

NAT64/DNS64 real life experiments, warnings and also one useful tool

...from go6lab.si and IPv6-lab.net

Brought to you by:



Internet
Society

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Problem statement and real world status

(Six Degrees of Inner Turbulence)

IPv6 and IPv4 are incompatible on the wire.

- We need transition and translation mechanisms between the two protocols
- Mobile operators are massively switching devices to IPv6-only connectivity
 - millions of users
 - using 464XLAT (Android) or plain NAT64 (Apple) as a transition tool to access IPv4 content
- Some people do weird stuff while adding AAAA to their DNS records
- Important questions:
 - Do content providers know how their content will be seen from such environments?
 - Do connectivity providers know what their users' experience on IPv6-only would be?

Credits, acknowledgments and supporters

(Metropolis, Pt. 1: The Miracle and the Sleeper)



Projects like this and all the massive amount of work cannot be performed without great support of people and companies that we work with:

[Internet Society](#) - for Jan's working time and funding of the numerous travels where we got the idea of the IPv6 issues while talking to operators and also future travels where we'll talk about this topic (we are here, aren't we? :))

[Go6 Institute Slovenia](#) - for funding and running the Go6lab where we got connectivity, HW, SW and place to experiment with all this things IPv6

[SJM Steffann](#) for Sander's working time, coding skills, massive energy and also HW/SW in their ipv6-lab.net to make this tool redundant.

[Corinne Pritchard](#) for a lovely design of a tool's front-end. Hugs :)

Go6lab NAT64/DNS64 public test-bed

(The Test That Stumped Them All)

Aimed at everyone who would like to test NAT64/DNS64 functionality

4 different implementations, 4 different instructions how to direct traffic there

Used by operators

Testing the idea of providing NAT64/DNS64 and/or 464XLAT to their users

Used by application providers

To see how their apps works in NAT64/DNS64 environment


Used by HW/SW vendors

Testing their solutions against multiple NAT64 vendors

Gained quite some traction and momentum this days

Instructions: <https://go6lab.si/current-ipv6-tests/nat64dns64-public-test/>

Go6lab NAT64/DNS64 test-bed

 <https://go6lab.si/current-ipv6-tests/nat64dns64-public-test/>

NAT64/DNS64 public test

Go6lab is hosting a variety of NAT64/DNS64 solutions, open for general Internet public for testing.

Disclaimer: This setup is not intended for performance testing, just to see how NAT64/DNS64 operates, what applications breaks and what are differences between different implementations. If you need to do performance testing of NAT64/DNS64 send email to [<zavod@go6.si>](mailto:zavod@go6.si) and schedule a test session in go6lab facility.

To test different NAT64/DNS64 setups you need to disable IPv4 on your device and set an IPv6 resolving DNS server, different one for each setup. Please **send us** your observations, specially about which applications breaks in IPv6-only/NAT64 environment. We would like to build a list of them.

A10 Networks NAT64 implementation: set your DNS to **2001:67c:27e4:15::6411**

NAT64 implementation is running on a A10 vThunder virtual appliance.

NAT64 routed prefix: 2001:67c:27e4:642::/64

Quick ping6 test if up&running: ping6 2001:67c:27e4:642::5bef:6015

PaloAlto Networks Firewall NAT64 with BIND9.9 DNS64: set your DNS to **2001:67c:27e4::64**

NAT64 implementation is running in PAN500 firewall box.

NAT64 routed prefix: 2001:67c:27e4:64::/64

Quick ping6 test if up&running: ping6 2001:67c:27e4:64::5bef:6015

Jool NAT64 with BIND9 DNS64: set your DNS to **2001:67c:27e4:15::64**

Jool NAT64 implementation is running in a virtual container on proxmox server.

NAT64 routed prefix: 2001:67c:27e4:1064::/64

Quick ping6 test if up&running: ping6 2001:67c:27e4:1064::5bef:6015

Cisco ASR1000 NAT64 with BIND9 DNS64: set your DNS to **2001:67c:27e4::60**

NAT64 implementation is running in Cisco ASR1001.

NAT64 routed prefix: 2001:67c:27e4:11::/64

Quick ping6 test if up&running: ping6 2001:67c:27e4:11::5bef:6015

Go6lab NAT64/DNS64 test-bed HW/SW

(Systematic Chaos)



Some DNS admins put “crap” in AAAA records

(The Enemy Inside)

Have you ever seen any of this values for AAAA record?

::

::1

::ffff:[IPv4_addr]

fe80::[some_value]

64:ff9b::[some_value]

2001:DB8::[some_value]

If you have seen something like this and you know who did it, talk to that people and tell them to fix it. This sort of thing isn't useful to anybody and severely impacts user experience.

More: <http://www.employees.org/~dwing/aaaa-stats/> (courtesy of Dan Wing)

Causing confusion with or without www

(Breaking All Illusions)

```
sander@MacPro:~$ host www.firstinsight.com
www.firstinsight.com is an alias for 160569.group19.sites.hubspot.net.
160569.group19.sites.hubspot.net is an alias for
cos2mdc.hubspot.net.mdc.edgesuite.net.
cos2mdc.hubspot.net.mdc.edgesuite.net is an alias for a1711.b.akamai.net.
a1711.b.akamai.net has address 88.221.254.18
a1711.b.akamai.net has address 88.221.254.10
```

```
sander@MacPro:~$ host firstinsight.com
firstinsight.com has IPv6 address ::
firstinsight.com mail is handled by 10 mx1.emailsrvr.com.
firstinsight.com mail is handled by 20 mx2.emailsrvr.com.
```

When deploying in real life you need “fixes”

(Build Me Up, Break Me Down)

So, what can we do about it?

We can figure out who this people are, contact them, warn them about the issue, educate them and ask them to fix the problem.

Remember: If you are not part of solution, you are part of the problem.

At the same time we can protect our users from bad user experience and set the “exclude” rules in our DNS64 servers. IANA allocated 2000::/3 as global unicast address pool, so whatever else is used in AAAA - it's by default bogus and we can safely ignore that.

