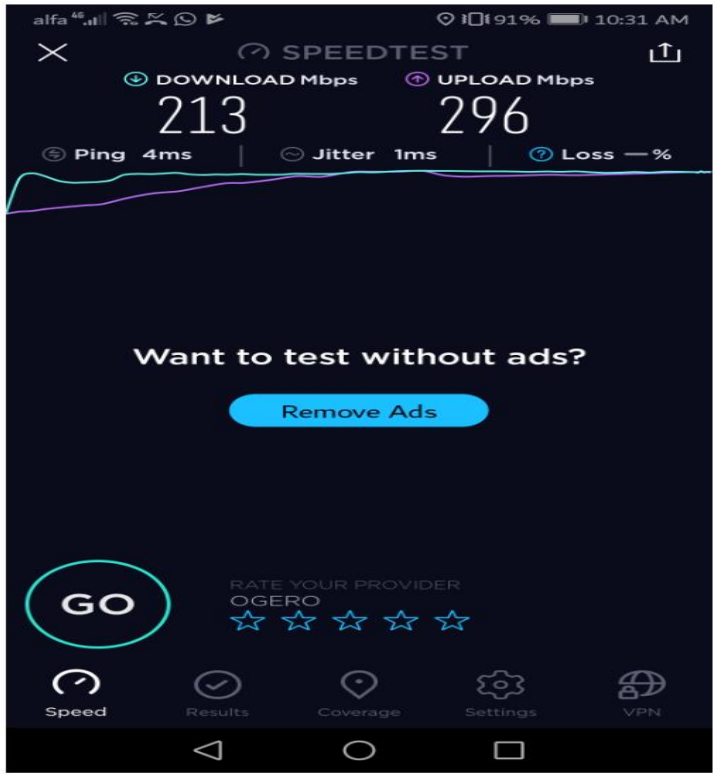
MENOG 19
April 3rd & 4th, 2019
Beirut, Lebanon

Lebanon Strategy for IPv6

Ahmad Itani
IT Director
OGERO
ahmad.Itani@ogero.gov.lb

ogero
it all starts here



IPv4	Supported
Address	178.135.94.170
Hostname	None
ISP	Ogero

IPv6 connectivity

IPv6	Supported
Address	2a00:6920:f0ef:ffe7:1cee:917:7168:ad32
Type	Native IPv6
SLAAC	No
ICMP	Filtered
Hostname	None

ogero it all starts here

alfa 94% 10:14 AM

English (US)

FAST

Your Internet speed is

180 Mbps

Latency		Upload
Unloaded	Loaded	Speed
3 ms	33 ms	87 Mbps

Client Beirut, LB 2a00:6920:e0ef:ff1e:1cee:917:7168:ad32
Server(s) Beirut, LB | Milan, IT

Settings 400MB 320MB

ogero it all starts here

ogero it all starts here

POWERED BY NETFLIX

alfa 93% 10:22 AM

ipv6-test.com

ipv6 test

IPv4	Not supported
Address	
Hostname	
ISP	

IPv6 connectivity

IPv6	Supported
Address	2a00:6920:e0ef:ff1e:1cee:917:7168:ad32
Type	Native IPv6
SLAAC	No
ICMP	Filtered
Hostname	None

ogero it all starts here

Ogero Journey with IPv6

- Current Development and Experience
- Roadmap and Challenges
- CDN Services and Infrastructure
- International Submarine Optical Networks
- OGERO/RIPE/ISP IPv6 Task Force
- Moving Forward

ogero
it all starts here

OGERO IPv6 Deployment & Experience

❑ OGERO IPv6 and deployment

- IPv6 for Ogero subscribers – Adoption of Dual-stack + CGNAT
- DHCPv6 – DNSv6
- 215 (70%) DSLAMs are IPv6 ready*
- 220K xDSL subscribers is now connected to IPv6*
- 17K DSL active user, 70K capable user*
- All GPON ONT and all OLTs currently support IPv6
- GC,FB and Netflix cache support IPv6
- Provide IPv6 BGP for the ISPs who request it.

