COMARCH

SILICON LABS

Development of Bluetooth Low Energy Mesh Mobile ADK for Silicon Labs

About Silicon Labs

Silicon Laboratories, Inc. is a leading provider of silicon, software, and a variety of other IoT solutions aimed at creating a connected world. The award-winning technologies offered by Silicon Labs shape the future of numerous industries.

Established in 1996 in Austin, Texas, the company supplies essential components for the worldwide Internet of Things (IoT) infrastructure – ranging from smart home systems to industrial IoT solutions, alongside intelligent retail and connected healthcare services.

Comarch & Silicon Labs partnership

The collaboration between Comarch and Silicon Labs started in 2013 and has since expanded to encompass 11 active projects. This strong partnership has allowed Comarch's experts to provide excellent support and successfully execute diverse projects, showcasing their vast competencies. The skilled team and long-standing relationship between the two companies were the main factors behind Comarch being selected for this project.

As an IT company with extensive competencies, Comarch utilizes various technologies in the development of this project, including Bluetooth for iOS and Android, Wi-Fi, and Z-Wave controller middleware. The engineers responsible for mobile BT Mesh apps development and maintenance handle tasks such as bug verification, testing, client communication, log checking, and documentation.

A dive into the Mobile ADK

The BLE Mesh Mobile ADK is an application development kit for mobile platforms, specifically Android and iOS. It empowers developers to create native applications for managing BLE Mesh networks. **The ADK includes platform-specific libraries built on top of the BLE Mesh stack developed by Silicon Labs, as well as reference mobile applications.** When combined with example firmwares flashed onto boards manufactured by Silicon Labs, these resources demonstrate various BLE Mesh use cases.

With the application utilizing ADK library, users' smartphones act as provisioners in the Mesh network. In this role, they can provision new devices to the network, configure existing nodes, send messages within SIG models defined in the Mesh model specification (e.g., lighting management, over-the-air firmware update), and schedule actions for specific nodes or subscribe to sensor measurements. The challenges to overcome included platform compatibility and consistency, library integration, mesh network management, model specification implementation, and firmware update.

Advantages for Silicon Labs

- Combination of extensive IT industry knowledge and expertise in Silicon Labs technology

- Access to additional competencies for Silicon Labs' projects, including project management, consulting, and mentoring, especially in the mobile area

- Stability derived from the long-term collaboration with Comarch enables Silicon Labs to strategically plan future developments

- Flexible capacity business strategy tailored to specific projects or engagements

Comarch competencies for Silicon Labs

The cooperation between Comarch and Silicon Labs encompasses three main areas: development, maintenance, and complementary expertise. Maintenance involves external solutions and those developed by Comarch, as well as application engineering. Complementary expertise includes technology stack, hardware design, and third-party systems integration. Regarding development, it covers qualification test automation and mobile apps.

ADK service scope

- Integration of the BLE Mesh stack written in C into the libraries for iOS and Android

- Collaboration with stack and SDK teams to deliver features across all layers of the technology stack

- Implementation of functionalities during the development of the official Mesh specification (Mesh 1.1. Protocol)

- Development of features consistent across iOS and Android

- Support of Silicon Labs' customers actively building their own products based on the ADK