When deploying in real life you need “fixes”

(Stream of Consciousness)

BIND9 example of DNS64 configuration in go6lab:

```
dns64 2001:67c:27e4:64::/96 {  
    clients { any; };  
    mapped { !rfc1918; any; };  
    exclude { 0::/3; 4000::/2; 8000::/1; 2001:DB8::/32; };  
    break-dnssec yes;  
};
```

Explanation of “exclude” configuration parameter: If DNS64 server gets an AAAA record with a value of anything outside 2000::/3 - it ignores it and synthesizes the AAAA record from NAT64_prefix::IPv4_address

When deploying in real life you need “fixes”

(Moment Of Betrayal)

This fixes the most common errors and keeps your users relatively safe from bad user experience when using 464XLAT and NAT64

This also prevent issues when AAAA record contains an IPv6 documentation prefix, that is inside 2000::/3 block.

“Break-dnssec yes” configuration directive:

By default, DNS64 module does not process queries that request DNSSEC data (DO = 1) or that have DNSSEC RRs in the answer. Setting break-dnssec yes will override this default and cause policy processing on all DNSSEC queries. However, the constructed response will not have any DNSSEC records added and therefore cannot be verified by the client (it may have the unintended consequence of looking like a bogus response or even an injection attack to the client).


```
macbook# dig AAAA 4.go6.si @2001:67c:27e4:15::64 +dnssec
```

```
; <<>> DiG 9.8.3-P1 <<>> AAAA 4.go6.si @2001:67c:27e4:15::64 +dnssec
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 13683
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 0, AUTHORITY: 4, ADDITIONAL: 1
```

```
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags: do; udp: 4096
;; QUESTION SECTION:
;4.go6.si.
```

IN AAAA ???

```
;; AUTHORITY SECTION:
```

```
go6.si. 3502 IN SOA nsec1.go6lab.si. root.go6.si. 2017010300 86400 7200 3600000 3600
go6.si. 3502 IN RRSIG SOA 8 2 3600 20170117190417 20170103072329 23274 go6.si. GeTWHLN5
b1aAsVADyIxviIsZLq0SY AUcR364SWTzuS7vkghSLaubYHo/6HWjSCJ8N4LiZMBSbFUXUQrcsbN9J 27c5SF85/0de+Ty00TtNvL46ETjVIaIkDE
T6DMHAn6uZ0ZDueful14C4PIoVqEGcCaNdxNm+LXQ0BZORELOGGe T8GzRuFJrYrxHo2YD83PERF7hYpb+zIV9IwOEMbznDi713I3gw3TNcwa V7a
N80b6I84vfiqRZ62ONU2jBuEQq yLWjJw==
c0jvnruvo3s4v19heogvskgfvro8nvdp.go6.si. 3502 IN RRSIG NSEC3 8 3 3600 20170113072032 20161229220157 23274 go6.si.
fJc+IJWZAET+CvMJww++8qz0yolq9T Qe3XoLb1l1900933mzeAYwaBqBHHJejkwyFY0LYnLZ5UyDw7TS9FSL00 dlsEa6XYigy7JIN6wxyFZy+CJ
ULtX WD37/HTS3uDxeit/s9zgPfltt0Qw3zXMoqWWa97CkLDvBfr0lzM8SOKn zkdQuGIYrBJRRaWU9U65sJIiJjgOE0MtXuLgyzhrMu24NVyN6aX
Z0Ec1Yo1TBpp0y3JWIedisGHpeITTZjGRcB 0gjMiQ==
c0jvnruvo3s4v19heogvskgfvro8nvdp.go6.si. 3502 IN NSEC3 1 0 5 82EEE992264B06E4 C83N2GVQ3KBH0KUQRMBHUD63IDHLBVSU A
```

```
;; Query time: 51 msec
;; SERVER: 2001:67c:27e4:15::64#53(2001:67c:27e4:15::64)
;; WHEN: Tue Jan 3 09:59:11 2017
;; MSG SIZE rcvd: 766
```

Without
break-dnssec yes;
(Enigma Machine)

```
macbook# dig AAAA 4.go6.si @2001:67c:27e4:15::64 +dnssec
```

```
; <> DiG 9.8.3-P1 <> AAAA 4.go6.si @2001:67c:27e4:15::64 +dnssec
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 45896
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 1, AUTHORITY: 3, ADDITIONAL: 1
```

```
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags: do; udp: 4096
;; QUESTION SECTION:
;4.go6.si.                IN      AAAA
```

```
;; ANSWER SECTION:
4.go6.si.                3600    IN      AAAA    2001:67c:27e4:1064::5bef:603d
```

```
;; AUTHORITY SECTION:
go6.si.                  3600    IN      NS       nsec1.go6lab.si.
go6.si.                  3600    IN      NS       nsec2.go6lab.si.
go6.si.                  3600    IN      RRSIG    NS 8 2 3600 20170110170427 20161227211300 23274 go6.si. iWA2Cfu
uKS6Ve0PwY7WXUPclfQR vUWamHv1bagVxo6zpz86WFAHdGuitdX3xHC3Klr+Ldi/5nLDJ1eFU9BJL fU4qe0FQjWaIY9zzv0MZjaIV8KK93GUD0
XL96BAIT6iDoSdYpbHBesk2//uxVzwQXJynRDgN75VM40fUU/Hj hTikI2D/2PenM6Lv17DNwxxFFM4gM1GG7W60/4L50j/4Ey3xE+xUV4BS m+
ZP1nhoWqNR0Bf/Rugjv/1t1Q5 qYAJCQ==
```

```
;; Query time: 384 msec
;; SERVER: 2001:67c:27e4:15::64#53(2001:67c:27e4:15::64)
;; WHEN: Tue Jan 3 10:06:24 2017
;; MSG SIZE rcvd: 406
```

With
break-dnssec yes;
(Enigma Machine)



When deploying in real life you need “fixes”

(Stream of Consciousness)

