

Functional Scope of the RateIT online app with section on requirements for Minimal Viable Product

This document outlines the Functional Scope of the RateIT online app. It has been prepared to communicate the data needs of the RateIT project to the PTIPS team at Transport for NSW. Please do not circulate without permission of the author.

The document begins with an overview of the RateIT project and how it is organised. The report then focuses on the intended functions of RateIT as it relates to the passenger's use of public transport. The scope of each function proposed is described in lay terms before outlining the type of information entered into RateIT as input, and the type of information coming out of RateIT as output.

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The RateIT project aims and objectives

The project aims to:

1. Design and develop an online app (compatible with Apple and Android devices) and that can be used to collect and disseminate crowdsourced passenger-to-passenger information in real-time
2. Design and develop the back-end systems that will enable transport operators to capture, interact and respond to real-time information provided by passengers about service quality and passenger experience

The RateIT project will contribute positively to the customer experience as it uses real-time crowd-sourced information to improve performance on service quality indicators. Subjective and objective data collected through RateIT will allow public transport operators to validate customer concerns so as to:

- increase responsiveness of public transport providers to customer concerns
- improve passenger experience and mitigate risks that reduce patronage.
- develop an evidence base to advocate on behalf of customers for land-use improvements
- provide opportunities for value added services e.g. booking additional pick-up service (bus or taxi) if late-running services will result in a number of passengers missing the same connection

This document outlines the Functional Scope of the RateIT app. It includes a description of the function, the type of information entered into RateIT as input, and the type of information coming out of RateIT as output.

About the organisation of the RateIT project

RateIT's project team consists of public transport specialists from the Institute of Transport & Logistics Studies and human interaction specialists from the School of IT working with a bus company industry partner, Forest Coach Lines. The strength of the RateIT project team is that it combines research, technology and operational knowledge to create a new space for information exchange about passenger views during their trip which over time will result in a longitudinal dataset to understand how to optimise passenger experience when patronage grows faster than the supply of public transport options.

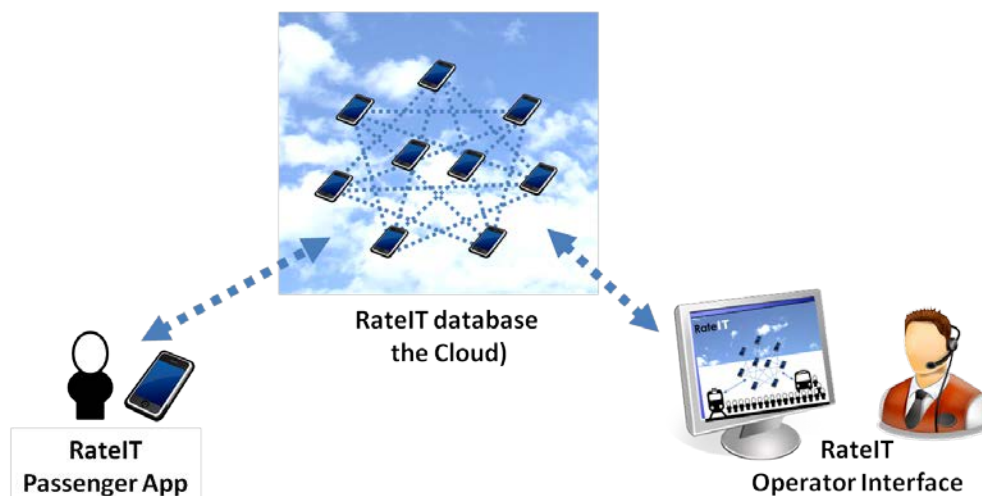


Figure 1: Components of RateIT (input and output)

The components of the RateIT project consist of three main elements (see Figure 1). At the user level the RateIT online app is used by passengers to receive and send data to the RateIT database. The RateIT database stored/accessed through the cloud/internet is the depository of all information which can be queried to provide information to the passenger through the app, or through the Operator Interface. The Rate IT operator interfaces are used by the Bus Operator (Forest Coach Lines) and the RateIT research team (ITLS, School of IT) to access reports or import/export data in the RateIT database. The Operator Interface is also the means that new content or functionality to the RateIT (online) app is updated.

