PHASE IV: DEVELOPMENT OF TRANSIT NETWORK TOOLS, STANDARDS, AND PROCESSES

Final Report

PROJECT GTFS

Oregon Department of Transportation

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by

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16. Abstract: The main objectives in phase IV of the project were to (1) continue to enhance the visualization and reporting features of the Transit Network Analysis (TNA) software tool, and (2) to ensure that the TNA software tool can be used, modified, and developed by others. To fulfill these objectives, several tasks aimed at incorporating new visualization and reporting features; documenting the server-side and client-side code; and automating the data import and management processes were completed. The contents of the final report have two main audiences. The first audience is the ODOT project sponsors with the objective of providing a comprehensive overview the TNA software tool architecture and the functional enhancements completed in phase IV. The second audience is the community of open source developers. For these developers, the goal of this report is to provide sufficient documentation so that when used in combination with documented source code, and available open source framework component documentation, the development of TNA software tool extensions is accessible.

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APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	millimeters squared	mm^2
ft^2	square feet	0.093	meters squared	m^2
yd^2	square yards	0.836	meters squared	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	kilometers squared	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	ml
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	meters cubed	m^3
yd^3	cubic yards	0.765	meters cubed	m^3
~NOTE: Volumes greater than 1000 L shall be shown in m^3.				
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg
		TEMPERATURE (exact)		
°F	Fahrenheit	(F-32)/1.8	Celsius	°C

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	millimeters squared	0.0016	square inches	in^2
m^2	meters squared	10.764	square feet	ft^2
m^2	meters squared	1.196	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	kilometers squared	0.386	square miles	mi^2
		VOLUME		
ml	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	meters cubed	35.315	cubic feet	ft^3
m^3	meters cubed	1.308	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams	1.102	short tons (2000 lb)	T
		TEMPERATURE (exact)		
°C	Celsius	1.8C+32	Fahrenheit	°F

*SI is the symbol for the International System of Measurement

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DISCLAIMER

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1.0 INTRODUCTION

This document constitutes the final report for the Oregon Department of Transportation (ODOT) research project titled "*Phase IV: Development of Transit Network tools, standards, processes*", which is a continuation of the ODOT research project "*An Open Source Tool for the Visualization, Analysis and Reporting of Regional and Statewide Transit Networks"* (1).

The main objectives in phase IV of the project were to (1) continue to enhance the visualization and reporting features of the Transit Network Analysis (TNA) software tool, and (2) to ensure that the TNA software tool can be used, modified, and developed by others. To fulfill these objectives, several tasks aimed at incorporating new visualization and reporting features; documenting the server-side and client-side code; and automating the data import and management processes were completed.

Several visual and tabular reports were added to the TNA software tool in this phase of the project, including:

- Key Transit Hubs,
- Connectivity Graph,
- Timing Connection,
- Data Dump,
- Flexible Reporting,
- Shapefile Generator,
- Administrative Interface,
- Heat Map, and
- Metric Definition.

In this report, the relational database model and the software tools (i.e., programming languages and libraries) that were utilized to implement the added functionality to the latest version of the TNA software tool are described.

1.1 REPORT AUDIENCE AND OBJECTIVES

This report in written for two main audiences. The first audience is the ODOT project sponsors with the objective of providing a comprehensive overview the TNA software tool architecture and the functional enhancements completed in phase IV. The second audience is the community

of open source developers. For these developers, the goal of this report is to provide sufficient documentation so that when used in combination with documented source code, and available open source framework component documentation, the development of TNA software tool extensions is accessible.

1.2 REPORT ORGANIZATION

The remainder of this report describes the development work conducted to produce the latest version of the TNA software tool. It is important to mention that most of the content included in this report is very similar to that of the report prepared for phase III of the project. The reason for this is that most of the software libraries used in the development of the TNA software tool have remained the same. In some cases, software libraries have been updated or have been enhanced by plug-ins to enable different (or more precise) functionality.

The remainder of this report is organized as follows. Chapter 2.0 describes the software architecture and the main components of the TNA software tool. Chapter 0 describes the database schema developed to organize the main data sources of the database management system deployed along with the GUI. In Chapter 4.0, the server-side main development tasks are discussed. Chapter 5.0 discusses the libraries and features utilized on the client-side to develop the GUI. Finally, Chapter 6.0 presents conclusions and recommendations for future work.

2.0 SOFTWARE ARCHITECTURE AND MAIN MODULES OF THE TNA SOFTWARE TOOL

In accordance with the Model-View-Controller (MVC) framework, the components of the TNA software tool are organized into three main groups: *Model*, *View*, and *Controller*. The MVC framework is the most commonly used design pattern when implementing user interfaces. In software architectures employed in web development, the "Model" group is typically composed of Java classes and other configuration files responsible for (1) manipulating and processing the data residing on the server, and (2) communicating with the relational database. The "View" group consists of all HTML, CSS, and JavaScript libraries used to present the graphical user interface (GUI) inside the user's web browser. Finally, the "Controller" group is composed of the Java servlets responsible for maintaining the communication between the web browsers (i.e., the "View" group) and the Java methods (i.e., the "Model" group).

Figure 2.1 depicts the architecture of the TNA software tool. Every time a user enters a URL in the browser or submits a form, an HTTP request is sent from the browser to the server. Once the HTTP request is received by the server, it is transferred to the corresponding Java servlet using a web container (e.g., Apache Tomcat 7). As a Java servlet receives the HTTP request, it extracts the input data and sends it to the appropriate Java methods. The Java methods query the necessary information from the database and send back the processed data to the Java servlet. The Java servlet then puts the processed data (or object) into an HTTP response and sends it back to the browser. Once the data contained in the HTTP response is received by the browser, JavaScript and HTML scripts are used to visualize the requested data.

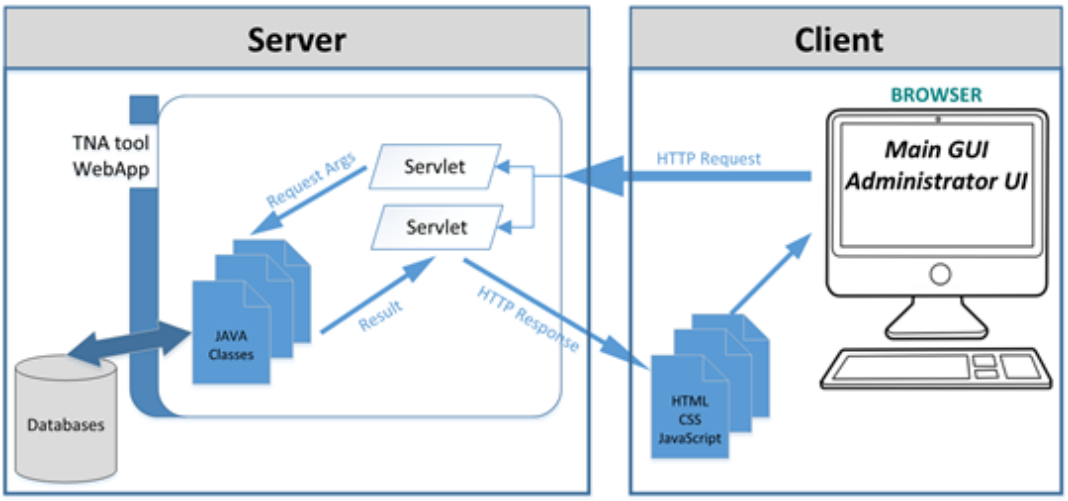


Figure 2.1: Main components of the TNA software tool

For simplicity, all the components responsible for processing the data on the server (i.e., Java servlets, Java methods, and other configuration files) are referred to as *Server Side* components

throughout this report. In contrast, the components responsible for visualizing the data on the web browser are referred to as the *Client Side* components.

3.0 DATABASE SYSTEM

One of the most important components of the software architecture of the TNA software tool is the underlying relational database system. The relational database system provides the means to store, organize, and query many different types of data necessary to produce the various visual and tabular reports available through the TNA software tool.

The specific relational database system utilized by the TNA software tool is PostgreSQL. PostgreSQL is a powerful, open source object-relational database system with a long standing and strong industry reputation for reliability, data integrity, and correctness. PostgreSQL runs on all major operating systems, including Linux, UNIX, and Windows. PostgreSQL is fully ACID[1] compliant, has full support for foreign keys, joins, views, triggers, and stored procedures in multiple languages (2). For the purposes of this project, the PostgreSQL relational database system is supplemented with PostGIS, which supports spatial data types (e.g., point, line, polyline, etc.) and spatial functions and queries.

Multiple data sources are used to populate the PostgreSQL relational databases within the TNA software tool. Figure 3.1 depicts these data sources along with the process of building an up-to-date PostgreSQL relational database. Figure 3.1: Data sources and the structure of the PostgreSQL relational databases supporting the TNA software tool

also illustrates the multi-database structure of the TNA software tool and how multiple data sources are put together to create a new database.

