



IPv6 Growth in the Middle East

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Overview and Methodology

- IPv4 address space is running out
- IPv6 transition is underway
- We can measure the progress, globally and in the Middle Eastern region

- Statistics in this presentation are drawn from actual measurement of the global routing table, as seen from ~400 IPv4 and ~150 IPv6 perspectives (full table feeds) worldwide

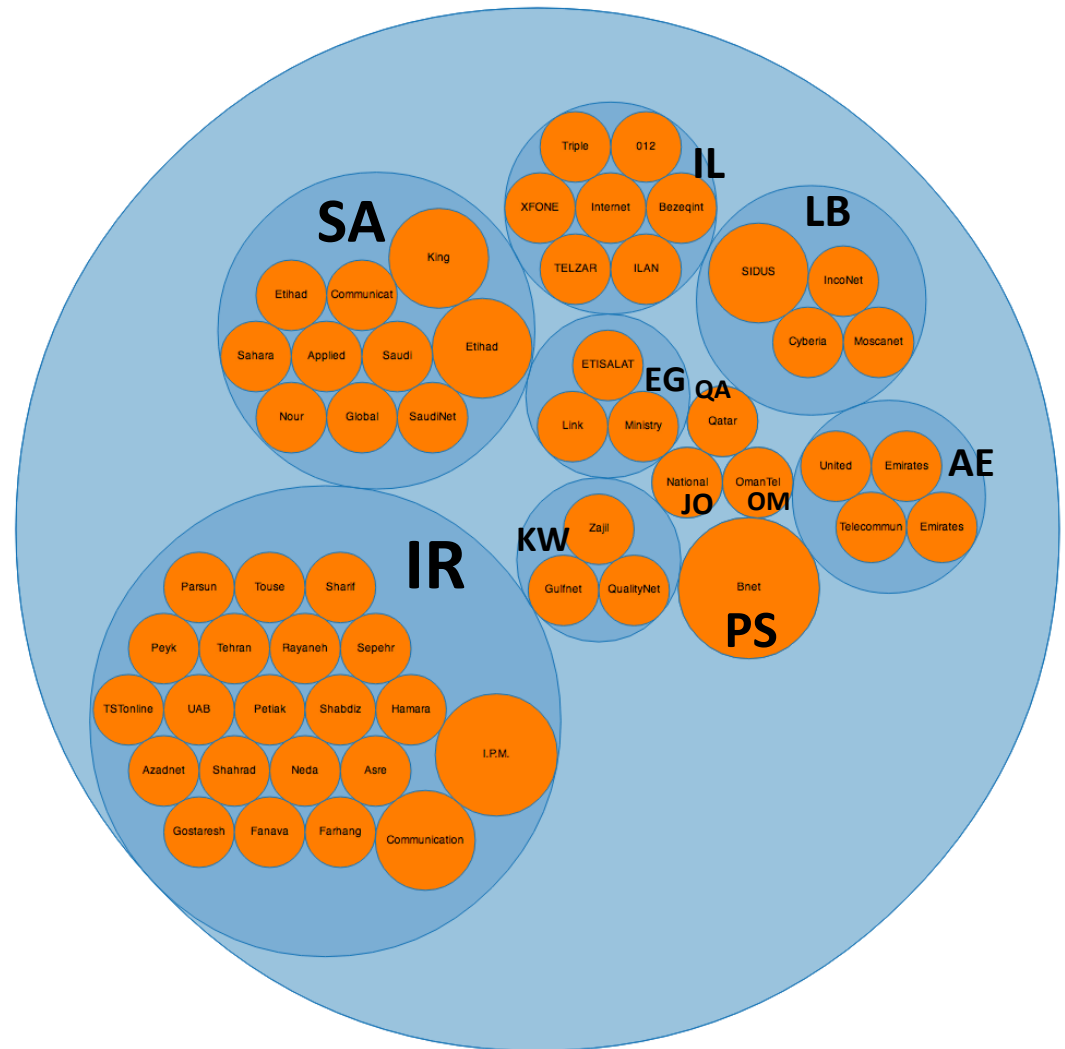
Good News and Bad News

- Both Middle East Internets are growing, IPv4 and IPv6
- Middle East Internet is now far more resilient than just a few years ago
- Middle East represents 2% of the IPv4 Internet, still only 1% of the IPv6 Internet



Middle Eastern IPv6 Routing Table

	ASNs	Prefixes
Iran	21	24
Saudi Arabia	10	12
Israel	7	7
Lebanon	4	5
UAE	4	4
Palestine	1	4
Kuwait	3	3
Egypt	3	3
Jordan	1	1
Oman	1	1
Qatar	1	1



Who's Providing IPv6 Service Here?

renesys® market intelligence® IPv6 [view our IPv4 data](#)

Dashboard Registrations Internet Index Provider Report Network Watch Market Watch

★ Middle East IPv6 Internet Index Ratings ?

