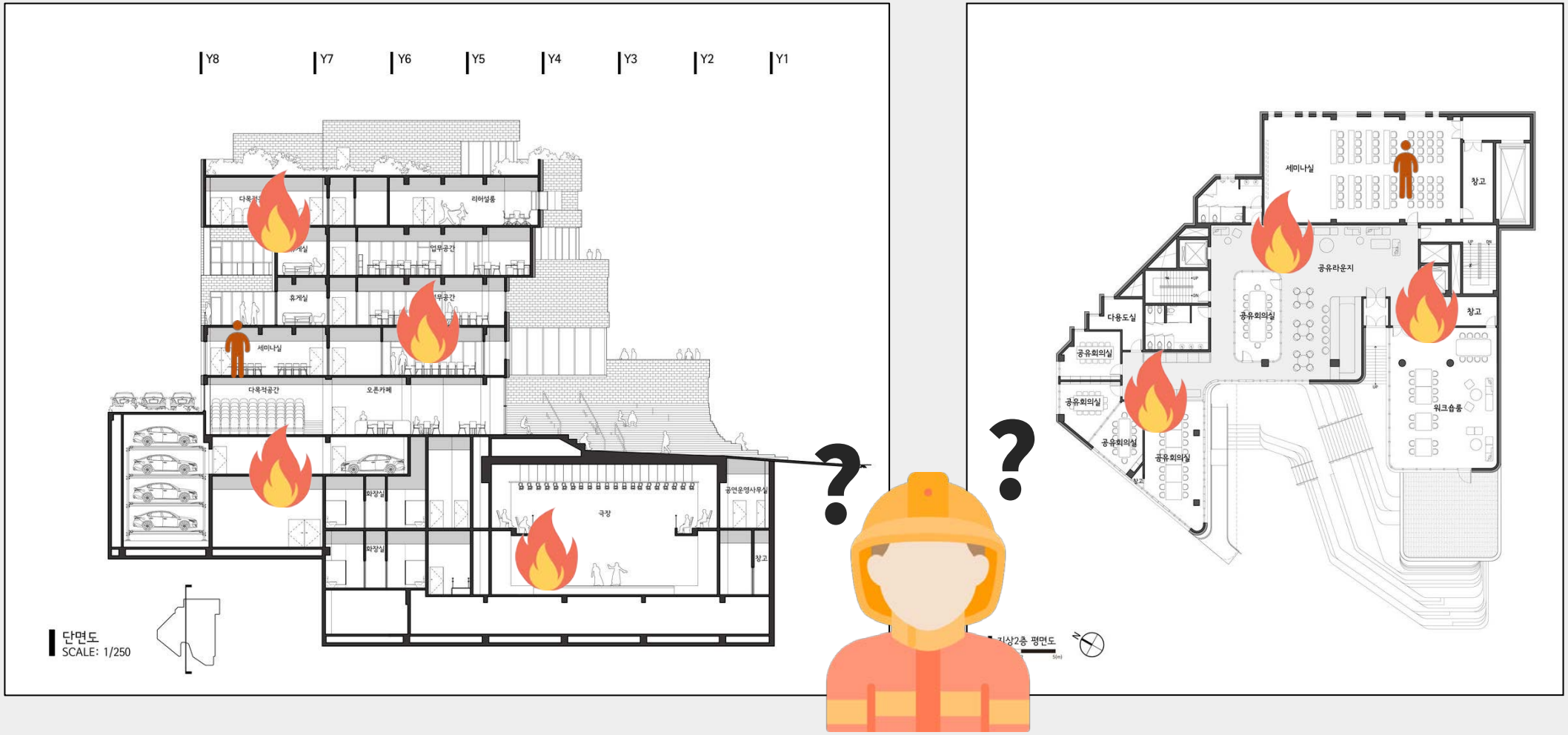
SADS

Spoofing Attack Detection System
At Indoor Positioning using BLE

Index

SADS

01 Introduction – 실내 위치 측위의 필요성



참조 : R. Zhang, F. Höflinger, and L. Reindl, “Inertial sensor based indoor localization and monitoring system for emergency responders,” IEEE Sensors J., vol. 13, no. 2, pp. 838–848, Feb. 2013

01 Introduction – 실내 위치 측위의 필요성

어빌리티시스템즈, 세브란스병원에 실내 길안내 서비스 공급

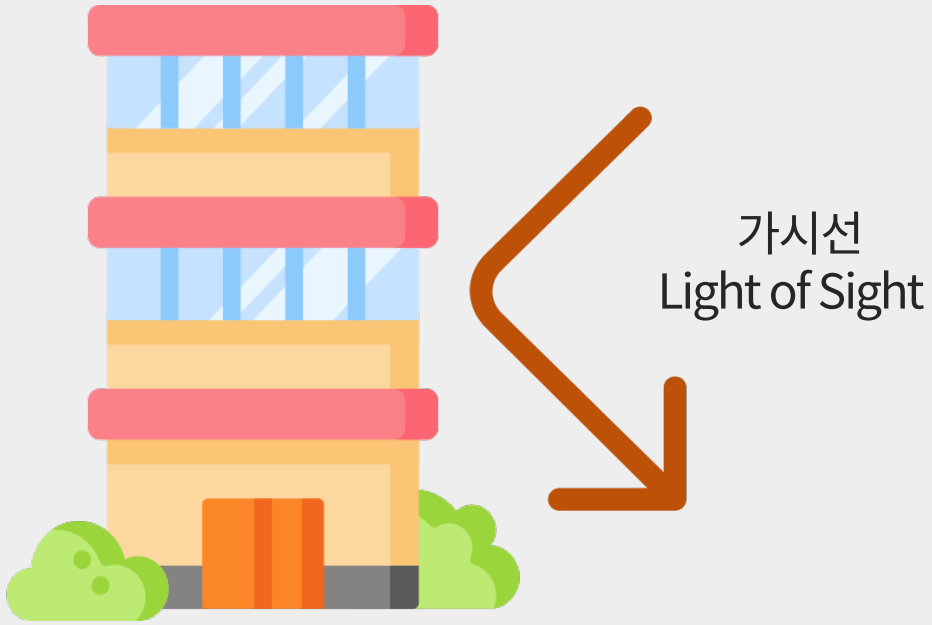
신재일 어빌리티시스템즈 대표는 "병원과 비콘의 결합은 병원에 방문하는 환자의 편의성과 만족도를 높여, 스마트병원으로의 이미지를 고착화 할 수 있다"며 "실내 내비게이션 서비스로 환자 편의의 스마트병원으로 거듭나는 병원들이 증가할 것으로 기대한다" 고 말했다.

