



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

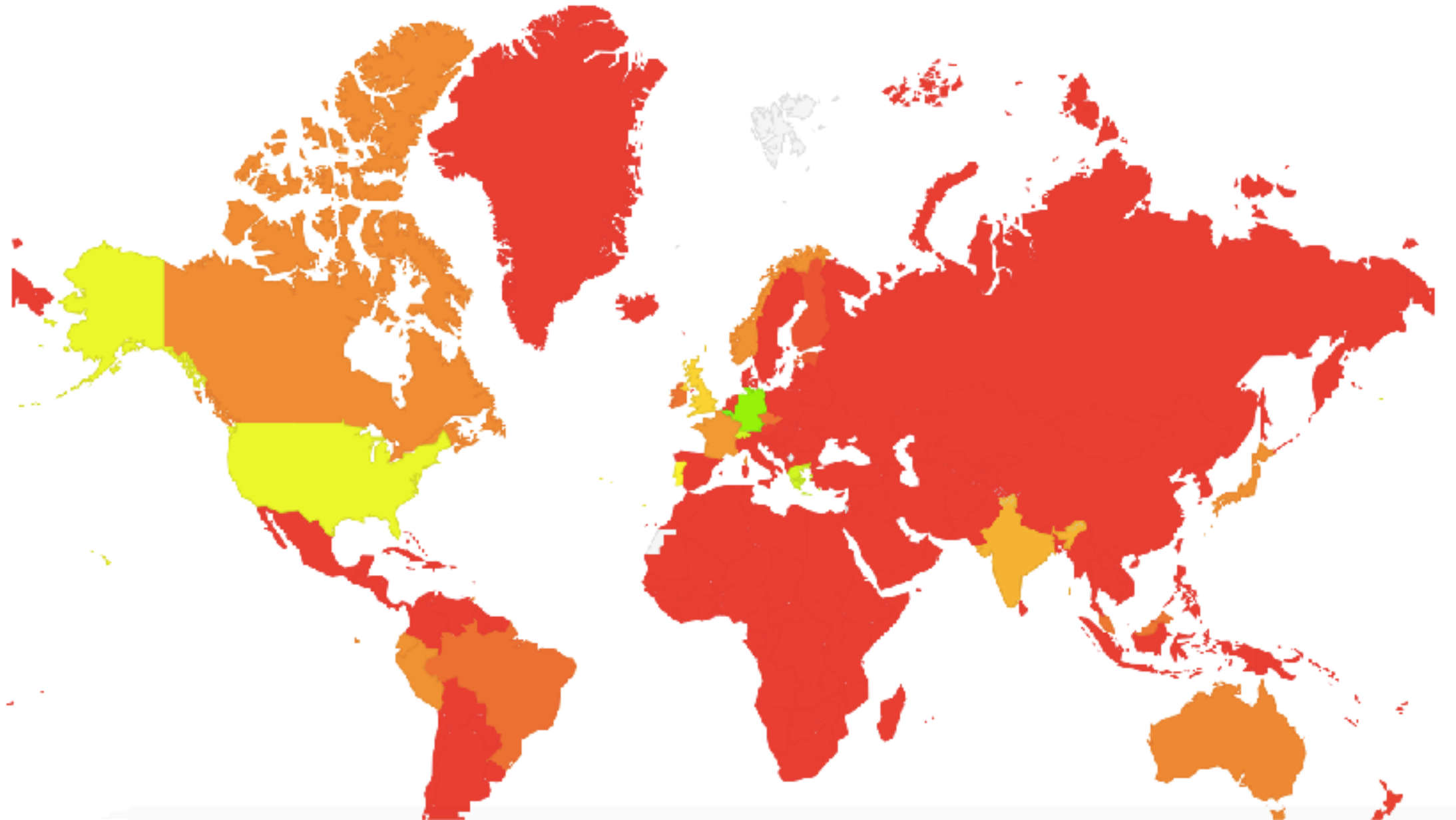
How to upgrade a country?

