Bahrain's Internet Ecosystem:
2012 Trends (Midyear Analysis)

27 June 2012

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Key Findings

At the request of the Bahrain TRA, Renesys periodically evaluates the blend of Internet transit provider alternatives that are available to Internet Service Providers in the Kingdom. Using publically visible BGP routing data collected from several hundred global vantage points worldwide, each provider's transit arrangements are summarized to provide insight into the current state of the market.

This report summarizes the evolution of Bahrain's Internet ecosystem during the first six months of 2012, as seen through the lens of each Bahraini ISP's Internet routing announcements.

Several trends are evident in 2012, most continuing themes from 2011:

- Domestic providers show evidence of transit mobility; that is, they are actively weighing the market alternatives and changing their domestic and international transit arrangements as new alternatives become available.

- The arrival of two new cables, Tata and GBI, has not yet visibly impacted the choices available to providers, suggesting either that they have not yet entered service, or they have not become available to NSPs. When GBI becomes broadly available to the NSP community, we expect to see new provider alternatives appear in the routing table as Bahrain's NSPs make their selections from the new choices.

- Saudi Telecom (AS41426) continues to attract new customers, but those customers tend to become single-homed (having no other provider for day-to-day routing of traffic). Important domestic providers such as Kalaam, Menatelecom, and Zain now rely heavily on STC for connectivity, a potentially worrisome single-provider trend from the standpoint of resilience and survivability.

- On a positive note, STC continues to increase its own upstream diversity. In January 2012, STC added a connection to Flag/Reliance as a backup to its use of the STC backbone (AS39386) for Internet transit. This, in turn, may have allowed STC customer Menatelecom to decide that it could spare the expense of maintaining its own second connection to Flag.

- Zain Bahrain, which dropped Etisalat in favor of Flag in 2010, and in turn phased out Flag for STC in 2011, this year dropped Tata as a backup provider, leaving it heavily reliant on STC for Internet transit. Zain does still maintain an apparent standby connection to Flag, but does not routinely utilize this connection to advertise the bulk of its network prefixes.

- Connectivity through Saudi Arabia has been relatively stable, compared to the fragility of Gulf submarine cables. An undocumented FOG outage in March 2012 caused visible impacts on providers such as Etisalcom Bahrain and Batelco, which relied on Qatar Telecom for transit. These providers failed over to surviving paths to Saudi Arabia over the Causeway and the GCCIA fiber infrastructure. As a result, the impacts of the multiweek event were significantly mitigated.

- We confirm our 2011 analysis that Flag's customer base diversity in the Kingdom appears to have peaked, after a short period of strong growth in 2010. No significant new Flag customers (other than Saudi Telecom) have emerged in 2012. Flag transit would be a logical diversification for heavily-dependent customers at the BIX such as 2Connect and BCN, following the lead of Lightspeed and Nuetel.[1]

CC	ASN	NSP	Jul07	Jan08	Jul08	Jan09	Jul09	Jan10	Jul10	Jan11	Jul11	Jan12	Jun12
BH	8781	Qatar Tel										1%	19%
BH	6453	Tata	93%	95%	92%	99%	97%	93%	93%	99%	77%	82%	93%
BH	15412	Flag Tel	42%	46%	32%	26%	22%	26%	20%	64%	52%	40%	88%
BH	8966	Emirates			27%	31%	35%	35%	38%	29%	16%	11%	27%
BH	39386	Saudi Tel								24%	27%	44%	66%

- As seen in this historical table, the share of the Bahrain market that's at least partially routed through ("on net with") Saudi Telecom continues to grow. In only 18 months, STC has gone from a new market entrant to having fully 66% of the Kingdom on-net.

- Tata's on-net percentage has rebounded to over 93%, because they provide transit to STC. Flag's on-net percentage is now its highest ever, at 88%, again because of their (new) transit relationship with STC. Because they are shared by several providers, these high on-net percentages are not cause for alarm. They suggest that the majority of Bahrain's smaller providers are able (directly or indirectly) to access a diverse blend of Tata, Flag, Saudi, Qatari, and Emirati transit.

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[1] Here and elsewhere in this report, it's important to distinguish the observed *technical* relationship (a "provider-customer" relationship in the BGP table; i.e., logical adjacency between two autonomous systems) from the actual *commercial* relationship, which may be mediated by a third party, not observed in routing. For example, Flag transit in the Kingdom is often mediated by Batelco as a reseller of access to the Flag cable, but the Batelco autonomous system does not appear in any of the globally visible routing relationships or traffic paths between Flag and the end customer.
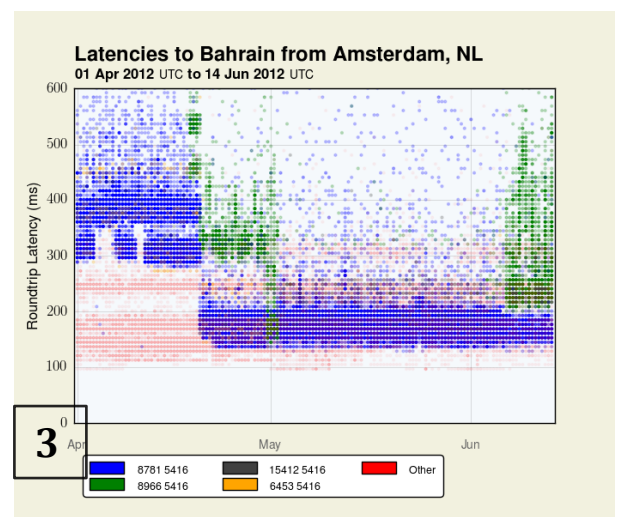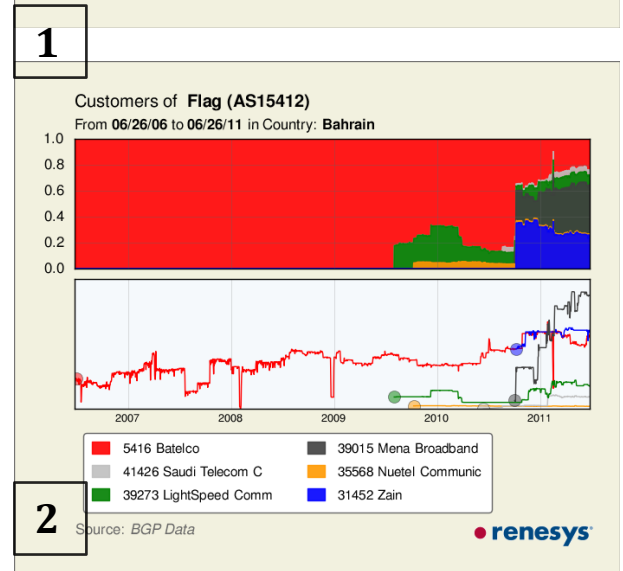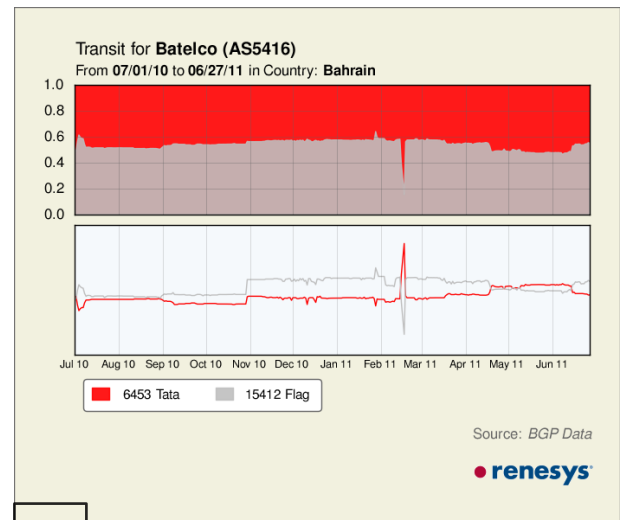
Methodology and Interpretation

Renesys continually monitors the global Internet routing table, synthesizing second-by-second changes in the advertised paths to every connected network on earth, and measuring round-trip latencies to those networks from around the world. Years of consecutive continuous observations are then mined to produce summaries of evolving interprovider relationships in each country, and each region of the world.

1. Transit shift plots present a histogram of a given provider's route selection percentages to each of their upstream transit providers, summing to 100%. The thickness of colored bands gives a visual indication of the importance of each provider in supplying Internet transit to the autonomous system in question. Below the histogram, the unnormalized customer base is plotted as a line plot, to give a sense for the growth or loss of transit volume over the lookback period.

2. Customer transit plots provide equivalent information for the provider's customer base, indicating the relative contribution of each downstream ASN to the provider's total customer base. Customer transit plots consist of a normalized stacked histogram on top, and an unnormalized line plot of the same customer base size data below.

3. Latency plots summarize the results of active traceroute measurements performed from a given location into Bahrain. Each dot represents a cluster of round-trip latency measurement with similar target, routing, timing, and results; latencies are plotted on the Y-axis, and an interval of time on the X-axis. Colors correspond to particular upstream providers appearing in the inbound path for the measurement through a given provider (in this example, Batelco).