Unbound example of DNS64 configuration in go6lab:

server:

module-config: "dns64 validator iterator"

dns64-prefix: 2001:67c:27e4:64::0/96

private-address: 0::/3

private-address: 4000::/2

private-address: 8000::/1

private-address: 2001:DB8::/32

private-address: 64:FF9B::/96

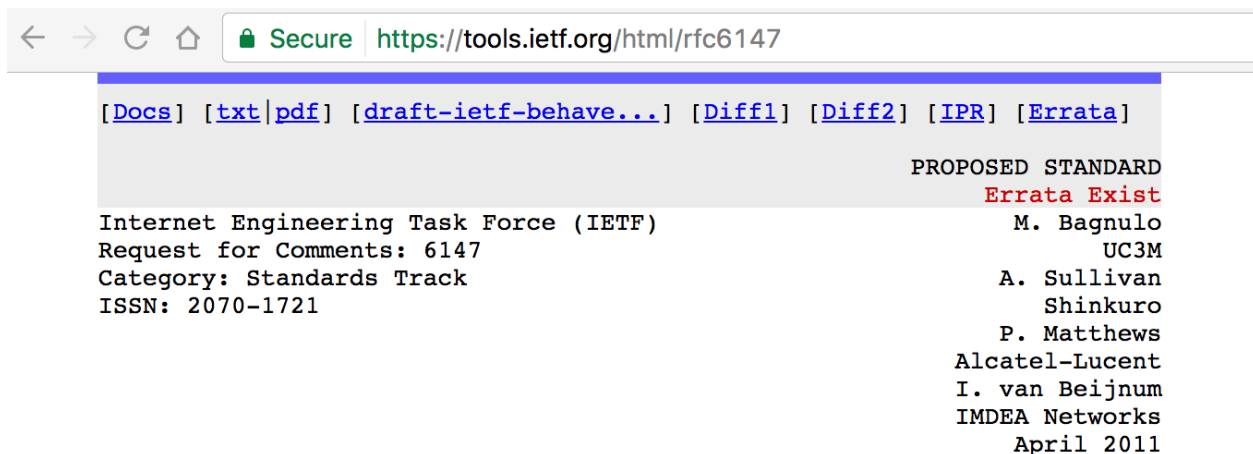
private-address: ::ffff:0:0/96

private-address: ::1/128

private-address: ::/128

interface: 2001:67c:27e4::64

More reading on DNS64 and DNSSEC – RFC 6147



DNS64: DNS Extensions for Network Address Translation from IPv6 Clients to IPv4 Servers

Abstract

DNS64 is a mechanism for synthesizing AAAA records from A records. DNS64 is used with an IPv6/IPv4 translator to enable client-server communication between an IPv6-only client and an IPv4-only server, without requiring any changes to either the IPv6 or the IPv4 node, for the class of applications that work through NATs. This document specifies DNS64, and provides suggestions on how it should be deployed in conjunction with IPv6/IPv4 translators.

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IPv4

NAT64

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Still waiting for that timeout...

IPv4

NAT64

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Indeed, very secure...

IPv4

NAT64

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Indeed, very secure, running on ::ffff:209.59.134.0...

IPv4

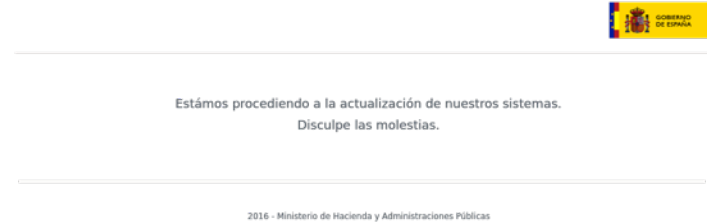
NAT64

Good DNS, bad server: notificaciones.060.es



The screenshot shows the homepage of the 'Servicio de Notificaciones Electrónicas' (Electronic Notifications Service). The header includes the 'administracion.gob.es' logo and the 'Dirección Electrónica Habilitada' (Authorized Electronic Direction) seal. A navigation bar at the top right contains links for 'mapa web', 'preguntas frecuentes', 'contactar', 'bienvenidos', 'bienvenida', 'servicios', 'ongt etom', and 'bienvenida'. The main content area features a large blue banner with the title 'Servicio de Notificaciones Electrónicas' and a description: 'El Servicio de Notificaciones Electrónicas permite a cualquier persona física o jurídica recibir por vía telemática las notificaciones administrativas.' Below this is a 'Más información' button. A section titled 'Reciba sus Notificaciones de forma segura y gratuita' (Receive your notifications safely and free of charge) contains three numbered steps: 1. 'DESE DE ALTA CON DNI O CERTIFICADO ELECTRÓNICO' (Request for registration with DNI or electronic certificate), 2. 'SUSCRÍBASE A PROCEDIMIENTOS' (Subscribe to procedures), and 3. 'ENTRE AL BUZÓN DE NOTIFICACIONES' (Enter the notification mailbox). To the right of the main content is a sidebar with links to 'Entrar al buzón', 'Registrarse', 'Requisitos de Acceso', 'Aplicación para Android' (with a Google Play button), 'Aplicación para iPhone y iPad' (with an App Store button), 'Verifique la validez de una certificación impresa' (with a [+1] icon), 'Obtenga / Renueve su Certificado Digital' (with a CERES logo), and 'dni electrónico'. At the bottom, there is a 'Soporte' (Support) section with links for 'Requisitos de acceso', 'Zona de descarga', 'Preguntas frecuentes', and 'Contacte con nosotros'. A 'Normativa' (Regulation) section includes links for 'Condiciones de Utilización del Servicio', 'Aviso Legal', and 'Política de Privacidad de Datos'. The footer contains the 'W3C' logo and the 'MII-11 NCAG 1.0' logo.

