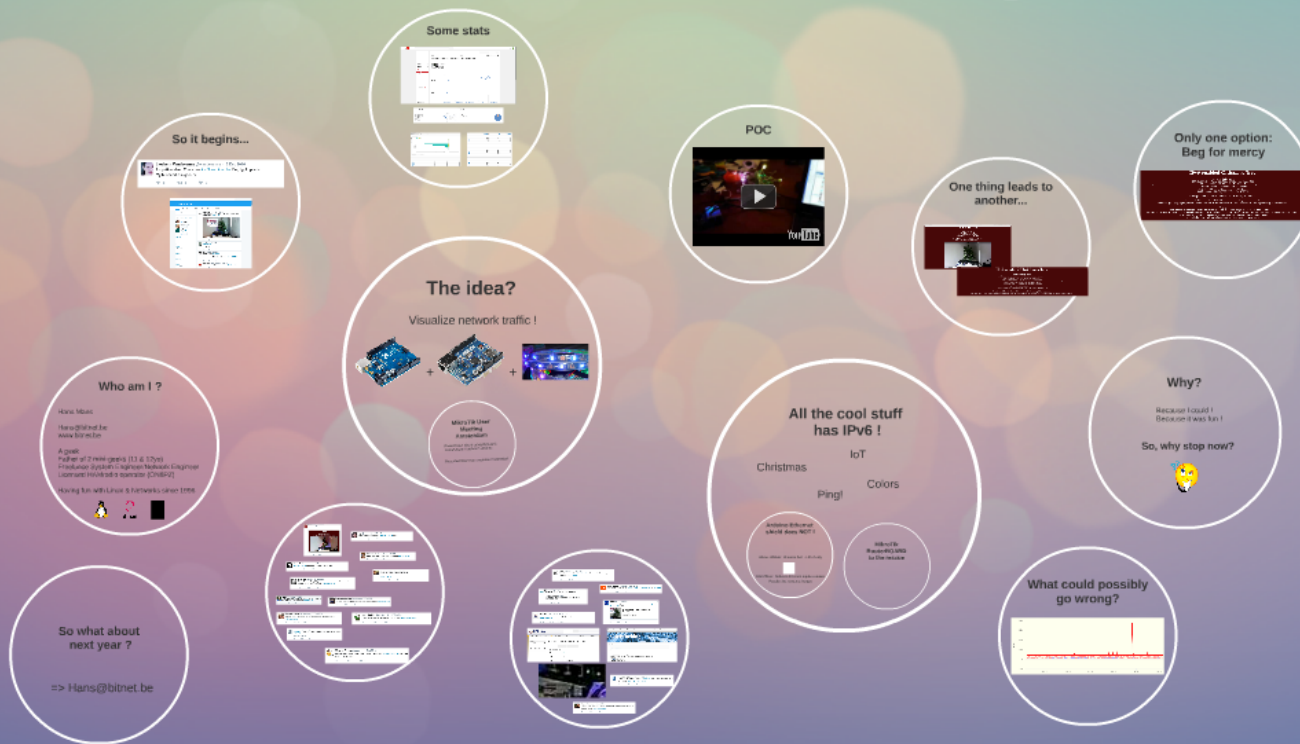
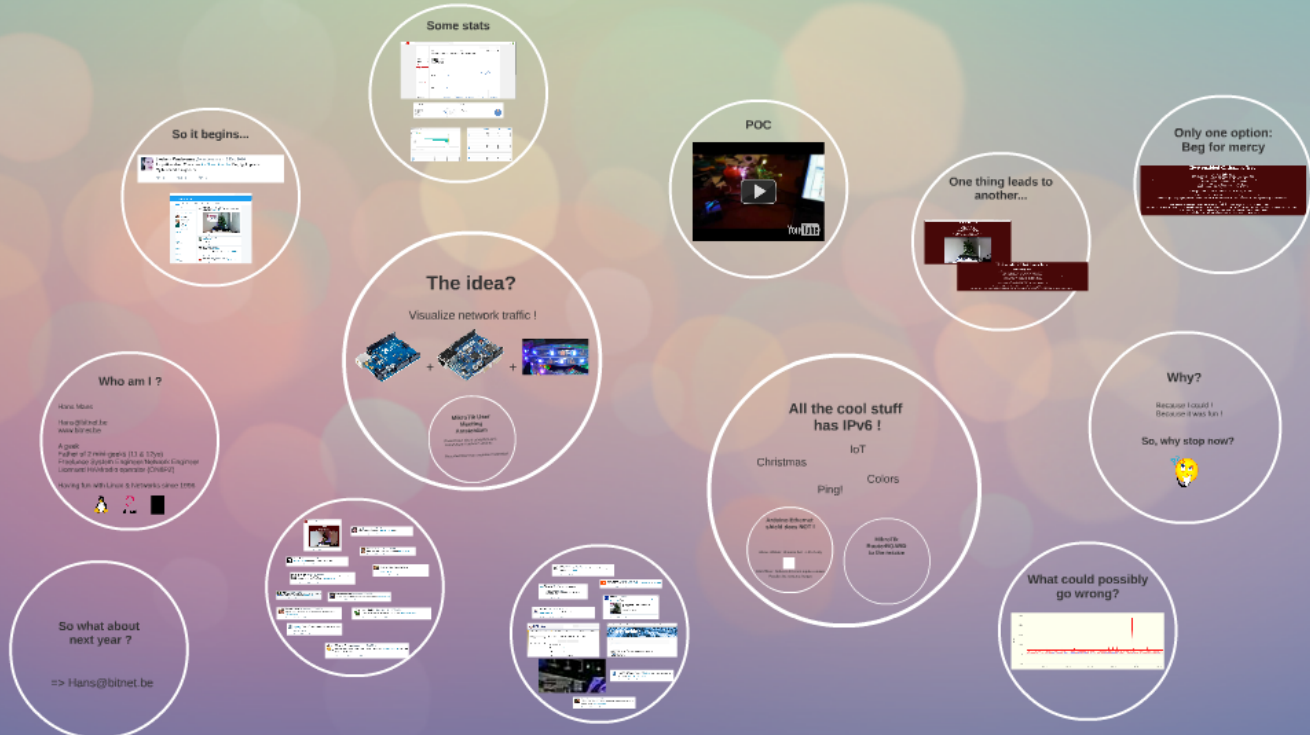


