TfNSW Flexible Transport Services Specification

Document Summary Information	
Version	0.3
Version Release Date	07/06/2019
Status	Draft
Document Name	TfNSW Flexible Transport Specification
Document Owner	TfNSW

Version History

Version	Date	Comments	Author
0.1	15/05/19	Initial draft	David Ling
0.2	21/05/19	Additional fields	David Ling
0.3	07/06/19	Modified based on feedback	David Ling

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1 Introduction

1.1 Purpose

The purpose of this specification document is to specify the data requirements for modelling on-demand and ride-sharing operators and operational aspects of their business. TfNSW is looking to publish this data specification so on-demand and ride-sharing operators can make their services known and available on TfNSW's digital products and customers to trip plan based on operators' services.

1.2 Background

TfNSW is building a MaaS ecosystem which consists of trip planning providers, app developers, and public and private transport providers. It enables the customers to plan, book and pay for their journeys using a range of services via a single customer interface, such as a mobile phone app.

On-demand and ride-share operators are an important piece in MaaS. While they all provide transport services to customers, different operators use different models to provide their services with some providing door-to-door services while others only service a limited region and alight/depart from certain stops. There is very little industry standardisation on how to model the operation of on-demand and ride-share operators and the various models that they operate under. This specification aims to model these different transport models and other information, such as fare costs, regions and times, associated with an on-demand and ride-share operator.

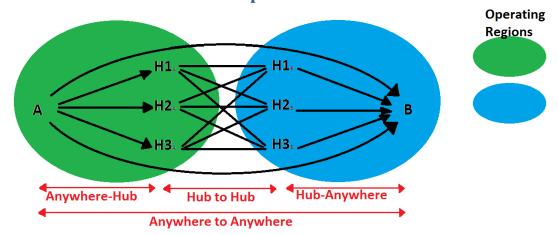## 1.3 Scope

This document covers the following scope of work:

1. Definition of MaaS transport model
2. MaaS operator data model
3. Get price estimate API

1.4 Definitions, Abbreviations and Acronyms

Abbreviations/Acronyms	Definition
API	Application Programming Interface
Hub	A designated location where transport operators' service(s) will pick-up and drop-off customers.
MaaS	Mobility as a Service
TfNSW	Transport for NSW

2 Definitions of MaaS Transport Model

- Anywhere to Anywhere – This is a point to point trip where the customer can travel from door-to-door using one mode of transport. In real-life, this model may be supported by operators such as taxis, Uber or other car ride operators. It may also be applicable to some On-Demand operators within one region.
- Anywhere to Hub / Hub to Anywhere – This is where the customer can be picked up from their starting location and be dropped off at one of the designated Hubs. Inversely, the customer can be picked up at a Hub and then dropped off at their final destination. A Hub can be an arbitrarily location selected by the operator or an existing public transport location such as a bus stop or train station. Operators of such model are typically On-Demand services.
- Hub to Hub – This is where the customer is picked up from a Hub and dropped off at another Hub. Operators of such model are typically On-Demand or shuttle style services.

The operating region is a concept for operators whose service is restricted to a geographical area.

3 Information required from Operators for MaaS models

The above models should be considered when on-boarding an operator. Depending on the model, different information should be provided by the operator.

3.1 Service

Service models many of the operational aspects of the operator. The data elements here are important to help define the type(s) of product offered by the operator and other information associated such as the operational area and time of the service

Field	Description	Data Type	Anywhere-Anywhere	Anywhere-Hub / Hub-Anywhere	Hub-Hub
Name	The name of the service that should be shown.	String	Mandatory	Mandatory	Mandatory
Product Type	The products available through this service as provided by the operator. Products may be different from pricing or service level perspective. Values should be specified by the operator but where possible consistent values should be used.	Enumerated [Scooter, Taxi, On Demand, Community Transport, Car Share, Bike Share]	Mandatory	Mandatory	Mandatory
Pick up from Anywhere	A flag to indicate whether the operator picks up the customer directly from their starting location if it falls in the operating region.	True/False	Mandatory	Mandatory	N/A
Drop off at Anywhere	A flag to indicate whether the operator drops off the customer directly to their destination if it falls in the operating region	True/False	Mandatory	Mandatory	N/A
Pick up Hub list	A list of hubs where the operator will pick up customers.	List of Location	N/A	Mandatory	Mandatory
Drop off Hub list	A list of hubs where the operator will drop off customers.	List of Location	N/A	Mandatory	Mandatory
Direction	The direction of travel for the service. This can be used as the head sign of the service.	String	N/A	Mandatory	Mandatory