Transit for **Batelco (AS5416)**
From **07/01/10** to **06/27/11** in Country: **Bahrain**

6453 Tata   15412 Flag

Source: *BGP Data*

1

Customers of **Flag (AS15412)**
From **06/26/06** to **06/26/11** in Country: **Bahrain**

5416 Batelco   39015 Mena Broadband
41426 Saudi Telecom C   35568 Nuetel Communic
39273 LightSpeed Comm   31452 Zain

2   Source: *BGP Data*

Latencies to Bahrain from Amsterdam, NL
01 Apr 2012 UTC to 14 Jun 2012 UTC

Roundtrip Latency (ms)

3   Apr   May   Jun

8781 5416   15412 5416   Other
8966 5416   6453 5416

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Bahrain's Autonomous Systems

In the following section, we briefly describe the Internet transit arrangements of each of the primary autonomous systems (in alphabetical order) that provide service within the Kingdom of Bahrain.
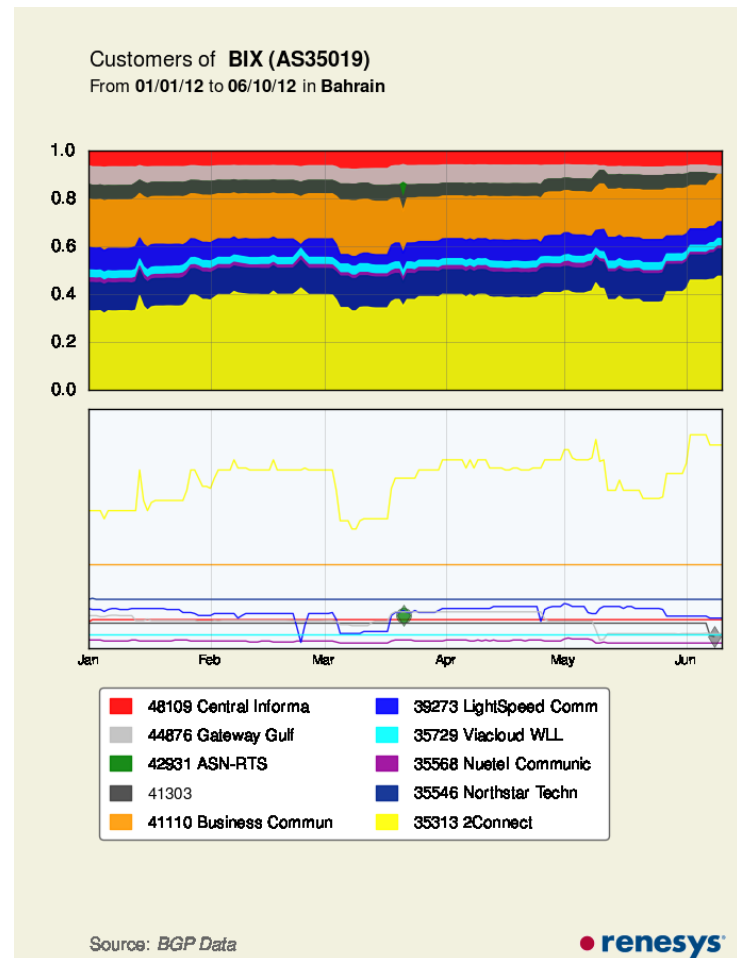
2Connect (AS35313) receives transit from the BIX, and from its UK subsidiary in London. In May 2012, 2Connect began providing transit in turn to its first downstream customer, The Benefit Company (AS30882).
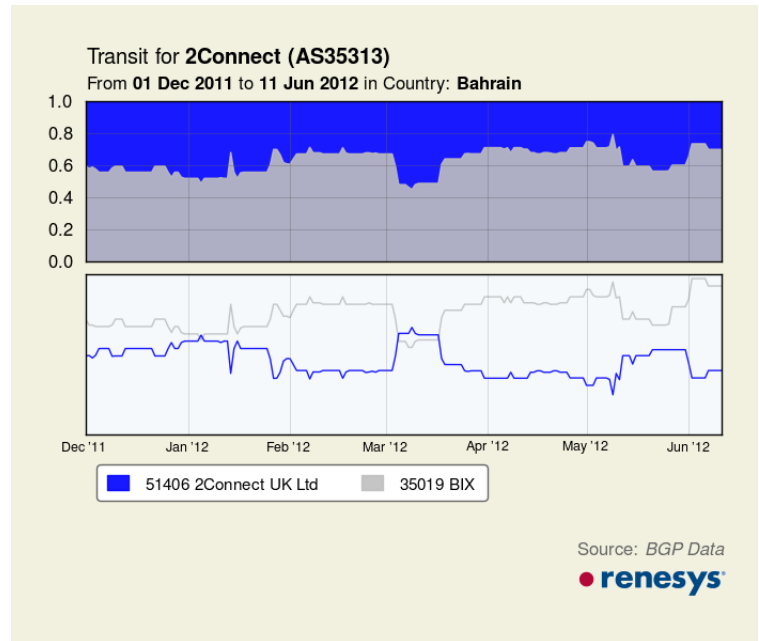
Bahrain Internet Exchange (AS35019) purchases transit from Etisalat and Tata. Except for an interlude during the March 2012 FOG submarine cable cut, during which Etisalat transit was unavailable, the two providers are roughly balanced.
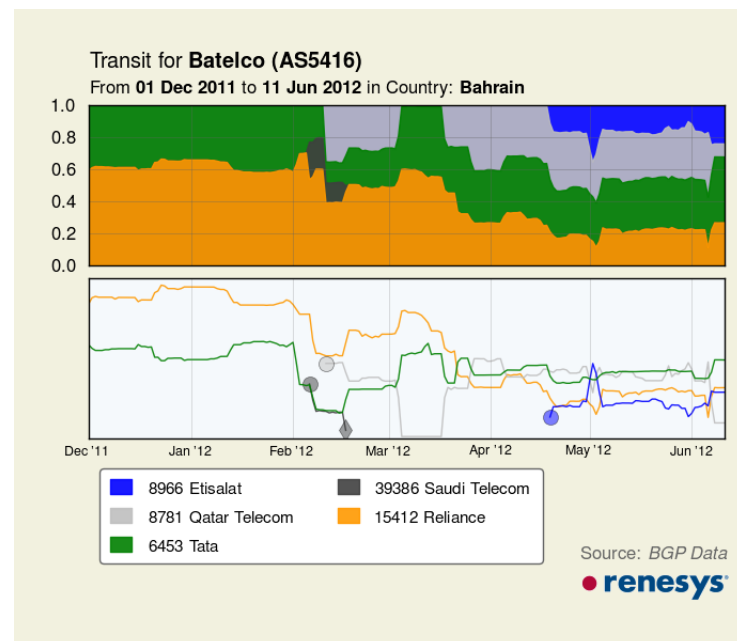

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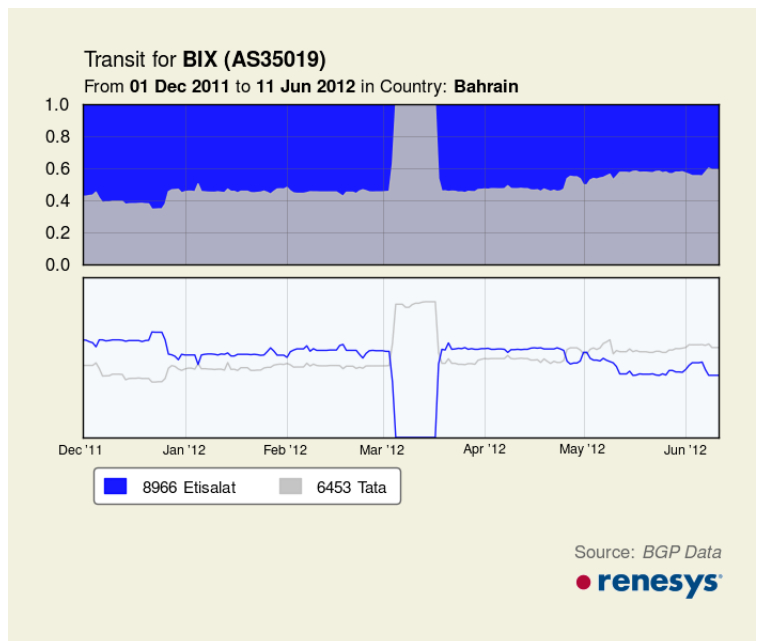
The BIX provides Internet transit to ten autonomous systems in 2012. Aside from Ascentech (AS41303), which appeared in March and disappeared by June, the BIX's customer list has remained stable thus far in 2012.
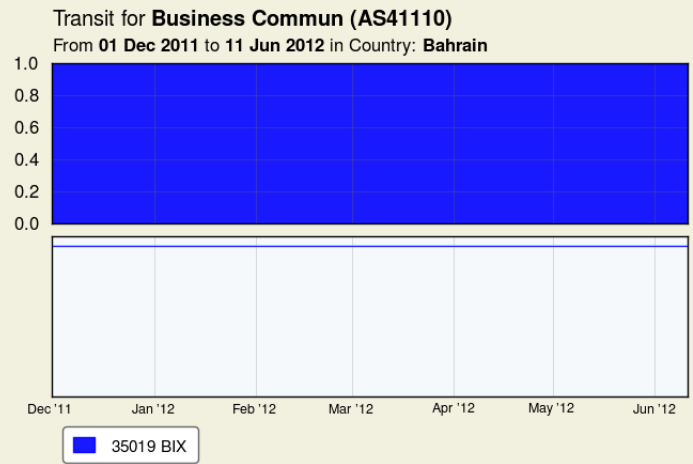

Customers of **BIX (AS35019)**
From **01/01/12** to **06/10/12** in **Bahrain**

🟥	48109 Central Informa	🟦	39273 LightSpeed Comm
⬜	44876 Gateway Gulf	🟦	35729 Viacloud WLL
🟩	42931 ASN-RTS	🟪	35568 Nuetel Communic
⬛	41303	🟦	35546 Northstar Techn
🟧	41110 Business Commun	🟨	35313 2Connect

Source: *BGP Data*

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Batelco (AS5416) is the Kingdom's incumbent provider, receiving transit from four separate international transit providers. Batelco's transit has historically been a straightforward blend of FLAG/Reliance (AS15412) and Tata (AS6453). This appears to be changing in 2012, however.

