

Work Portfolio  
to the final  
status of the project

# BUS PATRONAGE DASHBOARD REPORT

Brought to you by  
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**ACT**  
Government

Transport Canberra





## OVERVIEW

This report presents the Bus Patronage Dashboard project which is an internship program held by the Australian National University and collaborate with Transport Canberra and City Service (TCCS).

The objective and problem statement of this project will be introduced, followed by benefits of project outcomes, project process activities and the analysis of project produced dashboards.

## OBJECTIVE

This project works for the Transport Operations under TCCS, where the business scope includes Bus and Light Rail Operations, Network Systems and Service Performance.

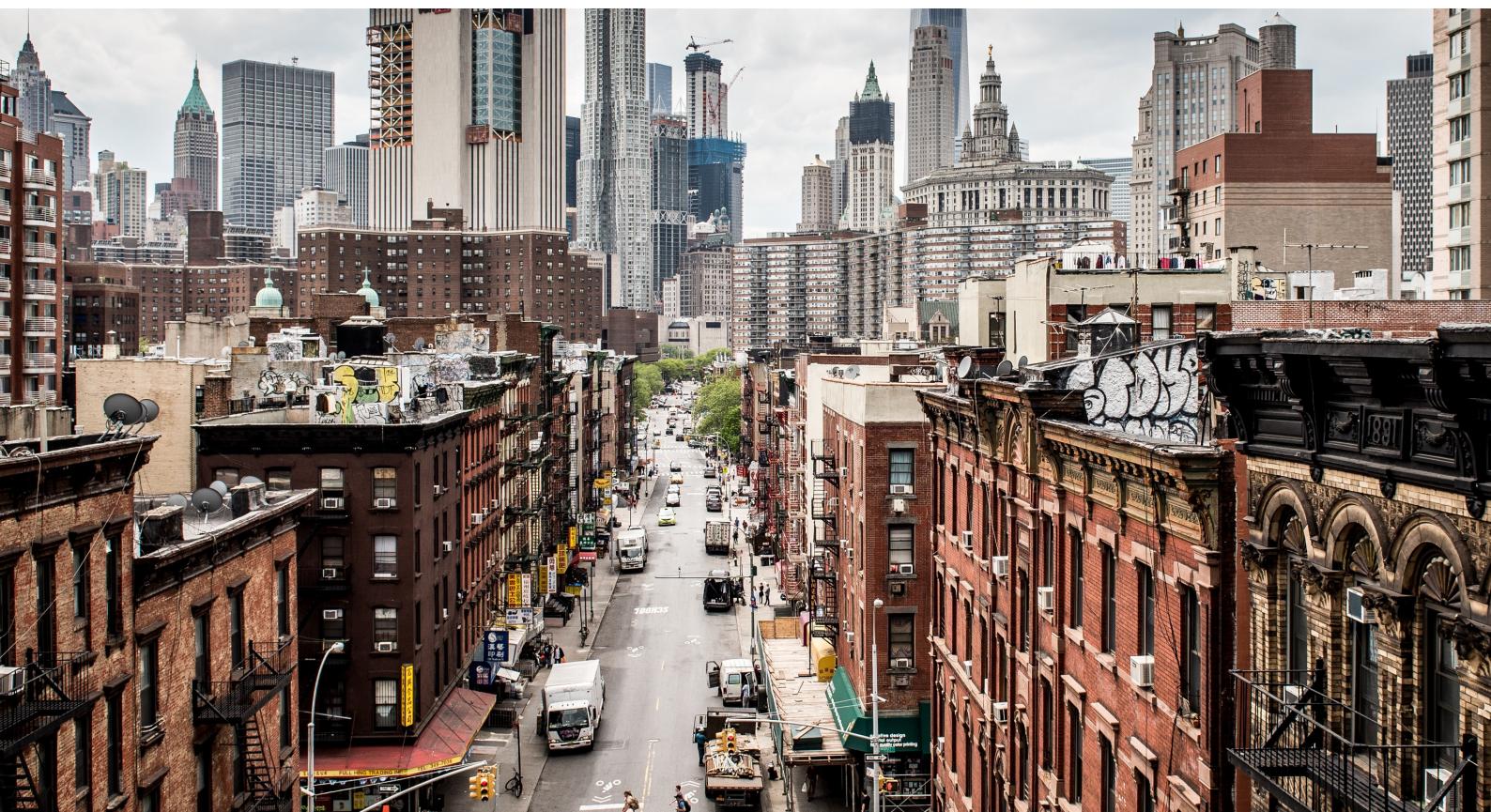
Bus and Light Rail Patronage data from the Open Data Portal are used to perform data visualisation and analysation. Aims to provided a dashboard to the Executive and other Transport Canberra operations. The dashboard will be able to present travel patterns of different passenger groups and transport types; provide ongoing monitoring on public transport service delivery; provide continued awareness of the performance of the transport network; also help solve business problems and make operational decisions on transport services.

