



Building Solutions for Crisis Management: The Contact Tracing Journey at SAP Labs

Identify and manage people who may have been exposed to a contagious disease, such as COVID-19 to prevent further spread

Steps:

Identification

Notification

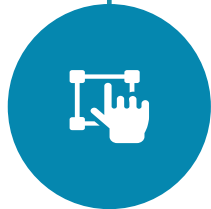
Monitoring and Support

What is Contact Tracing?

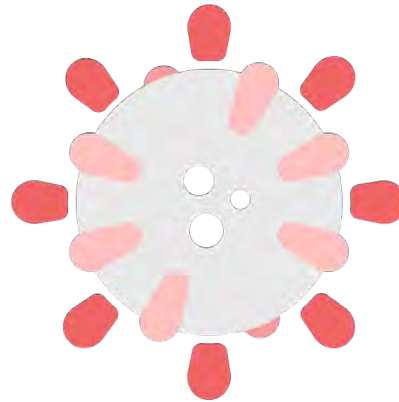
Why was it needed?



Identifying and notifying employees exposed to a COVID-positive case required extensive manual effort.



Manual sign-up sheets made tracking employee presence in the office inefficient and error-prone.

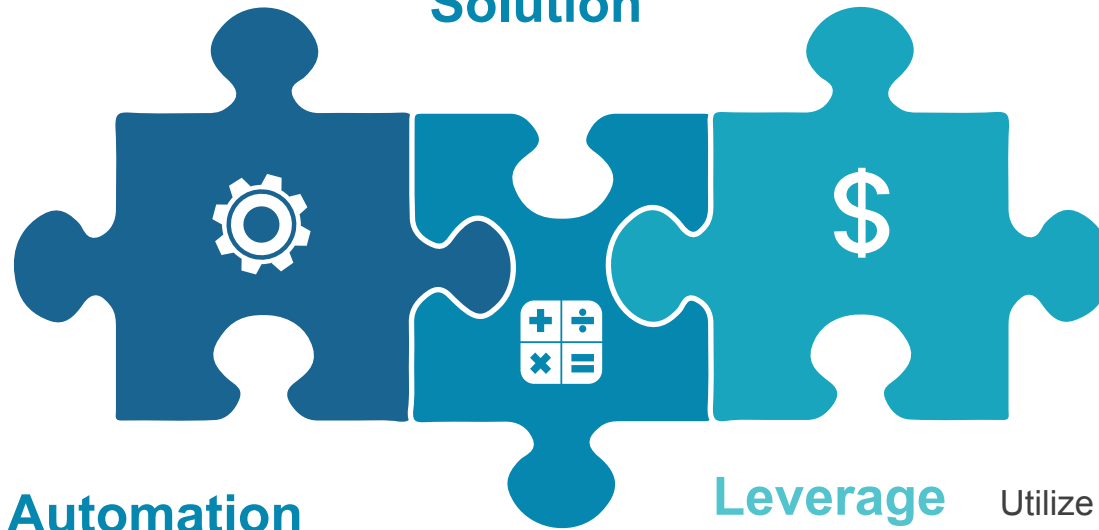


Delays in notifying exposed employees increased the risk of further infections.

Requirements from a business perspective

Minimize investment, especially in hardware, given the temporary nature of COVID.

Cost-Effective Solution



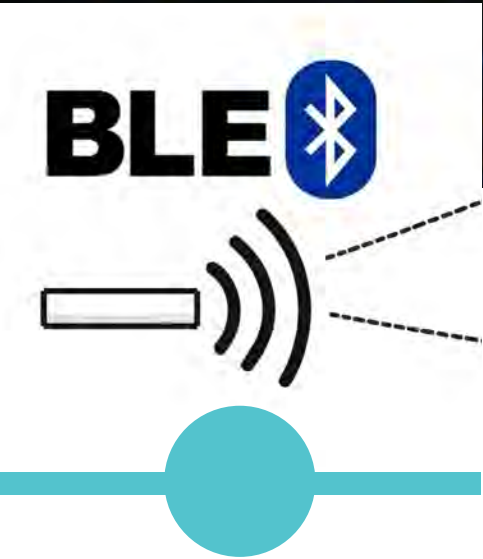
Automation

Implement an automated system to trace employee interactions and notify at-risk individuals efficiently.

