

# Removing Internet Anonymity Barriers with IP Geolocation Data and Services

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When making a decision in the offline world, geography plays a crucial role. For example, it affects the way you price and promote your products; it shapes the way you reach out to your target audiences; it is used to analyze the attributes of consumers within a particular area; and it places restrictions on the way you conduct business due to laws and regulations in a given area.

The same holds true in today's highly mobile, digital world. Understanding user location can be a critical factor in reaching customers when and where it matters most, and key to enhancing their digital experiences. A recent location-intelligence study revealed that many C-level executives considered location data to be an important part of their company's success and are looking to invest in this type of data during the next few years.

Digital Element's IP geolocation data and services can empower organizations to bring crucial offline decision-making factors to the digital world. In particular, Digital Element's patented NetAcuity® IP geolocation technology allows any type of digital business—from websites, brands, security companies, ad networks, social media platforms and mobile publishers—to identify the location of online visitors down to a ZIP+4/postcode level worldwide without invading user privacy.

This technology, which is based on user IP addresses, can perfect audience segmentation capabilities and targeting based on 59+ parameters in addition to location, including connection type/speed, mobile carrier, proxy type, ISP, Wi-Fi intelligence, and demographics—all in a non-invasive manner that respects the user's right to privacy.

Digital Element's global geolocation data and services are considered the de facto standards, delivering the most granular and accurate IP mapping solutions in the market. Armed with new information about the way in which individuals interact with the digital channel, organizations from startups to the world's most sophisticated internet players have the ability to create more meaningful and impactful interactions with online users, ultimately increasing reach, relevance and revenue—significantly improving ROI for their digital campaigns and other initiatives.



**"IP geolocation data helps you uncover crucial insights about your online customers, allowing you to connect with them in more effective, impactful, and non-invasive ways."**

## Sample IP targeting applications include:



### Targeted Online Advertising

Enables advertisers and marketers to geotarget to a ZIP+4/postcode-level worldwide, increasing advertising's reach, relevance and response. More than 59 other IP parameters allow for more pinpointed targeting and flexibility.



### Localized Content

Provides online entities with the tools to move away from "one-size-fits-all" messaging and information, instead delivering relevant content, language, currency, products and promotions—creating an instant connection with website visitors. This helps reduce website and transaction abandonment, resulting in increased sales and revenue.



### Geographic Rights Management

Allows online content distributors to adhere to licensing and copyright agreements surrounding usage of online audio, video and software content. Additionally, IP geolocation can be used to restrict downloads in certain geographic locations for encryption software or in other cases where access to content needs to be legally restricted.



### Enhanced Analytics

Offers companies a new way to view, parse and analyze online data to increase performance for digital initiatives. It also provides a real-time mechanism that allows companies to take immediate action to tactically refine local and international marketing campaigns with clarity and control.



### Online Fraud Prevention

Helps create a safe and secure environment for online customers to conduct their transactions. It helps determine which transactions to review and allow while strengthening identity verification and digital profiles. It also identifies access from proxies, which are major red flags for online fraud.



### Mobile User Targeting

Lets advertisers and retailers incorporate geotextual, or location- and context-aware, business strategies to encourage smarter, more relevant interactions with mobile consumers. It helps marketers reach audiences across multiple screens and Wi-Fi connections to create more engaging interactions with today's "always on" users.

## Variations in the Reliability of IP Data Exist

Prior to the development of Digital Element's IP geolocation technology, determining user location via IP address lookup or IP mapping revolved around unreliable techniques that returned questionable data—and unfortunately many of those methods are still in use today.

### Online Registration Data

Websites typically ask users to fill out simple forms in order to gather more information about them. This information is stored in a "cookie" and placed on the user's machine, thus allowing the website that collected the information to "remember" the user and present tailored information. The problem with information collected in this manner is twofold: 1) Many users falsify their personal information; and 2) More users are turning off cookies on their machines because they find them to be an invasion of privacy.

### Reverse Domain Name Server (DNS) Lookup

Reverse DNS lookups are inaccurate because some of the IP space has no associated host name. Furthermore, if there is a host name, the associated Top Level Domains (TLDs) consist of a two- or three-letter suffix such as .com or .jp, which were originally designed to provide a logical association with the assigned suffix. The problem is that they are not very accurate, and no longer consistently reflect geography when assigned. For example, the suffix .md began as a country designation, but has been sold to companies worldwide because of its appeal to those in the medical profession. Furthermore, TLDs do not offer location hints deeper than the country level. And, in the case of generic TLDs like .com and .net as well as the newer domains such as .shop and .app, geographic identifiers are absent.