# ABOUT TCCS

Transport Canberra and City Services (TCCS) delivers a wide range of public services and manages the public transport network in Canberra. These include but not limited to urban road construction and management, light rail and bus operation, public facility maintenance, waste management, landscape maintenance and animal management.

## PROBLEM STATEMENT

Since the Transport Operation team needs to report the performance of transport network to the Executive Group Manager, it wishes to consolidate various indicators into a new reporting framework, in order to achieve functional automation and to avoid repetitive computation of same-type indicators. In this case, a dashboard will be built through this project. The transport network performance could be visually presented by the dashboard. Additionally, different indicators could be automatically calculated by adjusting on date range and filtering on transport mode (Bus or Light Rail, Student or Non-Student, on Weekday or Weekend) etc.



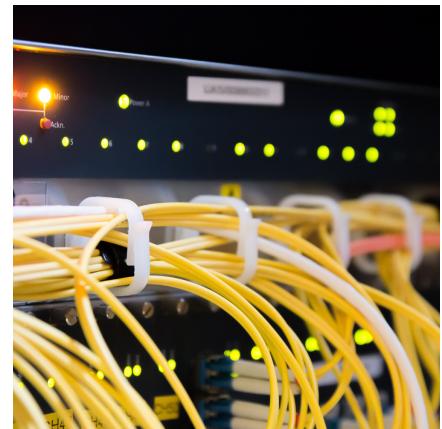
# BENEFITS

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The dashboard produced by this project will bring three main benefits to TCCS stakeholders

## Automation

The dashboards link to the Open Data Portal where the data source will be updated daily. Users are able to get the latest updated data. Hence achieving functional automation and efficiency.



## Time-saving

The dashboards contain charts, diagram and measurements design for regular reporting. Users will be able to filter and extract data. Hence saving time on data querying and calculation.

## Stakeholder friendly

The dashboards will be stakeholder friendly by visualizing data and information in charts and diagrams. It will enable TCCS users to identify and analyse problem, and also assist in presenting information to other stakeholders.





# PROJECT ACTIVITIES

The process and activities throughout this project.  
Demonstrating teamwork, communication and reflection skills.



- Firstly started by understanding Business Background with my supervisor and clients, to know the department structure, team composition, their responsibilities and business contents related to this project. Such as the Open data strategy and relevant data sets.
- Then next step is to understand Client's Requirements, such as who will use this dashboard, what business issues they wish to solve, is there any specific requirements on the functions or appearance of the dashboard.
- After that, exploring the data and get Insights. Finding out useful and meaningful features, attributes and indicators. And I would go back to clients to achieve agreements and seek for suggestions.
- Next step is to build the dashboard and modify designs on functions or layouts. In this process I still stayed close with my client, we would discuss about the data features, add new things and make changes in time. New functions and changes on layouts would be modified.
- The last step before finalized the dashboard is User testing. The client team will test and feedback on the accuracy of measures, accessibility of the data source, and consistency of word, units, format and layout. I would make corrections based on their feedbacks.

