Transit Planner Smartphone Application (BlackBerry)

1   Introduction

Transit Planner enables you to help improving public transit system. Public transit such as buses and trains are vital lines of cities. They improve quality of travel, and reduce traffic and carbon footprint brought by personal cars. However, public transit systems in many cities are insufficient or inadequate to meet citizens' travel needs.

Transit Planner provides an easy way for citizens to help public transit. Transit Planner aggregates anonymous movement data from users to find out people's movement pattern in cities. We share the data with public transit agencies to help them locate bus stops, plan schedules, etc.

2   How Transit Planner Works?

Transit Planner first collects GPS and accelerometer data from users' Smartphones. We keep energy efficiency as our first level goal when designing the application. Therefore, this data collection is highly energy efficient and can keep running for hours. After collecting the data, Transit Planner performs advanced travel mode identification to detect users' current travel mode, such as walking, driving, and riding public transit.

Transit Planner then anonymizes and transmits users' movement pattern to our data center, where data aggregation and advanced data mining operations are performed against the data. In this data collection phase, we protect users' privacy in multiple levels. First, the application does not collect any information related to users' identity including phone number, phone hardware ID, network address, etc. Secondly, we aggregate traces from different users and securely delete original traces. As a result, no one can backtrack to a specific user based on the aggregated trace.

Finally, Transit Planner shares the data mining results with public transit agencies to help them optimize existing facility or add new resources if necessary.

3   Install

There are two ways to install Transit Planner to your phone—OTA install and standard install. To perform OTA(over the air) install, simply go to the url given to you in your phone browser or use any QR code scanner application to scan the QR code provided by us. You will be asked if you want to download and install Transit Planner application (as shown in Figure 1. Download Transit Planner Application). Select "Download" and proceed with the installation. In the end you might be asked to reboot the phone. Please select "ok" and reboot. After reboot, you can find the Transit Planner application under

"Download" directory. Please make sure to enable GPS sensor in Options->Advanced Optoins->GPS->GPS Servers (BlackBerry OS5) or Options->Devices->Location Service(BlackBerry OS6). Otherwise Transit Planner will not work.
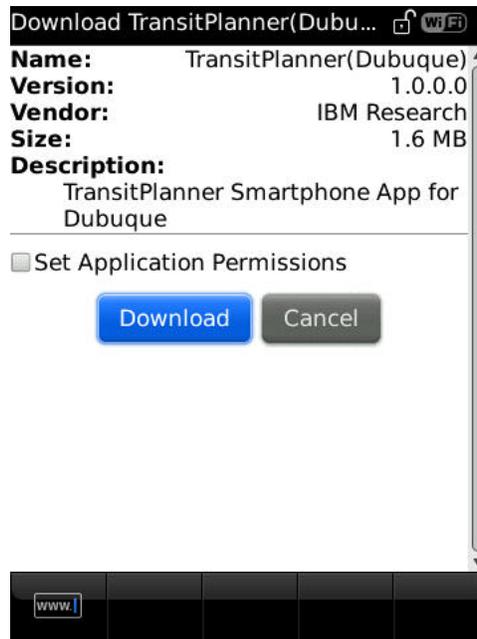

