

Student Number: 7895574

Name: Vin Ku Teng Yi

Assignment 2 Task 1

(1)

Facts:

- Trip
- Segment

Measures:

- **Total Kilometers Traveled (i):**
- **Obtained by:** Summing the distances of each trip segment traversed by each bus. For every segment a bus travels, the distance (length of the segment) is recorded. In the data warehouse, these distances are aggregated by day, month, and year to get the total kilometers traveled per bus over different time periods.
- **Total Number of Trips (ii):**
- **Obtained by:** Counting each completed trip in the operational database for each bus and driver. The data warehouse will aggregate this count by day, month, and year to provide the total number of trips performed by each bus and driver over time.
- **Total Number of Drivers per Trip (iii):**
- **Obtained by:** Counting the unique driver IDs associated with each trip in the operational database. Each trip may have one or more drivers assigned, and the data warehouse will store the total number of drivers per trip.
- **Total Number of Buses per Segment/Trip (iv):**
- **Obtained by:** Counting the buses assigned to each segment and each trip in the operational database. This count is aggregated over time (daily, monthly, yearly) in the data warehouse to get the total number of buses per segment and per trip.
- **Average Duration of Travel (v):**
- **Obtained by:** Recording the time taken by each bus to complete each segment. The duration of each segment traversal is stored in the operational database. In the data warehouse, these durations are averaged by segment, trip, and by day, month, and year.
- **Total Fuel Consumption (vi):**
- **Obtained by:** Using fuel consumption rates associated with each bus model and calculating the fuel consumed for each segment. Each segment's fuel consumption can be derived from the bus model's fuel efficiency and the segment's length. In the data warehouse, this measure is aggregated by segment, trip, bus model, manufacturer, and by day, month, and year.
- **Total Number of Trips per Depot/City (vii):**
- **Obtained by:** Counting trips that start or end at each depot or within each city. In the data warehouse, these counts are aggregated per depot and city to get the total number of trips by location.

- **Total Number of Passengers (viii):**
- **Obtained by:** Summing the number of passengers recorded for each segment of a trip. Each segment has a count of passengers, which is recorded in the operational database. In the data warehouse, these passenger counts are aggregated by segment, trip, and by day, month, and year.
- **Largest Number of Passengers per Bus/Trip (ix):**
- **Obtained by:** Finding the maximum passenger count recorded for each bus and each trip. In the data warehouse, this measure is stored as the highest number of passengers on any single segment of each bus or trip.
- **Average Number of Passengers per Trip (x):**
- **Obtained by:** Calculating the average number of passengers across all segments in a trip. This is derived by summing the passenger counts across segments in a trip and dividing by the number of segments. This average is stored in the data warehouse at the trip level.

Dimensions & Hierarchies:

Dimension	Hierarchy	Purpose
Bus	Manufacturer > Model > Bus ID	Enables analysis at manufacturer, model, and individual bus levels.
Driver	Driver ID > Years of Experience	Enables analysis based on specific drivers and potentially by experience.
Trip	Trip ID > Segment	Enables trip-level analysis and drilling down into segments.
Location	City > Depot	Enables location-based reporting by city or depot.
Passenger	Bus ID > Trip ID > Segment	Allows analysis of passenger counts on trips and segments.
Time	Year > Month > Day	Allows for time-based aggregations (e.g., daily, monthly, yearly reports).

(2)

Time (month)	Trip							
	1	2	3	4	1	2	3	4
	2001	150	175	180	180	222	99	107
	200km	150	175	180	180	222	99	107
Jan	70	30	450	700	700	333	111	121
Feb	234	77	427	233	233	181	171	141
Mar	106	728	121	222	222	212	108	171
Apr								
Bus (Brand)								
Volvo								
Mercedes								
Scania								
MAN								