It should be noted that the TNA software tool can access multiple databases, each of which representing a specific snapshot of the many data sources it aggregates (i.e., GTFS feeds, census data, Park & Ride data, employment data, and Title VI data). The user has the freedom to choose a desired database and to generate reports from the data it contains.

[1] Atomicity, consistency, isolation, durability are a set of properties that guarantee that database transactions are processed reliably.

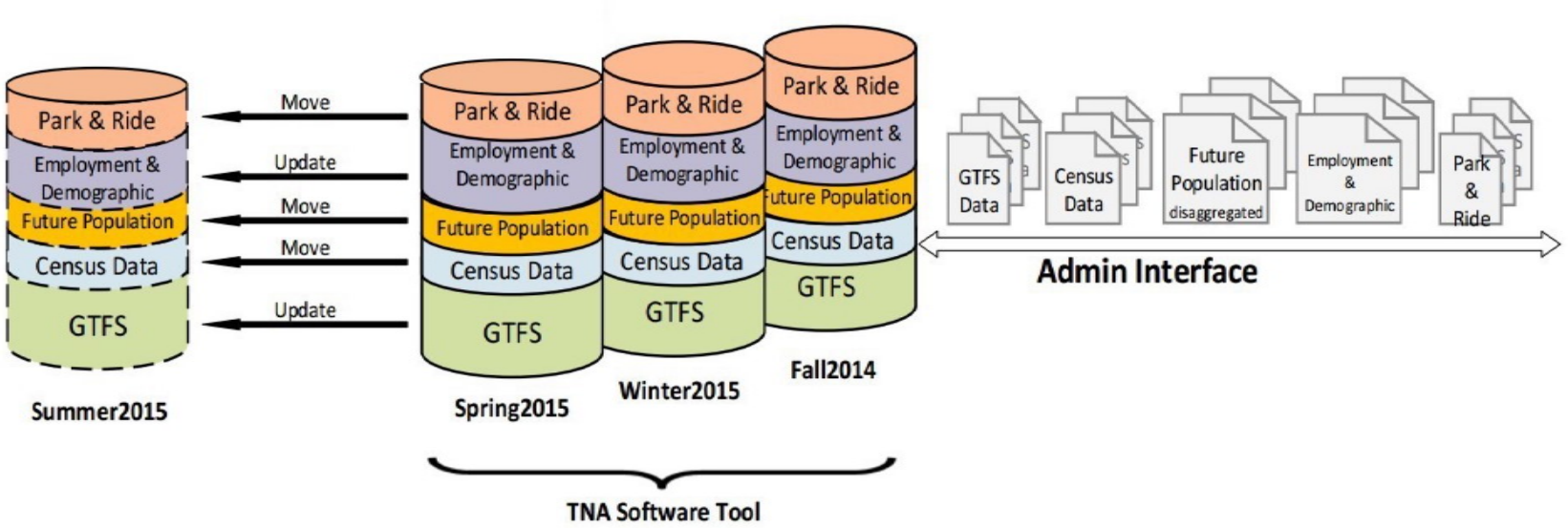


Figure 3.1: Data sources and the structure of the PostgreSQL relational databases supporting the TNA software tool

3.1 DATABASE SCHEMA

The Entity-Relationship (ER) diagram that represents the schema of the PostgreSQL relational database is depicted in Figure 3.2. The tables included in the schema can be classified into the following eight categories:

- **GTFS data tables.** These tables are created and populated by the module "onebusaway-gtfshibernate-cli".

- **GTFS data lookup tables.** These tables are created as a result of running PostgreSQL queries on GTFS data tables. This pre-processing is used to speed up more complex queries.

- **Census data tables.** These tables contain census data and are created by importing shapefiles into the PostgreSQL relational database using the shapefile import wizard.

- **Census data lookup tables.** These tables are created as a result of running PostgreSQL queries on census data tables. This pre-processing is used to speed up more complex queries.

- **Park and Ride table:** This table is created as a result of running PostgreSQL queries on Park & Ride data provided by the Oregon Department of Transportation.

- **Employment tables.** These tables are created and populated with data provided by the Longitudinal Employer-Household Dynamics (LEHD) program of the US Census Bureau using a PostgreSQL query. The tables are created to enable querying on current (as well as projected) employees living/working in census blocks.

- **Title VI table.** This table is created and populated as a result of running a PostgreSQL query. The table enables spatial queries on Title VI related data.

- **Database Information tables.** These tables are created as a result of running PostgresSQL queries. These tables store information about the database and the data sources it stores.

In the following sections, the tables in each of the above categories are further explored.

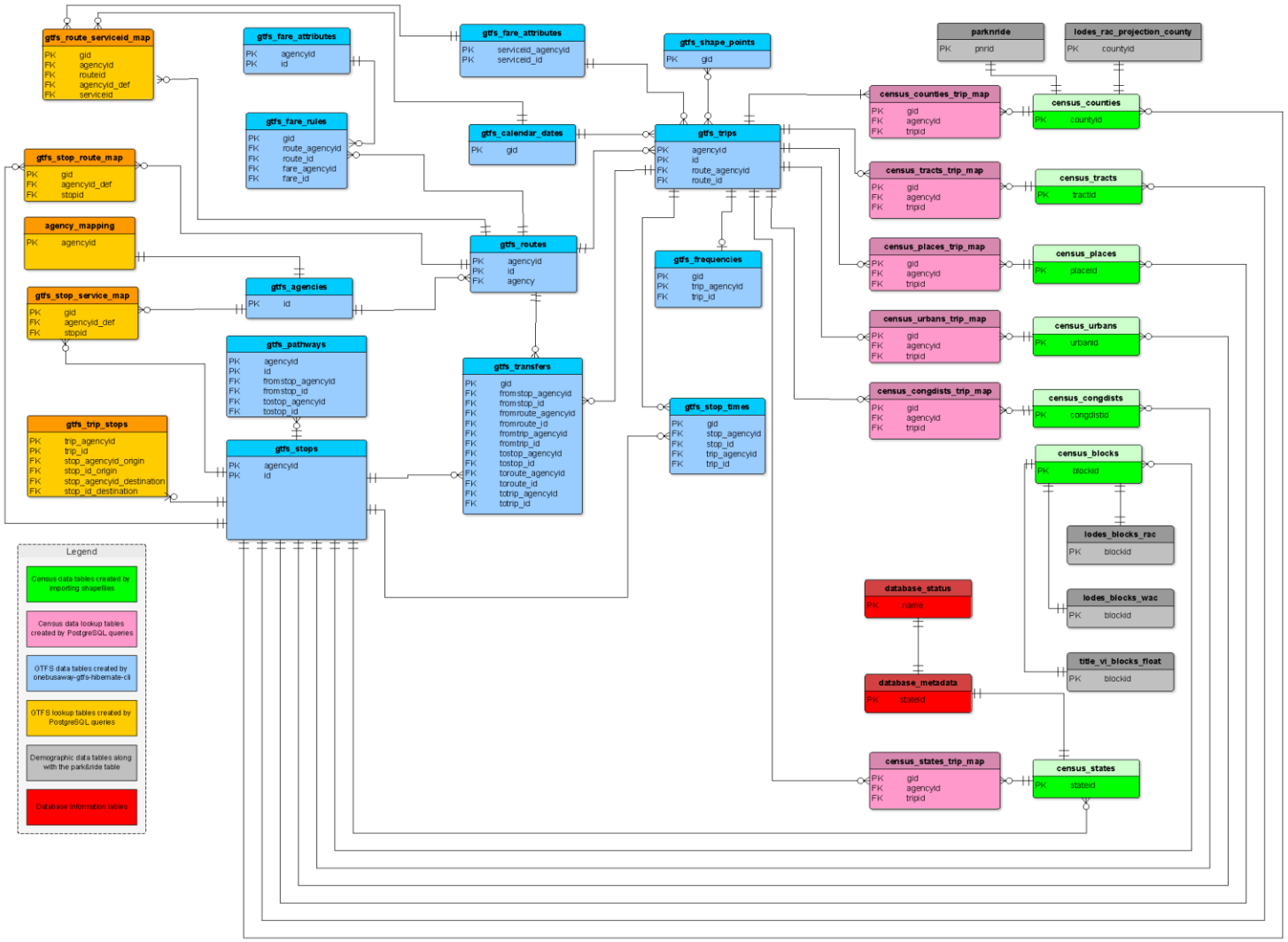


Figure 3.2: Entity-relationship (ER) diagram of the PostgreSQL relational database