For a week in February, Batelco briefly received transit from STC (AS39386); at the same time, they began a transit relationship with Qatar Telecom (AS8781) that has continued.
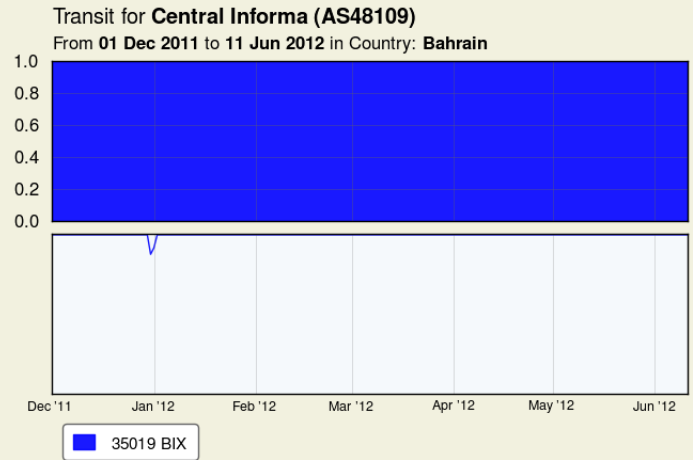
Batelco's connection to Q-Tel was briefly interrupted during the FOG outage in March, and in April they added Etisalat as a fourth provider.

Transit for **Batelco (AS5416)**
From **01 Dec 2011** to **11 Jun 2012** in Country: **Bahrain**

🟦	8966 Etisalat	⬛	39386 Saudi Telecom
⬜	8781 Qatar Telecom	🟧	15412 Reliance
🟩	6453 Tata		

Source: *BGP Data*

• **renesys**

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Business Communications Network (AS41110) and the **Central Informatics Agency (AS48019)** are both long-standing single-homed customers of the BIX.
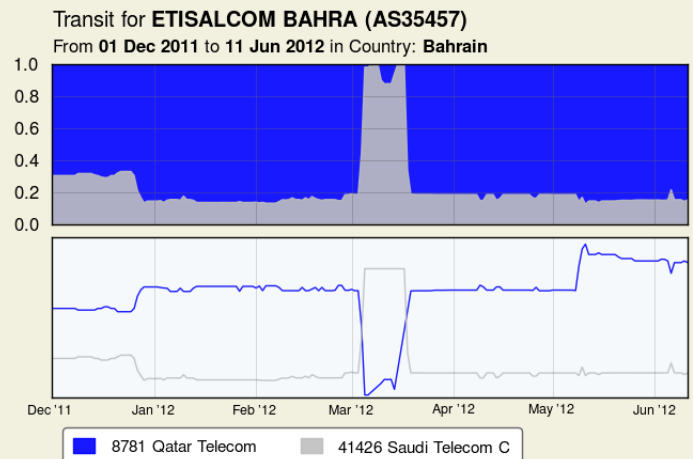
Transit for **Business Commun (AS41110)**
From **01 Dec 2011** to **11 Jun 2012** in Country: **Bahrain**

35019 BIX

Source: *BGP Data*

● **renesys**

Transit for **Central Informa (AS48109)**
From **01 Dec 2011** to **11 Jun 2012** in Country: **Bahrain**

35019 BIX

Source: *BGP Data*

● **renesys**

Etisalcom Bahrain (AS35457) routes through STC (AS41426) and Qatar Telecom (AS8781), with the latter being substantially preferred. During the March FOG outage, this ratio reversed itself, and the west-bound route to STC became primary until FOG was repaired.

Transit for **ETISALCOM BAHRA (AS35457)**
From **01 Dec 2011** to **11 Jun 2012** in Country: **Bahrain**

8781 Qatar Telecom   41426 Saudi Telecom C

Source: *BGP Data*

● **renesys**

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GCC-NGN (AS44075) continues to get its Internet transit through Saudi Telecom (AS41426). A brief routing mistake caused them to transit parent company Rawabi on a single day in March 2012.
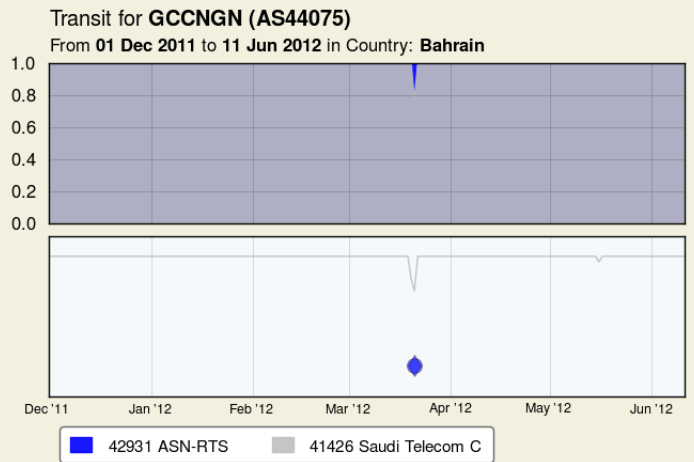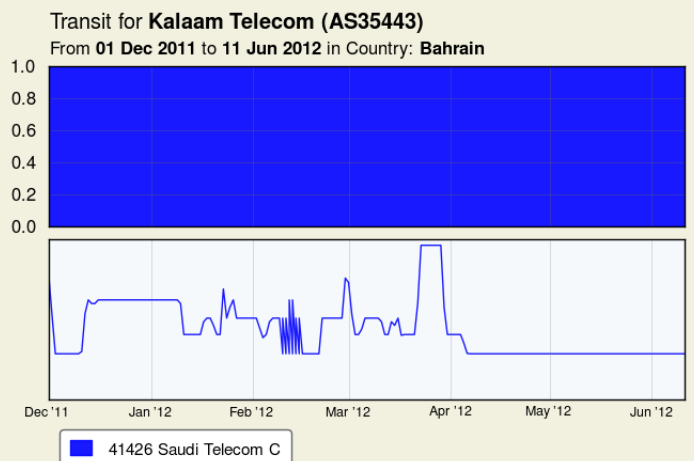

**iCol Plus (AS44167)** continued in 2012 to be a singlehomed customer of LightSpeed.
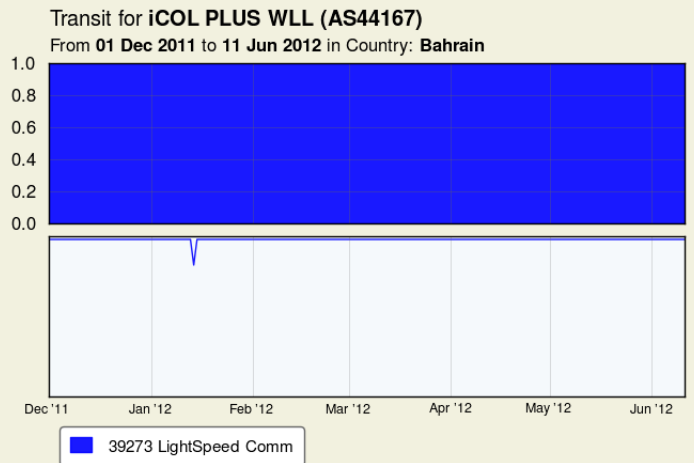
Kalaam (AS35443) continues to get all of its Internet transit from Saudi Telecom (AS41426).

