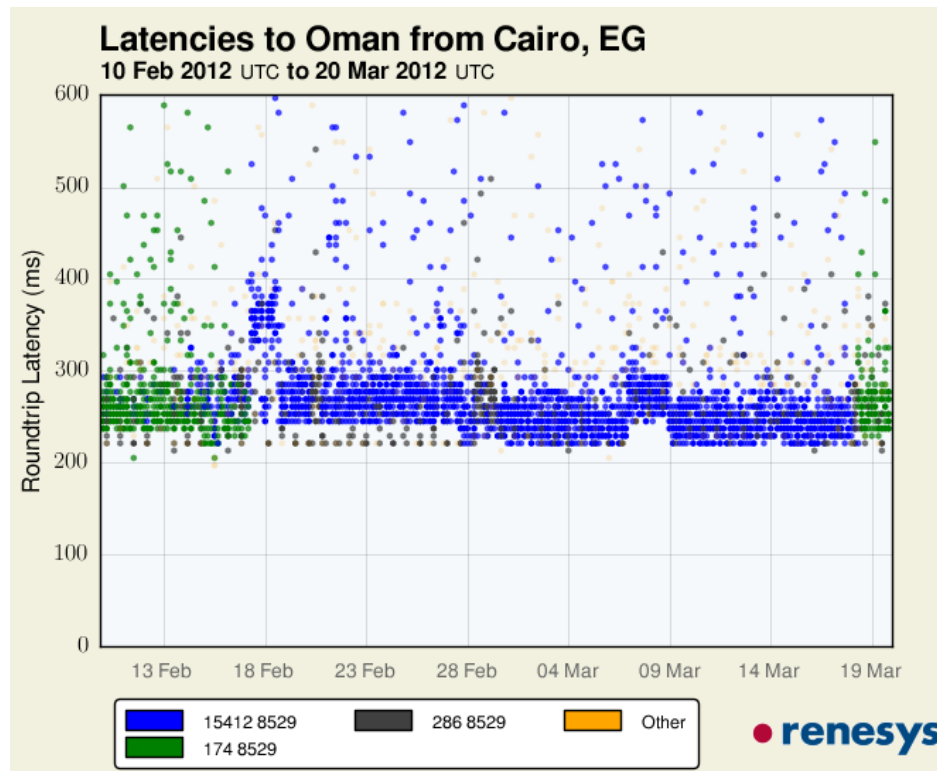
Source: *BGP Data*

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SMW3 Cable Cut
Impact in Oman

- Without TTnet (AS9121) and Cogent (AS174) transit, latencies to OmanTel (AS8529) from some locations increased significantly

Latencies to Oman from Istanbul, TR
10 Feb 2012 UTC to 20 Mar 2012 UTC

Legend:
- 286 8529 (blue)
- 1200 8529 (green)
- 15412 8529 (gray)
- 9121 8529 (orange)
- 9498 8529 (red)
- Other (cyan)

Latencies to Oman from Amsterdam, NL
10 Feb 2012 UTC to 20 Mar 2012 UTC

Legend:
- 9498 8529 (blue)
- 1200 8529 (green)
- 9121 8529 (gray)
- Other (orange)

SMW3 Cable Cut
Impact in Oman

- Other locations see little impact in latencies to Oman

Latencies to Oman from Cairo, EG — 10 Feb 2012 UTC to 20 Mar 2012 UTC

Legend: 15412 8529 (blue), 286 8529 (gray), Other (orange), 174 8529 (green)