Figure 1. Download Transit Planner Application

To perform standard install, you will need BlackBerry Desktop software, which can be downloaded from www.blackberry.com. You need to first extract the installation zip file to a folder. Then you need to connect your phone to a computer through USB cable, and start BlackBerry Desktop on the computer. Next, go to "Application" page, and click "Import Files…", as shown in Figure 2. Standard Installation Step 1 Select the folder you extract the installation zip file, as shown in Figure 3. Standard Installation Step 2, and click "open". Finally, click "Apply" to install the application to your phone, as shown in Figure 4. Standard Installation Step 3
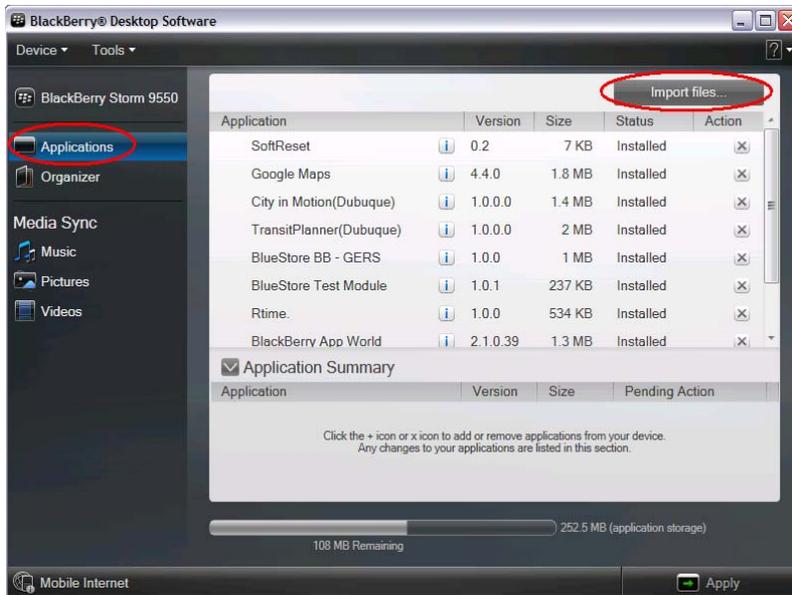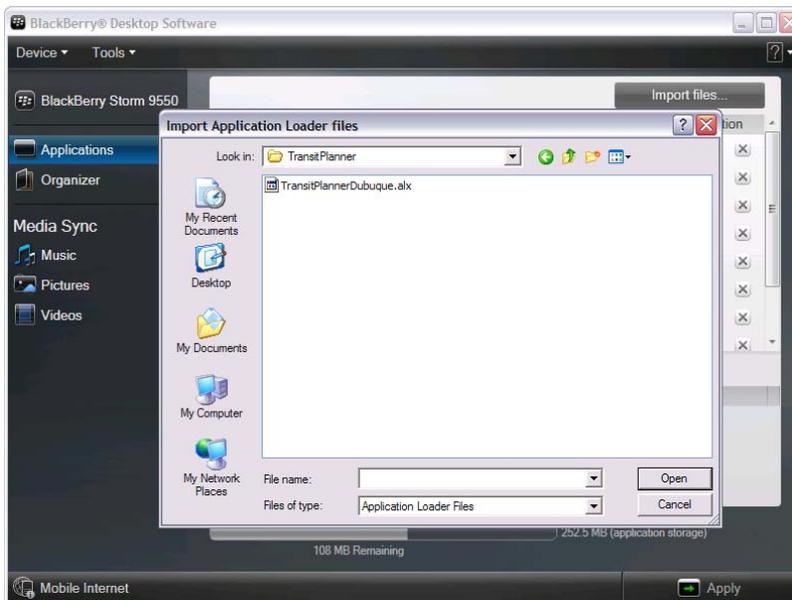
Figure 2. Standard Installation Step 1
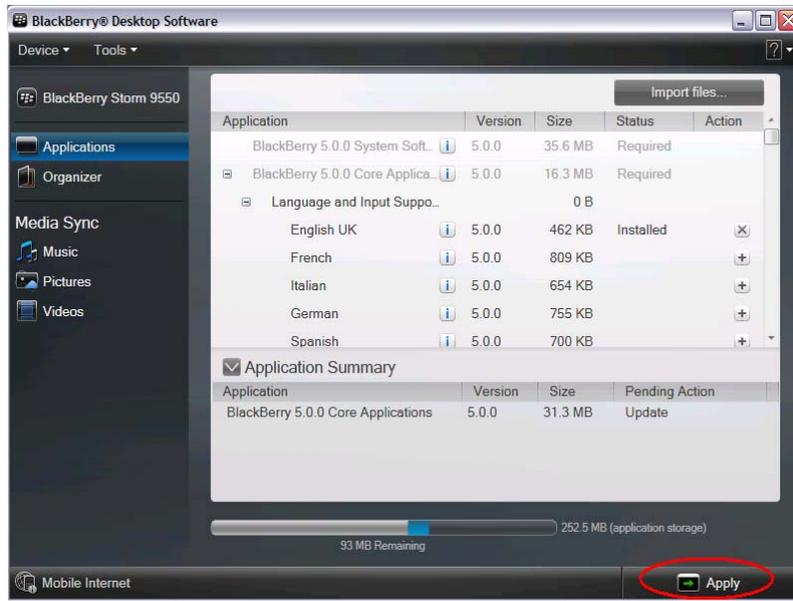

