OneBusAway

Sharing real-time transit info via open-source software

Sean J. Barbeau, Ph.D.
Overview

• OneBusAway Tampa

• Challenges and Lessons Learned

• Future of OneBusAway
Providing real-time transit information to Tampa transit riders

ONEBUSAWAY TAMPA
Open-source software

• Expensive/proprietary solutions customized for each agency have dominated transit software

• Open-source solutions provide opportunity for **shared investment** into transit information services that **anyone** can use

• Open transit data powers these solutions
  – General Transit Feed Spec. (GTFS) is de facto standard
Research

• Investigate state-of-the-art in open-source transit software for real-time info
  – Sponsored by UTC National Center for Transit Research

• Partnership with Georgia Tech to study impact on riders (focus on ridership)
  – Dr. Kari Watkins and Candace Brakewood
    • See poster “An Experiment Evaluating the Impacts of Real-Time Transit Information on Bus Riders in Tampa, Florida”
OneBusAway

- **Open-source** real-time transit information system
- Originated at University of Washington in Puget Sound Area, WA
- Includes mobile apps
  - iPhone
  - Android
  - Windows Phone

Where is your bus?

Let's find out. We provide easy access to real-time transit information for the Puget Sound region and beyond.

**Our Goal**
What is OneBusAway? Find out.
We want to make it easier to use public transit by providing easy access to schedule and real-time arrival information for the buses and trains you ride every day.

We provide:
- Real-time arrival information for a number of transit agencies
- Arrival info for every bus stop
- Easy access to information across a variety of devices

Why? We're not just like you and we don't like waiting for the bus any more than we have to.

**Our Tools**
Our tools are available across a number of interfaces:
- Web
- Phone
- SMS
- iPhone
- Android
- WP7
- Mobile

OneBusAway Deployments

**Production:**
- Puget Sound Region, WA
- New York City, NY
- Tampa, FL (Q3 2013)
- Detroit, MI (SMS and API only)

**Tech Demo:**
- New Zealand
- Atlanta, GA

http://onebusaway.org
Setting up OneBusAway Tampa

1. Establish a GTFS-realtime feed
Setting up OneBusAway Tampa

2. Configure OneBusAway software
Where is your bus?
Let's find out. We provide easy access to real-time transit information for the Tampa Bay region and beyond.

Our Goal
We want to make it easier to use public transit by providing easy access to schedule and real-time arrival information for the buses you ride every day.

We provide:
- Real-time arrival information for Hillsborough Area Regional Transit (HART).
- Arrival info for every bus stop.
- Easy access to information across a variety of devices.

Why? We're riders just like you and we don't like waiting for the bus any more than we have to.

Tools
Our tools are available across a number of interfaces:
- Web
- Mobile
- Android

Research
OneBusAway was started by students at the University of Washington, and it has been deployed in Tampa by the University of South Florida in collaboration with Georgia Tech. Check out our research page for more information.

http://www.usf.edu/onebusaway
OneBusAway - Websites

http://www.usf.edu/onebusaway
OneBusAway – Desktop Website

OneBusAway

Where Is Your Bus?

Search for stops:

5

By address (ex. “3rd and pike”) or route number (ex. “44” or “71”).

Clear this search

5 - 40th Street
Operated by Hillsborough Area Regional Transit

Real-time arrival info
Complete timetable

Routes:
5
OneBusAway – Desktop Website

Alumni Dr @ Laurel Dr
Stop #3105 - W bound

<table>
<thead>
<tr>
<th>route</th>
<th>destination</th>
<th>minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>North to University Area TC</td>
<td>4</td>
</tr>
</tbody>
</table>

09:12 - on time

Last Update: 09:08 PM

Nearby stops:
- Alumni Dr @ Leroy Collins @ Eng Bld - SE bound

Stop details:
- See the full schedule for this stop (# 3105)
- Show arrival times
- See multiple stops or filter routes
- Search for another stop

Schedule and arrival data provided by Hillsborough Area Regional Transit
OBA - Smartphone Website

You can search for stops by number. Learn about how to find your stop number.

Search by stop number:

3105

Search By Stop Number

If your stop is missing its number or you are not at the stop, you can also search by bus route.