How RateIT will be used

RateIT is designed to be used by passengers for various stages of their journey. Figure 2 illustrates the different stages as they relate to the journey to work. Passengers may interact with RateIT ahead of getting to the bus stop, at the bus stop, on-board the bus, at the destination stop, or on their way to the destination.

When a passenger is presented with the RateIT app they will see:

- pushed content organised like news alerting them to specific information or request for feedback
- menu items (icons) that allow them to instigate a function, such as checking vehicle type.

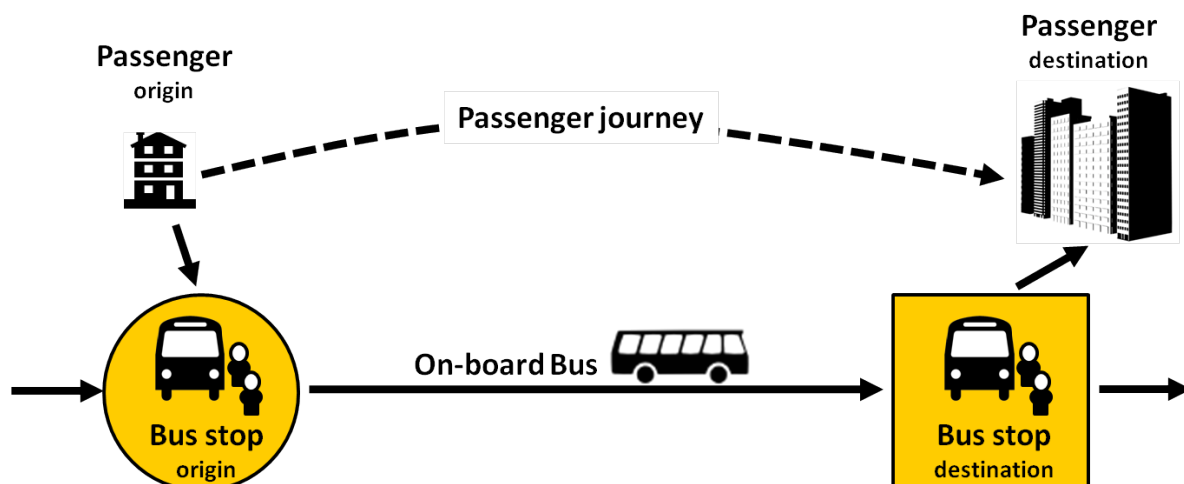


Figure 2: Process map of journey components (journey to work)

Types of data used by and generated by RateIT

The process map of journey components highlights some of the different types of data that need to be differentiated, and combined to provide meaningful data. Table 1 presents a list of different types of data that RateIT is likely to use. (Note, the list is a work in progress)

Table 1: Differentiating the types of data used within RateIT

Data	Description	Source
Bus Stop ID	Refers to the bus stop infrastructure ID that allows users to specify the location that they wish to board/disembark from a bus	TfNSW
Bus Route ID	Refers to the route that the bus is following.	TfNSW Bus operator
Bus Service ID	Refers to the timetable schedule that the bus is following. <i>Note: Not clear if this is different to the ID associated with each bus service in PTIPS.</i>	TfNSW Bus operator
Vehicle ID	Refers to the unique identifier of the vehicle that is displayed inside and on the bus. <i>Note: Not clear if this is different to the GPS ID associated with each bus vehicle and used in PTIPS.</i>	TfNSW Bus operator
Driver ID	Refers to the unique identifier that all authorised bus drivers display in the bus.	TfNSW Bus operator
Vehicle Info	Refers to vehicle specifications such as low-floor bus, double-decker / bendy / standard bus, air-conditioned. Vehicle Info linked to Vehicle ID .	Bus operator
Bus Service Info	Refers to data updated daily that identifies which Vehicle ID is used for each Bus Service ID .	Bus operator
Bus Driver Info	Refers to data updated daily that identifies which Driver ID is used for each Bus Service ID .	Bus operator
Bus Occupancy Info	Real-time data updated to show the estimated current level of occupancy on a bus. Data linked to Bus Service Info and real-time information collected through the RateIT app from passengers.	RateIT (real-time)
Passenger ID	Unique identifier for passengers using RateIT generated at registration.	RateIT database
Passenger Info	Data record of activity associated with Passenger ID . Queries to the RateIT database can pull down passenger preferences and certain statistics of past activity and ratings on service quality indicators.	RateIT database
Service Quality Scores	Data record of activity associated with different measures of service quality such as: punctuality rate, crowding, cleanliness linked to Bus Service ID .	RateIT database
Bus Service Score	Date specific Service Quality Scores associated with a Bus Service ID .	RateIT database
Bus Stop Scores	Data record of different measures of service quality such as: punctuality rate, crowding, cleanliness linked to Bus Service ID .	RateIT database

