



IPv6 Day Denmark

seen from AS1835



Who am I ?
What did I do ?
What do I do ?

- ## Making IPv6 Happen
- * Making a Business case *
 - * Exploring the market *
 - * Developing the product *



How did we actually deploy .. ipv6 In a live network



Is it used ?



```
$ nfdump -r ly0/nfcapd.201711011115 -s proto/bytes 'inet'
```

```
Top 10 Protocol ordered by bytes:
```

Date first seen	Duration	Proto	Protocol	Flows(%)	Packets(%)	Bytes(%)	pps	bps	bpp
2017-11-01 10:48:48.036	1867.839	TCP		6	7.2 M(77.5)	314.0 M(84.7)	174.9 G(83.3)	168088	749.1 M 557
2017-11-01 11:14:11.356	344.522	UDP		17	2.0 M(21.6)	34.3 M(9.2)	16.0 G(7.6)	99428	371.9 M 467
2017-11-01 11:14:32.514	323.367	ESP		50	5580(0.1)	17.2 M(4.6)	15.0 G(7.1)	53070	370.5 M 872
2017-11-01 11:14:49.615	301.331	L2TP		115	58(0.0)	4.8 M(1.3)	3.9 G(1.9)	15968	103.1 M 807
2017-11-01 10:45:36.424	2059.335	GRE		47	1055(0.0)	266502(0.1)	77.3 M(0.0)	129	300381 290
2017-11-01 11:14:32.514	323.300	ICMP		1	71128(0.8)	205467(0.1)	17.5 M(0.0)	635	432062 84
2017-11-01 11:14:35.021	313.212	IPv6		41	95(0.0)	465(0.0)	41456(0.0)	1	1058 89
2017-11-01 10:48:51.856	1851.535	OSPF		89	24(0.0)	264(0.0)	22304(0.0)	0	96 84
2017-11-01 11:14:42.800	297.856	PIM		103	47(0.0)	57(0.0)	3152(0.0)	0	84 55
2017-11-01 11:14:47.152	289.744	IGMP		2	55(0.0)	70(0.0)	2240(0.0)	0	61 32

```
Summary: total flows: 9243575, total bytes: 209874049664, total packets: 370663486, avg bps: 815259749, avg pps: 179981, avg bpp: 566
```

```
Time window: 2017-11-01 10:43:57 - 2017-11-01 11:19:56
```

```
Total flows processed: 9602543, Blocks skipped: 0, Bytes read: 623185524
```

```
Sys: 2.670s flows/second: 3596367.8 Wall: 2.689s flows/second: 3569723.9
```

```
$ nfdump -r ly0/nfcapd.201711011115 -s proto/bytes 'inet6'
```

```
Top 10 Protocol ordered by bytes:
```

Date first seen	Duration	Proto	Protocol	Flows(%)	Packets(%)	Bytes(%)	pps	bps	bpp
2017-11-01 11:03:28.259	988.711	TCP		6	128696(35.9)	10.7 M(87.6)	8.4 G(87.2)	10857	68.3 M 785
2017-11-01 10:43:57.054	2144.391	UDP		17	218736(60.9)	1.5 M(12.1)	1.2 G(12.7)	689	4.6 M 834
2017-11-01 11:05:48.974	832.417	ICMP6		58	11227(3.1)	35442(0.3)	7.9 M(0.1)	42	76209 223
2017-11-01 11:09:59.076	572.464	ESP		50	65(0.0)	4250(0.0)	1.8 M(0.0)	7	24862 418
2017-11-01 11:14:55.934	284.932	NOHE6		59	244(0.1)	409(0.0)	18814(0.0)	1	528 46

```
Summary: total flows: 358968, total bytes: 9679675603, total packets: 12253388, avg bps: 35852044, avg pps: 5673, avg bpp: 789
```

```
Time window: 2017-11-01 10:43:57 - 2017-11-01 11:19:56
```

```
Total flows processed: 9602543, Blocks skipped: 0, Bytes read: 623185524
```

```
Sys: 2.213s flows/second: 4339083.2 Wall: 2.217s flows/second: 4329430.7
```



```
$ nfdump -r ly0/nfcapd.201711011115 -s srcas/bytes 'inet'
```

Top 10 Src AS ordered by bytes:

Date first seen	Duration	Proto	Src AS	Flows(%)	Packets(%)	Bytes(%)	pps	bps	bpp
2017-11-01 11:14:49.335	306.531	any	8068	351069(3.8)	47.3 M(12.8)	31.5 G(15.0)	154460	822.2 M	665
2017-11-01 11:14:32.790	322.027	any	65022	1.3 M(13.7)	47.2 M(12.7)	27.3 G(13.0)	146623	679.4 M	579
2017-11-01 11:14:32.757	322.975	any	64513	1.4 M(15.3)	70.4 M(19.0)	18.9 G(9.0)	218002	469.3 M	269
2017-11-01 11:14:40.640	315.238	any	8075	1.3 M(14.5)	28.8 M(7.8)	18.7 G(8.9)	91478	474.4 M	648
2017-11-01 10:45:36.424	2059.425	any	23456	452024(4.9)	18.1 M(4.9)	18.5 G(8.8)	8798	71.8 M	1019
2017-11-01 11:14:14.032	341.849	any	31027	139576(1.5)	12.0 M(3.2)	12.6 G(6.0)	35097	295.1 M	1051
2017-11-01 11:14:49.335	306.526	any	13335	196409(2.1)	9.5 M(2.6)	11.0 G(5.3)	31122	288.0 M	1156
2017-11-01 11:14:32.513	321.399	any	42236	182965(2.0)	13.5 M(3.6)	10.2 G(4.9)	41902	253.7 M	756
2017-11-01 11:14:32.811	322.824	any	65103	424783(4.6)	14.3 M(3.9)	8.8 G(4.2)	44425	217.6 M	612
2017-11-01 11:14:32.758	322.982	any	65106	414520(4.5)	18.7 M(5.0)	8.4 G(4.0)	57914	208.5 M	449

Summary: total flows: 9243575, total bytes: 209874049664, total packets: 370663486, avg bps: 815259749, avg pps: 179981, avg bpp: 566

Time window: 2017-11-01 10:43:57 - 2017-11-01 11:19:56

Total flows processed: 9602543, Blocks skipped: 0, Bytes read: 623185524

Sys: 4.327s flows/second: 2219059.0 Wall: 5.051s flows/second: 1900955.7

```
$ nfdump -r ly0/nfcapd.201711011115 -s srcas/bytes 'inet'
```

Top 10 Src AS ordered by bytes:

Date first seen	Duration	Proto	Src AS	Flows(%)	Packets(%)	Bytes(%)	pps	bps	bpp
2017-11-01 10:43:57.054	2159.916	any	0	358968(100.0)	12.3 M(100.0)	9.7 G(100.0)	5673	35.9 M	789

Summary: total flows: 358968, total bytes: 9679675603, total packets: 12253388, avg bps: 35852044, avg pps: 5673, avg bpp: 789

Time window: 2017-11-01 10:43:57 - 2017-11-01 11:19:56

Total flows processed: 9602543, Blocks skipped: 0, Bytes read: 623185524

Sys: 3.479s flows/second: 2759659.9 Wall: 3.492s flows/second: 2749519.5



Working with a dual stack network

.. does it matter ?



Customer reactions: The good, the bad and the ugly



Network reactions: The good, the bad and the ugly



?