IPv4



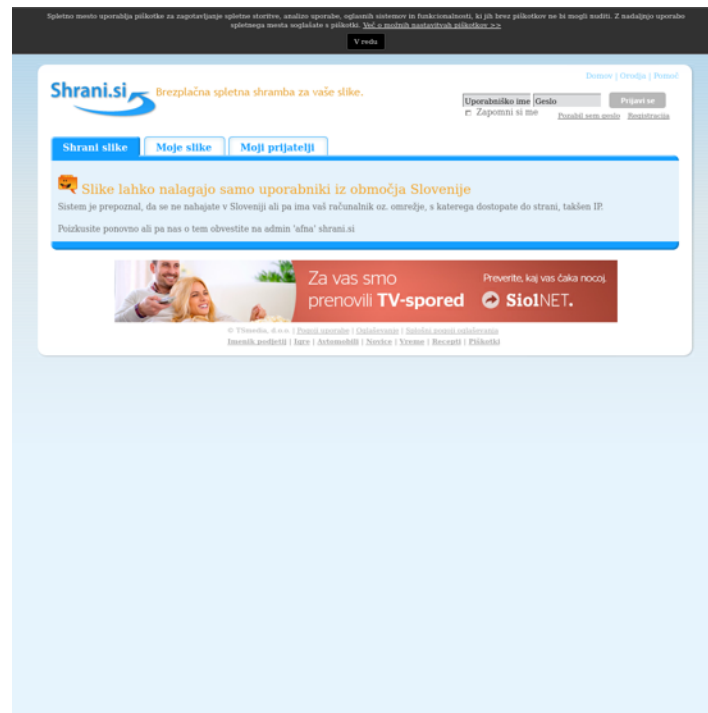
The screenshot shows a system update message. At the top right is the 'GOBIERNO DE ESPAÑA' logo. The main text reads: 'Estáms procediendo a la actualización de nuestros sistemas. Disculpe las molestias.' (We are proceeding with the update of our systems. Excuse the inconvenience.) Below this is a horizontal line. At the bottom, it says '2016 - Ministerio de Hacienda y Administraciones Públicas'.

IPv6 and NAT64

Good DNS, bad geolocation tool: shrani.si



IPv4



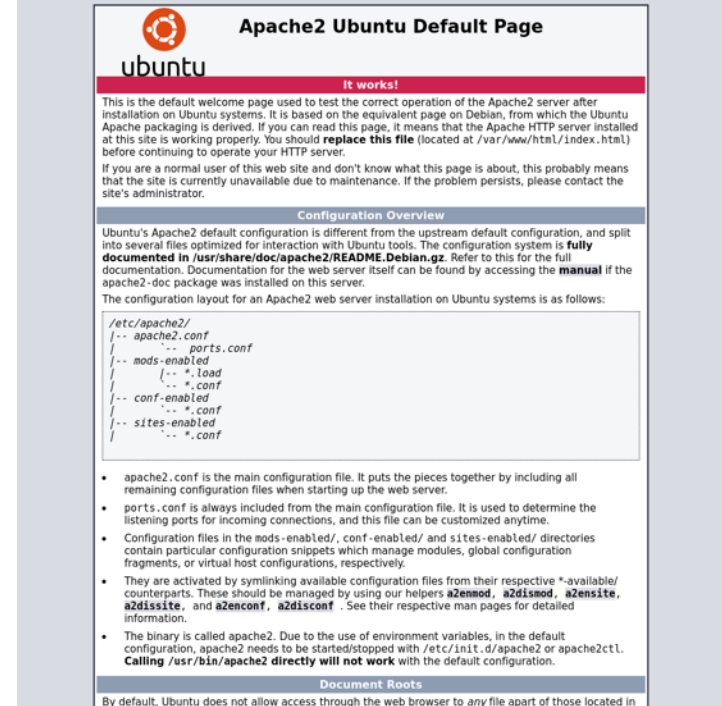
IPv6 and NAT64

No AAAA, server still confused: uc.cn



The screenshot shows the UC Browser website. At the top, there's a navigation bar with links: Home, UC Browser, Download, Media, Business Partners, and Community. Below this is a large banner titled "Awesome Local Video Experience" for "UC Browser Mini 10.5 for Android". The banner features a cartoon fox character holding a smartphone. Below the banner are buttons for "Download" and "Google Play". Further down, there are icons for various platforms: Android, iPhone, PC Browser, Windows Phone, Java, and Pad Download. A QR code is also present. At the bottom, there's a "Product News" section with a list of updates and an "Activity Area" with social media links.

IPv4




The screenshot shows the Apache2 Ubuntu Default Page. It features the Ubuntu logo and the title "Apache2 Ubuntu Default Page". Below the title, there's a section titled "It works!" which explains that this is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It mentions that the page is based on the equivalent page on Debian and that the Apache HTTP server installed at this site is working properly. It also provides instructions on how to replace the file if necessary. Below this, there's a "Configuration Overview" section which explains that Ubuntu's Apache2 default configuration is different from the upstream default configuration and is split into several files optimized for interaction with Ubuntu tools. It mentions that the configuration system is fully documented in /usr/share/doc/apache2/README.Debian.gz. It also provides a link to the manual if the apache2-doc package was installed on this server. Below this, there's a section titled "The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:" which lists the configuration files and their locations. It includes a code block showing the contents of the /etc/apache2/ directory. Below the code block, there's a list of bullet points explaining the configuration files and their locations. At the bottom, there's a "Document Roots" section which explains that by default, Ubuntu does not allow access through the web browser to any file apart of those located in the specified directories.

NAT64

Good server, bad content: ebay-kleinanzeigen.de

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
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 Kia picanto Kleinw... Willich Autos 5.500 € VB	 Schneeanzug Größ... Mannheim Babysitter & Kinderbe... 20 €	 Das Spiel ist kompl... Marl Film & DVD 20 € VB	 suche iPhone 6/6s ... Ingolstadt Handy & Telefon 1 €
 VB	 750 €	 VB	 100 €

IPv4 and NAT64

Um Ihnen ein besseres Nutzererlebnis zu bieten, verwenden wir Cookies. Durch Nutzung von eBay Kleinanzeigen stimmen Sie unserer [Verwendung von Cookies](#) zu.





ebay Kleinanzeigen Einloggen Registrieren
Kostenlos. Einfach. Lokal.