출처 : https://www.datanet.co.kr/news/articleView.html?idxno=117214

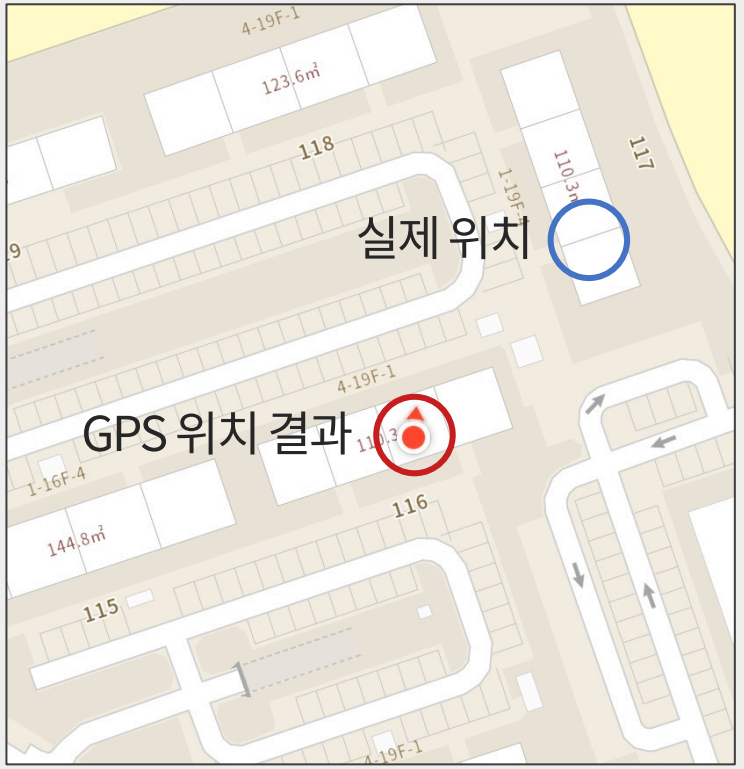
Global Positioning System

01 Introduction – GPS

1



2



참조 : F. Zafari, “iBeacon based proximity and indoor localization system,” Master’s thesis, Dept. Comput. Inf. Technol., Purdue Univ., West Lafayette, IN, USA, 2016.

01 Introduction – 무선 통신 기술을 활용한 실내 위치 측위

WIFI

- 대역폭 : 높음
- 지원범위 : 100m
- 하드웨어 : 네트워크 장치 및
  무선 라우터의 무선 어댑터

BLE

- 대역폭 : 낮음
- 지원범위 : 10m
- 하드웨어 : 서로 연결된 모든 장치의
  Bluetooth 어댑터

참조 : J. Kunhoth, A. Karkar, S. Al-Maadeed, and A. Al-Ali, “Indoor positioning and wayfinding systems: a survey,” Human-centric Comput. Inf. Sci., vol. 10, no. 1, p. 18, 2020.

01 Introduction – 무선 통신 기술을 활용한 실내 위치 측위

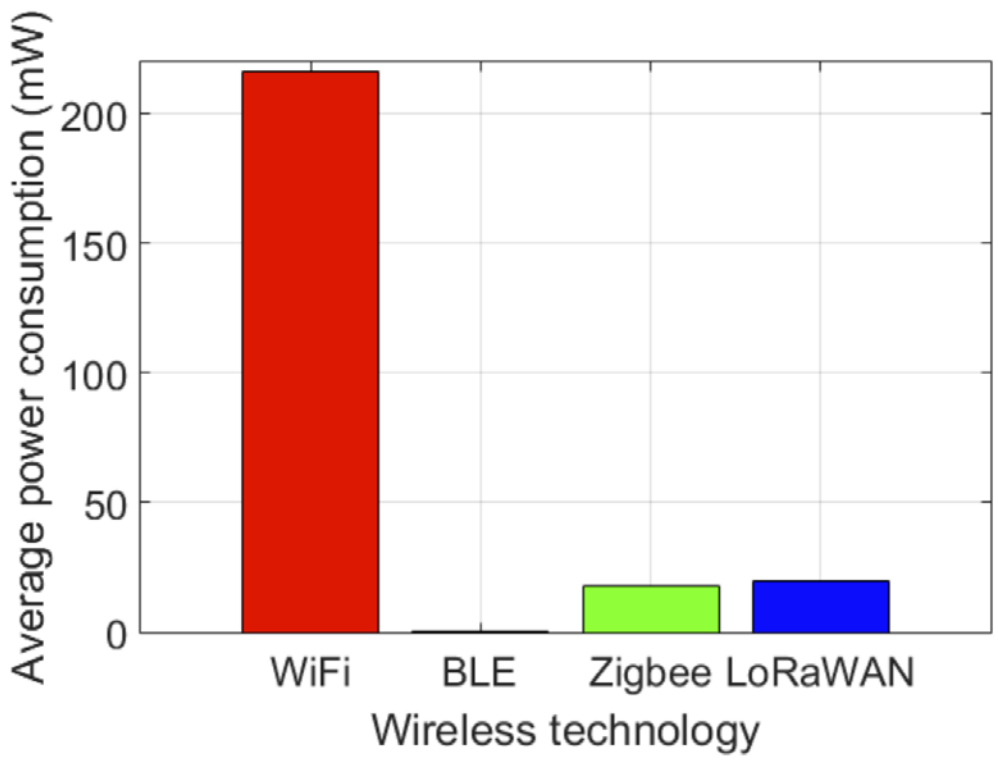


FIGURE 9. Average power consumption of wireless technologies.