**Lightspeed (AS39273)** continues to rely on Flag/Reliance (AS15412) for the majority of its transit, with a backup connection through the BIX. It provides transit to iCol Plus (AS44167) and Life Telecommunications (AS196896), as well as a single SITA prefix from Orange (AS5583).
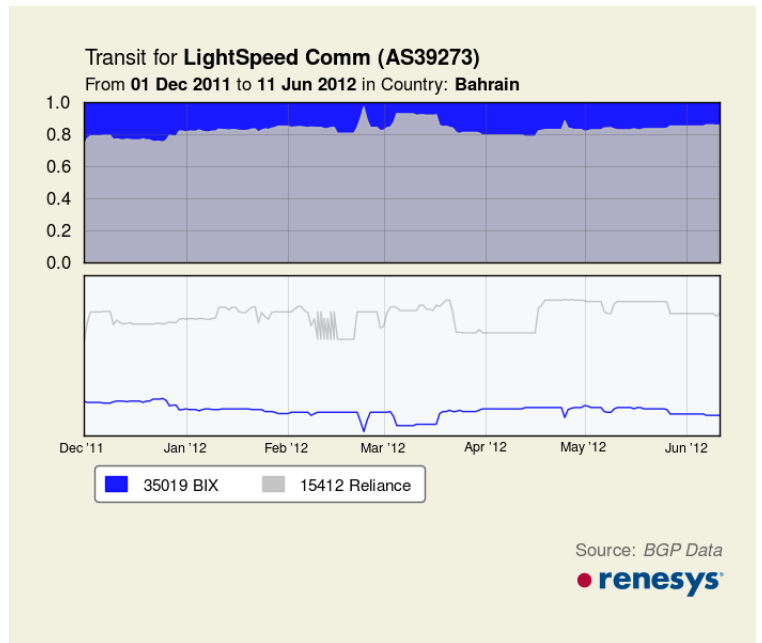
Menatelecom (AS39015) has phased out Flag/Reliance (AS15412) as its second transit provider, leaving it 100% reliant on Saudi Telecom (AS41426).
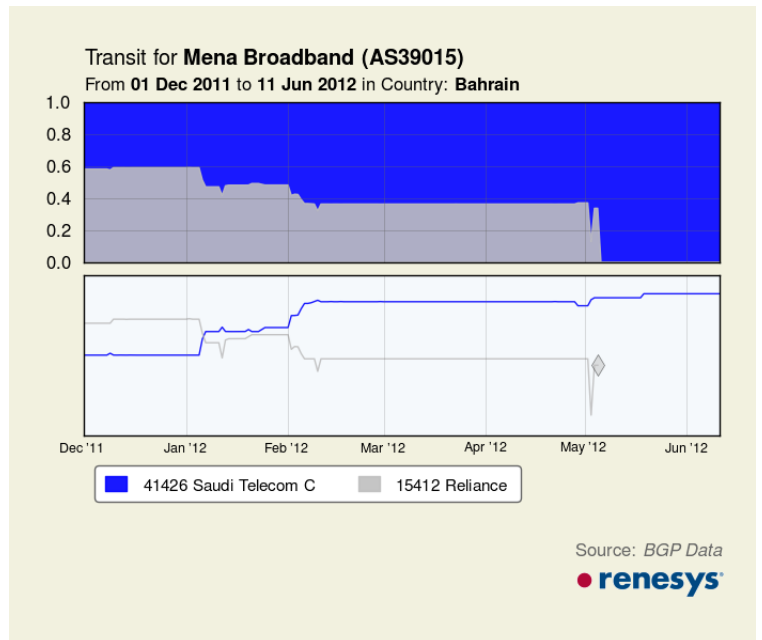

**Northstar (AS35546)** is another single-homed customer of the BIX.
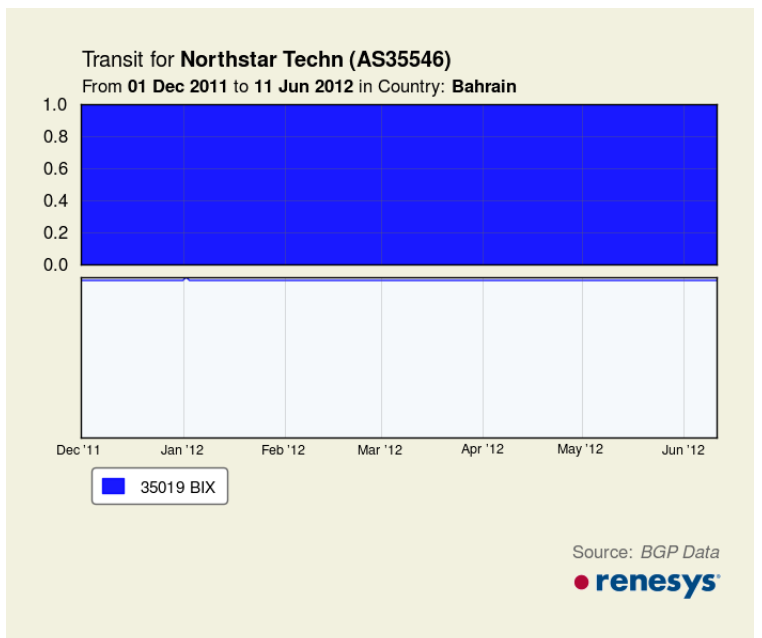
Nuetel (AS35568) has the same strategy as LightSpeed: Flag/Reliance (AS15412) as primary transit provider, BIX as the backup provider.   BIX's daily share of Nuetel's transit has trended lower in 2012.

Other than Nuetel, Lightspeed, and Batelco, only one other provider in Bahrain uses Flag/Reliance in a significant transit capacity: Saudi Telecom (AS41426, see below).
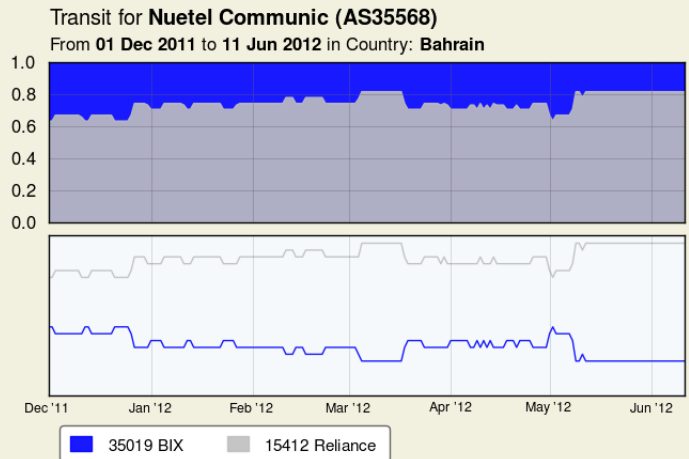
Rawabi (AS42931), which joined the BIX in 2011, now relies exclusively on Saudi Telecom for Internet transit. On one day in May, they briefly transited BIX, in a likely misconfiguration, mirroring their accidental provision of transit to GCC-NGN on the same day.

11
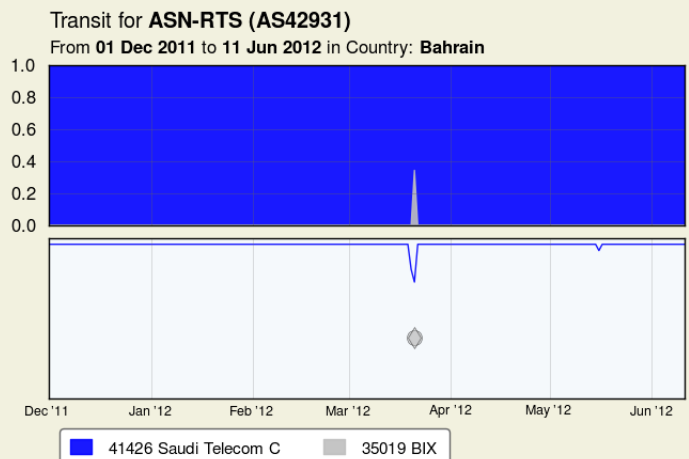
Saudi Telecom Bahrain (AS41426)
understandably gets most of its transit
through Saudi Telecom (AS39386),
utilizing GCCIA-owned fiber, and an
alternative path along the causeway to
Saudi Arabia.

In January 2012, however, STC started
drawing on Flag/Reliance transit
(AS15412) as a backup provider,
presumably to create physical
redundancy.   This move substantially
increases the resilience of STC's Bahrain
network, which has become an
increasingly important source of
connectivity for providers within the
Kingdom.

Viacloud WLL (AS35729) remains a
single-homed customer of the BIX.

Zain (AS31452) offers a striking look at a
shift toward Saudi Telecom transit, away
from traditional providers such as Tata
(AS6453) and Flag (AS15412).   By June
2012, Zain had reduced its Tata transit to
zero, and had only a single token network
prefix transiting Flag/Reliance. Zain ends
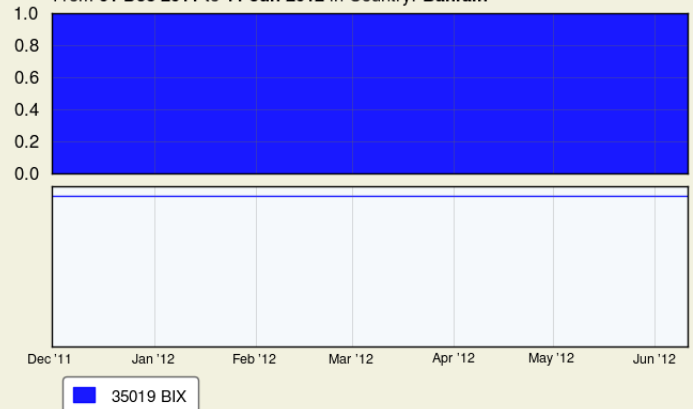the period effectively single-homed
through Saudi Telecom.