Description of proposed RateIT functions

Some example functions that RateIT could offer passengers are listed in Table 2. A survey of Forest Coach bus passengers is scheduled to take place which will help to identify which functions are of greatest importance and more greatly valued by passengers.

Table 2: List of RateIT functions (not in order of priority)

Function		Description	Input required	Output provided
1	Check vehicle type	Passengers select their bus service (route and time) and can see characteristics of the bus (for e.g. low-floor bus, double-decker / bendy / standard bus, air-conditioned, etc).	<ul style="list-style-type: none"> PTIPS information showing timetable information Dataset of Bus Operator vehicles and their specifications Daily update from Bus Operator about allocation of vehicle on services 	<ul style="list-style-type: none"> Presentation of information to passenger that is easy to read and sort
2	Vehicle preferences	Passengers can store the characteristics of the bus (for e.g. low-floor bus, double-decker/bendy/standard bus, air-conditioned, etc) that they prefer	<ul style="list-style-type: none"> Dataset of Bus Operator vehicles and their specifications Short form that passengers complete to indicate their preferences 	<ul style="list-style-type: none"> Information about the passenger preference stored against the passenger user account Updates to the passenger vehicle preferences stored as a separate time stamped log Highlighting of services that meet the passenger's vehicle preferences RateIT database updated with information about the vehicle preferences of passengers
3	Waiting for bus	<p>Passengers can identify the bus stop or bus service that they are waiting for.</p> <p><i>Supplementary features could include passengers guessing how long they will have to wait, and then comparing this to when the bus arrives. Data stored in RateIT database</i></p>	<ul style="list-style-type: none"> Bus Stop ID Bus Service ID Button to indicate passenger is waiting <i>Timer dial for passenger to indicate their guess of waiting time</i> <i>Passenger's statistics for past guesses of waiting time</i> 	<ul style="list-style-type: none"> Count of passengers waiting at Bus Stop ID and for Bus Service ID Counts stored in RateIT database Automated feedback counting down the bus arrival Real-time updates about the Bus Service ID <i>Passenger gets a score for the accuracy of their waiting time, which is stored against their profile.</i>

Function		Description	Input required	Output provided
4	On-board bus	Passengers log their presence on a bus service	<ul style="list-style-type: none"> • Bus Service ID • Button to indicate passenger is aboard 	<ul style="list-style-type: none"> • Count of passengers on board added to real-time Bus Occupancy Info • Bus Occupancy Info stored in RateIT database and available
5	On-board experience	Passengers can provide feedback about the on-board bus experience.	<ul style="list-style-type: none"> • Bus Service ID • Simple survey questions for passengers to provide comment on: <ul style="list-style-type: none"> ○ how full the bus is (scale from empty to full) ○ seated or standing ○ bus cleanliness ○ safety 	<ul style="list-style-type: none"> • Survey responses stored in RateIT database against Passenger ID • Responses added to Service Quality Scores for Bus Service ID
6	Rate trip	Similar to on-board experience but allows passengers to rate qualitative measures of their journey.	<ul style="list-style-type: none"> • Bus Service ID • Simple survey questions for passengers, for example: <ul style="list-style-type: none"> ○ did you arrive on-time to your destination ○ how did the bus trip contribute to your journey (calming / stressful, positively / negatively) 	<ul style="list-style-type: none"> • Survey responses stored in RateIT database against Passenger ID • Responses added to Service Quality Scores for Bus Service ID
7	Rate driver	Passengers can provide feedback about the performance of the bus driver.	<ul style="list-style-type: none"> • Bus Service ID • Simple survey questions for passengers to provide comment on: <ul style="list-style-type: none"> ○ Driving quality (rough or smooth) ○ Communication skills (scale: poor to excellent) 	<ul style="list-style-type: none"> • Survey responses stored in RateIT database against Passenger ID • Responses added to Service Quality Scores