참조 : 1) S. Sadowski and P. Spachos, "RSSI-based indoor localization with the Internet of Things," IEEE Access, vol. 6, pp. 30149–30161, 2018
2) F. Subhan, A. Khan, S. Saleem, S. Ahmed, M. Imran, Z. Asghar and J. I. Bangash, "Experimental analysis of received signals strength in Bluetooth Low Energy (BLE) and its effect on distance and position estimation," Transactions on Emerging Telecommunications Technologies, p. e3793, 2019.

02 Background – BLE란?

Advertise Mode

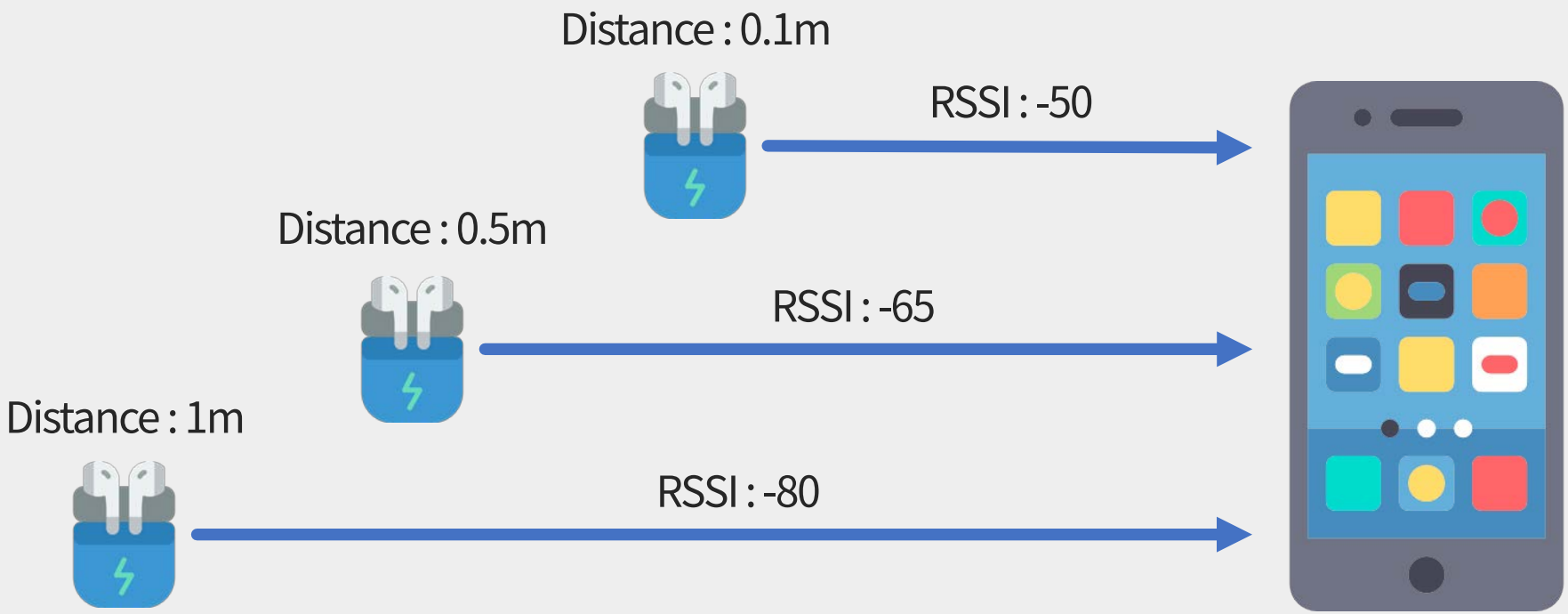
사용자와 연결되기 전
Advertising Packet
(Beacon Message)를 방송하는 Mode