Leverage Existing Resources

Utilize employees' smartphones as the primary tool for contact tracing since:

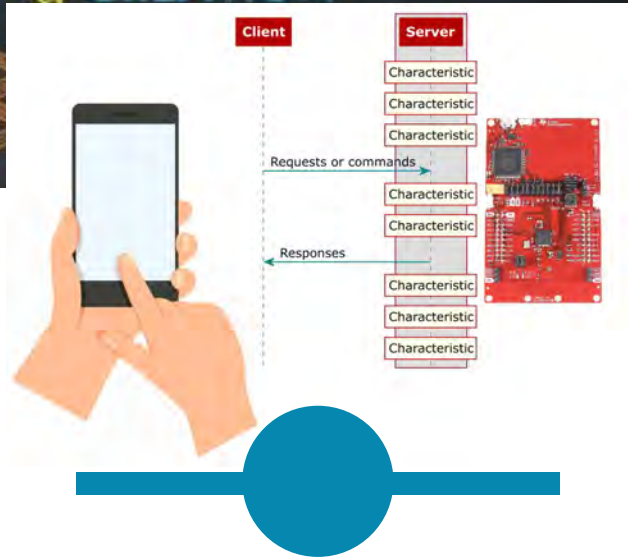
- Phones are unique to each employee.
- Phones are always with the employees, ensuring accurate tracking.



BLE technology to trace nearby devices to perform Contact Tracing.



Android and iOS - devices from different companies and brands

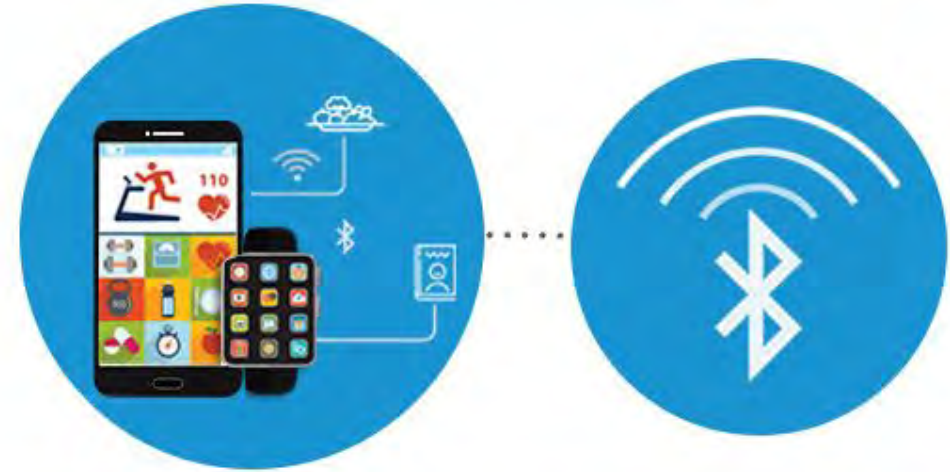


GATT server-client technology

Limitations

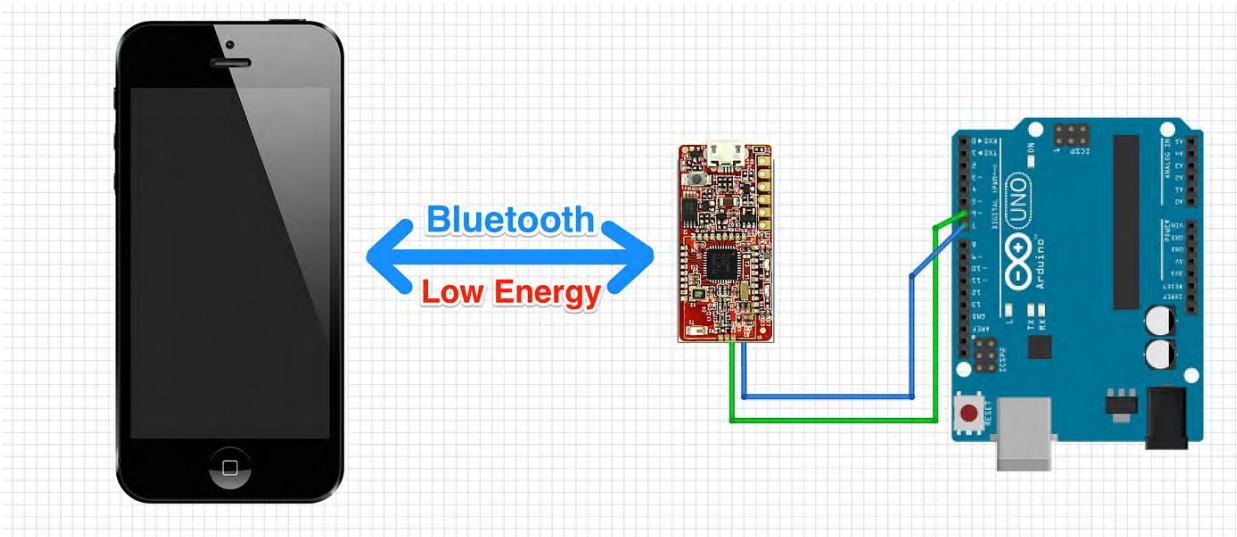
Android BLE GATT:

- **Multiple Connections:** Supports multiple clients connecting to a single server.
 - **Limitation:** Connecting to a new server automatically terminates the previous connection.
- **Asynchronous Nature:** Single BLE GATT connections cannot queue without potential loss of nearby contacts.
- **Advertising Capability:** Can broadcast both a scan record and an associated scan response.

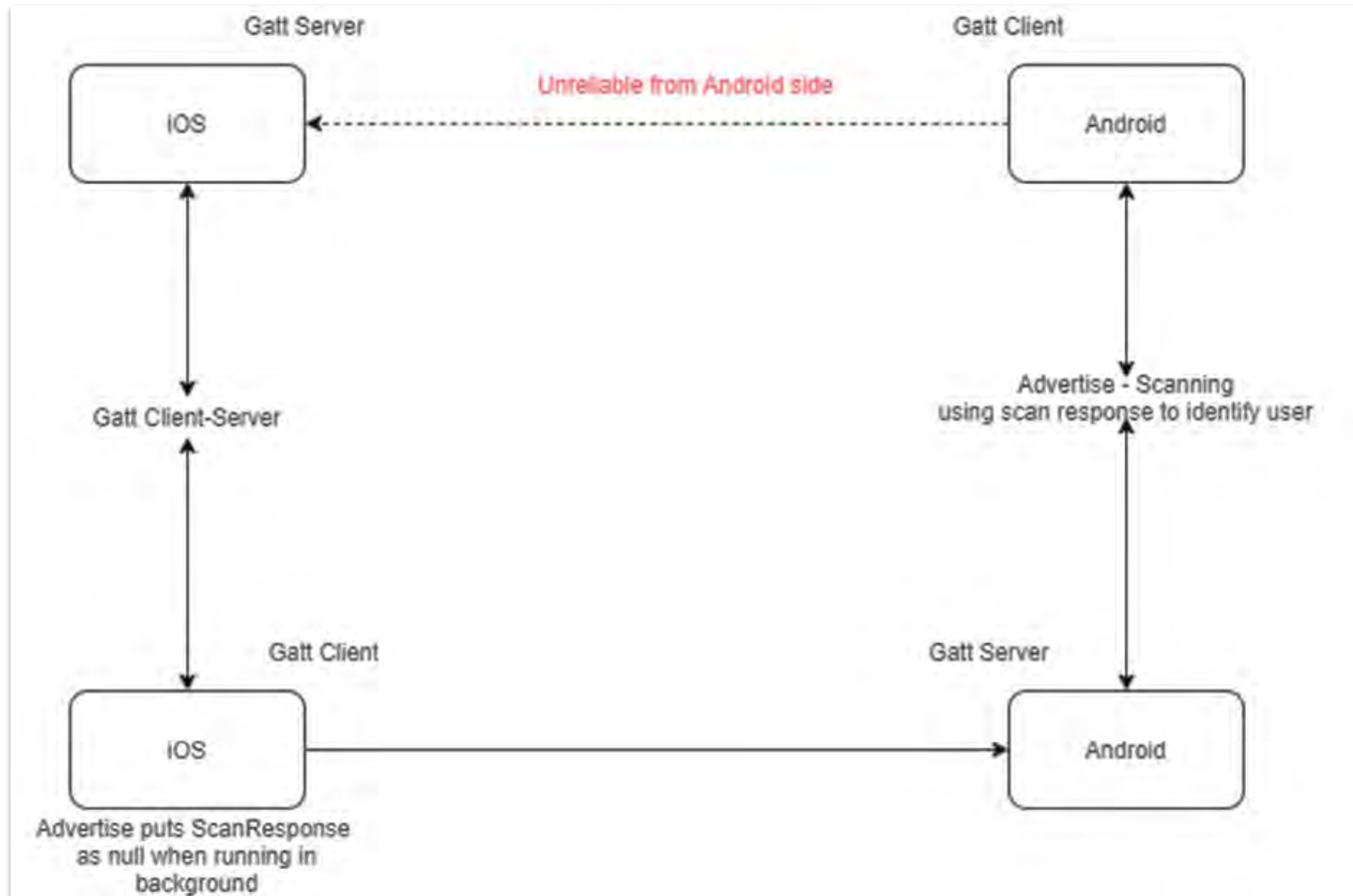


iOS BLE GATT:

- **Connection Queuing:** Performs queuing of servers for sequential client connections.
- **Background Limitation:** Advertiser sends a null scan response when running in the background.
- **Service Advertising:** Limited to broadcasting a single UUID for a service.