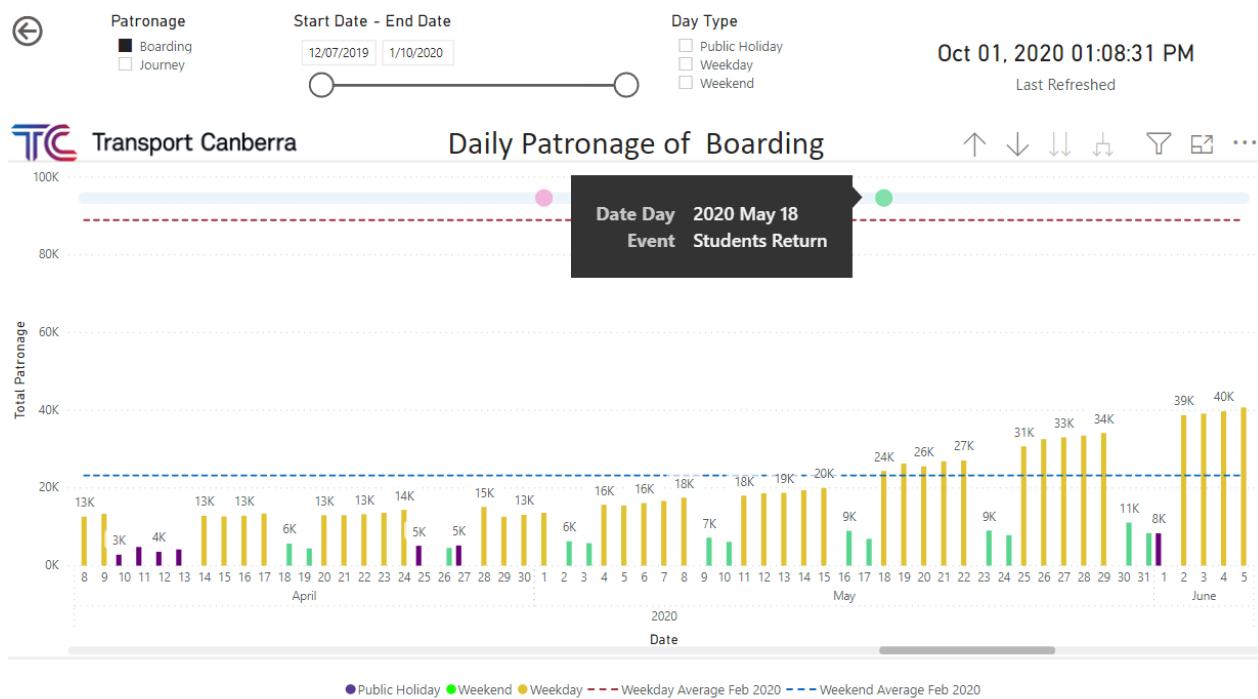
# DASHBOARD

Introduce each section of the dashboard. Explain different functions, designs and measurements. Give some ideas on how to use the dashboard and what insights can be gained.

Terms	Definitions
Boardings	A boarding is every time a person gets on a public transport vehicle, such as a bus or light rail vehicle.
Service types	- Light Rail - Bus: Including Bus service types of Rapid Bus, Local Bus, Peak Bus/Xpresso, School Services and Other.
Day Type	- Public Holiday: ACT public holidays. If a day is treated as a Public Holiday, it will not be counted as a weekday or weekend. - Weekday: All the weekdays except for public holidays. - Weekend: All the weekends except for public holidays.
Passenger Group	- Student: School students only, tertiary students are not included. - Non-student: Including passenger groups of Adults, Concessions, Tertiary students and Other.
Journey	A journey is a customer's whole travel from origin to destination on public transport, which may include more than one boarding.
On-time	On-time refers to whether a service is delivered punctuality. A bus service is considered to be on-time when it departs no later than 40 seconds and no earlier than 10 seconds compare to the scheduled departure time.
Reliability	Reliability refers to whether a service is delivered. A bus service is considered to be delivered when it departs within 15 minutes of the scheduled time and completes the trip from the first to the last stop.