Latencies to Oman from Sao Paolo, BR — 10 Feb 2012 UTC to 20 Mar 2012 UTC

Legend: 286 8529 (blue), 3491 8529 (gray), 12956 8529 (red), 174 8529 (green), 15412 8529 (orange), Other (cyan)
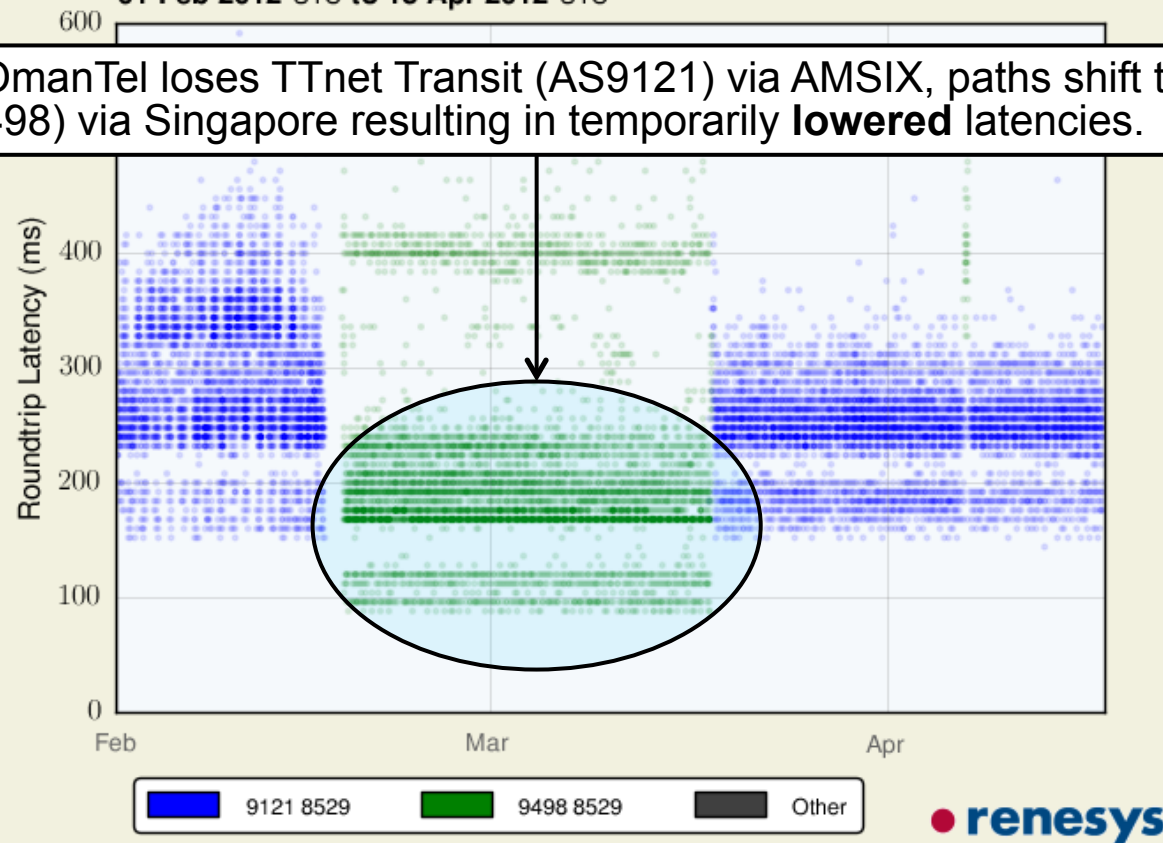
SMW3 Cable Cut
OmanTel Shift Impacted Pakistani Transit

- OmanTel is a major provider for Transworld (AS38193) in PK

Latencies to Pakistan from Dubai, AE
01 Feb 2012 UTC to 18 Apr 2012 UTC

17 Feb: As OmanTel loses TTnet Transit (AS9121) via AMSIX, paths shift through Bharti (AS9498) via Singapore resulting in temporarily **lowered** latencies.

Legend: 9121 8529 | 9498 8529 | Other

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SMW3 Cable Break Summary

- Some national providers lost connections with international providers
- Resulted in few outages due to provider diversity
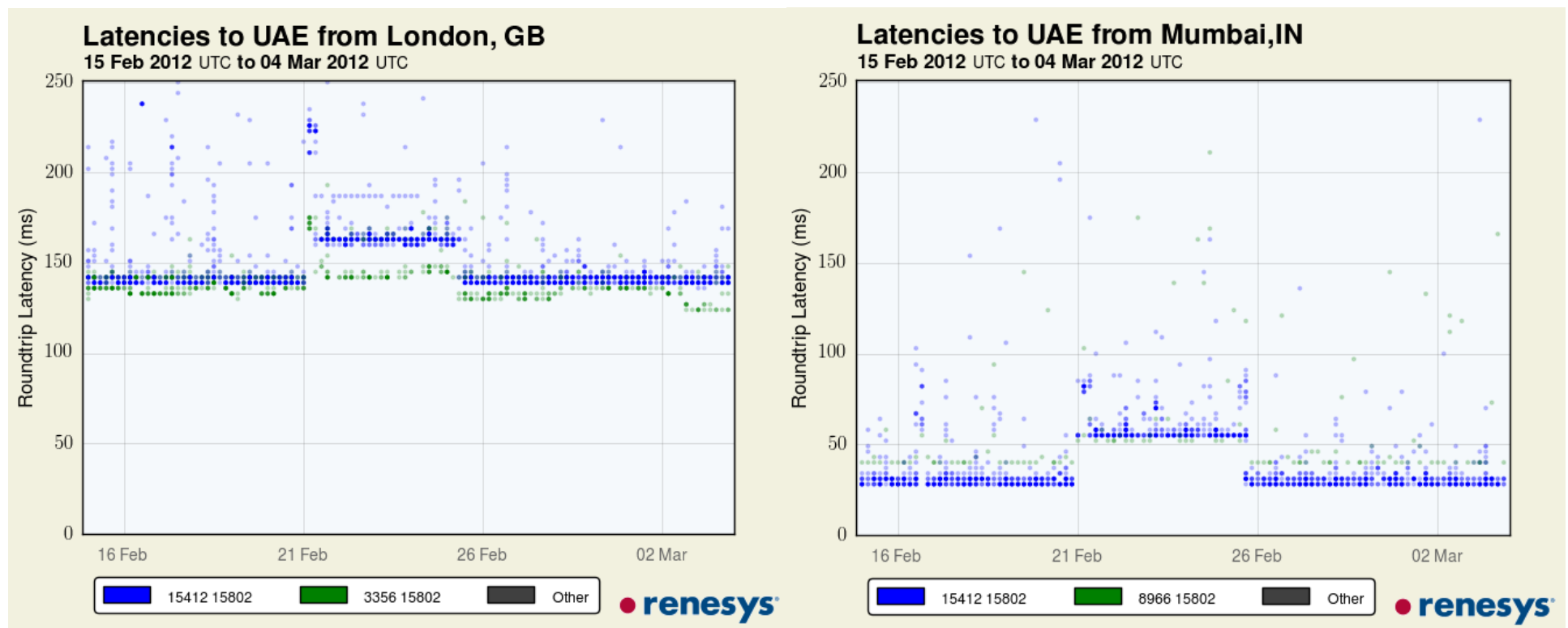

