

RIPE

IPv6: Is There a Problem?

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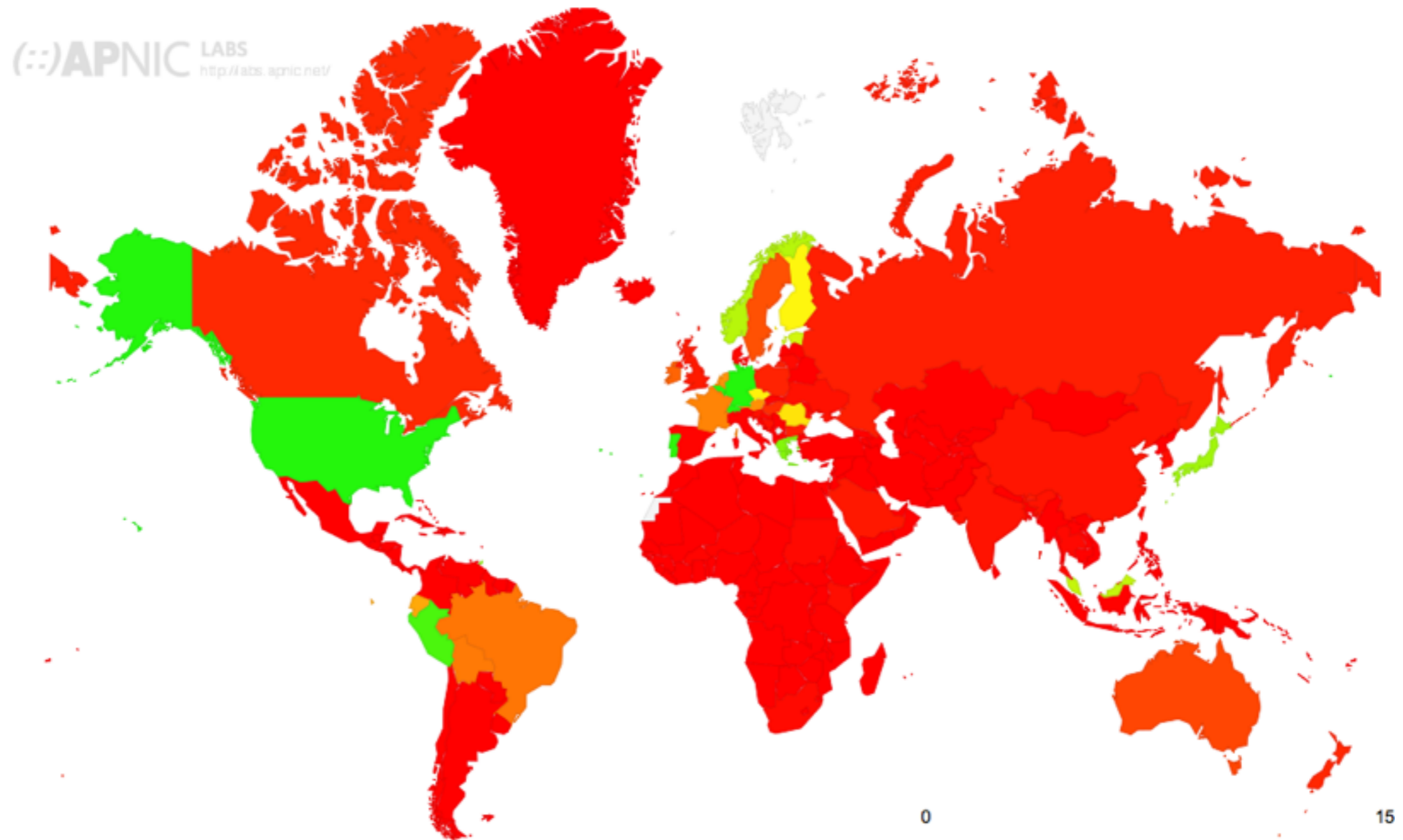


Deploying IPv6 Can Be a Challenge

- You need to re-educate your people
 - Not only the engineers, think of sales and support
- Need to update or modify legacy software
 - Operating systems, network management, billing
- Hardware upgrades such as CPE
- Maintain backwards compatibility
 - Handovers between 4G and 3G/2G (single stacked)
 - Have connectivity to non-IPv6 enabled services



