



Options to house & share regional bus data

Bus Transformation Project
– Rec B

Last updated January 26, 2020

Agenda

1. What is Recommendation B of the Bus Transformation Project?
2. What data could be shared?
3. What are some options for who to facilitate data sharing?
4. Next steps

Bus Transformation Project

Recommendation B



B	<p><i>Recommendation:</i> Collect and share standardized bus operations and performance data across agencies to improve transparency and better plan bus service.</p>	Primary 	Support
Benefits	Better and more complete data will enable the creation of a better, more efficient regional bus system.		
Outcome	Data standards and sharing agreements are reached so that there is consistency in data reporting to make planning and analysis easier and more efficient, which has benefits for other recommendations. Implementation of this recommendation will also include a way to share the operations and performance data easily between agencies and reporting partners.		
Schedule	Starts: 2020	Complete: 2023	

Bus Transformation Project

Recommendation B

Action steps

1. Convene a regional data sharing working group to develop data needs for ongoing planning and reporting, including the types of data, tools to collect data, and level of detail, while considering what is already being collected
2. Identify responsible party to house, own, and maintain the data on an ongoing basis and identify and develop a common tool and formats for collecting and storing the data
3. Identify what data will be shared with whom and develop an inventory of data types, level of detail, uses, and frequency of updates
4. Develop and sign a data sharing agreement between all transit agencies and the data repository owner
5. Collect and consolidate the first phase of data from each agency; develop and implement plans for collecting remaining data needed
6. Perform ongoing analysis of consolidated data

Action #1: What should be collected? *Proposed principles*

Key objective: **minimize reporting burden and keep it simple**

- What to measure: use **service guidelines** as a starting point
- How to measure: leverage **NTD definitions** whenever possible
- Data format: use **GTFS, GTFS-RT** and **NTD**
- Frequency: **annual** for most data points
- Collection method: scrape APIs already produced by providers, accept NTD forms

Options for measures + sharing mechanism

* Not a service guideline measure

^ GTFS and GTFS-RT | + NTD Submission

Customer Experience

how accessible, available, reliable and comfortable, is our service to customers?

Availability

- Span of Service[^]
- Service Headway[^]
- Stop Frequency[^]

Reliability

- On-Time Performance[^]
- Bus Speeds^{*^}
- Service Delivered^{*^}
- Real-time Prediction Accuracy^{*^}

Comfort

- Vehicle Load Factor⁺

Productivity and Cost Effectiveness

how effectively and responsibly are we delivering the guidelines?

Productivity

- Passengers per Revenue Hour/Trip⁺
- Passengers per Revenue Mile⁺
- Ridership⁺

Cost Effectiveness

- Operating Cost per Passenger Trip⁺
- Cost Recovery⁺

Service Guidelines | Local Bus Providers + Peers

	Year	Span of Service	Service Headway	Stop Frequency	Coverage	Route Design	Reliability	Comfort	Productivity	Effectiveness
Metrobus	2000							X	X	X
DC Circulator Washington, DC	2014		X	X			X		X	X
ART Arlington County	2016	X	X	X	X		X	X	X	X
CUE City of Fairfax	2017	X			X		X		X	X
DASH City of Alexandria	2019				X		X			X
Fairfax Connector Fairfax County	2016	X	X	X			X	X	X	X
Loudoun County Transit Loudoun County	2019	X	X	X			X	X	X	X
Ride On Montgomery County	2017		X		X		X	X	X	X
TheBus Prince George's County	2017	X	X			X			X	

Local bus provider data sources

	GTFS [^]	GTFS-RT [^]	NTD Submission ⁺
Metrobus	Publishes GTFS	Publishes GTFS-RT	Full reporter
DC Circulator Washington, DC	Publishes GTFS	In the process of developing GTFS-RT	Full reporter
ART Arlington County	Publishes GTFS	Publishes GTFS-RT	Full reporter
CUE City of Fairfax	Publishes GTFS	Shares real-time data through NextBus API, not GTFS-RT	Full reporter
DASH City of Alexandria	Publishes GTFS	Publishes GTFS-RT	Full reporter
Fairfax Connector Fairfax County	Publishes GTFS	Shares real-time data through BusTracker API, not GTFS-RT	Full reporter
Loudoun County Transit Loudoun County	Publishes GTFS	Deploying software upgrade that will support GTFS-RT	Full reporter
Ride On Montgomery County	Publishes GTFS	In the process of developing GTFS-RT	Full reporter
TheBus Prince George's County	Publishes GTFS	In the process of developing GTFS-RT	Full reporter