3.1.1 GTFS data tables

The GTFS data tables have a one-to-one correspondence to the fields of the files used by the GTFS specification. The library `onebusaway-gtfs-hibernate-cli` creates these tables by reading the GTFS feeds and loading their data into the PostgreSQL relational database. The GTFS data tables can be identified in the ER diagram depicted in Figure 3.2 by the "gtfs_*" prefix in their names. More information on how GTFS data are organized into files can be found on Google's GTFS standard reference page (3). The main GTFS data tables are:

- **gtfs_agencies**. Contains transit agency names and other information such as phone number and time zone.
- **gtfs_stops**. Contains the list of stops served by all transit agencies in the PostgreSQL database.
- **gtfs_routes**. Contains the list of routes served by all transit agencies in the PostgreSQL relational database.
- **gtfs_stop_times**. Contains the list of stop times for all trips served by all transit agencies in the PostgreSQL relational database.
- **gtfs_trips**. Contains the list of all trips served by every route offered by all transit agencies in the PostgreSQL relational database.
- **gtfs_frequencies**. Provides frequency information for trips that do not have stop times in the gtfs_stop_times table. This is a more flexible scheduling alternative offered by the GTFS standard for trips that do not have exact stop times for each stop.
- **gtfs_transfers**. Provides transfer information between different route/trips served by every transit agency.
- **gtfs_fare_rules**. Contains a list of rules for computing fares for some trips served by some transit agencies.
- **gtfs_fare_attributes**. Contains a list of fare prices and some other information that can be used to compute the fare price for transit agencies.
- **gtfs_pathways**. Pathways is not part of the official GTFS standard. Pathways describe connectivity among different stops and stations (4).
- **gtfs_shape_points**. Provides a list of trip shape points for all trips served by all transit agencies.
- **gtfs_calendars**. Contains all the schedules used by transit agencies in the PostgreSQL database for scheduling their trips.

- **gtfs_calendar_dates**. Contains exceptions to service schedules in the gtfs_calendars table.

3.1.2 GTFS data lookup tables

The GTFS data lookup tables are created by running queries in the PostgreSQL relational database. The purpose of the GTFS data lookup tables is to speed up more complex GTFS data based queries. The "gtfs_*" prefix and "*_map" suffix in a table name indicate a GTFS data lookup table in the ER diagram depicted in Figure 3.2. The main GTFS data lookup tables are:

- **gtfs_stop_service_map**. Used to query stops for every transit agency or transit agencies that serve each stop.

- **gtfs_stop_route_map**. Used to query stops for every route or routes that serve each stop.

- **gtfs_route_serviceid_map**. Used to query service IDs used for a route or routes that use a specific service ID.

- **agency_mapping**. Used to query all the agency IDs *contained* within the service area of a particular transit agency. Transit agency "A" is *contained* within the service area of transit agency "B" if all the stops of transit agency "A" are located within the convex hull built by the stops of transit agency "B". This table also helps in distinguishing between "centralized" and "decentralized" transit agencies. A transit agency is considered "decentralized" if the average distance between pairwise stops exceeds 27.96 miles (approximately 45 kilometers).

3.1.3 Census data tables

Shapefiles for the State of Oregon, as well as its counties, congressional districts, census tracts, census places, urban areas, and census blocks were downloaded from the website of the US Census Bureau (5). The shapefile data are imported into the PostgreSQL relational database using the shapefile import wizard. This shapefile import wizard is simple to use and loads information from the shapefiles into the tables in the PostgreSQL relational database that have the same name as the input file.

The TNA software tool uses population data at the census block level to calculate population statistics around stops. The population data used by the TNA software tool corresponds to the 2010 census conducted by the US Census Bureau. The prefix "census_*" in a table name identifies the census data tables in the ER diagram depicted in Figure 3.2. The main census data tables are:

- **census_blocks**. Contains all census blocks with population greater than zero in the state of Oregon.

- **census_tracts**. Contains all census tracts within the state of Oregon.

- **census_counties**. Contains all counties within the state of Oregon, as well as ODOT transit regions.

- **census_places**. Contains all census places within the state of Oregon.

- **census_urbans**. Contains all urbanized area within the state of Oregon.

- **census_congdists**. Contains all congressional districts within the state of Oregon.

- **census_states**. This table enables existing queries to be filtered at the state level. This table was added to enable extending the TNA software tool to include other states. Currently, only the State of Oregon is listed in this table.

3.1.4 Census data lookup tables

The census data lookup tables are created by running queries in the PostgreSQL relational database to speed up more complex queries. The "census_*" prefix and the "*_map" suffix in a table name indicate a census data lookup table in the ER diagram depicted in Figure 3.2. The main census data lookup tables are:

- **census_tracts_trip_map**. Used to query all trip sections within a census tract or to query census tracts that contain a specific trip.

- **census_urbans_trip_map**. Used to query all trip sections within an urbanized area or to query urbanized areas that contain a specific trip.

- **census_counties_trip_map**. Used to query all trip sections within a county or to query counties that contain a specific trip.

- **census_places_trip_map**. Used to query all trip sections within a census place or to query the census place that contains a specific trip.

- **census_congdistis_trip_map**. Used to query all trip sections within a congressional district or to query congressional districts that contain a specific trip.

- **census_states_trip_map**. Used to query all trips within an entire state. Currently, the State of Oregon is the only state for which trips are mapped.

3.1.5 Park and ride table

The Park and Ride table is created by running a PostgreSQL query using data imported from a comma separated values (CSV) file provided by ODOT. Data in this table include the location information of the Park and Ride lots within the state of Oregon and their amenities. There is only one table specific to the Park and Ride data named **Parknride**.

3.1.6 Title VI data table

The Title VI data table includes data related to race, age, language, poverty level, and disability status of the population within the state of Oregon. Title VI data are available at the block group level via the American Community Survey database. Before storing Title VI data into the PostgreSQL relational database, they are disaggregated to the census block level based on the distribution of the population at the block group level (provided by the US Census Bureau and already available in the census_blocks table). The Title VI data at the census block level are then saved to a CSV format spreadsheet. The Title VI table is created manually and then imported from the CSV file by a query. There is only one table used to store the Title VI table named **title_vi_blocks_float**.

3.1.7 Employment tables

The source of the employment data used in the TNA software tool is the LEHD Origin-Destination Employment Statistics provided by US Census Bureau. For each table, the data are put into a CSV file. Tables are created manually and the data are imported from the CSV file by a query. The following tables contain data needed to generate the employment reports:

- **lodes_blocks_rac:** Contains "Residence Area Characteristics Data" used to query on the employees who live in census blocks within the state of Oregon.

- **lodes_blocks_wac:** Contains "Workplace Area Characteristics Data" used to query on the employees who work in census blocks within the state of Oregon.

- **lodes_rac_projection_county:** Used as a basis for projecting the number of employees living in census blocks within the state of Oregon. The data are available at the county level for different years. The disaggregation of the data is performed simultaneously, by running a query as the user requests a report on projected employment.

- **lodes_rac_projection_block:** This table stores employment projection data available in "lodes_rac_projection_county" that are disaggregated to the census block level.

3.1.8 Database Information tables

The database information tables provide information about the different data sources that are used to create each database and also to report on their status. The database information tables are populated via the Administrative Interface (see section 3.2).

- **database_metadata:** This table contains information about the different data sources used to create a database.

- **database_status:** This table keeps track of the different processes involved in the creation of a database and the status of different tables that form a database.

3.2 ACQUIRING/UPDATING DATA

The TNA software tool is capable of switching between different PostgreSQL relational databases. As depicted in Figure 3.1: Data sources and the structure of the PostgreSQL relational databases supporting the TNA software tool

, all the PostgreSQL databases share a common schema. In this phase of the project, a separate feature of the TNA software tool called the "Administrative Interface" was developed to facilitate the processes of creating, modifying, and populating the databases used by the TNA software tool. Several data sources can be imported using the "Administrative Interface" including:

1. GTFS feeds.
2. Census data.
3. Title VI data.
4. Employment data.
5. Park & Ride data.
6. State regions.
7. Future Population Projections.
8. Future Employment Projections.

The process of acquiring and importing data into a new database via the "Administrative Interface" is thoroughly explained in a separate document.

4.0 SERVER SIDE MAIN DEVELOPMENT TASKS

One of the main advantages of a client-server architecture is that any resource intensive operations can be performed on the server side, enabling the best possible user experience on the client side. The TNA software tool takes maximum advantage of this benefit.

The data retrieved via queries from the PostgreSQL relational database can either be displayed directly onto the GUI of the TNA software tool or used to produce one of the many available tabular reports. These PostgreSQL queries are designed to minimize data processing on the client side.

In this section, the software tools and libraries used to add functionality to the TNA software tool are introduced. Eclipse was chosen as the integrated development environment (IDE) for developing the TNA software tool. Eclipse is a free and open source IDE which can be used to develop applications in the Java programming language, as well as other programming languages such as C, C++, JavaScript, Python, and CSS, to name a few (6). Additional plug-ins such as EGit, m2eclipse, and WTP, were installed in Eclipse to enable all the required functionality to develop the TNA software tool.