IPv6 Christmas Tree Project



www.bitnet.be - Hans@bitnet.be

IPv6 Christmas Tree Project



www.bitnet.be - Hans@bitnet.be

Who am I ?

Hans Maes

Hans@bitnet.be
www.bitnet.be

A geek

Father of 2 mini-geeks (11 & 12yo)

Freelance System Engineer/Network Engineer

Licensed HAMradio operator (ON8PZ)

Having fun with Linux & Networks since 1996



The idea?

Visualize network traffic !



MikroTik User Meeting Amsterdam

Presentation about category based
firewalling on RouterOS devices

Recorded livestream available if interested



Why?

Because I could !
Because it was fun !

So, why stop now?



All the cool stuff has IPv6 !

IoT

Christmas

Colors

Ping!

**Arduino Ethernet
shield does NOT !**



Wiznet W5100 : Ethernet SoC -> IPv4 only



ENC28J60 : Software Ethernet implementation
Possible but resource hungry

**MikroTik
RouterBOARD
to the rescue**



Arduino Ethernet shield does NOT !



Wiznet W5100 : Ethernet SoC -> IPv4 only



ENC28J60 : Software Ethernet implementation
Possible but resource hungry

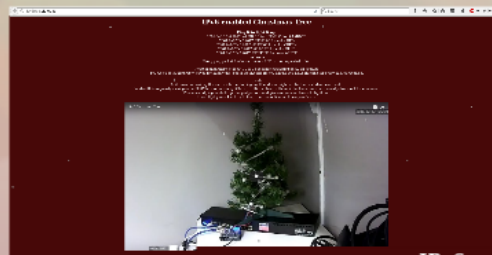
MikroTik RouterBOARD to the rescue



POC



One thing leads to another...



IPv6 enabled Christmas Tree

Ping it to light it up!
2001:6a8:28c0:2017::AA:BB:CC for HTML Color #AABBCC
2001:6a8:28c0:2017::FF:00:00 for color RED
2001:6a8:28c0:2017::00:FF:00 for color GREEN
2001:6a8:28c0:2017::00:00:FF for color BLUE
2001:6a8:28c0:2017::FF:FF:FF for color WHITE

send on...

Every ping packet flashes a random LED in the requested color.

Keep in mind there is about 10 to 15 seconds streaming delay on youtube

You won't get a ping reply (saves me bandwidth) but in the livestream you should see LEDs flashing for every packet received.

IPv6 enabled Christmas Tree

Ping it to light it up!

2001:6a8:28c0:2017::AA:BB:CC for HTML, Color #AABBCC
2001:6a8:28c0:2017::FF:00:00 for color RED
2001:6a8:28c0:2017::00:FF:00 for color GREEN
2001:6a8:28c0:2017::00:00:FF for color BLUE
2001:6a8:28c0:2017::FF:FF:FF for color WHITE
... and so on...

Every ping packet flashes a random LED in the requested color.

Keep in mind there is about 10 to 15 seconds streaming delay on youtube
You won't get a ping reply (saves me bandwidth) but in the livestream you should see LEDs flashing for every packet received.