IPv6 Customer Base: Wholesale — Middle East ?

1		★ Hurricane Electric, Inc.	6939	█
2		★ Level 3 Communications, Inc.	3356	█
3		★ Tata Communications	6453	█
4		★ IIX	5585	█
5	↓ 2	★ TELECOM ITALIA SPARKLE S.p.A.	6762	█
5		★ Cogent Communications	174	█
5		★ inexo Informationstechnologie und Telekommunikation KGaA	42652	█
5		★ SIDUS S.A.R.L.	41589	█
6	↑ 2	★ Tinet Spa	3257	█
7	↓ 1	★ TeliaNet Global Network	1299	█
7	↓ 1	★ Delta Telecom LTD.	29049	█
8	↑ 1	★ BT European Backbone	5400	█
8	↓ 1	★ Level 3 Communications, Inc.	3549	█
9	↓ 1	★ Bezeqint Internet Backbone	8551	█
9	↓ 1	★ The GEANT IP Service	20965	█
9	↓ 1	★ PCCW Global	3491	█
9	↓ 1	★ KDDI CORPORATION	2516	█
9	↓ 1	★ KEMS	6412	█
9	↓ 1	★ NEU Telecom & Technologies	47887	█
9	↓ 1	★ GlobalCom-LV	42979	█
9	↓ 4	★ Oman Telecommunications Company - OmanTel	8529	█
9	↓ 1	★ Cairney Network	44980	█
9	↓ 1	★ NTT Communications	2914	█
9	↓ 1	★ Parsun Network Solutions, IR	31732	█
10	New	★ Etihad Etisalat Company (Mobily)	35819	█
11	New	★ ANKABUT (U.A.E Research and Educational Network)	47862	█

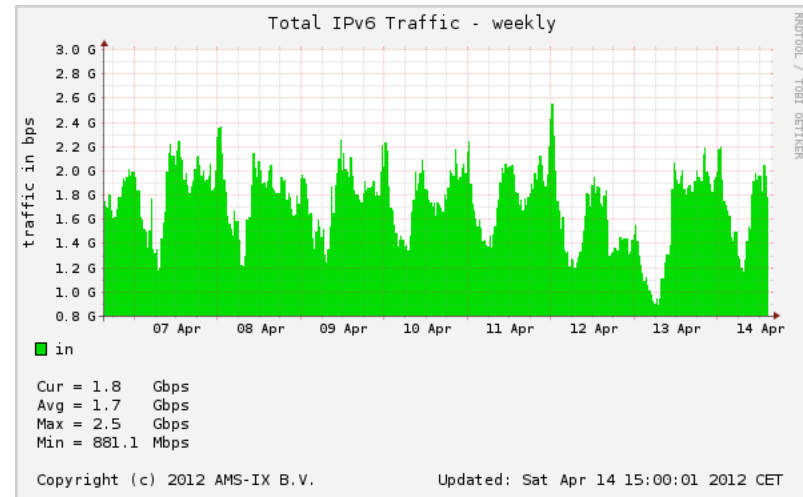
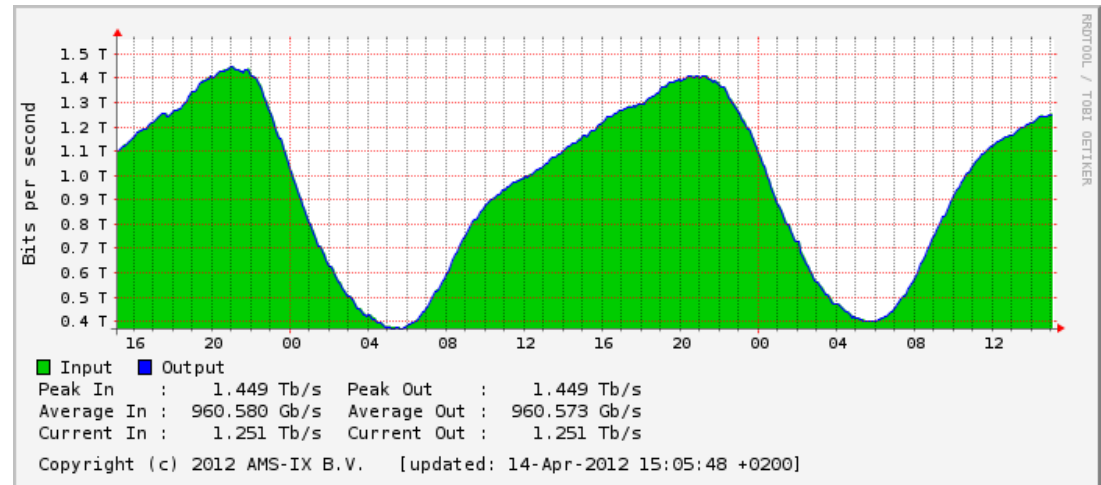
- Hurricane Electric is the dominant wholesale IPv6 provider in the region
- Level3, Tata, Sparkle, Cogent, Tinet, Telia ...
- Local providers (Mobily and Sahara.Net!)