Figure 3. Standard Installation Step 2

Figure 4. Standard Installation Step 3

4 *Setup Application Permissions*

Before using Transit Planner, you need to set application permissions. Go to "Options", then "Applications" on your phone, and click on "Transit Planner(Dubuque)" in the list, then you will see a page as in Figure 5. Click "Edit Permissions", you will see a page as in Figure 6. Then click "Connections", you will see a page as in Figure 7. Then from the drop-down list next to "Location Data" select "Allow". Click the back button on your phone and save the configuration.
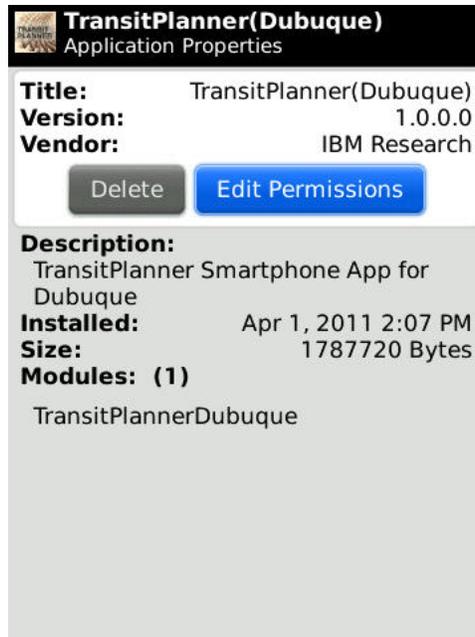
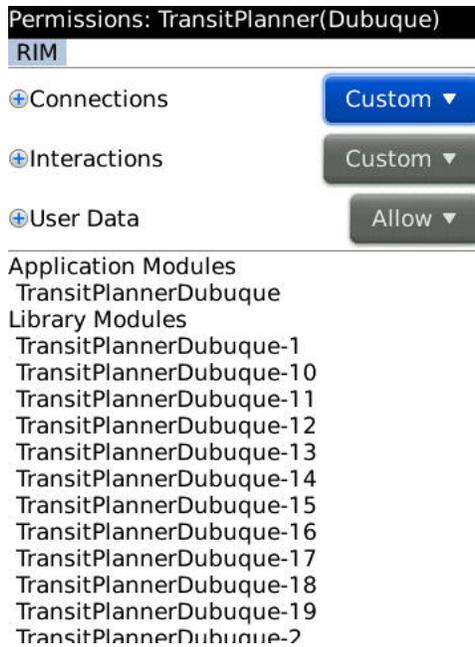**Figure 5. Setup Permission Step 1**

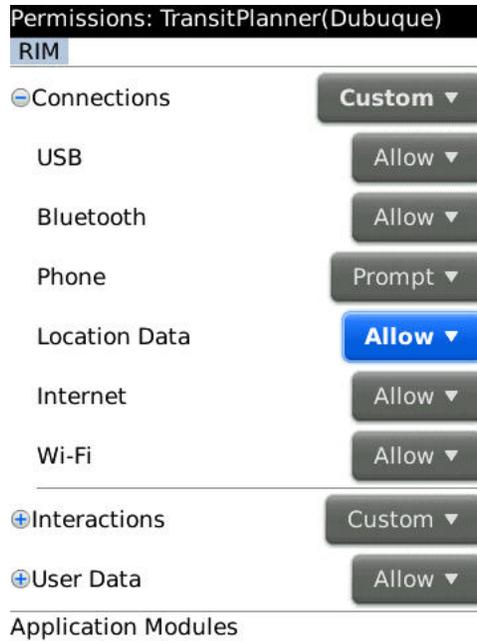**Figure 6. Setup Permission Step 2**

Figure 7. Setup Permission Step 3

5   Uninstall

To uninstall Transit Planner, simply go to "Options" on your phone. Select "Applications", then highlight the Transit Planner application. Click the menu button and select "Delete". You will be asked if you want to delete the application. Select "yes" and the application will be removed from your phone.

