**Entities:**

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|  | **Description** | **Attributes** | **Note** |
| **CustomerAccount** | * Represents registered customer accounts * May hold 0 or more MykiCards | * customer\_id (PK): VARCHAR(50) * full\_name: VARCHAR(100) * email: VARCHAR(50) * phone\_num: VARCHAR(20) * address: VARCHAR(100) * dob: DATE * register\_date: DATETIME * account\_status: VARCHAR(20) * password\_hash: VARCHAR(256) | * Optional: card may be anonymous |
| **MykiCard** | * Identify users and deduct objects * Can be anonymous (no link to customer account needed) * Used to initiate trips and hold value | * card\_id (PK): VARCHAR(50) * balance: DECIMAL(10,2) * customer\_id (nullable FK): VARCHAR(50) * card\_type: VARCHAR(20) * myki\_pass: VARCHAR(50) | * Linked to lookup table CardType contained:   Full-fare  Concession  Child  Senior |
| **Trip** | * Represents a single **transport journey** (from touch on to touch off) * Every touch-on action will have a corresponding trip record * A trip may or may not involve an actual fare charge | * trip\_id (PK): VARCHAR(50) * card\_id (FK): VARCHAR(50) * touch\_on\_time: DATETIME * touch\_on\_scanner\_id: VARCHAR(50) * touch\_on\_stop\_station\_id: VARCHAR(50) * touch\_off\_time (nullable): DATETIME * touch\_off\_scanner\_id (nullable): VARCHAR(50) * touch\_off\_stop\_station\_id (nullable): VARCHAR(50) * fare\_charged: DECIMAL(10,2) * fare\_type: VARCHAR(20) * fare\_calc\_method: VARCHAR(20) | * Fare-related value can be derived and updated later when detected touch-off action |
| **Transaction** | * Represents a **monetary action** (deduction, top-up or buying a pass) on the card. * A trip may generate **zero or one** fare-related transaction. (May within 2 hours free period) | * transaction\_id (PK): VARCHAR(50) * card\_id (FK): VARCHAR(50) * trip\_id (nullable FK): VARCHAR(50) * scanner\_id (FK): VARCHAR(50) * amount: DECIMAL(10,2) * type: VARCHAR(20) * timestamp: DATETIME | * Types may include like 'TopUp', 'FareDeduction', and ‘Mykipass’ |
| **Scanner** | * Make the record once a myki card touches * Physical or virtual(online) scanning device used for touch-on/off or any interaction regarding Myki card | * scanner\_id (PK): VARCHAR(50) * device\_location (FK): VARCHAR(50) | * Online transactions will be seen as one type of scanner that device\_location is ‘online’ * Connected to either vehicle or stop station via DeviceLocation |
| **DeviceLocation** | * Abstracts the physical context where a scanner is installed | * device\_location\_id (PK): VARCHAR(50) * vehicle\_id (nullable FK): VARCHAR(50) * stop\_station\_id (nullable FK): VARCHAR(50) * location\_type: VARCHAR(20) | * Location\_type can include vehicle, stop station, online |
| **StopStation** | * Represents a physical transport stop or station | * stop\_station\_id (PK): VARCHAR(50) * name: VARCHAR(100) * zone\_id: VARCHAR(20) * geo\_point: GEOGRAPHY | * geo\_point used for GPS-based arrival inference that record longitude and latitude * zone\_id will be either ‘Zone1’, ‘overlap’, or ‘Zone2’ |
| **Route** | * Represents a public transport route | * route\_id (PK): VARCHAR(50) * route\_name: VARCHAR(100) * route\_type: VARCHAR(50) * start\_time\_of\_day: TIME * last\_run\_time: TIME | * One route consists of multiple RouteStops |
| **RouteStop** | * Defines the sequence of stops along a route | * route\_id (PK): VARCHAR(50) * stop\_station\_id (PK): VARCHAR(50) * direction (PK): VARCHAR(10) * scheduled\_arrival\_time: TIME | * Composite PK defines stop identity within route direction |
| **Vehicle** | * Represents a physical transport vehicle | * vehicle\_id (PK): VARCHAR(50) * vehicle\_type: VARCHAR(20) | * Values include metropolitan\_bus, metropolitan\_tram, etc. |
| **VehicleRun** | * A single operational instance of a vehicle on a route | * run\_id (PK): VARCHAR(50) * vehicle\_id (FK): VARCHAR(50) * route\_id (FK): VARCHAR(50) * direction: VARCHAR(10) * start\_time: DATETIME | * Used to track daily or scheduled trips of a vehicle |
| **VehicleStopLog** | * System-inferred record when a vehicle stops at a station | * stop\_log\_id (PK): VARCHAR(50) * vehicle\_id (FK): VARCHAR(50) * run\_id (FK): VARCHAR(50) * stop\_station\_id (FK): VARCHAR(50) * actual\_arrival\_time: DATETIME * actual\_departure\_time: DATETIME | * Derived from real-time logs |
| **VehicleRealTimeLog** | * Records GPS position of a vehicle at a given time | * live\_log\_id (PK): VARCHAR(50) * vehicle\_id (FK): VARCHAR(50) * stop\_station\_id (nullable FK): VARCHAR(50) * vehicle\_lat: DECIMAL(9,6) * vehicle\_long: DECIMAL(9,6) * timestamp: DATETIME | * Used to infer actual stops and arrival |