Update:

As it turns out inviting the entire internet to ping my IP address might not be the best idea I ever had...
Bandwidth is regularly maxing out at 300MBits of incoming ICMPv6 traffic, so bear with me if the livestream occasionally drops out for a moment.
Please avoid pingfloods for prolonged periods and give everyone a chance to try it out.
If we all play nice I will try to keep the tree online until new year's eve.



IPv6 enabled Ch

Ping it to ligh

2001:6a8:28c0:2017::AA:BB:CC f
2001:6a8:28c0:2017::FF:0
2001:6a8:28c0:2017::00:FF
2001:6a8:28c0:2017::00:0
2001:6a8:28c0:2017::FF:FF
and so c

... out limiting the entire internet to ping my IP address might not be the best idea I ever had...
... out at 300Mbps of incoming ICMPv6 traffic, so bear with me if the livestream occasionally drops out for a moment.
Please avoid pingfloods for prolonged periods and give everyone a chance to try it out.
If we all play nice, I will try to keep the tree online until new year's eve.



IPv6 enabled Christmas Tree

Ping it to light it up!

- 2001:6a8:28c0:2017::AA:BB:CC for HTML Color #AABBCC
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- 2001:6a8:28c0:2017::00:00:FF for color BLUE
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* ... and so on...

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Home Notifications Messages ipv6tree.bitnet.be

ipv6tree.bitnet.be

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- #thevoicebe** 1,276 Tweets
- Brussel** 1,268 Tweets
- #RMAFCB** 65.6K Tweets
- #terzaketv**
- Vidal** 51.1K Tweets
- #goedvolk**
- #topdokters**
- #deafpraak**
- #LEIATL** 1,571 Tweets
- #ShoppingQueens**

Citrix NetScaler @NetScaler · 26 Dec 2016
Want to hold on to the holidays? Here's an IPV6-enabled Christmas tree you can ping to light up. buff.ly/2i29oEv



↻ 5 ♥ 7

ぼり @bori_so1 · 26 Dec 2016
ipv6tree.bitnet.be
RouterBoardだ w

↻ ♥ 1

Geeek @rGeeek · 23 Dec 2016
Retweeted MikroTik (@mikrotik_com):
IPv6 ping can control lights on this christmas tree (via #RouterBOARD of... fb.me/1jBB2U6zU)

↻ ♥

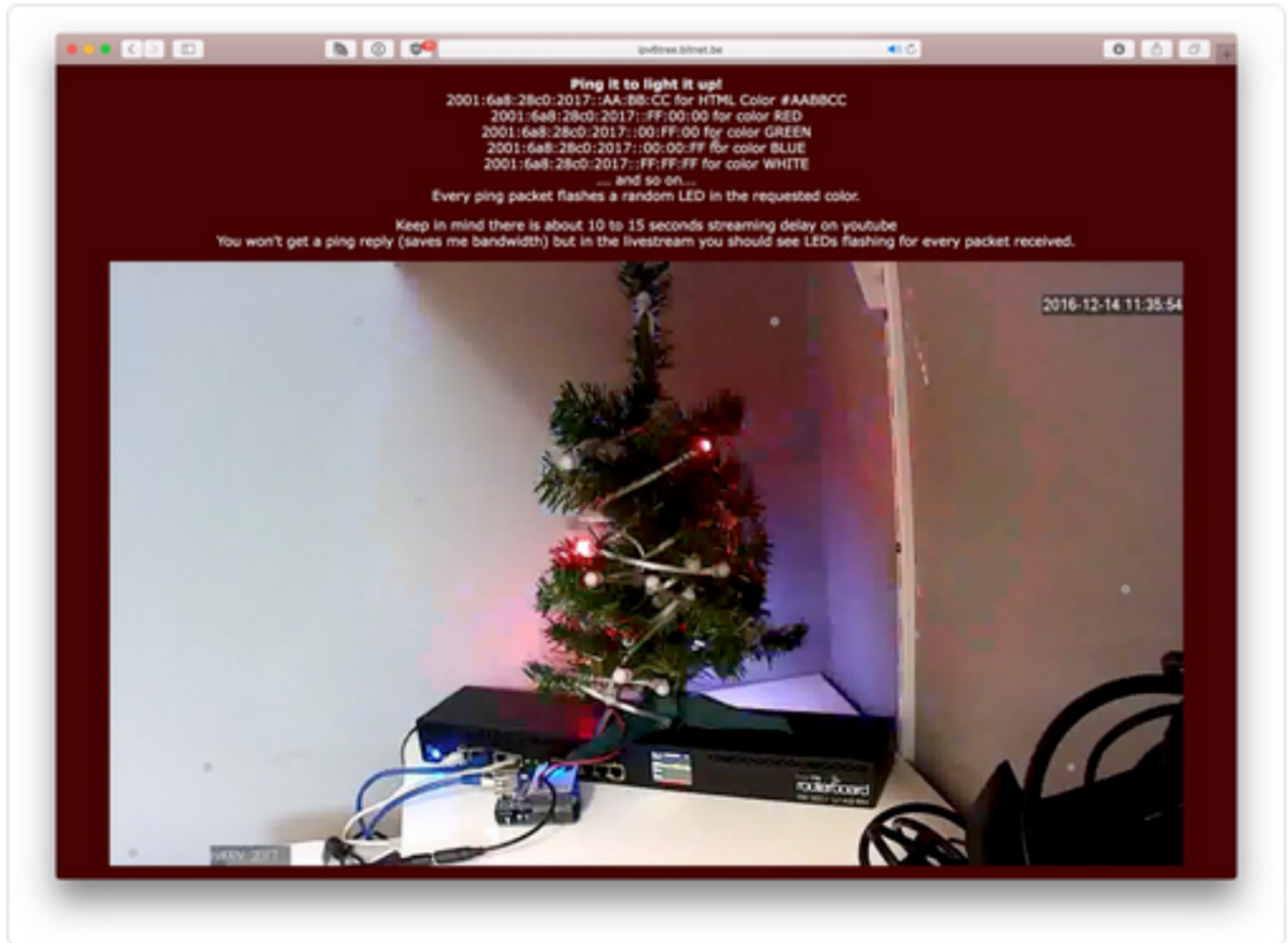
AbertayNetworks @AbertayNetworks · 19 Dec 2016
Now this is IT dedication to Xmas... ipv6tree.bitnet.be #ipv6 #xmas2016