Operator Name	Name of operator running the service.	String	Mandatory	Mandatory	Mandatory
Note	Free text note for the service	String	Optional	Optional	Optional
Booking URL	The URL of the operator's booking website or app where the customer can book their service. Where possible it should allow parameters in the URL to allow for deep link, i.e. passing along from/to and pickup time as parameters.	URL	Mandatory	Mandatory	Mandatory
Android Booking URL	The deep link URL to start the app on Android devices containing customer supplied values as parameters	URL	Mandatory if applicable, otherwise N/A	Mandatory if applicable, otherwise N/A	Mandatory if applicable, otherwise N/A
iOS Booking URL	The deep link URL to start the app on iOS devices containing customer supplied values as parameters	URL	Mandatory if applicable, otherwise N/A	Mandatory if applicable, otherwise N/A	Mandatory if applicable, otherwise N/A
Information URL	The URL of the operator's homepage.	URL	Optional	Optional	Optional
Contact Phone	The customer contact number for this service.	Phone number	Mandatory	Mandatory	Mandatory
Contact email	The customer contact email for this service.	Email	Optional	Optional	Optional
Lead time for booking	The amount of lead time, in minutes, for the booking to take effect.	Integer	Mandatory	Mandatory	Mandatory
Lead time for amendment	The amount of lead time, in minutes, for amendments	Integer	Mandatory	Mandatory	Mandatory
Lead time for cancellation	The amount of lead time, in minutes, for cancellation	Integer	Mandatory	Mandatory	Mandatory
Maximum waiting	The amount of time, in minutes, it takes for the service to do the round-trip. This value	Integer	Optional	Optional	Optional

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time	needs to be specified so it can be included for trip planning as it is possible the customer will need to wait for the vehicle to return even though their booking is accepted and valid.				
Travel Costs	Different costs for utilising the service. Costs are typically either distance based or fixed. Costs also indicate any concession rates or free travel entitlements.	Travel Costs	Mandatory	Mandatory	Mandatory
Acceptable payments	Accepted forms of payment. The operator should indicate all acceptable forms of payment. If a payment method incurs a charge, such as a merchant fee, then information regarding the amount and unit of the charge must be provided to inform the passenger and for fare calculation purposes.	List of Payment Method	Mandatory	Mandatory	Mandatory
Valid From Date	Date from which the service starts operating.	Date (format YYYYMMDD)	Mandatory	Mandatory	Mandatory
Valid To Date	Date to which the service stops operating. Can be configured as a date far into the future.	Date (format YYYYMMDD)	Mandatory	Mandatory	Mandatory
Hours of operation	Days and times when the service operates.	List of Operational Hours	Mandatory	Mandatory	Mandatory
Arrival times / Departure times	If the service runs according to a timetable then the operator should indicate when it will arrive at or depart from a certain Hub.	List of Times (format HHMM)	N/A	Mandatory	Mandatory
Operating area geometry information	The geometry information for the operating region of the service. It is typically a collection of coordinates of the boundary of the operating region. This information is	Acceptable formats • KML • WKT • GeoJSON	Mandatory	Mandatory	Mandatory

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	mandatory if there's a limit to the service's operating region within the state of NSW.				
Maximum travel distance	The maximum distance that the operator will allow customers to travel using the vehicle. This is important in particular for operators of vehicles where the distance is limited by factors such as battery charge, i.e. an e-bike. The unit of this value is in kilometres (KM).	Integer	Optional	Optional	Optional
Vehicle Type	The vehicle type that will be providing the service to passengers.	Enumerated set [Car, Bus (needs to be split into different types of buses), Taxi, Motor cycle, Ferry, Bicycle, Scooter]	Mandatory	Mandatory	Mandatory
Accessible service	A flag to indicate if the service will be provided by vehicles that are wheelchair accessible.	True/False	Mandatory	Mandatory	Mandatory
No. of child seats	Indicates the number of legally approved child seats on each service. Minimum value is 0.	Integer	Mandatory	Mandatory	Mandatory
Vehicle Standing Capacity	The number of passengers that are legally permitted to travel while standing in the vehicle	Integer	Mandatory	Mandatory	Mandatory
Vehicle Seating Capacity	The number of passengers that are legally permitted to travel while sitting in the vehicle	Integer	Mandatory	Mandatory	Mandatory
Maximum travel speed	The maximum speed that the vehicle can travel at. This is useful for e-bike or e-scooter operators where the vehicle's maximum speed is faster than that of the	Integer	Optional	Optional	Optional

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| | traditional bike or scooter but still slower than a car. This value should be taken into an e-bike or e-scooter's trip planning consideration when specified.