Connection Mode

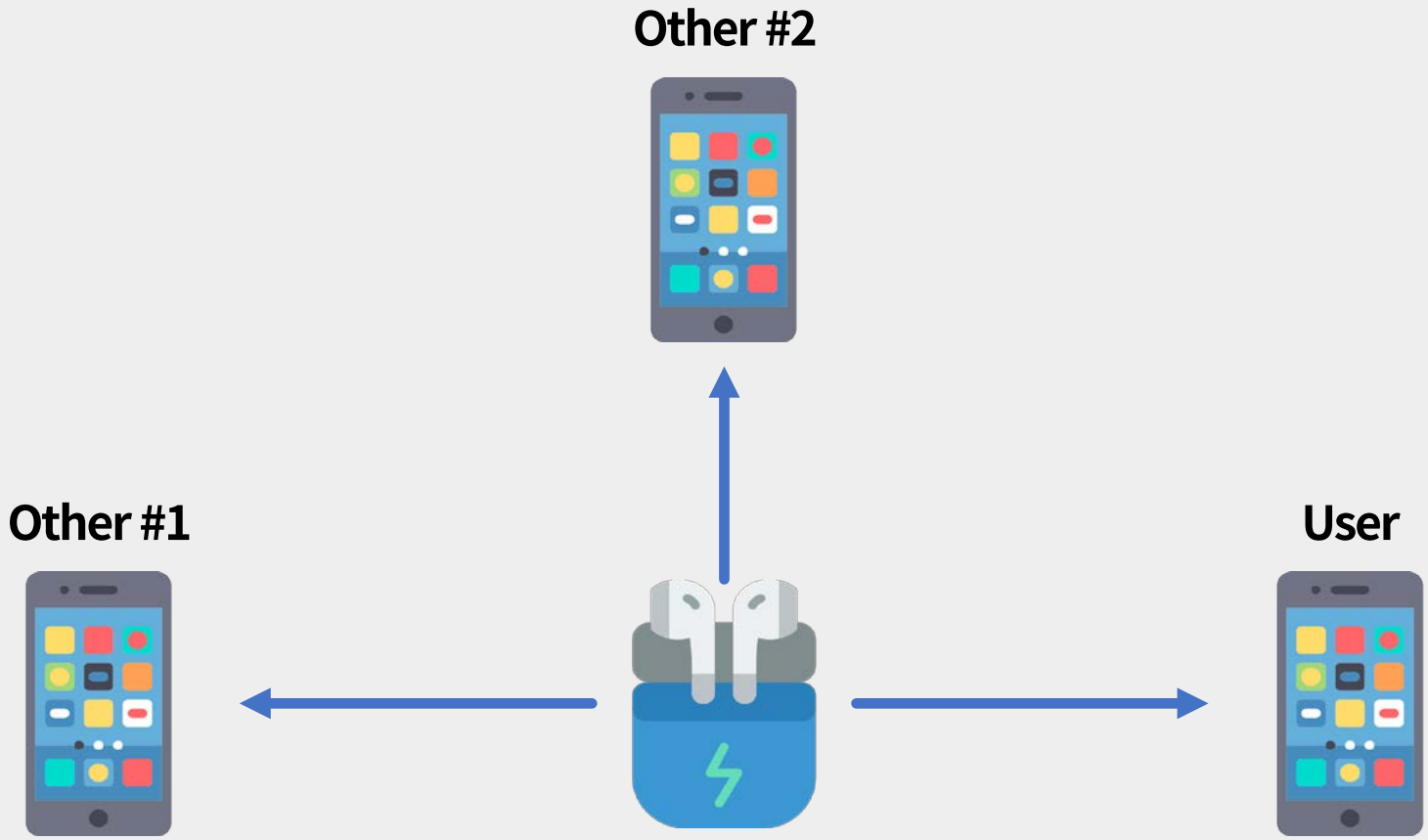
Advertising Packet
(Beacon Message)을 수신하여
사용자와 연결되어 데이터를 주고 받는 Mode

02 Background – BLE란?

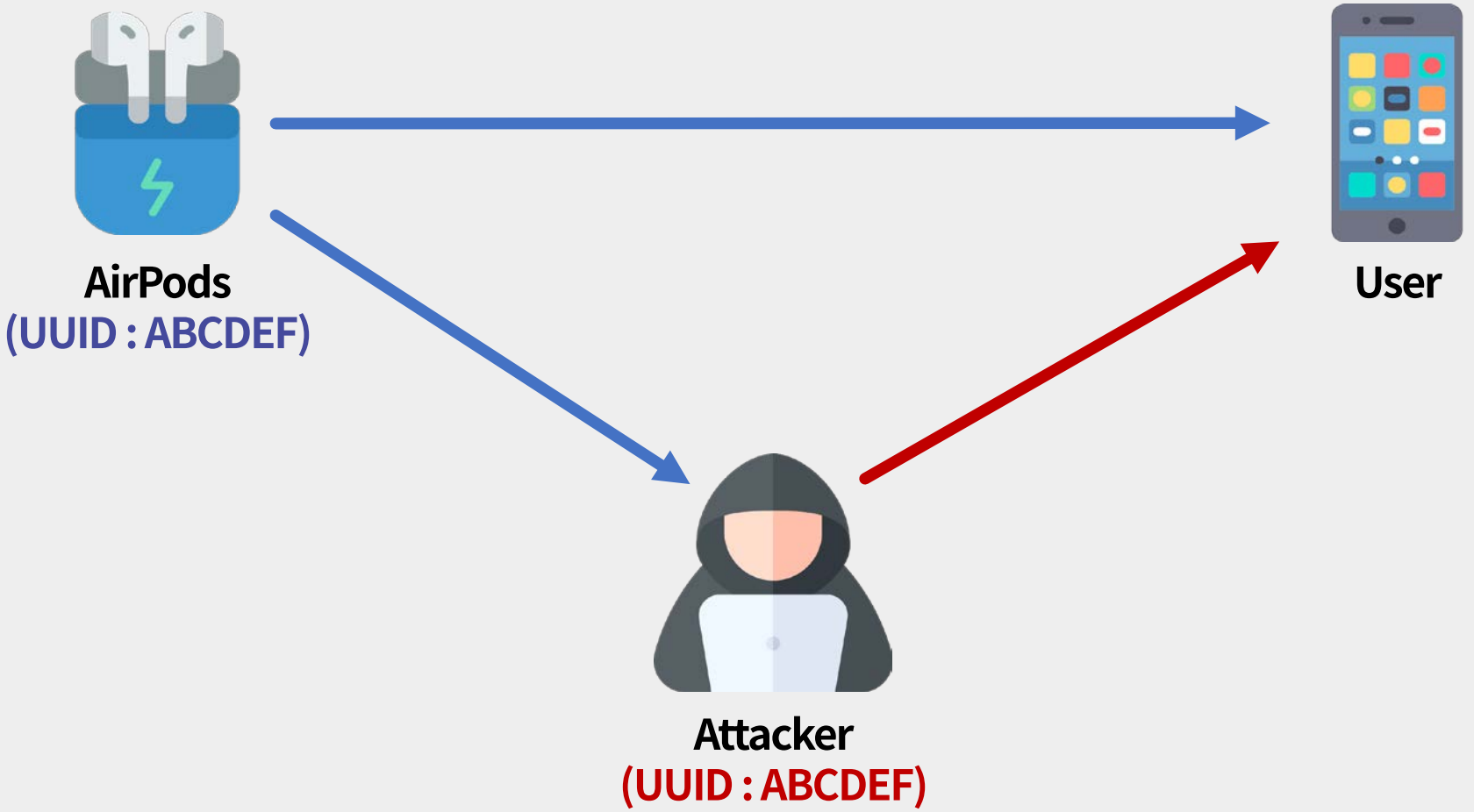
Received Signal Strength Indicator (RSSI)