### WHOIS/Registry Data

WHOIS data ordinarily provides contact information for each IP address range. But in the case of many hundreds of thousands of IP addresses, the WHOIS data just isn't accurate. Further compounding the problem is that for large enterprises or Internet Service Providers (ISPs) that have geographically dispersed workers or customers, the information in the WHOIS database reflects the location of the company headquarters, and not the actual location of a given user, making reliability of this data extremely poor.

Example of a "Whois" entry (over 64,000 IP addresses registered to Comcast's corporate headquarters even though they actually may be allocated to cities throughout the United States and the rest of the world):

Comcast Cable Communications, Inc.

1800 Bishops Gate Blvd.  
Mount Laurel, NJ 08054 US  
Netname: PA-34



Digital Element utilizes  
a user's IP address to  
determine location

Netblock: 24.0.0.0 - 24.0.255.255

## IP Targeting Data Accuracy Is Key in Today's Digital Marketplace

Unlike the techniques above, which rely on individual user or corporate information, Digital Element's technology utilizes a user's or machine's IP address to determine location and other IP information. IP addresses are network-supplied, 32-bit numbers that allow users/machines to initiate an internet session. No personally identifiable information is associated with these numbers, but every person on the internet must have one in order to access content. Unlike user-supplied registration data, IP addresses are assigned by the network, making it impossible to supply intentionally misleading information. The problem with these addresses as noted in the last section is that the IP address assignments to large corporations or ISPs (which serve consumers) generally refer to a single geographic location such as corporate headquarters, and are not assigned based on geography. Instead, these blocks of allocated IP addresses are assigned on a "first come, first served" basis, making it extremely difficult to accurately determine the geographic location of the user or machine.

Another factor that makes it difficult to track the location of IP addresses is that the locations of IP addresses are in a constant state of flux: the assignment of an individual or block of IP addresses can change in an instant. For example:

- Addresses may be moved by the owner of the IP block
- Addresses are allocated and reallocated on a continual basis
- Addresses are constantly de-allocated

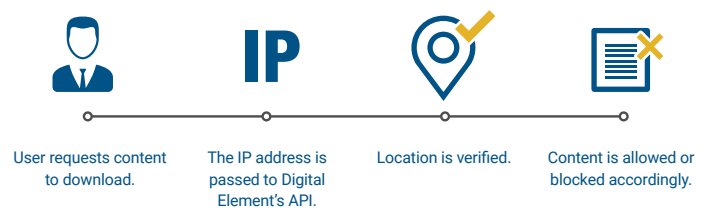
However, while addresses may change, dynamic IP addresses, which are found in ISP dial-up networks, do not affect NetAcuity's accuracy. While a user may get a different address every time he or she logs on through an ISP's point of presence (POP), the IP address range itself at the POP is generally static. NetAcuity analyzes the allocations at a given ISP, and stores this information in the NetAcuity database.

Digital Element bases its mapping on where known pools of dynamic IPs are located. ISP dynamic re-allocations tend to be within those known pools of IP addresses, and the geographic allocation of pools actually remains fairly constant at the ISP end-point equipment level. With such an extensive customer network performing more than 10 trillion IP lookups per month, the company is able to pick up IP address reallocations the instant they occur, ensuring that data remains highly current and accurate.

## NetAcuity Technology at Work

### How It Works

Keeping track of such a massive universe of IP addresses and working to tie geographic and other relevant information such as domain name, connection speed and ISP is the core focus of Digital Element. In 1999, Digital Element's parent company, Digital Envoy, was the first to develop city-level geolocation technology utilizing more than 20 different methods to determine the physical location of an IP address down to city level worldwide. Digital Element's patented technology combines Internet routing infrastructure analysis with hundreds of millions of partner-derived online end-points, resulting in the most accurate IP geolocation data available today.



Digital Element utilizes patented web-spidering technology and 20+ proprietary methods to triangulate the location, connection speed, and many other characteristics associated with an IP address. It combines this "inside-out" infrastructure analysis with "outside-in" user location feedback gleaned from a network of commercial partners to improve and validate its response at a hyperlocal level (city/postcode/ZIP+4). Furthermore, Digital Element offers the only database that overlays mobile device-derived data to provide precision targeting of on-the-go users.

NetAcuity utilizes Intelligent Trace Agents (ITAs), which function in much the same way as a search engine spider. NetAcuity ITAs constantly "crawl" the internet, providing a comprehensive, global view by utilizing network tools, routing tables (BGP, ASN, etc.) and triangulation from various points on the internet, to name just a few. By utilizing this artificial intelligence core and a team of dedicated data analysts, NetAcuity can determine the location from which IP addresses originate. This information is then stored in a database at the company's data analysis center and is constantly monitored and updated.