## Business Glossary

A table records definition of the business glossary terms used in this project. Some of them are applied in filters, some are data features. Boarding and journey are two types of patronage. Day type is the way we sort date. Service type and passenger group are two ways to classify patronage data. On-time and reliability are related to bus service quality.

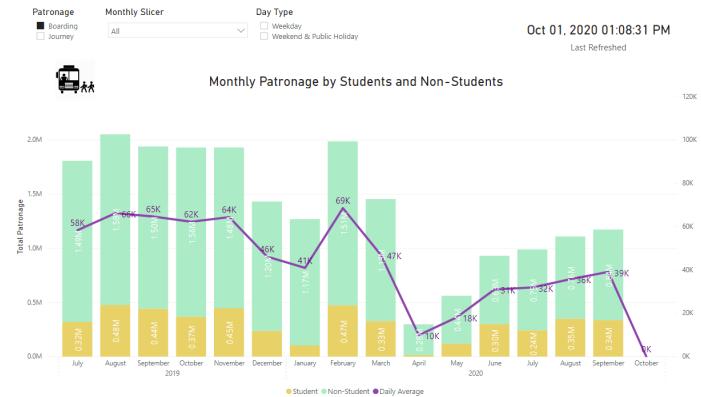
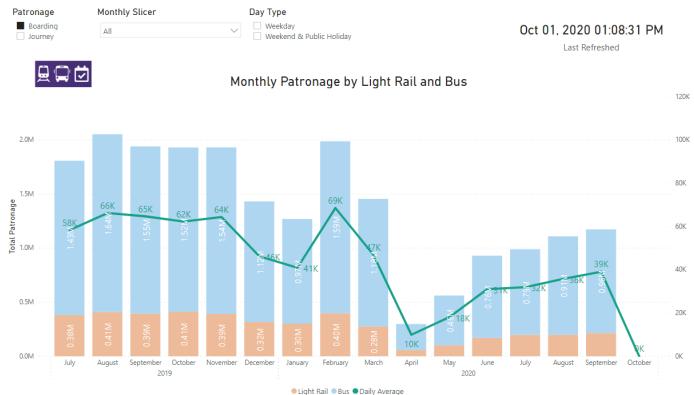


On the top of a section, there are some filters which allows users to choose data according to their needs, such as the different types of patronage. Choose different filtering options, the data displayed in the chart will change accordingly. Users could also choose the date range of data to be presented, and they could choose different day types to be shown. Here are three different day types, public holiday, weekday and weekend, they are marked as different colors in the bar chart. On the top right corn, it shows the timestamp of data source updating.

On the top of the chart, there is an event register line, shows major events which would affect the public transport service. The light blue line here means the Coivid19 is happening, hence the total number of patronage is much less comparing to the red and blue benchmarks which represent weekday and weekend average of last February respectively. While the pink dot marks the public restriction begin easing, the green dot marks the students return to school, hence we can find the patronage started to raise from May.

# MONTHLY PATRONAGE

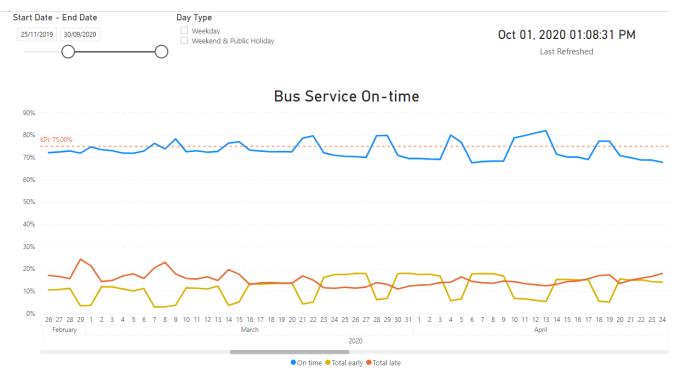
The pair of graphs shows the monthly patronage for different service types (left) and different passenger groups (right). Each bar represents the total number of boarding/journeys in a month, with blue representing buses and pink representing light rail. There is also a daily average line, which is calculated by dividing the total patronage of the month by the number of days in the month.