This value isn't useful for a car-based operator as the maximum speed of a car is faster than the typical legal road speed limit.

The unit of this value is in kilometres per hour (KM/h) | | | | |
|---|---|---|---|---|---|

3.2 Operational Hours

Operational hours indicate the days and times when the services are running.

Days of operation	Day of week when the service will run. Each day of the week needs to be specified separately.	[Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, publicHolidays]	Mandatory	Mandatory	Mandatory
Hours of operation	The operating hours of the service as specified by the operator.	Time range within 24 hours	Mandatory	Mandatory	Mandatory

3.3 Location

The Location object should be used to model the designated physical Hub of an operator where the service picks-up or drops-off customers.

Field	Description	Data Type	Anywhere-Anywhere	Anywhere-Hub / Hub-Anywhere	Hub-Hub
Name	Public known name of the Hub, such as a	String	N/A	Mandatory	Mandatory

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	particular stop for the service				
Latitude	Latitude of the Hub. The value must be valid WGS 84 latitude in decimal degrees format.	Float	N/A	Mandatory	Mandatory
Longitude	Longitude of the Hub. The value must be valid WGS 84 latitude in decimal degrees format.	Float	N/A	Mandatory	Mandatory
Address	The publicly known address of the Hub.	String	N/A	Mandatory	Mandatory
Accessible Location	A flag to indicate if the location is wheelchair accessible	True/False	N/A	Mandatory	Mandatory
Total Capacity	The total number of vehicles that can be parked at this particular location. This field can be used by bike-share operators to indicate how many bikes can be docked at this particular location. Otherwise it can also be used by car-share operators to indicate how many cars can be parked at this particular location. Minimum value should be 1.	Positive Integer >= 1	N/A	Mandatory	Mandatory
Available spots	The number of spots available at this location for vehicles to be docked/parked. This is a real-time (or near real-time) value that should reflect the number of free spots that customers can dock/park their vehicles. Minimum value is 0 meaning there are no free spots. The maximum value should be the same as Total Capacity.	Integer [0 .. Total Capacity]	N/A	Optional	Optional
Location geometry information	The geometry information for the location. It is a collection of coordinates around the location.	Acceptable formats • KML • WKT • GeoJSON	N/A	Optional	Optional

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3.4 Travel Costs

Field	Description	Data Type	Anywhere-Anywhere	Anywhere-Hub / Hub-Anywhere	Hub-Hub
Fares	The monetary cost of travel and the type of cost, i.e. distance based or fixed cost.	List of Fares	Mandatory	Mandatory	Mandatory
Concession rate	The concession rate, as a percentage of the full price, applied to customers with valid concession passes. This should be shown to the customers followed by a % symbol.	Integer	Optional	Optional	Optional
Free travel entitlements	A description of who will be entitled to free travel on the service.	String	Optional	Optional	Optional

3.5 Fares

Field	Description	Data Type	Anywhere-Anywhere	Anywhere-Hub / Hub-Anywhere	Hub-Hub
Fare	The fare amount in Australian dollars. The amount should always be inclusive of GST. It should be displayed after the $ symbol.	Float (2d.p)	Mandatory	Mandatory	Mandatory
Trip Type	The trip type covered by this fare.	String Enum [OneWay, Return, Weekly, Monthly]	Mandatory	Mandatory	Mandatory
Fare Type	The type of fare, whether it is adult, child or others.	String Enum[Adult, Child, Student, Concession, Apprentice]	Mandatory	Mandatory	Mandatory
Minimum distance	The minimum distance (inclusive) applicable to this fare band. The unit for this is in metres.	Integer	Optional	Optional	Optional

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| Maximum distance | The maximum distance (inclusive) applicable to this fare band. The unit for this is in metres. | Integer | Optional | Optional | Optional |