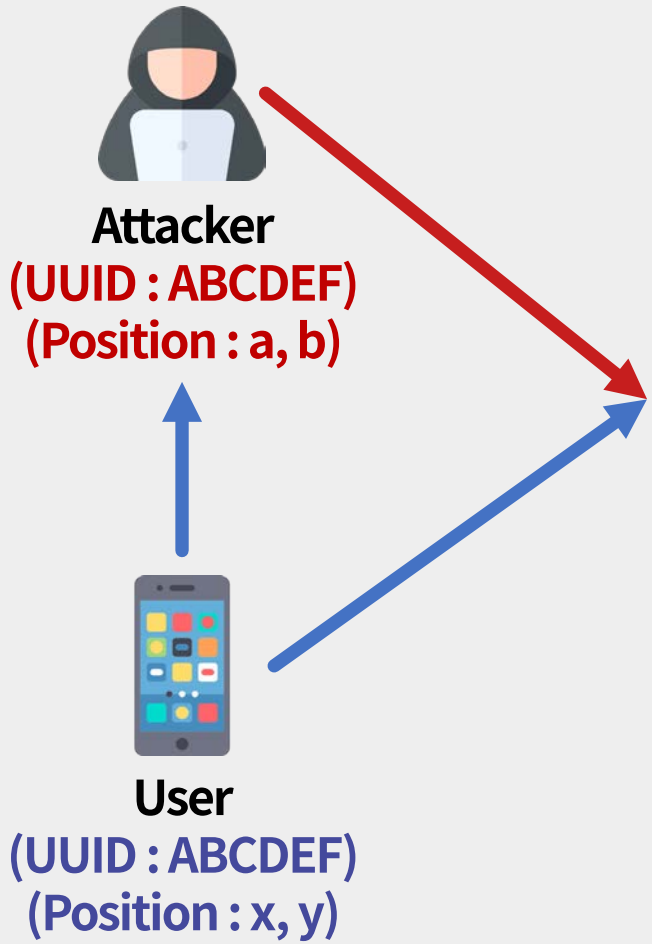
02 Background – Broadcast

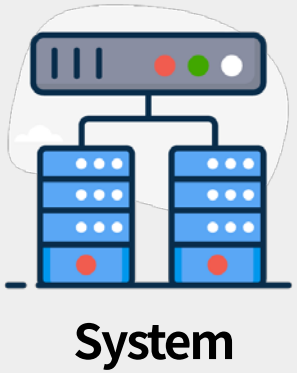


02 Background – 스푸핑 공격이란?

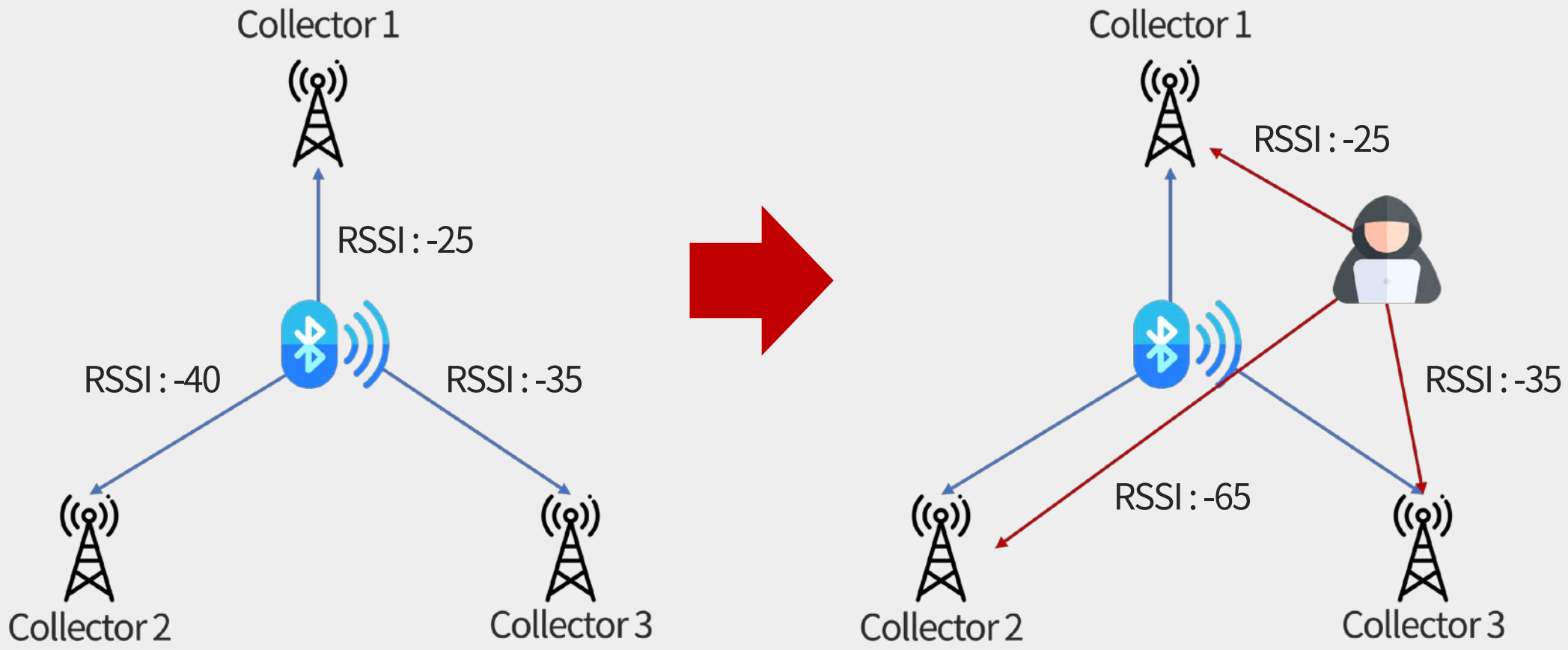


02 Background – 실내 위치 측위에서 스푸핑 공격의 위험성