# BUS SERVICE QUALITY

InThe pair of line charts shows the bus service qualities. Reliability refers to how many buses have delivered compared to scheduled. And on-time refers to whether a bus is delivered punctually. The reliability declined between March and June, which may be due to the impact of Covid19.

Similarly, the service “on time” rate (blue line) also dropped since March. However, we can find that the “total early” rate (yellow line) has raised, while the “total late” rate (red line) dropped. This means due to the impact of Covid19, there were fewer vehicles on the road, hence buses could run faster and depart earlier.



# NUMERIC INDICATORS

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Several numeric indicators in full sentences. They are updated and calculated automatically. Can be copied and used directly into reporting.

Start Date - End Date  
1/07/2019 | 1/10/2020

Oct 01, 2020 01:08:31 PM

Last Refreshed

## Overall

During the date range from 01/Jul/2019 to 01/Oct/2020, the total Boarding number is 20,870,320, and the total Journey number is 15,249,114.

### Boarding

1. Service Type: contains 16,648,737 from Bus (79.77%), and 4,221,583 from Light Rail (20.23%).

2. Passenger Group: contains 4,563,602 from Students (21.87%), and 16,306,718 from Non-Students (78.13%).

### Journey

1. Service Type: contains 12,009,358 from Bus (78.75%), and 3,239,756 from Light Rail (21.25%).

2. Passenger Group: contains 3,534,139 from Students (23.18%), and 11,715,005 from Non-Students (76.82%).

- Present the total boarding and total journeys for a selected period.
- Present the boarding/journey amount and proportion of different service types and passenger groups (The executive put more concerns on school students).

Patronage  
 Boarding  
 Journey

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## Target

Year to Date (01/Jul/2020-01/Oct/2020) has total 3,272,051 Boardings.

### Comparison

Last day (30/Sep/2020) has total 35,065 Boardings, it is -47.23% compare to last year (30/Sep/2019).

Last week (21/Sep/2020-27/Sep/2020) has total 276,628 Boardings, it is -41.24% compare to last year (23/Sep/2019-29/Sep/2019).

Last month (September/2020) has total 1,173,257 Boardings, it is -39.54% compare to last year (September/2019).

- Target: Present the Year-to-Date total boarding/journeys for the current financial year.
- Comparison-last day: Comparing the total patronage (Boarding/Journey) of the last day with the same day last year, to see how the current performance changes.
- Comparison-last week: Each week have been assigned a week number; comparing the total patronage (Boarding/Journey) of the last week with the same week last year.
- Comparison-last month: Comparing the total patronage (Boarding/Journey) of the last month with the same month last year.

# STAKEHOLDERS



## TCCS - Transport Operations (TO)

The Business Service team under Transport Operations will act as the client side of this project. It maintains public transport operations including buses and light rail, ensuring the service quality and reliability. Transport Operations are the data owners and therefore responsible for endorsing the data publish to the Open Data Portal.



## TCCS - Innovation, Data and Analytics Team (IDA Team)

The IDA team acts as the owner and manager of this project. It provides business intelligence services, helps business units to get insights and make decisions. It is also responsible for the Open Data Strategy, managing data collection and publication.



Australian  
National  
University

## ANU - Research School of Computer Science

ANU is involved in providing mentoring support to the interns through workshops, small group discussions and one-to-one mentoring sessions. Support will be focus on developing professional skills and enhancing personal skills.



## THE INTERN - Yuchen Zhang

Yuchen is an IT student passionate about Data science. She interned at TCCS as a Business intelligence specialist and individually completed this project. In the process, she demonstrated her communication skills, professional skills in research and teamwork, and technical skills in indicator calculation and data visualization. She has enhanced PowerBI technique through this project, and hope to go further in the direction of data in the future.