- API library documentation

- Support for software development lifecycle at every stage, including CI/CD

- Handling application distribution to external testers, AppStore, and Google Play.
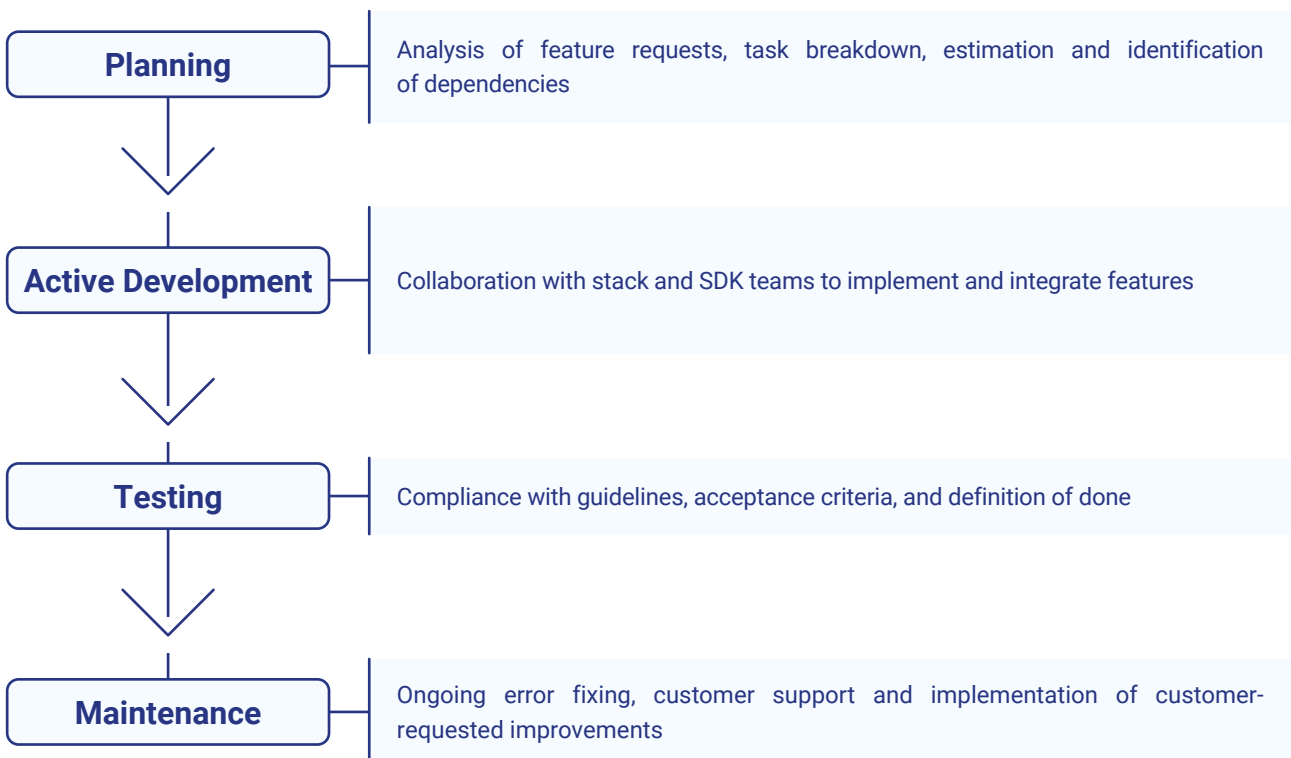
Embedded SDK service scope

Comarch has actively participated in the implementation of the Silicon Labs Bluetooth Mesh SDK on the embedded firmware side. Comarch's involvement focused on the following areas:

- Bluetooth Mesh Application Layer development and proactive integration with lower layers

- Support related to the Bluetooth Mesh Qualification process

- Comprehensive modernization, development, and fixing of the legacy Bluetooth PTS Qualification test system

- Implementation of hundreds of test cases for the Bluetooth PTS Qualification test system

- Integration with CI/CD machines

- Bluetooth Mesh hardware-related expertise Testing and bug detection

- Active support for periodic releases at all stages

- Close, international collaboration with teams overseeing the development of other SDK components

- Contact with Bluetooth SIG and bug reporting

Multi-phase project

Every six months, we released a major version. Each cycle (in conjunction with some of the Scrum ceremonials), consisted of:

| **Planning** | Analysis of feature requests, task breakdown, estimation and identification of dependencies |

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| **Active Development** | Collaboration with stack and SDK teams to implement and integrate features |

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| **Testing** | Compliance with guidelines, acceptance criteria, and definition of done |

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| **Maintenance** | Ongoing error fixing, customer support and implementation of customer-requested improvements |

Successful delivery

Comarch's cooperation with Silicon Labs, along with the support provided, enabled the creation of a world-class level library, allowing developers worldwide to develop BLE Mesh applications for the most popular mobile platforms. The Mesh reference applications are available in Google Play and the App Store. **This successful and experience-based cooperation leaves Comarch hopeful for further collaboration and more exciting projects to come.**

> *Comarch has been instrumental in the development, maintenance, and support of our Bluetooth Mesh Mobile ADK, showcasing their extensive expertise in the Bluetooth Mesh standard and iOS/Android mobile app development. Their team's commitment to excellence and ability to deliver high-quality solutions have enabled developers to build innovative Bluetooth Mesh network applications. This partnership has not only resulted in a widely used ADK but also highlights Comarch's vast competencies and our successful collaboration.*

Joe Tijerina
Product Manager – IoT Mobile Apps & HW Tools

About Comarch

Comarch (headquartered in Kraków) is a leading global IT company with a portfolio of thousands of complex and successful IT projects and implementations of software development for more than 40,000 companies worldwide. We have wide knowledge of IT systems and solutions including cloud services, IoT ecosystems and embedded software. Comarch has been a reliable partner for global IT standards organizations since 2007. Over the years, we've worked with various organizations and gained knowledge and expertise in how to support certification bodies at each step of the creation of certification programs, and aid their members in technology adoption

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