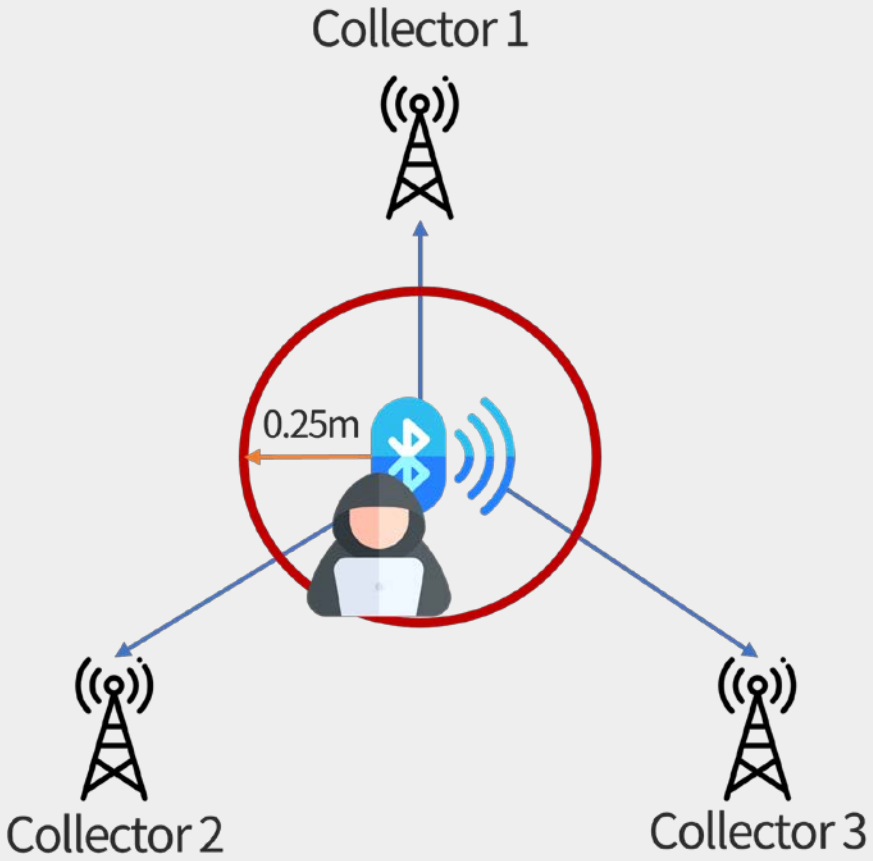


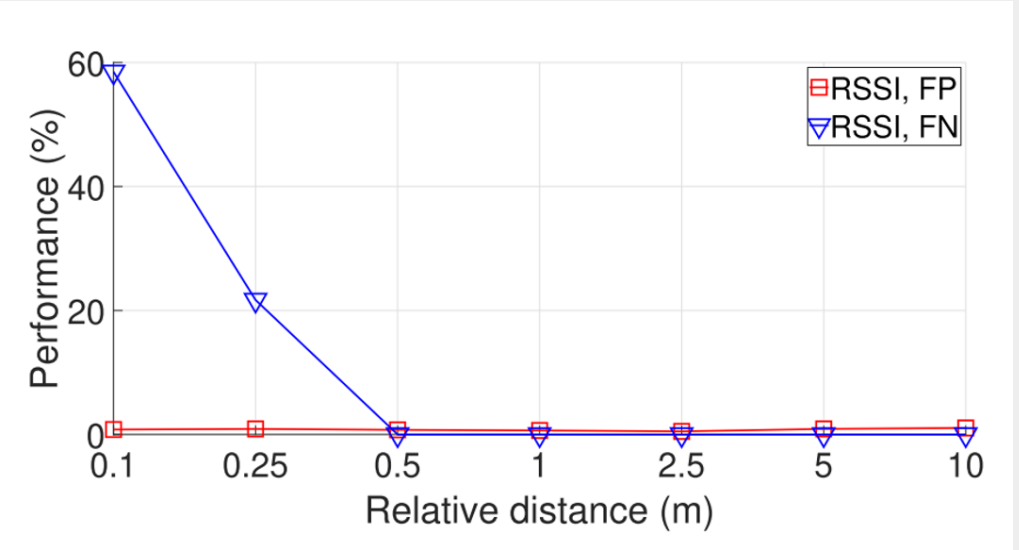
03 Related Work – 블루쉴드



참조 : Wu, J., Nan, Y., Kumar, V., Payer, M., & Xu, D. (n.d.). 블루쉴드: Detecting Spoofing Attacks in Bluetooth Low Energy Networks.