Digital Element is working 24x7 to update its databases and send these updates to its clients and partners throughout the world on a weekly basis to ensure that they have the most up-to-date information available.

Digital Element's IP geolocation solutions provide coverage for 99.9999 percent of the internet and collect more than 60-70 million points of view daily. The company has received accreditation from the Media Rating Council (MRC) for the geographic location identifications reported by its NetAcuity platform. NetAcuity solutions have the most accurate data in the industry: Global accuracy is more than 99.9 percent at the country level and is up to 97+ percent accurate at a city level.



Up to 97+ percent accurate at a city level.

## Deployment

While keeping the constantly changing IP address universe up to date is a difficult task, deployment of NetAcuity technology is not. Whether used as a standalone solution or integrated into an enterprise or networking application, the set-up is a simple task.

## Deployment Options

1. NetAcuity can be installed on a client's web server or on a dedicated machine, whichever works best for the application. It is installed and queried locally and is essentially a caching mechanism for the database files. It is queried through APIs that Digital Element provides in most standard languages. The database is automatically updated weekly via a non-performance impacting hot swap.
2. A flat file of the database is also offered for clients that want to load Digital Element's data in their own DB structure and not install the software. Updates are also weekly, and clients can "automate" this process via a simple script to pull down the DB. APIs are not provided with this option, but instead clients query the DB in whatever way works best.
3. Finally, Digital Element offers a high-performance cloud service for those companies that simply prefer to query the DB offsite.
4. After NetAcuity is installed and running, making the data integrate with a client's web or enterprise application falls to the client, thus ensuring complete control when extracting information from the NetAcuity server and ensuring smooth operations with existing applications.

## Specifications

NetAcuity runs on virtually any off-the-shelf machine, and does not require a huge capital outlay for proprietary or expensive hardware.

## Specifications

Computing Platforms – Provides support for a variety of popular 64-bit computing platforms: Red Hat Enterprise Linux 5, Windows 2003/2008 Server

Client Platform – Integrates with most operating systems and applications

Application Programming Interface (API) – Apache Web Module, C, C++, C++ Embedded, C#, Go, Java, Java Embedded, NGINX Web Module, Node.js, Perl, PHP, PHP Shared Memory (Linux only), Python, Ruby, Ruby Embedded and custom support is available for a wide variety of programming languages and client platforms

Database Updates – Weekly

Processing – Capable of over 30,000 IP resolutions per second

Latency – As low as .03 milliseconds

RESTful interface

Up and running in as little as 20 minutes

Support – 24/7 technical support

## Data Parameters

NetAcuity's geographic coverage is unsurpassed in the marketplace at more than 99.9999 percent of the globe. Below are current IP address-to-location database offerings, with accuracy percentages included where appropriate.

## Data Parameters

Parameter	Parameter
Country	Region or State
City	ZIP/Postal Codes
ZIP+4	Connection Speed
Connection Type	Mobile Carrier
Latitude/Longitude	Proxies
Domain Name	Industry Codes
DMA/MSA (U.S. only)	Organization Name
ISP	ASN
Home/Business	Language
Country level only	Time Zone
Company Name	Demographics
UK ITV Regions	Custom Regions

\* Globally

Note: Accuracy rates vary greatly. As with all IP targeting technologies, accuracy rates will remain variable on ZIP and area-code targeting.

## Perfect Audience Segmentation, Targeting with Comprehensive Data

It's important to remember that you can glean a vast amount of useable, reliable and accurate online data without invading users' privacy with Digital Element's technology. This wealth of information will allow you to confidently produce the necessary one-to-one, cross-channel marketing efforts necessary to succeed in today's competitive digital marketplace.

Contact Digital Element to learn more about how the global leader in geolocation data and services can help give your company's online and mobile initiatives the competitive edge.

## About Digital Element



Since 1999, Digital Element has been providing global geolocation data and services that bring anytime, anywhere relevance and context to online initiatives—from desktops to mobile devices. The company's patented technology has been certified and accredited to deliver real-time access to accurate and reliable location intelligence without invading Internet users' privacy. For nearly two decades, many of the world's largest websites, brands, security companies, ad networks, social media platforms and mobile publishers have trusted Digital Element's technology to target advertising, localize content, enhance analytics, and manage content rights as well as detect and prevent fraud.

Visit [www.digitalelement.com](http://www.digitalelement.com) for more information on how to bring the power of location to the online world. Follow us on LinkedIn and Twitter @DigitalElement then like us on Facebook. Headquartered in Atlanta and London, Digital Element is a division of Digital Envoy Inc.

## Examples of Leading Companies That Count on Digital Element's Data Accuracy



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