Middle Eastern Internet Trends

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MENOG 7 - Istanbul

Ibn Batutta (1304-1368)
(أبو عبد الله محمد ابن عبد الله اللواتي الطنجي بن بطوطة)

- Travelled the world for 30 years, from Tangiers to China *and back again*

- Described **rich networks** of trade, scholarship, commerce, communication linking this region in the 14th century

- The inspiration for our look today at the growth and interconnection of the regional Internet

Our Middle East focus will be narrower than ibn Batutta's!

Today:

Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Gaza, West Bank, Qatar, Saudi Arabia, Syria, Turkey, UAE, Yemen

Save for another day:

Caucasus, South+Central Asia, Maghreb, Horn of Africa

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Our Journey Today

- Regional overview: market growth and interconnection trends

- 2010 Country Snapshots and Market Rankings

- Predictions for 2011-2012

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A word about data and interpretation

- This presentation uses objective data gathered from the public Internet:
    - BGP route updates from hundreds of peers worldwide
    - Traceroute data from many key vantage points
- The interpretation of these data rely on feedback and context from regional operators and regulators.
- Your comments and corrections are critically important to this project!

# Country Overview and Regional Trends

Country Review

- Brief synopsis of each country in the region, from the smallest Internet market to the largest

- You will notice that:

  - Geography is all-important
  - Not everyone has been dealt the same hand
  - Different countries mediate international access.. Differently.

- Internet topology (international connectivity, transit diversity, competition, **peering**) will change in specific ways as markets grow

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Ecosystem Complexity

X-axis: Rank of **Number of ASNs** Observed Originating Prefixes in National Market

Y-Axis: Rank of **Market Size** (Renesys Market Intelligence Customer Base Score, Oct 2010).

- **UAE has relatively low ASN complexity (large market, few origins)**

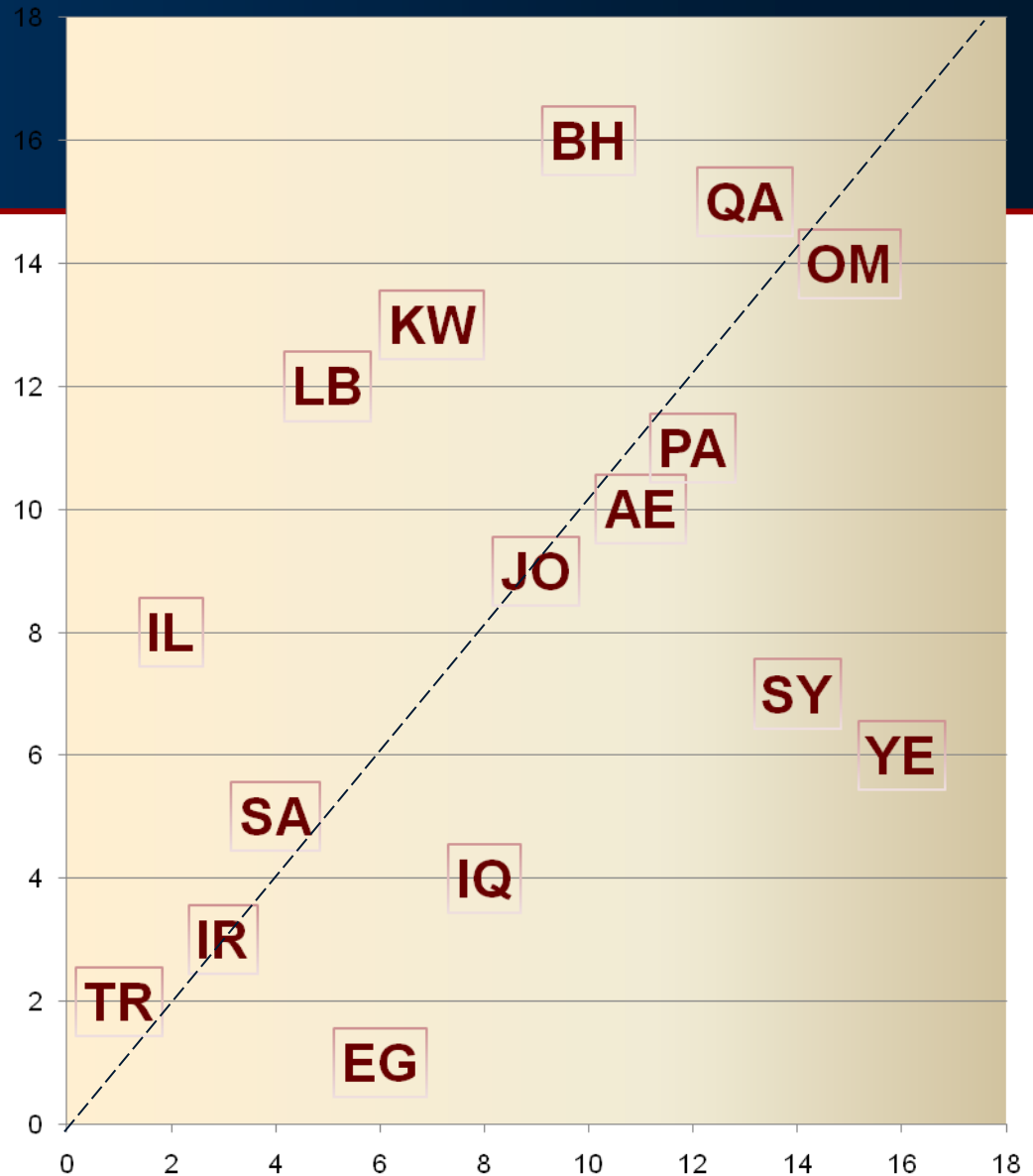- **Lebanon and Iraq have relatively high ASN complexity**
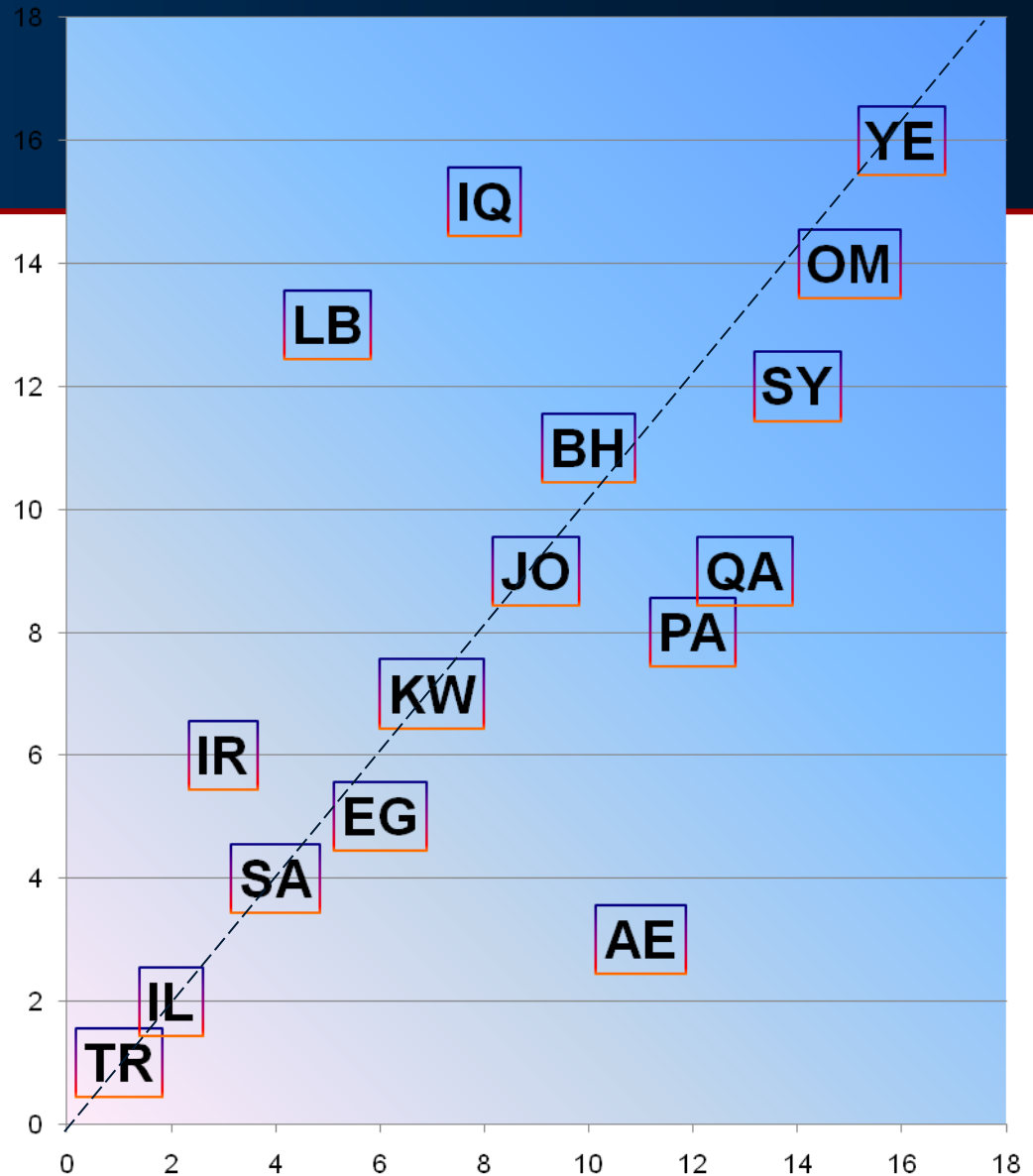
"ASNs Per Person"

X-axis: Rank of Number of ASNs Observed Originating Prefixes in National Market

Y-axis: 2005 Population Rank

- **Israel, Lebanon, Kuwait, Bahrain have large markets proportionate to their population**

- **Egypt, Iraq, Syria, Yemen have less Internet than expected for their size**

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Per-Country Internet Transit Maps

- **Red boxes** are international providers
- **Blue boxes** are domestic providers

- Domestic providers with international connectivity are larger or smaller according to their relative importance
- Goal is to show how countries acquire and manage international transit: the **key challenge** for the Middle East

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Yemen (#14)

- 1 originating Autonomous System
- Yemen Net (AS12486) originates 28 prefixes
  - Terrestrial fiber transit from Mobily/Bayanat, Saudi Telecom
  - FLAG Falcon, SMW3 transit from internationals:
 - PCCW, Orange, Tata, Flag

Yemen (#14, 1 Origin)
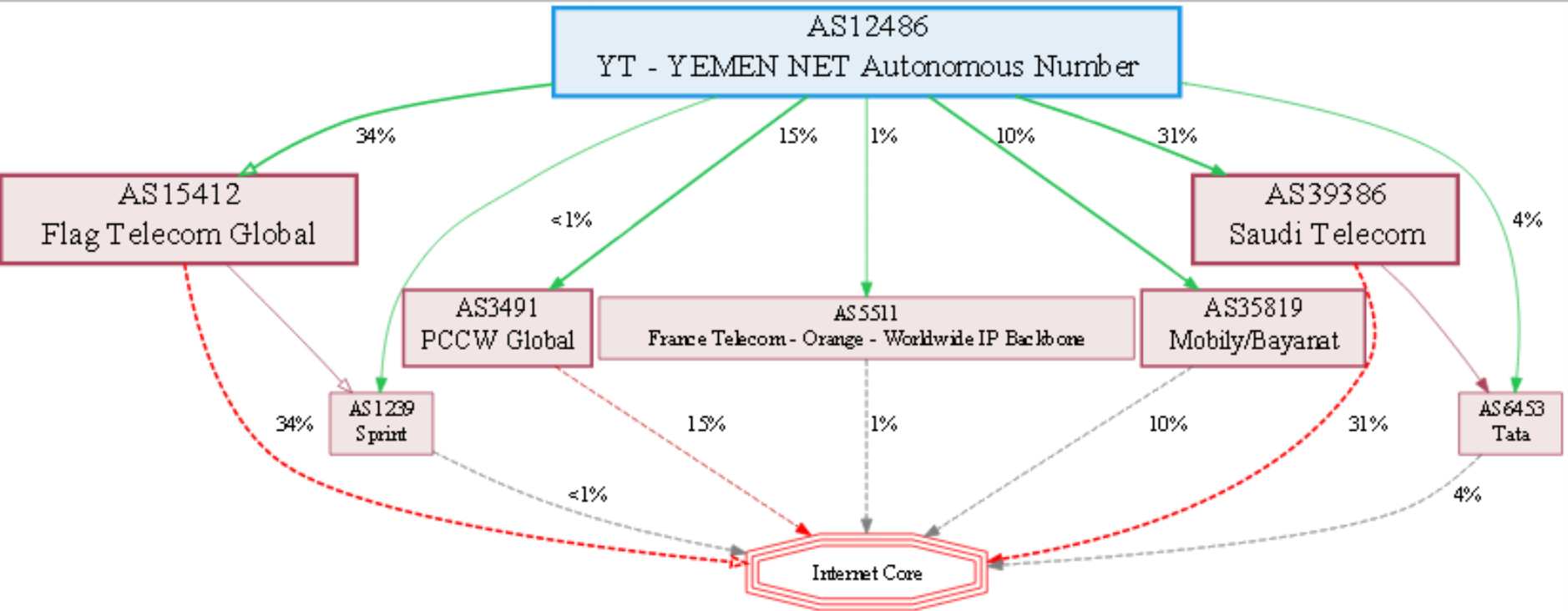
Oman (#13)

