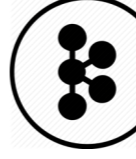



Project Overview

In the management of warehouses where outbound volumes are high, the picking process has to be optimized in order to deliver orders on time. This project aims to improve the picking efficiency for one of DB Schenker's client by creating an algorithm which will then be integrated in a mobile application.

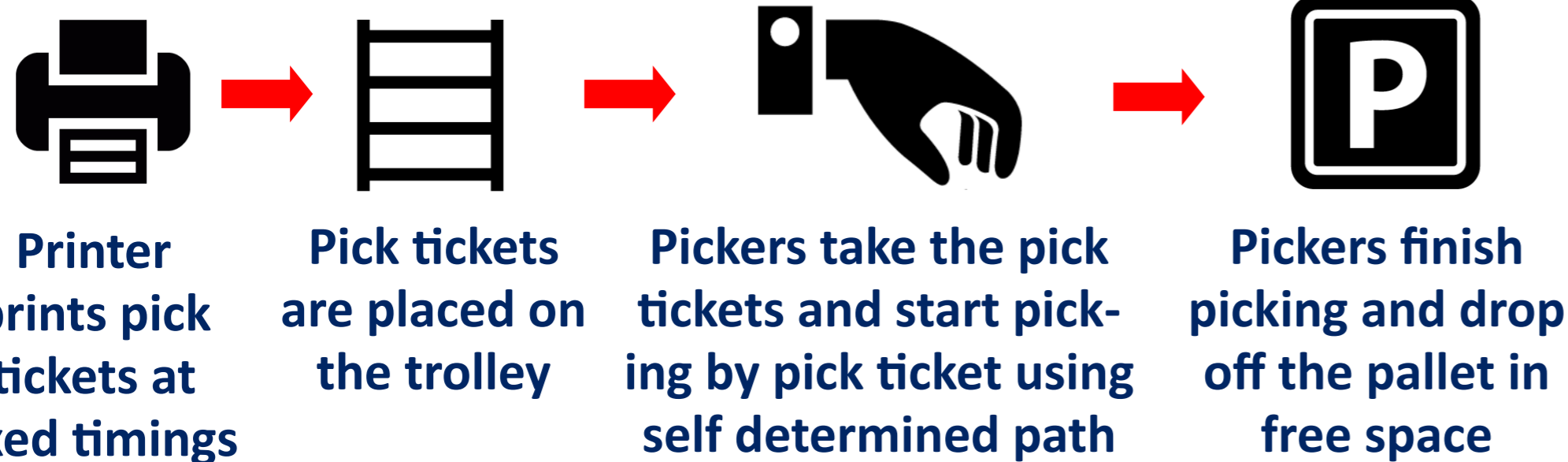
Objectives

Improve picking process by:

-  Algorithm to optimize the picking sequence
-  A mobile application to replace paper-dependent process