↻ ♥ 1



MikroTik @mikrotik_com · 14 Dec 2016

IPv6 ping can control lights on this christmas tree (via #RouterBOARD of course) ipv6tree.bitnet.be



2

40

40

this the best use of IPv6 yet, ipv6tree.bitnet.be? It is!



Jonathan Stone @JonMStone · 15 Dec 2016

Things like this are why the internet was created: ipv6tree.bitnet.be



Dave P @Sarkies_Proxy · 15 Dec 2016

Its like a Big Bang Episode has come to life.

ipv6tree.bitnet.be

...e this are why the internet was created: ipv6tree.bitnet.be



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Its like a Big Bang Episode has come to life.

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Dennis S. @der_rod · 14 Dec 2016

ipv6tree.bitnet.be Finally IPv6 is useful for *something* ;)



Drew Hess @dhess · 15 Dec 2016

This is the kind of silly thing we used to use the Internet for, rather than tired memes, cat pix, and fake news. ipv6tree.bitnet.be



@apexys · 15 Dec 2016

more IPv6 addresses are there than IPv4 ones?" "Enough for our on my christmas tree!" ipv6tree.bitnet.be



Maarten Lambrechts @ma

The IOCT. Yes, that's right,





← 2 ↻ 40 ♥ 40



Dennis S. @der_rod · 14 Dec 2016

ipv6tree.bitnet.be Finally IPv6 is useful for *something* ;)

← ↻ ♥ 1



Drew Hess @dhess · 15 Dec 2016

This is the kind of silly thing we used to use the Internet for, rather than memes, cat pix, and fake news. ipv6tree.bitnet.be

← 1 ↻ ♥



Prezi



Ingo @lasombra_br · 14 Dec 2016

Is this the best use of IPv6 yet, ipv6tree.bitnet.be? It is!



Jonathan Stone @JonMStone · 15 Dec 2016

Things like this are why the internet was created: ipv6tree.bitnet.be



use the Internet for, rather than tired
e.bitnet.be



Maarten Lambrechts @maartenzam · 16 Dec 2016

The IOCT. Yes, that's right, the Internet of Christmas Trees ipv6tree.bitnet.be



disabled!!!



David Barbion @davidb2111_ ·

If you need a reason to adopt IPv



@maartenzam · 16 Dec 2016

right, the Internet of Christmas Trees ipv6tree.bitnet.be



David Barbion @davidb2111_ · 17 Dec 2016

If you need a reason to adopt IPv6, try this ipv6tree.bitnet.be





memes, cat pix, and fake news.