Some People Take the Plunge



Top 20: IPv6 Deployment per Country

BE	41,6 %	MY	9,6 %
US	25,8 %	EE	9,3 %
CH	24,5 %	CZ	8,6 %
DE	21,5 %	SG	8,12 %
PE	14,5 %	RO	7,6 %
PT	14,3 %	FI	7,1 %
LU	14,3 %	FR	5,4 %
GR	10,7 %	EC	4,9 %
NO	10,1 %	AT	4,8 %
JP	9,9 %	BO	4,0 %

Norway levelling out since April 2015

Germany steady growing by about 10% a year

Finland went from 0% to 7% in June

Runners up: NL (3,9%) and Saudi Arabia (2,9%)

Sweden 2,62%, Denmark 0,21%, Iceland 0,14%



Biggest IPv6 Populations

ASN	AS Name	Country	IPv6 Users	% of ASN
AS 7922	Comcast	US	23,269,228	50,9 %
AS 7018	ATT Services INC	US	17,297,256	68,7 %
AS 3320	Deutsche Telekom AG	DE	8,236,671	30,7 %
AS 2516	KDDI	JP	6,968,245	41,2 %
AS 22394	Verizon Wireless	US	3,996,397	88,0 %
AS 31334	Kabel Deutschland	DE	3,568,127	55,8 %
AS 21928	T-mobile USA	US	3,279,632	67,7 %
AS 4134	Chinanet	CN	2,446,331	0,8 %
AS 28573	NET Servios de Comunicao	BR	2,203,469	9,0 %
AS 3303	Swisscom	CH	2,162,207	53,4 %
AS 16086	DNA	FI	295,225	27,8 %
AS 2119	Telenor	NO	228,806	10,3 %
AS 41164	GET	NO	82,720	25,5 %



IPv6 in Norwegian Market

ASN	AS Name	IPv6 Capable	Samples[*]
AS 2119	Telenor Norge AS	9,37 %	132950
AS 39832	Opera Software ASA [**]	81,39 %	89491
AS 29695	Altibox AS	1,58 %	26178
AS 41164	Get AS	26,9 %	22014
AS 15659	NextGenTel AS	0,01 %	16939
AS 2116	Broadnet AS	0,1 %	13715
AS 12929	TeliaSonera Norge	0,0 %	4951
AS 29492	Eidsiva Broadband	0,1 %	2902
AS 224	Norwegian University Research Network	17,3 %	2878
AS 34087	NTE, Bredband Norway	2,2 %	2498

Number of samples is roughly equivalent to market share

[*] Measurements use Flash and are slightly biased against IOS devices (mobile)

[**] Opera is global, people using browser get measured as Norwegian



Making the Difference

- Having market leaders on board makes all the difference:
 - Provides large amounts off IPv6 users
 - Set an example to the others
 - Might also enable wholesale/MVNO products
- Put IPv6 on the radar of other players
 - Enable them to find a business case
 - Proof technology works in mass market deployments



Is Doing IPv6 Really Enough?

Altiboc

```
inetnum:  
netname:  
descr:  
country:  
org:  
admin-c:  
tech-c:  
status:  
mnt-by:  
mnt-lower  
mnt-domai  
mnt-route  
created:  
last-modi  
source:
```



The UK's government network uses addresses owned by the Department for Work and Pensions

The UK government has started selling off internet addresses that it no longer uses.

The first group of 150,000 addresses has been snapped up by a Norwegian firm called Altibox for about £600,000.

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Double Edged Sword

- Despite investments in IPv6 companies are forced to keep investing in IPv4
 - Caused by non-alignment of efforts
- We need to encourage others to deploy IPv6
 - Sharing knowledge
 - Agree on milestones

Role of Public Sector

- “Critical” websites are not IPv6 enabled:
 - <http://www.altinn.no/>
 - <http://www.regjeringen.no/>
 - <http://www.skatteetaten.no/>
- “I can’t file my taxes using IPv6”
 - Which forces me to keep IPv4
- **Altinn** would be the single web-site with highest impact on the IT industry in Norway - due to all the integrations.

www.nkom.no is an alias for nkom.no.
nkom.no has address 80.232.10.2
nkom.no has IPv6 address 2a02:228:105:d000::10



2 suggested actions

- ISP project to enable IPv6 offering from all major ISPs
- Coordination project on public sector - as suggested by DiFi

Questions?