Numerous Java methods and classes were implemented to carry out data retrieval procedures from the PostgreSQL relational database, and processing of the data to create the visual or tabular reports requested by the user. A description of these methods are included in the code available on the GitHub repository (7).

The additional libraries used in the development of the server side modules are listed in Table 4.1.

Table 4.1: Server Side Major Libraries of the TNA Software Tool

Library Name	Library Description	Reference
`Hibernate ORM`	Hibernate is an open source object-relational mapping library for Java.	(8)
`Hibernate Spatial`	Hibernate spatial is an open source object-relational mapping library with support for spatial databases.	(9)
`onebusaway-gtfs`	An open source library in Java with classes for GTFS entities.	(10)
`onebusaway-gtfs-hibernate`	An open source library in Java that uses hibernate to query GTFS data from relational databases.	(11)
`onebusaway-gtfs-hibernate-cli`	An open source library that uses hibernate for reading and loading GTFS data into relational databases.	(12)
`GeoTools`	An open source Java library that provides tools for processing geospatial data.	(13)
`JDBC – Java Database Connection`	Provides the API for accessing and processing data stored in a data source (usually a relational database) using the Java™ programming language.	(14)

4.1 LOADING DATA INTO THE POSTGRESQL RELATIONAL DATABASE

As mentioned in section 3.2, the Administrative Interface of the TNA software tool can be used to create a new database to represent the most current status of the transit system. The data provided by the user via the Administrative Interface is then used to create an empty database in the database management system (i.e., PostgreSQL). GTFS data, as well as all the data sources mentioned in section 3.2, can be loaded into the PostgreSQL database of the TNA software tool by means of the Administrative Interface. The open source library `onebusaway-gtfs-hibernate-cli` is used to import GTFS feeds into the database. The `onebusaway-gtfs-hibernate-cli` library is developed in Java and uses the library `Hibernate ORM` (8) to interface with various relational databases including MySQL, SQL Server, and PostgreSQL. More information about the `onebusaway-gtfs-hibernate-cli` library can be found on the OneBusAway developers' website (12).

All the other data sources are uploaded to the server in a specific order in CSV format and populated into previously created PostgreSQL tables. The required format of each data file is specified in the Administrative Interface. Once all the required data are imported into the TNA software tool, a set of update queries are executed to create and populate all other tables (e.g., census mapping tables, lookup tables, etc.) Once all the update queries are executed successfully, the files containing information on available databases in the TNA software tool are updated with connection information to the newly created database.

4.2 WEB APPLICATION FOR THE TNA SOFTWARE TOOL

A web application (WebApp) was developed for the TNA software tool using components referred to as Java servlet, Jackson, and Jersey. The Java servlet is a Java program that allows the TNA software tool to process requests received from the client application and generate responses. Jackson is a high performance open source JavaScript Object Notation (JSON) processor which is used on the WebApp to create JSON objects. Jersey is an open source framework for developing RESTful web services in Java.

The WebApp includes modules for adding/updating GTFS data in the PostgreSQL database (`com.webapp.modifiers`); methods for generating responses to the queries from the GUI; and a servlet that loads the main-map-interface of the tool and the wiki servlet (`com.webapp.api`).

All the other classes used for retrieving and manipulating data are located in the `com.model` package.

4.3 QUERYING AND PROCESSING SPATIAL DATA

The WebApp of the TNA software tool must query spatial data (e.g., a list of census tracts) and issue spatial queries (e.g., identify census block internal points within a user defined shape). The main driver used for making a connection to the PostgreSQL relational database and querying spatial data is the Java Database Connection (JDBC) driver (14). Additionally, in order to make the process of connecting and querying the PostgreSQL relational database easier for executing simple queries, the library `library-hibernate-spatial` was utilized in multiple methods.

The library `library-hibernate-spatial` uses `Hibernate Spatial` and `Hibernate` to connect to the PostgreSQL relational database and relies on `GeoTools` to manipulate geographic data, including the creation of geographies such as point and polyline as well as performing projections. The library `library-hibernate-spatial` consists of several packages. The `com.library.model` package uses Plain Old Java Objects (POJO) to map to corresponding data tables in the PostgreSQL relational database. The `com.library.util` package has a class for managing connections to the PostgreSQL relational database, and the `com.library.samples` package has an `EventManager` class that queries spatial data from the PostgreSQL relational database.

As explained in the documentation for `Hibernate Spatial` and `Hibernate` (8), (9), an XML mapping file is used to map POJOs to the data tables in the PostgreSQL relational database. The XML mapping file is available via the following file.

```
library-hibernate-spatial/src/main/resources/mapping.hbm.xml
```

The line shown above indicates the location of the file within the source code of the project. Given this address, a developer can find the file regardless of how their system is configured. All queries used to retrieve spatial data from the PostgreSQL relational database through hibernate are also stored in the same file.

All the information regarding these configurations databases is kept in a file called “dbInfo.csv”:

```
src/main/resources/admin/resources/dbInfo.csv
```

4.4 ONEBUSAWAY-GTFS-HIBERNATE LIBRARY

The WebApp of the TNA software tool uses the `onebusaway-gtfs-hibernate` library to query GTFS data from the PostgreSQL relational database. The library `onebusaway-gtfs-hibernate` includes a few standard queries that are used by the OneBusAway project for trip planning.

However, the TNA software tool requires many more queries to retrieve complex data to generate reports and on map visualizations. Therefore, the POJOs in the library `onebusaway-gtfs` had to be modified to accommodate new attributes. Also, the `Hibernate` object mapping file was updated to match the changes made in the database schema of the PostgreSQL relational database and the POJOs. The XML mapping file is stored in:

```
src/main/resources/com/model/database/connections/spatial/mapping
   /GtfsMapping.hibernate.xml
```

The queries are stored in a separate XML file:

```
src/main/resources/com/model/database/connections/spatial/mapping
   HibernateGtfsRelationalDaoImpl.hibernate.xml
```

4.5 MULTI-DATABASE FEATURE

One salient feature of the TNA software tool is the ability to access and compare GTFS data and census data from different time periods (e.g., first quarter versus last quarter of a given year). To enable this functionality, several instances of the PostgreSQL relational database can now be stored on the server and accessed by the TNA software tool. The different instances of the PostgreSQL relational databases must be created manually by an administrator on a specific schedule (e.g., monthly, quarterly, or yearly).

An instance of the PostgreSQL relational database available through the TNA software tool may contain customized GTFS and shape data. However, each individual instance of the PostgreSQL relational database must store a complete set of census data available through the US Census Bureau (e.g., 2010 census data are currently used by the TNA software tool). This is important to note because there are data tables in the PostgreSQL relational database that are created based on both transit (i.e., GTFS and shape data) and census data that have relationships with both transit and census data tables. In addition, for every newly created database, a copy of all the tables other than GTFS and census tables (i.e., employment, Title VI, Park & Ride and Playground tables) have to be copied to support the functionality of all the features/reports of the TNA software tool.

The TNA software tool has three libraries that access the PostgreSQL relational database (i.e., `JDBC, onebusaway-gtfs-hibernate`, and `library-hibernate-spatial`). The library `onebusaway-gtfs-hibernate` accesses GTFS data using `Hibernate`, which uses an XML configuration file that contains the URL, username, password, and type of each instance of the PostgreSQL relational database. An individual XML configuration file is needed for each

individual instance of the PostgreSQL relational database. The `Hibernate` configuration files for the library `onebusaway-gtfs-hibernate` are located at:

```
src/main/resources/com/model/database/connections/transit/
```

The XML configuration files for the library `library-hibernate-spatial` are located at:

```
src/main/resources/com/model/database/connections/spatial/
```

The WebApp uses the information stored in a Java object to find the location and the quantity of the `Hibernate` configuration files, as well as the name of each instance of the PostgreSQL relational database that will be displayed on the GUI of the TNA software tool. The Java object that contains all the information described above is located at:

```
com/model/database/Databases.java
```

4.6 METHODS FOR ON-MAP REPORTING

The TNA software tool generates a variety of visual reports directly on the GUI. These GUI-based reports are referred to as *on-map* reports. On-map reports can be generated for a specific geographical area defined by a geometric shape drawn by the user (e.g., circle, rectangle, or polygon), or by clicking on single stops cluster icons (i.e., stops clusters that represent a single stop) on the main map interface of the TNA software tool. On-map reports are based on transit data (e.g., stops, routes, schedules, etc.) and on geospatial data (e.g., census tracts, census block internal points, etc.)