Valentin Buck @apexys · 15 Dec 2016

"So how many more IPv6 addresses are there than IPv4 ones?" "Enough for every 24-bit colour on my christmas tree!" ipv6tree.bitnet.be



billions of packets @justinesherry · 15 Dec 201

I feel like such a failure that my Christmas tree is



Valentin Buck @apexys · 15 Dec 2016

"So how many more IPv6 addresses are there than IPv4 ones?" "Enough for every 24-bit colour on my christmas tree!" ipv6tree.bitnet.be



Maarten
The IOCT



billions of packets @justinesherry · 15 Dec 2016

I feel like such a failure that my Christmas tree isn't IPv6 enabled!!!
ipv6tree.bitnet.be



john van dijk @johnvandijk85 · 14 Dec 2016

@ZiggoWebcare wanneer word het eindelijk mogelijk om hier naar te pingen?
ipv6tree.bitnet.be

Translate from Dutch



ions of packets @justinesherry · 15 Dec 2016

feel like such a failure that my Christmas tree isn't IPv6 enabled!!!

ipv6tree.bitnet.be

1



john van dijk @johnvandijk85 · 14 Dec 2016

@ZiggoWebcare wanneer word het eindelijk mogelijk om hier naar te pingen?

ipv6tree.bitnet.be

Translate from Dutch



k om hier naar te pingen?



Ward De Ridder @warddr3 · 19 Dec 2016

Does anyone have a spare /8? I want to recreate ipv6tree.bitnet.be made by ON8PZ using IPv4 :)





SixXS @tweetsix · 14 Dec 2016

Almost Xmas and with ipv6tree.bitnet.be only those with IPv6 can light up the Christmas Tree #GetIPv6



ARIN · 13 Dec 2016

D, IPv6 tree. How lovely are thy ping packets

 **lvandevenne** @lvandevenne

... Xmas tree ipv6tree.bitnet.be Ping light up leds!



Hacker N

IPv6 enab



IPv6 can light up the



Hacker News 20 @newsyc20 · 15 Dec 2016

IPv6 enabled Christmas Tree ipv6tree.bitnet.be (bit.ly/2hSx3DC) via @moo9000



2



APNIC @apnic · 15 Dec 2016

Meanwhile in Belgium, the #IPv6 Christmas tree continues to sparkle! youtu.be/xRcVurZ2nZc Read more:



Help light an IPv6-enabled Christmas tree

Posted to Reddit's section devoted to networking by



ARIN @TeamARIN · 13 Dec 2016



O, IPv6 tree. O, IPv6 tree. How lovely are thy ping packets

Liesbeth Vandevenne @lvandevenne

An ipv6 enabled Xmas tree ipv6tree.bitnet.be Ping light up leds!
My husband is a geek :)



RIPE NCC @RIPE_NCC · 14 Dec 2016



APNIC @apnic · 15 Dec 2016

Meanwhile in Belgium, the #IPv6 Christmas tree continues to sparkle! youtu.be/xRcVurZ2nZc Read more:



Help light an IPv6-enabled Christmas tree

Posted to Reddit's section devoted to networking by user felixdgniezno, this IPv6-enabled Christmas tree is garnering rave reviews.

networkworld.com



https://www.reddit.com/r/networking/comments/5icuf8/ipv6_enabled_christmas_tree_ping6_it/?st=j1nzt

PREZI

REDDITS POPULAR - ALL - RANDOM | ASKREDDIT - FUNNY - PICS - WORLDNEWS - NEWS - VIDEOS - TODAYILEARNED - GIFS - GAMING - AWW - SH

Liesbeth Vandevenne @lvandevenne

An ipv6 enabled Xmas tree ipv6tree.bitnet.be Ping light up leds!
My husband is a geek :)



RIPE NCC @RIPE_NCC · 14 Dec 2016

#IPv6 enabled Christmas Tree: pings in progress
ipv6tree.bitnet.be



ipv6tree.bitnet.be

1

29

23



RIPE Database (Whois)

Website

Search IP Address or ASN

Login

Manage IPs and ASNs >

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You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements > Measurement #6965464

RIPE Atlas <<

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Probes and Anchors >

Measurements, Maps and Tools >

Resources >

RIPE NCC Members >

*⁶BLUE http://ipv6tree.bitnet.be Xmass-Tree Ping measurement

General Information

Probes

Map

LatencyMON

Results

General Information

ID #6965464

Group ID #6965464

Type *⁶ Ping

Public measurement? Yes

Target 2001:6a8:28c0:2017::00:00:FF





/r/networking

comments

↑ 572 IPv6 enabled Christmas Tree - ping6 it ;) (self.networking) submitted 4 months ago by felixdgniezno

IPv6 enabled Christmas Tree
<http://ipv6tree.bitnet.be/>

68 comments share

all 68 comments

sorted by: **best** ▾

↑ [-] **AE5CP** CCNP Data Center 103 points 4 months ago

↓ This is the most amusing use of IPv6 I have seen to date. Maybe these gimmicks will drive adoption.

permalink embed

↑ [-] **curtis934** 34 points 4 months ago

↓ It's probably the only use of IPv6.