*Information as March 19th, 2019

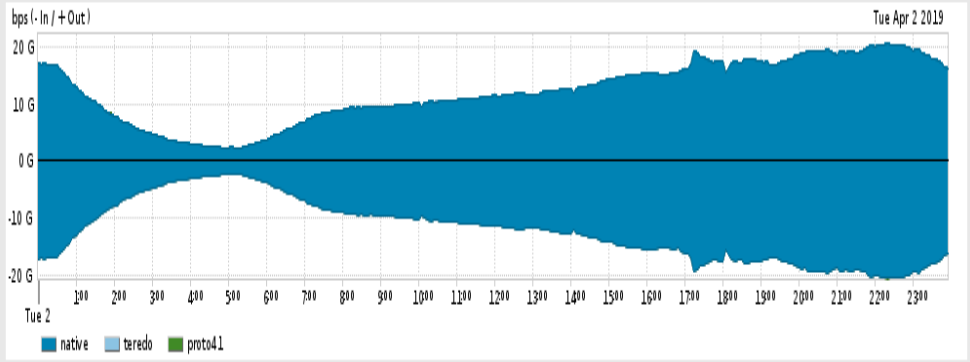
❑ IPv6 Road-Map and Challenges

- Upgrade/replace all legacy Network equipment i.e. DSLAMs /Routers/switches to support IPv6
- Upgrade legacy DSL Modems to support Dual–Stack (IPv4/v6)
- Add all GPON Customers OLT/ONT to support IPv6
- Customer awareness and experience with IPv6
- More ISP to adopt and upgrade infa to support IPv6
- Knowledge Updates and technical training (RIPE)

Current International IPv6 Traffic

24Hrs

This dashboard analyzes IPv6 traffic passing in or out of the network. It includes both native IPv6 traffic as well as tunneled traffic such as Teredo and IP protocol 41 traffic. The IPv6 share of all network traffic is calculated based on the most recent ("Current") measurement.



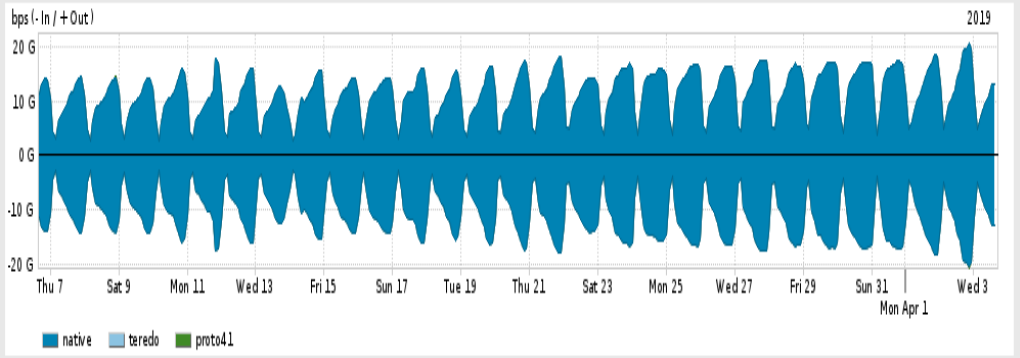
Most Recent IPv6 traffic:	IPv6 share of all network traffic:	Maximum:	Average traffic:	95th Percentile:
32.3 Gbps	9.6%	41.0 Gbps	24.3 Gbps	39.0 Gbps

Number of Customers Using IPv6: **90**

Number of Peers Using IPv6: **4**

1 month

This dashboard analyzes IPv6 traffic passing in or out of the network. It includes both native IPv6 traffic as well as tunneled traffic such as Teredo and IP protocol 41 traffic. The IPv6 share of all network traffic is calculated based on the most recent ("Current") measurement.