Function		Description	Input required	Output provided
8	Check service quality score	<p>Passengers can see how a bus service or route has performed in the past.</p> <p>Distinguish made between current score of a service and historical performance. f a specified bus service or bus route. Queries to the RateIT database can pull down Amalgamated service quality indicators organised by time to differentiate between historical performance, performance by time-of-day and current performance.</p>	<ul style="list-style-type: none"> • Bus Route ID • Bus Service ID • Bus Service Score • List of available Service Quality Scores (e.g. punctuality rate, crowding, cleanliness) • Query parameters (current, weekday, monthly, etc) 	<ul style="list-style-type: none"> • Service Quality Scores stored in RateIT database
9	Rate infrastructure	<p>Passengers can score the quality of the bus stop infrastructure, and alert Bus Operator to issues</p>	<ul style="list-style-type: none"> • Bus Stop ID • Simple survey questions for passengers to provide comment on: <ul style="list-style-type: none"> ○ available seating ○ appropriate signage ○ opinion on shelter ○ cleanliness / upkeep of bus stop infrastructure ○ issues with lighting, tripping hazards, feelings of safety 	<ul style="list-style-type: none"> • Survey responses stored in RateIT database against Passenger ID • Responses added to Service Quality Scores for Bus Stop ID that can be used to engage the relevant local government authority
10	Alert incident	<p>Passengers can initiate an alert to inform other passengers and operator of an issue. (e.g. traffic incident, sick passenger, anti-social behaviour amongst passengers, lost item)</p>	<ul style="list-style-type: none"> • Bus Service ID • Bus Stop ID • Simple form to indicate incident type • Simple form to indicate assessment (e.g. traffic incident location, severity) 	<ul style="list-style-type: none"> • Notification of incident report sent to Bus Operator • Data validation rules applied in RateIT database (e.g. referencing Passenger ID to check they have not been flagged as providing false incident alerts) before posted on RateIT for other passengers to see and validate.

Types of data required within the database and the operational interface

Some example functions that RateIT database needs to offer operators and the RateIT research team are listed in Table 3. These data are separated into 'User and session information' to indicate standard data that could be used to identify different records and track the same user use of RateIT over time. The second category of 'Trip and location information' focuses on identifying different journeys taken by users which can help in analysing their trip behaviour, incidents on the same route, and location specific information.

Table 3: Important data for the operator interface and database

	Important data for the operator interface and database	Information Source	Link to Table 1	Filter
User and session information	Passenger ID	RateIT database	Yes	
	User name	User		
	Time and date logged in	Registered by app		
	Time and date logged out	Registered by app		
	Time and date page submitted	Registered by app		
Trip and location information	Bus route	User		
	Bus route ID	TfNSW	Yes	
	Bus stop where journey commenced	User		Dependent upon Bus route
	Bus stop ID	TfNSW	Yes	
	Time when boarded the bus	User		
	Location of incident	User		Dependent upon Bus route
	On-board bus or other part of journey (e.g. at bus stop)	User		
	Submitting after the incident	User		
	Geographical location of use of RateIT	User		Dependent upon Bus route and on/off bus

Process map of trip and location information

Collecting the users' trip and location information will be an important attribute of RateIT because some of the incidents that they report on may happen during the journey. For e.g. reporting that the bus has got full during the journey requires information about what part of the bus route this has occurred.

Figure 3 provides an example of dynamic questions, organised as a hierarchy that can be utilised to accurately identify a user's location during their trip.

