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How to Use and Interpret Metro Ridership Data

The data in the ridership data portal describes how many customer trips occurred on the 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 system does not record all boardings or unlinked trips (UPT). When customers make transfers between rail lines behind the faregates, this is not represented as an additional trip. One entry can represent more than one boarding.
    - 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 rail, since January 1, 2023, we also record passengers who enter the gates without tapping a valid fare. These can include fare evaders as well as people who enter when the gates are in free mode (e.g. the 4th of July).
- On Metrobus, we used Automated Passenger Counters (APCs), which are sensors near the doors, to count passengers boarding buses. These have been the system of record for ridership since January of 2019.
    - APCs do not record a valid sample on all trips. For this reason, valid data are scaled to the total number of trips run, and are not available in as granular a fashion as taps are. We will provide greater precision in these dashboards to the public as the data are available.
    - The fare system also 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. These were the official methods to count passengers before 2019.

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.

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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 begins in January 2012 for Metrorail and Metro Parking. This reflects the date the last of these datamarts began operating at an enterprise scale, as the software (primarily Cubic's NextFare5 system) came online, and provides consistency of availability across all modes.

For Metrobus, data in this portal begins in January 2012, using taps, cash fares, and non-tapped boardings as recorded by the operator. In January 2019, we switched to using APCs to count passengers, so the farebox-based dashboard ends at this date.

The data for the Metrorail and Metro Parking, and bus and rail daily summary dashboards are refreshed on a 7-day lag, while Metrobus summary data are refreshed each month on the 20th (for the previous month). Bus ridership is processed at the end of each month and needs some delay to ensure all data is reported.

Downloading the Data

Data from the ridership data portal can be downloaded as a CSV. To download the data:

- Click the dashboard of interest and go to the download button in the bottom right corner.
- Select 'Data' from the options.
- The Summary tab will provide the aggregated data as seen in the dashboards, while the Full Data tab will provide the disaggregated data. Filters applied to the dashboards will be applied to the data download and depending on quantity of data selected, the Full Data option may take several minutes.
- Click 'download all rows as a text file' for a CSV that can be opened in Excel or other software.

Ridership Data in the COVID-19 Era (updated February 2023)

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

- On Metrorail, faregates continued to record ridership consistently. Even as service levels and ridership fluctuated significantly, impacts to data systems were minor.

- At Metro parking facilities, paid parking was suspended in early April 2020, and paid transactions dropped to near zero. In mid-August 2020 paid parking was reinstated.
- On Metrobus, passengers began boarding through the rear doors and fares were not collected beginning in late March 2020, and Metro began reporting bus ridership from the Automatic Passenger Counters (see below). We show data here from APCs since 2019, but believe these data to be accurate representations of ridership through the COVID period.

Holidays

The portal currently shows ridership data for all holidays that Metro observes. Including holidays in averages can be misleading since ridership is often different than a usual day of that schedule type. 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."

If you would like to exclude all holidays, simply uncheck the box.

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.

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.

Ridership Year-over-Year Change Data Viewers

In the previous version of the Ridership Data Portal, we had a set of dashboards to view the change in ridership compared to last year. These are temporarily down because of changes in the data, but we are working to re-design them and publish them soon.

Ridership Data Portal Metadata

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

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

Daily Ridership Summary Dashboards

These dashboards provide daily total ridership on Metrobus and Metrorail viewable back to 2019 when APC data became available.

Measures

- Entries or Boardings: This column totals the number of entries (including non-tap entries after January 1, 2023) on Metrorail or boardings on Metrobus by service day. Entries
    - On rail, entries are recorded by faregates at stations. Beginning January 1, 2023, non-tapped entries recorded by sensors are included.
    - On bus, entries are recorded by automated passenger counters (APCs) at the doors of the buses.
    - Note: While these are reported to the single number, we do not believe the data are this accurate.

Dashboards:

1. **Bar Chart View**
    1.1. The Bar Chart View dashboard shows daily ridership in a bar chart with different colors representing bus or rail total ridership.
2. **Line Chart view**
    2.1. The Line Chart View dashboard shows daily ridership in a line chart with different colors representing bus or rail total ridership.
3. **Data View**
    3.1. The Data View shows daily ridership in a table.
4. **Station-level View**
    4.1. The Station-Level View shows daily ridership in a line chart, but allows users to filter down to a single station.