3.6 Payment Method

Field	Description	Data Type	Anywhere-Anywhere	Anywhere-Hub / Hub-Anywhere	Hub-Hub
Payment method	A payment method that will be accepted for the service. If the operator accepts multiple ways to pay then each should be specified as a separate payment method.	Enum set[CashOnPickup, AmEx, VisaMC, OpalPay, Paypal, Subscription, Mobilepayment, DirectDebit, Banktransfer, Giftcard voucher, Digitalcurrency, Others]	Mandatory	Mandatory	Mandatory
Surcharge amount	The surcharge amount, if any, for this payment type. This surcharge should be displayed to the customer separate to the cost of the fare.	Float (2d.p)	Mandatory	Mandatory	Mandatory
Surcharge unit	The unit type of the surcharge, it's either a percentage or in dollars. The unit symbol should be displayed to the customer either as a prefix $ or a postfix %	Enum set [Percentage, Dollars]	Mandatory	Mandatory	Mandatory

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4 Determining the MaaS model

It is vital for the operator to understand which MaaS model they fit in as it determines how much data needs to be provided to correctly model the services provided. The following examples help in determining which MaaS model an operator should belong to.

Example Operator	MaaS Model	Key Data Required
A shared-bike operator that allows customers to pick-up a bike from one of its docking stations. The bike can be dropped off anywhere.	Hub – Anywhere	• Pick-up at anywhere = false • List of bicycle pick-up locations • Drop-off at anywhere = true • Vehicle type = Bicycle
An on-demand operator will pick-up the customer from their home and drop them off at any location within the Lake Macquarie area	Anywhere – Anywhere	• Pick-up / Drop-off at Anywhere = true • Shape file – Lake Macquarie area • Vehicle type = Car • Vehicle capacity • Travel cost • Payment methods
A bus operator picks-up customers from their homes and drops them off at Sutherland station in the morning between 6am – 9am. In the afternoon from 5pm – 7pm the bus operator picks-up customers from Sutherland station and drops them off at their home.	Anywhere – Hub Hub – Anywhere	Anywhere – Hub • Pick-up at Anywhere = true • Drop-off location – Sutherland station • Direction = To Sutherland station • Vehicle type = Bus • Travel cost • Payment methods • Hours of operation = 6am – 9am Hub – Anywhere • Drop-off at Anywhere = true • Pick-up location – Sutherland station • Direction = Away from Sutherland station • Vehicle type = Bus • Travel cost • Payment method • Hours of operation = 5pm – 7pm

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5 GET /estimates/price

As not all operators have a fixed/tiered price model, sometimes it is necessary to query the operator's systems for an estimated price. This section discusses how this will be done.

An assumption made here is the operator has IT systems in place to allow for estimated price to be queried based on a stand and end location departing at a particular time. In return, the operator will provide a list of estimated prices for the journey based on the available products offered by the operator.

5.1 Query Parameters

Name	Mandatory/Optional	Type	Description
startLatitude	Mandatory	float	Latitude value of the start location
startLongitude	Mandatory	float	Longitude value of the start location
startAddress	Mandatory	string	The known address of the starting location.
endLatitude	Mandatory	float	Latitude value of the end location
endLongitude	Mandatory	float	Longitude value of the end location
endAddress	Mandatory	string	The known address of the end location.
productID	Optional	string	The productID that is being requested, if known. ProductID is the identifier of one of the products offered by the operator. Products offered by an operator may differ in terms of price, speed or frequency.
pickupTime	Mandatory	datetime (yyyymmdd HH:MM:SS)	Time of pickup. Default to now() but can be future dated. Cannot be in the past.

5.2 Response Code

Status code	Description
200	Query is successful with valid response.

5.3 Response Body

The response will consist of a list of the following quote element. Each quote is for a particular product that is offered by the operator. Products may be different from pricing or service level perspective.

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Name	Type	Description
productID	string	Unique identifier of product.
currencyCode	string	ISO 4217, should always be AUD
displayName	string	The name of the product to be displayed
estimate	string	Formatted string of estimate in AUD based on the start and end locations. Estimate could be a range, a single number (flat rate) or "Metered" for taxi.
minimum	float	Minimum price for the product
lowEstimate	float	Lowest estimated price for the product
highEstimate	float	Highest estimated price for the product
multiplier	float	Expected multiplier/surcharge-rate for the product during the duration of the trip. The price estimates provided should include the multiplier already and the multiplier is for information display only, not for calculation purposes.
distance	float	Estimated distance of travel in kilometres.

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