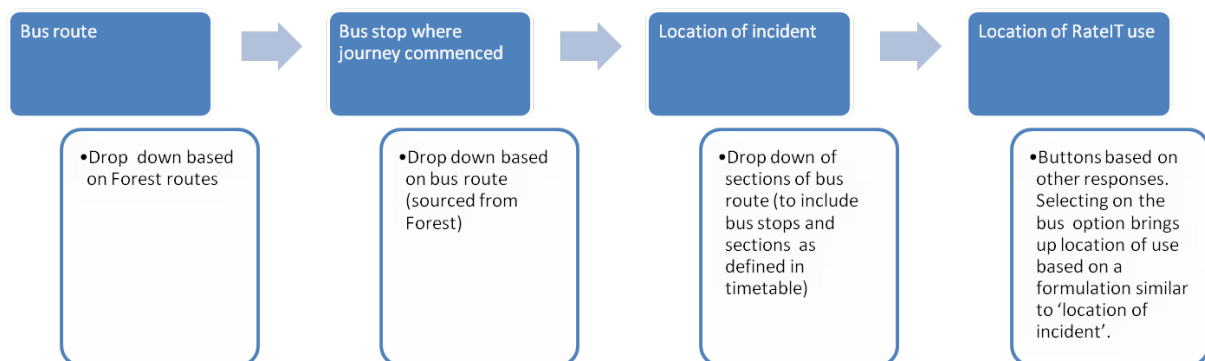


Figure 3: Process map of trip and location information

Minimal Viable Product (MVP)

When considering the minimal viable product (MVP) we have taken into account the three user groups:

- RateIT research team
- The bus operator (Forest Coach Lines)
- The passengers

In the MVP we require:

- All user groups to have a minimum level of functionality so that they can interact with each other, and therefore demonstrate the value of these real-time interactions.
- Function for passengers to:
 - View ratings
 - Rate their trip
 - View alerts

The top-level information needed for any of these functions is to define what bus the passenger is viewing or reporting on. Choice of actions are view, rate, alert.

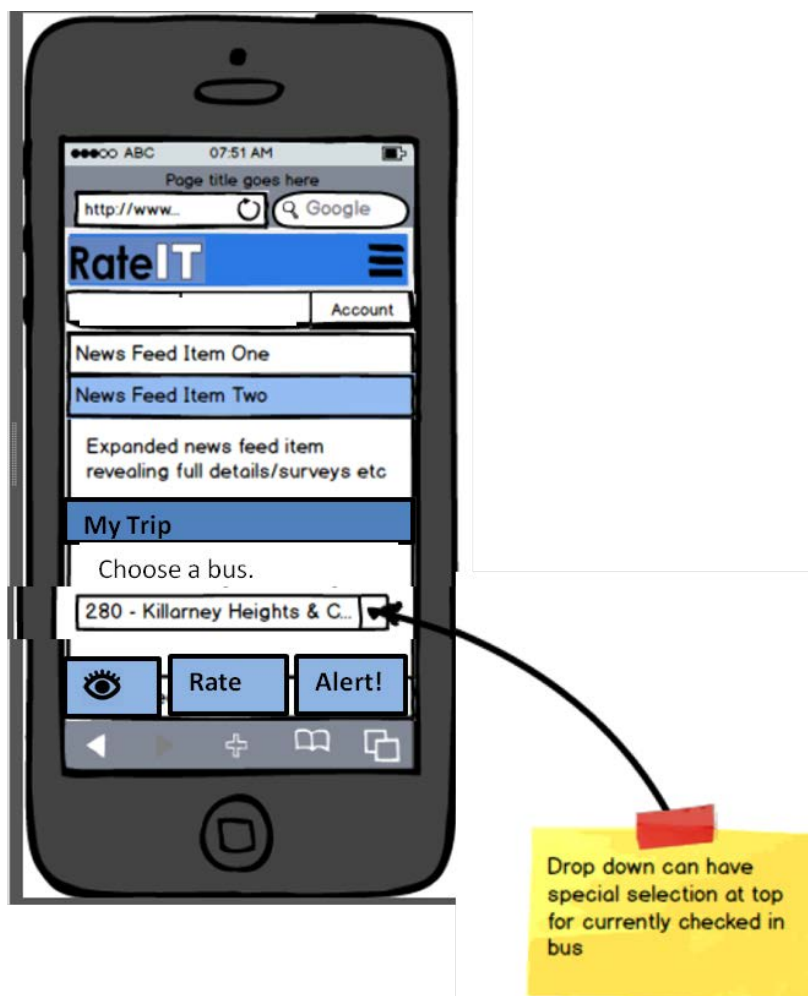


Figure 4: Mash-up of user interface home

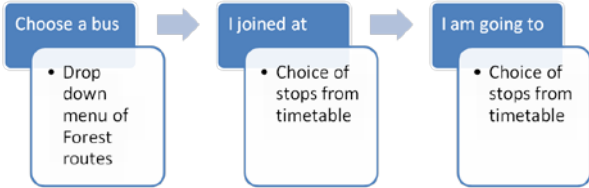
In the MVP we will limit our expectations to those functions/content related to:

