How to Use and Interpret Metro Ridership Data

The data in the ridership data portal describe how many customer trips (transactions) occurred on Metrorail, Metrobus, and Metro Parking facilities. This data is presented openly here for planning and analysis purposes, and may diverge from official counts of ridership Metro maintains for accounting and revenue purposes, and for submission to the Federal Transit Administration and other oversight bodies.

How the Data is Recorded

- On Metrorail, the fare system records a customer trip in two transactions – an entry, and an exit. This data portal shows entries and exits.
    - The are system does not record all boardings or unlinked trips. When customers make transfers between rail lines behind the faregates, this is not represented as an additional trip. One entry can represent two boardings.
    - By the end of a service day, total entries and exits on Metrorail can differ slightly, because this view of fare system data counts entries without matching exits, and vice versa.
- On Metrobus, the fare system records a customer trip when a customer boards the bus. Boardings are generated when a customer taps their SmarTrip card, or pays a cash fare, or when the bus operator presses a button to indicate a boarding without the customer having interacted with the farebox, including fare evasion.
    - The bus farebox system is separate from the Automatic Passenger Counter system (see more details below).

The Importance of Ridership Snapshots in Interpretation of the Data

When interpreting data from this portal, please do read the accompanying Ridership Snapshot for any given month analyzed (if available). These snapshots note the critical external and internal events which impacted the month's ridership data – such as extreme weather, equipment failures, station closures, and/or bus service changes. For example, a station closure could cause an apparent loss at one station, but an apparent gain at a neighboring station due to bus shuttles from the closed stations. Or, a parade or special event can cause a spike in ridership for one day that changes the month's averages more moderately. It is critical to note these factors when interpreting the data.

In addition, in the snapshots we note any discrepancies or inconsistencies in the alignment of dates and holidays when showing ridership change compared to the equivalent day last year. When holidays shift a week in either direction, occasionally this can lead to a normal corresponding change in ridership.

Why are the Numbers Shown as Average Daily?

Most ridership data in this portal is presented as Average Daily Ridership. This is a good way to compare ridership numbers over time, because different months and years have different numbers of weekdays, Saturdays, and Sundays. Because ridership is typically higher on weekdays than weekends, for example, a monthly total can be impacted by as much as 5% by a shift of one weekday in either direction, and it would be incorrect to characterize a trend in underlying demand for Metrobus and Metrorail from this. Average daily ridership is a figure that normalizes across different numbers of days each month and year - and facilitates year-to-year and month-to-month comparisons.

Nevertheless, total ridership figures are useful too, so they are included in some parts of the dashboards for reference. But for most ridership data analysis showing trends over time, average weekday, or average Saturday/Sunday tell the most accurate story about whether ridership is going up or down. As we gauge customer interaction and use of the data, we can add additional aggregation methods in the future.

Extent of the Data

Data in this portal begin in August 2010 for Metrorail, January 2010 for Metrobus, and January 2012 for Metro Parking. This reflects the dates on which these datamarts began operating at an enterprise scale, as the software (primarily Cubic's NextFare5 system) came online.

The data will be refreshed on a roughly 30-day lag, in one-month increments. So, for example, we hope to publish January data at the beginning of March.

Ridership Data in the COVID-19 Era (updated July 2020)

The COVID-19 pandemic significantly impacted Metro service, ridership, and data systems beginning in late March 2020, in different ways.

- On Metrorail, faregates continue to record ridership consistently. Even as service levels and ridership have fluctuated significantly, impacts to data systems have been minor.
- At Metro parking facilities, paid parking was suspended in early April, and paid transactions dropped to near zero.
- On Metrobus, passengers began boarding through the rear doors and fares were not collected beginning in late March, and Metro began reporting bus ridership from the Automatic Passenger Counters (see below). The bus farebox data shown in this ridership data portal consists primarily of bus operators pressing special keys to record ridership. This data (since late March) is only partial and should not be used for aggregate ridership.

Future Data: Bus Automatic Passenger Counters (APC)

Metrobus also estimates ridership using data generated from a system of infrared beams and overhead cameras mounted on the front and rear doors of the bus. Boardings and alightings can be measured when the beam is broken or by video analysis software. However, this data needs to be cleaned and sampled over many observations to correct for known inaccuracies in the data. In addition, APC counts often diverge from farebox counts for a variety of reasons. Although this data is not immediately available in this portal, we are exploring ways to share it. For now, bus ridership shown is data generated from the bus farebox system.