- 5 originating ASNs (tied with Syria)

- OmanTel (AS15679, AS8529)
  - Omani Qatari Tel (AS50010) and ITA (AS15679) downstream

- International transit evenly balanced across PCCW, Global Crossing, Telecom Italia, Bharti Airtel, KPN, STIXLITE Singapore (FLAG Falcon, SMW3)

- Additional transit from Turk Telekom since July 2010

Oman (#13, 5 Origins)
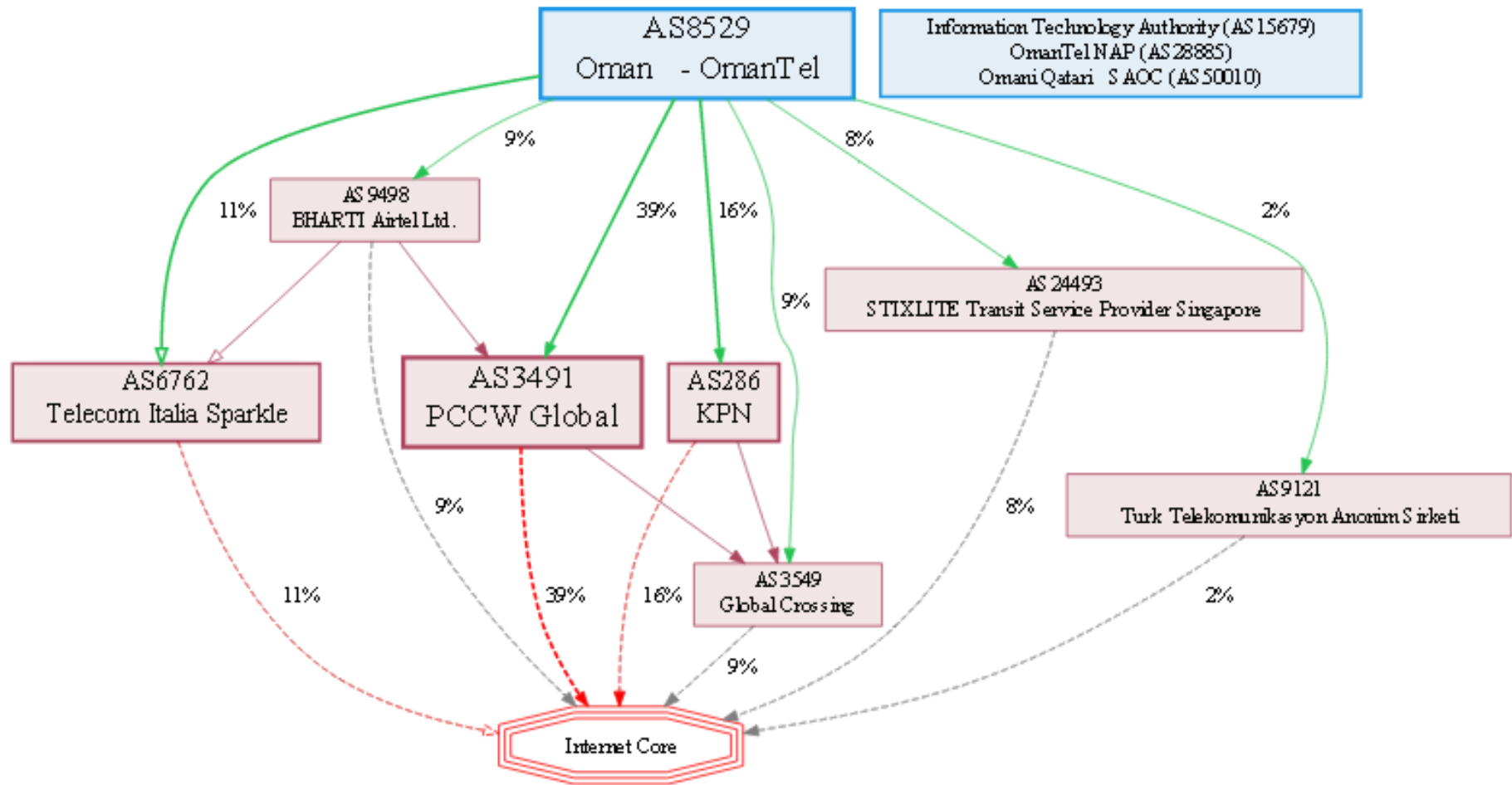
Syria (#13)

- 5 originating ASNs (#13, tied with Oman)
- Syrian Telecom (AS29256, AS29386)
- Majority transit via submarine cable (Deutsche Telecom, PCCW, Tata); minority via Turk Telekom
- Syriatel advertises via Syrian Computer Society (AS24814), downstream of Syrian Telecom; many smaller w/out ASNs (Tarassul, AYA, MTN Syria..)
- Classic centralized model for all ISP transit. How will JADILINK change this picture?

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Syria (#13, 5 Origins)
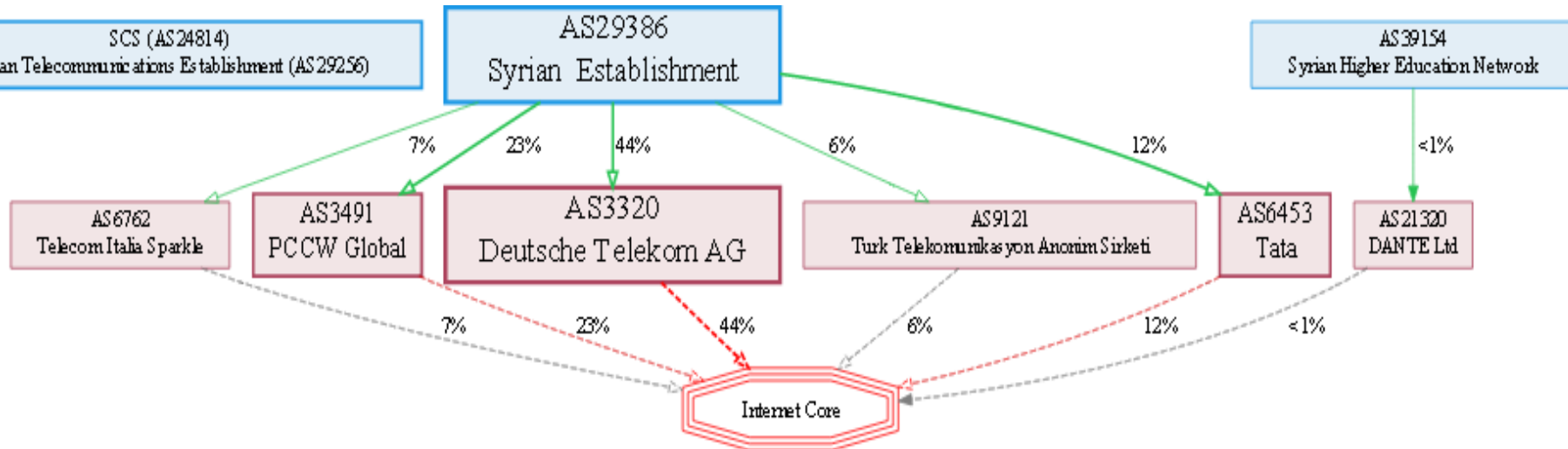
Qatar (#12)

- 10 originating ASNs
- Q-Tel (AS8781, AS42298)
  - Submarine cable transit balanced across Tata, HE, AT&T, Flag, NTT, L3, Stixlite Singapore
- Some providers (Qatar Foundation for Education, Science, and Community, AS29384) have **direct international transit** (eg., FLAG) and appear to be reselling it to downstream customers
- Vodafone Qatar will land GBI in Doha in 2011
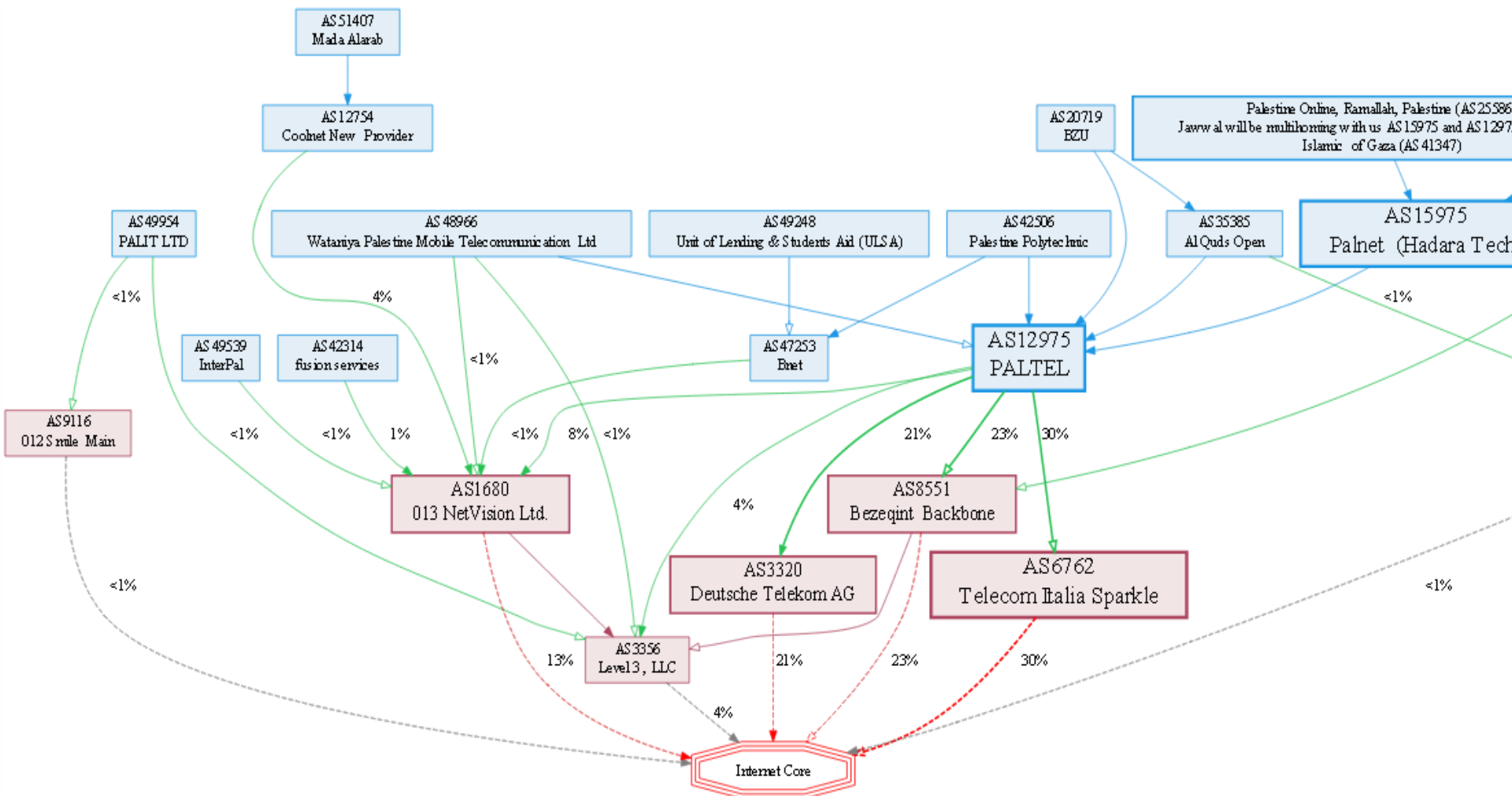- Intelsat provides additional bandwidth
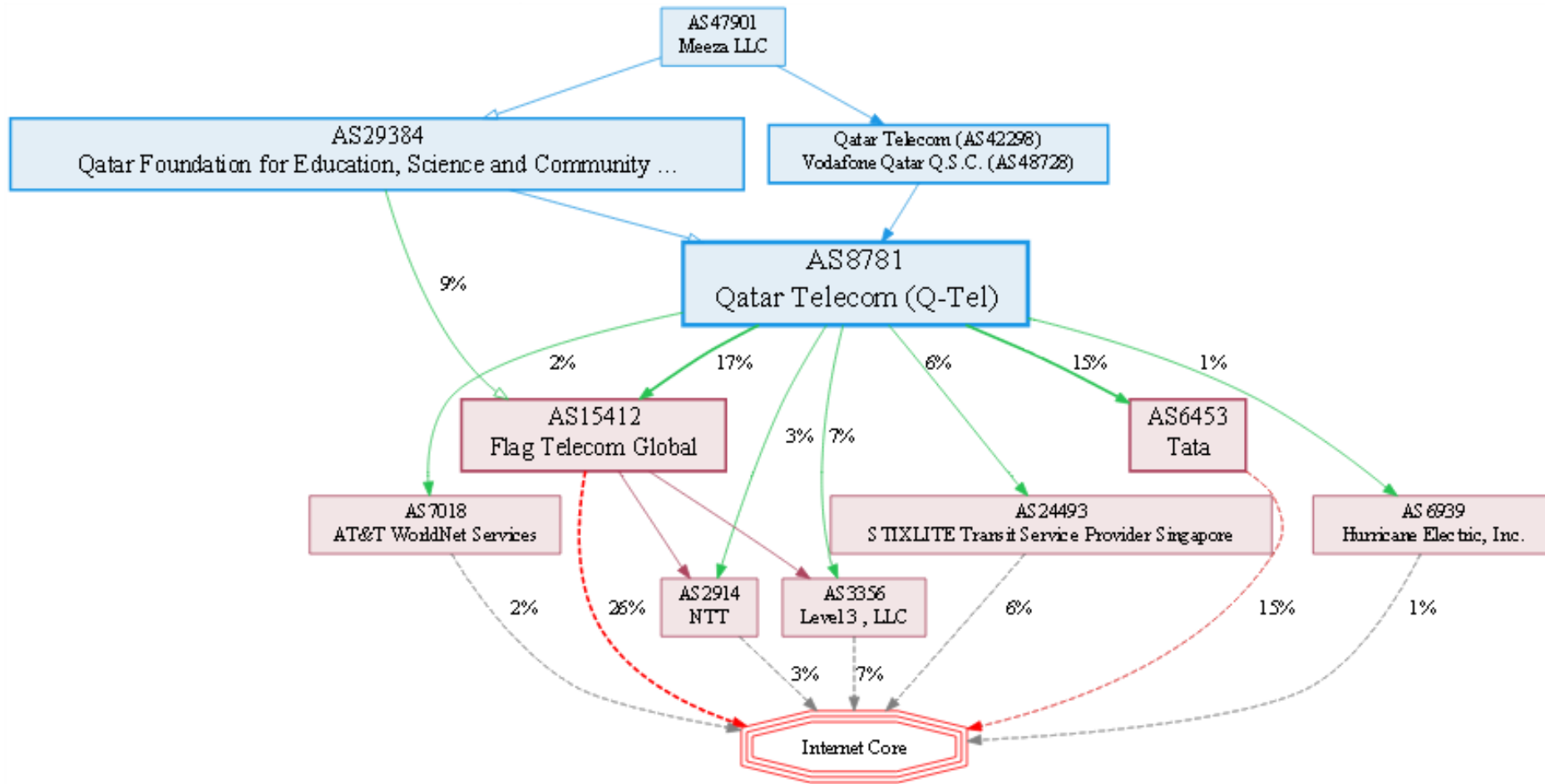
Palestinian Territories (#11)