Problem Investigation

Current Process





Waste

1. Time spent to print, sort and pick
2. Paper wasted in the process of printing pick tickets

Methodology

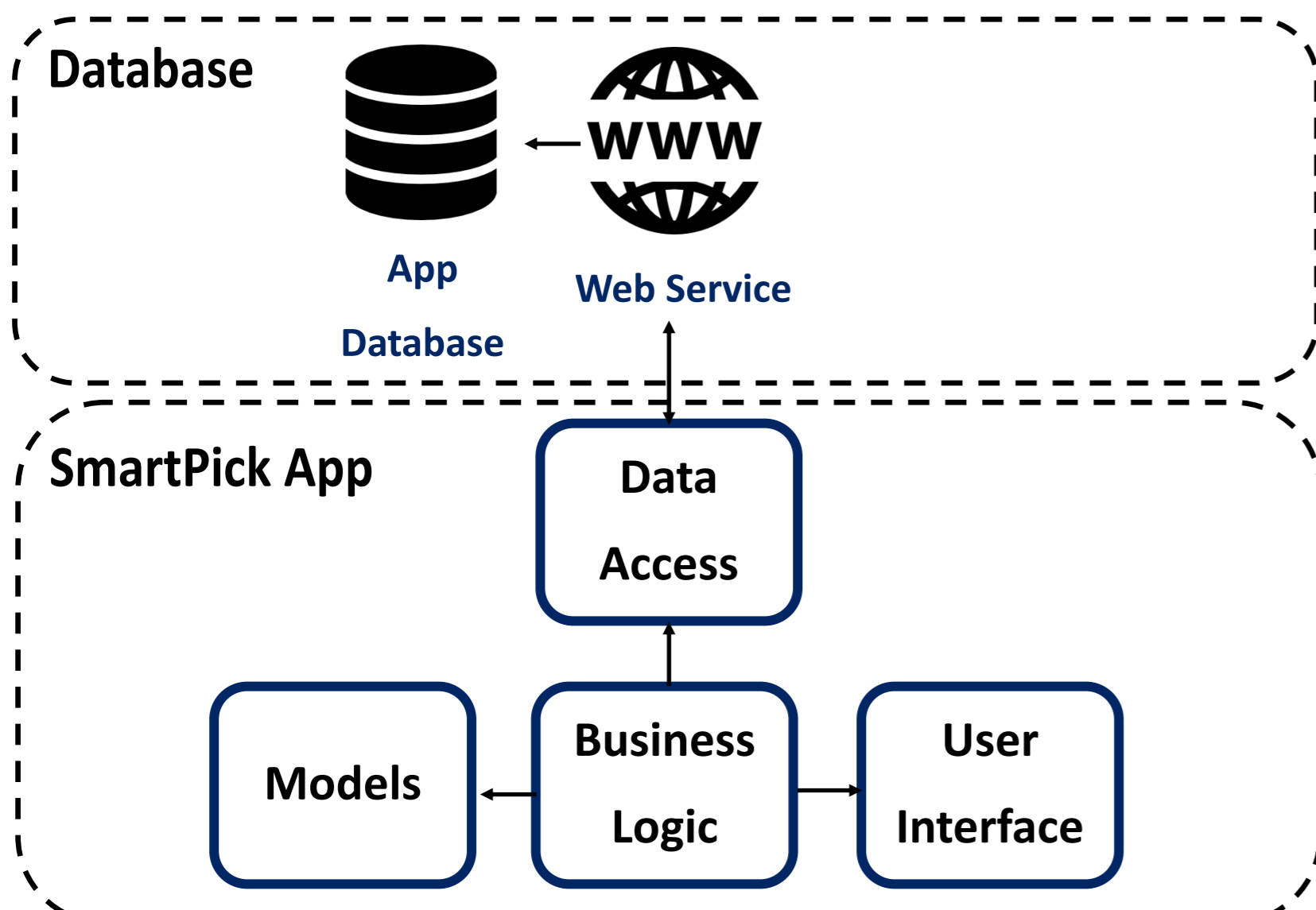


Proposed Solutions

-  **Batching**
Batching of pick tickets in the same picking job for each picking instead of picking per tickets
-  **Sorting**
Batched items across pick tickets sorted according to S-path of warehouse layout

