

GeoLocation Overview

Location-as-a-Service

*How Mobile, iGaming and Lottery Markets can Advance
with Layered Location Intelligence*

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Overview

This document features best-in-class geolocation practices to support you in achieving compliance and verification for all of your gaming and lottery transactions.

In many cases for regulated gaming applications, it is mandatory to validate if the patron is within the authorized jurisdictional boundary (e.g. the state of New Jersey) in order to wager, purchase a lottery ticket or complete a mobile or online transaction. The gaming industry relies on many of the following location verification checks to insure the patron is physically located within your authorized boundary:

- IP Geolocation Check of the device utilized to place the wager and obtain additional IP Insights (anonymizers, proxy types, etc)
- Cell Phone Triangulation – precise AGPS and cell phone tower locations
- Wi-Fi Signal
- Compliance API – is a device or IP in or out of one or more jurisdictional boundaries
- Device Profiling – is a device rooted, jailbroken or it was seen in too many places at one time
- Other GPS or network identification tools approved in writing by the Gaming Board.

A patron's mobile device location serves as an excellent proxy of a patron's real-world physical location. This white paper outlines the details on the variety of validation sources employed by the gaming and lottery industries to ensure compliance and patron satisfaction. There is not a one size fits all approach and the ability to have multiple factors of verification and a layered location intelligence approach allows device location to be successfully utilized in this marketplace.

Location Source 1: IP Location

IP intelligence has been used for many years as essential information to help determine location compliance for international gaming operators. Since the requirements for these operators have been limited to identifying the country in which the user requesting a wager is located, the efficacy of an IP Intelligence location service has been adequate to satisfy country regulatory authorities. However, regulatory authorities such as the Nevada Gaming Control Board have concluded that relying solely on IP Intelligence for location validation within U.S. state boundaries is inadequate. Furthermore, requirements to exclude sovereign Native American lands located within state boundaries adds additional challenges and complexities in many states now planning to introduce online gaming.

What is Geo IP Location?

- Location and other important information can be gleaned by a user's IP address
- Location information about the connection, such as lat/long, state, ZIP code can be provided in real-time
- It works because a unique identifier assigned to any device (computer, Xbox, smartphone connected to the Internet. It is a "computer address"

An IPv4 address (dotted decimal notation)

172 . 16 . 254 . 1

↓ ↓ ↓ ↓

10101100.00010000.11111110.00000001

One byte=Eight bits

Thirty-two bits (4 x 8), or 4 bytes

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In certain cases, IP Intelligence can be used to conclusively confirm in-state compliance. For example, when a session is originated from an IP block assigned to an ISP that only provides terrestrial transit services to customers within a given state’s boundaries, identifying that user as in-state based solely on the IP address may be reasonable. Similarly, if the IP block is identified to be located well within the borders of a state and the connection type assigned to that block is DSL or Cable, it may be reasonable to accept that user as in-state. Gaming operators should consult with the local regulatory authority in determining the methodology, rule sets and threshold tuning practices for their in-state location compliance system during the design phase. This procedure will help ensure their systems conform to published guidelines and identified best practices.

IP Location Reliability

It is important to recognize the location assigned to an IP address by an IP Intelligence data provider is the location of the machine generating sessions with that IP address. This location is not necessarily a reliable indication of the user (the human being) who generated the request. Some examples where the location assigned to an IP address is not reliable as the location of the user are when the connection type has been identified to be a mobile gateway, a satellite connection, a corporate proxy, or an “anonymous proxy.” In the case where an IP address has been identified to be one of these connection types, additional technologies, data sources or manual procedures must be used before a wager can be authorized.

Assessing the Quality of IP Location

IP Intelligence data vendors vary in their approaches and technologies to generate data. As a result, there are a variety of schemas available from these vendors that provide various levels of granularity and categories of network attributes that are essential to implementing an effective online location system. The following table is an example of a typical IP Intelligence data schema.

Continent	City	DMA	Second-Level Doman	Anonymizer
Country	ZIP Code	MSA	Top-Level Domain	Home
Confidence	Time Zone	Connection Type	Carrier	Org Type
Region	Lat/Long	Line Speed	ASN	NAICS
State	Area Code	IP Routing	Reg Org	ISIC

High-end IP Intelligence providers include confidence factors at various levels of geographic granularity that can be used in place of, or in combination with network characteristic values to help identify whether the country, state or city assignment is a reliable indicator of the user's location. The values are derived by applying an algorithm that analyzes the network attribute values to assign a numeric confidence value. These "quantitative indicators" can simplify rule creation and facilitate system tuning.

However, most operator systems use a combination of specific network attributes plus confidence factors in their block/authorize rule sets.

LocationSmart delivers IP Intelligence data for location compliance applications only from vendors with the highest standards.