- 19 originating ASNs with increasing diversity
- PalTel (AS12975) has seven downstream ASNs
  - Most transit balanced among Telecom Italia, Deutsche Telecom, and Israeli Bezeqint
  - **2nd and even 3rd generation ASN-based transit relationships are common**, with multihoming (example: Cairo Amman Bank, AS48701, multihomed to Palnet and Bezeqint)
  - Several small ASNs have direct access to international transit; e.g., Wataniya Palestine Mobile, **triply-homed** to PalTel, NetVision, and Level3

UAE (#10)

- 24 originating ASNs (tied with BH)
- Emirates (AS5384,AS8966,etc)
  - Rich international transit (Flag, VZ, Singtel, Glbx, TI, Transworld, L3, Telia, ….) via submarine cables
  - Limited evidence of downstream ASNs, multihoming
  - Limited direct development of international transit
  - Surprisingly rich satellite connectivity still in place
  - Geographically favorable conditions, high international connectivity, low ASN count?

UAE (#10, 24 origins)
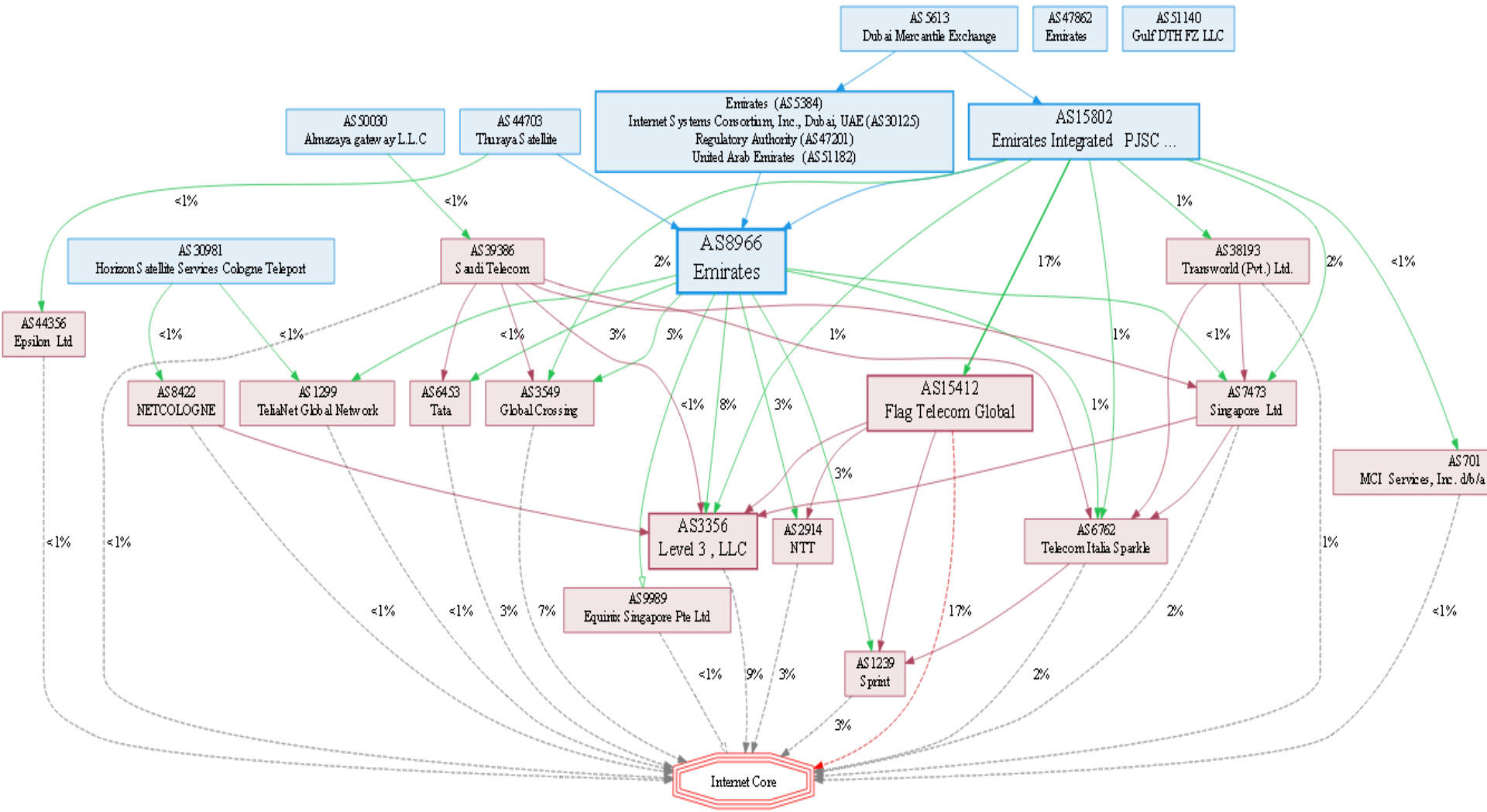
Bahrain (#10)

- 24 originating ASNs (tied with UAE)

- FLAG, FOG, Terrestrial connectivity to SA

- Limited international carrier choice: FLAG, Tata

- Batelco (AS5416): No ASN downstreams

- Zain, Mena, Lightspeed, 2Connect, Nuetel, Kalaam, etc. have international connectivity, directly or via BIX (AS35019): **increasingly competitive market**

- Saudi Telecom's Viva has entered as 3rd mobile licensee, over leased GCCI dark fiber

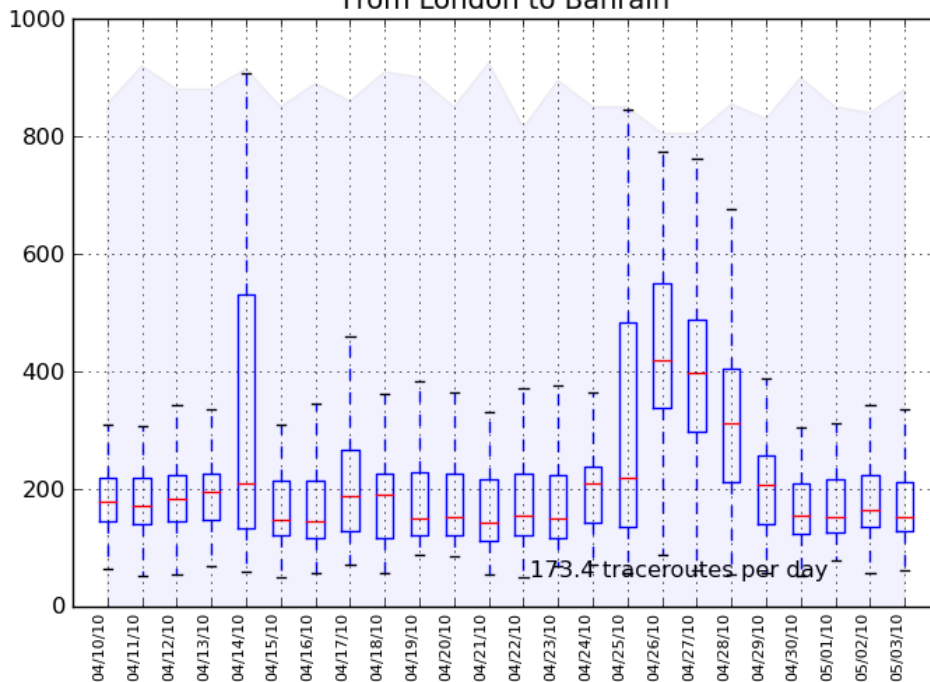- New fiber landings in 2011 will increase choice

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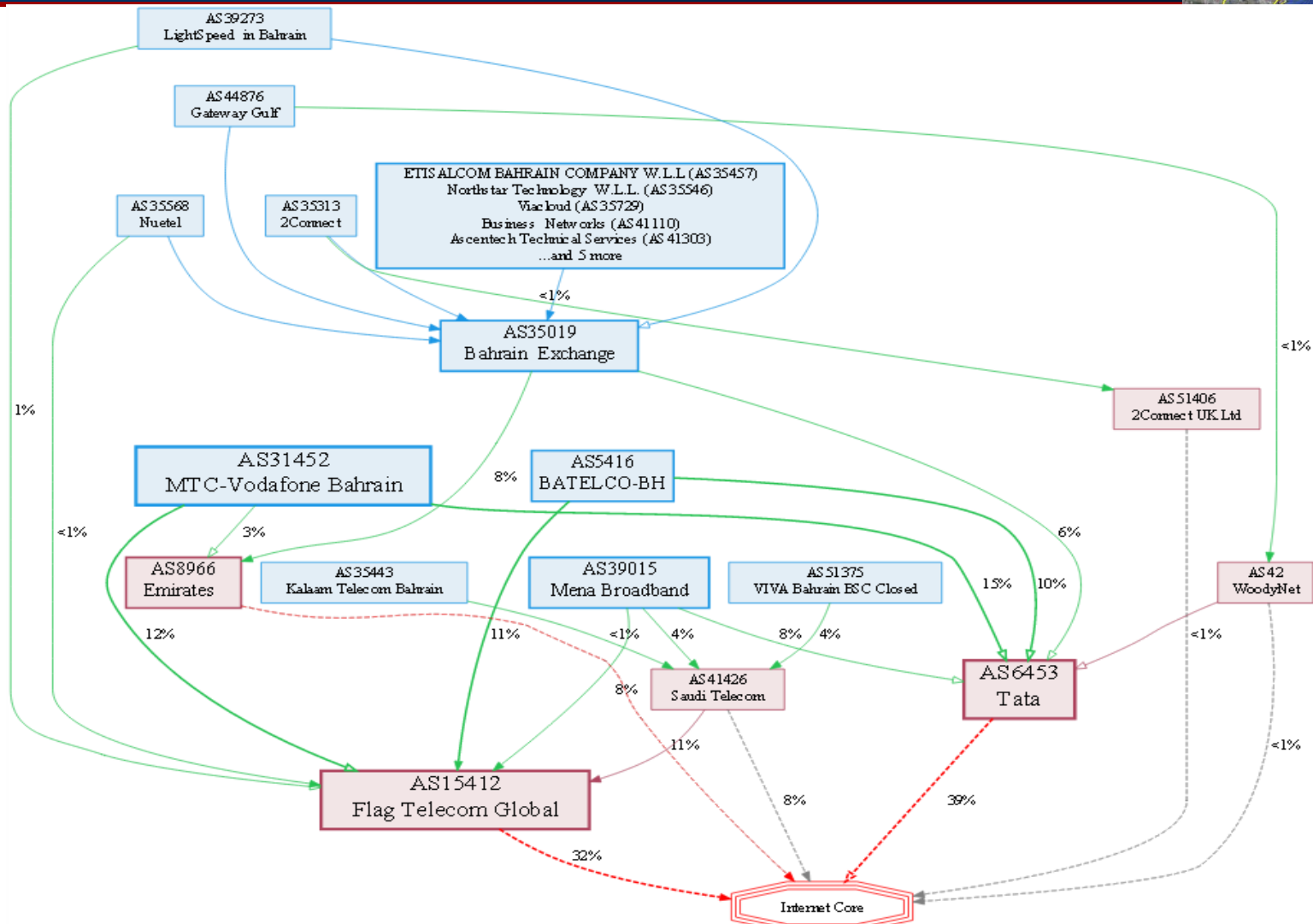
SMW4 Shunt Fault and Repair, April 2010