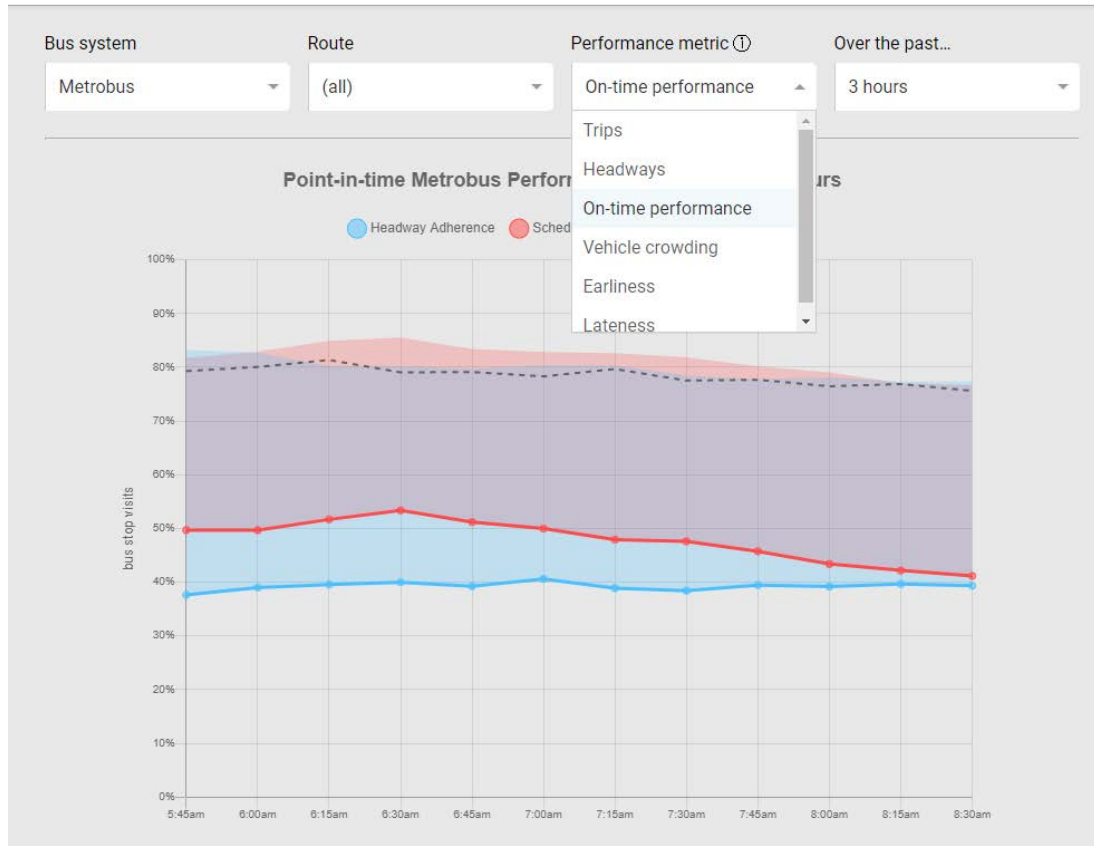
MetroHero Aries leverages this data

Adherence + Reliability + Integrity Evaluation System

Select a bus system in the Greater Washington region to view a breakdown of every route's performance in real time

last updated a few seconds ago / data automatically updates every 30 seconds

Bus System	Headway Adherence	Schedule Adherence	Bunched	Over-spaced	Ahead	Behind	Data Integrity
DASH	91%	88%	0%	9% (by 5 minutes)	10%	1%	99%
ART	86%	84%	0%	14% (by 6 minutes)	11%	5%	98%
MTA Local Bus	49%	55%	1%	51% (by 12 minutes)	15%	30%	68%
Metrobus	38%	40%	1%	62% (by 19 minutes)	23%	37%	76%
Ride On	7%	8%	0%	93% (by 30 minutes)	3%	89%	35%



