



# Geolocation problems. Do we have a solution?

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# 1.5 years ago RFC9092



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## Finding and Using Geofeed Data

### Abstract

This document specifies how to augment the Routing Policy Specification Language inetnum: class to refer specifically to geofeed data comma-separated values (CSV) files and describes an optional scheme that uses the Routing Public Key Infrastructure to authenticate the geofeed data CSV files.

- IP geolocation is needed on various occasions
  - To respect country regulations
  - To provide localized content
  - To optimize latencies
  - Troubleshooting
  - Research

# What's the problem?



- The lack of...
  - Central repo
    - RIRs are not (and don't want to be) geolocation providers
    - There are several datasets offered by geolocation providers
    - Content providers/CDN have their own fork/enrichments
  - Common strategy
    - Geolocation data can be derived/guessed in several ways whois, rdns, latency
    - Whois geographic hints are **a total mess!**
  - Authoritative data
    - How can I change **my** IP geolocation?
- If the geolocation is wrong you have to contact **many** organizations

- The **geoloc** attribute is supported by RIPE and APNIC. It allows to associate latitude and longitude coordinates to single inetnums.
- The **country** attribute in inetnums is supported by APNIC, LACNIC and RIPE. In all the three it has different or not specified meanings.

- “**country:**” – This identifies a country using the ISO 3166-2 letter country codes. It has never been specified what this country represents. It could be the location of the head office of a multi-national company or where the server centre is based or the home of the End User. Therefore, it cannot be used in any reliable way to map IP addresses to countries.



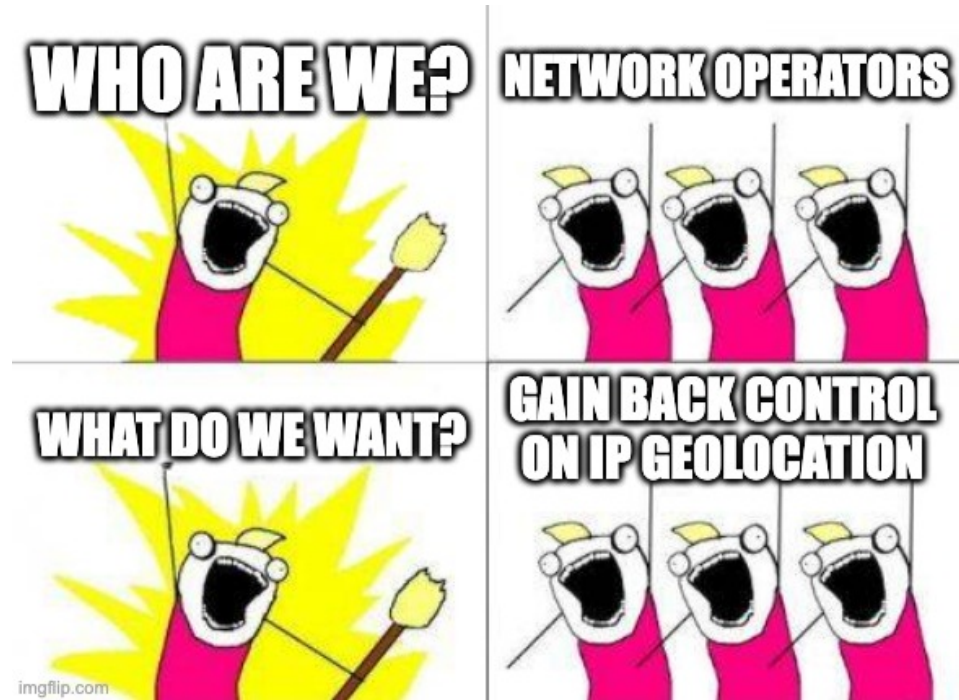
# How often does it happen?



- Only in NANOG mailing list 241 emails related to geolocation problems since September 2019

# What we want?

- A way to get control on IP geolocation
  - We need to be authoritative for this information
- A way to be flexible
  - From prefixes to single IP
  - From country to city
- Easy to maintain
  - Something like... editing a file
  - No emails!