Type	* ⁶ Ping
Public measurement?	Yes
Target	2001:6a8:28c0:2017::00:00:FF

TRENDING: Open source companies to watch · Computing pioneer Robert Taylor dies · Cloud migration pitfalls · Intel scraps annual IDF event · Resources/White Papers

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BUZZBLOG

By Paul McNamara, News Editor, Network World | DEC 15, 2016 10:21 AM PT

About

In addition to my editing duties, I have written Buzzblog since January, 2006. Feel free to e-mail me at buzz@nww.com.

Help light an IPv6-enabled Christmas tree



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VIDEO What is serverless computing?



[-] [curtis934](#) 34 points 4 months ago

It's probably the only use of IPv6.



Christian Rahl @rahlxcb · 14 Dec 2016

A guy asked the internet to ping his [#christmas](#) tree! Waiting for the router to catch on fire! [#nerdy ipv6tree.bitnet.be](#)



World IPv6 Day Results: New Internet Protocol Proves It's Ready

Chapter 10: Implementing IPv6



VIDEO
What is serverless computing?

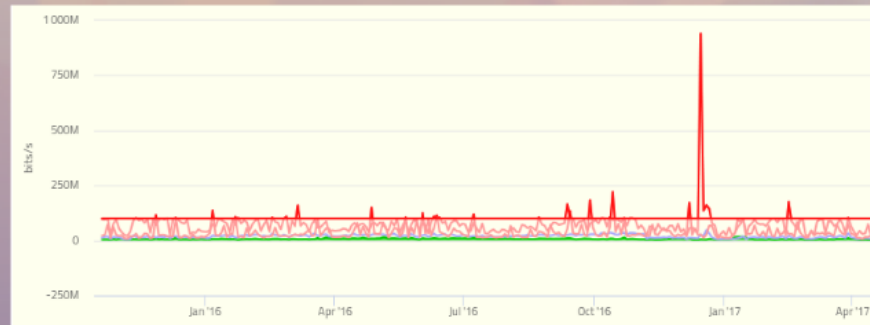


Jason @coolacid · 14 Dec 2016

The IPv6 Tree - Light up a light by sending ping packets to IPv6 IPs.. What could go wrong? ipv6tree.bitnet.be



What could possibly go wrong?



Only one option: Beg for mercy

IPv6 enabled Christmas Tree

Ping it to light it up!

```
2001:6a8:28c0:2017::AA:BB:CC for HTML Color #AABBCC
2001:6a8:28c0:2017::FF:00:00 for color RED
2001:6a8:28c0:2017::00:FF:00 for color GREEN
2001:6a8:28c0:2017::00:00:FF for color BLUE
2001:6a8:28c0:2017::FF:FF:FF for color WHITE
... and so on...
```

Every ping packet flashes a random LED in the requested color.

Keep in mind there is about 10 to 15 seconds streaming delay on youtube
You won't get a ping reply (saves me bandwidth) but in the livestream you should see LEDs flashing for every packet received.

Update:

As it turns out inviting the entire internet to ping my IP address might not be the best idea I ever had...
Bandwidth is regularly maxing out at 300Mbps of incoming ICMPv6 traffic, so bear with me if the livestream occasionally drops out for a moment.
Please avoid pingfloods for prolonged periods and give everyone a chance to try it out.
If we all play nice I will try to keep the tree online until new year's eve.

Christmas Tree

```
!
HTML Color #AABBCC
or color RED
color GREEN
or color BLUE
r color WHITE
```

in the requested color.

streaming delay on youtube
u should see LEDs flashing for every packet received.

Only one option: Beg for mercy

IPv6 enabled Christmas Tree

Ping it to light it up!

2001:6a8:28c0:2017::AA:BB:CC for HTML Color #AABBCC

2001:6a8:28c0:2017::FF:00:00 for color RED

2001:6a8:28c0:2017::00:FF:00 for color GREEN

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2001:6a8:28c0:2017::FF:FF:FF for color WHITE

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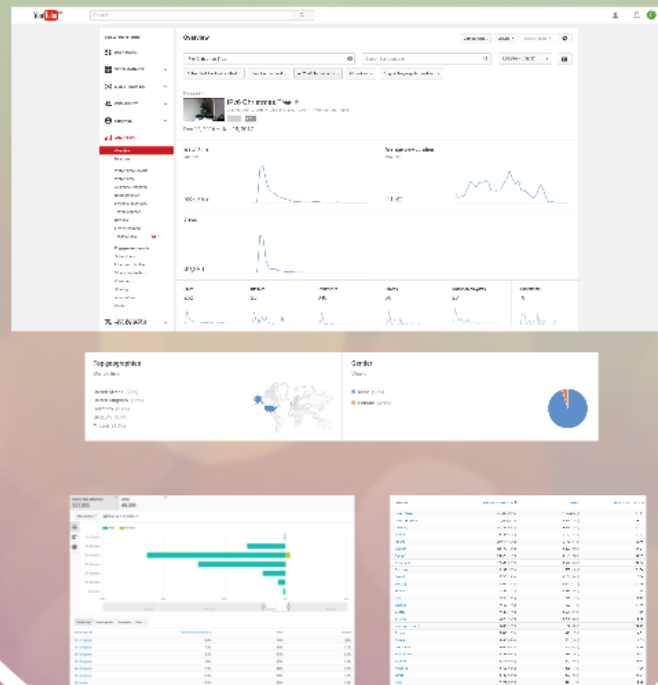
Bandwidth is regularly maxing out[®] at 300Mbit/s of incoming ICMPv6 traffic, so bear with me if the livestream occasionally drops out for a moment.