Bahrain (160ms->400ms)

UAE (160ms->240ms)

Distribution of Traceroute Latencies
From London to Bahrain

173.4 traceroutes per day

Distribution of Traceroute Latencies
From London to UAE

106.9 traceroutes per day
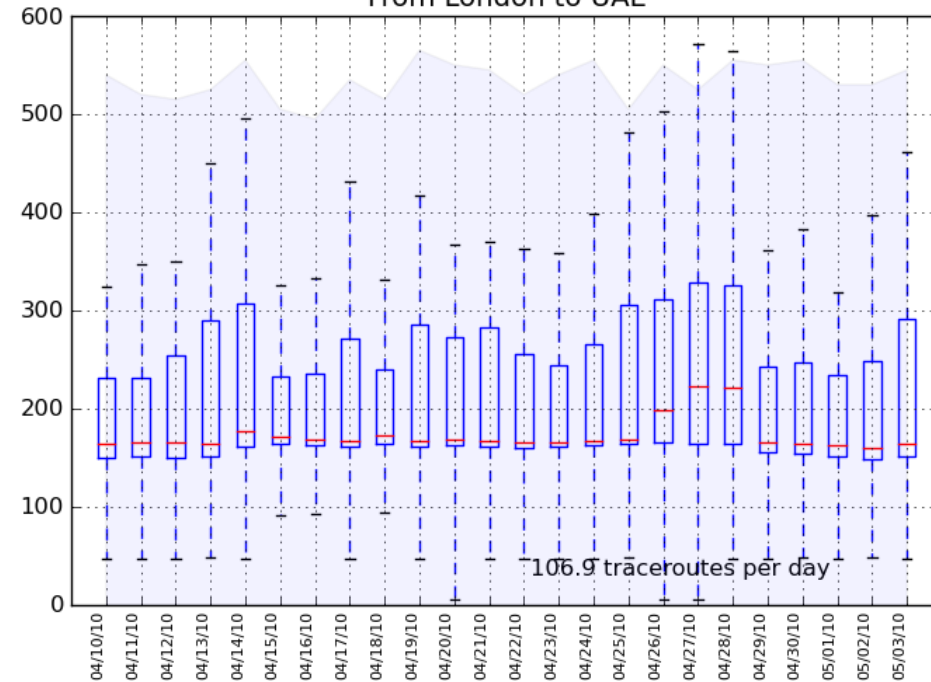
As an Aside: the Kenyan experience

Transit provider percentages for Wananchi Online (AS15399)

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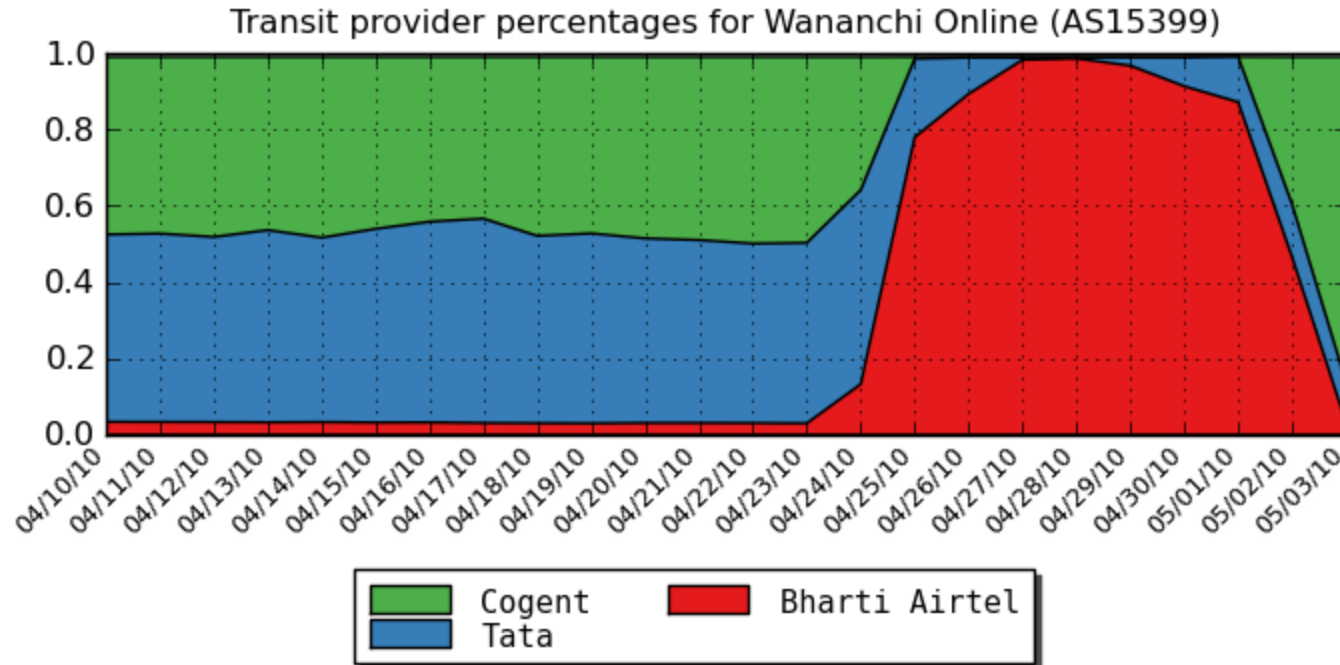
Jordan (#9)

- 27 originating ASNs

- Jordan Orange Telecom (AS8697,AS8376)
  - International transit from Orange on FLAG, with additional diversity from Saudi Telecom, Level3, Tinet

- **Relatively diverse downstream** with many provider, **enterprise ASNs** (Vtel, Linkdotnet, Metrobeam, Sama, Farah Trading, wi-tribe, Tarasol, …)

- Turk Telekom may emerge as transit provider after deployment of JADILink, further increasing international transit diversity
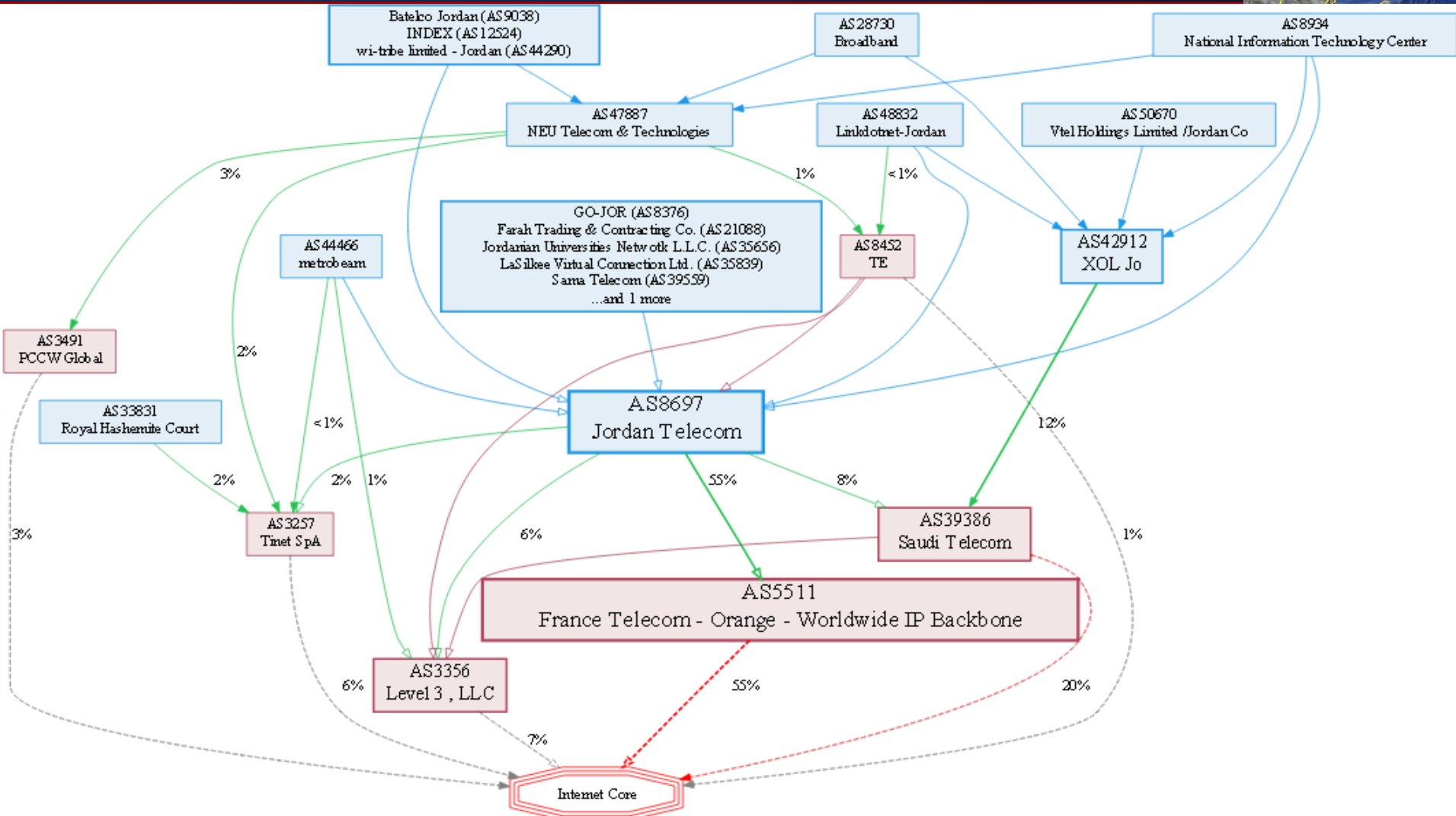
Iraq (#8)

- 30 originating ASNs, rapid growth
- Rare opportunity to see a telecommunications market rebuilt from scratch
- Kurdish northern regions have geographic edge
- Newroz, IQ Networks, Al-Sard buying Turkish, Iranian, Azeri, and (soon) Russian transit
- GBI landing new cable at Basra will diversify available transit, create north-south corridor
- Potential competition for JADILink..

