



HANDS-FREE
MOBILE
TICKETING



About us



- 16 years of experience with passenger transport ticketing & mission-critical IT systems
- Team of 40 professional developers
- Two products: T solutions & Jiffi



香港電車
HONG KONG TRAMWAYS





Be-in/Be-out

IS NOT

Check-in/Be-out

How does it work?



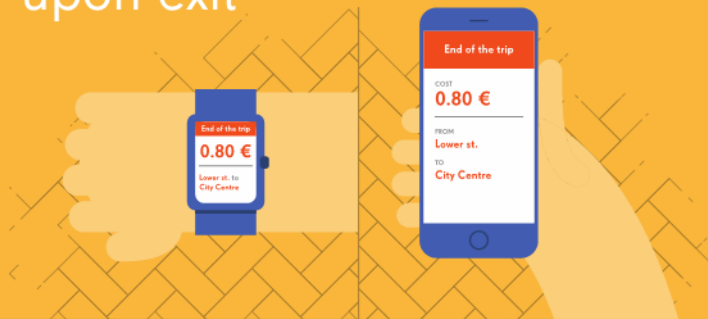
1 App detects you're on board



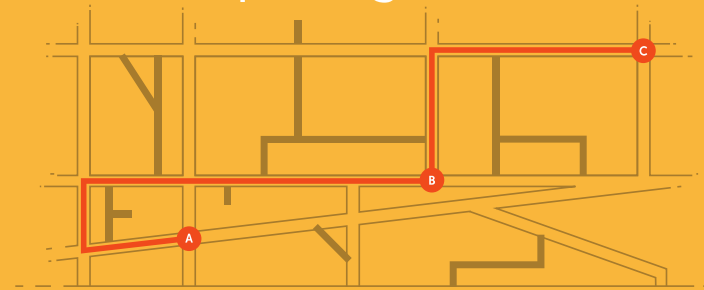
2 You travel & you arrive



3 Billing happens automatically upon exit



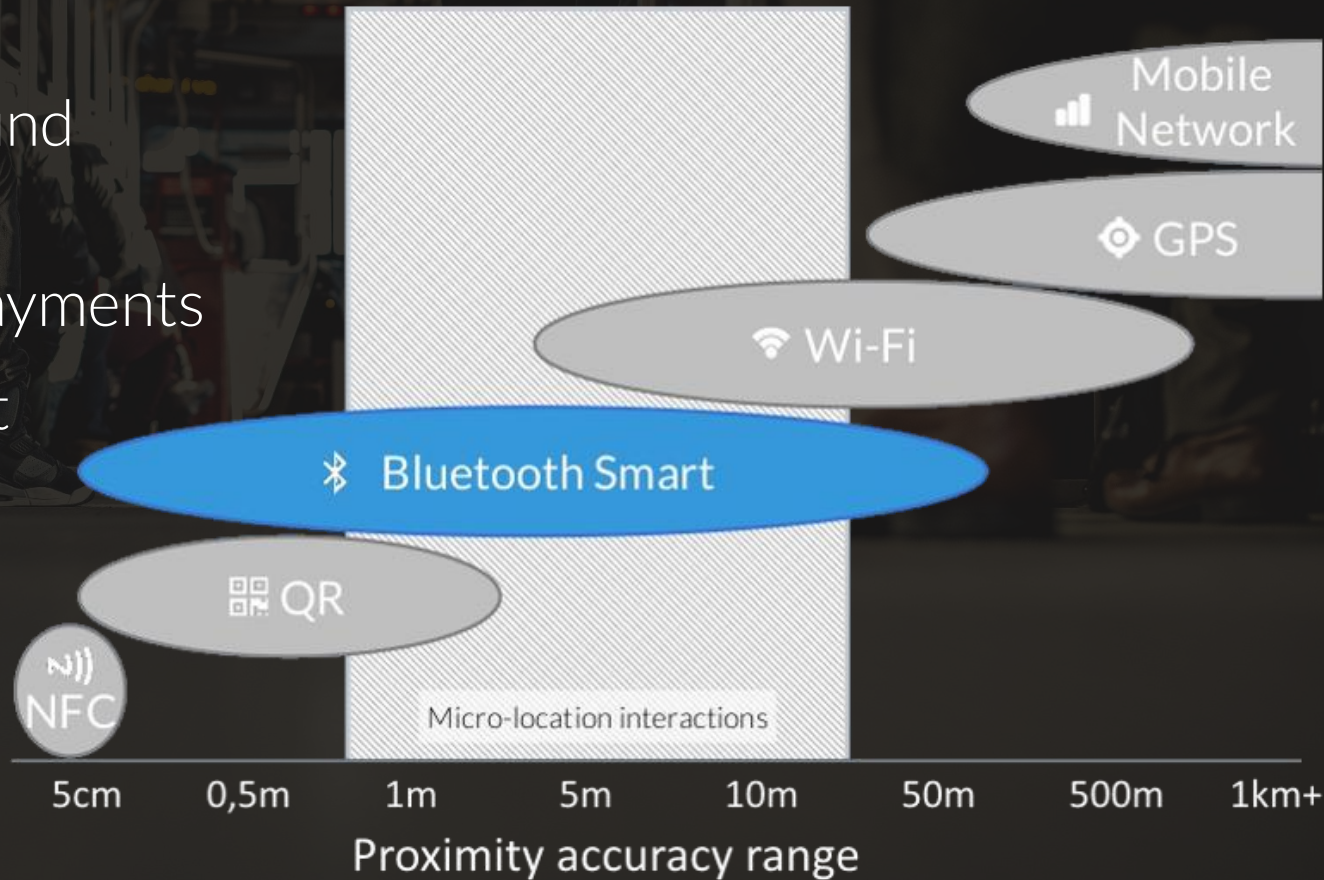
4 Better route planning & smarter pricing



Proximity technology



- Already built into smartphones
- Supports background action triggering
- Secure for micropayments
- Currently the most accurate detection technology for BiBo range



Current status & next steps



- Project started 2 years ago
- Prototype testing in Tartu with 10 buses and ~3000 successful BiBo validations
- Main goal was to validate the technological feasibility
- Hardware deployed on 65 buses
- Tartu city has agreed to launch city-wide piloting in end of 2016



BLE beacons and installation



Main challenges for BLE BiBo



- Automated billing requires bullet-proof detection & triangulation algorithm
 - Beacon signal strength can vary because of many factors (the vehicle is full, electromagnetic interference etc)
 - Different phones have different reception sensitivity
 - All those factors increase the probability of false be-in/be-out transactions
- Spoofing of the ordinary beacon signal can compromise the ticketing and validation security
- Conventional beacon's batteries will die out too fast (high broadcasting frequency, cold weather etc)



- Constraints of iBeacon protocol:
 - Time to „listen“ to beacons is limited
 - Battery conservation vs. Polling frequency & discovery time
- Reliability of BiBo requires context analysis
- Requirements for on-board equipment:
 - On-board computer that handles beacon infrastructure
 - Validation algorithm failover if some of the beacons fail
 - Remote access & restart
- Inspection mode in order to avoid last-minute check-in

Future of proximity locations



- Bluetooth Smart 5.0
 - Eight times the broadcast messaging capacity
 - Reduces or even eliminates the need for specific app
 - Increased battery life for beacons
- UWB (Ultra WideBand) in the smartphones
 - Even more accurate proximity technology than BLE
 - Currently no commercially available smartphones



THANK YOU

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