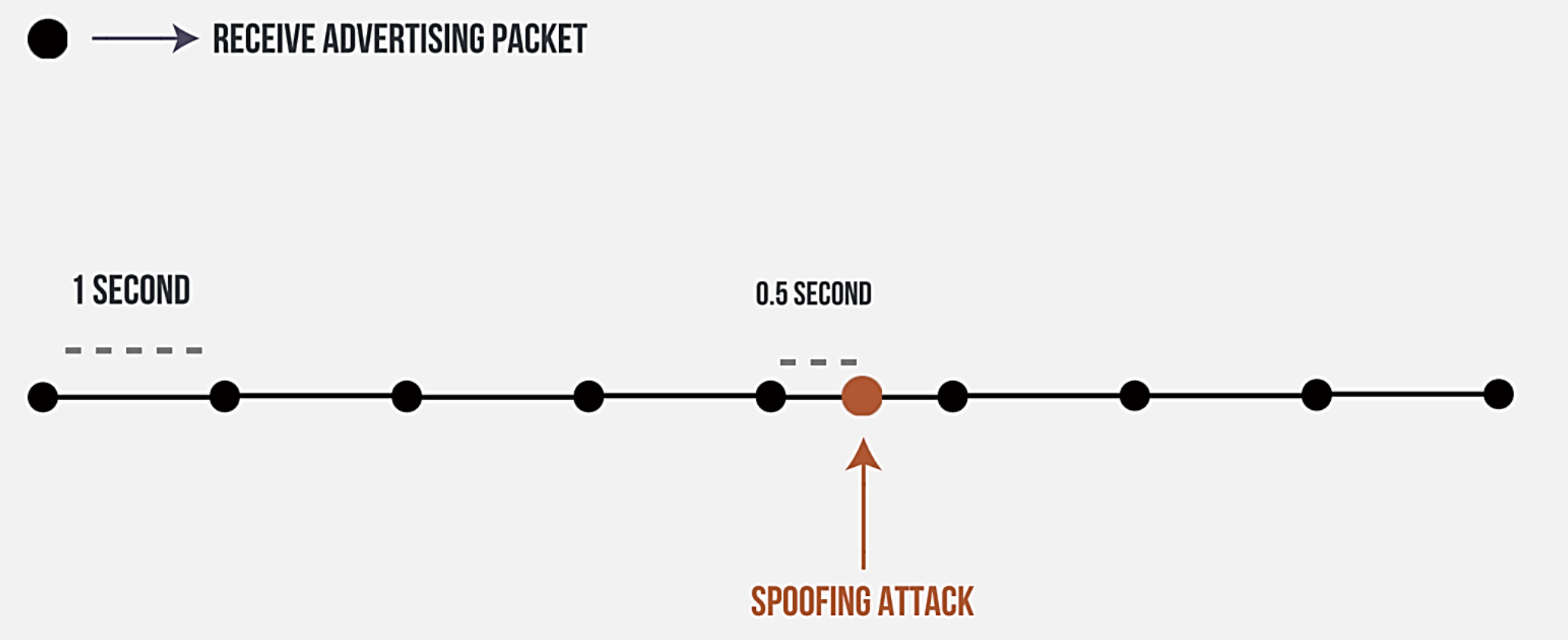
03 Related Work – 블루쉴드의 한계점



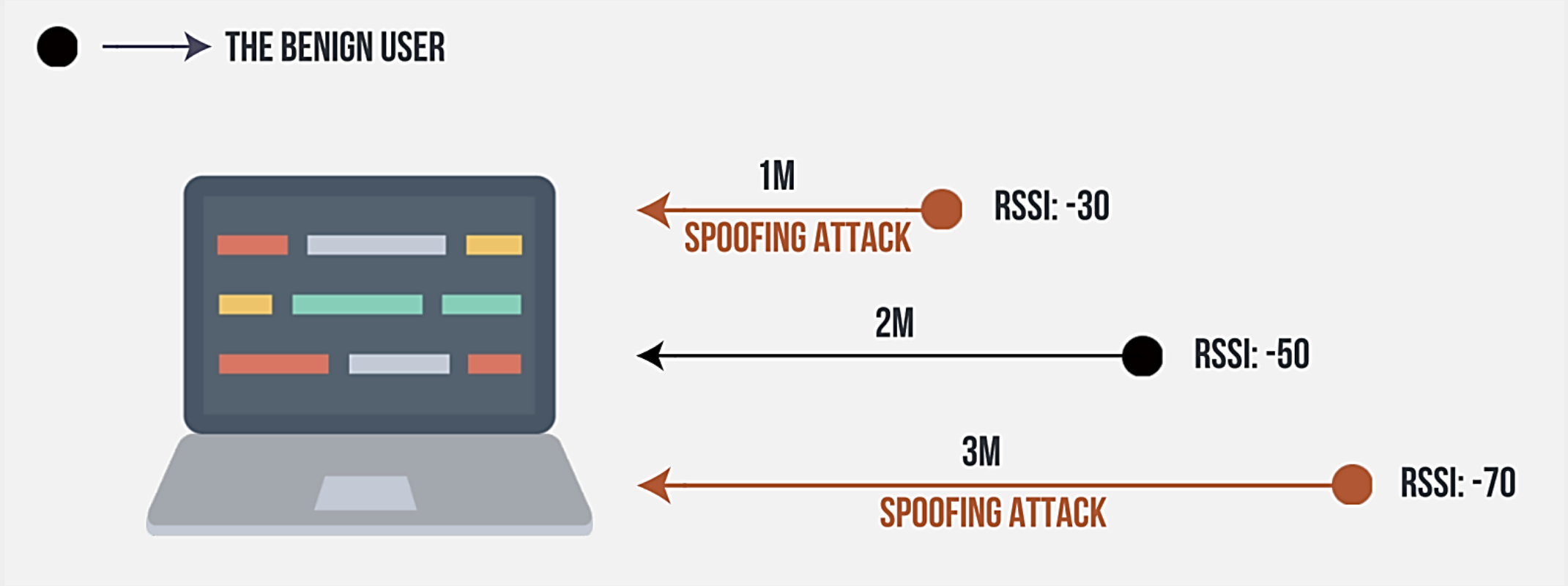


참조 : Wu, J., Nan, Y., Kumar, V., Payer, M., & Xu, D. (n.d.). 블루쉴드: Detecting Spoofing Attacks in Bluetooth Low Energy Networks.