12
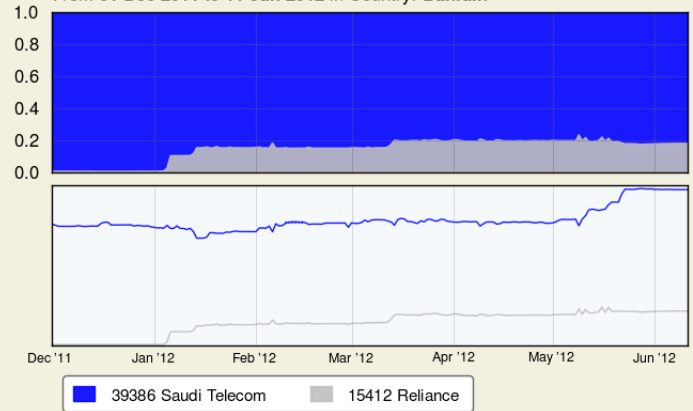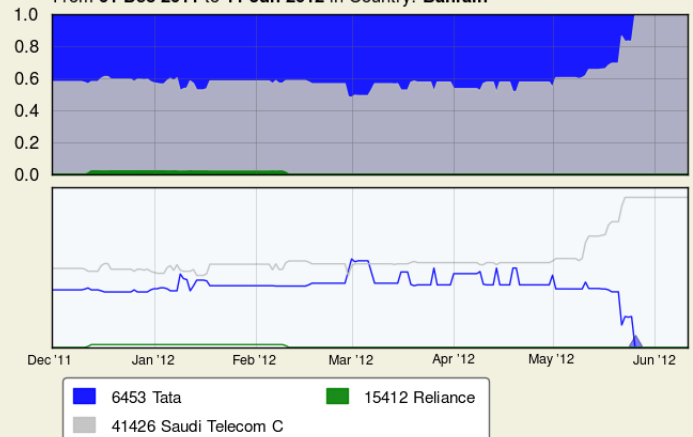
International Transit Providers Serving Bahrain: 2012

In this section we compare and contrast the downstream customers of each of the five major international Internet service providers that serve Bahrain: STC, Flag/Reliance, Qatar Telecom, Tata, and Emirates/Etisalat.

Saudi Telecom (AS39386) provides transit to Bahrain via its single local customer, STC's AS41426.   Note the high degree of multihoming in evidence, and the stability (except for the phaseout of Bharti in January) of STC's provider blend.
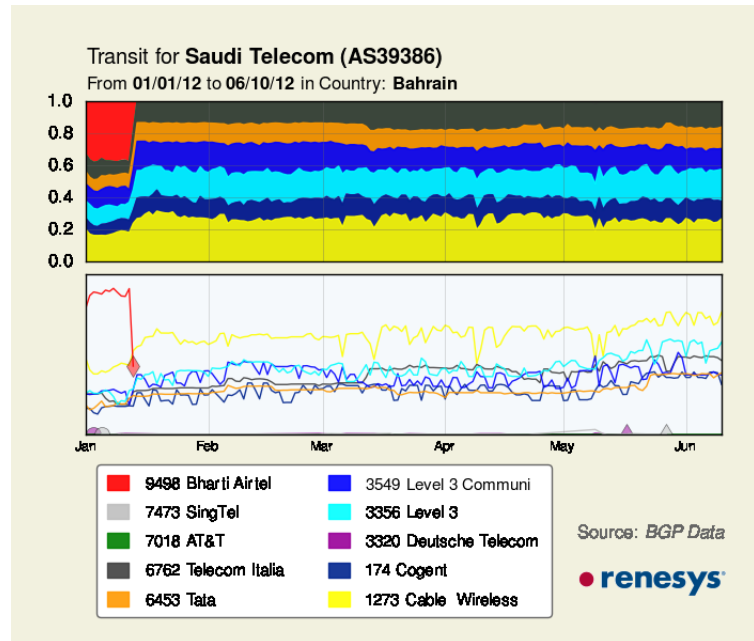
Saudi Telecom Bahrain (AS41426) now serves more downstream customers than any provider in Bahrain except the Bahrain Internet Exchange.

Besides VIVA Bahrain (AS51375), its subsidiary downstream customer, STC serves Rawabi, GCC/NGN, Menatelecom, Etisalcom Bahrain, Kalaam Telecom, and Zain.

Zain, in particular, has increased its transit through STC as it eliminated its dependence on Tata.

13
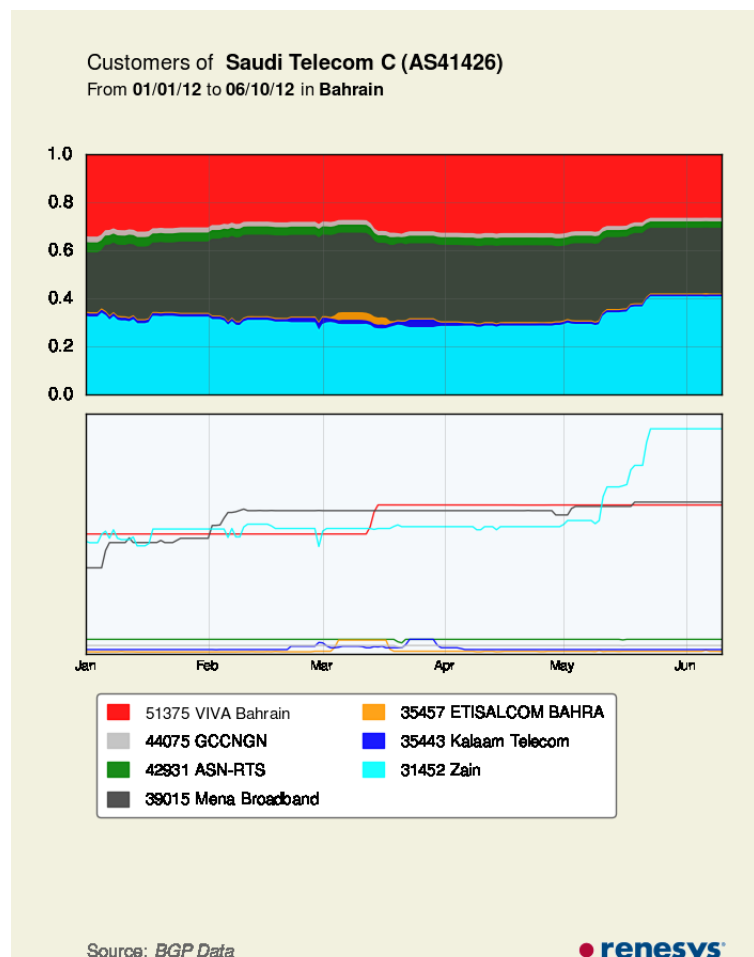
Qatar Telecom (AS8781) serves both Batelco and Etisalcom Bahrain. For two days in May, they appear to have transited 2Connect UK as well, briefly. During the FOG cut in March, both Batelco and Etisalcom shifted away from QTel to their alternative providers (Tata for Batelco, STC for Etisalcom).

Customers of **Qatar Telecom (AS8781)**
From **01/01/12** to **06/10/12** in **Bahrain**

5416 Batelco
35457 ETISALCOM BAHRA
51406 2Connect UK Ltd
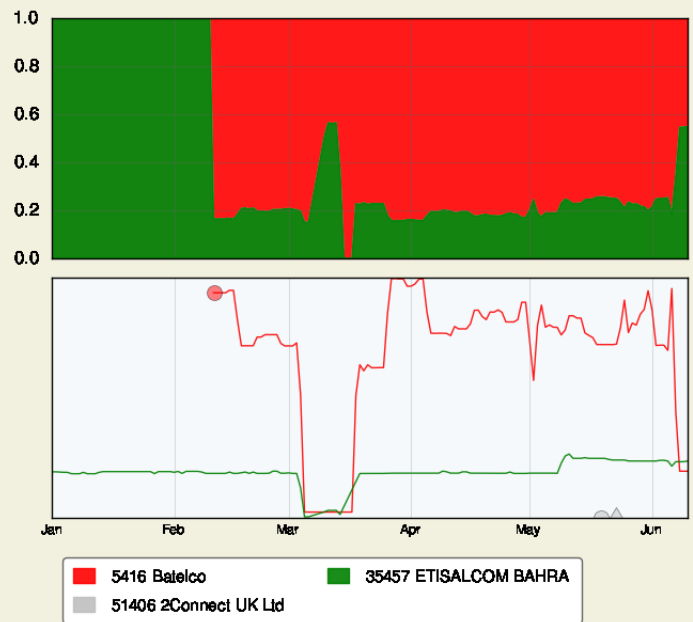
Source: *BGP Data*

Tata (AS6453) has seen relatively steady transit from remaining Bahrain customers Batelco and BIX.

Tata has also provided some minor upstream transit to STC's AS39386, on behalf of STC's AS41426 and thereby its other customers.

The loss of Zain as a customer in May 2012 reduces Tata's overall role in providing BGP-visible Bahraini transit.

It is likely that providers such as 2Connect are still making use of Tata's global network to reach London, though they do not appear downstream of Tata in the routing table.

