

Real-Time Transit Information 101

Commuter Connections Subcommittee

July 21, 2015

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Structure of Presentation

- Transit Info:
 - Static
 - Real-time
 - Data formats
- What is an API?
- Real-Time Data in US Transit Industry
- Real-Time Data for Region's Transit Providers
- Regional Coordination issues
- Resources / References

Transit Info: Real-Time and Static

What do we use transit data for?

- *Traveler Applications* built for desktop, web and mobile platforms
- *Transit Agency Operations and Planning Applications* that leverage the data to improve safety, efficiency, regulatory compliance, and customer satisfaction of transit operations
 - MWCOG uses for planning and Regional Data Clearinghouse

What transit data is there?

- *Static Data* – most static transit data is now available in electronic form provided in:
 - Trip planners via the web, and
 - In standard formats like GTFS
- *Real-time Information* – larger transit providers are now providing in:
 - Various forms via web tools and applications
 - In various formats

Static Data: Data Visualization

- Static data can be used to produce much information, but is essentially a version of traditional paper schedules.
- Good static information is still valuable, and is the baseline for when real-time data is not available.

The screenshot shows the PlanItMetro blog interface. The header includes the Metro logo and the title 'PlanItMetro Metro's Planning Blog' for the Washington Metropolitan Area Transit Authority. Navigation tabs include 'Engage', 'In The News', 'Metro 101', 'Planning Studies', and 'Strategic Planning'. The main content area features a video player titled 'Washington, DC transit (WMATA): one day of acti...' with a play button. Below the video is a list of transit agencies: Loudoun Connect & Ride, LoudounLink, Alexandria DASH, Arlington Commuter Bus, DC Circulator, DASH - City of Fairfax, Fairfax Connector, LIJK - Reston, Loudoun Transit, Ride On, Silver Line Transit, WM Circulator, Virginia Railway Express, Washington Transit, Loudoun County Transit, and MET - Arlington Transit. To the right of the video is a 'New Studies Map!' showing a map of the Washington area with location-specific studies marked. Below the map is a 'Site Pages' section with links to 'About PlanItMetro', 'Non-Metro Regional Transit Projects', and 'Regional Transportation Links'. Further down is a 'PLAN Links' section with links to 'Metro Board Items', 'Metrobus Studies', 'Metrobus Studies on Twitter', and 'Planning and Development page at WMATA.com'. The 'Recent Posts' section lists 'Visualization of Metrorail Station Activity', 'Next Generation Communications', 'Goal 3 - Improve Regional Mobility and Connect Communities', 'Critical Board Accomplishments', and 'Improving Quality of Life'. The 'Recent Comments' section shows a comment by Andrew on 'New Blue Line Connections'.

Washington, DC transit (WMATA): one day of acti...

Recently we showed you a visualization of Metrorail, Metrobus and Circulator transit created by a STLTransit. The developer had created the previous visualization from the GTFS file available from the [WMATA developers resources page](#).

Metro regularly exports all of the data from our Trip Planner into a separate GTFS file which we share with COG/TPB for updating regional transit schedules in their travel demand model. We are working to make this file publicly available. In the mean time, we were able to share it with STLTransit who kindly created the updated fully regional visualization of Washington area transit, embedded above.

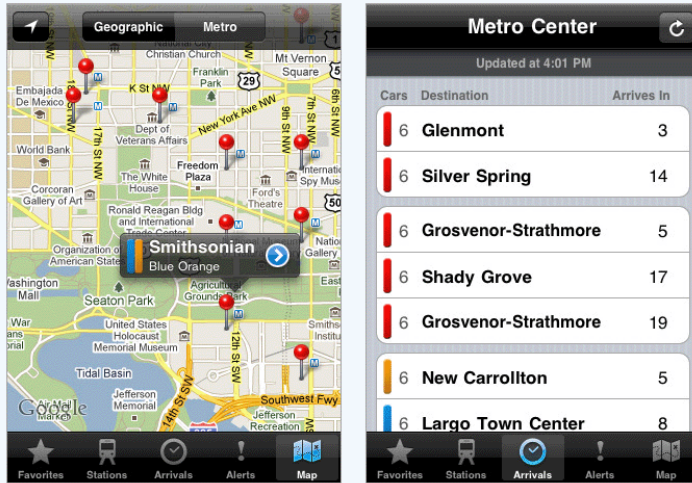
As with last time, this visualization is best viewed full-screen and in HD mode.

Some interesting things to note:

- Frederick County TransIT service use of timed transfers (or pulse points) at transit centers is very noticeable.
- MARC and VRE commuter rail are illustrated as white tadpoles, not to be confused with the colored tadpoles representing Metrorail service.
- The expansiveness of the commuter rail network becomes very apparent, as those white tadpoles shoot towards the edges of the map to the northeast, northwest and south.

http://www.youtube.com/watch?v=J8sjGQV_beo#at=31

Real-Time Data



- Time to next bus/train, based on current vehicle location vs. stop location and estimated time to arrive.
 - Estimates of arrival time are not always accurate, especially for buses (due to traffic).