# The solution



- RFC9092 gives to the network operators the power to control the geolocation of their IP resources by linking geofeed files in whois
- This allows geolocation databases and content providers to automatically discover the geofeed files and to import them from a format they are already familiar with
  - *and to validate them!*

# How does it work



1. Create a CSV file with the prefixes/IPs you want to correct/geolocate
  - Each entry like: **204.141.120.0/22,US,US-VA,Ashburn,**
2. Publish that CSV file somewhere, possibly over https
3. Add a remark/comment to the related inetnum/NetRange
  - “Geofeed <https://your/file.csv>”
  - Multiple inetnum can point to the same geofeed file

# Example of Geofeed file



```
83.231.214.172/30,RO,RO-B,Bucharest,  
83.231.214.212/30,RO,RO-SB,Sibiu,  
212.119.27.192/30,IT,IT-21,Turin,  
5.158.213.8/30,IE,IE-D,Dublin,  
83.231.214.228/30,CH,CH-GE,Genève,  
83.231.214.196/30,FI,FI-18,Helsinki,  
83.231.214.112/30,IT,IT-MI,Milan,  
213.198.77.176/30,RO,RO-TM,Timisoara,  
165.254.178.240/28,US,US-NY,,  
202.68.64.0/20,AU,AU-NSW,Sydney,  
103.13.80.0/22,AU,AU-NSW,Sydney,  
153.254.80.0/22,AU,AU-NSW,Sydney,  
198.107.141.0/24,US,US-CA,,  
128.241.0.128/29,US,US-CA,,  
116.51.31.96/30,SG,,Singapore,  
209.212.229.0/24,HK,,,  
165.254.42.200/29,US,US-VA,,  
209.212.233.0/24,AU,AU-NSW,Sydney,  
209.212.228.0/24,JP,JP-13,Tokyo,  
209.212.236.0/24,KR,,Seoul,  
209.212.234.0/24,MY,,,  
209.212.232.0/24,SG,,Singapore,
```

# Add remarks in the RIPE database



The screenshot shows the RIPE Database interface. On the left is a dark blue sidebar with navigation options: 'My LIR' (LIR Account, Billing, Users, General Meeting, Training), 'Requests' (Tickets, Resources, Updates, Transfers), 'Resources' (My Resources, Sponsored Resources), and 'My Resources'. The main content area is titled 'RIPE Database' and contains three sections: 'inetnum' with the value '213.198.56.0 - 213.198.56.255', 'remarks' with the value 'Geofeed https://geofeeds.packetvis.com/b84e0\_213.csv', and 'netname' with the value 'NTT-MASSIMO'. Each section has a '+' button and a '?' button. The 'remarks' section also has a dropdown arrow, a trash icon, and a '?' button.