Mobile Application

Architecture

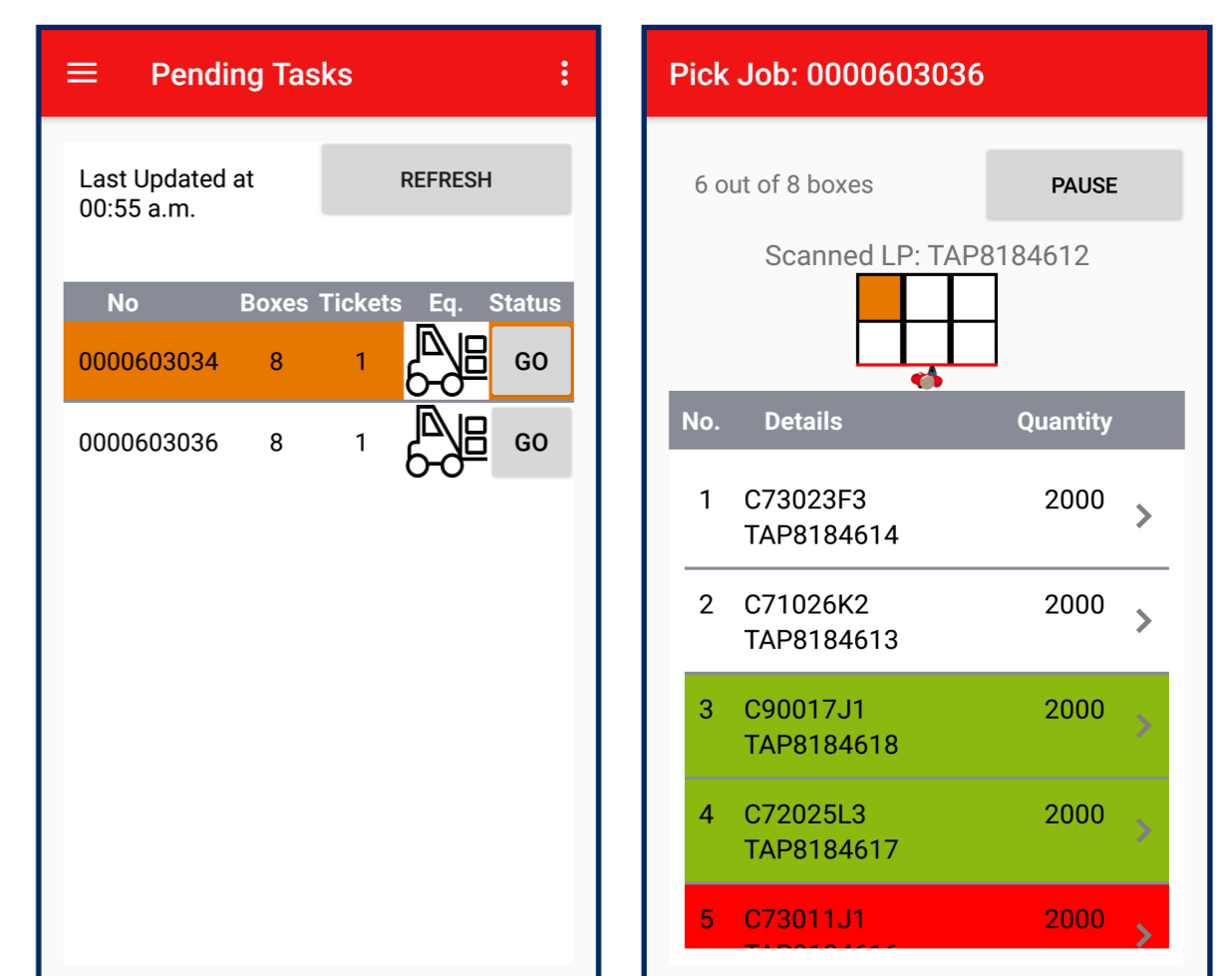