A method was developed in the WebApp to invoke other methods in the libraries `onebusaway-gtfs-hibernate`, `library-hibernate-spatial` and `JDBC` modules to acquire the GTFS, Census and Park & Ride data required for generating on-map reports. The results are then presented as JSON objects and sent to the GUI of the TNA software tool for display.

4.7 CODE DOCUMENTATION

Per the requirements of task 6 of the work plan, a high-level documentation (in the form of comments added to the code) was completed for all the methods implemented to retrieve and process data from the PostgreSQL relational database. The red rectangle in Figure 4.1 depicts an example of how the code was documented. In this example, the documentation consists of a brief explanation of the purpose of the method, followed by the parameters passed to the method and the variable returned by the method (if any).

```
/**
 * Queries Route miles for a geographic area
 * @param type -  area type
 * @param areaId - area ID
 * @param username - user session
 * @param dbindex - database index
 * @return routeMiles (float)
 */
public static float RouteMiles(int type, String areaId, String username, int dbindex)
{
  Connection connection = makeConnection(dbindex);
  Statement stmt = null;
  float RouteMiles = 0;
  String query = "with aids as (select distinct agency_id as aid from gtfs_selected_feeds where username='"+username+"'), "
        + "trips as (select agencyid, routeid, round(max(length)::numeric,2) as length "
        + "     from "+Types.getTripMapTableName(type)+" map inner join aids on map.agencyid_def=aids.aid "
        + "     where "+Types.getIdColumnName(type)+" ='"+areaId +"' "
        + "     group by agencyid, routeid) "
        + "select sum(length) as routemiles from trips;";
  try {
    stmt = connection.createStatement();
    ResultSet rs = stmt.executeQuery(query);
    while ( rs.next() ) {
        RouteMiles = rs.getFloat("routemiles");
    }
    rs.close();
    stmt.close();
  } catch ( Exception e ) {
      e.printStackTrace();
  }
  dropConnection(connection);
  return RouteMiles;
}
```

Figure 4.1: Server side code documentation

5.0 CLIENT-SIDE DEVELOPMENT TASKS

The client side functionality of the TNA software tool was implemented using hypertext markup language (HTML) (15). Cascading Style Sheets (CSS) (16) was the tool used for styling the web pages and JavaScript (17) was the main scripting language used in the GUI. Table 5.1 provides a brief description of the additional JavaScript plug-ins and libraries that were used to add functionality to the client side of the TNA software tool.

Table 5.1: Client Side Libraries of the TNA Software Tool

Name	Description	Reference
jQuery	jQuery is a feature rich JavaScript library that is compatible with most web browsers.	(18)
jQuery UI	jQuery UI is a plug-in for jQurey that provides some effects, widgets and interactions for jQuery.	(19)
jQuery UI DataTables	A JavaScript library used for displaying reports in tables with features like searching, sorting, and exporting.	(20)
jQuery UI dialogextend	An open source JavaScript library that extends features of the standard jQuery UI dialog box.	(21)
Bootstrap Dropdown	An open source JavaScript library for generating dropdown menus.	(22)
Jstree	An open source free JavaScript plug-in that provides a tree menu structure.	(23)
Leaflet	Leaflet is a versatile and widely used JavaScript library, which is open source and free. It is used for building interactive maps.	(24)
Leaflet markercluster	Leaflet markercluster is a JavaScript library that provides clustering capability for leaflet markers. Markercluster can display up to 50,000 markers on map efficiently.	(25)
Leaflet.encoded	An open source leaflet library used to decode the encoded polyline into an array of L.LatLng objects that can be displayed on a map.	(26)
Leaflet MiniMap	An open source leaflet library that adds mini map feature to LeafLet maps.	(27)
Google Maps API	A free library that allows using Google maps features such as map tiles and street view.	(28)
OpenStreetMap API	A free library for using OpenStreetMap features like location search.	(29)
jQuery Datepicker	A javascript library for selecting multiple dates as input.	(30)
Slidebars	A jQuery plugin for implementing app style off-canvas menus and sidebars into website.	(31)
jQuery File Upload	File Upload widget with multiple file selection, drag&drop support, progress bars, validation.	(32)
tile.stamen.js	Stamen is a free map-display JavaScript library for displaying OpenStreeMap data.	(33)
leaflet.polylineDecorator.js	A plug-in for the JS map library Leaflet, allowing to define patterns (like dashes, arrows, icons, etc.) on polylines.	(34)

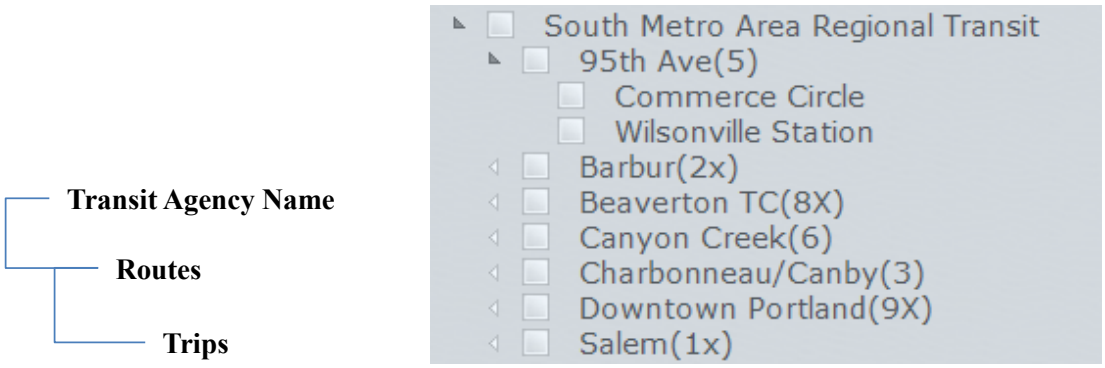
Individual components of the TNA software tool may require a different set of inputs, or different interactions with the user via the GUI to display results. Based on these requirement, each component of the TNA software tool was implemented using corresponding JavaScript libraries. Table 5.2 shows a mapping of which JavaScript libraries are used to implement the different components or functionality of the TNA software tool.

Table 5.2: JavaScript Libraries used in Different Components of the TNA Software Tool

Name	Main Interface (On-map reports)	Tabular Reports	Tabular Reports (Employment & Title VI reports)	Admin Interface
`jQuery`	✓	✓	✓	✓
`jQuery UI`	✓	✓	✓	✓
`jQuery UI DataTables`	✓	✓	✓	
`jQuery UI dialogextend`	✓			
`Bootstrap Dropdown`	✓			
`Jstree`	✓		✓	
`Leaflet`	✓			
`Leaflet markercluster`	✓			
`Leaflet.encoded`	✓			
`Leaflet MiniMap`	✓			
`Google Maps API`	✓			
`OpenStreetMap API`	✓			
`jQuery Datepicker`	✓	✓	✓	
`Slidebars`			✓	
`jQuery File Upload`				✓
`tile.stamen.js`	✓			

5.1 THE OREGON TRANSIT AGENCIES FLOATING DIALOG BOX

Figure 5.1 depicts the Oregon Transit Agencies (OTAs) floating dialog box, which is used in the TNA software tool to store a transit agency tree-like menu. The OTAs floating dialog box is implemented using the libraries `jQuery UI` and `jQuery UI dialogextend`. The OTAs floating dialog box is transparent to allow tracking of changes that take place on the main map interface when the contents of the OTA floating dialog box are clicked. The OTAs floating dialog box can also be moved, resized, minimized, collapsed, and maximized.



(a) Pane Tree Structure (b) South Metro Area Regional Transit Agency Example

Figure 5.1: The hierarchical structure of the extended OTAs floating dialog box

Inside the OTAs floating dialog box, a tree-like menu is implemented to view and select one or multiple transit agencies for visualization. The transit agency tree-like menu has three levels:

- **Level 1**. Lists all transit agencies in the state of Oregon in alphabetical order. Clicking an item at this level unchecks all of its child nodes (if checked) and displays the stops that belong to the selected transit agency on the main map interface. Right clicking on a transit agency name opens a menu that allows displaying/hiding all trip shapes served by the transit agency.

- **Level 2.** Lists all the routes that belong to the selected transit agency (parent node). Selecting any nodes at this level unchecks its parent node (if checked) and displays the stops that are served by the selected route. Right clicking on a route name opens a menu that allows displaying/hiding all trip shapes served by the route.

- **Level 3.** Lists all trips with unique shapes for the route (expanded parent node). Checking a node at this level, displays the trip shape on map.

The open source JavaScript plug-in `jstree` is used to implement the tree-like menu used in the OTAs floating dialog box. The `jstree` plug-in is customized so that any of the nodes in the tree-like menu can be selected by selecting one of the available checkboxes. Selecting a checkbox in the tree-like menu triggers an event based on the type of node selected (i.e., either a transit agency, a route, or a trip). A JSON object is created on the server side application (see section 4.2) to populate the tree-like menu. Therefore, no extra manipulation is required for data conversion, which ensures a swift experience on the client side of the TNA software tool. The tree-like menu is loaded once the client side main page is called and it is used as long as the page remains open.

