

Becky Leslie (beleslie), Bryce Martz (bmartz), Daniel Houtsma (dhoutsma), David Li (lidav6), Nicolas Bissiri (nbissiri), and Dylan Whitlow (whitldy)

## Product Description

Anyone who consistently rides King County Metro buses has experienced delays in bus arrival times. An app called OneBusAway mitigates these problems for riders by using bus location data to estimate and report when buses will actually arrive at stops. Yet, when unusual circumstances arise, OneBusAway cannot always provide an accurate estimate of when a bus will arrive. For instance, if a tire on a bus is blown or if the trolley wheel of an electrically-powered bus comes off the overhead cable, OneBusAway may estimate the bus is ten minutes away based on location data and report that arrival time to users. However, given the situation, the bus will not actually move until the trolley wheel is reconnected to the cable or, in the case of the blown tire, the bus will likely not come at all. Without this information, OneBusAway users often become frustrated as they repeatedly check the app and see the bus will reportedly arrive in ten minutes when it actually will not come until much later.

To alleviate this problem, we are creating a mobile app called Where's My Bus? to help riders of King County Metro buses find information about why their buses may be stalled in unusual circumstances. Riders can use Where's My Bus? to communicate about their experiences on the bus. For example, someone riding a bus whose tire was blown could search for that bus on our app, click on that bus name, and post about the issue. Then, people waiting for that bus who have noticed an extended delay can check the same page to see if there are any potential problems with the bus and read about the blown tire. Alternatively, people waiting for a delayed bus can ask a question on Where's My Bus? and other users can respond with information. Moreover, transit services like King County Metro can use Where's My Bus? to submit any alerts about certain routes, like if any buses will be rerouted due to construction, sporting events, or other reasons. With this information from Where's My Bus?, riders can then determine if they should delay their plans or find an alternate means of transportation.

No alternatives really exist that allow riders to find information about problems with their buses in the way we plan to do. OneBusAway estimates when buses will arrive at stops based on their location data, and in general cases where the buses are running smoothly, the app does a great job of giving users an idea of when their bus will arrive. However, OneBusAway does not offer users any information about unusual situations with buses and often does not give accurate estimates about bus arrival times in these cases. King County Metro also has a website where they post alerts about bus routes and allow users to subscribe to email and text alerts. Since these alerts come straight from King County Metro, riders can be certain they are receiving accurate information about their buses. However, these alerts typically address only issues foreseen ahead of time, like bus reroutes due to construction on major streets. In addition, unless there is an emergency due to weather, the alerts, including those sent by email or text, are only issued Monday through Friday from 5 am to 8 pm, which does not give riders any information over the weekend or later on weeknights. Moreover, people receiving texts or emails do not necessarily want this information whenever King County Metro sends out an alert on a weekday, especially if they are not currently waiting for a bus. Furthermore, people who do not usually take a certain route cannot receive these alerts because they did not sign up for the service ahead of time. Finally, even though the aforementioned services do offer riders some information, they do not allow riders to communicate with each other, which may be the easiest way for people to learn

about problems if King County Metro cannot release an alert or statement immediately. Our app will allow riders to communicate with each other directly, look for information about their bus when they actually want it, and do all of this on an easy-to-use mobile app, a likely more suitable format for bus alerts since people generally want information about their buses as they're waiting outside for them.

We plan to implement several features for Where's My Bus? users. First and foremost, we want to provide forums for users to submit and view information about problems that affect specific bus routes or neighborhoods in King County through which buses travel. To do so, we will implement a search feature where users can look up a particular route or neighborhood by catalog or by a map view. For routes people use or neighborhoods they visit often, users can star their favorite routes and neighborhoods to access them more quickly instead of searching for them every time they want to find information. Then, when users view a forum containing alerts about a bus route or neighborhood, they can give an alert a positive rating if they found it helpful or a negative rating if they feel it was spam. In addition, when users view bus stops on a map, we will offer a feature where users can select a bus that will arrive at that stop and view its current location on a map. Finally, as a means of external documentation, we will implement a help button to provide assistance for people using our app.

To supplement our core functionality, we have additional stretch features we aspire to build before the completion of our project. For example, the vast majority of alerts King County Metro posts on their website or sends via email or text involve reroutes due to construction or major events. In case King County Metro does not want to submit alerts directly to our app, we would like to automate collecting these alerts and displaying them to users. In addition, when Metro notifies riders about reroutes, we would like to provide users with a map that shows where the bus will travel during a reroute. Finally, when a bus delay occurs, we would like to determine how to communicate with users which specific bus from a given route is having problems to give users more information about the source of any delays.

To enhance the performance and dependability of our app, we have set a number of non-functional requirements for our system. For example, when a user launches Where's My Bus?, the app should load in at most 5 seconds. After a user submits an alert, other users should be able to view that alert within a minute. Finally, if the app is in the background on a user's phone, the app should not collect data from the user.

In terms of external documentation for our app, we will implement the help button described above as our primary means of communicating how to understand and use Where's My Bus?. Formal documentation does not seem like a viable option for providing help with a mobile app; users are unlikely to want to read an extensive written manual to use a basic app. Instead, with our help button, users can view how to use the major features of our app and where to find the buttons for these features.