There are various ways to measure IPv6

- What curve should we be on to reach “convergence” by \$TARGET_DATE?
- When will IPv4 be replaced?
- Data to draw on include:
 - How much **traffic** at major exchanges?
 - How many **prefixes** in a “full BGP table?”
 - How many **autonomous systems** use IPv6?

“How much traffic at major exchanges?”

- e.g., AMS-IX
 - IPv4: 1.5TB/s
 - IPv6: 2.5GB/s
- Rule of thumb is “a tenth of a percent”
- Hasn't changed much recently



“How many prefixes in a full table?”

- The IPv6 table was *designed* to be smaller
- **Still, to reach a tipping point, we need tens of thousands of ASNs with just 1-5 prefixes each**
 - They have to be individually persuaded to invest
 - Many of them still can't find IPv6 providers
 - At 2 prefixes per global ASN, we expect **82K** routes, but today we see only **9K**.

“How Many Autonomous Systems?”

- This is a more direct transition measurement
- No matter what you think the “right” number of prefixes per provider should be, we have to accommodate a certain number of ASNs
- IPv6 adoption has been skewed towards the larger “core” ASNs (large providers) with money to invest
- **Assertion: everyone who does BGP on IPv4 will want the ability to do BGP in IPv6**

Why so many ASNs?

- Having PI space and your own multihomed ASN gives you bargaining power over providers
- Enterprises and small providers worldwide are not going to give that model up without a fight
- Therefore we expect to see 100% participation from IPv4 ASNS in the IPv6 routing table at convergence.

- **How close are we today?**

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- “It’s likely that the majority of ASNs will still not be advertising IPv6 prefixes in May 2012 (today, it’s about 90%)” *14/May/2011*
- *Unfortunately, I was right. **It’s still about 90%.***
- IPv6 participation growth rate worldwide has stalled, despite greater awareness (IPv6 day)

% of IPv4 ASNs originating IPv6 prefixes

- *Last year: **89%** of ASNs ignored IPv6.*
- *This year: only **87%** are ignoring IPv6!*
- *Middle East: **93%** (was **94%**).*

	2011	2012	Growth
Middle East	5.8%	6.9%	1.1%
Global	10.6%	13.4%	2.8%

Middle Eastern Internet Is Growing!

- Middle Eastern IPv4 ASNs growing slightly **faster** than global Internet (11% vs 9%)
- Middle Eastern IPv6 ASNs growing slightly **slower** than global Internet (31% vs 37%)
on a very small base

ASNs Originating IPv4, IPv6 Prefixes

		May 2011	Apr 2012	Growth Rate	
IPv4	Middle East	722	801	11%	(+79)
	Global	37423	40766	9%	(+3343)
		2%	2%		
IPv6	Middle East	42	55	31%	(+13)
	Global	3969	5445	37%	(+1476)
		1%	1%		

Put Another Way

- For every ASN that joins the IPv6 table ...
 - **2.3** ASNs join the IPv4 table (globally)
 - **6.1** ASNs join the IPv4 table (Middle East)
- IPv4 exhaustion has arrived, but so far there are **few/no visible effects** on IPv6 adoption

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- Regulators could step in and mandate adoption, but it won't work unless both content and eyeballs are in the same jurisdiction

Predictions

- By May 2013, 80%+ of ASNs worldwide will *still* have no IPv6 connectivity
- IPv4 address transfer marketplaces will continue to grow (white, grey, black markets)
- High-growth countries will need to study these developments carefully to ensure that their industries have adequate address space, and not count on IPv6 to save the day



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