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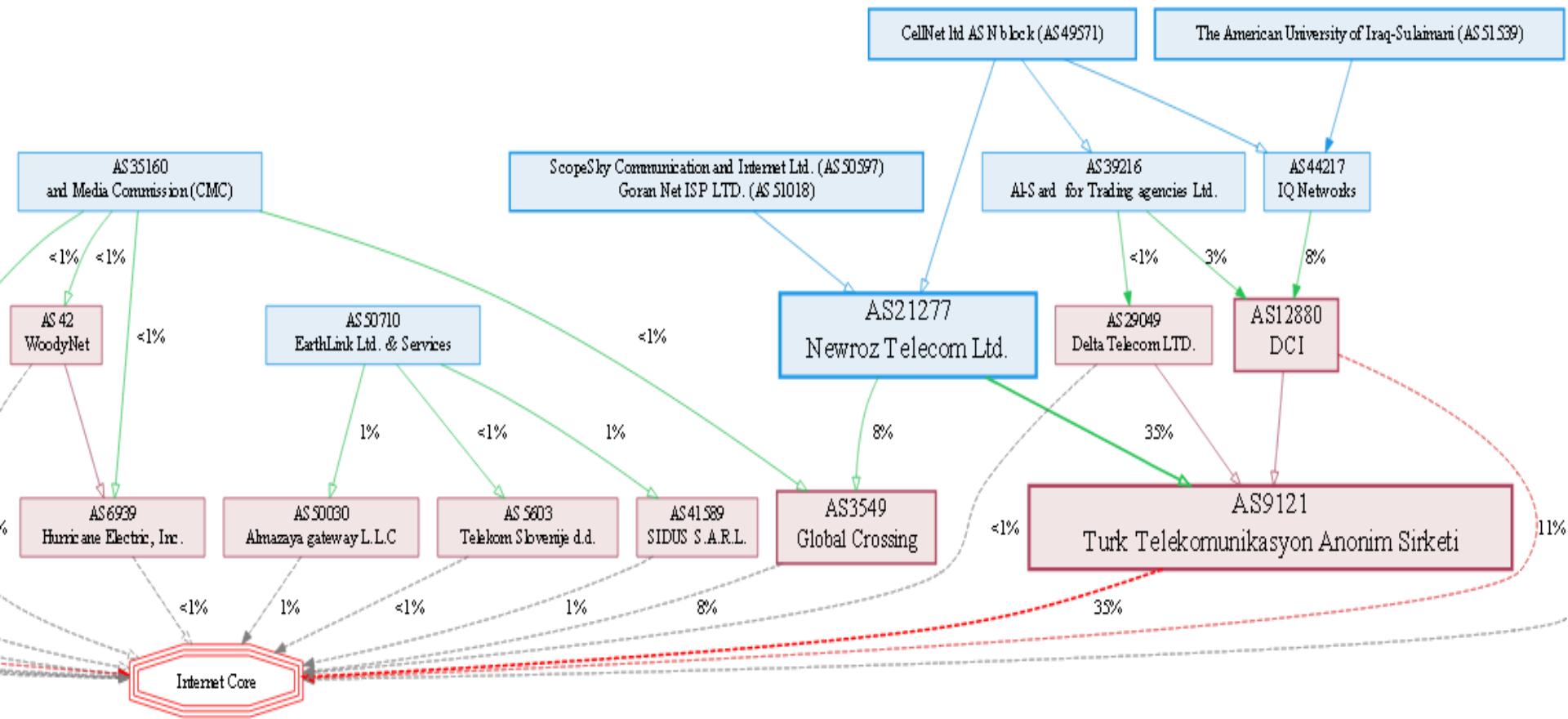
Kuwait (#7)

- 44 originating ASNs
- Diverse providers: QualityNet, Fast, Gulfnet Kuwait, KEMS, Wataniya Telecom, MTC, Kuwaiti Telecom, …..
- Very deep field of ASNs, from many sectors, richly multihomed
- Wide array of international carriers available over FALCON cable
- Peering is challenging (KUIX? Bilateral?)

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Kuwait (#7, 44 origins)

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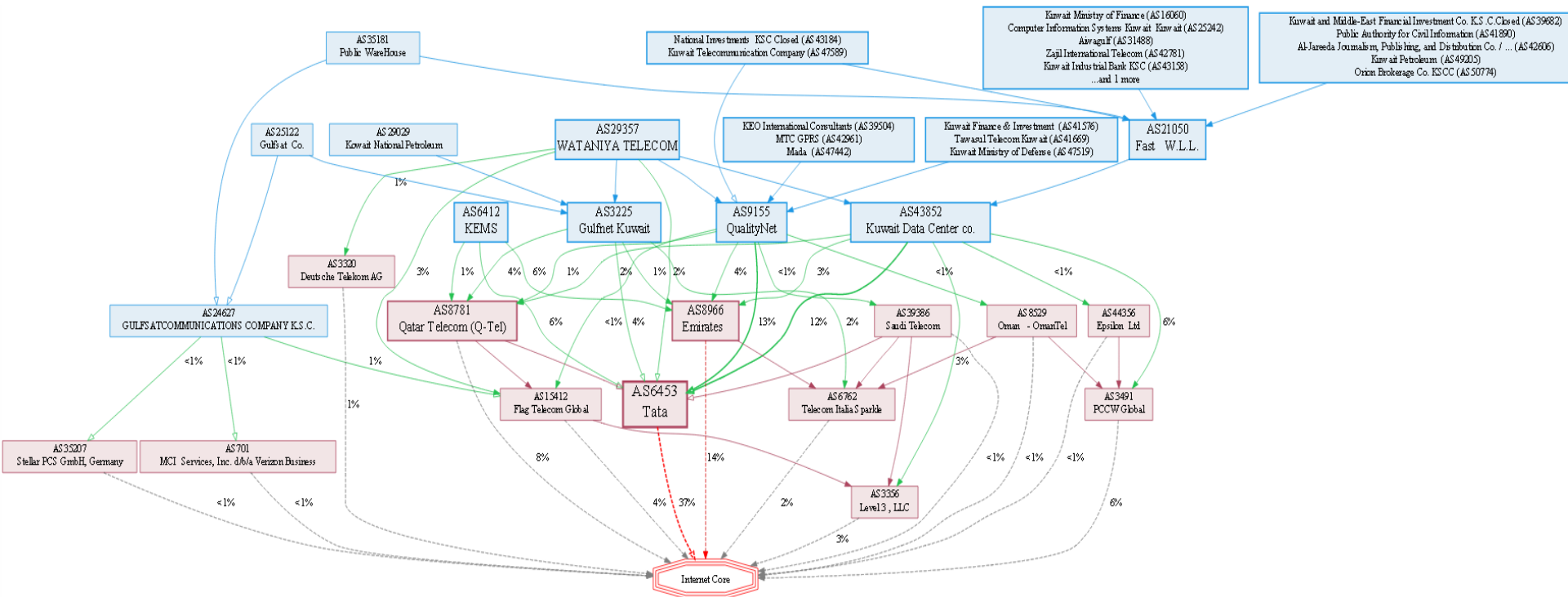
SMW4 Shunt Fault, April 2010

Kuwait RTT
latencies go from
160ms to nearly
500ms!

Distribution of Traceroute Latencies
From London to Kuwait

257.3 traceroutes per day
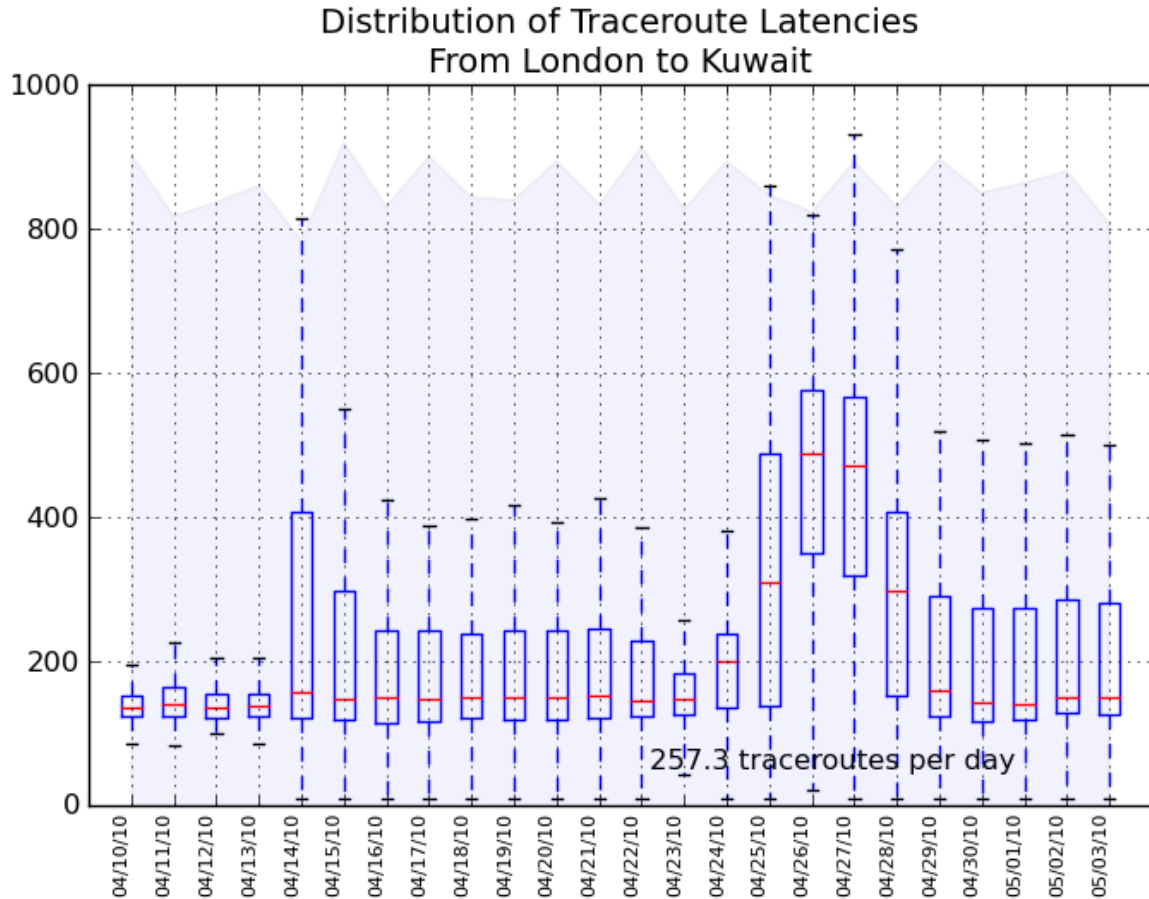
Egypt (#6)

- 53 originating ASNs

- Telecom Egypt, Link Egypt, Etisalat Misr, Raya Telecom all provide international access

- Telecom Italia provides significant transit, as do Tata, Flag, Level3, others

- Crossing point for international cables creates incredible opportunity, significant hazards

- Peering exchanges exist; are they well-utilized?
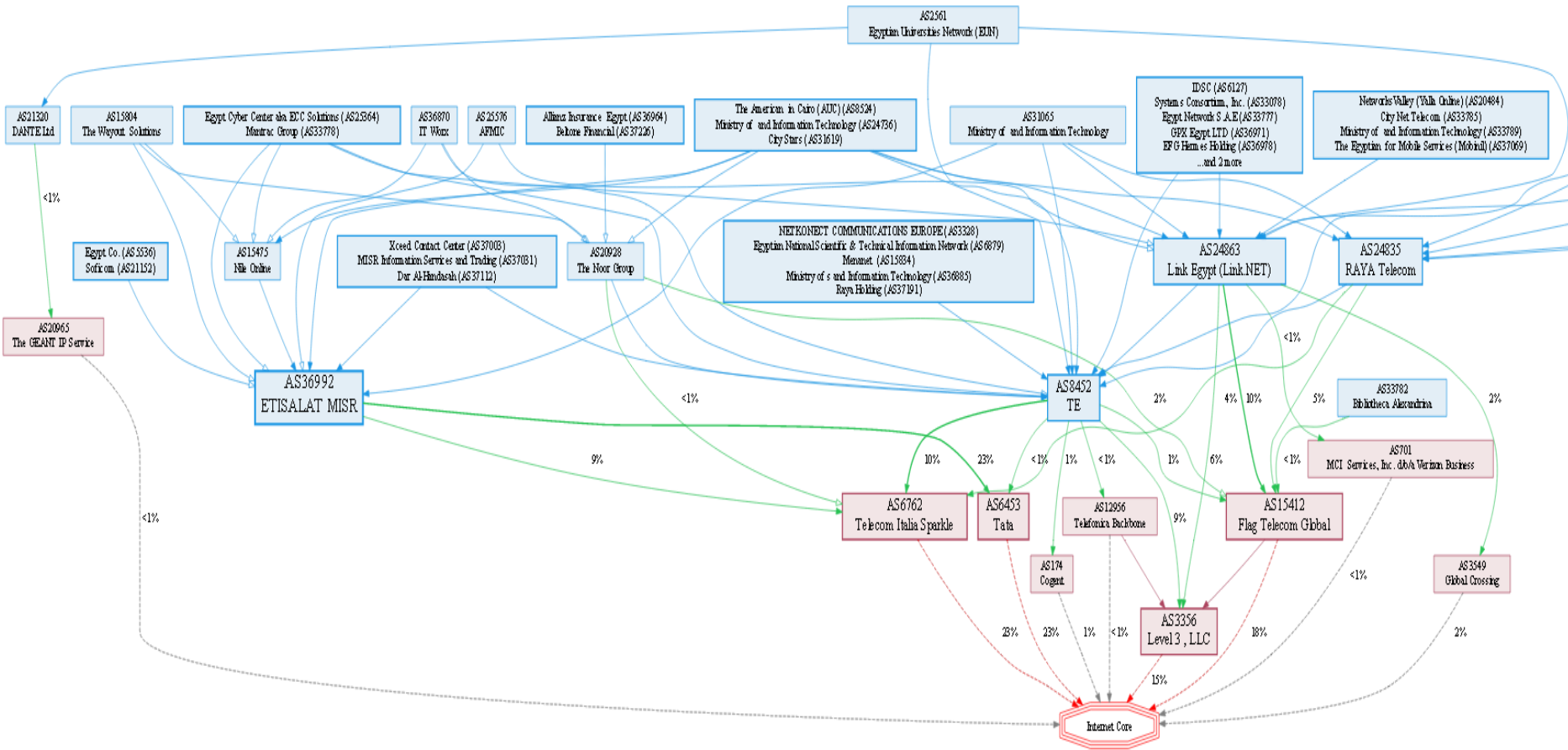
SMW4 Shunt Fault, April 2010

Egypt RTT latencies go from 100ms to 150ms (congestion) to 200+ms

After the repair, latencies take a long time to reconverge...