- Real-time data is what customers want.

- Smartphones
- Displays

- Also used for operations:
 - Dispatching / service control
 - Incident response

DC Metro Rails

Get real time train arrivals and rail alerts for the Washington DC Metro

Get around the city with DC Metro Rails and your Android phone. Use real time train arrivals and rail alerts to help you catch the next train. Find the nearest station entrance and get there with the map and compass. Favorite your most used stations or make a shortcut to them on your home screen.



What data formats are out there?

Static data format

- GTFS – General Transit Feed Specification (*previously G stood for Google*)
 - Common format for public transportation schedules and associated geographic information.
 - Has emerged as a national standard for static information and for the most part is the standard in the region

Real-time data standards have yet to formally emerge:

- GTFS-RT – variation of above for real-time info
 - allows public transportation agencies to provide real-time updates about their fleet to application developers.
- SIRI (Service Interface for Real Time Information)
 - European standard specifically designed for public transport
- APTA Transit Communications Interface Profiles (TCIP) Standard

What is an API?

- Application Programming Interface (API)
 - “Specifies how software components should interact with each other. In practice, most often an API is a library that includes specifications for routines, data structures, object classes, and variables.”
 - Formatted data exchange between two computer systems
 - Specific data request (e.g., what time next bus at place X?)
 - Specific data response (e.g., looks at all bus lines that serve X.)
 - Requires common format/standards
 - Not just language or format, but what terms, what order, etc., in a common “vocabulary”.
 - Popular formats include: JSON, XML, Protobuf
 - Requires management: WMATA uses Mashery to control data access -> which limits speed at which data can be accessed
 - *These APIs are typically proprietary to the developers*

Using an API

- Two kinds of API: *Everything* and *Transactional*
 - “Everything” – lots of data -> maps, displays, and high-connectivity situations.
 - “Transactional” – limited data -> ask a specific question, useful for smart-phones or low-connectivity situations.

format of a typical data query

- Mode of Transportation (Bus, Rail)
 - Information Type (Static, Real-time, Support)
 - Data Category (Groups similar information, e.g., Agency Information, Stop Information, Route Information)
 - Data Element (Defines individual data elements available via the API)

Where is the transit industry on real-time data formats?

- New York MTA – modified SIRI (for bus) and GTFS-RT (for rail)
- Los Angeles MTA – internally developed API and Nextbus API
- Chicago (CTA) – Clever Devices BusTime API, separate rail API by QuicTrak
- Philadelphia (SEPTA) – internally developed API
- San Francisco (Muni) – Nextbus API

- The national trend is for transit agencies and others to make static and real-time information openly available to developers at no charge

Where is our region on APIs/real-time data?

- WMATA – originally an internally developed API for bus and rail
 - NextBus Inc. under contract to use this data for bus predictions
 - WMATA has moved to an open API <https://developer.wmata.com/>
- DC Circulator uses Nextbus API. Other apps available from DDOT <http://www.godcgo.com/home/tools-for-getting-around/transit-apps.aspx>
- Montgomery County Ride-On – Ride-On Real Time (own API), GTFS-RT
- Arlington ART – Data available in multiple formats (Mobility Lab); contractor Connexionz also provides GTFS-RT
- Prince George's The Bus, Fairfax City CUE – Nextbus API
- Alexandria DASH – Real-time info provided to app developers
- Fairfax Connector, MTA Commuter Bus, PRTC – real-time info not yet available.

Considerations for Regional Coordination

- Institutional context considerations:
 - Multiple agencies -> multiple data sources
 - Different formats, different uses
 - Liability for data accuracy & integrity
 - Use of data for purposes other than the original intent
 - Relationships with third parties (i.e., NextBus, API developers)
 - Cost of providing information
- Critical questions:
 - What should be the regional standard?
 - Who would build and manage the infrastructure?
 - How would local agencies provide funding and technical support required for support of any regional directory/data hub?
 - What type of governance would be implemented?
 - Ensuring format, regional transit stop identification, periodic updates, etc.
 - Responding to public uses of data, which may alter or use information in unintended ways.

References / Resources

- David Alpert, Greater Greater Washington: Three part series: Jan 16, 18, & 23, 2013
 - <http://greatergreaterwashington.org/post/17386/whats-up-with-nextbus-part-1-the-disappearing-app/>
 - <http://greatergreaterwashington.org/post/17402/whats-up-with-nextbus-part-2-a-pile-of-apis/>
 - <http://greatergreaterwashington.org/post/17460/whats-up-with-nextbus-part-3-where-ride-on-is-the-leader/>
- Kurt Raschke, blogger
 - <http://www.kurtraschke.com/>
- WMATA PlanIt Metro
 - <http://planitmetro.com/2013/02/11/one-day-of-washington-region-transit/>
 - <http://planitmetro.com/2013/07/19/next-generation-communications/>