Was suchen Sie? Alle Kategor... PLZ oder Ort Ganzer Ort













Kategorien alle anzeigen

- Auto, Rad & Boot**
Autos
Fahrräder
Mehr ...
- Immobilien**
Gewerbeimmobilien
Häuser zum Kauf
Mietwohnungen
Mehr ...
- Dienstleistungen**
Auto, Rad & Boot
Babysitter & Kinderbetreuung
Haus & Garten
Mehr ...
- Familie, Kind & Baby**
Baby- & Kinderkleidung
Kinderwagen & Buggys
Mehr ...
- Freizeit, Hobby & Nachbarschaft**
Kunst & Antiquitäten
Sammeln
Mehr ...
- Haus & Garten**
Küche & Esszimmer
Wohnzimmer
Mehr ...
- Haustiere**
Hunde & Zubehör
Katzen & Zubehör
Mehr ...
- Jobs**
Gastronomie & Tourismus

Galerie Anzeige hier platzieren

 Eissegler DN Schlit... Bokssee 5.300 € VB	 gebrauchte Reifen... Herne 15 € VB	 Esszimmerausstat... Schwabing-West 3.099 € VB	 Mehrsprach. Haus... Bogenhausen VB
--	---	--	---

Neueste Anzeigen Neue Anzeige aufgeben

 Alesia xplorer 26 zo... Treptow Fahrräder 7 €	 Kommode Sideboard... Wesel Wohnzimmer 80 €	 Super verschmuste... Baunatal Katzen & Zubehör 150 € VB	 April/Mai Platz bei ... Süd Babysitter & Kinderbe... VB
 Gespann - Seitew... Kirchham Motorräder & Motom... 12.000 € VB	 Möbeltransport Um... Hamburg Volksdorf Umgang & Transport 10 € VB	 ABC DESIGN TURB... Wolfsburg Kinderwagen & Buggys 100 €	 Rattangarnitur Tisc... Hankensbüttel Garten & Pflanzen 15 €
 350 €	 VB	 30 €	 VB

IPv6

Good server, bad content: thegatewaypundit.com



The Gateway Pundit

Where Hope Finally Made a Comeback

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- [Facebook](#)
- [Twitter](#)
- [YouTube](#)

hillary-yoga-2



Breaking: After Tens of Thousands of Emails Leaked, Second HRC Email Regarding "Yoga" is Found

Oct 14th, 2016 1:39 pm by [Jim Hoft](#)

In March 2015 Hillary Clinton held a presser at the United Nations. She said she released all of her work ... [Leave a Comment](#)

In March 2015 Hillary Clinton held a presser at the United Nations. She said she released all of her work ...

Filed Under: [Uncategorized](#)

[hillary-laugh-ellen-win-november](#)



Hillary Jokes With Ellen About When She's In White House — SHE THINKS IT'S OVER!

Oct 14th, 2016 11:54 am by [Jim Hoft](#)

IPv4 and NAT64


IPv6

Non working AAAA record = broken NAT64 😊

Secure <https://nat64check.go6lab.si/v6score/measurement-156228/>

Image match

NAT64



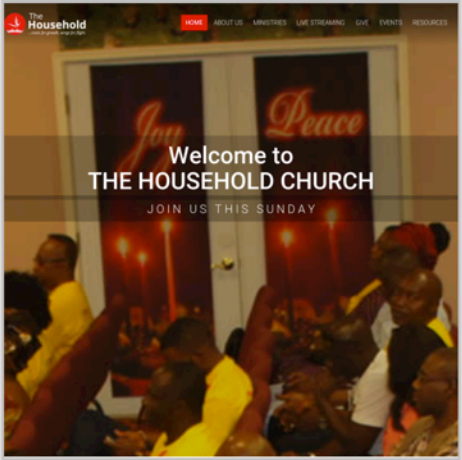
Resources match ▶

Fails because of broken IPv6

DNS records

Ping


IPv4-only



139.162.170.125

22.4	22.4	22.3	22.3	22.1
ms	ms	ms	ms	ms

IPv6-only



IPv6 web server broken!

2a01:7e01::f03c:91ff:febb:c794

22.1	21.5	21.4	21.4	21.4
ms	ms	ms	ms	ms

Working AAAA record and IPv4-only content

NAT64 84%

DEKO SVET
Delovanje svoj svet!

KONTAKT DOM POROKA OTROCI ZABAVA EKO ZABAVA KOŠARICA:0

3,50 €/1 kos
8,50 €/1 kos
od 5,50€
2,50 €/1 kos

Paketki po naročilu

Dobrodošli v DEKO SVET-u – svetu polnem idej, inspiracij in zabavnih artiklov za vaš dom, zabavo, poroko, rojstni dan ali preprost piknik s prijatelji.

Ker si želimo, da dekorirate vaš svet, bomo spletno trgovino neprestano posodabljali s trenutnimi trendi, idejami ter novimi izdelki, zato se že veselimo vaših rednih obiskov naše spletne trgovine.

Lep pozdrav, vaš DEKO SVET

Uporaba piškotkov
Spletno mesto uporablja piškotke z namenom zagotavljanja spletne storitve in funkcionalnosti, ki jih brez piškotkov ne bi mogli nuditi. Z obiskom in uporabo

IPv4-only

DEKO SVET
Delovanje svoj svet!

KONTAKT DOM POROKA OTROCI ZABAVA EKO ZABAVA KOŠARICA:0

3,50 €/1 kos
8,50 €/1 kos
od 5,50€
2,50 €/1 kos

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IPv6-only 78%

DEKO SVET
Delovanje svoj svet!

KONTAKT DOM POROKA OTROCI ZABAVA EKO ZABAVA KOŠARICA:0

3,50 €/1 kos
8,50 €/1 kos
od 5,50€
2,50 €/1 kos

Paketki po naročilu

Dobrodošli v DEKO SVET-u – svetu polnem idej, inspiracij in zabavnih artiklov za vaš dom, zabavo, poroko, rojstni dan ali preprost piknik s prijatelji.

Ker si želimo, da dekorirate vaš svet, bomo spletno trgovino neprestano posodabljali s trenutnimi trendi, idejami ter novimi izdelki, zato se že veselimo vaših rednih obiskov naše spletne trgovine.