Distribution of Traceroute Latencies From London to Egypt

1079.9 traceroutes per day

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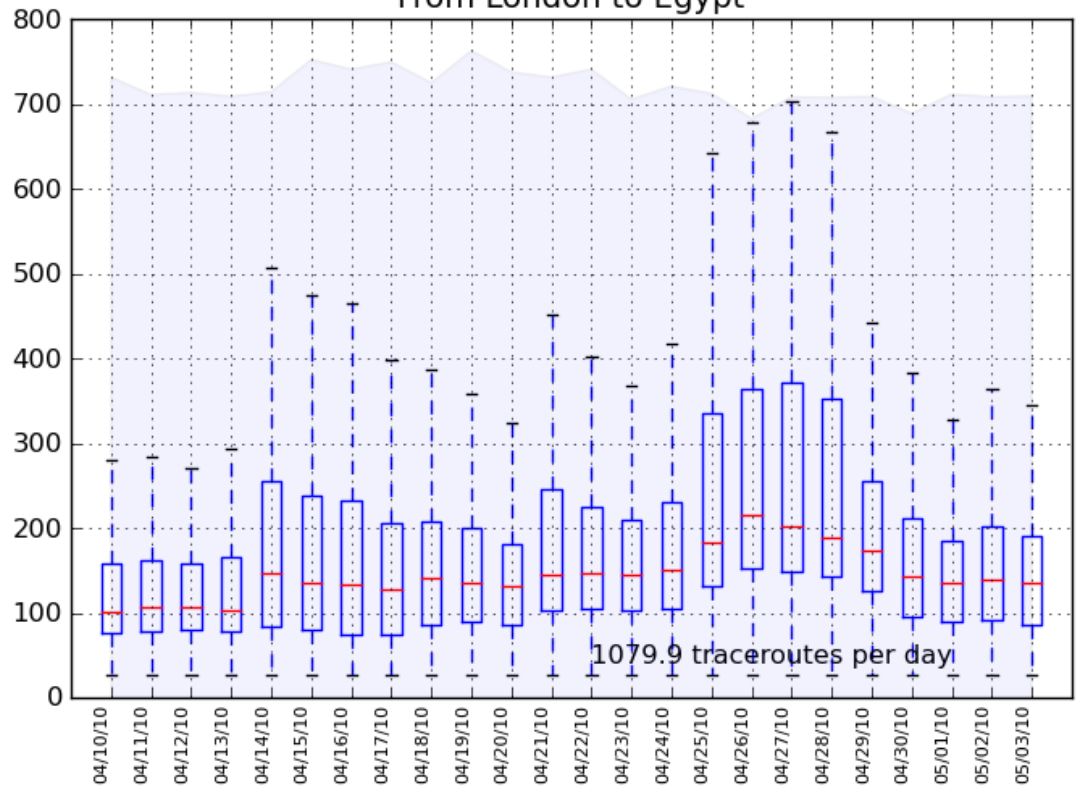
Lebanon (#5)

- 54 originating ASNs

- Liban Telecom primary provider, with significant transit from Level3 and AT&T

- Deep set of secondary providers rely on satellite connectivity in response to limited cable landing opportunities

- Horizon Cologne, Telekom Austria VSAT, SatGate Lithuania, InSat Gmbh, New Skies,…

- The arrival of IMEWE will be a game-changer

Lebanon (#5, 54 origins)
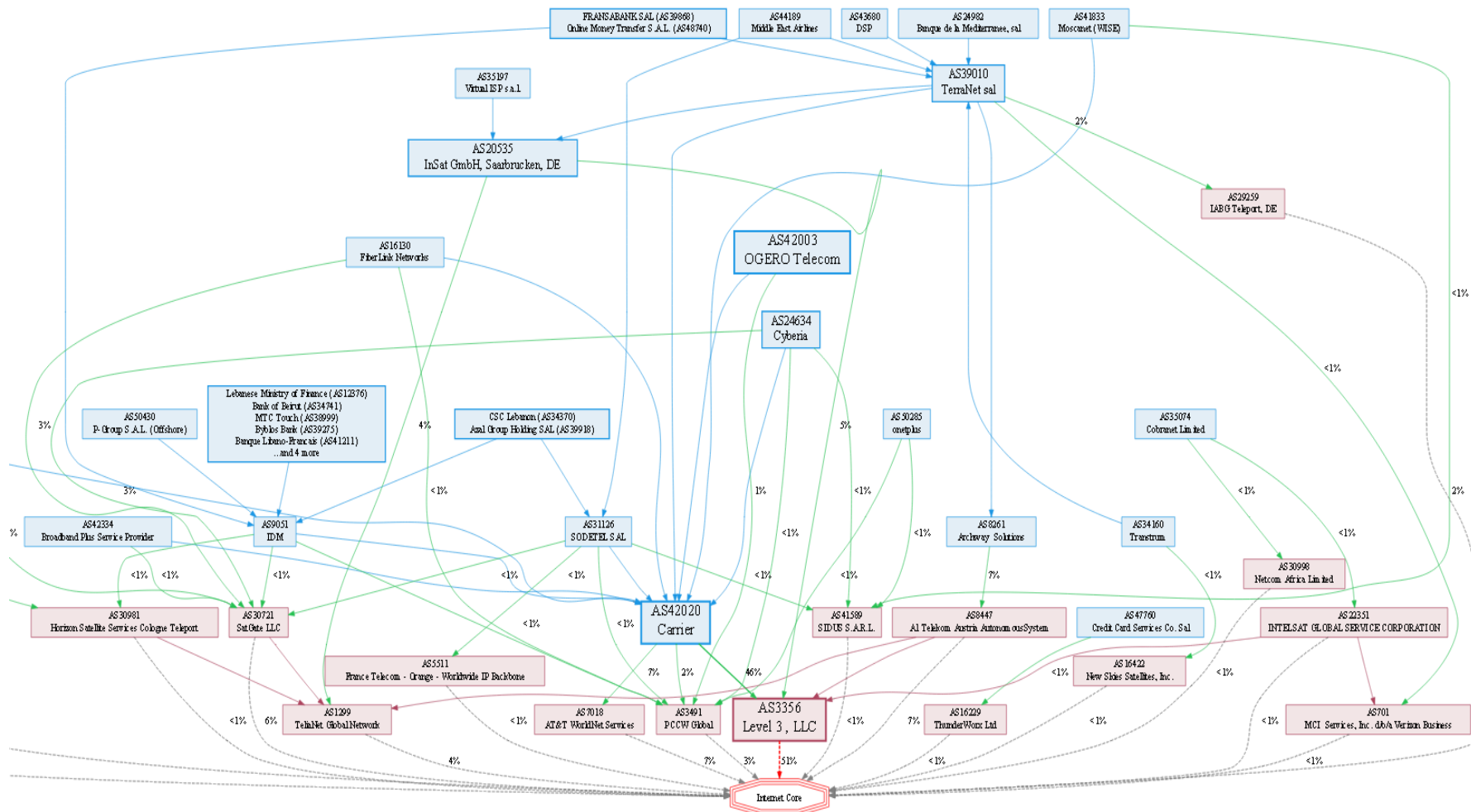
Saudi Arabia (#4)

- 85 originating ASNs

- Saudi Telecom, Etisalat Atheeb, KACST/ISU Riyadh, Mobily/Bayanat, others have direct international connectivity

- Geographic centrality provides diverse entry/exit points for international transit

- Level3, Tata, GLBX, Emirates all providing significant transit onward to Europe and Asia

Saudi Arabia (#4, 85 origins)
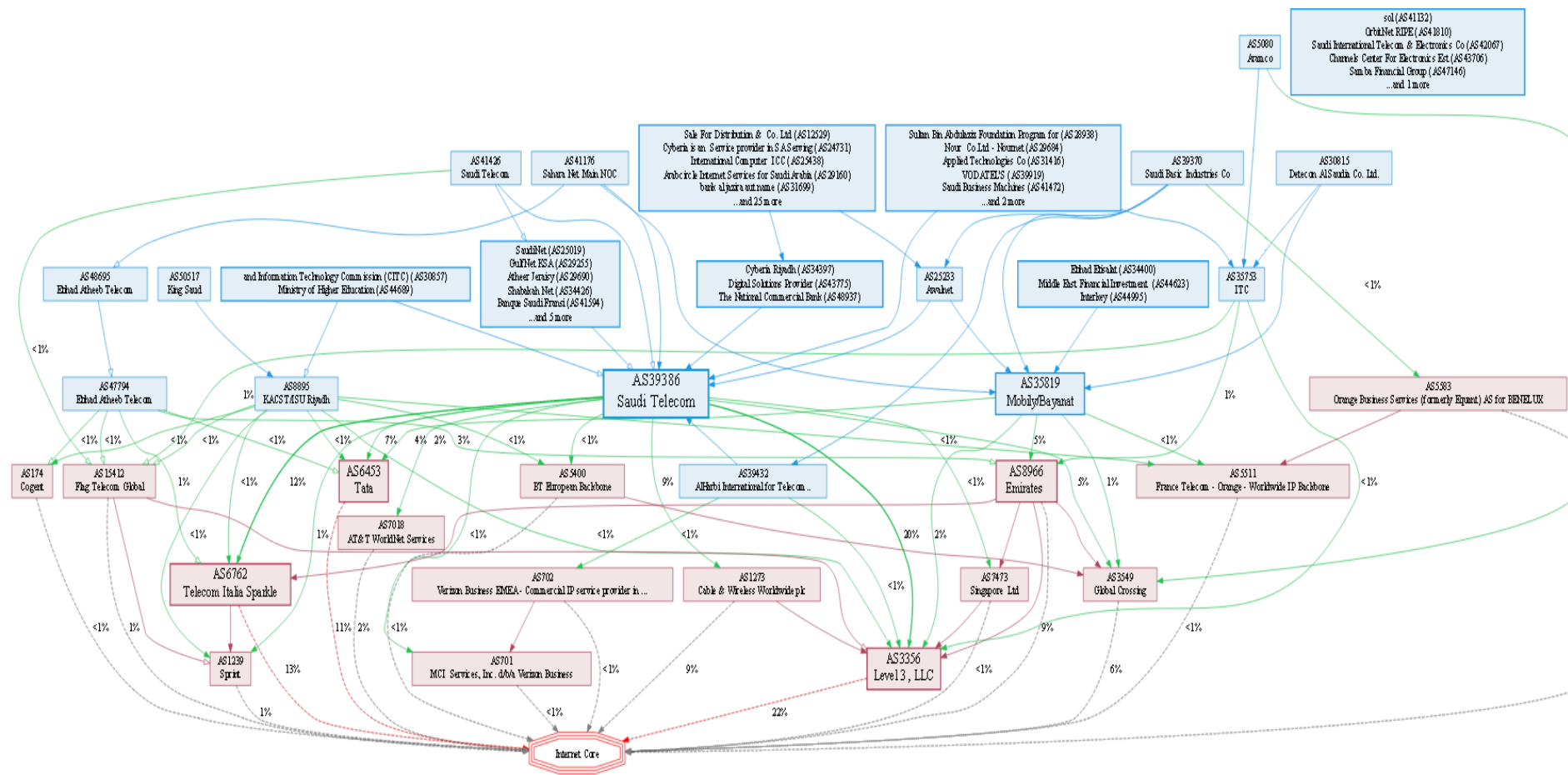
Iran (#3)

- 135 originating ASNs; DCI (AS12880) primary
- Smallest "surface-to-volume ratio" of any Middle Eastern Internet market
- Submarine cable connectivity from UAE, terrestrial paths to Turkey, Azerbaijan provide increasingly diverse international transit
- Iran has even started **exporting** Internet transit to neighboring Iraq, Afghanistan; entry path for Russian carriers seeking Gulf business

Iran (#3, 135 origins)