# Result



```
% IANA WHOIS server
% for more information on IANA, visit http://www.iana.org
% This query returned 1 object

refer:      whois.ripe.net

inetnum:    83.0.0.0 - 83.255.255.255
organisation: RIPE NCC
status:     ALLOCATED

whois:      whois.ripe.net

changed:    2003-11
source:     IANA

# whois.ripe.net

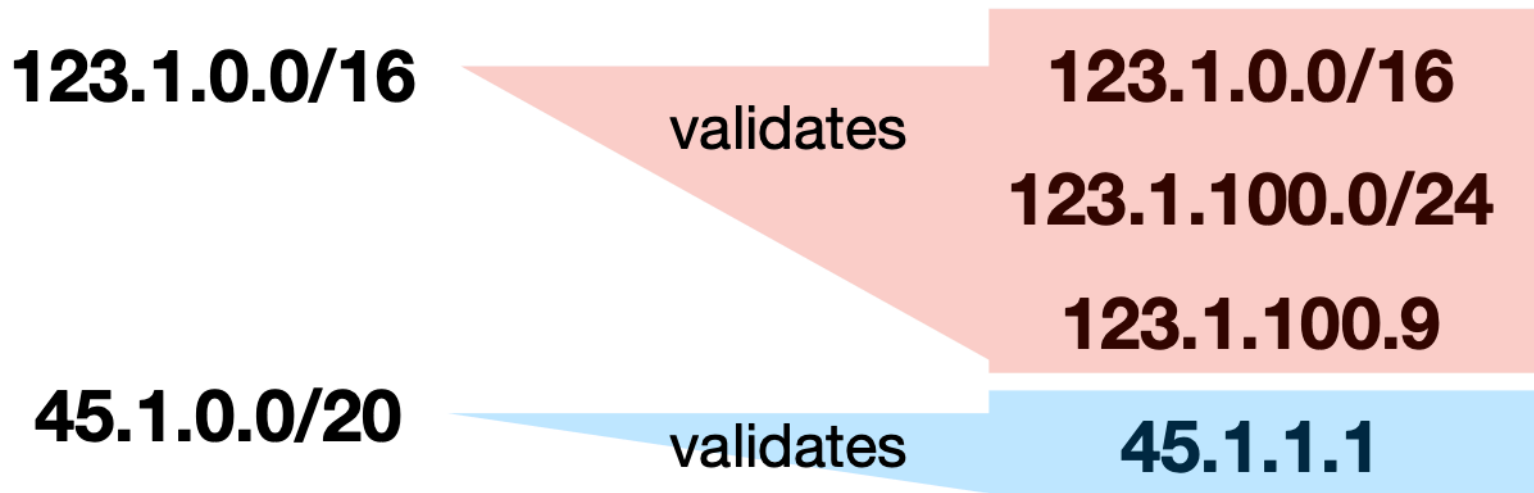
inetnum:    83.231.214.0 - 83.231.214.255
netname:    VERIO-DE-INFRA
descr:      NTTEO DE frankfurt facility
country:    DE
admin-c:    NERA4-RIPE
tech-c:     NAIA1-RIPE
status:     ASSIGNED PA
remarks:    INFRA-AW
remarks:    Abuse/UCE: abuse@us.ntt.net
remarks:    Network: noc@us.ntt.net
remarks:    Security issues: security@us.ntt.net
remarks:    Geofeed https://geo.ip.gin.ntt.net/geofeeds/geofeeds.csv
mnt-by:     MAINT-VIPAR
created:    2013-12-10T17:18:59Z
last-modified: 2020-09-08T18:21:39Z
source:     RIPE # Filtered
```

Don't forget the link!