Action #2: Identify body to collect and maintain data *Requirements*

- 1. Develop and maintain a central data warehouse**
- 2. Develop a tool or other mechanism to collect the data** (e.g. standard-format spreadsheet, web-interface, scrape and archive GTFS/GTFS-RT feeds)
 - Needs to consider the capacity of the agencies providing the data, the need for ease of querying and reporting
 - Objective: minimize level of effort required by agencies
- 3. Calculate performance results for some measures**
- 4. Maintain documentation about data sources and definitions**
- 5. Evaluate data quality and work with providers to resolve issues**
- 6. Develop an interface for stakeholders to download and/or interact with the data**
 - Stakeholders may have different access levels
 - Data should be downloadable in CSV format, at minimum
 - Stakeholder needs will be identified by the working group

Option 1: WMATA

Pros

- WMATA is the largest provider in the region and so will have the largest volume of data to share
- WMATA receives funding from all jurisdictions
- WMATA has an IT Business Intelligence team with expertise developing and maintaining data warehouses, including the regional SmarTrip Database
- WMATA shares data publicly on wmata.com via the ridership data portal and the Metro scorecard. WMATA also shares data via API
- WMATA already building a datamart for GTFS and GTFS-RT that archives API information
- Potential to ride the SmarTrip data sharing agreement

Cons

- As a transit provider, some members of the public may question the accuracy of the results reported

Cost

- **Labor**
 - One FTE database developer: \$250k/yr [contractor]
 - One FTE Performance analyst: \$150k/yr (years 1-3 to get system set up)
- **Hosting**
 - **TBD**

Option 2: Regional Body

Pros

- Regional body promotes transparency
- Existing mechanism for regional coordination

Cons

- May need to add staff or technological resources to meet the need

Cost

- Depends on extent to which infrastructure already exists
- Could require additional funding from regional providers

Option 3: Academic Institution

Pros

- Third-party, adds layer of accountability
- Likely to have expertise in data analysis and sharing
- Opportunity to engage students and generate interest in careers in transit
- Opportunity to facilitate research that could benefit transit operations

Cons

- New data sharing agreement needs to be negotiated and signed
- Risk of student/professor turnover
- Funding arrangement – who and how would it be funded?
- Contract term [e.g. 5 years]

Cost

- Depends on extent to which infrastructure already exists
- Likely to require additional funding from regional providers

Option 4: Consultant

Pros

- Third-party, adds layer of accountability
- Expertise from working with other regions/ clients/ vendors
- Leverage open source technology

Cons

- Funding arrangement – who and how would it be funded?
- Contract term [e.g. 5 years]

Cost

- Will require additional funding from regional providers

Next steps

- ✓Catalog data available in NTD, GTFS and GTFS-RT [complete]
- ✓Develop list of potential measures/data points [complete]
- ✓Compile NTD definitions of relevant measures [complete]

Which should come first?

- Establish a working group and focus on WHAT should be collected. Participants should be:
 - Knowledgeable about performance measures
 - Knowledgeable about agency data collection practices
- Determine WHO will collect and maintain data set

Key Reference Documents

- January 2020 WMATA Board presentation on Bus Transformation Project Recommendations: <https://www.wmata.com/about/board/meetings/board-pdfs/upload/3A-BTP-Endorsement.pdf>
- Bus Transformation Project Website: <https://bustransformationproject.com/>
- Bus Transformation Project Executive Summary: https://bustransformationproject.com/wp-content/uploads/2019/09/Exec_Summary_Bus_Transformation_Project_Complete_Strategy_2019-09-05.pdf
- Bus Transformation Project Action Plan: <https://bustransformationproject.com/wp-content/uploads/2019/12/Action-Plan-2019-12-06-SECURE.pdf>
- Service Guidelines: <https://www.wmata.com/about/board/meetings/board-pdfs/upload/9A-Metrobus-Service-Guidelines-Corr.pdf>
- Line Report
- MetroHero ARIES performance monitoring: <https://aries.dcmetrohero.com/>