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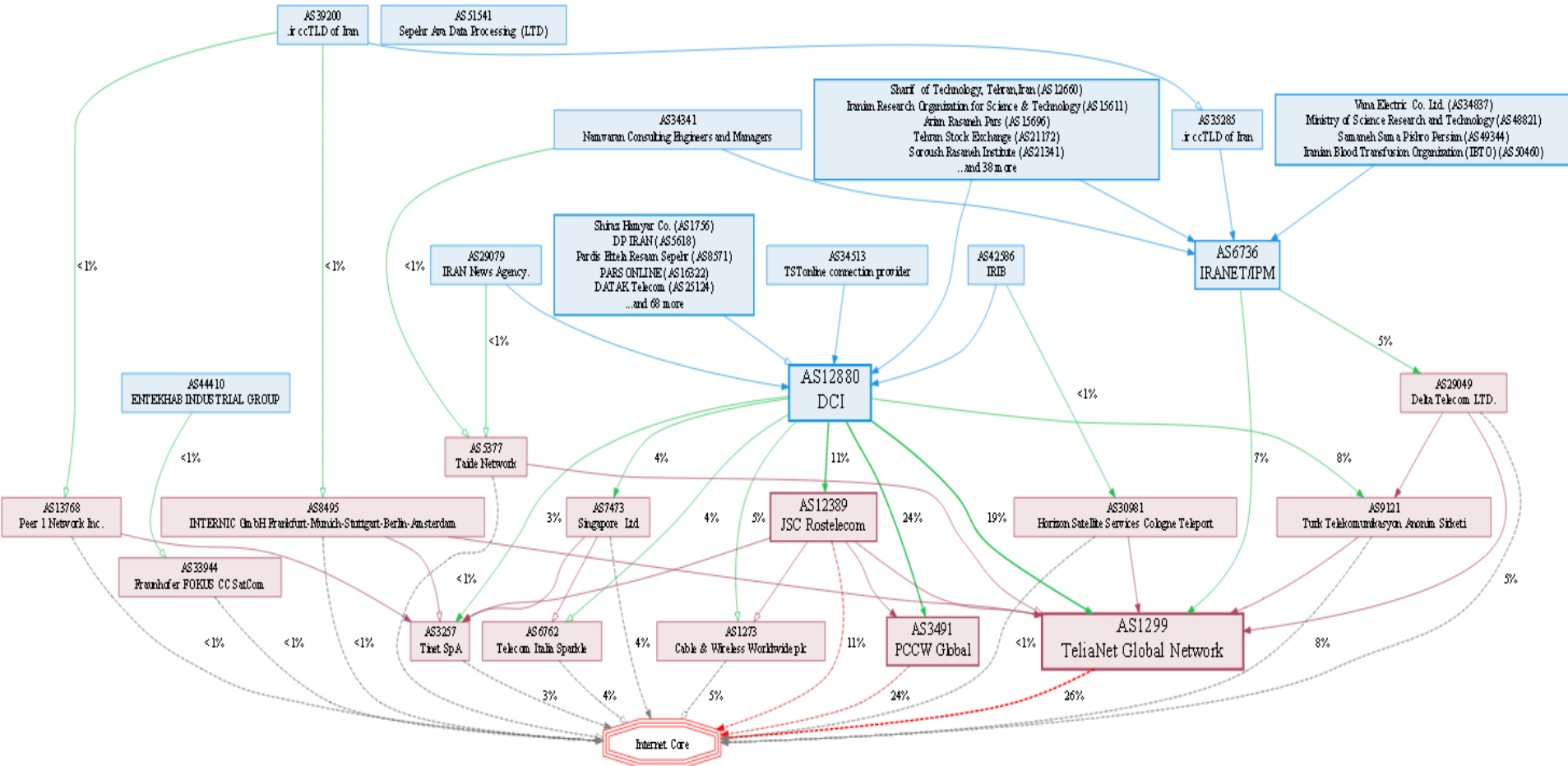
Israel (#2)

- 191 originating ASNs

- Smile (9116), Bezeqint (8551), NetVision (1680) are leading providers

- In all, 26 ASNs have direct international connectivity – compare to Lebanon (17) or Turkey (12)

- Wholesale rankings led by TINet, Level3, Verizon Business, PCCW, Telia
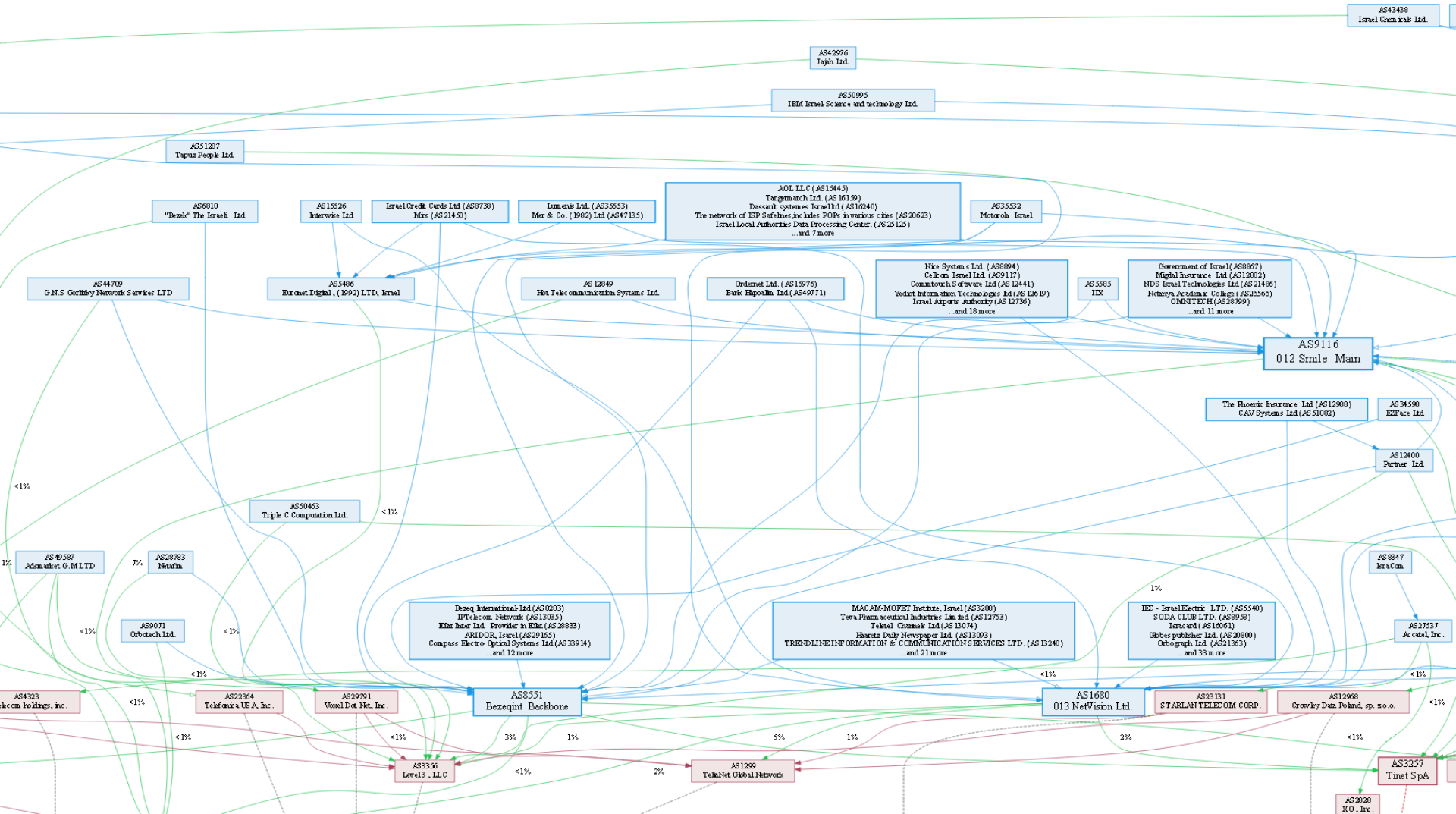
SMW4 Shunt Fault and Repair, April 2010

Israel (unaffected)

Palestinian Territories (unaffected)

Distribution of Traceroute Latencies From London to Israel

Distribution of Traceroute Latencies From London to Palestinian Territories

And Finally, #1 .....

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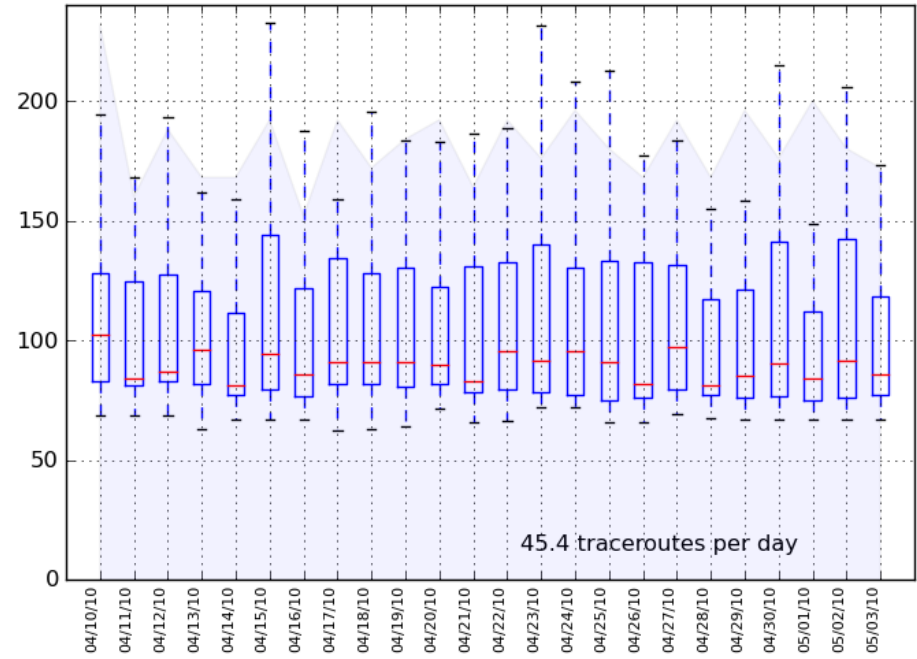
And Finally, #1 .....

- **Are you tired yet?**

- Remember, it took Ibn Batutta **seven years** to reach Constantinople
- You and I have gotten here in just 30 minutes

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Turkey (#1)

- 266 originating ASNs
  - 40% more originating ASNs than #2 Israel
  - …but only half as many **multihomed** ASNs
- Turk Telekom, SuperOnline both building international terrestrial networks to bridge Europe to Asia
- Turk Telekom carries bulk of Turkish international traffic to Europe (Invitel acquisition)
- Mobile data growth and Turkish language content should drive substantial peering demand

Turkey (#1, 266 origins)
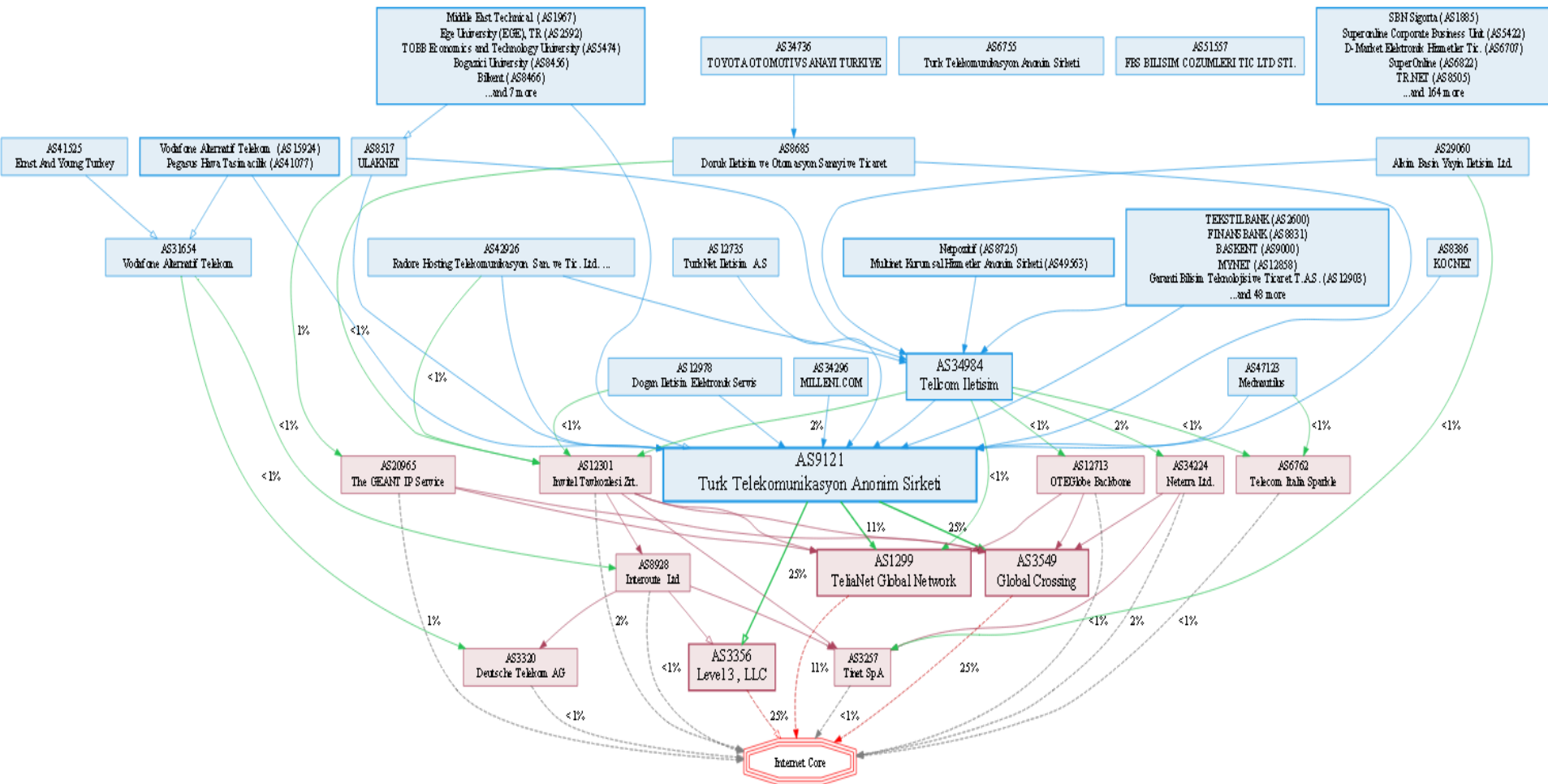
Retail Rankings: Turkey
Renesys Market Intelligence, 18 Oct 2010

⭐ **Turkey Internet Index Ratings**   ?