Search by route number:

Search By Route

Nearby stops:

Alumni Dr @ Leroy Collins @ Eng Bld
Stop #: 3109 - SE bound

Schedule and arrival data provided by Hillsborough Area Regional Transit
OneBusAway – Mobile Apps

Android

iPhone

Windows Phone

(Not used in Tampa study)

Support user location, route, stop contextual/personalized information

All OPEN-SOURCE!
OBA – Android app
The challenges we’ve faced and overcome

CHALLENGES AND LESSONS LEARNED
# Challenges – Technology / Process

<table>
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<tr>
<th>Challenge</th>
<th>Solution / Lesson Learned</th>
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| Old documentation for OneBusAway at the start of the project             | Create new documentation!  
*Painful at first, but helps others*                                         |
| Unknown accuracy of arrival times from vendor AVL                         | On-the-ground testing and validation necessary  
*After several iterations, got good results!*                                  |
| Race BRT Deployment in Tampa                                             | Move fast! Made it by 2 weeks (May 2013)  
*Coincidentally, BRT schedule was also adjusted.*                              |
| Determine how to quickly offer the apps to riders during the experiment   | Use existing apps on market, have user modify settings  
*Not user-friendly, but it works*                                              |
| Communication with various parties                                       | Get upper-management buy-in for Agency, have in-person meetings  
*Takes time, but reduces overall turnaround time for requests*                 |
| • Agency ITS staff                                                        |                                                                                           |
| • Agency IT staff                                                         |                                                                                           |
| • Agency Marketing staff                                                  |                                                                                           |
| • Vendor                                                                  |                                                                                           |
| • GA Tech for survey component                                           |                                                                                           |
## Challenges – Data

<table>
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</table>
| **GTFS** - arrival time for Stop A is after arrival time for Stop B during trip | Work with agency to resolve problem  
*Show the agency error in software, create documentation to explain the current data issues with examples* |
| **GTFS** - Seconds resolution (“HH:MM:SS”) for time not included | " |
| **GTFS** - Incorrect route URLs prevented app users from seeing schedules | " |
| **AVL** - tripIDs not matching GTFS tripIDs | Examine data dictionary for AVL system, talk directly to vendor  
*Conference call helped resolve issue* |
| **AVL** - Flipped +/- for delay value | Extensive troubleshooting and isolation of issue, talk directly to vendor  
*Finally resulted in on-site meeting, where we resolved the problem* |
| **AVL** – Agency database replication issues | " |
| **AVL** - Use “deviation” or “predicted_deviation” value? | On-the-ground testing and validation necessary  
*After several iterations, got good results!* |
Challenge – “Multi-Region” Apps

• Native mobile apps, without requiring extra user config, still work only in Puget Sound, WA
• We are currently working on a “multi-region” architecture to make them available to other OBA cities
• Will be first time a suite of real-time transit native mobile apps are available in more than one city
  – Android
  – iPhone
  – Windows Phone
• Tampa is 3rd full-scale deployment of OneBusAway
• GA Tech study underway, will wrap up in May
  – 200 control subjects, 200 using OneBusAway
  – Positive feedback already!
    • "This is my first day with the app and I have to tell you. It told me I had 3 min to catch my bus so I booked it to my stop. It was just on time. I want to thank you in advance for this opportunity. You already saved me a 1/2 hour today”
    - OneBusAway Tampa User
• OneBusAway gives all cities this opportunity!
The future of OneBusAway

WHAT’S NEXT?
Future roadmap for OneBusAway

• OneBusAway Board – official guiding body
  – Members from U. of Washington, Sound Transit, USF, and GA Tech

• Multi-region mobile apps
  – Seamless user experience for using OneBusAway in multiple cities
  – Less cost to agencies to reach all major mobile platforms!

• Additional OneBusAway deployments in progress
  – Atlanta, GA – GA Tech with MARTA

• Transition of OneBusAway Tampa to HART for production use

• More research!
The takeaways

CONCLUSIONS
Conclusions

• Open-source software can create a revolution in real-time transit services

• There are challenges in any real-world software deployment, but they can be overcome
  – Getting upper-management buy-in at Agency and talking directly to vendor are key
  – Be prepared for data issues!

• We will see a lot more of OneBusAway in the future!
Thanks!

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