Rail Origin-Destination Data

Because Metrorail is a tap-in and tap-out system, Metro also maintains a view on rail ridership data where entries are connected to exits. Although this data is not immediately available in this portal, we are exploring ways to share it.

Holidays

The portal currently shows ridership data for all holidays that Metro observes. Holidays can be identified by a non-standard Service Type such as Saturday Supplemental, or a non-standard pairing of the Day of the Week and the Service Type. For example, Thursday, November 28, 2019 (Thanksgiving Day), is shown as Day of Week "Thursday" and Service Type "Sunday."

For reference, holidays in calendar year 2019 are represented as follows:

Date	Holiday Name	Day of Week	Service Type in Data Portal		
			Rail	Bus	Parking
1/1/2019	New Year's Day	Tuesday	Sunday	Sunday	Sunday
1/21/2019	Martin Luther King Jr.	Monday	Saturday Holiday	Saturday Supplemental	Saturday Holiday
2/18/2019	Presidents Day	Monday	Saturday Holiday	Saturday Supplemental	Saturday Holiday
5/27/2019	Memorial Day	Monday	Sunday	Sunday	Sunday
7/4/2019	Independence Day	Thursday	July 4th Special	Saturday	July 4th Special
9/2/2019	Labor Day	Monday	Sunday	Sunday	Sunday
10/14/2019	Columbus Day	Monday	Saturday Holiday	Saturday Supplemental	Saturday Holiday
11/11/2019	Veterans Day	Monday	Saturday Holiday	Saturday Supplemental	Saturday Holiday
11/28/2019	Thanksgiving	Thursday	Sunday	Sunday	Sunday
12/25/2019	Christmas Day	Wednesday	Sunday	Sunday	Sunday

Parking

Metro's daily parking facilities are a pay-on-exit system. To exit a Metro-owned Parking facility, customers pay with a SmarTrip card or a credit card. The portal reflects all transactions for daily paid parking, regardless of how the customer paid, or how much the customer paid.

The portal contains no data on usage of spaces with a parking meter or other spaces. The portal contains data only on facilities that are owned and operated by Metro. Other facilities not owned by Metro, even if they are near a rail station, are not represented in this portal.

Note that parking's service day data is on a calendar day, not service day – see notes below.

Data Quality

The data shown in this portal has passed a set of business rules to qualify as ridership data. Unsuccessful transactions are typically not included in these counts, for example.

However, Metro's fare system is composed of hundreds of devices, communication lines, and backend support systems that function in a complex operating environment every day. Data generated by the system can be impacted by unexpected real-world events, such as:

1. Equipment failures
2. Bus operator behavior, such as logging onto a route, and pressing keys to represent ridership
3. Incomplete integration of farebox and automatic vehicle location technology on buses
4. Incomplete probing of buses to download the data stored on the vehicles each night
5. Incomplete rail data if faregates are ever opened to alleviate extreme crowding during special events

In addition, external factors influence the data as well, such as extreme weather like snow days, or station closures for capital maintenance.

Rail Virtual Tunnels

Rail customers can use the "virtual tunnel" Farragut Crossing to transfer between Farragut North and Farragut West stations without being over-charged. That is, customers can exit one station, walk on the street level to the other station, and re-enter, and will be charged a fare as if their trip had been continuous.

In addition, When Metro closes a station(s) for capital maintenance, customers can be forced off a train, onto a bus bridge around the closure, and then to re-enter the rail system on the other side. When this happens, Metro typically establishes procedures in the fare system to avoid over-charging customers, like the Farragut Crossing.

However, even though customers using Virtual Tunnels (either for Farragut Crossing or for capital maintenance) are charged a fare as if their trip were one single rail trip, their trips are counted in this ridership data portal as two separate rail trips.

Why Can't I Download to .CSV or Excel?

This is currently a limitation of the software used to host the Ridership Data Portal, unfortunately. We will be looking for a workaround or alternate solution in the future.