Image Credit: Telegeography

Flag FALCON

- Owned by Reliance
- Ready for Service: September 2006
- Cable cut between Oman and UAE on 21 Feb 2012
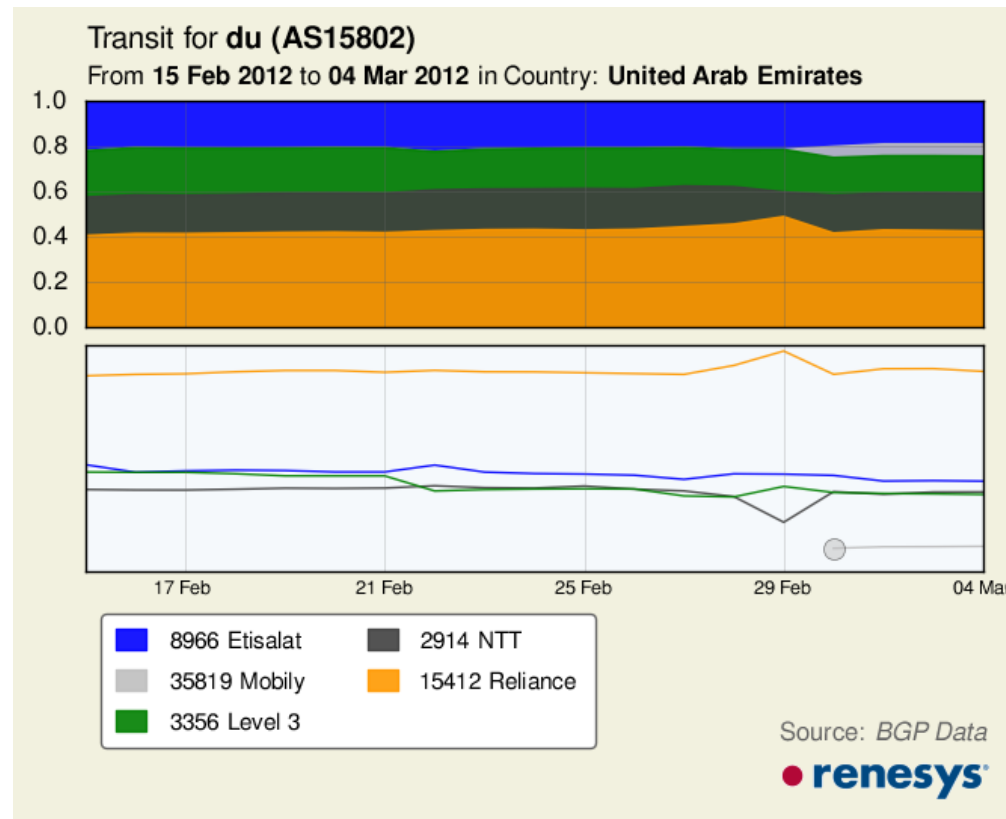

Image Credit: Telegeography

Flag FALCON Break Impact in UAE

- No outages, however traceroutes to **du** (AS15802) must travel the long way around the Gulf slightly increasing latencies through Reliance's Flag (AS15412)

