



## Removing Internet Anonymity Barriers with IP Intelligence

When making a decision in the bricks and mortar 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 the online world. Understanding user location can be a critical factor in customer outreach, yet until now there has been no reliable way to uncover location information about online users.

Digital Element's patented NetAcuity® IP Intelligence technology allows any type of online business – from online advertisers to emerging technology companies to global corporations to online retailers – to identify the location of online visitors down to a city-level worldwide – without invading user privacy. This technology, which is based on user IP addresses, can also uncover other valuable information about an online user such as connection speed, ISP and domain name, providing a more accurate picture of online traffic — in a non-invasive manner.

Digital Element's IP Intelligence is the de facto standard for accurate targeting and is used across industries to enhance the value of online endeavors. Armed with new information about the way in which individuals interact with the online channel, organizations from startups to the world's most sophisticated Internet players now have the ability to create more meaningful and impactful interactions with online users, ultimately increasing reach, relevance and ROI.

Sample applications of IP Intelligence include:

- **Targeted Online Advertising**  
*Enables online advertisers and marketers to geotarget to a city-level worldwide, increasing advertising's reach, relevance and response. New IP parameters allow for more pinpointed targeting and flexibility.*
- **Content Localization**  
*Provides online entities with the tools to move away from "one-size-fits-all" web content and instead deliver relevant content, language, currency, products and promotions—creating an instant connection with website visitors—that helps to 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 and video content. Additionally, IP Intelligence can be used to restrict downloads in certain geographic locations for encryption software or in other online uses where content needs to be legally restricted.*
- **Enhanced Analytics**  
*Offers companies a new way to view, parse and analyze online data to increase performance for online initiatives. It also provides a real-time mechanism that allows customers to take immediate action.*

## The First Generation of IP Intelligence

When first created, NetAcuity was referred to as "geotargeting" or "geolocation" technology. Prior to this type of technology—and unfortunately still in use today—determining user location revolved

around unreliable techniques that returned questionable data.

### Online Registration Data

Websites typically ask users to fill out simple forms in order to gather more information about the user. 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: many users falsify their personal information, and more and more users are turning off cookies on their machines because they find them to be privacy-invasive.

### Reverse Domain Name Server (DNS) Lookup

Reverse DNS lookups are inaccurate because most 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, 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 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 Earthlink's corporate headquarters even though they actually may be allocated to cities throughout the US and the rest of the world):

EarthLink, Inc.  
3100 New York Drive  
Pasadena, CA 91107  
US

Netname: EARTHLINK2000-B  
Netblock: 165.247.0.0 - 165.247.255.255  
Maintainer: ERMS

## IP Intelligence Today

Unlike the techniques above, which rely on individual user or corporate information, Digital Element's IP Intelligence 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.

Needless to say, keeping a current database of IP addresses is a daunting task. Location changes of 2.5% to 5% of the IP address base per month (which is made up of over 4 billion addresses total) is not unheard of. In order for IP-based intelligence technology to be accurate and reliable, a 24x7 monitoring

and updating effort needs to take place.

## NetAcuity Technology

### 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 – dubbed NetAcuity – utilizing more than 20 different methods to determine the physical location of an IP address down the city level worldwide, and providing over one million views a day from different online vantage points. 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.

### Hyperlocal Data

The NetAcuity Edge database is an enhancement to Digital Element’s NetAcuity data, providing increased accuracy at the city/town and zip/postal code levels.

Addressing the inherent limitations associated with mapping IP addresses to zip and postal code-level data, NetAcuity Edge data is derived by taking an ‘outside in’ approach and leveraging data from our

partners, which include large online portals, popular social networking sites, and large online auction and retail sites. These sites collect zip and postal code data from store locator functionality and customer profiles, then strip the personally identifiable information before passing on to Digital Element. Once collected, Digital Element validates this anonymous, user-supplied information through the use of proprietary clustering analysis algorithms (CAA) and deep knowledge of the Internet’s topology, providing the only validated, user-supplied information on the market.

Already introduced for the United States, the United Kingdom, Canada, Germany, Italy, Spain, the Netherlands, Norway, Japan, Australia, and Russia, Digital Element is now in the process of rolling out Edge data for the following countries: France, Israel, China, India, Brazil, South Korea, Denmark, Sweden, Finland, Mexico, Austria, Belgium, Luxembourg, Switzerland, Ireland, and Poland, with more countries to follow throughout the year.

NetAcuity Edge data is available for purchase in addition to Digital Element’s current NetAcuity data offerings for those companies looking for greater targeting depth.

The information is also sent to all NetAcuity field servers at customer locations throughout the world on a weekly basis. These seamless, non-performance impacting updates are done once a week to ensure that clients and partners have the most up-to-date information available.

### 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. Digital Element supplies its customers with APIs in a number of different languages, allowing a customer's content server to interface with the local NetAcuity server collocated at the customer's site. The application server then passes an IP address to the NetAcuity server, and relevant information is returned about that IP address.

After NetAcuity is installed and running, making the technology 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.

- Computing Platforms – Red Hat Enterprise, Linux 3+, Solaris 2.7+, FreeBSD 4.8+, Windows 2000/2003 Servers
- Client Platform – Integrates with all operating systems and applications
- Application Programming Interface (API) – C, C#, Perl, Java, PHP, .NET, Ruby, Python, or custom
- Database Updates – Weekly
- Processing – Capable of over 30,000 IP resolutions per second
- Latency – As low as .03 milliseconds
- Support – 24/7 technical support

### Data Sets

NetAcuity's geographic coverage is unsurpassed in the marketplace at over 99.9999 percent of the globe.

- Country
- Region or State
- City/Town
- Connection Speed
- DMA/MSA (US only)
- US Area Code
- Time Zone
- Zip/Postal Code
- Domain Name
- NAICS Codes
- Org Name
- ISP
- Home/Business
- Language  
*Country level only*
- Proxy
- Company Name
- Demographics
- UK ITV Regions
- Latitude/Longitude

### Conclusion

NetAcuity IP Intelligence technology provides an excellent way to non-invasively gather new intelligence about the online universe, and Digital Element delivers the de facto standard in IP Intelligence, providing coverage for 99.9999 percent of the Internet and collecting more than one million views daily from different online vantage points. Taking advantage of its patented technology and a team of dedicated data analysts, some of the world's most recognized online

properties and businesses have chosen Digital Element for access to the most comprehensive set of IP data available. Through Digital Element's industry vision and leadership, this non-invasive technology has evolved into much more than geographic information and now includes other intelligence factors such as connection speed, domain name, ISP and language.

For more information about Digital Element, please visit [www.digitalelement.com](http://www.digitalelement.com)

Digital Element, IP Intelligence Whitepaper  
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