Customers of **Tata (AS6453)**
From **01/01/12** to **06/10/12** in **Bahrain**

8781 Qatar Telecom
35019 BIX
5416 Batelco
31452 Zain
39386 Saudi Telecom

Source: *BGP Data*

14
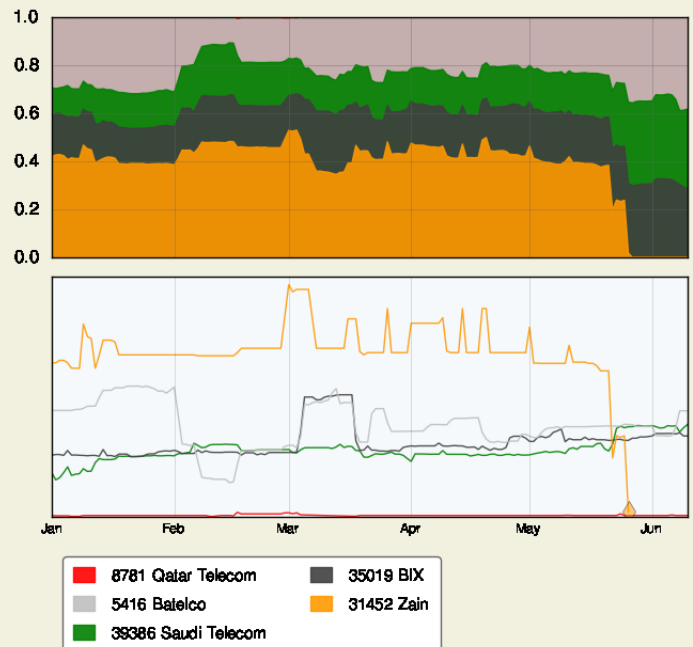
Flag/Reliance (AS15412) has also lost market share to Saudi Telecom in 2012. Menatelecom dropped Reliance as a backup provider in May 2012, perhaps perceiving (correctly) that STC's own purchase of Reliance for backup transit in January 2012 made Menatelecom's connection largely redundant.

No other providers have stepped in to take advantage of Reliance's services in 2012. They are left with Batelco, Lightspeed, and STC as primary customers, with very minor transit provided to Nuetel and Zain.

Customers of **Flag (AS15412)**
From **01/01/12** to **06/10/12** in **Bahrain**

Legend:
- 8781 Qatar Telecom
- 5416 Batelco
- 41426 Saudi Telecom C
- 39273 LightSpeed Comm
- 39015 Mena Broadband
- 35568 Nuetel Communic
- 31452 Zain
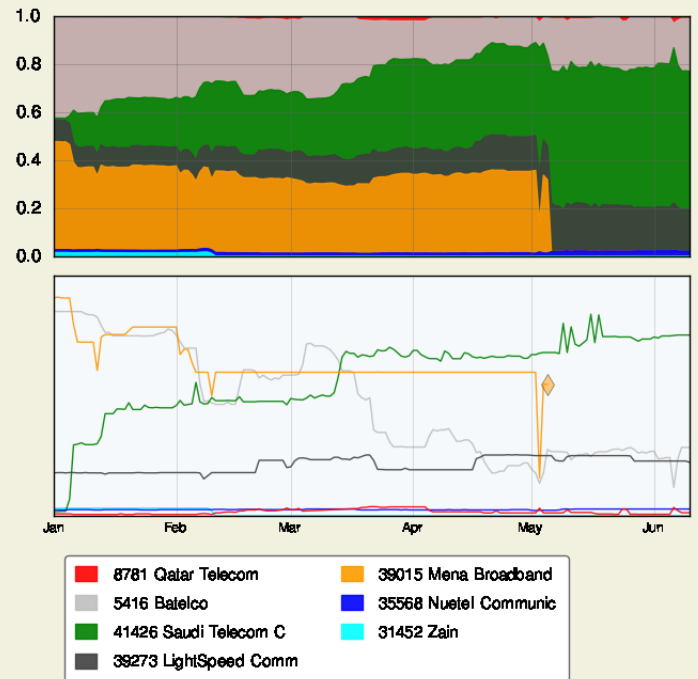
Source: *BGP Data*

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Etisalat (AS8966) gained Batelco as a second Bahrain transit customer in April, alongside the BIX. It's unclear why Batelco chose Etisalat as a fourth provider; however, the desire for path redundancy may have played a role.

Customers of **Etisalat (AS8966)**
From **01/01/12** to **06/10/12** in **Bahrain**

Legend:
- 8781 Qatar Telecom
- 5416 Batelco
- 35019 BIX

15
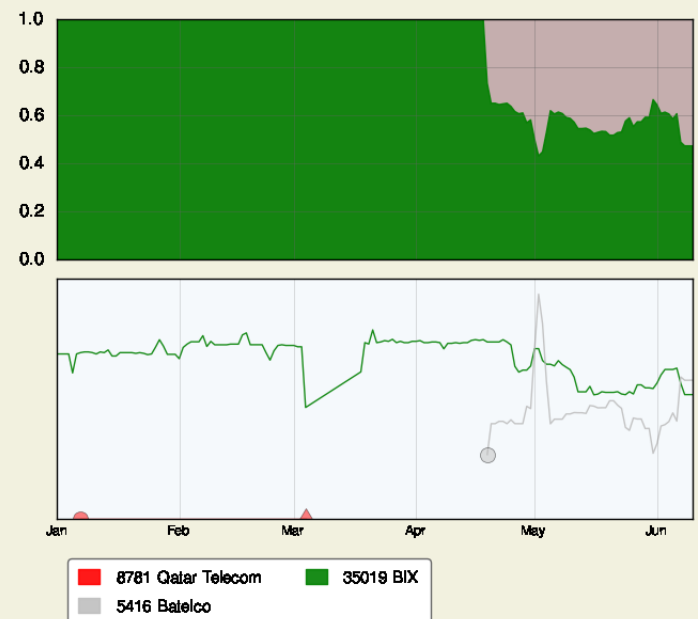
Event Analysis: March 2012 Cable Cut

Routing shifts and changes in inbound traceroute latencies both suggest that a significant interruption on the FOG cable took place between 3 and 18 March 2012.

This was not an officially acknowledged outage; however, the impacted providers make it reasonably clear that the event affected connectivity to Qatar Telecom and Emirates for providers in Bahrain.   In each case, because alternative connectivity was available, either on FLAG or over the Causeway to Saudi Arabia, there were no serious impacts on regional connectivity beyond a temporary increase in latency; that is, there were no outright routing outages.

For example, the plot at right summarizes round-trip latencies into Bahrain from a Renesys traceroute collector in Dubai over the past six months. Traces to Batelco hosts are colored according to the upstream provider (e.g., Batelco's transit provider); traces to non-Batelco hosts are colored cyan.

In December 2011 and January 2012, one can see fairly stable typical latencies of 20ms (via Emirates, AS8966) or 140ms (via Flag, AS15412), with occasional higher measurements (presumably due to congestion).
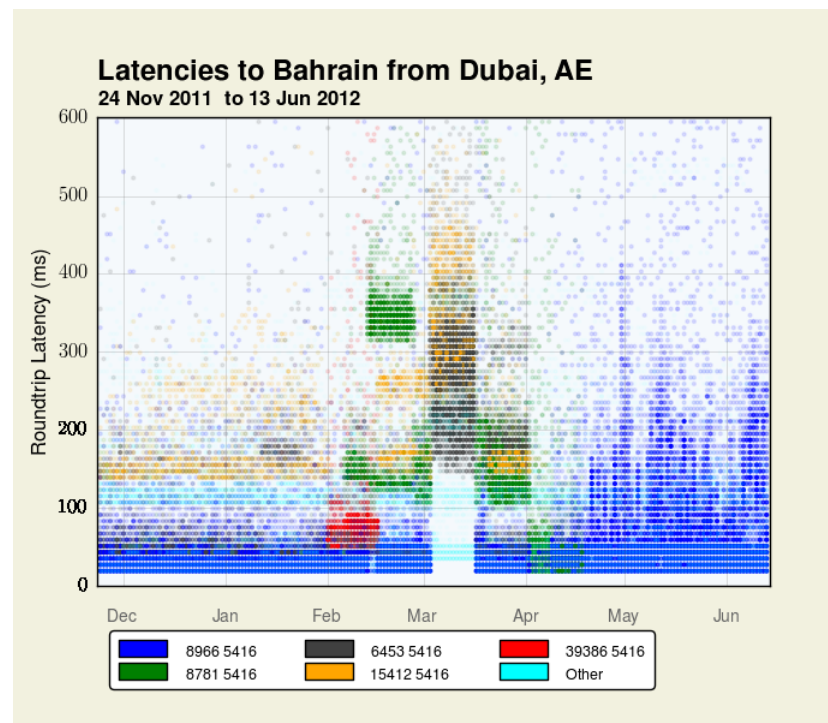
In February, one can see a period in which Batelco is also reached via STC (in red), with slightly higher latencies of 50-100ms.

The most visible event, however, is the FOG cut in March.   Note that Emirates transit (in blue, 20-50ms) and Qatar Telecom transit (in green, 140ms) both become unavailable, replaced by much slower paths through Tata (in dark grey, 150-300ms).

When the cable damage is repaired, the previous transit and latency patterns are reasserted.

In May and June, Emirates traces come to dominate the Batelco measurements from Dubai, with latencies that spike into the 200ms+ range on a daily basis.

This plot of latencies from Dubai uses a different provider filter, examining only traces into the Bahrain Internet Exchange (others in grey).

The fastest traces are those through Emirates (AS8966, in blue, at 20-50ms). The slower path is through Tata (AS6453, in green, at 100ms).