What Can you Find Out About an IP Address?

IP address=69.228.195.68	←	• This is my home IP address. It does not reveal any personal information (CPNI).
Continent: North America		
Country: US		
State: California	←	• But you can glean much from this data. I am located in California, in Saratoga. You may also know my zip code, area code and DMA.
City: Saratoga		
Zip Code: 95070		
Area Code: 408		
Time Zone: UTC/GMT -8 hours		
Latitude/Longitude: 37.263 / -122.021		
DMA: 803		
MSA: 41940		
ASN: 4355		
ISP: AT&T Internet Services	←	• You also know that I use DSL (but that I didn't pay for the really fast version.) But I still can view rich media
Top Level Domain: .NET		
Second Level Domain: PacBell		
IP Routing Type: Fixed		
Connection Type: DSL		
Connection Speed: Medium		
Anonymizer Proxy in Use: No	←	• You know that I am not using an anonymous proxy—that I am not trying to deliberately hide my location. So I am probably no a fraudster.

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Location 2: Carrier Network Mobile Location

Gaming and lottery companies use Carrier Network Mobile Location to acquire a discrete, un-spoofable location of either the device generating the session, or of a personal device associated with the user (e.g. the user's cell phone). Carrier Network Mobile Location can be used to locate the device generating the session only if that device has a mobile telephone number (also referred to as an MDN or Mobile Device Number). Unlike well-known smartphone location services (iPhone, Android and WindowsPhone), Carrier Network Mobile Location is not limited to specific devices, it does not require that any software be resident on the device, and once the initial opt-in is complete, it does not require the user to authorize location requests individually before they take place. This means that all cell phones including feature phones, as well as tablets and laptops with cellular data connections, can be reliably and dynamically located for in-state compliance purposes.

Carrier Network Mobile Location can locate a mobile device by utilizing the same network infrastructure employed to locate E911 calls. This may be a highly accurate Assisted-GPS location executed by the U.S. Government's 27 orbiting GPS satellites, or by the individual cell / sectors to which the device is connected. By measuring the round trip delay (RTD) or timing advance (TA), the accuracy of an individual cell / sector can even be improved upon through a ranging technique known as enhanced Cell ID (eCID).

Accuracy for Assisted-GPS is dependent on the number of visible satellites that have been received, but is typically very good in outdoor environments. It boasts location accuracy within 5 -10 meters, i.e: the outdoor environment of a hotel casino property or on the Las Vegas strip.

A new approach to locating a user regardless of the device being used to place a wager involves locating the user's personal device such as their mobile phone. The location of this personal device can serve as a "proxy" for the user's location. As with any other location methodology, the operator must gain acceptance for this approach from the regulatory authority in advance. With this technology, authentication and verification techniques can confirm the cell phone and the user to ensure are both in the same approved area. A unique authorization code can be sent via SMS or a web interface that must be returned from the cell phone before a wager is authorized.

Location 3: Wi-Fi Location

Wi-Fi Location allows you to know the physical location of your Wi-Fi enabled smartphones, tablets and specialized gaming devices anywhere in the world. Wi-Fi (BSSID) location is available in 300 countries and territories on more than 500M+ Wi-Fi Access Points. Combined with Carrier Network Mobile Location and GeolP location services, gaming and lottery operators have a very comprehensive collection of location services at their disposal for compliance and verification.

Anytime a device accesses a Wi-Fi network, the BSSID of the serving Wi-Fi Access Point can be obtained. In addition, all other visible BSSID's nearby, sometimes as many as 15-20 in densely deployed areas, are also visible.

The location technique used for positioning with Wi-Fi BSSID(s) utilizes the serving BSSID along with all visible neighboring BSSID's and trilaterates the position utilizing the multiplicity of seen data points. Accuracy depends on the number of positions that have been received, but is typically very good, with location as accurate as 5 -20 meters. By utilizing trilateration of a multiplicity of BSSIDs, the integrity and validation of the returned location is increased.

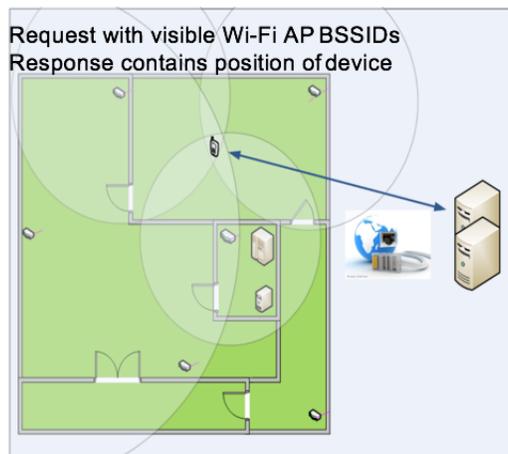


Figure 1: Wi-Fi Network Name: Matt's Coffee House, (Redmond, WA)
BSSID Format: 00:1E:2A:53:26:2A

Location 4: Enhanced Patron Intelligence Data

To further enhance the integrity of location services, the gaming industry is adding comprehensive device intelligence data into the mix. This data constantly monitors more than 1B transactions a month to identify anomalies. Device profile services can identify fraudulent activity in real-time.