Lep pozdrav, vaš DEKO SVET

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Spletno mesto uporablja piškotke z namenom zagotavljanja spletne storitve in funkcionalnosti, ki jih brez piškotkov ne bi mogli nuditi. Z obiskom in uporabo

Resources match ▼

99%

1%

URL

GET <http://deko-svet.si/>

GET <http://www.deko-svet.si/>

GET <http://frog.wix.com/bt?src=29&evld=3&pn=1&et=1&v=1.1939.13&msid=73fcc1f2-b6a4-4066-9548-5598c03d9b03&vsi=40da48dd-2df1-4f54-8951...>

GET <http://frog.wix.com/bt?src=29&evld=3&pn=1&et=1&v=1.1939.13&msid=73fcc1f2-b6a4-4066-9548-5598c03d9b03&vsi=dd42d5c9-3d4d-40ef-9e0a...>

GET <http://frog.wix.com/bt?src=29&evld=3&pn=1&et=1&v=1.1939.13&msid=73fcc1f2-b6a4-4066-9548-5598c03d9b03&vsi=d33a5027-aef3-4c98-96cc...>

GET <https://static.parastorage.com/services/third-party/requirejs/2.1.15/require.min.js>

NAT64-only

IPv4-only

IPv6-only

Moved

Moved

Moved

Ok

Ok

Ok

Ok

Ok

Bad gateway

Ok

Ok

-

Working AAAA record and IPv4-only content

URL	NAT64-only	IPv4-only	IPv6-only
GET http://deko-svet.si/	Moved	Moved	Moved
GET http://www.deko-svet.si/	Ok	Ok	Ok
GET http://frog.wix.com/bt?src=29&evid=3&pn=1&et=1&v=1.1939.13&msid=73fcc1f2-b6a4-4066-9548-5598c03d9b03&vsi=40da48dd-2df1-4f54-8951...	Ok		
GET http://frog.wix.com/bt?src=29&evid=3&pn=1&et=1&v=1.1939.13&msid=73fcc1f2-b6a4-4066-9548-5598c03d9b03&vsi=dd42d5c9-3d4d-40ef-9e0a...			Bad gateway
GET http://frog.wix.com/bt?src=29&evid=3&pn=1&et=1&v=1.1939.13&msid=73fcc1f2-b6a4-4066-9548-5598c03d9b03&vsi=d33a5027-aef3-4c98-96cc...		Ok	
GET https://static.parastorage.com/services/third-party/requirejs/2.1.15/require.min.js	Ok	Ok	-
GET https://static.parastorage.com/services/santa/1.1939.13/app/main-r.min.js	Ok	Ok	-
GET https://static.parastorage.com/services/santa/1.1939.13/static/css/viewer.css	Ok	Ok	-
GET https://static.parastorage.com/services/web/2.1229.56/javascript/wysiwyg/viewer/deprecatedbrowsers/UpgradeBrowser.js	Ok	Ok	-
GET http://frog.wix.com/ugc-viewer?c=1480946736314&evid=361&src=42&majorVer=3&server=app-jvm14c&did=98a027aa-433e-4874-8e6b-9197c3fa...	Ok		
GET https://static.wixstatic.com/sites/959e83_1685ea46e831627d8b2fee6a28075065_726.json.z?v=3	Ok	Ok	
GET http://frog.wix.com/ugc-viewer?c=1480946736315&evid=351&src=42&majorVer=3&server=app-jvm14c&did=98a027aa-433e-4874-8e6b-9197c3fa...	Ok		
GET http://frog.wix.com/bt?c=1480946736323&evid=3&src=29&pn=1&isp=1&url=deko-svet.si%2F&v=1.1939.13&dc=app-jvm14c&sid=98a027aa-433e-...	Ok		
GET http://frog.wix.com/ugc-viewer?c=1480946736130&evid=361&src=42&majorVer=3&server=app-jvm12a&did=98a027aa-433e-4874-8e6b-9197c3fa...		Ok	
GET http://frog.wix.com/ugc-viewer?c=1480946736131&evid=351&src=42&majorVer=3&server=app-jvm12a&did=98a027aa-433e-4874-8e6b-9197c3fa...		Ok	
GET http://frog.wix.com/bt?c=1480946736139&evid=3&src=29&pn=1&isp=1&url=deko-svet.si%2F&v=1.1939.13&dc=app-jvm12a&sid=98a027aa-433e-...		Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/wixCodeInit/wixCodeInit.min.js	Ok	Ok	
GET https://static.parastorage.com/services/third-party/lodash/3.10.1/lodash.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/coreUtils/coreUtils.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/skins/skins.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/components/components.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/core/core.min.js	Ok	Ok	
GET https://static.parastorage.com/services/third-party/tweenmax/1.18.2/minified/TweenMax.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/animations/animations.min.js	Ok	Ok	
GET https://static.parastorage.com/services/third-party/react/0.14.3/react-with-addons.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/layout/layout.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/wixappsCore/wixappsCore.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/wixappsClassics/wixappsClassics.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/wixappsBuilder/wixappsBuilder.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/tpa/tpa.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/dataFixer/dataFixer.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/siteUtils/siteUtils.min.js	Ok	Ok	
GET https://static.parastorage.com/services/santa/1.1939.13/packages-bin/translationsUtils/translationsUtils.min.js	Ok	Ok	
GET https://static.parastorage.com/services/third-party/hammerjs/2.0.8/hammer.min.js	Ok	Ok	

How to test for all of these things?

(The Looking Glass)

There are many things to test:

Test on NAT64

Test on IPv6-only

Did all resources (images, stylesheets, scripts) load ok?

Does it look good to the user?

Do we see any pMTUd issues?

One service to test them all: **NAT64Check !!!**

(Caught in a web)

nat64check

Check: <http://www.example.com/>



steffann



NAT64

IPv6

Poor

Mediocre

Good

	URL	When	NAT64	IPv6-only
Details	http://dehumida.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://osvelikadolina.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://puhar.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://vkf-renzel.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://domstarejsihidila.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://mirza.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://program-za-trgovino.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://fitness-epicenter.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://vrtuoz.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable
Details	http://chill.si	Nov. 27, 2016, 10:27 p.m.	100%	Unreachable

(Caught in a web)

nat64check

Check:



steffann



NAT64

IPv6

Poor

Mediocre

Good

	URL	When	NAT64	IPv6-only
Details	http://www.sdeval.si	Nov. 27, 2016, 10:25 p.m.	100%	100%
Details	http://myunikat.si	Nov. 27, 2016, 10:21 p.m.	100%	100%
Details	http://korsic.si	Nov. 27, 2016, 10:19 p.m.	100%	100%
Details	http://igraj-tenis.si	Nov. 27, 2016, 10:16 p.m.	100%	97%
Details	http://www.vrtecosbos.si	Nov. 27, 2016, 10:08 p.m.	100%	100%
Details	http://69.si	Nov. 27, 2016, 10:06 p.m.	100%	100%
Details	http://renovatio.si	Nov. 27, 2016, 10:02 p.m.	100%	100%
Details	http://ki-ki-do.si	Nov. 27, 2016, 10:02 p.m.	100%	100%
Details	http://projekt-it.si	Nov. 27, 2016, 9:58 p.m.	100%	100%
Details	http://lenstime.si	Nov. 27, 2016, 9:56 p.m.	100%	97%

nat64check

(The Mirror)

www.netbk.co.jp

Test again

Last test finished:
23 November 2016, 01:21 CET

Image match

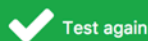


Resources match

nat64check

(The Shattered Fortress)

www.netbk.co.jp



Last test finished:
23 November 2016, 01:21 CET

Image match



Resources match

We don't “fix” brokenness

(Lines in the Sand)

For NAT64/DNS64 implementations in go6lab, we try to avoid AAAA bogus records and all our DNS64 configs are tuned like we have shown in previous slides.