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DATA

Some stats



SOME STATS

CREATOR STUDIO

- DASHBOARD
- VIDEO MANAGER
- LIVE STREAMING
- COMMUNITY
- CHANNEL
- ANALYTICS**
 - Overview**
 - Realtime
 - Watch time reports
 - Watch time
 - Audience retention
 - Demographics
 - Playback locations
 - Traffic sources
 - Devices
 - Live streaming
 - Translations NEW
 - Engagement reports
 - Subscribers
 - Likes and dislikes
 - Videos in playlists
 - Comments
 - Sharing
 - Annotations
 - Cards
- TRANSLATIONS & TRANSCRIPTIONS

Overview

Comparison... Groups Export report...

IPv6 Christmas Tree Search for locations 12/12/16 - 1/18/17

Subscribed & not subscribed Live & on demand All YouTube products All devices Original language & translated

PeeZee >

IPv6 Christmas Tree Created: Dec 12, 2016 • Duration: -29821:0-36 • Privacy setting: Public

Dec 12, 2016 - Jan 18, 2017



Likes 262	Dislikes 20	Comments 848	Shares 56	Videos in playlists 28	Subscribers 18
---------------------	-----------------------	------------------------	---------------------	----------------------------------	--------------------------

Top geographies

Watch time

- United States (27%)
- United Kingdom (12%)
- Germany (9.6%)



Gender

Views

- Male (95%)
- Female (4.9%)



- Traffic sources
- Devices
- Live streaming
- Translations NEW
- Engagement reports
- Subscribers
- Likes and dislikes
- Videos in playlists
- Comments
- Sharing
- Annotations
- Cards

TRANSLATIONS & TRANSCRIPTIONS



Top geographies

- Watch time
- United States (27%)
 - United Kingdom (12%)
 - Germany (9.6%)
 - Belgium (5.3%)
 - Finland (5.2%)



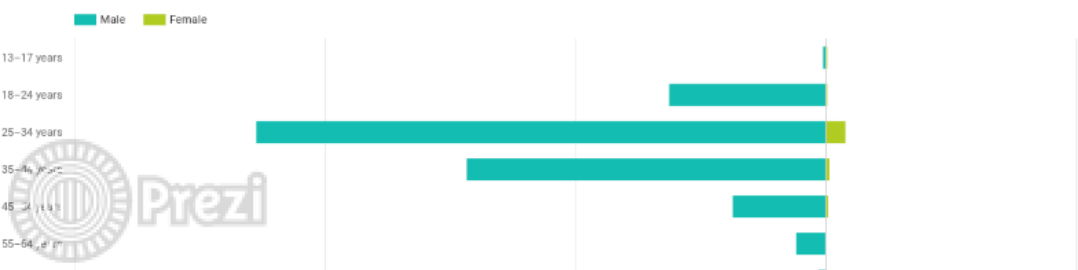
Gender

- Views
- Male (95%)
 - Female (4.9%)



WATCH TIME (MINUTES) 55 | VIEWS 49,389

metrics Show as % of totals



Geography	Watch time (minutes) ↓	Views
United States	144,199 (27%)	12,683 (26%)
United Kingdom	61,945 (12%)	3,843 (7.8%)
Germany	51,336 (9.6%)	3,844 (7.8%)
Belgium	28,737 (5.3%)	2,120 (4.3%)
Finland	27,817 (5.2%)	2,178 (4.4%)
Sweden	24,470 (4.6%)	1,487 (3.0%)
Norway	23,623 (4.4%)	1,134 (2.3%)
Netherlands	17,689 (3.3%)	1,674 (3.4%)
Denmark	16,132 (3.0%)	505 (1.0%)
Poland	15,765 (2.9%)	2,251 (4.6%)
Hungary	12,584 (2.3%)	1,062 (2.2%)