Not only can companies leverage the knowledge of where their users are and if they are in an area of authorized use, they can now determine if the device can be trusted based on it's current and prior activity and use. The types of device profile data that can be evaluated include:

- VPN use
- Remote desktop access (RDA) – non whitelisted so it can detect new RDA immediately
- Device insight – same device or different than the patron normally uses
- Velocity data – has the user traveled an unrealistic distance in a short period of time
- User personal information

There is no download required to obtain these details and it improves overall user experience.

We Are Innovators

Largest Global Trust Intelligence Network

- Community of **4,000 enterprise customers** in ecommerce, finance, media, and gaming processing over **1 billion transactions a month**
- **Protects over 250 million** active users across **15,000 webpages**
- The network collects real-time data from tens of **billions of transactions & hundreds of millions of user credentials**

Device & Location

Device Analytics

Device & Network

Identity Analytics

Device & Behavior

Behavior Analytics

Activities

Patterns & Anomalies

Interests & Personalities

Customer Defined Policies

Associations & Related Events

Analyst & Trust Feedback

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Compliance Checks

Having lots of location sources available is great but companies also need a way to compare the patron's current location against approved geographic areas for gaming transactions. That's where compliance checks come into play. Compliance checks are performed to allow gaming operators to follow strict regulatory requirements in both wagering and lottery offers via the Internet and mobile channels.

Gaming operators and platform providers pre-configure rule-based geofences or zones based on their own geo-boundaries (shapes representative of areas of interest, including inclusion/exclusion areas). Once configured, these operators submit locations (in the form of latitude and longitude) to be evaluated against the established zones.

An example use case is a series of boundaries, each separately representing a U.S. state (e.g., New Jersey) and Native American tribal lands. The user, a gaming platform or operator, uploads the boundaries and then specifies the zone as: "in New Jersey AND NOT in all tribal lands." This would be a typical zone-definition for

an online gaming use case. Once the zone is defined, the user's application retrieves the player's location and submits the resulting latitude and longitude with the zone reference to the API, ensuring location compliance. Any valid location source can be used with the compliance check, which could include mobile network location, device location, IP geolocation, browser location or a latitude/longitude coordinate from any trusted source. This allows for maximum flexibility and compliance.

Layered Location Intelligence. Combining Location Sources

The strength of layered location is being able to deliver multiple location sources via a single platform.

Through a combination of mobile network location, IP geolocation, device-based hybrid location, browser location, device profiling and compliance checks, gaming operators are able to deliver authenticated, non-spoofable location and exceptional patron experiences.

By utilizing all of these location sources, confidence in knowing where the device is can be assured.



Using Carrier Network Mobile Location to Validate Discrete Location of IP Addresses

With layered location insight, Carrier Network Mobile Location can be used to identify the specific location of an IP address as either in-state or out-of-state when the address has been located close to a state border. While many ISPs have their network services backhauled through different routes on either side of a state border, there are exceptions to this practice.

It is possible to use the location of a mobile device connected to one of these terrestrial services through a Wi-Fi router to reliably confirm the actual location of that address.

In addition to validating the location for the current session, it is feasible that this location could be stored together with a date and time stamp to be used for future session originating from that IP address. If the same user is requesting a wager from the same IP address at a future date, an operator may decide that this is also a reasonable indicator of in-state or out-of-state compliance.

LocationSmart's Winning Combination for Gaming

LocationSmart is the leader in geolocation, being the first provider to launch mobile and iGaming in Nevada, Delaware and as a geolocation service provider in New Jersey. We offer a very robust platform with critical location data, consent management, compliance services and device profiling delivered through a single easy to integrate API. We are trusted by the top gaming and lottery operators to validate transactions and enhance player experience.

Corporate Overview

LocationSmart® is the worldwide Cloud Location Services market leader for connected devices. We provide the easiest and most comprehensive cross-carrier platform for local, hyper-local and context-aware application development. Our core location technologies span indoor and outdoor use for any device, any platform and any network to mirror the way we live our lives. Servicing Fortune 500 customers, the needs of call centers, roadside, transportation, financial transaction verification, proximity marketing and other core enterprise needs, LocationSmart is changing the ways companies do business. We deliver the broadest reach and largest global footprint, with an extensive portfolio of privacy consent methods for easy user adoption.