Flag FALCON Break Summary

- Marginal increase in latencies
- No major impact on routing however

TEAMS Cable Break

- The East African Marine System (TEAMS)
- Etisalat (AS8966) a Major Owner
- Connects
  - Fujairah, UAE
  - Mombasa, Kenya
- Cut by a ship's anchor at:
  - 09:13 UTC on 25 February 2012
- Described in post in our blog:
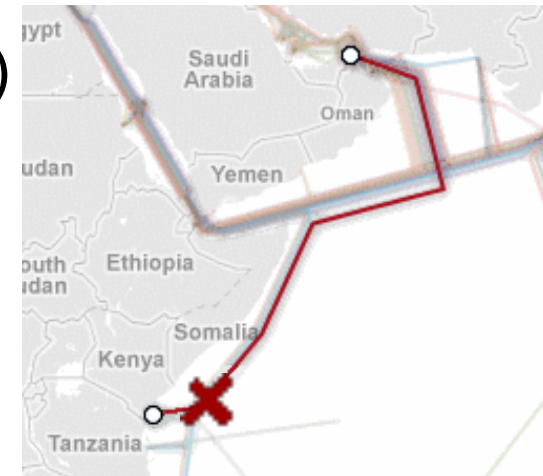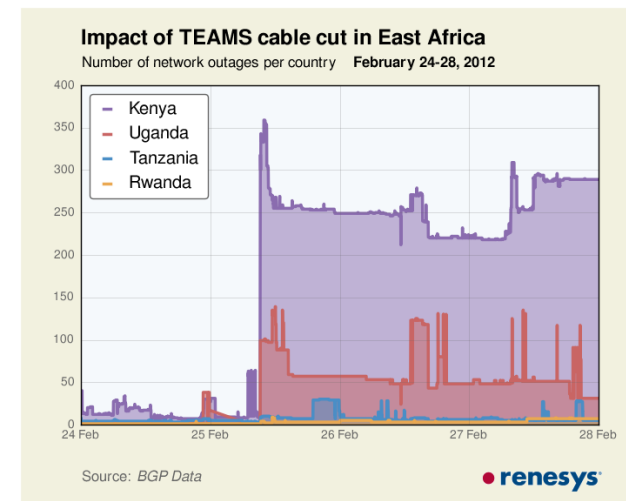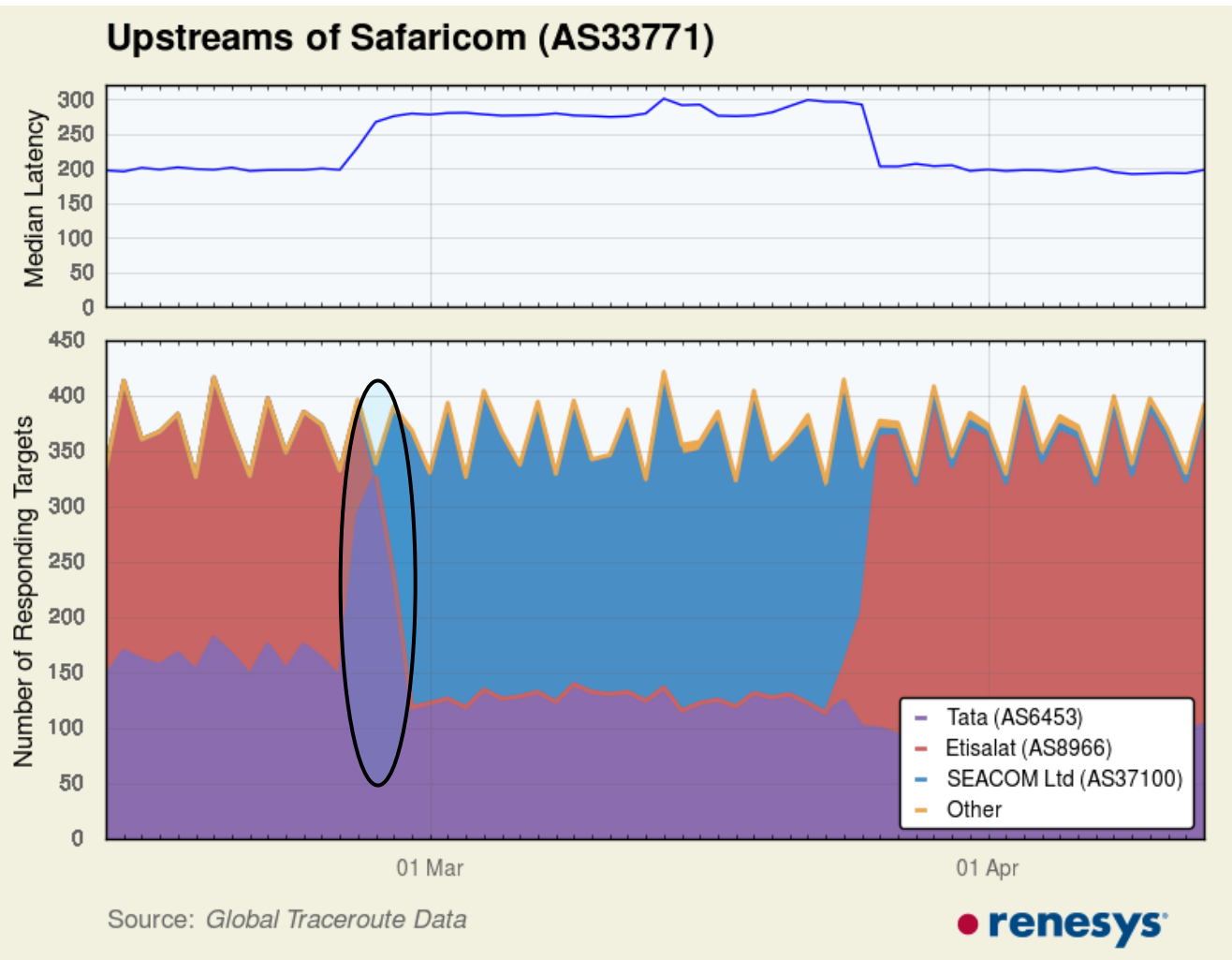 - **East African Internet Resilience**