Right clicking on objects in levels 1 and 2 of the tree-like menu allows the display of all trip shapes on the main map interface. However, only the shape of the longest trip is displayed on the main map interface. In addition, right clicking on level 1 of the tree, provides access to the *On-Map Connected Agencies Report*, which is implemented using `jQuery UI`, `jQuery UI dialogextend` and `leaflet`. The *On-Map Connected Agencies Report* displays the transit agencies that are connected to the transit agency from which the user generated the report, and

gives the option to visually track the connections by selecting agencies listed in the OTAs floating dialog box.

5.2 LOCATION SEARCH BOX

The location search box enables searching of specific locations based on their names (e.g., cities, street addresses, places and businesses, etc.) The location search box is implemented using the free and open source OpenStreetMap (OSM) API.

5.3 MAP TILES

The OSM layer and the Toner layer by Stamen Design (33) were available in the earlier version of the TNA software tool. The toner map tiles provide improved visualization and printing of a transit agency characteristics (i.e., stops and routes). Additionally, the Google Aerial photography map tiles replaced the OSM Aerial map tiles used in the former version of the TNA software tool to provide higher quality imagery using the Google API.

5.4 DISPLAYING STOPS AND ROUTE SHAPES

Methods were developed on the server to provide stops and trip shapes to the client side of the TNA software tool. The JavaScript library `Leaflet` was used to implement all the visualization capabilities of the TNA software tool.

When displaying stops, the list of stop names and coordinates are provided. The trip shapes are received in encoded polyline form from the server and, therefore, need to be decoded into coordinates in order to be displayed on the main map interface using Leaflet. `Leaflet.encoded` is a plug-in for leaflet that adds the capability to encode and decode polylines to `Leaflet`.

5.5 CLUSTERING STOPS

The TNA software tool displays stops as clusters that change in size as the level of zooming is changed. The software component used to implement this functionality is the plug-in library `Leaflet markercluster`.

As the mouse is hovered over stops clusters that represent more than two stops, a convex polygon (convex hull) shows the area covered by the transit stops present in the cluster. In the new version of the TNA software tool, a stops cluster becomes transparent when the polygon is displayed to provide more contrast and better visibility.

5.6 REPORTS

The latest version of the TNA software tool has an improved reports interface with many new reports added. Reports are displayed in a tabular format with various features. The library `jQuery UI DataTables` is used to display report content. This library allows reports to be sorted, searched, and presented in several pages to improve usability. The library `jQuery UI DataTables` also supports exporting reports in CSV format. Also the `jQuery Datepicker` library is used to enable date selection by the user.

Several reports in the latest version of the TNA software tool include a full calendar and a date picker tool. With the full calendar and date picker, a report can be generated for a specific date or a selection of dates. Also, the reports generated are more accurate because the exceptions in service are also taken into account. For an extensive definition of the metrics used in tabular reports, refer to Appendix A.

The **Reports** button, located on the far right of the OTAs floating dialog box (see Figure 5.2), opens a menu that shows a list of all available reports in the TNA software tool.

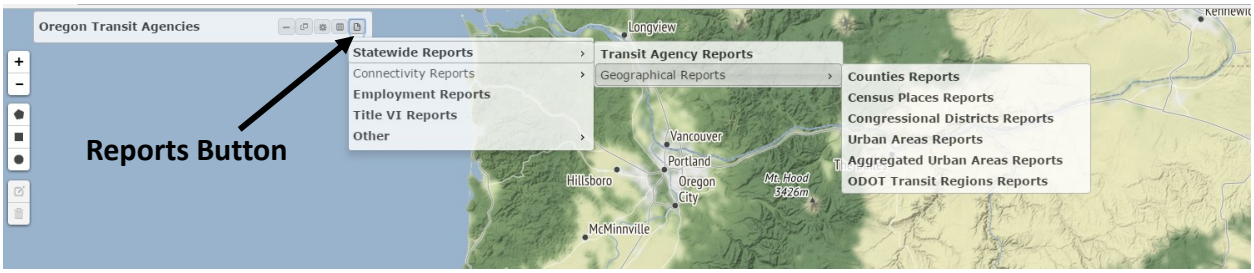


Figure 5.2: Reports interface of the TNA software tool

For example, the option *Transit Agency Reports* provides access to the “Transit Agency Summary” report, which contains general information on all transit agencies in the state of Oregon, as well as access to the "Routes" report, “Schedule” report, "Stops" report, and "Transit Agency Extended" report. Other report options include the *Counties Reports*, *Census Places Reports*, *Congressional Districts Reports*, *Urban Areas Reports*, *Aggregated Urban Areas Reports*, and *ODOT Transit Regions Reports*. Clicking on any of the mentioned report categories opens summary level reports which presents a list of the selected geographic areas in the state of Oregon. Clicking on the Geo ID of the geographic areas in the list will open the extended reports for the selected area to provide more in depth metrics.

5.7 DISPLAYING GEOGRAPHICAL SHAPES ON THE MAIN MAP INTERFACE

The TNA software tool can display the shapes of all Oregon counties, ODOT transit regions, urbanized areas (i.e., urban areas with population over 50,000), and congressional districts as a map layer. The corresponding shapes were obtained from the US Census Bureau (5) in *.shp* format (i.e., the native format provided by the US Census Bureau) and imported into the PostgreSQL relational database. The shape data were then queried and converted to GeoJSON format (i.e., the format that the library `Leaflet` supports) using a PostgreSQL query. The resulting file was fed to the online mapshaper tool (34) to reduce the size of the layer and make it more suitable for visualization purposes by removing a portion of the points from the shapes and also discarding a few decimal points off the coordinate values. This process results in slightly less accurate, but very small shapefiles that can be easily overlaid on top of many layers such as stops and trip shapes on the main map interface. Every geographic area shape includes name and surface area (in square miles) which are displayed in an `L.control Leaflet` object that shows up when the mouse is hovered over a county shape on the map.

All shape layers are styled to be transparent to allow other layers beneath it to remain visible. There are also functions that slightly highlight the shapes and update the data displayed in the box over the map when the mouse is hovered over a shape. If a shape is clicked on with the mouse, the map zooms in on the corresponding area.

5.8 LINKING TABULAR REPORTS

Some instances of tabular reports are linked to other, lower-level reports through hyperlinks. To implement this feature, a hyperlink tag was added to the corresponding fields in the parent report (i.e., the report that provides access to a lower level report). Figure 5.3 depicts an example of one of these hyperlinked tags in the Statewide Summary Report (**Note:** Only a portion of the Statewide Report is displayed in the picture for illustration purposes).

Since these links are not actual hyperlinks (i.e., they do not refer to a URL), a JavaScript function was implemented to capture the click events. Two custom attributes (i.e., `Type` and `ID`) are necessary to identify the type and parameters of the report that needs to be loaded. Therefore, each time a hyperlink is clicked, the JavaScript function decides which type of report to load by looking into the `Type` attribute and then passes the appropriate parameters to the query that generates the report by looking into the `ID` attribute.

As depicted in Figure 5.4, a navigation tab was added to the top left corner of tabular reports to help the user better understand the links among different reports. When clicked, the navigation bar displays all the lower level reports that can accessed from the current report and the higher level reports through which the current report was accessed.

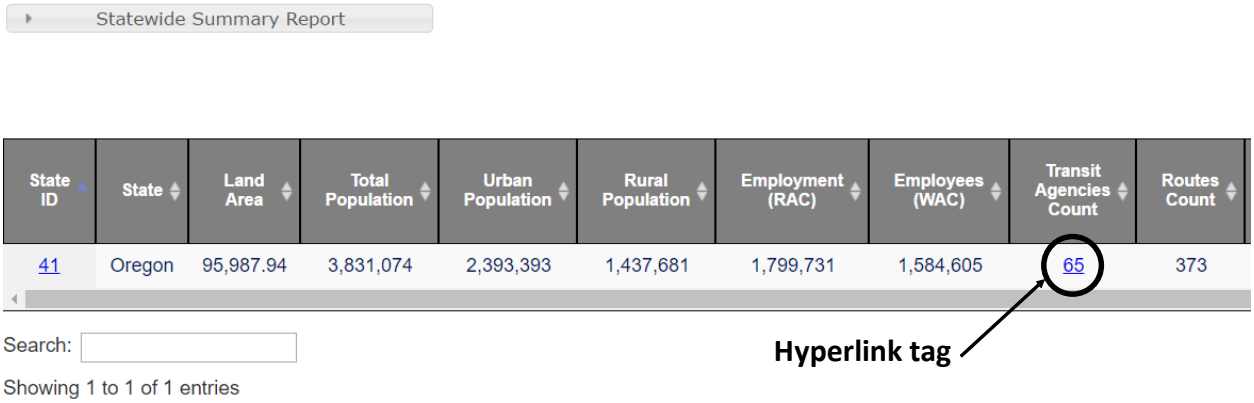
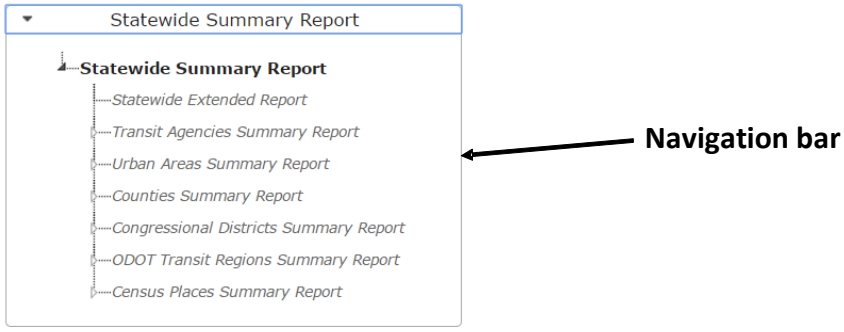