Ridership Year-over-Year Change Data Viewers

Viewers showing how ridership data has changed show year-over-year statistics. Because Metro's ridership, particularly rail ridership, has strong seasonal patterns that vary across stations, the best way to characterize whether ridership is going up or down is to compare it to the same ridership, at the same time and place, last year. Month-over-month comparisons will too quickly capture trends that would have happened anyway due to seasonal factors – events, weather, Cherry Blossom Festivals, and tourism, e.g. – that should not be mistaken for more fundamental changes in ridership.

The Ridership Year-over-Year Change Data Viewers compare a small batch of recent ridership data to the same ridership data on the equivalent date last year, to characterize how ridership is changing. While this is still our preferred method of characterizing ridership change, use caution with these Viewers in two primary ways.

- Occasionally, the "equivalent date last year" is not an exact match, for example when a holiday changes its week and can align with a regular weekday in the year prior.
- Some year-over-year comparisons can be impacted by major events and trackwork in both the current year, and the prior year. For example, during the summer of 2019, ridership at Pentagon and Crystal City appear much higher than in 2018, but this is due to major shuttle bus activity in 2019 from a capital investment project.

Ridership Data Portal Metadata

The Ridership Data Portal is a set of interactive Viewers of Metro fare system data, each focusing on a different view of the data.

The following sections describe the viewers, and the columns and rows in each.

Rail Ridership Data Viewer, and Rail Ridership Year-over-Year Change Data Viewer

Measures

1. **Average Daily Entries**
   1.1. The average number of entries as recorded by fare gates, per service day during the filtered period and at the filtered locations
   1.2. Defined as: Sum(Entries) / Count(distinct date)
2. **Average Daily Exits**
   2.1. The average number of exits as recorded by fare gate taps per service day during the filtered period and at the filtered locations
   2.2. Defined as: Sum(Entries) / Count (distinct date)
3. **Date**
   3.1. The date of service. Metro service days are defined as 4:00 AM to 3:59 AM the following day for rail ridership. The date range begins on August 1, 2010 and runs to the end of the month that completed at least 30 days in the past. This means that ridership after midnight is categorized to the prior day. For example, ridership at 12:30am on a Saturday (by the clock) is shown in this viewer as Day of Week = Friday.
4. **Day of Week**
   4.1. Calendar day of the week (Monday, Tuesday, etc.), with weeks beginning on Monday.
5. **Entries**
   5.1. The number of passenger entries, recorded by faregates in rail stations.
6. **Exits**
   6.1. The number of passenger exits, recorded by faregates in rail stations.
7. **Service Type**
   7.1. The type of rail schedule Metro planned to run on that day of service.
   7.2. Typical Service Types are: Weekday, Saturday, Sunday, and holiday schedules.
8. **Station**
   8.1. The rail station where customers entered or exited. Where stations have multiple entrances, all entrances are summed together.
9. **Time Period**
   9.1. On Metrorail, the service period during which the entry or exit occurred. This usually corresponds to how fares are charged, with the exception of Late Night Peak.
   9.2. Late Night Peak on rail is defined as any fare system transaction that occurs after midnight. Because stations can be open and trains still running up to 10-15 minutes after the posted closing time (which has been midnight in the past), ridership can be generated under Late Night Peak even when the posted closing time is midnight. To isolate late night ridership on only Friday and Saturday nights, when Metrorail has at times stayed open past midnight, select Late Night Peak from the Period filter, and select Friday and Saturday from the Day of Week filter.

10. **Hour** (visible only on Hourly Distribution)
    10.1.   The hour of the service date, e.g. "2:00 PM"

Pages:

1. **Calendar Years**
   1.1. The Calendar Years page displays the average daily entries broken down by calendar year.
2. **Weekdays**
   2.1. The Weekdays page displays the average daily entries with a service type of 'Weekday' broken down by time period.
3. **Weekend Days**
   3.1. The Weekend Days page displays the average daily entries with service types of 'Saturday' and 'Sunday', broken down by day of the week.
4. **Hourly Distribution**
   4.1. The Hourly Distribution page shows the average daily entries and average daily exits broken down by hour of day.
5. **Months**
   5.1. The Months page shows the average daily entries with a service type of 'Weekday' broken down by month and year.
6. **Days of Week**
   6.1. The Days of the Week page shows the average daily entries broken down by day of the week.
7. **Tabular**
   7.1. The Tabular page shows the average daily entries broken down by station and time period.

