

# The Location-Enabled Network



- Re-thinking the network's role in delivering location-based services

# The World Merges On...

## READY OR NOT, THE EVOLUTION HAS BEGUN.

Access networks aren't just cellular anymore, they're a mosaic of Wi-Fi, broadband, GSM, hybrid, DSL, PCS and more. It's a dynamic eco-system teeming with smart phones, net books, geocaching, and telematics.

Even phones are no longer just phones. With GPS embedded chipsets, swappable data storage, server interfaces, and faster throughput, they are fully-functioning computers. Fact is, 58% of mobile phones in the US now have web-connectivity.<sup>1</sup>

**Worldwide, LBS subscribers are forecast to grow from 41.0 million in 2008 to 95.7 million in 2009 while revenue is anticipated to increase from US\$998.<sup>3</sup> million in 2008 to US\$2.2 billion in 2009.**

*Source: Gartner Research, June 2009*



### It's All About Location, Location, Location

Across this new landscape the ability to support location-based services (LBS) is no longer a stand-alone benefit, it is a functional expectation. People want to know where they are going, who has the best pizza, what the weather will be in their area, and where their friends and family are. Companies need to track their vehicles, know where their packages are, and support their sales force. And local governments need to ensure that EMS, police, fire departments, and other public safety services have the tools to respond immediately and accurately. No wonder daily queries from more than 2,500 location-based mobile applications now number in the hundreds of millions: five times what they were just a year ago.

**NO DOUBT ABOUT IT.** The world is merging and location-based services are exploding. Until now, this new information-rich landscape had been created and cultivated by device manufacturers and application developers. They have opened their systems and their services, allowing users to decide for themselves what applications and capabilities are important. This openly collaborative environment has spawned a business opportunity that is expected to top \$13 billion by 2013.<sup>2</sup>

**Location-based mobile social networking revenues will reach \$3.3 billion by 2013, while location-based advertising integrated with sophisticated algorithms holds a lot of promise.**

*Source: ABI Research, August 2008*

<sup>1</sup> ITfacts.biz, May 1, 2009

<sup>2</sup> "RCR Wireless News"; April 28, 2008

<sup>3</sup> 2008 North America Consumer Location-based Services (LBS) Market - The Wireless Carrier Opportunity; Frost & Sullivan; January 20, 2009

## The Critical Role of the Network

Despite the robust growth of location-based applications, many users still do not have access to them. Although more and more devices are now GPS-enabled, GPS is not always reliable, such as in dense urban or indoor settings. Other device-centric or third-party location technologies such as World in a Database (WiDB)\* have inherent shortcomings as well. Fact is, there are so many different locating technologies, systems, and devices—so many different environments and applications for which they can be used—there simply is no single “best” locating method. The best solution is to provide a structure that can apply multiple methods and make them work together.

So what if the answer is not just another technology or network server? What if the answer is in how all the various locating systems and devices are coordinated and managed? Herein lies the unique opportunity for today’s network operators - a chance to differentiate their services and position themselves as a key player in a multi-billion dollar market.

**“The competitive landscape will change and most mobile carriers need to alter their approach toward offering LBS and dealing with developers... Mobile operators’ initiatives to open up the application programming interface (API) to third-party developers will help them compete against other players in the market and will also be beneficial to the different parties involved, down to the end user.”**

*Source: IT Gartner, Dataquest Insight: Consumer Location-Based Services, Subscribers and Revenue Forecast, 2007-2013; July 2009*



\*World in a Database (WiDB) is a third-party location technology that operates by surveying networks everywhere for signals that can be used to estimate location. The databases must be continually refreshed and operators do not typically control the networks that they measure.