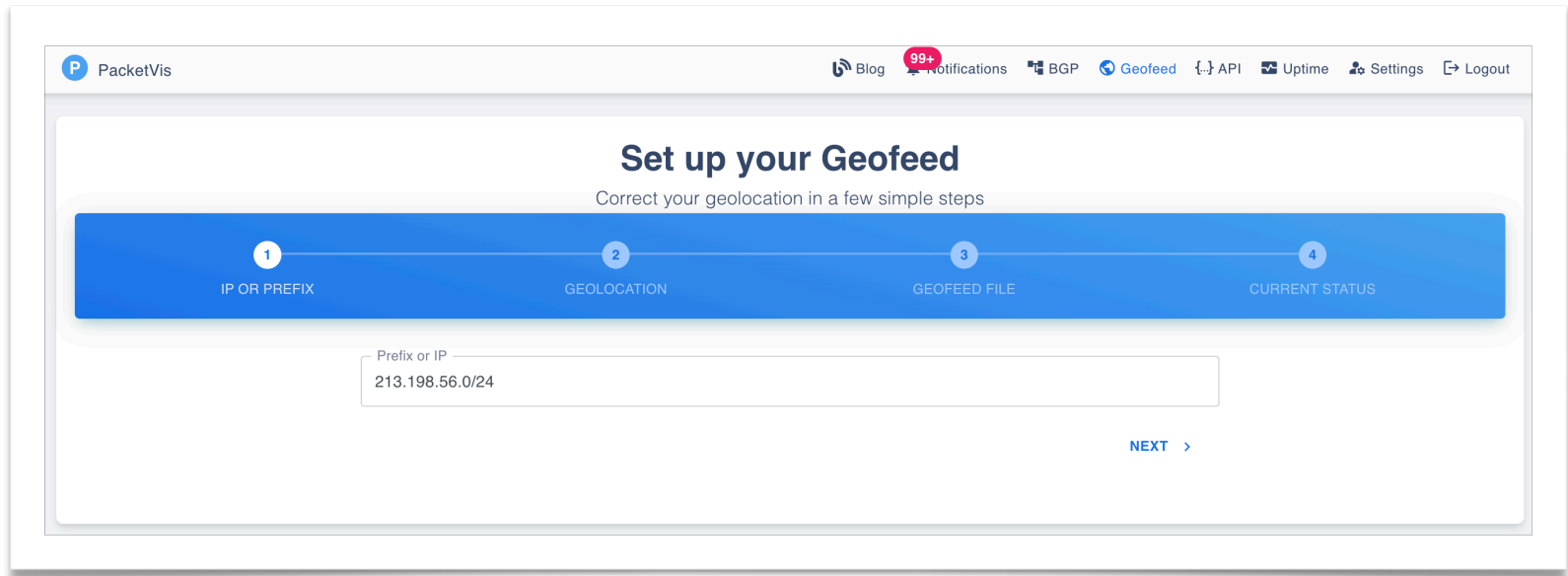
## Inetnums

## Geofeed file content





# A utility to set up geofeed files

- Available at <https://packetvis.com/geofeed> (not an NTT service)
- It simplifies the entire process



The screenshot shows the PacketVis website interface for setting up a geofeed. The page has a navigation bar with links for Blog, Notifications (99+), BGP, Geofeed, API, Uptime, Settings, and Logout. The main heading is "Set up your Geofeed" with the subtext "Correct your geolocation in a few simple steps". Below this is a four-step progress bar: 1. IP OR PREFIX, 2. GEOLOCATION, 3. GEOFEED FILE, and 4. CURRENT STATUS. The first step is active. A text input field labeled "Prefix or IP" contains the value "213.198.56.0/24". A "NEXT >" button is located below the input field.

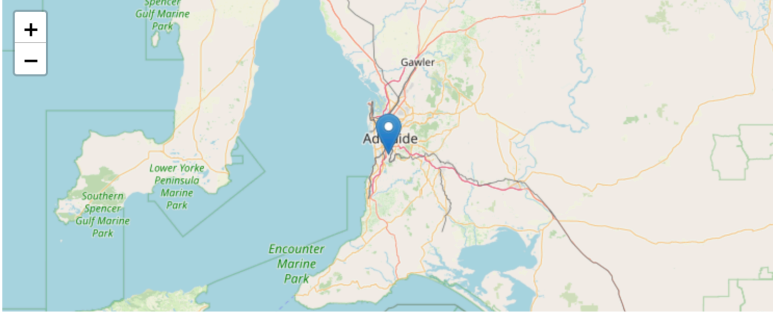
# PacketVis Geofeed Tool - Location

Country  
United States (US)   ▼

City  
Pasadena ▼

State  
California (US-CA) ▼

Zip code



DO NOT GEOLOCATE

[< PREV](#) [NEXT >](#)



# PacketVis Geofeed Tool - Inetnum

It looks like everything is ok here and nothing has to be done in the inetnum

<b>inetnum:</b>	213.198.56.0 - 213.198.56.255
<b>netname:</b>	NTT-MASSIMO
<b>mnt-by:</b>	MAINT-VIPAR

Contains the following remarks

<b>remarks:</b>	Geofeed <a href="https://geofeeds.packetvis.com/b84e0_213.csv">https://geofeeds.packetvis.com/b84e0_213.csv</a>
-----------------	---

Hosted by

PACKETVIS  MYSELF

[< PREV](#)

[SAVE AND TEST](#)

# PacketVis Geofeed Tool - Inetnum validation

It looks like everything is ok here and nothing has to be done in the inetnum


<b>inetnum:</b>	213.198.56.0 - 213.198.56.255
<b>netname:</b>	NTT-MASSIMO
<b>mnt-by:</b>	MAINT-VIPAR

Contains the following remarks

<b>remarks:</b>	Geofeed <a href="https://geofeeds.packetvis.com/b84e0_213.csv">https://geofeeds.packetvis.com/b84e0_213.csv</a>
-----------------	---

**Hosted by**

PACKETVIS  MYSELF

 Your geofeed deployment is working properly! Nothing else to do.















































[< PREV](#)

[CHECK WHERE GEOLOCATION PROVIDERS SAY IT IS >](#)

[FIX ANOTHER IP >](#)

# PacketVis Geofeed Tool - Current status

We check the geolocation of your prefix across all the geolocation providers below, and we will let you know once the geolocation is updated.