Image Credit: Telegeography

Impact of TEAMS cable cut in East Africa
Number of network outages per country   February 24-28, 2012

Kenya
Uganda
Tanzania
Rwanda

Source: BGP Data   •renesys

TEAMS Cable Break As Seen From UAE

- 25 Feb: Safaricom (AS33771) lost Etisalat (AS8966) as a provider when TEAMS was cut and lost its low-latency path to UAE.

- Traffic was shifted to Tata (AS6453) and SEACOM (AS37100) over the SEACOM cable system.

- Traceroutes through SEACOM ASN (37100) disappeared after TEAMS cable was restored.

Upstreams of Safaricom (AS33771)

Median Latency

Number of Responding Targets

Tata (AS6453)
Etisalat (AS8966)
SEACOM Ltd (AS37100)
Other

01 Mar   01 Apr

Source: Global Traceroute Data

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TEAMS Cable Break As Seen From UAE

Latencies to Kenya from Dubai, AE
11 Feb 2012 UTC to 13 Apr 2012 UTC

25 Feb: Safaricom (AS33771) lost Etisalat (AS8966) as a provider when TEAMS was cut and lost its low-latency path to UAE.
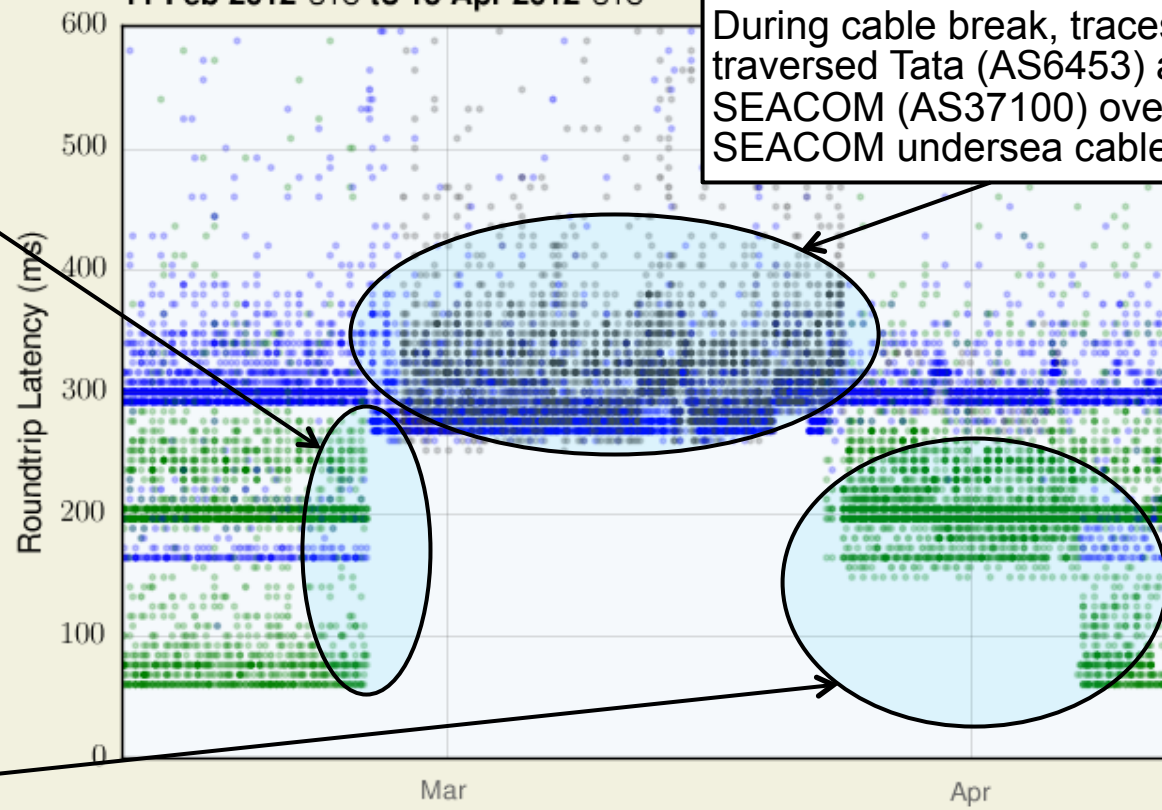
During cable break, traces traversed Tata (AS6453) and SEACOM (AS37100) over SEACOM undersea cable

23 Mar 13:36UTC: Etisalat (AS8966) returned as provider of Safaricom (AS33771)
Apr 7 11:42UTC: Lower latency paths returned

