Position Paper by Fastly
For IAB Workshop on IP Address Geolocation (ip-geo, ipgeows)
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Fastly submits this position paper in response to the announcement by the program committee of the IETF's interest in convening the IAB Workshop on IP Address Geolocation in December 2025[1].

As both a Content Delivery Network (CDN) and Edge Compute Platform, Fastly has a deep interest in IP address geolocation from the dichotomy of being both a consumer and provider. Fastly currently utilizes IP address geolocation to enrich customer connections through its CDN, and provides an API endpoint for querying geolocation information against a data set from both its platforms. Fastly customers rely on the accuracy of geolocation services and the consumption of RFC 8805[2] geofeeds to represent the locations of proxied users.

IP address geolocation is used primarily by Fastly's customers as a means to gate based on location for licensing or trade compliance as well as to serve specific content to users on geographic boundaries. Geolocation information provided by Fastly is mainly used to locate or at least log their customer's information to help better analyze their traffic. Each of these businesses need to serve relevant traffic to customers or geoblock traffic, some malicious, from accessing information that they are not permitted to access (e.g. a regional streaming video service needs to block traffic from outside their region).

There are challenges with IP address geolocation that make customer's goals for using geolocation facilities incredibly difficult. Fastly recognizes several problems with the current geolocation problem space; detailed accuracy below country level, deliberate false specificity, accuracy when updating information, mobility of IP addresses, non-geographic conglomerate address space (e.g. anycast), timely data providing, and validation. All of these are problems for customers who consume our geolocation service. However, the problems involving accuracy and data validation are particularly challenging.

Fastly is concerned that data validation and authentication is largely an unaddressed problem in the industry; datasets containing false or inaccurate localities are detrimental to many of the goals for which the geolocation datasets are employed. Updates that have not been carefully validated may themselves be false, or changes in the ownership or advertisement of address space may render claims in geolocation datasets inaccurate. Absorbing large or hard to verify changes in datasets is a difficult problem for validation, in particular cases where the geolocation claim resolves to the address of the IP address registrant or contains false specificity (e.g. the geographic center of the United States). Methods associated with the ability to rapidly change IP address space assignments within or between cloud providers and large networks confound the utility of datasets that are updated on timescales of days or weeks.

1: https://datatracker.ietf.org/group/ipgeows/about/
2: https://www.ietf.org/rfc/rfc8805.html

IP address geolocation datasets are therefore subject to time pressures that can render them increasingly inaccurate.

In addition, current geofeed publication methods poorly represent addresses, which may be in use in multiple or potentially non-specific locations. Included in the above is the issue with several types of dynamic IP addresses, for example anycast addresses. Inherently, an anycast address has multiple locations, but geographically distributed anycast prefixes represented in current geolocation datasets are misrepresented; at best their locality reflects the primary business location of the resource holder. As anycast deployments have become more sophisticated and particularly with the greatly expanded identifier space provided by IPv6, it is increasingly common that services residing within IPv6 anycast space can operate both as clients and servers so the problem of where these prefixes are claimed to be located becomes increasingly germain to the deployment and provisioning of cloud services.

Another issue with treating all IP address space in the same manner is mobile devices and their addressing assignments. Network providers generally allocate IP addresses based on the location of the egress gateway assigned to handle the mobile devices traffic destined for the Internet. Not only is a mobile device potentially changing its location frequently, but also its assigned egress gateway may be hundreds of miles away or across a political boundary which may render it inaccurate for the purpose of geoblocking content. All of these factors lead to geolocation feeds providing false locality claims without any indication of the accuracy of the data.

This leads consumers of geolocation datasets to have limited trust, when the data can point to outdated information or at a generic location such as a corporate headquarters location, which is most likely not correct in a majority of cases.

The above litany of complaints points to the larger issue around how the industry is conflating IP address location and user location and the concomitant ontology that describes them. This misunderstanding affects our customers. It should be clear that IP address geolocation is not itself a determination of user location but presently a limited and possibly unspecified claim about the location of an IP address.

The IETF's work on user identity protection, anonymization, and mass commercial or government surveillance motivated by the publication of RFC 7258[3] creates additional impetus for examining claims made by geolocation datasets. IETF proposed standards like RFC 9458 as well as the widespread deployment of consumer and enterprise oriented VPNs and SDWAN solutions render questionable a number of claims asserted in geolocation datasets. To the extent that anonymity providers have an interest in accurately representing the location of their customers, they may wish to do so to a particular level of specificity and no more. The provisioning of these services may also require the consumption of meaningful amounts of scarce IPv4 address space and drive further de-aggregation; that space might otherwise be used by end users. The ability of IP geolocation providers to evaluate the claims in an RFC

3: https://www.ietf.org/rfc/rfc7258.html

8805 geofeed which describes allocations that are below the event-horizon provided by a proxy or vpn endpoint is dubious.

The provisioning of privacy oriented proxy services can greatly increase the size of geolocation datasets. In particular, the enormous size of the IPv6 locator/identifier space can be employed to produce geolocator records without effective limits.

Proxy services built on RFC 94584[4] Oblivious HTTP Relay services, obscure the identity of clients from servers for a variety of purposes, mostly anonymity preservation. It is desirable to accurately, to various degrees, represent the proximate geographic location of the client while anonymizing the IP behind the CDN. This claim of locality is performed by publishing RFC 8805 geofeeds. Presently there is no ontology which distinguishes between a geolocation claimed on behalf of a third party vs a claim made with respect to where the IP address, as a locator, is domiciled.

Fastly is very interested in engaging in further industry collaboration on the continued standardization efforts to improve the nature of the claims made by IP address geolocation datasets. RFC 8805 is a starting point. It reflected informal but common practice at the time of publication. We recommend expanding on this with some of the issues discussed above in order to refine the scope of what is claimed, in order to ensure accurate information for all classifications of IP addresses. Industry practices for the evaluation or imposition of locality claims should be examined even if they are not themselves the subject of standardization.

Fastly would like to thank the Internet Architecture Board for putting together this workshop on IP address geolocation and is looking forward to working with the IAB, IETF, and broader community on addressing these challenging problems.

Authors:

Brian Haberman (brian.haberman@fastly.com)
Ricky Hosfelt (ricky.hosfelt@fastly.com)
Joel Jaeggli (joel@fastly.com)
Stephen Strowes (sds@fastly.com)

4: https://www.ietf.org/rfc/rfc9458.html