- the on-board experience part of the journey (see Figure 2). Functions related to bus stop infrastructure, or other parts of the passenger journey can be the focus of future versions.
- the topic matter of crowding
- variations of functions 5, 6, 8 and 10 that were previously described in Table 2.

To assist in the preparation of list that will be used to determine the acceptance tests these functions have been broken down into more detailed descriptions in the following tables.

Table 4 presents the web app interface used by passengers.

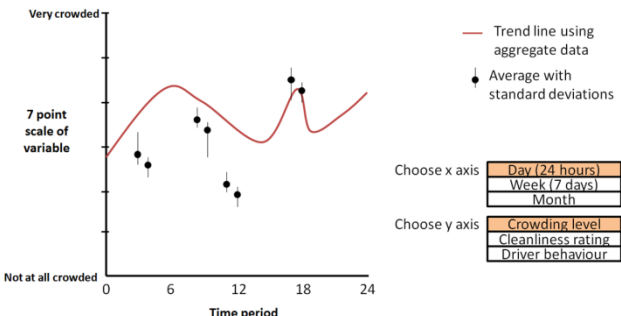
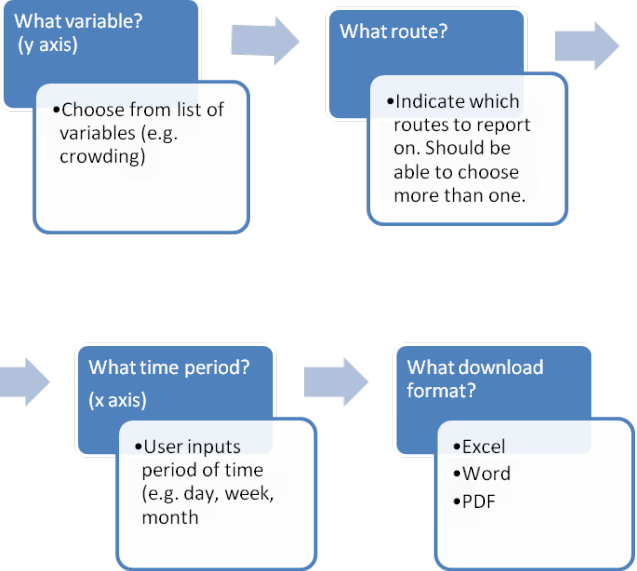
Table 4: Functions in the web app interface used by passengers

Function	Description	User input (instruction and data type)
About RateIT	Launches page with information about RateIT. It includes content that can be expanded to see the ethics information, and contact details.	Static content organised under collapsing/expanding subheadings.
Register user	Launches RateIT registration survey for new users. Registration survey is used as a baseline measure for user. Note: links to create survey function in the researcher/operator interface	User inputs responses through a combination of drop-down menus, sliding scale or radio buttons (one choice and multiple choice). Avoid use of text boxes except for name, email and password.
Login user	Existing users enter their username (email) and password.	
News feed	Area of interface that shows current alerts, and pushed content that has been tagged in the researcher/operator interface.	
Choose a bus	Important information captured from user that allows report to be tagged to Bus Route ID .	 <pre> graph LR A[Choose a bus • Drop down menu of Forest routes] --> B[I joined at • Choice of stops from timetable] B --> C[I am going to • Choice of stops from timetable] </pre>