Legend:
- 6453 33771
- 8966 33771
- 37100 33771
- Other

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TEAMS Cable Break Summary

- Many outages as East African providers were single-homed on low-cost TEAMS cable

- Resulted in the loss of low-latency paths between East Africa and ME

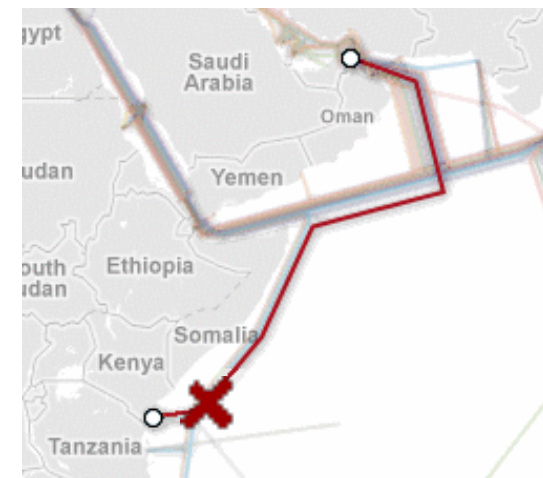- SEACOM took East African traffic load until TEAMS was repaired

Image Credit: Telegeography

Fiber Optic Gulf (FOG) Cable Break

- Owned by Etisalat, Qtel, Batelco, Kuwait Ministry of Communications
- Ready for Service: June 1998
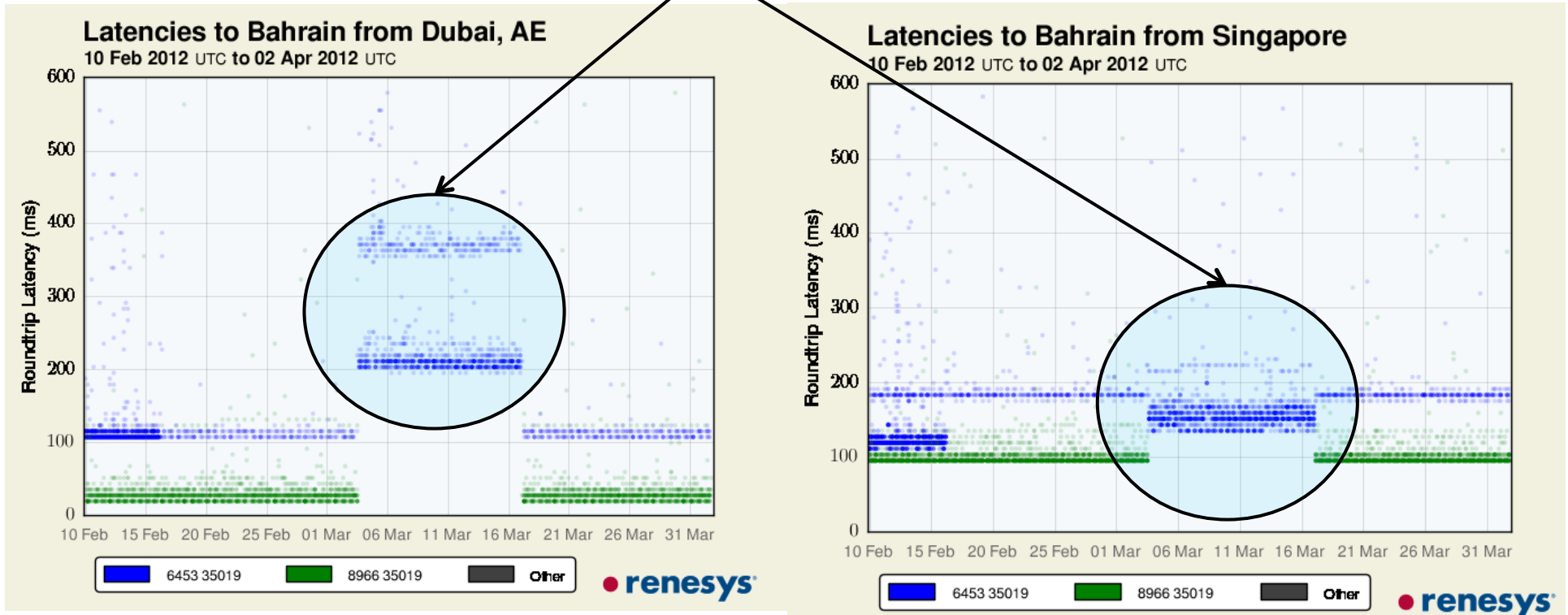- No public announcement of cable break, however data suggests one
  - 3 – 18 March

Image Credit: Telegeography

FOG Cable Break

- Traceroutes into Bahrain Internet Exchange (AS35019)

March 3: Connection with Etisalat (AS8966) gone, replaced with Tata (AS6453)

