

[Public] GTFS Fares v2 - Transfer Semantics

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As we (Google) have looked at GTFS Fares v2, we've had a couple of questions come up around how to interpret the spec, especially in multi-leg journeys with transfers.

Fare Products

For a fare transfer rule to match two legs, is it required that both legs have the same fare product?

- See related discussion in [Should fare transfers require that the same fare product is used on both legs?](#)
- TL;dr seems to be that some providers want this behavior, some don't.

Multiple Transfer Rules

Is it intended that multiple rows in `fare_transfer_rules.txt` can match a single leg-to-leg transfer (after `transfer_count` disambiguation)?

- The inclusion of `'fare_product_id'` in the primary key implies that multiple matches are potentially possible (though see questions above about [fare products](#)). In such a case, would we pick the cheapest transfer?
- The spec text also specifies "If the transfer exactly matches a record in `fare_transfer_rules.txt`" which seems to imply that only a single record should match.

Fare Media

Similar to the [fare products](#) question:

- For a leg-to-leg transfer to match a row in `fare_transfer_rules.txt`, is it required that both legs have the same fare media type (if fare media is specified)?
- If the `fare_transfer_rules.txt` row specifies a `fare_product_id`, is it required that the transfer fare product shares the same media as the source and destination leg?

This gets into a more general discussion of fare media in multi-leg journeys. Should journey planners only consider uniform fare media where possible? Would it be permitted to compute all combinations of fare media across all legs and present the cheapest combination?

Fare Transfer Type = 2

In `fare_transfer_rules.txt`, `fare_transfer_type=2` specifies that the cost of the combined transfer legs should come from the fare product of the transfer rule (aka the AB cost). However, for a 3-leg transfer, spec indicates that the cost of the combined 3 legs for `fare_transfer_type=2` is "S

+ BC”, where S is the cost of the preceding two legs, including transfer cost. It seems counterintuitive that fare_transfer_type=2 behaves more like fare_transfer_type=0 in a three-leg case. Is that intended? Does it matter what the fare_transfer_type is of the preceding two legs if the second transfer is of type 2?

Notes:

- Same feed? No.

Duration Limit

Suppose there are 3 legs A - B - C, and we have processed the transfer A-B. When looking for a transfer match for AB - C, does the duration_limit_type=1 or 2 apply to the departure time of A, or the departure time of B?

- The wording of the spec (“current leg”) implies the departure time of B.
- However, this [Fares v2 Example](#) seems to imply A (“transfer an unlimited number of times ... within the 90 minute timeframe”).

Non-Sequential Legs

There are systems where transfers are time-based such that you can get a fare discount for a non-direct transfer. Consider a journey with three legs: [System A → System B → System A]. In System A, a user is eligible for a free transfer to a second leg as long as the previous leg was started in a particular amount of time, even if the user travels on a different leg in a separate system (System B in this example) in between.

Is it possible to model these semantics with GTFS Fares v2 today? What about the opposite case, where the transfer leg must immediately follow the initial leg? How would we distinguish between these cases?