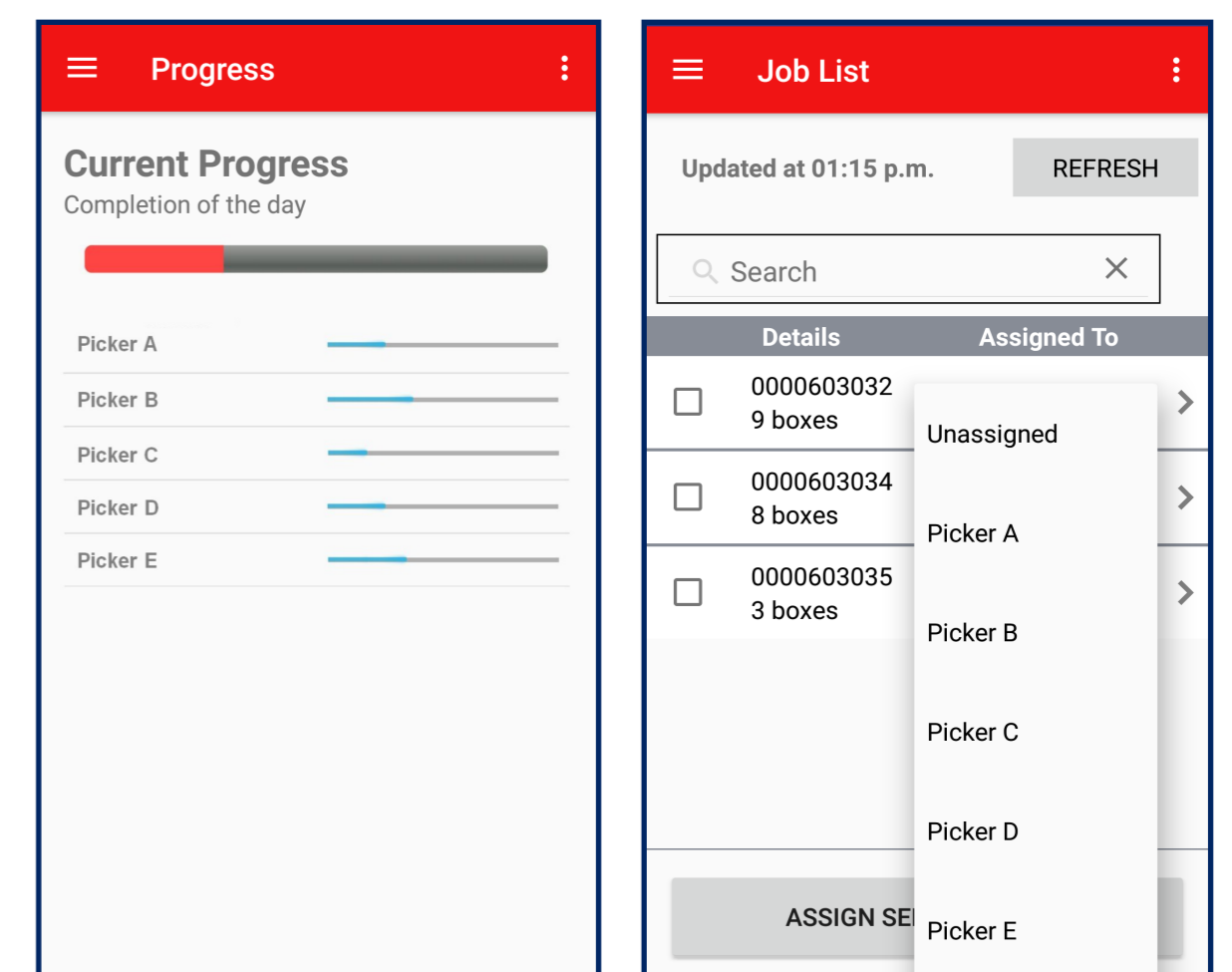