FOG Cable Break

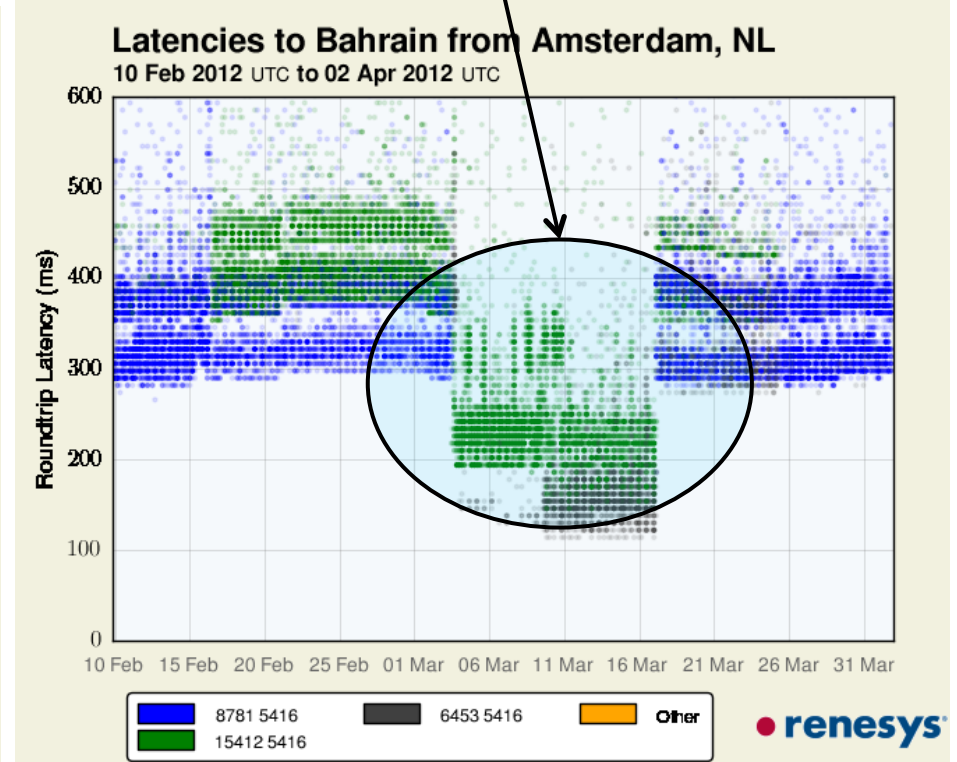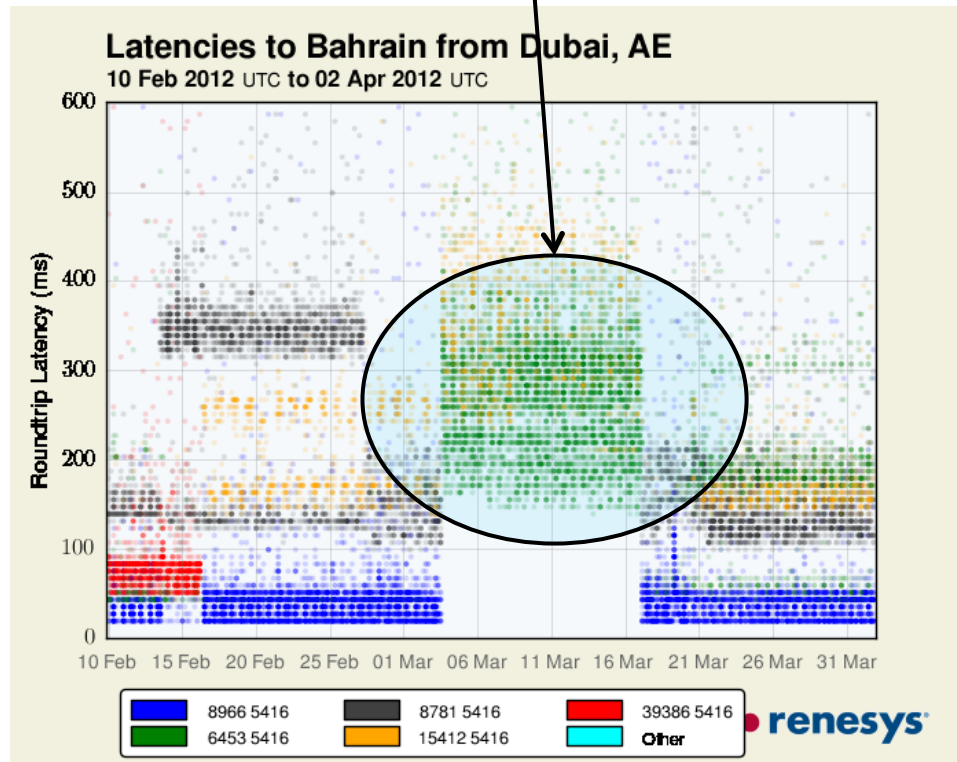- Etisalat (AS8966) disappeared and routes were shifted to Tata (AS6453)