Specify time	Important information captured from user to identify if the report relates to now, or a past event. Used in RateIT, and 'Create Alert'	<pre> graph LR A[What time?] --> B[Now] A --> C[Date & Time] B --> B1["• Use time stamp (HH:MM, DD/MM/YYYY)"] C --> C1["• User inputs date or indicates today"] C --> C2["• User inputs approximate time differentiating between AM/PM"] </pre>
Specify location	Secondary information captured from user that indicates which segment of trip (Point A, Point B) a report relates to. Used in 'Create Alert' function.	<pre> graph LR A[Location is between (Point A)] --> B[and (Point B)] A --> A1["• Drop down menu of timing stops from timetable"] B --> B1["• Drop down menu of timing stops from timetable"] </pre>
Update subheading menu	Info from 'choose bus' function to be updated in subheading menu so that user knows which bus they are receiving, or giving information about.	
Look up rating	Aggregate data for current Bus Route ID presented as an indicator on different topics.	First topic: crowding related
Rate trip	<p>Action that launches a set of survey questions that links to the current trip.</p> <p>Survey questions are organised by topic and need to be grouped accordingly.</p> <p>Note: Survey questions are created through the researcher/operator interface.</p>	<p>First topic: crowding related</p> <p>Second topic: bus type</p>
Create alert	<p>Action that launches a new form/page that collects information on type of incident.</p> <p>Note: MVP alert only gets sent to operator and researcher, not other passengers.</p>	<p>First topic: crowding related</p> <p>Second topic: cleanliness</p>
Rate agreement	Action that launches a survey question that captures if passenger agrees with an alert.	<p>First topic: crowding related</p> <p>Second topic: cleanliness</p>

The operator interface needs to help manage and respond to issues in a timely manner. In most cases the information needs to be at the aggregate level, but with the option of drilling down when required. Issues arising are highlighted in the alerts being sent by passengers. Much of the functionality of the RatelT operator interface is to be able to review and evaluate performance against past trends. These functions unique to the operator interface are shown in Table 5.

Table 5: Functions required in the operator interface

Function	Description	User input (instruction and data type)
Show aggregate data as a visualisation	<p>Visualisation gives operator an overview of how a variable is rating at the moment and how it compares to past trends.</p> <p>Visualisation can be changed to show a specific route AND a specific variable (e.g. crowding on route 123). Visualisation to show different timeframes on x axis. E.g. 24 hour, 7 day week, month.</p>	<p>Crowding on route 123</p>  <p>User can choose from a set list of variables for the x and y axis. Red line represents a trend line of aggregate data from past reports for the same scale over the same period of time. Black markers are average for that hour period, with the vertical line representing the standard deviation.</p>
Query, report and download	<p>Operator can chose from a set of predefined variables a report that want to download for a specific timeframe (e.g. weekly report on crowding on bus routes).</p> <p>Download formats for e.g. to include Excel, Word and PDF.</p>	
Save queries	Operator can save common queries for reuse.	

There are functions that are common to both the operator and the researcher. These are shown in Table 6.

Table 6: Functions required in BOTH the operator and researcher interface

Function	Description	User input (instruction and data type)
Push content to passengers	Operator and researcher can push content to passengers which appears in the newsfeed of passenger interface. Content is categorised by topic. Rules set for who receives pushed content, and rules for when shown (e.g. show next time user logs in, or remove after dd/mm/yyyy).	
View log of alerts (history)	Researcher and operator able to view a summary of alerts made, categorised by variable (topic, date, response)	
Respond to alerts	Operator and researcher able to provide feedback on an alert.	
Verification	Opportunity to tag issue reported by user as true / false. Function to exclude false reports from aggregate data.	

The researcher needs to have administrative level access, which includes the opportunity to give permissions to other users. The functions important to the researcher in the MVP are presented in Table 7.

Table 7: Functions required in the researcher interface

Function	Description	User input (instruction and data type)
Specify a survey question	Researcher can construct a survey question or use a previously saved survey question. Information required: <ul style="list-style-type: none"> • topic (the variable) 	

	<ul style="list-style-type: none"> question type (e.g. sliding scale, multiple choice) rules for when to display audience targeted 	
Store survey questions	Library of previously saved survey questions, with details such as variables, and dates used saved.	
Classifying users	Search and label users by a variable (e.g. demographic characteristics, routes travelled, how often they use RateIT	
Permissions setting	Researcher should have administrator access and be able to define permissions available to different users, and access to certain content.	
Modify visualisation settings	The design of any visualisations viewable in the operator interface should be able to be modified by the researcher (e.g. which variables to visualise, what timeframe should be on the x axis)	
Download function	Function to download specific data from the database. Format to be compatible with SPSS, e.g. CSV file.	

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