ITEA 4

Project Results

ProSe

A new generation of proximity services

Using various sensor technologies, the ITEA project ProSe (Proximity Services Framework) has developed a system for detecting proximity and providing services on mobile devices. By adapting these to the users and their environment, new approaches to the Internet of Things (IoT) have been enabled in several industrial domains.

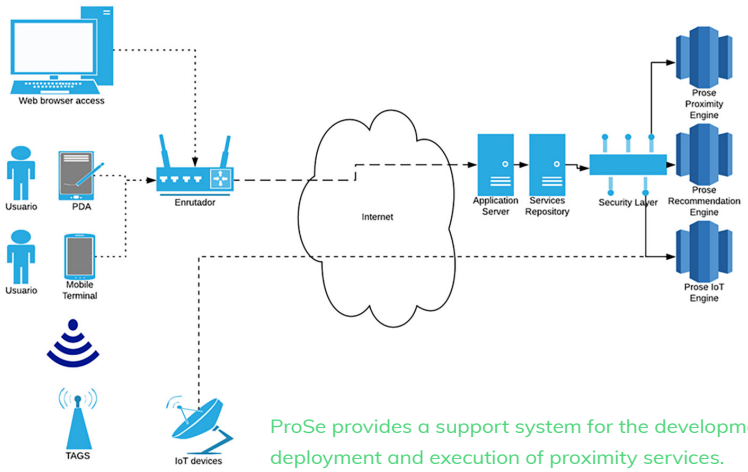
Project origins

In 2020, the number of IoT devices hit 50 billion. However, the current basis in applications is an obstacle to smart spaces in public environments as users cannot be expected to download an app to interact with IoT in each new location. To fully harness the power of IoT, proximity services should be available in a generic mobile app on user devices without the need for additional downloads. New mechanisms must also ensure reliability and security without requiring prior knowledge of the available infrastructure.

Having designed a support system for the development, deployment and execution of proximity services, ProSe centres on a set of devices and components that characterise the IoT-enabled environment and the necessary labels to define its location. Through its scalable and extensible framework and combination of proximity detection technologies, applications have been created through which users can intuitively interact with their environments, such as unlocking doors with mobile devices. To demonstrate the versatility of this technology, four use-cases have been investigated: hotels (Spain), hospitals (Canada), banks (Turkey) and smart parking (Romania).

Technology applied

ProSe's technology is based on the proximity client component, a mobile application with layers for proximity detection, client service execution middleware and user profiles. A proximity server component also serves as a repository of services attributed to a location. Within the mobile application software architecture, the proximity framework uses various mobile hardware drivers (Bluetooth, Wi-Fi, NFC, UWB, etc.) to feed a set of proximity services. These pass through the ProSe Communication Module, which communicates with IoT devices via the IoT-Ignite Connection Module. A user interface also offers settings, visual message handling and vibration/sound notifications.



ProSe provides a support system for the development, deployment and execution of proximity services.

ProSe's core services are located at the backend and include a recommendation engine which retrieves historic data (such as age, profile or platform usage) to generate a user profile. A machine learning algorithm then uses this to make recommendations for services. As for security, a key generator and components for authentication, authorisation and encryption secure all communication between the mobile application and the different services. Platform service/integration APIs connect the ProSe framework to partner systems and mobile applications.

ProSe's services differ per use-case but each has achieved notable successes. For hotels, all platform components have been demonstrated and a mobile proximity framework is now available for IOS/Android. For banks, all cloud services are installed behind a security firewall to protect against cyberattacks and cloud services are scanned periodically for vulnerabilities. Finally, the hospital use-case allows users to create custom forms and checklists that integrate data streams from numerous sources, including IoT devices. This data is immediately available in performance dashboards and reports.

Making the difference

ProSe's technical results are especially impressive due to the lack of existing

technology for almost every KPI. Starting from scratch, the proximity detection layer has achieved a localisation accuracy of 50 centimetres while the accuracy of the proximity service recommendations has reached 95%. Other results include 90% accuracy of derived contextual information by the context identification algorithm, a 60% reduction in the amount of data stored and a data analysis processing time of just 0.05 seconds. Given the project's basis in IoT, the multifaceted approach to security is vitally important to the platform's uptake and is able to face an average of 50 cyberattacks per second.

Although ProSe's key results are primarily technical, commercialisation is also underway. Banking is a particular success story: Ibtech has already integrated the services into the existing mobile application of QNB Finansbank for proximity-based customer service enhancements, while ARDIC is providing a secure driving service and application using proximity sensing and complex event processing. In the first quarter of 2021, an initial phase of 20,000 devices has been deployed in the USA. As for the health sector, Walsh Integrated has rolled out this platform to 85 new clients in North America and is currently working with BEIA to implement their solution in Romania. A longer-term impact can also be expected in tourism due to the large market potential of around 150,000 hotels in Spain alone.

ProSe arrives at a pertinent time, as the coronavirus pandemic has highlighted the increasing need and desire for contactless services and devices. As demand for such solutions grows, the project consortium will be ahead of the curve and is likely to have excellent access to markets which emerge; Walsh Integrated, for instance, intends to offer the first ever technology to integrate real-time movement tracking with cleaning performance evaluation in order to predict hospital-acquired infections, including COVID-19. Faced with a quality assessment/management market populated by closed technologies, domains with large transient public client bases (healthcare, tourism, air travel, etc.) increasingly require systems that can integrate disparate data sources and provide performance insights. By offering this, ProSe guarantees its relevance for the foreseeable future.

Major project outcomes

Dissemination

- Several presentations to present the project: Institute of Tourism of the Region of Murcia (ITREM), Murcia Health Service (SMS).
- Participation at conferences / fairs: DIATIC 2018 in Murcia, Smart tourism 4.0 2018, IMWorld 2018 (Bucharest), Smart City Expo World Congress (SCEWC) 2018 (Barcelona), EFECS 2018 (Lisbon), EGIS 2019 (Manchester), Innovative Enterprise Week (Bucharest), RAAI 2019 (Bucharest), Data Science Summer School 2019 (Bucharest), GoTech World 2019, Smart Cities of Romania 2019, International Smart City Business Forum 2019, Smart Cities International Conference 2019, Intellitur Conference 2019, EBN CONGRESS 2019 (Roma), SGEM 2020, ECAI 2020 event, HANNOVER MESSE 2020, CCW 2020.

Exploitation (so far)

New products / services:

- Facial recognition platform with a success rate of 99% and in a record time of 0.2 seconds.
- Recommendation engine platform to propose services to users depending on their profiles.
- QNB Finansbank Mobile Banking Platform.
- IoTIgniteSmartBeacon (Mobile App).
- ProSeSmartWelcome (Mobile App) to identify client and inform banks about client proximity.
- IOT Data storage platform.

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https://itea4.org

ProSe

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Partners

Canada

- Walsh Integrated

Denmark

- SENSZON

Romania

- Beia Consult International

Spain

- Answare
- VISUALTIS

Turkey

- ARDIC
- Ibtech

Project start

December 2017

Project end

December 2020

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ITEA 4

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