WATCH TIME (MINUTES)
537,365

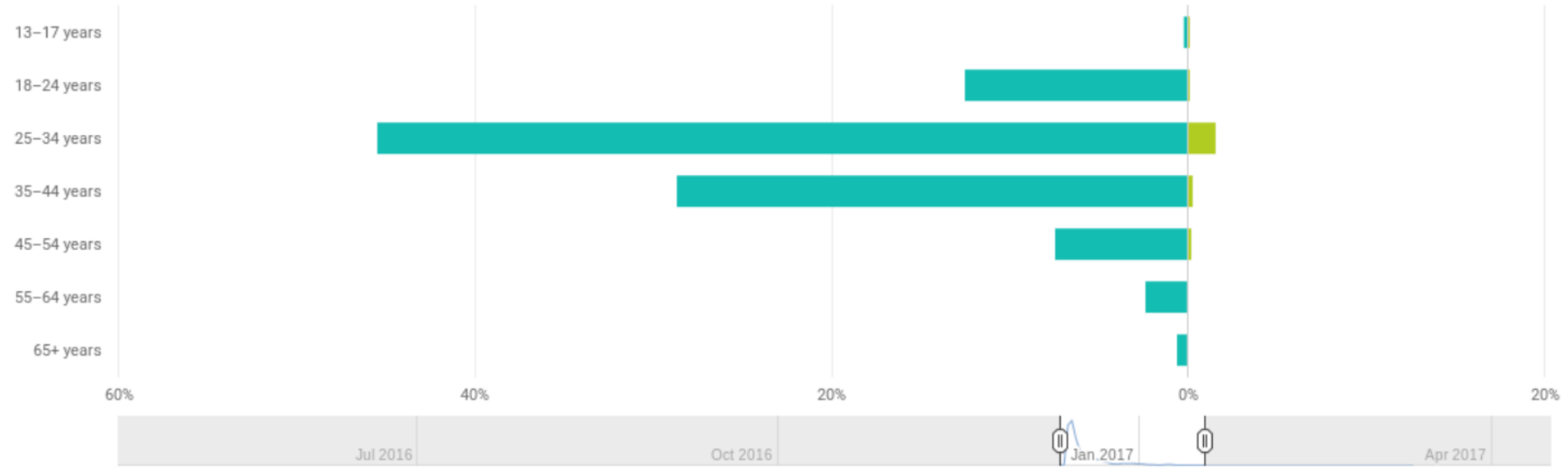
VIEWS
49,389

More metrics ▾

Show as % of totals ⓘ









Male Female



Viewer age Viewer gender Geography More ▾

Viewer age ↑	Watch time (minutes) ⓘ	Male	Female
13-17 years	0.4%	74%	26%
18-24 years	13%	99%	1.1%
25-34 years	47%	97%	3.3%
35-44 years	29%	99%	1.0%
45-54 years	7.7%	98%	2.3%
55-64 years	2.4%	99%	1.5%
65+ years	0.7%	98%	1.8%



Geography	Watch time (minutes)  	Views 	Average view duration 
United States	144,199 (27%)	12,683 (26%)	11:22
United Kingdom	61,945 (12%)	3,843 (7.8%)	16:07
Germany	51,336 (9.6%)	3,844 (7.8%)	13:21
Belgium	28,737 (5.3%)	2,120 (4.3%)	13:33
Finland	27,817 (5.2%)	2,178 (4.4%)	12:46
Sweden	24,470 (4.6%)	1,487 (3.0%)	16:27
Norway	23,623 (4.4%)	1,134 (2.3%)	20:49
Netherlands	17,689 (3.3%)	1,674 (3.4%)	10:34
Denmark	16,132 (3.0%)	505 (1.0%)	31:56
Poland	15,765 (2.9%)	2,251 (4.6%)	7:00
Hungary	12,584 (2.3%)	1,062 (2.2%)	11:50
France	11,497 (2.1%)	1,483 (3.0%)	7:45
Italy	7,802 (1.5%)	714 (1.4%)	10:55
Slovakia	7,663 (1.4%)	680 (1.4%)	11:16
Canada	7,645 (1.4%)	1,531 (3.1%)	4:59
Czechia	6,370 (1.2%)	1,736 (3.5%)	3:40
Unknown region 	5,833 (1.1%)	152 (0.3%)	38:22
Estonia	5,596 (1.0%)	816 (1.7%)	6:51
Russia	4,835 (0.9%)	504 (1.0%)	9:35
New Zealand	4,646 (0.9%)	251 (0.5%)	18:30
Switzerland	4,351 (0.8%)	473 (1.0%)	9:11
Slovenia	4,211 (0.8%)	392 (0.8%)	10:44
Australia	3,468 (0.6%)	835 (1.7%)	4:09
	3,409 (0.6%)	227 (0.5%)	15:01
	2,771 (0.5%)	819 (1.7%)	3:23

**So what about
next year ?**

=> Hans@bitnet.be