# The Location-Enabled Network



## LOOKING AT LOCATION THROUGH A WHOLE NEW LENS

**Welcome to the location-enabled network, a new paradigm for supporting and delivering location-based services. In the location-enabled network, every customer has access to location-based services, regardless of where they are within the network or what kind of mobile device they are using.**

The location-enabled network does not replace the various location technologies such as device-centric GPS. It supports them. Using the network's existing infrastructure, it coordinates the efforts and capabilities of all location components inside and outside the network—GPS-enabled phones, LMUs, network-based location servers, internet-based applications, E-9-1-1 emergency calls, etc.—and ensures that everybody within the network is location enabled.

### How it Works

The heart of the location-enabled cellular network is the Andrew GeoLENS<sup>®</sup> Mobile Location Center (MLC), a compact processor group that manages all locating functions in a carrier's network or networks, regardless of how many networks there are or which technologies they employ. A carrier with 2G GSM and 3G UMTS networks, for example, could have a single Andrew MLC that would provide and coordinate all locating methods appropriate to both network types. The same Andrew MLC equipment could even support location for LTE if the carrier transitioned to that 4G technology.

The MLC is all that is needed to location-enable the cellular network. In other IP environments such as wireline broadband access or DSL, an Andrew GeoLENS Location Information Server (LIS) would be deployed to identify locations of IP devices. Location Measurement Units (LMUs) could also be installed at the carrier's option in specific geographic areas that could benefit from the application of Multiple Range Estimation Location (MREL) technology.





## The Pieces are Already in Place

The beauty of the location-enabled network is that all the components already exist: mobile location centers, location information servers, location measurement units, etc. and a booming population of devices that can benefit from them. The location-enabled network brings them all together into a single system that is flexible enough to accommodate any environment, quick to deploy, and easy to manage.

Most importantly, the location-enabled network places the network operator in the middle of this multi-billion dollar opportunity as a key partner for anyone involved in location-based services.



### THE LOCATION-ENABLED NETWORK

- Ensures every customer—even those without GPS service—has access to location-based services.
- Provides 100% network coverage for individuals, businesses, and those responsible for public safety.
- Dynamically supports all current and future locating technologies.
- Works seamlessly across all wireless and wireline environments.

# Bringing the Location-Enabled Network to Market

## INTRODUCING

# GeoLENS<sup>®</sup>

**GeoLENS is a portfolio of solutions from Andrew that enables operators to transform their location-passive networks into reliable environments that are fully location-enabled. GeoLENS brings together all the components needed to locate any user across the network and then relay that information between location-based service providers and the user's mobile device.**

## Mobile Location Centers



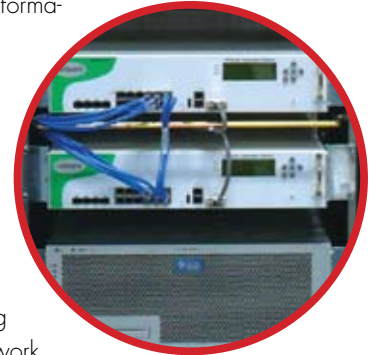
For location determination in 3GPP wireless networks, Andrew offers the GeoLENS Mobile Location Center (MLC). Flexible, powerful, and scalable, the GeoLENS MLC consolidates the various network node types—gateway mobile locating center (GMLC), serving mobile locating center (SMLC), stand-alone SMLC (SAS), Secure User Plane (SUPL) locating platform, etc.—into a single, easy-to-manage solution. Each GeoLENS MLC is configurable for the specific network environment. The result is a single solution designed and developed by one vendor, capable of handling and coordinating all 3GPP network location requests.

## Policy Server

Andrew offers the GeoLENS Policy Server for access control for the location-enabled network. GeoLENS Policy Server ensures specific location information is accessible only to approved end users. Used as a stand alone platform, integrated into a GeoLENS location server, and/or in conjunction with other network servers, the GeoLENS Policy Server screens all requests for location information. Depending on the subscriber status, the operator decides the level of location service provided. Bottom line—operators have the control and flexibility to enforce location policy within the network with minimal investment, optimizing resources and return on investment.