IPv6 in Sweden

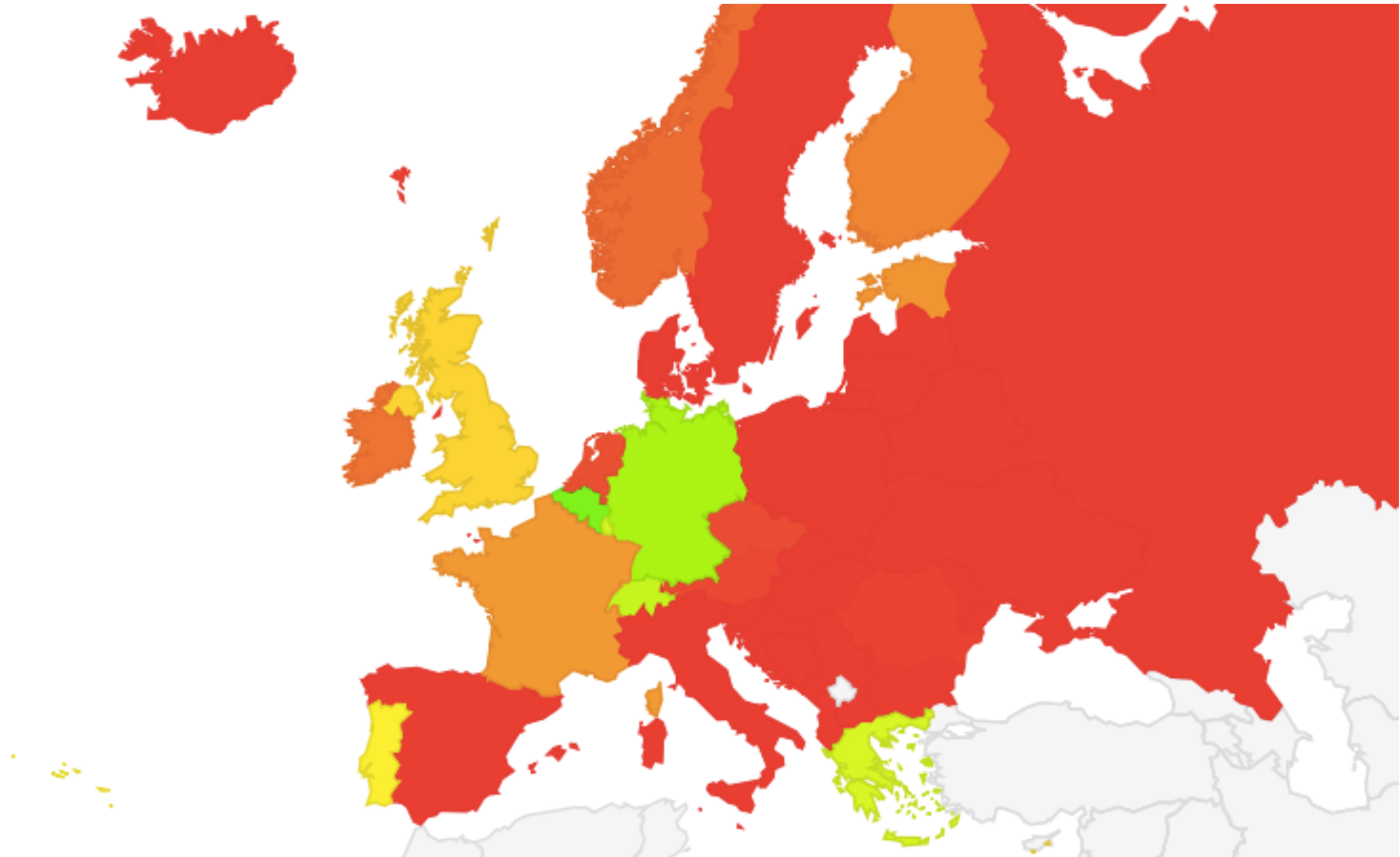
IPv6 In The World



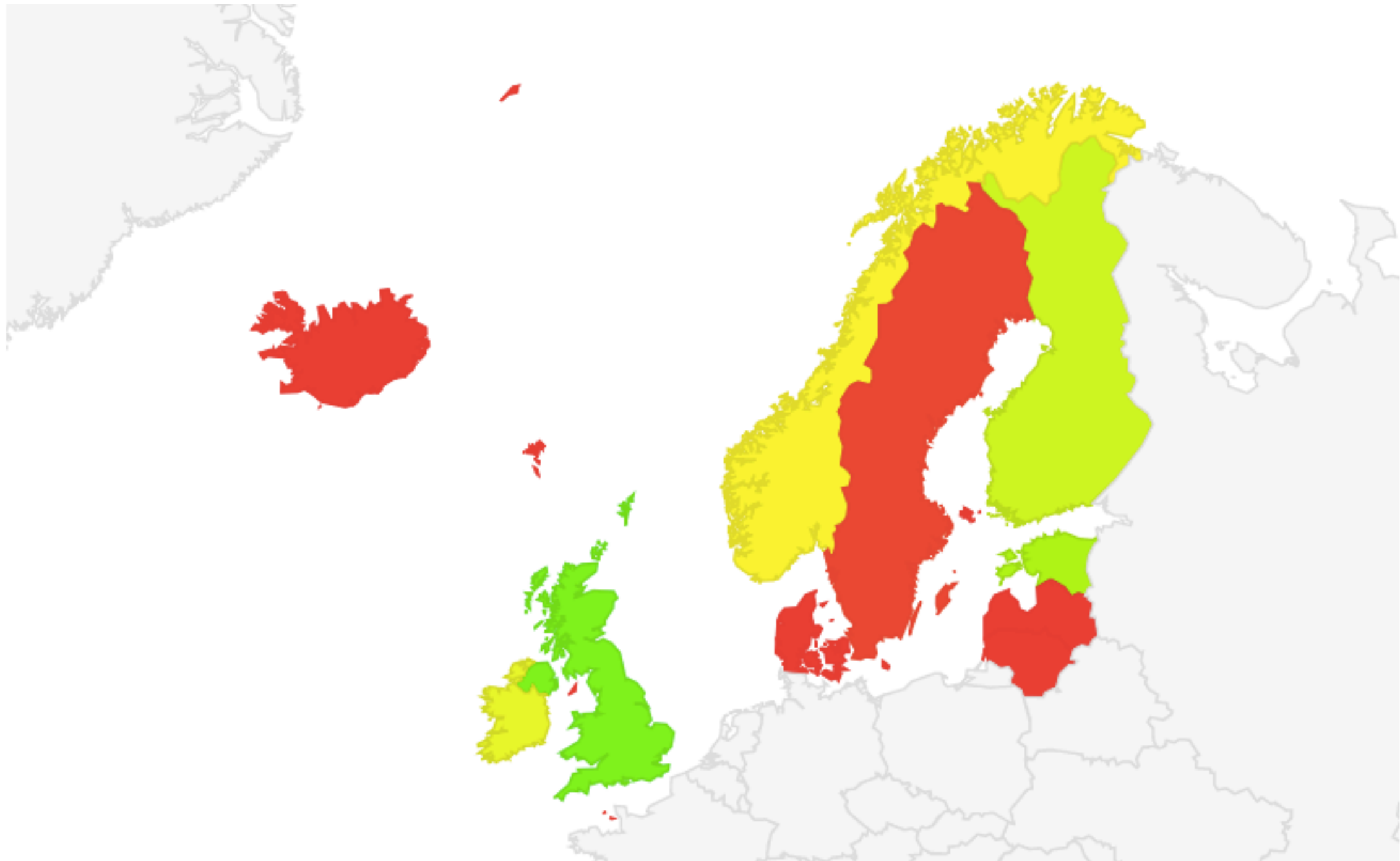
IPv6 Capable Rate by country (%)



Europe



Northern Europe





You came second...