Architecture



Results and implementation

Results:

- Achieved seamless cross-platform contact tracing.
- Resolved platform limitations:
 - iOS: No scan response in the background.
 - Android: GATT client queueing limitations.



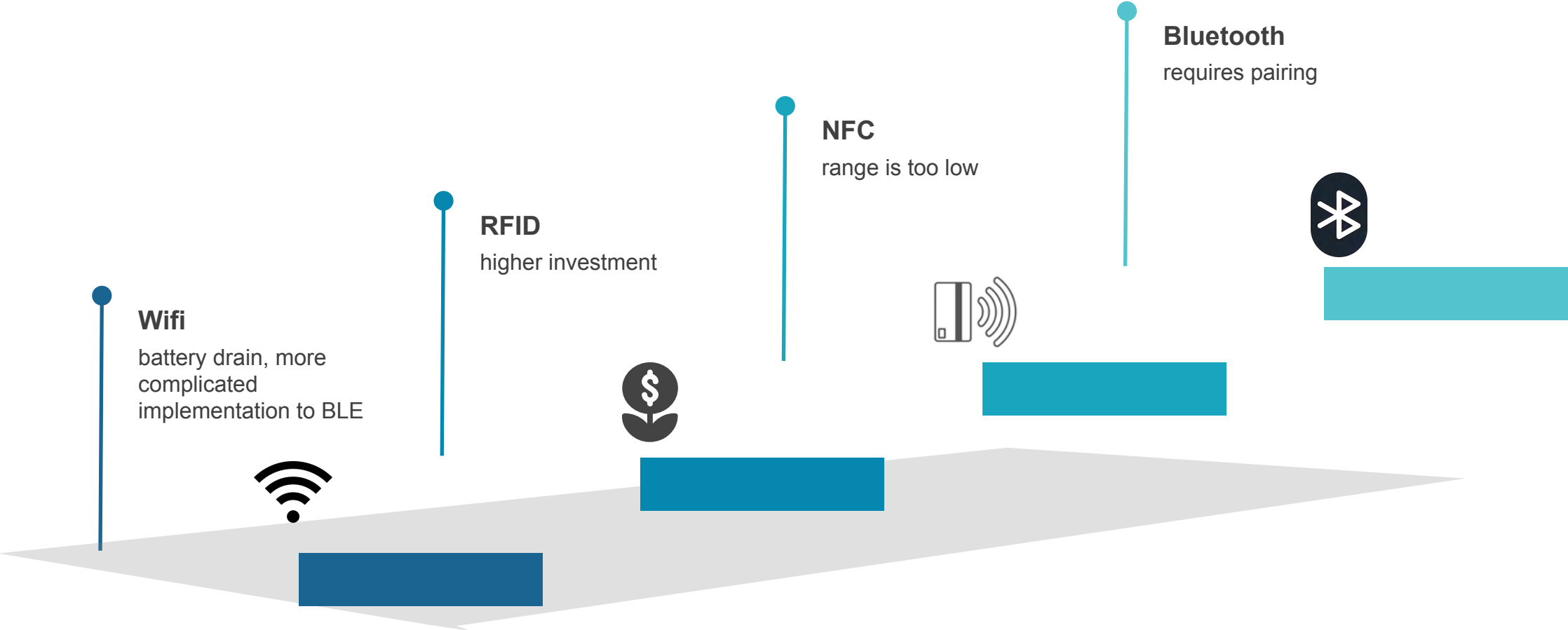
Robust and efficient tracing across Android and iOS platforms.



Implementation:

1. **Android – Android:**
 - Advertiser broadcasts UUID (scan record) and user ID (scan response).
 - Scanner detects nearby broadcasting devices.
2. **iOS – iOS:**
 - GATT Server-Client: Advertises UUID, retrieves temporary MAC addresses, and reads user ID from characteristics.
3. **Cross-Platform:**
 - Android runs GATT server.
 - iOS connects to Android GATT server, retrieves user ID, and logs contact.

Other technologies explored





THANK YOU