

The next generation of location-based service

Europe's Galileo satellite system has gone live on 15 December 2016, with 18 out of 30 planned satellites in orbit. The system should be fully deployed and operational by 2020. Beyond EU member states, Galileo has the support of India, Israel, Morocco, Saudi Arabia, South Korea and Ukraine. The Galileo system, named after the **Italian engineer and astronomer**, designed to provide commercial and government customers, is the EU's answer to the US GPS and Russia's Glonass. The China is developing its own navigation system, Bei Dou.

The system promises to deliver **more precise data than GPS**. Commission Vice-President Maroš Šefčovič, responsible for the Energy Union, said: *"Geo-localisation is at the heart of the ongoing digital revolution with new services that transform our daily lives. Galileo will increase geo-location precision ten-fold and enable the next generation of location-based technologies; such as autonomous cars, connected devices, or smart city services. Today I call on European entrepreneurs and say: imagine what you can do with Galileo – don't wait, innovate!"*

Initial services, free to users worldwide, will be available only on smartphones and navigation units already fitted with Galileo-compatible microchips. Some devices may need only a software update to start using the service. So far, the first Galileo smartphone by Spanish company BQ is already available on the market and other manufacturers are expected to follow suit.

People have become increasingly reliant on geo-localisation for anything. Galileo will offer more accurate and reliable positioning for end users, but this does not seem to be enough because someone is studying a better way to locate.

48 US patents were granted on **11 October 2016** and assigned to **Google**. Among these, there is a very ambitious patent titled *"Systems and Methods for Generating a User Location History"*. Google aims to analyze raw location reports received from one or more devices associated with a user to identify one or more **real world location entities** visited by the user.

Today many different techniques exist for attempting to determine a location associated with a device. In addition to satellite triangulation, for example, location based on serving cell (GSM/UMTS), IP address, WiFi access point. One or more devices associated with a user can periodically determine their location and report this information to a Google central server to provide a log of their location over time. Aggregating this information can result in a history of the user's location over a period of time. If you opt into being tracked, Google can record where you've been through Google Maps and your Android phone. Everything is logged in an interactive map called "your Timeline" that's accessible through your Google account.

The following information will also be **used to determine the exact position** where you were: search history, emails sent and received, photographs, requests for directions on Google Maps, social media posts, receipts from mobile payments. In particular, each location report can provide a time and a location. For example, the location included in each location report can be a geocode (e.g. latitude and longitude). Therefore, such raw location data can fail to identify a particular entity (e.g. restaurant, park, or other point of interest) that the user was visiting at the time. Human perceptions of location history are generally based on time spent at particular locations associated with human experiences and a sense of place, rather than a stream of latitudes and longitudes collected periodically.

The plurality of location reports can be clustered into a plurality of segments. A starting time and ending time can be associated with each segment. Likewise, map data can be analyzed to identify all location entities that are within a threshold distance from a segment location associated with the segment.

If user is not comfortable with this collecting of his data, he might be **able to opt-out**. If the user does not allow collection and use of such signals, he can also be provided with tools to revoke or modify consent. In addition, certain information or data can be treated in one or more ways before it is stored or used, so that personally identifiable information is removed.

What Google will do in the future with all this data is anyone's guess, but the company's business model is to **sell these data** and to make money through targeted advertising. Google is a transparent company but so are the other. For example, in Apple's commitment to your privacy we read: *"We don't build a profile based on your email content or web browsing habits to sell to advertisers. We don't monetize the information you store on your iPhone or in iCloud. And we don't read your email or your messages to get information to market to you"* (Tim Cook). ©

Giovanni Nazzaro