Bus Ridership Data Viewer, and Bus Ridership Year over Year Change Data Viewer

Measures

1. **Average Daily Boardings**
   1.1. The average number of boardings as recorded by fare box, including SmarTrip card transactions, operator button-presses representing ridership without interaction with the farebox (for a variety of reasons), and cash fares paid per service day during the filtered period and on the filtered routes.
   1.2. Note this figure is <u>not</u> based on Metro's Automatic Passenger Counter (APC) system.
   1.3. Defined as: Sum(boardings) / Count (distinct date)
2. **Date**
   2.1. The date of service, running from 4:00 AM to 3:59 AM for bus ridership. The date range begins on January 1, 2010 and runs to the end of the month that completed at least 30 days in the past.
3. **Day of Week**
   3.1.   Service day of the week, with weeks beginning on Monday.
4. **Entries**
   4.1. The number of passenger entries as recorded by the bus farebox.
5. **Service Type**
   5.1. The bus schedule run on that day of service.

5.2. Typical Service Types are: Weekday, Saturday, Sunday, and holiday schedules.

6. **Route**

6.1. The bus route number where customers boarded the bus. This field generally shows the route alphanumeric name at the time the route was operated. Route designations may change over time due to service modifications. Route designations that are no longer in use will show no ridership.

Pages:

1. **Calendar Years**

1.1. The Calendar Years page displays the average daily boardings broken down by calendar year.

2. **Weekdays**

2.1. The Weekdays page displays the average daily boardings with a service type of 'Weekday' broken down by time period.

3. **Weekend Days**

3.1. The Weekend Days page displays the average daily boardings with service types of 'Saturday' and 'Sunday', broken down by day of the week.

4. **Hourly Distribution**

4.1. The Hourly Distribution page shows the average daily boardings broken down by hour of day.

5. **Months**

5.1. The Months page shows the average daily boardings with a service type of 'Weekday' broken down by month and year.

6. **Days of Week**

6.1. The Days of the Week page shows the average daily boardings broken down by day of the week.

7. **Tabular**

7.1. The Tabular page shows the average daily boardings broken down by route number and time period.

Metro Parking Usage Data Viewer

Measures

1. **Average Daily Transactions**

1.1. The average number of parking transactions recorded per service day during the filtered period and at the filtered lots/stations.

1.2. Defined as: Sum(transactions) / Count (distinct date)

2. **Capacity**

2.1. The nominal number of parking spots available at that lot or garage. This may be affected by temporary changes at the lot such as construction.

3. **Capacity Utilization**

3.1. The Average Daily Transactions at a lot or garage divided by capacity during the filtered period and at the filtered lots/stations.

3.2. Defined as: Sum(Transactions) / Capacity

4. **Date**

    4.1. The date of service, running from 12:00 AM to 11:59 PM for parking transactions. The date range begins on January 1, 2012 and runs to the end of the month that completed at least 30 days in the past.

5. **Day of Week**
   5.1. Service day of the week, with weeks beginning on Monday.
6. **Service Type**
   6.1. The schedule of service hours on that day.
   6.2. Typical Service Types are: Weekday, Saturday, Sunday, and holiday schedules.

Pages:

1. **Calendar Years**
   1.1. The Calendar Years page displays the average daily parking transactions broken down by calendar year.
2. **Weekdays**
   2.1. The Weekdays page displays the average daily transactions with a service type of 'Weekday' broken down by jurisdiction.
3. **Weekend Days**
   3.1. The Weekend Days page displays the average daily transactions with service types of 'Saturday' and 'Sunday', broken down by day of the week.
4. **Months**
   4.1. The Months page shows the average daily transactions with a service type of 'Weekday' broken down by month and year.
5. **Days of Week**
   5.1. The Days of the Week page shows the average daily transactions broken down by day of the week.
6. **Tabular**
   6.1. The Tabular page shows the average daily transactions broken down by lot/garage location and day of the week.
7. **Station Map**
   7.1. The Station Map page shows the average capacity utilization for each lot/garage and their capacity on the standard Metro map.