During the March FOG event, however, the Emirates path becomes unavailable. BIX is left with two physical paths to Tata, one with RTTs of 200ms, and the other around 375ms. We speculate that these may be round trips to London from Dubai, and back again across Saudi Arabia.
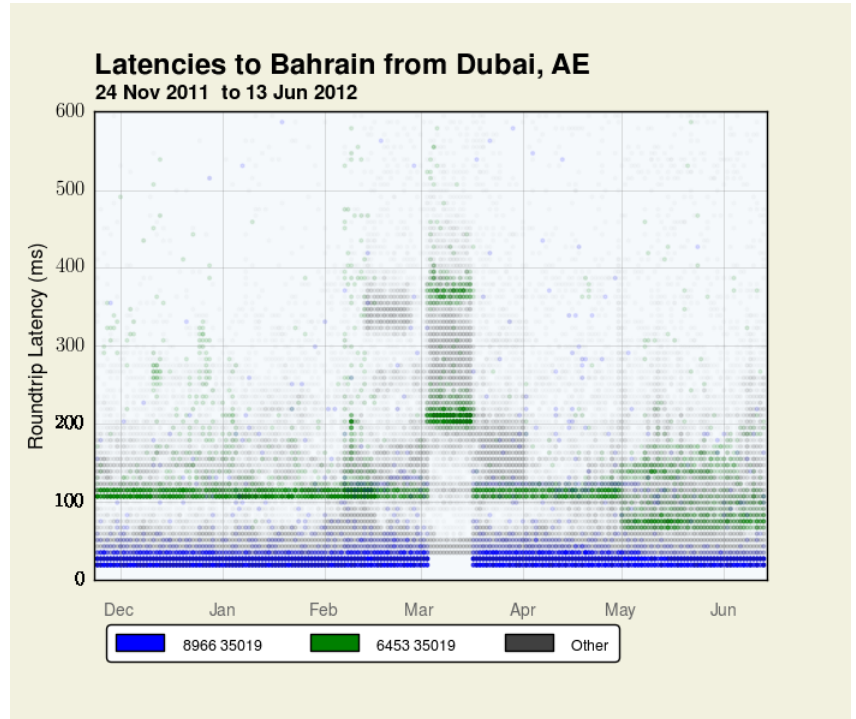
Comparing these to the BGP-based transit shift plots for Batelco and the BIX at the same time, the provider shifts that induced the latency increases are clearly evident.

17
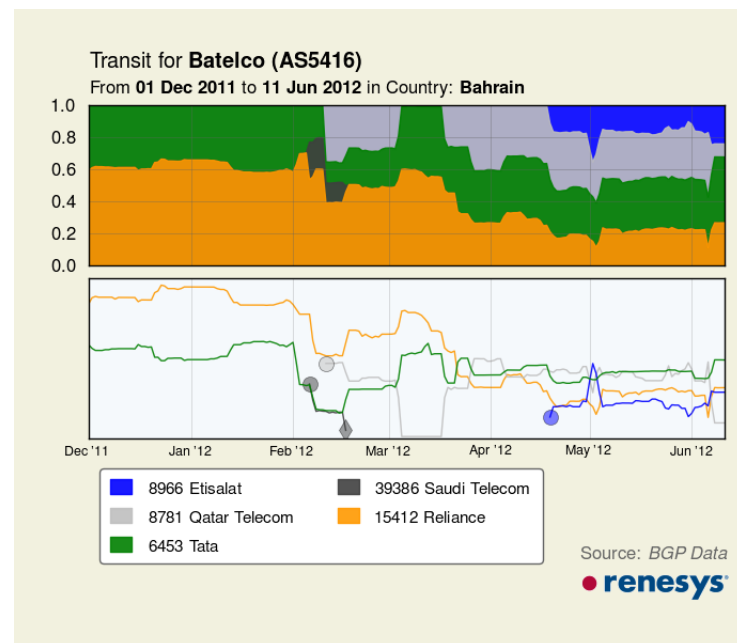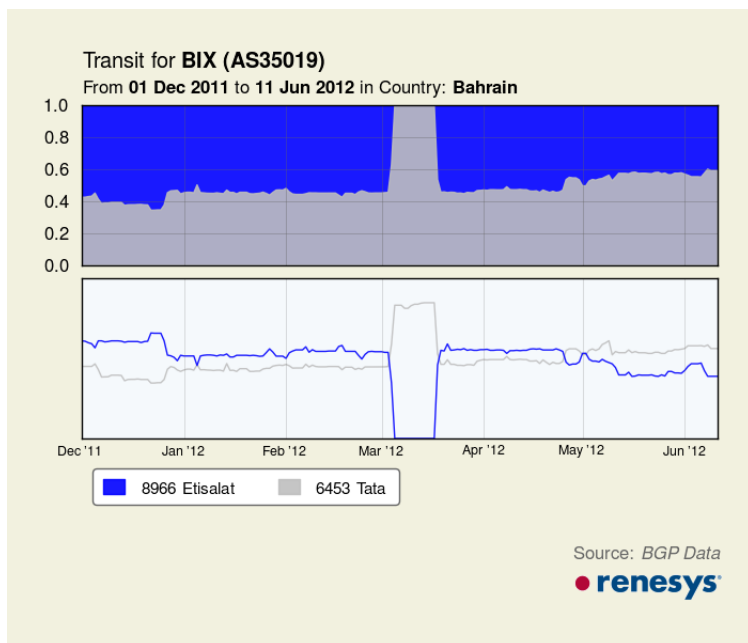
Bahrain Summary: 2007-2012 Evolution

To visually understand the evolution of the Bahrain market, it may help to compare the following two graphs of the Kingdom's Internet ecosystem over five years.

At the start of 2007, Bahrain's Internet was a simple place, roughly divided between Batelco and the Bahrain Internet Exchange. Only Batelco used Flag/Reliance; all other providers were reliant on the BIX, or relied on expensive satellite Internet.

January 2007
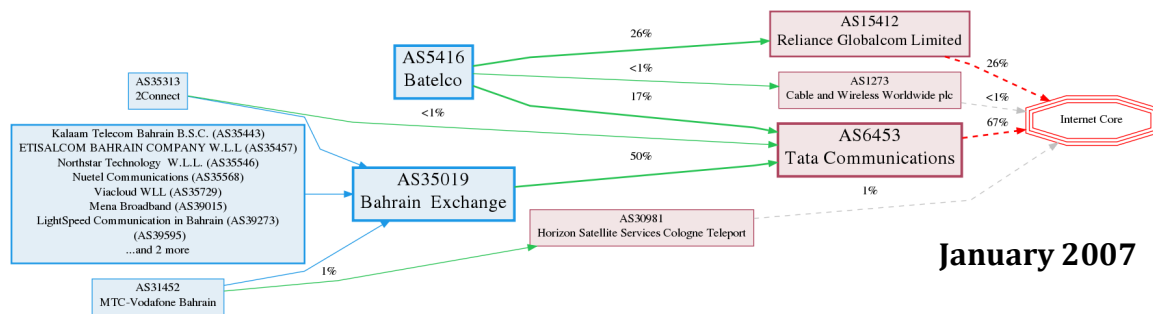
By June 2012, the market expands considerably in depth and complexity.

Domestic providers choose from a broader range of upstream service providers, and utilize multihoming (multiple Internet connections, along multiple physical paths) to insulate themselves from dependence on any single cable or transit provider.

June 2012

18
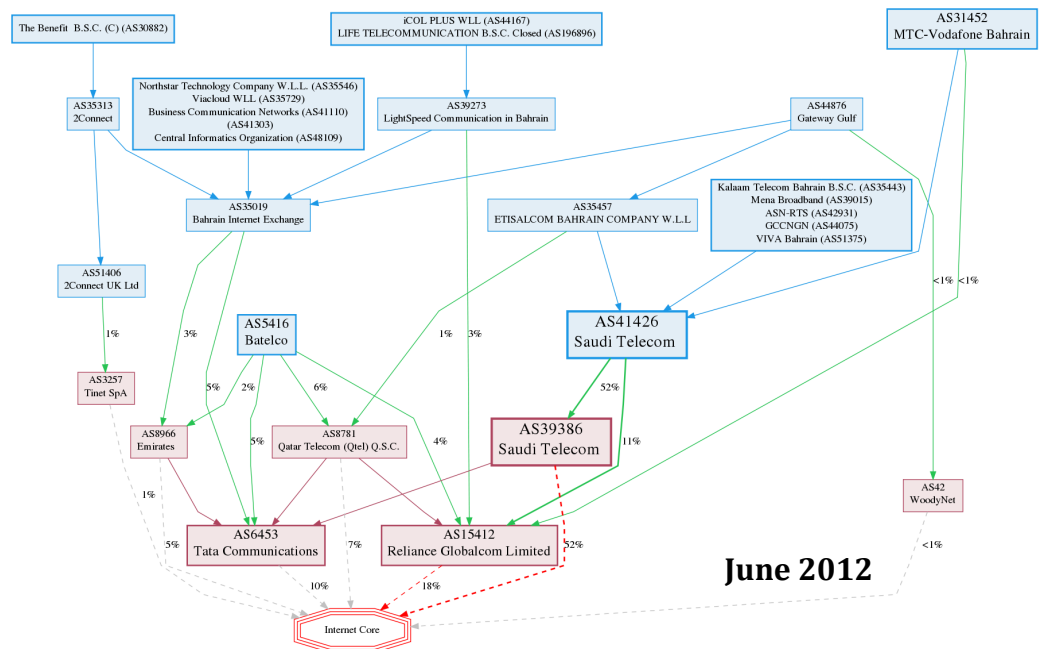
Market Importance of Domestic Providers, By Country

On-net percentages[2] can be used as a reasonable metric for examining relative domestic provider importance around the region, by measuring the weighted percentage of the national market served as customers of a given provider (directly or indirectly).