Provider	Country	City	Update method	Last check
 Bigdata Cloud	 NL 	Amsterdam 	automatic	2023-05-08 01:37 UTC
 fastah	 GB 	Kent 	automatic	2023-05-08 01:37 UTC
 ipinfo.io	 US 	Pasadena 	automatic	2023-05-08 01:37 UTC
 ipregistry	 US 	Pasadena 	automatic	2023-05-08 01:37 UTC
 IPWHOIS.IO	 US 	Pasadena 	automatic	2023-05-08 01:37 UTC
 ipdata	 US 	Pasadena 	automatic	2023-05-08 01:37 UTC
 apiip.	 GB 	Kent 	manual 	2023-05-08 01:37 UTC
 MAXMIND	 GB 	Hornchurch 	manual 	2023-05-08 01:37 UTC
 ipgeolocation	 US 	Greenwood Village 	manual 	2023-05-08 01:37 UTC
 WhoisXMLAPI <small>The Whois Behind Domain, IP &amp; Cyber Threat Intelligence</small>	N/A	N/A	N/A	now
 ipstack	 DE 	Frankfurt am Main 	manual 	2023-05-08 01:37 UTC
 IP2LOCATION	N/A	N/A	N/A	now

1-12 of 12 < >



# Adoption



## Geolocate much?

RFC9092 gives to the network operator the power to control the geolocation of its IP resources.

It works by linking geofeed files in whois. This allows geolocation databases and content providers to automatically discover the geofeed files and to import them from a format they are already familiar with. It can be used to set the geolocation of entire prefixes or specific IPs.

It works by simply editing a text file. No need to open tickets or send emails.

**At the moment there are 63035 prefixes with geofeeds.**

[READ MORE](#)

[TEST YOUR GEOFEED](#)

### Adoption

Name	File format ⓘ	Auto-discovery v4 ⓘ	Auto-discovery v6 ⓘ	Reactivity ⓘ	Share
IPInfo.io	✓	✓	✓	1 day	<a href="#">Twitter</a>
IP2Location	✓	✓	✓	1 day	<a href="#">Twitter</a>
IPRegistry.co	✓	✓	✓	1 day	<a href="#">Twitter</a>
WhoisXMLAPI	✓	✓	✓	2 days	<a href="#">Twitter</a>
BigDataCloud	✓	✓	✓	4 days	<a href="#">Twitter</a>
Fastah	✓	✓	✓	5 days	<a href="#">Twitter</a>
IPData.co	✓	✓	✓	7 days	<a href="#">Twitter</a>
IPGeolocation.io	✓	✗	✗	N/A	<a href="#">Twitter</a>

# Test your geofeed



## Test your Geofeed

If you type an IP or a prefix, you can check if it is covered by a geofeed file and if the file is correct.

IP or Prefix  
165.254.42.200/29

TEST

### Inetnum with geofeed found:

**NetRange:** 165.254.0.0 - 165.254.255.255  
**NetName:** NTTA-165-254  
**Organization:** NTT America, Inc. (NTTAM-1)  
**Comment:** Geofeed <https://geo.ip.gin.ntt.net/geofeeds/geofeeds.csv>

### Geofeed entries inside the inetnum

Prefix	Country	Region	City
165.254.178.240/28	✔ US	✔ US-NY	
165.254.42.200/29	✔ US	✔ US-VA	
165.254.21.0/29	✔ BR	✔ BR-SP	Sao Paulo

Rows per page: 100    1-3 of 3    < >

SHARE RESULT ON TWITTER

> How does it work?

> The Geofeed format

> How adoption is calculated?

> What about geoloc/country in the RIR databases?

> How to find the geofeed files?

> What to do if it doesn't work?

SHARE ON TWITTER 

**Download all validated feeds at once**

<https://geolocatemuch.com/geofeeds/validated-all.csv>



# Recap



- Utility to set up and test a geofeed easily:
  - <https://packetvis.com>
- To check adoption numbers, test, and read more info
  - <https://geolocatemuch.com/>
- RFC9092
  - <https://datatracker.ietf.org/doc/html/rfc9092>

# Thank you.

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