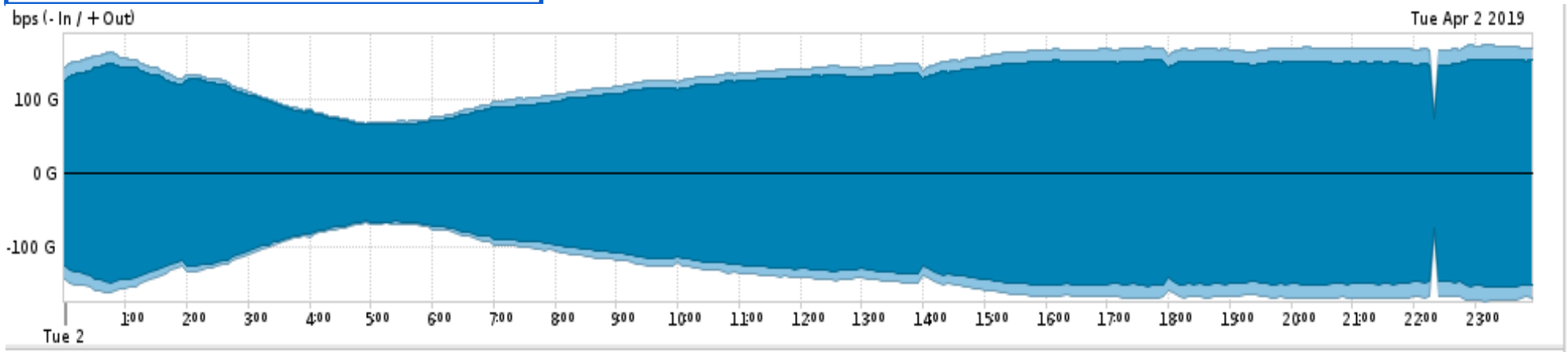
Current IPv6 traffic:	IPv6 share of all network traffic:	Maximum:	Average traffic:	95th Percentile:
0.0 bps	0.000%	41.0 Gbps	22.6 Gbps	34.0 Gbps

Number of Customers Using IPv6: **96**

Number of Peers Using IPv6: **4**

OGERO IPV6 vs. IPV4

Sampled Customer



Select All | Clear All | Update

Average | Max | PCT95

Name	In	Out
IPv4 Summary	125.28 Gbps	125.28 Gbps
IPv6 Summary	12.14 Gbps	12.14 Gbps

International and Local ISP using IPv6

Sample list of Local ISP using IPv6

Name	IPv6 In	IPv6 Out	% of All IPv6
OGERO	12.16 Gbps	12.16 Gbps	100.00%
IDM	4.40 Gbps	4.40 Gbps	36.16%
MIC2 TOUCH	1.53 Gbps	1.53 Gbps	12.61%
SODETEL	1.46 Gbps	1.46 Gbps	12.03%
Facebook Cache IPV6	1.27 Gbps	1.27 Gbps	10.40%
CONNEXIONS	988.72 Mbps	988.72 Mbps	8.13%

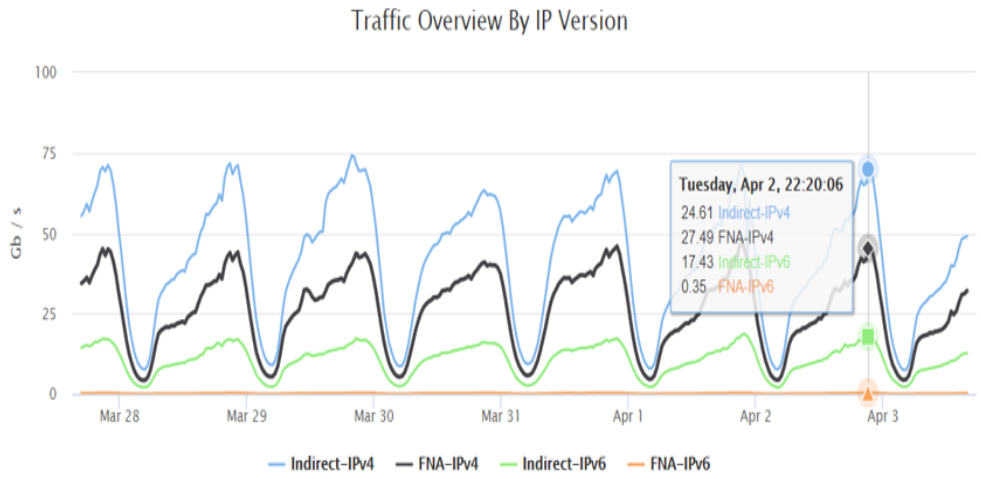
Sample list of Teir-1 Peering using IPv6