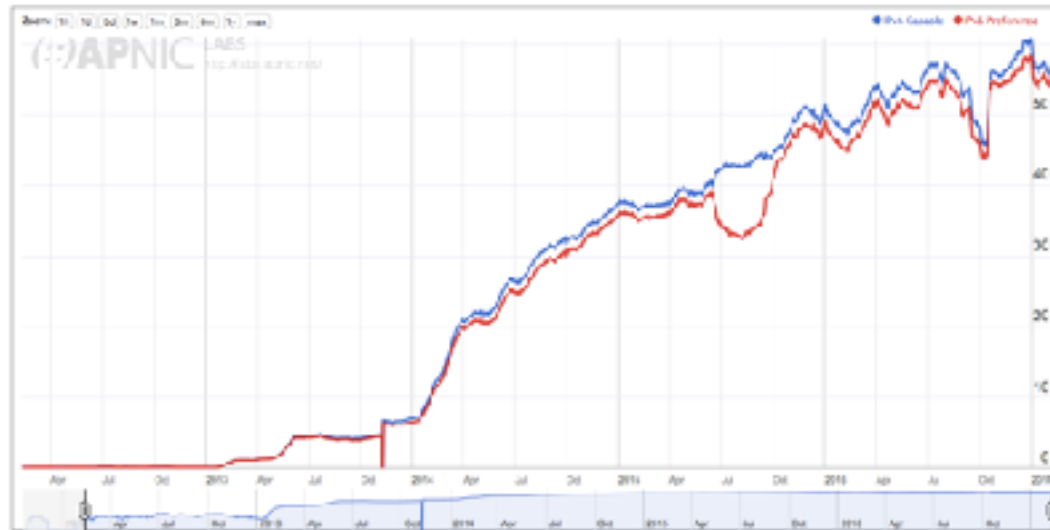


Finland 15.82%
Norway 13.25%
Sweden 4.05%
Denmark 3.49%

Up And To The Right



Use of IPv6 for Belgium (BE)



Use of IPv6 for Netherlands (NL)



Use of IPv6 for United Kingdom of Great Britain and Northern Ireland (GB)



Use of IPv6 for Greece (GR)



Swedish Market



Use of IPv6 for Sweden (SE)



There is a lot of IPv6 in Sweden

ASN	AS Name	IPv6 Capable ▼	IPv6 Preferred	Samples
AS198008	RK Regeringskansliet	100.00%	0.00%	302
AS47708	SVERIGES-RADIO Sveriges Radio AB	93.51%	0.00%	77
AS25252	VOLVOIT Volvo Information Technology AB	93.02%	0.00%	2,222
AS2839	Kungliga Tekniska Hogskolan	90.83%	87.97%	349
AS52173	MAKONIX Makonix SIA	76.37%	75.08%	1,786
AS42708	PORTLANE Portlane AB	66.06%	52.02%	14,473
AS21503	ARETE-AS Availo Networks AB	59.92%	0.00%	242
AS1257	TELE2	58.83%	54.02%	166,217
AS2842	Goteborgs universitet	40.60%	40.17%	468
AS197595	OBENETWORK Obenetwork AB	30.15%	21.92%	2,003
AS21321	ARETI-AS Areti Internet Ltd.	25.16%	0.00%	5,957
AS29672	STEK-AS St Erik Kommunikation AB	24.95%	0.00%	1,479
AS48514	CSB Stiftelsen Chalmers Studenthem	15.43%	15.31%	849
AS39351	ESAB-AS 31173 Services AB	8.80%	0.88%	341
AS60213	HNET-OVAN Helsinge Net Ovanaker AB	7.29%	7.29%	329
AS18978	ENZUINC-US - Enzu Inc	6.00%	2.00%	50
AS2843	LIUNET Linkopings Universitet	5.77%	5.62%	641
AS2833	SUNET-UMU Umea Universitet	5.59%	4.95%	465
AS1653	SUNET SUNET Swedish University Network	5.21%	3.59%	6,405
AS60729	ZWIEBELFREUNDE Zwiebelfreunde e.V.	4.51%	1.29%	466

Swedish Market



Use of IPv6 for Sweden (SE)



Top 3 combined are 10 times bigger than the 4th on this list

ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples ▼
AS3301	TELIANET-SWEDEN TeliaSonera AB	1.72%	1.61%	935,959
AS39651	COMHEM-SWEDEN Com Hem AB	0.05%	0.01%	596,862
AS2119	TELENOR-NEXTEL Telenor Norge AS	0.05%	0.01%	490,669
AS8473	BAHNHOF Bahnhof Internet AB	0.16%	0.13%	204,485
AS1257	TELE2	58.83%	54.02%	166,217
AS29518	BREDBAND2 Bredband2 AB	0.09%	0.06%	157,772
AS44581	SE-ALLTELE AllTele Allmänna Svenska Telefonaktiebolaget	0.16%	0.12%	122,517
AS33885	OWNIT Ownit Broadband AB	0.34%	0.31%	74,220
AS44034	HI3G Hi3G Access AB	0.02%	0.01%	72,864
AS28908	T3 Telecom3 Sverige AB	0.03%	0.02%	54,406
AS25169	TELENOR-SE-AS Telenor Sverige AB	0.04%	0.00%	45,511
AS21250	TYFON Tyfon	0.01%	0.00%	24,700