For NAT64 Check tool, however, we don't exclude anything. We are trying to show how it is in reality and not mask problems. Those people, causing problems needs to find out the situation and fix it.

<https://nat64check.go6lab.si/>
<https://nat64check.ipv6-lab.net/>

How does this work?

(Illumination Theory)

Four servers:

- Management server and web interface

- Server with only IPv4

- Server with only IPv6

- Server with NAT64

- Go6lab specific: All servers are virtual machines (LIX) on Proxmox 4.2 virtualization cluster

- IPv6-lab.net specific: All running on virtual machines (Ubuntu) on a VMware cluster

Using phantomjs as a command-line browser

- Keep track of all loaded (or not) resources

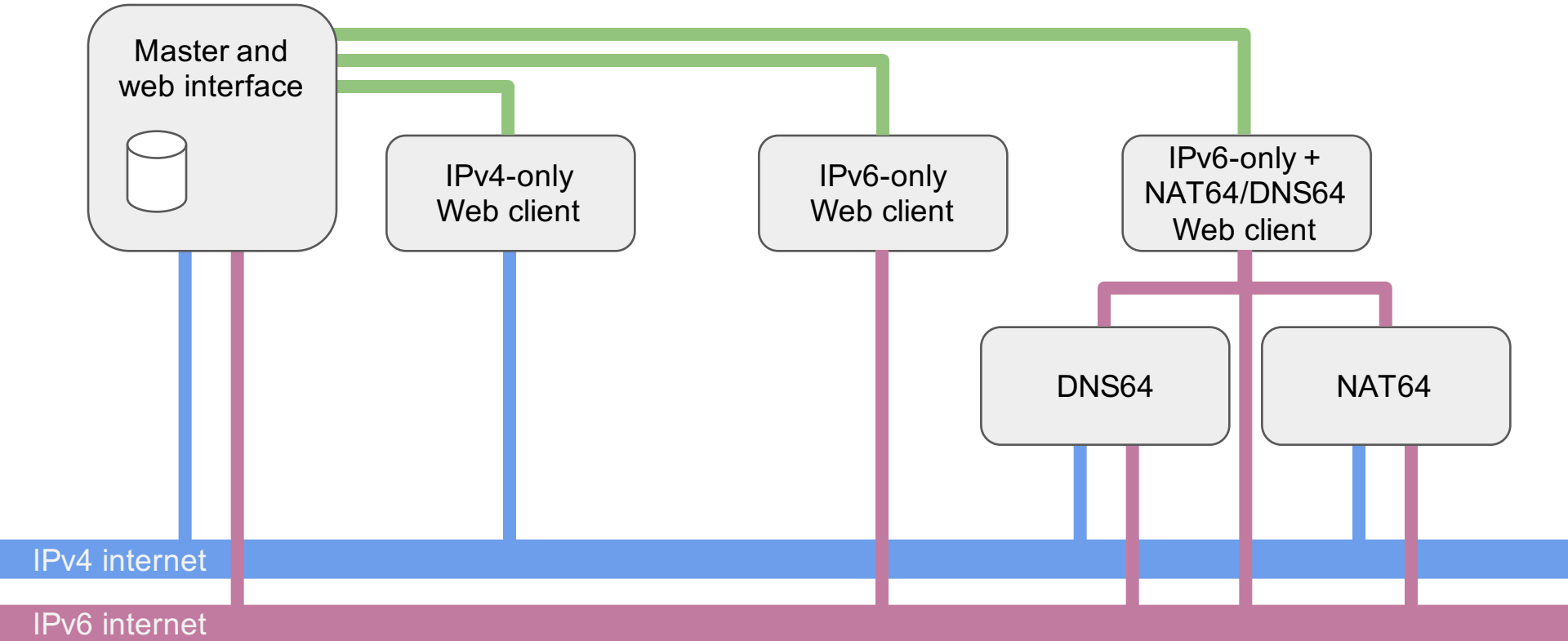
- Make a screenshot when the page has loaded

Compare images with each other

Check for resources that could not be loaded

How does this work?

(Images and Words)



Run the test and calculate the score

(Take the Time)

Enter the domain name or URL that you would like to test and submit it to the system.

nat64check

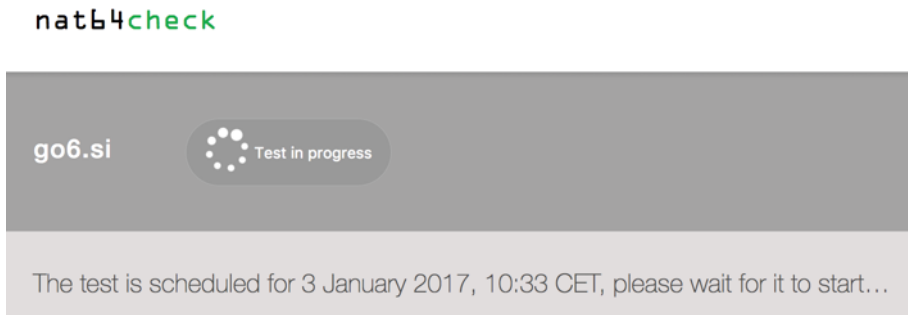


The process of starting all needed browsers, get the results, grab the screen and calculate/compare all the results takes some time, so please be patient.

Run the test and calculate the score

(Take the Time)

You'll see something like this for some time after you start the measurement...