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Rail Ridership Summary Dashboards

Measures

- **Average Daily Entries**
  - The average number of entries as recorded by faregates, per service day during the filtered period and at the filtered locations
  - Defined as: Sum(Entries) / Count(distinct date)
- **Date**
  - 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 January 1, 2012 and runs to 7 days prior to the current date. 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.
- **Day of Week**
  - Calendar day of the week (Monday, Tuesday, etc.), with weeks beginning on Monday.
- **Entries**
  - The number of passenger entries, recorded by faregates in rail stations.
- **Exits**
  - The number of passenger exits, recorded by faregates in rail stations.
- **Service Type**
  - The type of rail schedule Metro planned to run on that day of service.
  - Typical Service Types are: Weekday, Saturday, Sunday, and holiday schedules.
- **Station**
  - The rail station where customers entered or exited. Where stations have multiple entrances, all entrances are summed together.
- **Time Period**
  - 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.
  - 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.

Dashboards:

1. **Avg Weekday Entries by Year**
   1.1. The Calendar Years dashboard displays the average weekday entries broken down by calendar year.
2. **Average Weekday Entries by Time Period**

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

3. **Avg Weekend Entries by Year**
   3.1. The Weekend Days dashboard displays the average daily entries with service types of 'Saturday' and 'Sunday', broken down by day of the week.
4. **Avg Daily Entries by Month**
   4.1. The Months dashboard shows the average daily entries broken down by month and year for the selected filters.
5. **Avg Daily Entries by Day of Week**
   5.1. The Days of the Week dashboard shows the average daily entries broken down by day of the week for the selected filters
6. **Avg Daily Entries by Station**
   6.1. The Avg Daily Entries by Station dashboard shows the average daily entries by station and by time period for the selected filters.
7. **Avg Total Daily Entries by Station**
   7.1. The Avg Daily Entries by Station dashboard shows the average daily entries by station for the selected filters, divided into tapped and non-tapped entries.
8. **Daily Rail Entries over Time**
   8.1. The Daily Rail Entries over Time dashboard shows total entries by day for the time range and filters selected. You may filter to certain stations.
9. **Total Entries and Exits by Day**
   9.1. The Total Entries and Exits by Day dashboard shows total entries and exits per day for the filters selected. You may filter to a certain station with this dashboard.

Bus Ridership Data Viewer

There are two workbooks with Metrobus data. The first shows APC-based ridership since January 2019. The second set of dashboards show farebox-based ridership which was used for ridership reporting through December 2018.

Metrobus Ridership

Measures

- Average Daily Boardings
  - Boardings are summarized from the APCs and scaled and adjusted to account for missing data or missed trips. They are then shown here as a daily average by month for each route and day type (Weekday, Saturday or Sunday)

Dashboards

1. Average Daily Ridership (Boardings)
   1.1. This dashboard shows the average ridership by day type for all routes for the month selected. By default this is sorted by weekday ridership.
2. Ridership by Month

2.1. This dashboard shows a line chart with monthly average daily ridership for the route and day type selected.

Metrobus Ridership (Farebox-based)

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 not 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, 2012 and runs to 14 days prior to the current date.
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.

Dashboards:

1. **Calendar Years**
   1.1. The Calendar Years dashboard displays the average daily boardings broken down by calendar year.
2. **Weekdays**
   2.1. The Weekdays dashboard displays the average daily boardings with a service type of 'Weekday' broken down by time period.
3. **Weekend Days**
   3.1. The Weekend Days dashboard 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 dashboard shows the average daily boardings broken down by hour of day.
5. **Months**
   5.1. The Months dashboard 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 dashboard shows the average daily boardings broken down by day of the week.
7. **Tabular**
   7.1. The Tabular dashboard shows the average daily boardings broken down by route number and time period.
8. **Totals**
   8.1. The Totals dashboard shows the number of boardings by day.

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.

Dashboards:

1. **Calendar Years**
   1.1. The Calendar Years dashboard displays the average daily parking transactions broken down by calendar year.
2. **Weekdays**
   2.1. The Weekdays dashboard displays the average daily transactions with a service type of ‘Weekday’ broken down by jurisdiction.
3. **Weekend Days**

3.1. The Weekend Days dashboard 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 dashboard 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 dashboard shows the average daily transactions broken down by day of the week.
6. **Tabular**
   6.1. The Tabular dashboard shows the average daily transactions broken down by lot/garage location and day of the week.
7. **Station Map**
   7.1. The Station Map dashboard shows the average capacity utilization for each lot/garage and their capacity on the standard Metro map.
8. **Totals**
   8.1. The Totals dashboard shows the number of parking transactions by day.