Size Matters

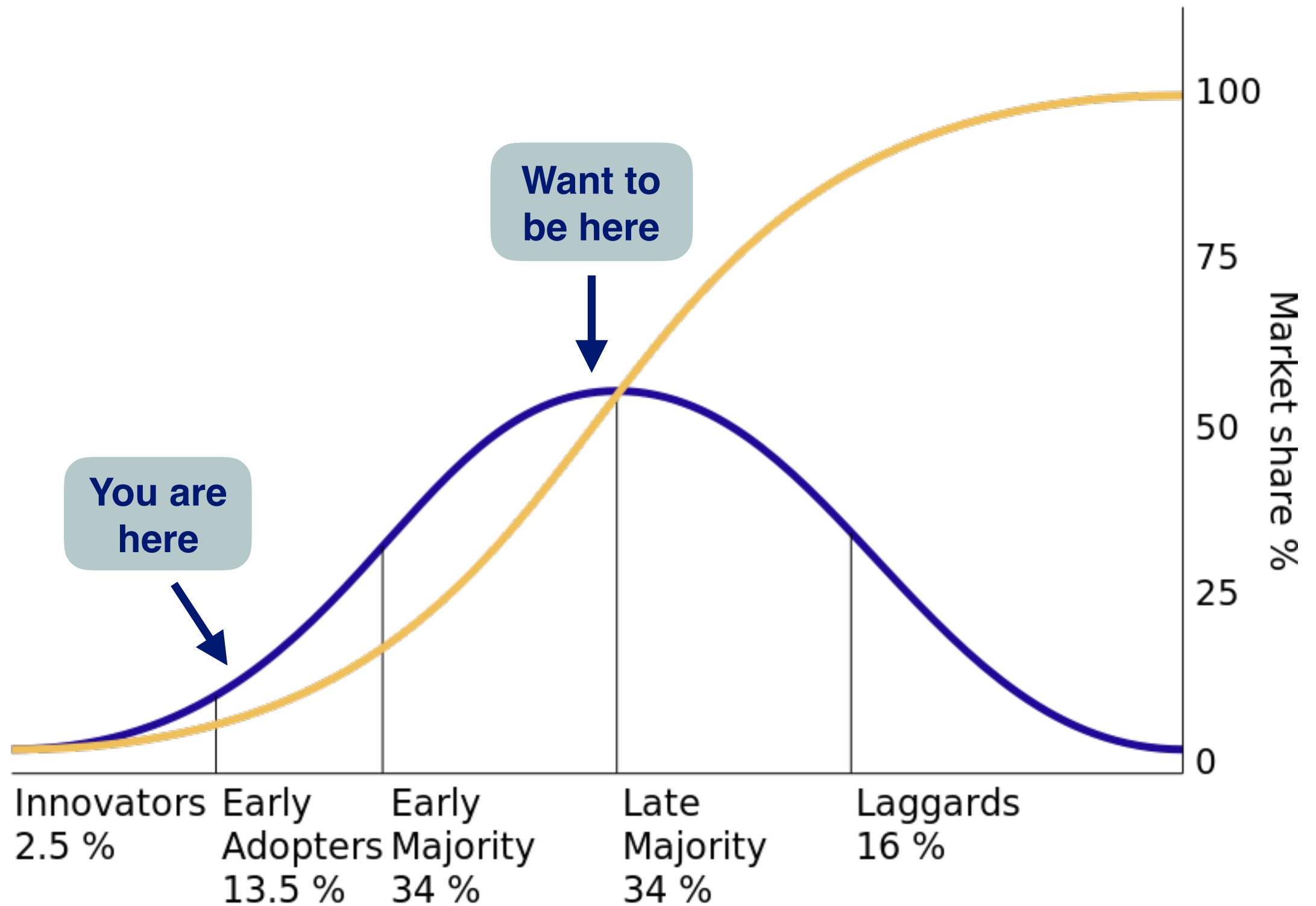


ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples
AS6799	CTENET-GR Ote SA (Hellenic Telecommunications Organisation)	56.83%	55.94%	2,307,317
AS1241	FORTHNET-GR Forthnet	55.27%	54.34%	908,961
AS3329	HOL-GR hellas online Electronic Communications S.A.	0.06%	0.05%	787,029
AS25472	EVERGY-AS TELLAS Telecommunication Services S.A.	0.01%	0.01%	628,593
AS6866	CYTA-NETWORK Cyprus Telecommunications Authority	0.03%	0.05%	512,045
ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples
AS2856	BT-UK-AS British Telecommunications PLC	11.13%	10.70%	3,033,636
AS5607	BSKYB-BROADBAND-AS Sky UK Limited	89.16%	86.26%	2,989,658
AS5089	NTL Virgin Media Limited	0.01%	0.00%	2,711,521
AS9105	TISCALI-UK Tiscali UK Limited	0.00%	0.00%	608,975
AS12576	ORANGE-PCS EE Limited	0.10%	0.05%	545,809
ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples
AS5432	BELGACOM-SKynet-AS Proximus NV	49.41%	47.43%	1,782,461
AS6848	TELENET-AS Telenet N.V.	77.44%	75.42%	1,116,229
AS12392	ASBRUTELE Brutele SC	78.42%	76.60%	430,030
AS21502	ASN-NUMERICABLE NC Numericable S.A.	0.01%	0.01%	124,705
AS47377	MES Mobistar SA	0.15%	0.06%	77,435
AS2611	BELNET BELNET	8.95%	7.72%	33,710
ASN	AS Name	IPv6 Capable	IPv6 Preferred	Samples
AS1136	KPN KPN B.V.	16.97%	16.57%	2,026,990
AS9143	ZIGGO Ziggo B.V.	7.72%	7.17%	1,582,116
AS6830	LGLIPC Liberty Global Operations B.V.	5.90%	5.68%	1,020,219
AS13127	VERSATEL Tele 2 Nederland B.V.	0.01%	0.00%	362,712
AS50266	WIERICKE Vodafone Libertel B.V.	0.00%	0.00%	247,752
AS16435	KABELFOON CAIW Dionsen B.V.	0.01%	0.01%	239,922
AS5390	EURONET Euronet Communications B.V.	0.01%	0.01%	224,549
AS3265	XS4ALL-NL XS4ALL Internet BV	83.03%	80.49%	180,753