6   Running the Application

When TransitPlanner is running, an icon will appear on the top bar as shown in Figure 8. Top Bar Icon To switch TransitPlanner to foreground, simply click the TransitPlanner icon in the application list. To exit the application and stop data collection, click the menu button and select Exit item, as shown in Figure 9.

Figure 8. Top Bar Icon

Figure 9. Exit Menu

7   Views

The Transit Planner application consists of four views. We introduce the functions of
each view as follows.
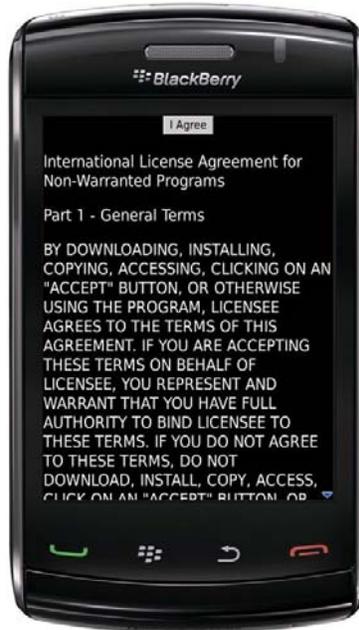
7.1 EULA view

Figure 10. EULA View

The EULA view shows the End User Agreement (as shown in Figure 10. EULA View). The users can accept the agreement by clicking "I Agree" button. Transit Planner WILL NOT collect any information until the user accepts the agreement. If a user does not accept the agreement, she/he can simply exit from the application. After clicking "I Agree", the application will start collecting data and the users will see the first view "Status View".

7.2   Info view

Figure 11. Info View

The Info view shows transportation related information. This is the first view users will see after the application starts. Users can also go to this view by clicking "Info" in the top navigation bar. The satellite icon on the top right corner shows GPS signal status. If GPS signal is not available due to blockage or configuration error, a red cross will show on top of the satellite icon. The application collects users' movement data and is designed to upload at most twice a day. It also uses free and energy efficient communication methods as much as possible, for instance Wi-Fi connection.
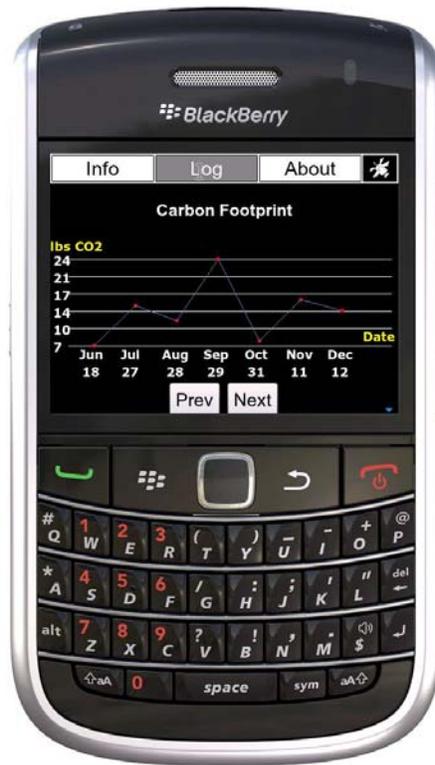
7.3   Log view

Figure 12. Log View

The Log view shows users' travel pattern. Users can go to this view by clicking "Log" in the top navigation bar. The graph shows the user's carbon footprint of last thirty days. The carbon footprint is calculated based on how long the user drove a car each day and considers average fuel efficiency of cars in the United States.

7.4   About view

Figure 13. About view

The About view shows introduction of the application and instruction on how to use it.