## GeoLENS Location Information Servers for IP Location Applications

For IP-based networks, a GeoLENS Location Information Server (LIS) is key to implementing next-generation emergency service models such as NENA i3 and enabling customers to access the growing wealth of internet location services. Using the internet-based HELD (HTTP Enabled Location Delivery) protocol, GeoLENS LIS enables the network to communicate location information to the device regardless of the device type or how it is connected. The GeoLENS solution is completely flexible and can be deployed in IP-based networks whether wired or wireless, broadband or enterprise. Its unique versatility enables operators to transition to the HELD protocol while maximizing the capabilities of their existing network location infrastructure.



## Location Measurement Units

For mobile operators supporting US E9-1-1 Phase II requirements and security applications, GeoLENS LMUs are critical. Deployed across the network, GeoLENS LMUs capture location measurements coordinated by the GCS (Geolocation Control System). Location results are made available via standard interfaces for delivery to the PSAP (Public Safety Access Point). When combined with Andrew's MREL locating technology, GeoLENS LMUs are an effective way for operators to reduce capital and operating expenses while improving location speeds and accuracy.



## GeoLENS Operations System Support (OSS) for Complete OAM Support

A state-of-the-art software solution that interacts with the GeoLENS location platforms deployed across your network to provide complete OAM support. Communication between the GeoLENS OSS and individual location platforms is two-way. For operations such as provisioning and updating, the GeoLENS OSS pushes critical information out to your various platforms, enabling you to remotely manage and maintain multiple servers from your network operations center. It is also a central point for data collection, pulling operational and configuration data from your various GeoLENS nodes for coordinated analysis and backup.

## The Location-Enabled Network.

### THE LINK BETWEEN WHERE YOU ARE AND WHERE YOU WANT TO GO.

The evolution is in full swing and the proverbial flood gates are open. IP applications are seeping into every nook and cranny of the network eco-system. More and more of them hinge on location.

Network operators are in a unique position to become a critical link in this multi-billion dollar opportunity. With the network infrastructure already in place and the building blocks at the ready, who better to ensure that every user is able to access the entire spectrum of location-based services and applications?

The location-enabled network does exactly that. With the ability to support any locating technology in any digital broadband environment, it picks up where device-centric solutions leave off. And creates additional opportunities for network operators in the process.

**“Wireless carriers must determine what value-add beyond A-GPS location capability they bring to the consumer LBS market.”**

*Game-Changing Moves Strengthen Consumer LBS in North America; Frost & Sullivan; April 20, 2009.*

#### Location-Based Service Revenues



## Bridging the Gap with MREL Locating Technology:

Among the many benefits spawned by the development of the GeoLENS<sup>®</sup> portfolio of solutions is the creation of an entirely new locating technology.

MREL (Multiple Range Estimation Location) is Andrew's new, patent-pending, locating technology. MREL is designed for mobile operators supporting U.S. E9-1-1 Phase II requirements, commercial location-based services, and security applications.

In most environments, MREL meets or exceeds the performance metrics offered by many high-accuracy technologies, without requiring locating capabilities in, or the assistance of, the mobile devices themselves. MREL can meet public safety requirements and provide support for commercial opportunities for all GSM, UMTS and LTE mobile handsets and other devices.

## GeoLENS<sup>®</sup>

GeoLENS works seamlessly in and among the following wireless environments:

- GSM
- UMTS/WCDMA
- WiMAX
- LTE

GeoLENS supports the following locating technologies:

- A-GPS
- TA/NMR
- NMR/MPL
- Cell ID
- U-TDOA \*†
- MREL \*
- RTT
- Hybrid
- Multilateration
- O-TDOA

\* Requires deployment of GeoLENS Location Measurement Units

† Used for E9-1-1 Location Only

To learn more about the GeoLENS MLC and the GeoLENS portfolio of solutions, contact us at [Geolens@andrew.com](mailto:Geolens@andrew.com) or visit us at [www.commscope.com/andrew/eng/product/geo/index.html](http://www.commscope.com/andrew/eng/product/geo/index.html).



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