FOG Cable Break

- Traceroutes into Batelco (AS5416)

Connection with Etisalat (AS8966) gone, replaced with Tata (AS6453)
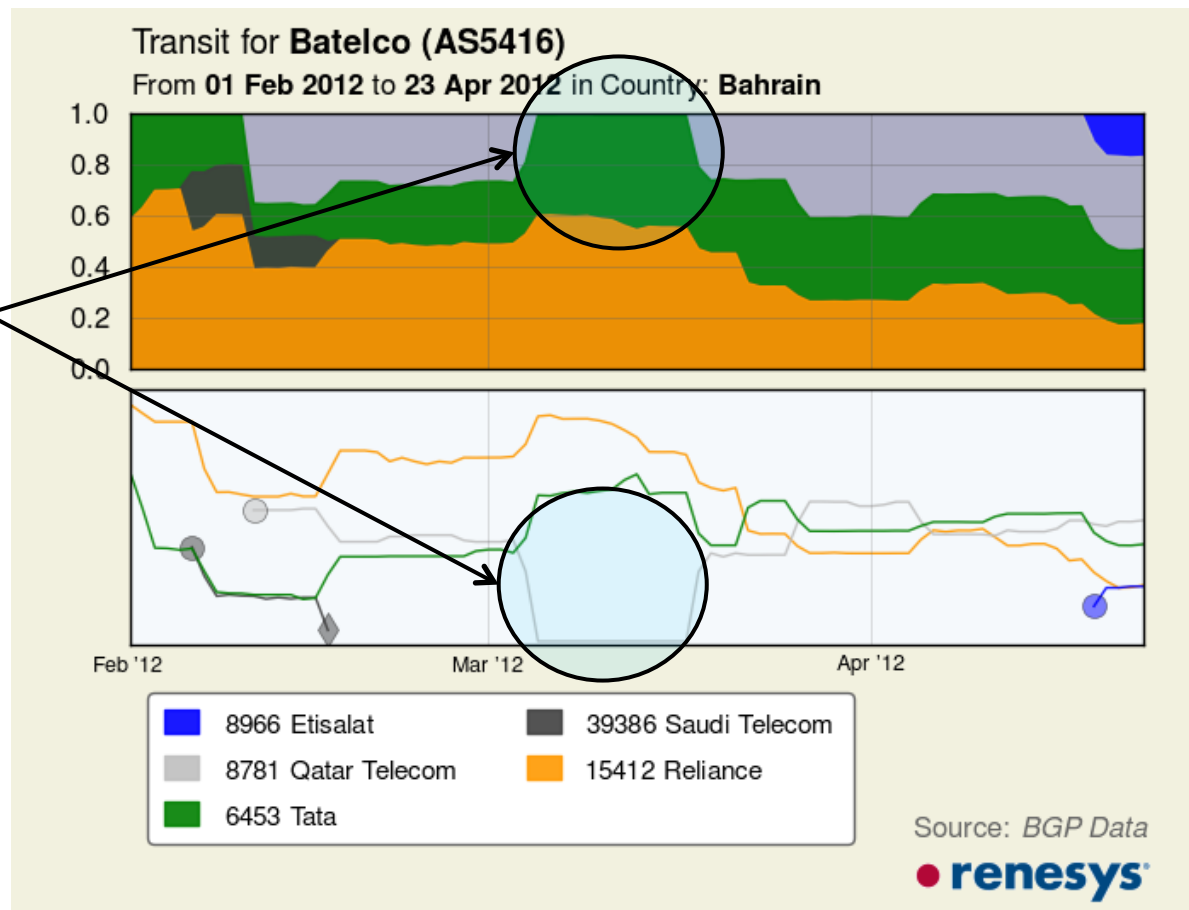
Connection with Qtel (AS8781) gone, connected through Reliance (AS15412) with *improved latencies*

FOG Cable Break

- Also evident in routing data

Connection with QTel (AS8781) gone, replaced with Tata (AS6453)

Transit for **Batelco (AS5416)**
From **01 Feb 2012** to **23 Apr 2012** in Country: **Bahrain**

Legend:
- 8966 Etisalat
- 8781 Qatar Telecom
- 6453 Tata
- 39386 Saudi Telecom
- 15412 Reliance

Source: *BGP Data*

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FOG Cable Break Summary

- No outages, however some dramatic changes in latencies as traffic is shifted to surviving connections
  - Some latencies are unexpectedly seen to improve
- Analysis of a cable cut does not depend on a public announcement

Image Credit: Telegeography

Insights Again

- ## Diversity Still Very Important
  - Increased Provider & Cable Diversity has reduced impacts of these cable breaks

- ## Consensus Regional IX Still Needed
  - Many ME providers still connect to each other via Europe resulting in long latencies
  - Surprisingly, cable failures can result in **reduced** latencies

- ## Coming Cable Projects Can Only Help
  - RCN, JADI, EPEG, GBI, TGN

Thank you!

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