IAB Workshop on IP Address Geolocation (ip-geo) (ipgeows)

https://datatracker.ietf.org/group/ipgeows/about/

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In Japan, Internet Service Providers (ISPs) offer internet connectivity over NTT's nationwide NGN (Next Generation Network). This infrastructure allows IPv6 addresses to be partially linked to geographic information. Furthermore, a database that maps IP addresses to geographic locations is maintained by representatives of the ISPs.
Taking this situation into account, this report outlines the current state and challenges of GeoIP in Japan, as well as its potential future applications.

Today's Use Cases and Gaps and Problems

- **Marketing and Advertising**
  - By identifying the general area from an IP address, targeted advertisements can be delivered, or users can be guided to nearby stores. This helps reduce unopened rates and improve CVR (Conversion Rate).

- **Crime Prevention in Finance and Other Sectors**
  - By identifying the time and region from an IP address, unauthorized access from overseas or from unexpected domestic regions can be blocked in advance, enhancing security.

- **Content Filtering**
  - GeoIP is used to control content that is prohibited in certain countries or regions. This contributes to copyright protection.
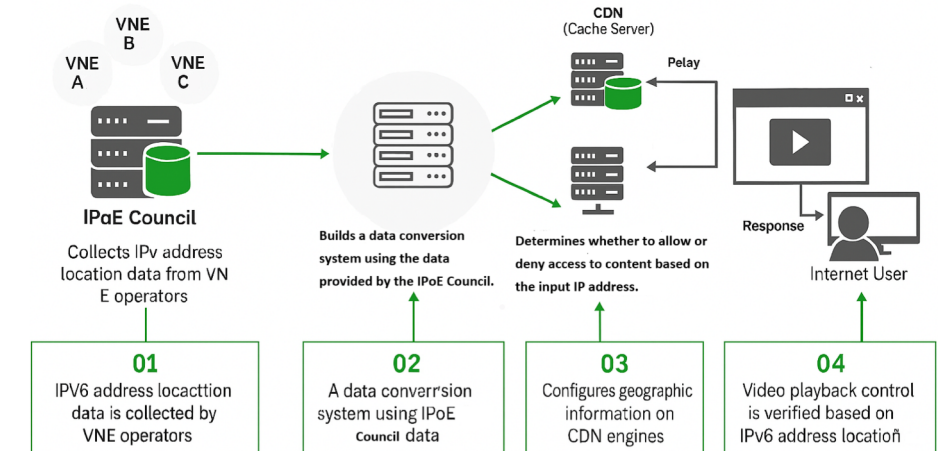
- **Lack of Standard Format**
  - Although data is provided in MaxMind format, it does not support advanced statistical data formats. There is no universally accepted standard, and formats are used ad hoc.

- **Data Correction Methods**
  - Currently, raw databases are used and not regularly updated. If a user corrects data using tools like MetaClean filters, the correction may apply only to that specific service and not be reflected across others. Since each service uses its own database, a mechanism for sharing corrected data across services is needed.

- **Privacy Concerns**
  - While IP addresses and geographic indicators alone cannot identify individuals (and are not considered personal information), it is still necessary to gain user understanding.
  - Users who do not wish to provide their personal information similarly express concerns about GeoIP. However, user understanding of GeoIP varies widely, making it difficult to promote awareness.

System Overview: Providing Local Store Information to Website Visitors

Fukukar Region → Fukuuka Prefecture → Fuxuhio City → Store
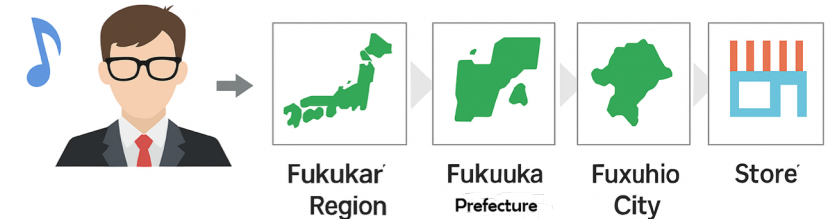
Users can instantly find information about the nearest store in their area.