The system will show you when the test was requested, when test was started and will also show you the result in the same page after some time.

No need to hit the “Back” button, it will happen, just give it some time. We promise. Scout’s word of honor. :)

Wash, rinse and repeat

(Lifting Shadows of a Dream)

- Test your website

Are you sure all the images, analytics scripts etc. load over IPv6?

If you don't have IPv6 on your server:

Did you hard-code any IPv4 addresses in your HTML code? In this case NAT64/DNS64 will fail. You might get away with it on 464XLAT, but don't count on it.

Why you don't have IPv6 on your server yet?

If things fail - make sure you are persistent enough to find the issues. There are millions of potential viewers of your content on IPv6-only connection at this precise moment, make sure you don't mess it up and that our tool shows the 100% good result.

- Test again

- Repeat until your website is no longer broken

- If you are fixing a DNS misconfiguration - it might take some time before our tool gets and sees the new and fixed AAAA value. DNS propagation is slow.

Non properly working target domain = no content!

(Learning To Live)

```
Dec 02 12:01:21 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'supersaver.si/AAAA/IN': 2a0b:8e00:1::10#53
Dec 02 12:07:08 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'everlast.si/AAAA/IN': 192.241.255.25#53
Dec 02 12:07:08 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'everlast.si/AAAA/IN': 176.62.8.3#53
Dec 02 12:07:08 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'everlast.si/AAAA/IN': 176.62.8.3#53
Dec 02 12:07:08 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'everlast.si/AAAA/IN': 192.241.255.25#53
Dec 02 12:09:34 nat64check-core named[42328]: DNS format error from 173.255.195.189#53 resolving ns3.dnserv.com/AAAA: Name dnserv.com (SOA) not subd
main of zone ns3.dnserv.com -- invalid response
Dec 02 12:09:34 nat64check-core named[42328]: FORMERR resolving 'ns3.dnserv.com/AAAA/IN': 173.255.195.189#53
Dec 02 12:09:34 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'strojno-vezenje.si/AAAA/IN': 173.255.195.189#53
Dec 02 12:10:18 nat64check-core named[42328]: REFUSED unexpected RCODE resolving 'biomasanakkli.si/A/IN': 185.53.12.52#53
Dec 02 12:18:59 nat64check-core named[42328]: success resolving 'g-ns-1485.awsdns-10.co.uk/AAAA' (in 'awsdns-10.co.uk?') after disabling EDNS
Dec 02 12:18:59 nat64check-core named[42328]: success resolving 'g-ns-453.awsdns-04.net/AAAA' (in 'awsdns-04.net?') after disabling EDNS
Dec 02 12:19:00 nat64check-core named[42328]: success resolving 'g-ns-163.awsdns-35.org/AAAA' (in 'awsdns-35.org?') after disabling EDNS
Dec 02 12:19:00 nat64check-core named[42328]: success resolving 'g-ns-596.awsdns-20.com/AAAA' (in 'awsdns-20.com?') after disabling EDNS
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 203.205.147.152#53 resolving ns1.qq.com/AAAA: Name qq.com (SOA) not subdomain of
zone ns1.qq.com -- invalid response
Dec 02 12:37:40 nat64check-core named[42328]: FORMERR resolving 'ns1.qq.com/AAAA/IN': 203.205.147.152#53
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 203.205.147.152#53 resolving ns3.qq.com/AAAA: Name qq.com (SOA) not subdomain of
zone ns3.qq.com -- invalid response
Dec 02 12:37:40 nat64check-core named[42328]: FORMERR resolving 'ns3.qq.com/AAAA/IN': 203.205.147.152#53
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 182.254.16.102#53 resolving ns-cnc1.qq.com/AAAA: Name qq.com (SOA) not subdomain
of zone ns-cnc1.qq.com -- invalid response
Dec 02 12:37:40 nat64check-core named[42328]: FORMERR resolving 'ns-cnc1.qq.com/AAAA/IN': 182.254.16.102#53
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 182.254.16.102#53 resolving ns-cmn1.qq.com/AAAA: Name qq.com (SOA) not subdomain
of zone ns-cmn1.qq.com -- invalid response
Dec 02 12:37:40 nat64check-core named[42328]: FORMERR resolving 'ns-cmn1.qq.com/AAAA/IN': 182.254.16.102#53
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 182.254.16.102#53 resolving ns-tel1.qq.com/AAAA: Name qq.com (SOA) not subdomain
of zone ns-tel1.qq.com -- invalid response
Dec 02 12:37:40 nat64check-core named[42328]: FORMERR resolving 'ns-tel1.qq.com/AAAA/IN': 182.254.16.102#53
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 182.254.16.102#53 resolving ns1.qq.com/AAAA: Name qq.com (SOA) not subdomain of
one ns1.qq.com -- invalid response
Dec 02 12:37:40 nat64check-core named[42328]: FORMERR resolving 'ns1.qq.com/AAAA/IN': 182.254.16.102#53
Dec 02 12:37:40 nat64check-core named[42328]: DNS format error from 182.254.16.102#53 resolving ns-os1.qq.com/AAAA: Name qq.com (SOA) not subdomain
```

NAT64Check code available on GITHUB

(In Constant Motion)

- All code is free and open and it lives on GitHub.
- Feel free to use it and/or contribute:

<https://github.com/sjm-steffann/nat64check>

91 commits

1 branch

0 releases

1 contributor

Branch: master ▼

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steffann Make message more accurate

Latest commit 7b5bc7e on 5 Dec 2016

nat64check	Running tests on the actual workers	a month ago
old	Major styling and functionality update	2 months ago
v6score	Make message more accurate	a month ago
.gitignore	Running tests on the actual workers	a month ago
manage.py	Update manage.py	4 months ago
requirements.txt	Running tests on the actual workers	a month ago

Conclusions, questions, suggestions?

(Act II: Scene Eight: The Spirit Carries On)

If you are content provider: test how people sees your content from different environments

If you are connectivity provider: test how IPv6-only and 464XLAT/NAT64-DNS64 users sees content

If both: all of the above 😊

You might be surprised. Well, you probably will be surprised.

<https://nat64check.go6lab.si/>
<https://nat64check.ipv6-lab.net/>



Internet
Society

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