Customer Base: Retail — Turkey   ?

#	Change		Name	Value	Bar
1		☆	Turk Telekomunikasyon Anonim Sirketi	6755	▰▰
2		☆	Turk Telekomunikasyon Anonim Sirketi	9121	▰▰
3		☆	Tellcom Iletisim Hizmetleri	34984	▱
4	⬆ 1	☆	Turkcell	16135	▱
5	⬇ 1	☆	Dogan Iletisim Elektronik Servis Hizmetleri ve Yayincilik ...	12978	▱
6		☆	ULAKNET	8517	▱
7	⬆ 1	☆	Vodafone	15897	▱
8	⬇ 1	☆	KOCNET	8386	▱
9	⬆ 3	☆	Vodafone Alternatif Telekom Hizmetleri	15924	▱
10	⬇ 1	☆	SuperOnline	6822	▱
11	⬇ 1	☆	TR.NET	8505	▱
12	⬇ 1	☆	Turksat Uydu Haberlesme ve Kablo TV Isletme	47524	▱
13		☆	Is Net Elektonik Bilgi Uretim Dagitim Ticaret ve Iletisim ...	9021	▱
14		☆	Dexar	12861	▱
15		☆	Global Iletisim Hizmetleri	34104	▱
16	⬆ 2	☆	AVEA Iletisim Hizmetleri	20978	▱
17		☆	TurkNet Iletisim Hizmetleri A.S	12735	▱
18	⬆ 1	☆	Istanbul Teknik Universitesi	9095	▱
19	⬆ 1	☆	MILLENI.COM	34296	▱
20	⬆ 1	☆	Doruk Iletisim ve Otomasyon Sanayi ve Ticaret	8685	▱

Wholesale Rankings: Turkey
Renesys Market Intelligence, 18 Oct 2010

⭐ **Turkey Internet Index Ratings**

Customer Base: Wholesale — Turkey

			Company		
1	⬆1	☆	Global Crossing	3549	▬
2	⬆1	⭐	Level 3 Communications, LLC	3356	▬
3	⬇2	☆	TeliaNet Global Network	1299	▬
4		☆	Turk Telekomunikasyon Anonim Sirketi	9121	▬
5		☆	Tellcom Iletisim Hizmetleri	34984	▬
6		☆	The GEANT IP Service	20965	▬
7		☆	Neterra Ltd.	34224	▬
8		☆	Invitel Tavkozlesi Zrt.	12301	▬
9		☆	OTEGlobe Backbone	12713	▬
10	⬆1	☆	ULAKNET	8517	▬
11	⬆1	☆	France Telecom - Orange - Worldwide IP Backbone	5511	▬
12	⬆1	☆	Deutsche Telekom AG	3320	▬
13	⬆1	☆	European Backbone of LambdaNet	13237	▬
14		☆	Interoute Communications Ltd	8928	▬
15		☆	TR.NET	8505	▬
16		☆	Cogent Communications	174	▬
17		☆	Telecom Italia Sparkle	6762	▬
17		☆	DCI	12880	▬
17		☆	Vodafone Alternatif Telekom Hizmetleri	31654	▬
17		☆	Sprint	1239	▬

- Observed peering relationships in Turkey tend to be international in nature

- Domestic peering substantially less than expected given the size, complexity, wealth of the Internet marketplace

- TTNet #30

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| ⭐ Turkey Internet Index Ratings			
Peering Base — Turkey			
1	↑1	☆ Interoute Communications Ltd	8928
2	↑1	☆ EDPNET	9031
3	↑1	☆ nLayer Communications, Inc.	4436
4	↑1	☆ Hurricane Electric, Inc.	6939
5	↑2	☆ OTEGlobe Backbone	12713
6	↑2	☆ i3B - Internetbreitband GmbH	39912
7	↑2	☆ Atrato IP Networks	5580
8	↑2	☆ GlobalaXs Communications	9009
9	↑4	☆ European Backbone of LambdaNet	13237
10	↑5	☆ Voxel Dot Net, Inc.	29791
11	↑5	☆ ROMTELECOM S.A	9050
12	↑2	☆ ISPrime, Inc.	23393
13	↑5	☆ sunrise (TDC Switzerland AG)	6730
14	↑6	☆ MCI Communications Services, Inc. d/b/a Verizon Business	701
15	↑7	☆ NTT Communications	2914
16	↑7	☆ Cogent Communications	174
17	↑7	☆ Tata Communications	6453
18	↑7	☆ Telecom Italia Sparkle	6762
19	↑7	☆ Deutsche Telekom AG	3320
20	↑7	☆ Sprint	1239
21		☆ Verizon Business EMEA - Commercial IP service provider in ...	702
22	↑6	☆ France Telecom - Orange - Worldwide IP Backbone	5511
23	↑6	☆ Tinet SpA	3257
24	↑6	☆ TeliaNet Global Network	1299
25	↑6	☆ Telefonica Backbone	12956
26	↑6	☆ Level 3 Communications, LLC	3356
27	↑6	☆ Global Crossing	3549
28	↑6	☆ PCCW Global	3491
29	↓23	☆ LEASEWEB	16265
30	↑5	⭐ Turk Telekomunikasyon Anonim Sirketi	9121

SMW4 Shunt Fault, April 2010

Turkish latencies are **unaffected** by the fault, thanks to ample terrestrial capacity to Europe.

No significant delays or traffic reroutings are visible.

Distribution of Traceroute Latencies From London to Turkey

4229.5 traceroutes per day
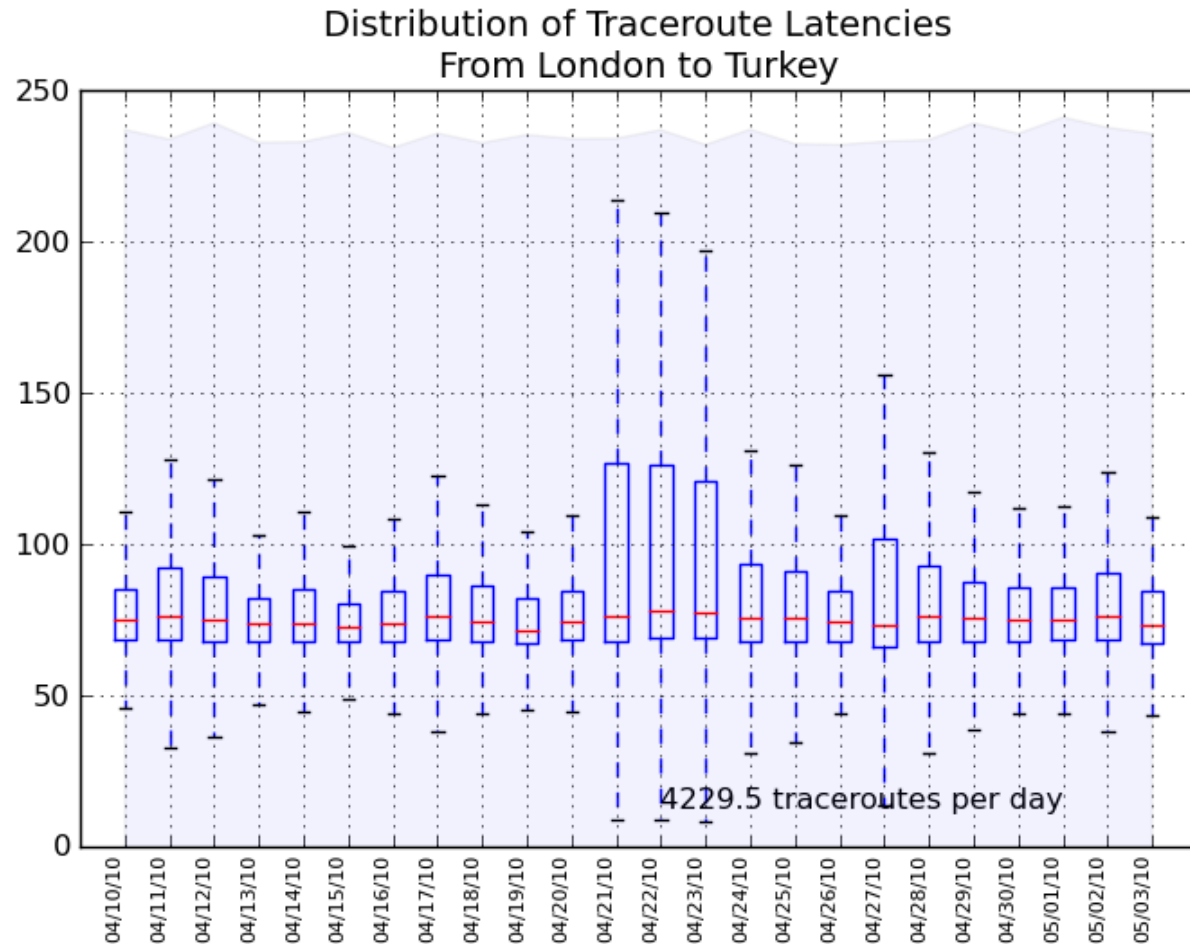
Predictions

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Three Safe Middle Eastern Predictions: 2011

- 1. International transit margins erode.

- 2. Mobile data will drive Internet transit growth; mobile and VOIP providers will come together at national/regional exchanges to peer data+voice

- 3. Domestic and regional peering will strengthen, as governments compete to attract content and cloud providers who can go anywhere

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1. IP Transit Margins Converge to $0

- Worldwide, arrival of low-cost carriers in domestic market signals revolutionary shifts in transit pricing power
  - Cogent selling in Egypt (8452), Saudi Arabia (8895), Israel (25003), Turkey (12735)
  - TINet selling strong in IL and PS (8551, 9116, 12400,25003), Turkey (12301,29060,34224), Jordan (8697, 33831,47887)
- Flood of new capacity reaching the Middle East in 2011 will erode IP transit margins
- Premium terrestrial routes hold out a little longer

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2. Mobile Data in Emerging Markets

- Leads to seismic shifts in Internet topology, market share, IP wholesale transit pricing

- Asymmetries in customer stickiness due to licensing, regulation actually work to erode incumbent leverage (unless the incumbent is also mobile-dominant)

- Hastens the collapse of international transit pricing to the global norm (which today is perilously close to zero margin, or below)

How Mobile Data Drives Peering

- Fixed line incumbent starts out with healthy margins on international IP transit

- Competitive mobile operators emerge, begin to source and sink significant mobile content

- **Mobile operators buy or build IP backbones**

- Domestic content customers realize that their mobile eyeballs are 100s of milliseconds away, through expensive/fragile foreign exchange

- Mobile eyeballs aren't going to change transit providers, so the content providers begin to defect

- **Domestic/regional peering emerges as a way for everyone to keep their customers**

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3. Peering Strengthens in the Middle East

- Public exchanges allow domestic and/or regional traffic to settle locally

- Don't incur latency of carrying traffic to Europe or America and back again

- Consider security implications as well

- Security-sensitive, delay-sensitive traffic should not be flowing through exchange points 100s of milliseconds away on other continents!

- 'Frictional effects' include higher prices to consumers, congestion, network fragility

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Peering is Strategic Like Never Before

- International transit is cheap because the content/consumers that utilize it are generic, undifferentiated

- Regional traffic generates profits for companies that understand local requirements: advertising, voice, search, security services, cloud computing, not just moving packets

- **The country that emerges as regional peering hub will reap massive follow-on enterprise ICT investment: content hosting, cloud computing providers to serve Middle Eastern consumers**

Competitive national considerations

The ideal regional exchange country would have:

- Geographic centrality (RTT sub 30ms)
- Geographically diverse (ideally, consortium-based) submarine cable landings
- Geographically diverse terrestrial fiber paths
- Competitive high-growth local market
- Liberal financial and legal framework

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Who could emerge as the IX winner?

- **Egypt** has submarine cable landings, lacks terrestrial connectivity.

- **Saudi Arabia** has diverse landings, multiple cables, long terrestrial paths to Europe

- **Bahrain** is racing to acquire diverse international connectivity, has all the other pieces in place

- **UAE** have made a good case at previous MENOGs, peers with all GCC already

- **Iran** could emerge as a hub for Russian, Pakistani, Central Asian paths to Europe+Asia

- **Turkey** combines stability, geography, connectivity, and robust domestic market

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