ADMIN

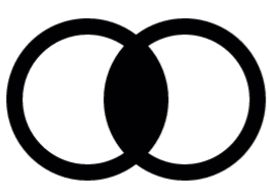

- Functionalities for supervisors
- ✓ Able to see picking progress overview
 - ✓ Assign jobs to pickers
 - ✓ Track errors in picking process
 - ✓ Notify pickers of urgent jobs
 - ✓ Has access to order-related data

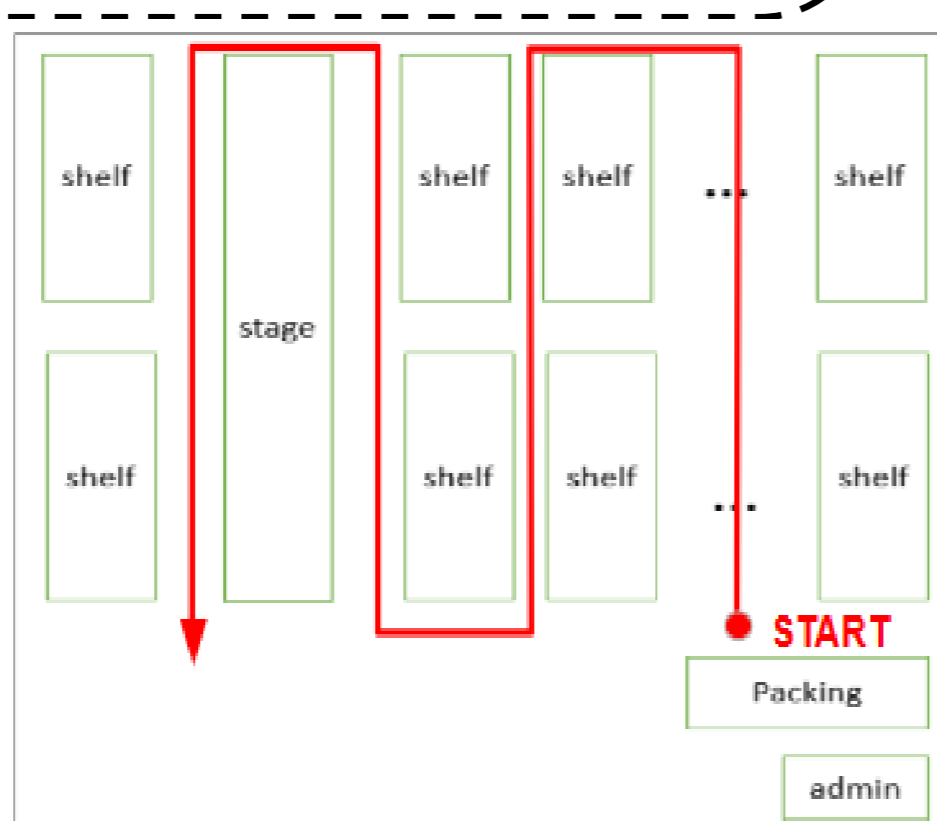
PICKER

- Functionalities for pickers
- ✓ Has access to pick jobs assigned
 - ✓ Use of Bluetooth scanner to pick
 - ✓ Directed on where to put the items on the pallet
 - ✓ Report errors directly through app
 - ✓ Track his/her picking records



Algorithm

-  Combine items across pick tickets in picking job
-  Order all items by S path



Simulation Model

To simulate the current process, we identify 3 aspects of the path taken that contribute to time taken for picking:

Travel time per Block

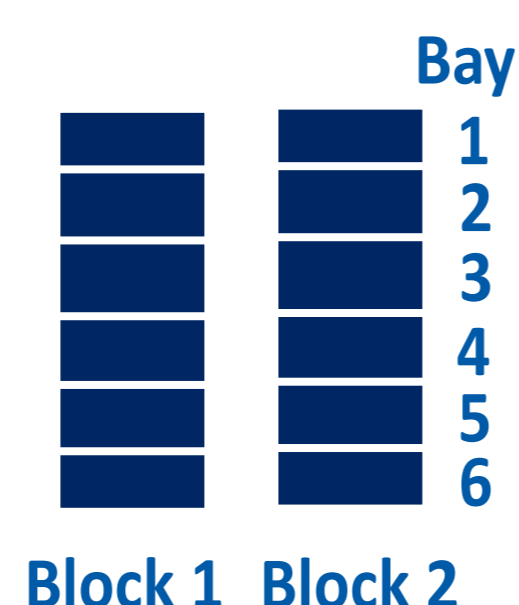
Mean: 3.7s Standard dev. : 0.1s

Travel time per Bay

Mean: 3.0s Standard dev. : 0.2s

Travel time per Level (vertical distance)

Mean: 1.6s Standard dev. : 0.08s



Results above are generated based on input from 2 weeks' real data

Performance Analysis

Fixed S-path

Proposed Process

Current Process