System Configuration for GeoIP-Based Video Playback Control (Proof-of-Concept in Japan)

VNE B
VNE A
VNE C

CDN (Cache Server)
Pelay
Response
Internet User

IPaE Council
Collects IPv address location data from VN E operators

Builds a data conversion system using the data provided by the IPoE Council.

Determines whether to allow or deny access to content based on the input IP address.

01 IPV6 address locacttion data is collected by VNE operators

02 A data convarr'sion system using IPoE Council data

03 Configures geographic information on CDN engines

**04** Video playback control is verified based on IPv6 address locatioñ

Future Opportunities

Future Opportunities: If we re-designed technical solutions to address the motivating use cases, what would those solutions look like? Are there alternative approaches that can avoid the gaps and problems we have today? Is there value in conveying other information in addition to or instead of geography, such as type of last mile network connection?

- Refining and Enhancing the Reliability of Geolocation Data
  - In Japan, efforts are underway to build a system in which ISPs share databases that link IP address information with geolocation data. However, network topology and geographic information do not always map accurately, and building such databases incurs significant costs.
  - By establishing common formats and protocols for data exchange between service providers, ISPs can benefit from more efficient database construction and maintenance.
- Benefits of Data Granularity and Reliability
  - Enhancing the granularity of geolocation data opens up new scenarios for GeoIP utilization

1. Disaster Response
- With the widespread use of IoT devices, mapping IP addresses to location data can help identify areas affected by power outages or water supply disruptions. Communication with IoT devices enables real-time data collection during emergencies.

2. Internet Performance Monitoring
- Knowing the location of user devices allows for analysis of communication quality, such as regional differences in throughput between devices and servers. This data can also be used to support users by identifying and resolving network performance issues.

Use of Geolocation Information During Disasters
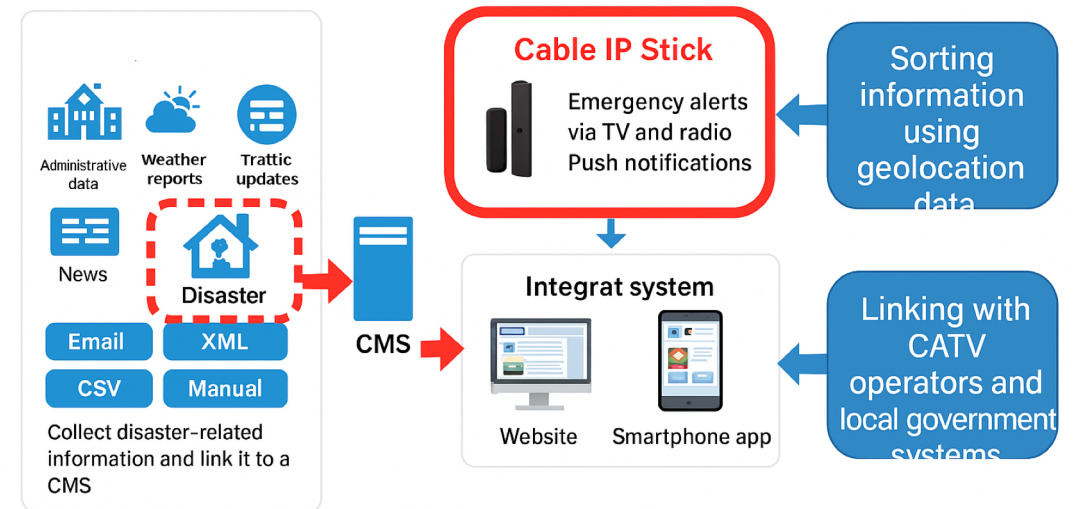
By obtaining the geographic information of the devices involved in this system, it becomes possible to provide more accurate and reliable information.