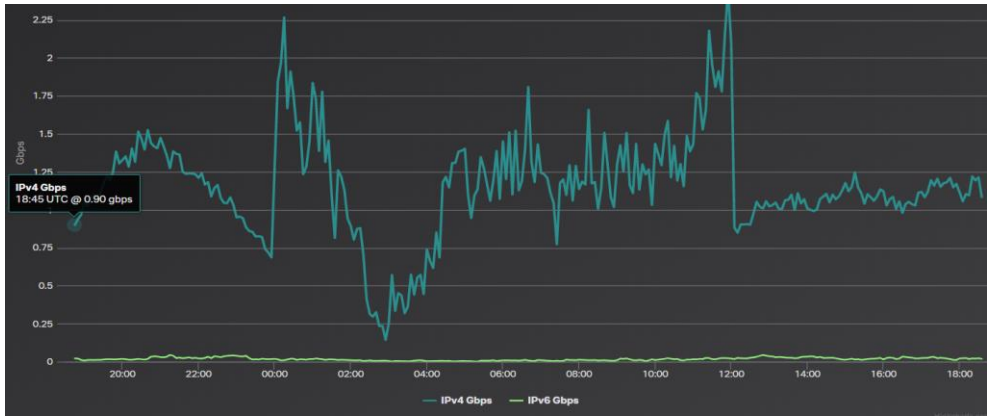
Name	IPv6 In	IPv6 Out	% of All IPv6
LVL3	10.79 Gbps	404.78 Mbps	46.01%
TIS	719.49 Mbps	31.80 Mbps	3.09%
Orange	2.51 Mbps	119.32 Mbps	0.50%
TATA	153.92 Kbps	393.00 bps	0.00%

CDN & New Services

❑ CDN and New Services

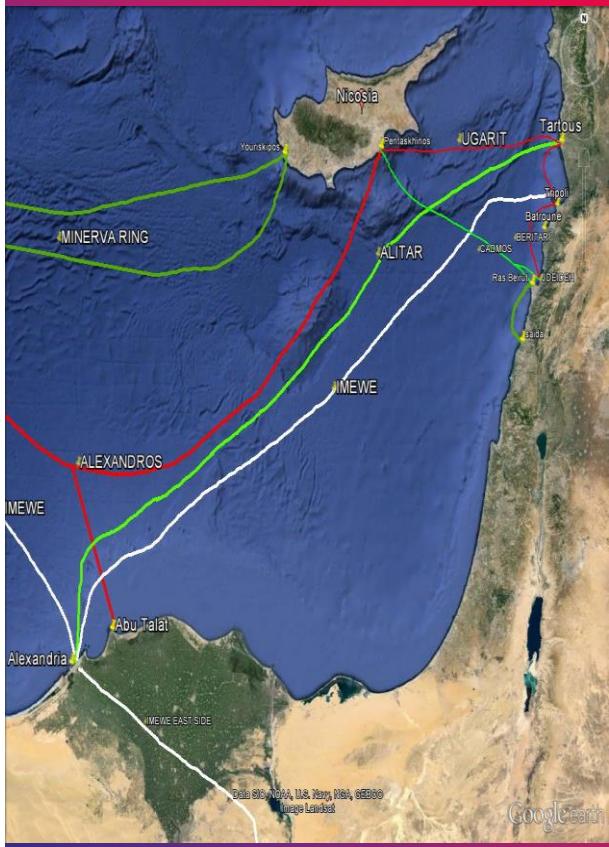
- ✓ Google Cash supports IPV6
- ✓ Facebook (about 18G of IPv6)
- ✓ Netflix
- ✓ Cloude Flare (In progress)
- ✓ VOD and other streaming content (pilot)
- ✓ Next phase to add more CDNs with network optimization for edge distribution
- ✓ DDOS services to ISP and two major mobile operators