Figure 5.3: Example of a hyperlinked tag in the statewide summary report



State ID	State	Land Area	Total Population	Urban Population	Rural Population	Employment (RAC)	Employees (WAC)	Transit Agencies Count	Routes Count
41	Oregon	95,987.94	3,831,074	2,393,393	1,437,681	1,799,731	1,584,605	65	373

Search:

Showing 1 to 1 of 1 entries

Figure 5.4: Example of navigation bar

5.9 ON-MAP REPORT

The on-map report can be invoked by either drawing a geometric shape (e.g., circle, rectangle, or a polygon) on the main map interface, or by clicking on a single stop cluster to reveal a window with a button to generate the on-map report.

The library `LeafLet.draw` is used for drawing, editing, and deleting shapes on the main map interface of the TNA software tool. Once the shape is drawn, it is sent to the server to generate the on-map report. The contents of the on-map report are displayed using a `jQuery UI` dialog box on the main map interface. Invoking an on-map report hides the other layers (e.g., stops, routes, etc.) and collapses the OTAs floating dialog box.

5.10 MULTI DATABASE FUNCTIONALITY

The multi database feature is implemented on both the visualization and reporting interfaces of the GUI in the TNA software tool. A button was added to the OTAs floating dialog box to allow a user to specify the database that should be used for analyses purposes (see Figure 5.5). When the TNA software tool loads, the first database in the list is chosen as the default database. Changing the database on the visualization interface reloads the page (which removes all visualized objects such as stops, routes, and on-map reports from the map), re-populates a new instance of the OTAs floating dialog box based on the new database, and all new visualizations and on-map reports will be from the new database from this point. The multi database feature is also available in the reports interface through a menu box on the top right corner of every report.

Changing the database on any report, reloads the report with the new values extracted from the selected database.

A method is developed in the WebApp to allow the GUI of the TNAST to retrieve available database names and populate the database list based on that information. To implement the multi database feature, a new parameter named “dbindex” is added to all API commands. This parameter is also visible in the address bar of the web browser at the very end of the URL. This way, the database parameter is sent to another page while opening a new report.

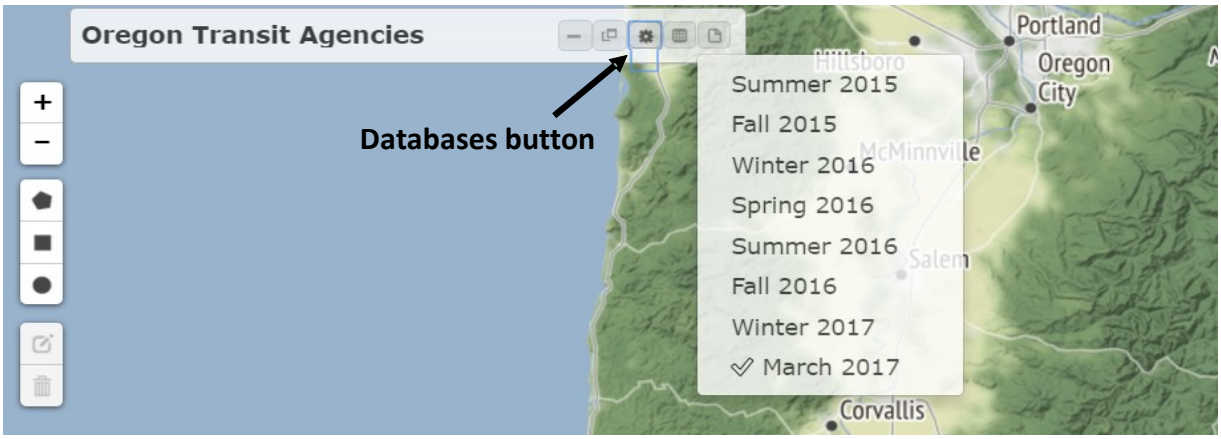


Figure 5.5: Location of the databases button on the OTA floating dialog box

5.11 CODE DOCUMENTATION

The documentation of the code written to implement the client side functionality of the TNA software tool was implemented in a similar fashion to that of the server side code, as depicted by the red rectangle in Figure 5.6. In this example, the documentation consists of a brief explanation of the purpose of the function, followed by the parameters passed to the function and the return type of the variable returned by the function.

```
/**
 * returns the navigation parameter of a tabular report based on its title
 * @param title
 * @returns {String}
 */
function findNavigationId(title){
    var nav = getURIParameter("nav");
    if(nav==null || nav==undefined){
        if(navigationIdMap[title]=="stateS"){
            nav = "stateS";
        }else{
            nav =  "stateS-"+navigationIdMap[title];
        }
    }else{
        nav += "-"+navigationIdMap[title];
    }
    return nav;
}
```

Figure 5.6: Example of the client side code documentation

6.0 CONCLUSIONS AND FUTURE WORK

The main objectives of phase IV of this project were to (1) continue to enhance the visualization and reporting features of the Transit Network Analysis (TNA) software tool, and (2) to ensure that the TNA software tool can be used, modified, and developed by others.

The most current version of the TNA software tool now contains the GTFS feeds of 66 different Oregon public and private transit agencies (the prior version included 64 GTFS feeds), in addition to census data, park and ride data, employment data, and Title VI data. These data sources are used to populate different kinds of reports (both in visual and in tabular format), which should provide planners and analyst with a wide variety of options to visualize and evaluate the statewide public and private transit network.

A new module called the "*Administrative Interface"* was added to the TNA software tool to facilitate the processes of creating, modifying, and populating databases. Through the "Administrative Interface", a user can selectively add a subset of the available 66 GTFS feeds and then visualize and generate tabular reports based exclusively on the transit agencies added. Furthermore, users have the option to also add their own GTFS feed, add this newly created feed to a database of the TNA software tool, and analyze the impact of these changes on the performance of their system.

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APPENDIX A: TABULAR REPORTS METRICS DEFINITION

Report Name	*Metric Name*	Definition/Computation method
Statewide Summary Report	*State*	Name of the state
Statewide Summary Report	*Land Area*	Total land area of the state in square miles.
Statewide Summary Report	*Population*	Total population of the state.
Statewide Summary Report	*Urban Population*	Total aggregated population of urban census blocks within the state.
Statewide Summary Report	*Rural Population*	Total aggregated population of rural census blocks within the state.
Statewide Summary Report	*Employment (RAC)*	Total people employed residing in the geographic area. Metric is calculated using Residence Area Characteristic (RAC) data.
Statewide Summary Report	*Employees (WAC)*	Total people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.

Statewide Summary Report	*Transit Agencies*	Number of transit agencies operating in the state. Any transit agency with at least one stop in the geographic area is counted.
Statewide Summary Report	*Routes*	Total number of routes operated by the transit agencies in the geographic area.
Statewide Summary Report	*Stops*	Total number of stops operated by transit agencies in the geographic area.
Statewide Summary Report	*Urbanized Areas*	Number of Urbanized Areas within the state.
Statewide Summary Report	*Urban Clusters*	Number of Urban Clusters within the state.
Statewide Summary Report	*Congressional Districts*	Number of congressional districts within the state.
Statewide Summary Report	*ODOT Transit Regions*	Number of ODOT transit regions within the state.
Statewide Summary Report	*Census Places*	Number of census designated places within the state.