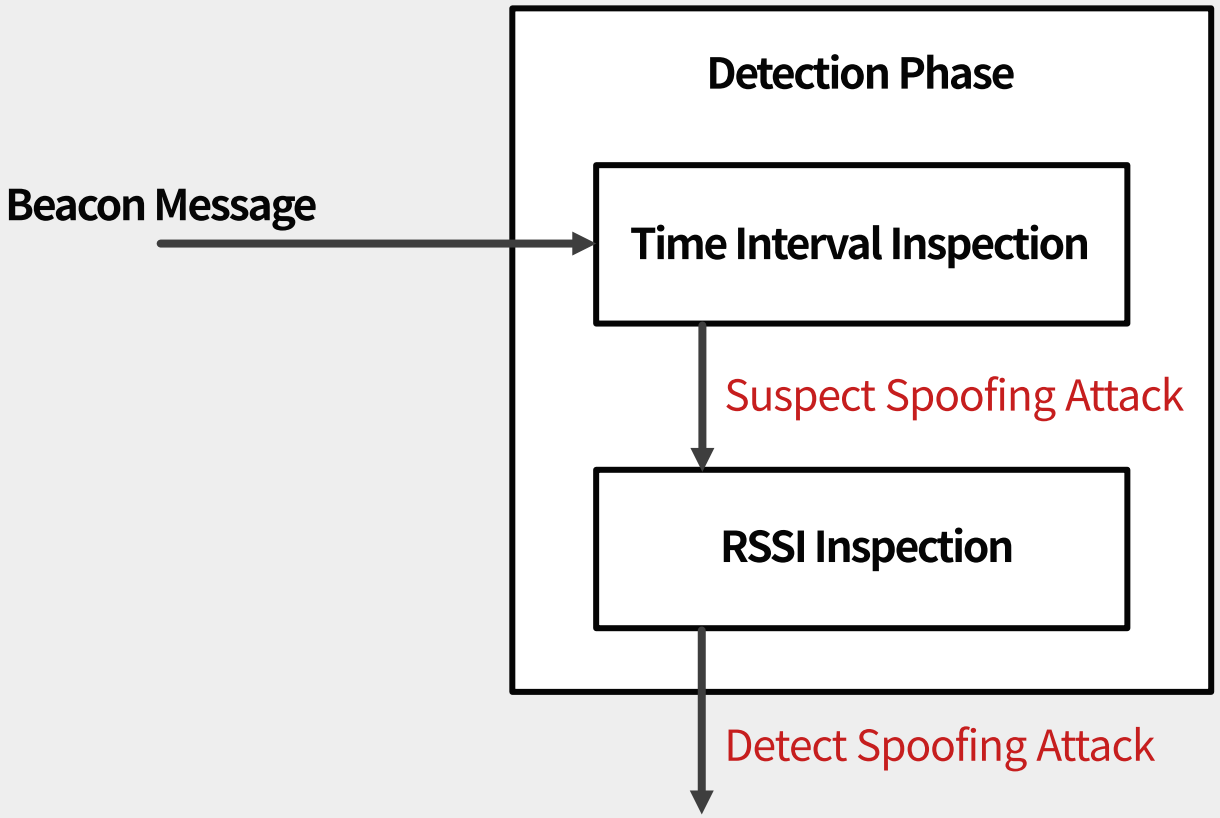
04 System Design – Time Interval (INT)



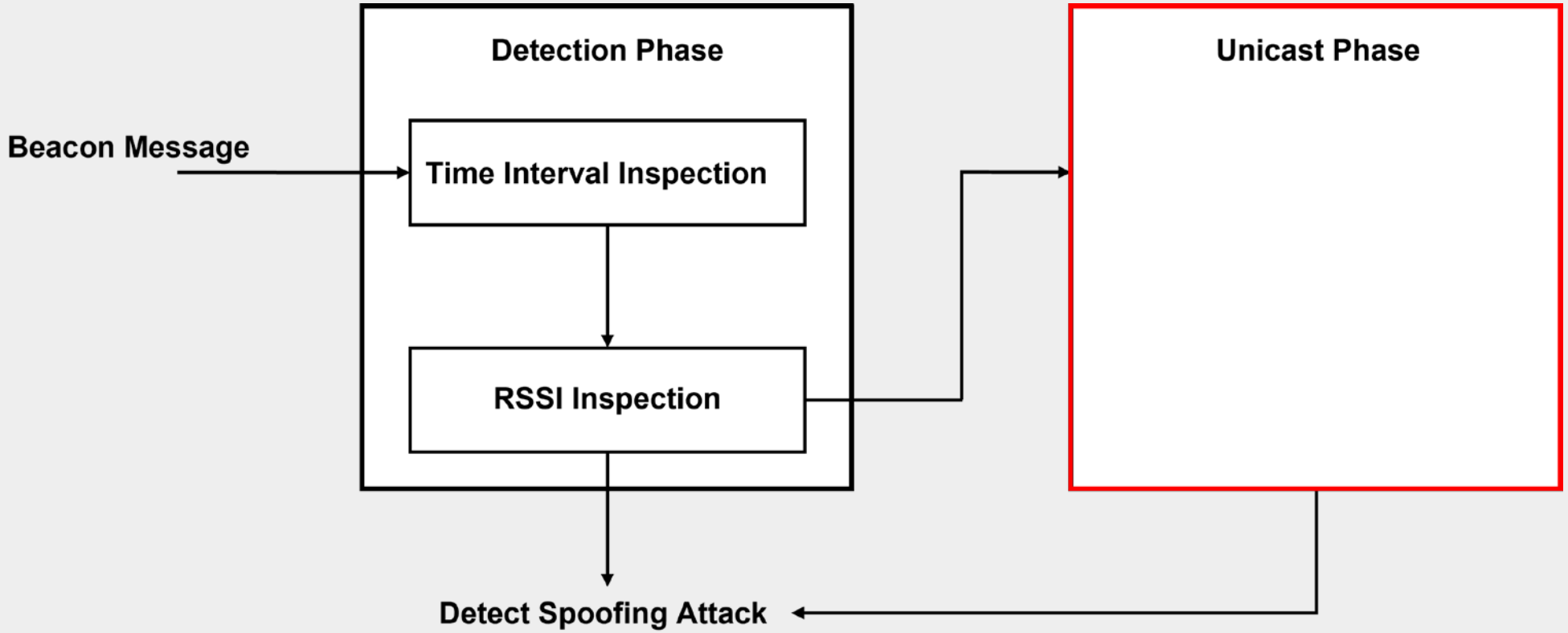
04 System Design – RSSI



04 System Design – Detection Phase



04 System Design – Unicast Phase



04 System Design – Use Case