If there are several domestic providers in a given market with similar on-net percentages below 50%, it's more likely that the market supports competition.   If one domestic provider has more than 75% of the country's address space on-net, on the other hand, it can be a sign that competition is limited.

In the tables of domestic provider on-net numbers[3] on the following pages, note that **Iran, Syria, the UAE, Qatar,** and **Oman** all have a single largest domestic carrier with more than 75% of the domestic market on-net, potentially signaling an IP transit market in which competition is limited.

Jordan, Lebanon and **Saudi Arabia** are intermediate cases, whose incumbent provider still retains between 50% and 75% of the national market on-net.   In each case, the emergence of a strong competitor (typically a mobile provider) is driving demand for international transit on better terms. As rival solutions to the international transit puzzle emerge, and domestic providers reach out to international carriers directly, the incumbent's share of domestic on-net market gradually declines.

Kuwait, Egypt, Iraq, and **Bahrain** all have a largest domestic provider with less than 50% of the market on-net, indicating that no single provider controls access to a simple majority of IP space.   (If current trends continue in 2012, Iraq (and perhaps Egypt) may soon move into the previous, intermediate category.)

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[2] In service provider terminology, the term "on net" describes a block of IP space that is globally observed to be reachable through a given provider. Therefore, an ISP's "on-net percentage" in Bahrain is the percentage of the total volume of Bahrain's IP space that belongs to the ISP, or to its direct or indirect customers.
[3] Note that in this context, the term "domestic market" connotes the set of *routed IP network prefixes* within the country, not the economic market, for the purpose of competition assessment.

Here, on-net percentages **may sum to more than 100%** if one of these domestic providers sells to one of the other listed domestic providers, as they each get credit for their overlapping customer bases. Things to note:

- In **Oman**, the competitor (Nawras/Omani Qatari Telecom) continues to grow its market share relative to the incumbent, Omantel.
- In **Iraq**, a new provider (Earthlink Limited, AS50710) has emerged out of obscurity to take 49% of the national market on-net in just 12 months.
- **Bahrain** probably has the most evenly spread market share across domestic providers, now that Zain's ASN for mobile data (AS42961) has grown to 39% of the total routed Internet in **Kuwait**.

Percentage of National Routed Internet, By Provider

CC	ASN	NSP	Jan09	Jul09	Jan10	Jul10	Jan11	Jul11	Jan12	Jun12
AE	**8966**	**Emirates Telecom**	**97%**	**97%**	**98%**	**98%**	**97%**	**94%**	**98%**	**96%**
AE	5384	Emirates Internet	78%	79%	80%	71%	72%	70%	69%	70%
AE	15802	Du	20%	19%	19%	28%	27%	28%	29%	29%
BH	**5416**	**BATELCO-BH**	**40%**	**34%**	**31%**	**27%**	**21%**	**20%**	**20%**	**18%**
BH	31452	Zain Bahrain	24%	27%	27%	33%	25%	26%	23%	26%
BH	39015	Menatelecom	5%	10%	15%	17%	26%	24%	24%	17%
BH	51375	Viva Bahrain	--	--	--	--	9%	10%	14%	17%
BH	35019	BIX	32%	36%	26%	21%	29%	17%	12%	12%
EG	**8452**	**TE**	**82%**	**51%**	**39%**	**34%**	**41%**	**36%**	**42%**	**45%**
EG	36992	ETISALAT MISR	--	18%	25%	34%	33%	39%	31%	26%
EG	24863	Link Egypt (Link.NET)	21%	31%	33%	27%	24%	24%	25%	27%
EG	24835	RAYA Telecom	24%	20%	14%	16%	18%	16%	19%	23%
EG	15475	Nile Online	13%	12%	14%	7%	6%	7%	--	--
IQ	21277	Newroz Telecom Ltd.	8%	17%	21%	26%	45%	43%	33%	19%
IQ	44217	IQ Networks	--	--	--	12%	28%	21%	34%	31%
IQ	50710	Earthlink Ltd	--	--	--	--	--	--	22%	49%
IR	**12880**	**DCI**	**98%**	**94%**	**92%**	**90%**	**90%**	**90%**	**94%**	**92%**
IR	6736	IRANET/IPM	5%	9%	11%	14%	16%	14%	12%	9%
IR	21341	Soroush Rasaneh Institute	15%	16%	13%	10%	7%	7%	6%	5%
JO	**8697**	**Jordan Telecom**	**100%**	**88%**	**85%**	**77%**	**76%**	**79%**	**73%**	**73%**
JO	8376	Jordan Data Communications	46%	41%	44%	37%	41%	45%	38%	43%
JO	47887	NEU Telecom	--	--	--	--	10%	11%	10%	16%
JO	42912	XOL Jo	--	1%	5%	11%	10%	8%	14%	13%
JO	9038	Batelco Jordan	12%	11%	8%	8%	9%	9%	10%	11%

Percentage of domestic market on-net with leading providers. Incumbents often have more than 75% of the domestic market on-net. Percentages that add to more than 100% signify multihoming (consumer networks on-net with multiple providers).

Percentage of National Routed Internet, By Provider (Continued)

CC	ASN	NSP	Jan09	Jul09	Jan10	Jul10	Jan11	Jul11	Jan12	Jun12
KW	43852	Kuwait Data Center co.	27%	23%	30%	33%	36%	20%	24%	18%
KW	9155	QualityNet	28%	20%	25%	26%	42%	31%	24%	29%
KW	21050	Fast W.L.L.	20%	20%	19%	19%	24%	16%	16%	11%
KW	6412	KEMS	22%	26%	23%	21%	20%	27%	25%	28%
KW	3225	Gulfnet Kuwait	13%	17%	16%	15%	18%	16%	13%	15%
KW	29357	WATANIYA TELECOM	9%	9%	9%	18%	17%	14%	19%	15%
KW	42961	MTC GPRS	--	--	--	--	15%	28%	28%	39%
LB	42020	**Liban Telecom**	45%	66%	64%	63%	68%	69%	88%	86%
LB	42003	OGERO Telecom	23%	42%	42%	46%	54%	50%	53%	50%
LB	20535	InSat GmbH	2%	2%	3%	6%	--%	--%	--%	--%
LB	39010	TerraNet sal	17%	17%	18%	16%	13%	12%	13%	12%
LB	8261	Archway	--	--	12%	14%	--%	--%	--%	--%
LB	24634	Cyberia	12%	13%	13%	11%	9%	--%	10%	10%
OM	8529	**OmanTel**	100%	100%	100%	99%	100%	100%	84%	80%
OM	28885	OmanTel NAP	100%	100%	100%	86%	88%	85%	66%	61%
OM	50010	Omani Qatari	--	--	--	13%	12%	15%	34%	39%
QA	8781	**Qatar Telecom**	75%	98%	99%	99%	99%	99%	99%	99%
QA	29384	Qatar Foundation	15%	15%	15%	12%	11%	13%	11%	9%
SA	39386	**STC**	75%	65%	67%	72%	67%	66%	60%	55%
SA	25019	SaudiNet	26%	31%	31%	48%	49%	51%	48%	44%
SA	35819	Mobily/Bayanat	6%	18%	15%	12%	20%	23%	28%	36%
SA	34400	Etisalat	7%	10%	11%	8%	14%	17%	21%	28%
SA	47794	Atheeb (Batelco)	---%	2%	5%	7%	5%	4%	5%	4%
SY	29386	**Syrian Telecom**	52%	66%	84%	99%	99%	99%	100%	100%
SY	24814	SCS	44%	33%	27%	28%	19%	--%	--%	--%

Percentage of domestic market on-net with leading providers. Incumbents often have more than 75% of the domestic market on-net. Percentages that add to more than 100% signify multihoming (consumer networks on-net with multiple providers).

IPv6, Bahrain, and the GCC

IPv4 address space exhaustion continues to be an important topic of study for service providers worldwide.   As the pool of available IPv4 addresses is depleted, NSP requests for address space may be denied, leaving them unable to assign their subscribers globally unique IPv4 addresses.

In response, organizations worldwide are examining the costs and benefits of transitioning their networks to utilize IPv6 addresses instead. Since most Internet content providers are still not offering IPv6-based services, and because IPv4 and IPv6 are not interoperable protocols, IPv6 traffic levels worldwide have struggled in recent years to exceed a few tenths of a percent of the IPv4 Internet's traffic.

A secondary market for IPv4 address space has come into existence, and several companies are bringing unused IPv4 space to market, often without the support of the regional Internet registries.   ARIN has taken the lead in creating an official facility to support in-region IPv4 address transfers in accordance with local policy; however, no such facility is yet available in the RIPE region.

The GCC states collectively represent about a third of the greater Middle East's 1,678 IPv6 prefix advertisements.

Within the GCC, Saudi Arabia leads with 299 advertised IPv6 prefixes, followed by Oman (95), Kuwait (81), the UAE (75), and Qatar (75).

To date, no provider in Bahrain has advertised any IPv6 capability. This should be a topic for discussion in 2012, as the scarcity of IPv4 address resources is likely to create additional costs for Bahrain's service providers, and may become a limiting factor for the Kingdom's Internet growth within the next decade.

GCC IPv6 Prefix Advertisements
1 June 2012