❑ International Submarine Optical networks

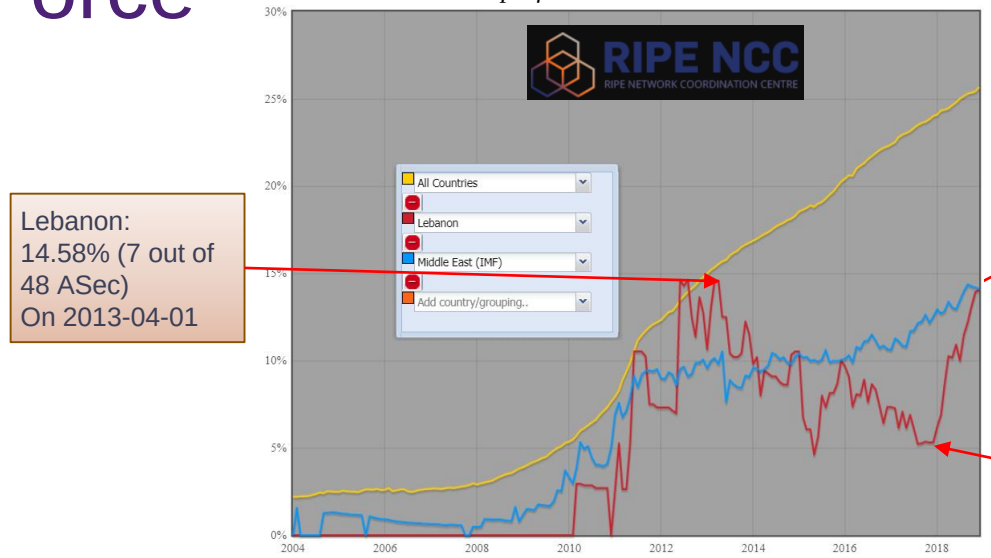
- Upgrade OGERO ISP POP to support multiple of 100G interfaces
- Replace the two (2) IGW with the latest technology (in process)
- Replace 10G with 100G IP peering with Tier-1 providers.
- Add IGWs and ISP POPs for redundancy and load balancing
- Upgrade of IMEWE Submarine to support 3.5 Tb/s
- New Cable system between Lebanon and Cyprus to replace CADMOS
- New Consortium cable System from the East to West passing through Lebanon.
- International Peering with 4 major Teir-1 providers
- Local peering with All Major ISP



❑ IPv6 OGERO/RIPE Task Force

- Ogero and RIPE NCC hold the first meeting in Beirut on July 5th, 2018 and attended by all Lebanese ISPs and enterprises
- Ogero announced the completion of the PILOT and go-live for the IPv6
- Since that date IPv6 growing potentially and more ISP are connected.

This graph shows the percentage of networks (ASes) that announce an IPv6 prefix.



Lebanon:
14.58% (7 out of 48 ASec)
On 2013-04-01

Lebanon:
14.05% (17 out of 121 ASec)
On 2018-12-01

Lebanon:
5.31% (6 out of 113 ASec)
On 2017-11-01

An overview of selected states in the RIPE NCC service region

Country	Number of ASNs	Mumber of LIRs	Number of/22 from last /8	Total Amount of IPV4 Allocated /32s	Total Amount of IPV6 Allocated /32s
TR	636	540	543	16173824	2200
IR	632	441	571	12482560	2049
LB	180	152	147	610304	478
IQ	125	124	113	680192	462
SA	178	132	107	9736704	336
AE	88	94	56	3800576	190
KW	69	45	31	1733632	148
JO	39	40	36	677888	128
PS	54	39	39	672512	113
SY	7	84	97	1174528	75
QA	14	15	10	835584	64
BH	25	19	14	451584	49
YE	5	6	6	110592	48
OM	16	16	17	864256	39

Reference: RIPE NCC

IPV6 Task Force - continue

- Ogero and RIPE will facilitate the next Task force meeting in May 8th 2019 @10AM in Ogero IT Director Meeting room.
- The Top ten IPv6 ISPs will be invited for the meeting to discuss:
  - Experience learned
  - Best practices
  - Internet Exchange (IX)
  - Peering and IX
  - Knowledge transfer

Moving Forward

❑ Moving Forward

- All ISP to request IPv6
- All Enterprise SME to upgrade there IT infra to support IPv6 and request IPv6
- Residential users to upgrade the DSL modems with new IPv6 modems and will have unlimited fixed IP address (IOT devices, IP cams, etc….)
- FTTH/FTTC users to enable IPv6


ogero
it all starts here