EMYNOS Technical Newsletter #2

August 2017

The Next Generation Emergency Communications (EMYNOS) project[1] is co-funded by the European Commission/H2020 under the grant agreement No 653762. It aims at developing a Next Generation platform for enabling European citizens to make IP based emergency calls (to police, ambulance and fire brigade). This platform intersects the NG112 architecture, described in NG112 LTD [2], and implements the related functionalities according to the project consortium needs and requirements. Accurate location is one of the main topics the EMYNOS project has been investigating.

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[1] www.emynos.eu

[2] www.eena.org/ressource/static/files/eena_ng112_ltd_v1-0_final.pdf

1. What you should know about location in IP based emergency services

The caller location information is crucial for emergency services as it enables (a) the determination of the nearest emergency callcenter, and (b) localizing the caller, which leads to a faster and a more efficient dispatching operation. Two aspects related to location were investigated by the standardization bodies (e.g, IETF Geopriv working group): the format of the location information (civic or geodesic), and the protocols for retrieving this information. As a result, several solutions based on "LLDP-MED (layer 2), DHCP (layer 3), HELD (layer 7)" [3] were proposed. These solutions were implemented in the context of the EMYNOS project and demonstrated. Another technique that is more suitable for mobiles phones and nomadic devices will be discussed in this flyer.

2. Indoor Location Problem

According to the COMCOM 17-01 document[4], from 1 July 2015 till 31 June 2016, more than 158.000.000 calls were made to 112, where 70% to 80% of these calls were placed from mobile phones. If an emergency call is indoors and using GPS for caller location provision, the location information is not as accurate as needed and this affects the dispatching operation.

3. Fraunhofer Fokus and Combain - WiFi based location support for indoor emergency services

Fraunhofer Fokus [5] is a leader in Next Generation Networks and coordinating the EMYNOS project. Combain[6] is a Swedish company owning the world's largest cell-ID and WiFi database. Both institutions joined their efforts to offer a solution using the Combain WiFi network and delivering better indoor location accuracy using the Fraunhofer Fokus OpenIMScore [7] and the EMYNOS Open ESInet.[8]

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[3] https://www.emynos.eu/the-emynos-esinet-b7ddc3040131168a

[4] https://ec.europa.eu/digital-single-market/en/news/implementation-european-emergency-number-112-results-tenth-data-gathering-round

[5] www.fokus.fraunhofer.de

[6] www.combain.com

[7] http://openimscore.sourceforge.net/?q=emergency_installation_guide

4. Combain - WiFi positioning

Combain's Wifi positioning is based on signal strength (RSSI) measurements to all Wifi access points (AP) within range. The locations of the APs are given by the database which is crowdsourced from mobile phones and it is continuously updated. By trilateration, the active mobile phone can be localized. In urban areas, the localization accuracy of the solution is varying between 20 to 40 meters. In order to improve the accuracy, RSSI measurements are also combined with sensor data coming from the phone such as accelerometer, gyroscope, and barometric pressure. By optimization, the data is fitted to a model of where the APs are located, including floor level information of the APs. The improved model is then used for localization of any Wifi connected device within that building with an accuracy varying between 10 to 20 meters.

5. Fraunhofer Fokus/Combain solution: a demonstration

The demo uses a VoIP client, running on Android, and which was extended within the EMYNOS project to support IP based emergency services features3 such as emergency URNs, location configuration, Real Time Text, and sensors data transmission. The VoIP client retrieves the WiFi access points MAC addresses information and sends it in a standardized way within the audio/video session through the emergency branch of the OpenIMScore and then through the EMYNOS ESInet to the Public Safety Answering Point (PSAP). The WiFi location information (latitude, longitude, floor) is shown on the Fokus building map.

PSAP Call Taker Client

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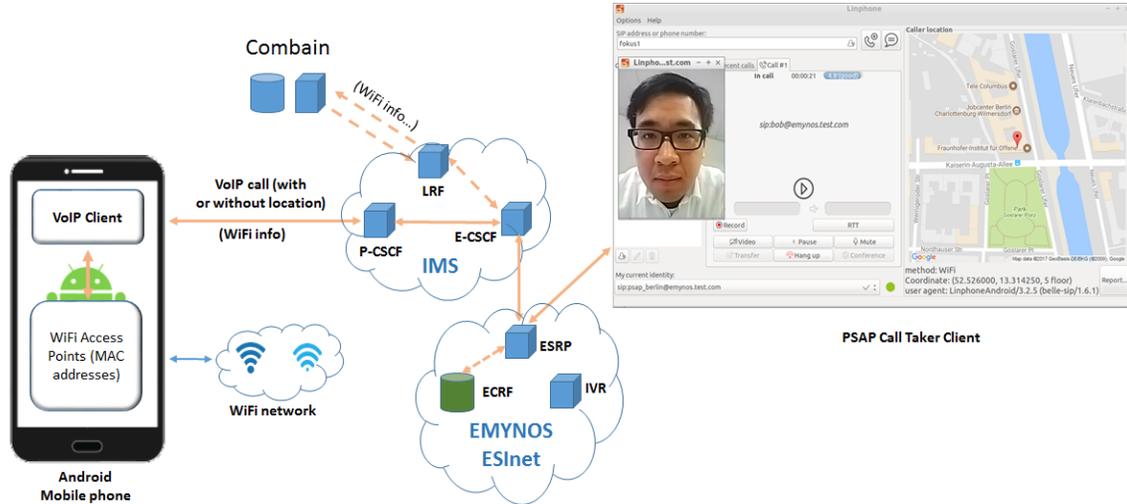
6. Towards a European Emergency Address Database (EEAD)

With the proliferation of smart phones and the increase of features they support, it is crucial that these devices are used in order to improve the caller location accuracy in case of emergency. In the United States for instance, a National Emergency Address Database (NEAD) for registering and storing location information related to WiFi access points and Bluetooth beacons is being specified and implemented[9]. Besides showing an example of 112 indoor location accuracy, the Fraunhofer Fokus/Combain demo also aims at stressing to the concerned stakeholders (public authorities, operators, industry, etc) the need for a similar initiative in order to build a European Emergency Address Database and provide improvements to 112 emergency location capabilities.

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[9] http://www.atis.org/01_news_events/pressroom/2016/11/new-atis-standard-advances-national-emergency-address-database-build-out.asp

The EMYNOS Consortium

The EMYNOS framework will be implemented by partners with complementary expertise (telecom/satellite operators, VoIP provider, eCall testers, end users), which together form the chain for the provision of emergency services and which will deliver the EMYNOS demonstrator that will be validated in operational environment.

The EMYNOS consortium covers a wide set of complementary capabilities, expertise, background and understanding in dealing with Crisis management.

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