AS5615	TISNL-BACKBONE KPN B.V.	0.01%	0.01%	134,714
AS12871	NL-CONCEPTS KPN B.V.	0.67%	0.65%	95,105
AS15542	ZEELANDNET ZeelandNet BV	7.32%	6.79%	74,244
AS39309	EDIJTEL-AS Edutel B.V.	0.82%	0.78%	53,623



The challenge

Theory: “Diffusion”





Incentivise the Market Leaders?



- Financial pressure
 - Increase in revenue or profit margin
- Competitive pressure
 - Feature parity to not be left behind
- Public pressure
 - Name and shame them
- Regulatory pressure
 - If you have no choice left...

Financial Pressure



- IPv6 remains a hard business case
 - Substantial investments can be required
 - Software licenses for various systems
 - OSS/BSS changes (volume based billing)
 - Replacing large amounts of CPE
 - Core networks are less of a problem
- IPv4 is getting more expensive as well

Competitive Pressure



- Seen this work in many countries
 - Once you have one big deployment
 - But you still need one of them to move
- Side effects to other sectors
 - Content usually follows the eye balls
 - Gives people a chance to circumvent IPv4/CGN

Public Pressure



- Measurements providing transparency
 - Who has and who hasn't?
- Most customers do not have a choice
 - Make them aware of the issues with IPv4 and NAT

Regulatory Pressure



- Regulate where you must...
 - Some people call this market failure
- IPv4 address sharing is causing issues
 - LEA is already asking for a ban on CGN
- In Belgium a voluntary approach worked:
 - Code of Conduct with major access providers
 - Maximum of 16 users behind a single IPv4 address
 - 60% of the users now has a working IPv6 address

Thank you

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