Statewide Summary Report	*Counties*	Number of counties within the state.
Statewide Summary Report	*Census Tracts*	Number of census tracts within the state.
Statewide Extended Report	*Geo ID*	Identification number associated with the geographic area.
Statewide Extended Report	*Name*	Name of the geographic area.
Statewide Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes operated by the transit agency within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
Statewide Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the square miles of the geographic area. This metric is date-independent.
Statewide Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.
Statewide Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date (or a set of dates) specified using the calendar. The services hours reported are cumulative over the selected dates.

Statewide Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date (or a set of dates) specified using the calendar. The service miles reported are cumulative over the selected dates.
Statewide Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the square miles of the geographic area.
Statewide Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.
Statewide Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Statewide Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Statewide Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by the total population of the geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Statewide Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by the total population of the geographic area. X is the population search radius and N is the minimum level of service set by the user.
Statewide Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.

Statewide Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Statewide Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
Statewide Extended Report	*Urban Service Stops*	Total number of times the stops within the urban census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Statewide Extended Report	*Rural Service Stops*	Total number of times the stops within the rural census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Statewide Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Statewide Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Statewide Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Statewide Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
Statewide Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by the total number of people employed working in the area. X is the population search radius and N is the minimum level of service set by the user.
Statewide Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Statewide Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
Statewide Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Statewide Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Statewide Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.

Statewide Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-miles radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Statewide Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-miles radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Statewide Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).
Statewide Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Statewide Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.
Statewide Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).
Statewide Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.

Statewide Extended Report	*Minimum Fare*	If available, this field points to the minimum fare for the given geographic area during the selected date(s).
Statewide Extended Report	*Average Fare*	If available, this field points to the average fare for the given geographic area during the selected date(s).
Statewide Extended Report	*Median Fare*	If available, this field points to the median fare for the given geographic area during the selected date(s).
Statewide Extended Report	*Maximum Fare*	If available, this field points to the maximum fare for the given geographic area during the selected date(s).
Transit Agencies Summary Report	*Agency ID*	Identification number reported in the transit agency's GTFS feed.
Transit Agencies Summary Report	*Agency Name*	Agency name reported in the transit agency's GTFS feed.
Transit Agencies Summary Report	*Phone #*	Contact phone number for the transit agency.
Transit Agencies Summary Report	*Total Routes*	Total number of routes operated by the transit agency. This metric is date-independent.

Transit Agencies Summary Report	*Total Stops*	Total number of stops operated by the transit agency. This metric is date-independent.
Transit Agencies Summary Report	*Geographic Areas*	Count of geographic areas within which the transit agency operates. An agency is considered to operate in a geographic area if it has at least one stop within that area regardless of whether the stop is served or not.
Transit Agencies Summary Report	*Fare*	If available, this is the fare information published by the transit agency on its web site. This metric is date-independent.
Transit Agencies Summary Report	*Service Start Date*	The earliest service date specified in the transit agency's GTFS feed in YYYYMMDD format.
Transit Agencies Summary Report	*Service End Date*	The latest service date specified in the transit agency's GTFS feed in YYYYMMDD format.
Transit Agencies Summary Report	*Feed Information*	If available, this is the feed information such as name, version, publisher name, and publisher URL.
Transit Agency Extended Report	*Agency ID*	Identification number reported in the transit agency's GTFS feed.
Transit Agency Extended Report	*Agency Name*	Agency name reported in the transit agency's GTFS feed.

Transit Agency Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes operated by the transit agency. The length of the longest trip of a route is considered as the route length. This metric is date-independent.
Transit Agency Extended Report	*Route Stops*	Total number of stops served by the transit agency. This metric is date-independent.
Transit Agency Extended Report	*Urban Stops*	Total number of stops that are served by the transit agency that are located within urban census blocks. This metric is date-independent.
Transit Agency Extended Report	*Rural Stops*	Total number of stops that are served by the transit agency that are located within rural census blocks. This metric is date-independent.
Transit Agency Extended Report	*Stops Per Route Mile*	Route Stops of the transit agency divided by its Route Miles.
Transit Agency Extended Report	*Service Hours*	Total hours the transit agency serves all round trips of its routes. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date (or a set of dates) specified using the calendar. The services hours reported are cumulative over the selected dates.
Transit Agency Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on selected date(s). Service miles may be calculated for a specific date (or a set of dates) specified using the calendar. The service miles reported are cumulative over the selected dates.
Transit Agency Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops the transit agency serves. Each urban census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the

		selected date(s).
Transit Agency Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops the transit agency serves. Each rural census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Transit Agency Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop of the transit agency and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Transit Agency Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop of the transit agency and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Transit Agency Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed who reside in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops that the transit agency serves. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Transit Agency Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed who work in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops that the transit agency serves. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Transit Agency Extended Report	*Service Stops*	Total number of times the agency stops are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.

Transit Agency Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop served by the transit agency. Population served by service for a census block is calculated as the population of that block multiplied by the times the block is served by the transit agency on the selected date(s). The number reported is cumulative over the selected dates.
Transit Agency Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop served by the transit agency. Population served by service for a census block is calculated as the population of that block multiplied by the times the block is served by the transit agency on the selected date(s). The number reported is cumulative over the selected dates.
Transit Agency Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop served by the transit agency. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times the block is served by the transit agency on the selected date(s). The number reported is cumulative over the selected dates.
Transit Agency Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop served by the transit agency. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times the block is served by the transit agency on the selected date(s). The number reported is cumulative over the selected dates.
Transit Agency Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip is served by the selected transit agency.
Transit Agency Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all stops served by the transit agency. This metric is date-dependent.

Counties Summary Report	*Geo ID*	Identification number associated with the geographic area.
Counties Summary Report	*Name*	Name associated with the geographic area.
Counties Summary Report	*ODOT Region ID*	ODOT transit region ID associated with the geographic area.
Counties Summary Report	*ODOT Transit Region*	ODOT transit region name associated with the geographic area.
Counties Summary Report	*Population*	Total population of the geographic area.
Counties Summary Report	*Employment (RAC)*	Total number of people employed living in the geographic area. Metric is calculated using Residence Area Characteristic (RAC) data.
Counties Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.
Counties Summary Report	*Land Area*	Total land area of the geographic area in square miles.

Counties Summary Report	*Water Area*	Total water area of the geographic area in square miles.
Counties Summary Report	*Total Agencies*	Total number of transit agencies operating in the given geographic area. An agency with at least one stop in the geographic area is counted.
Counties Summary Report	*Total Urban Stops*	Total number of stops within the given geographic area located in a urban census block.
Counties Summary Report	*Total Rural Stops*	Total number of stops within the given geographic area located in an rural census block.
Counties Summary Report	*Urbanized Areas*	Total number of Urbanized Areas within the geographic area.
Counties Summary Report	*Urban Clusters*	Total number of Urban Clusters within the geographic area.
Counties Summary Report	*Tracts*	Total number of census tracts within the geographic area.
County Extended Report	*Geo ID*	Identification number associated with the geographic area.

County Extended Report	*Name*	Name of the geographic area.
County Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes operated by the transit agency within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
County Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the square miles of the geographic area. This metric is date-independent.
County Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.
County Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date (or a set of dates) specified using the calendar. The services hours reported are cumulative over the selected dates.
County Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date (or a set of dates) specified using the calendar. The service miles reported are cumulative over the selected dates.
County Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the square miles of the geographic area.
County Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.

County Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
County Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
County Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by the total population of the geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
County Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by the total population of the geographic area. X is the population search radius and N is the minimum level of service set by the user.
County Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
County Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
County Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
County Extended Report	*Urban Service Stops*	Total number of times the stops within the urban census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.

County Extended Report	*Rural Service Stops*	Total number of times the stops within the rural census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
County Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
County Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
County Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
County Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
County Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by the total number of people employed working in the area. X is the population search radius and N is the minimum level of service set by the user.
County Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.

County Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
County Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
County Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
County Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.
County Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-miles radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
County Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-miles radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
County Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).

County Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
County Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.
County Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).
County Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
County Extended Report	*Minimum Fare*	If available, this field points to the minimum fare for the given geographic area during the selected date(s).
County Extended Report	*Average Fare*	If available, this field points to the average fare for the given geographic area during the selected date(s).
County Extended Report	*Median Fare*	If available, this field points to the median fare for the given geographic area during the selected date(s).
County Extended Report	*Maximum Fare*	If available, this field points to the maximum fare for the given geographic area during the selected date(s).

Census Places Summary Report	*Geo ID*	Identification number associated with the geographic area.
Census Places Summary Report	*Name*	Name associated with the geographic area.
Census Places Summary Report	*Population*	Total population of the geographic area.
Census Places Summary Report	*Employment (RAC)*	Total number of people employed residing in the geographic area. Metric is calculated using Residence Area Characteristic (RAC) data.
Census Places Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.
Census Places Summary Report	*Land Area*	Total land area of the geographic area in square miles.
Census Places Summary Report	*Water Area*	Total water area of the geographic area in square miles.
Census Places Summary Report	*Total Agencies*	Total number of transit agencies operating in the given geographic area. An agency with at least one stop in the geographic area is counted.

Census Places Summary Report	*Total Routes*	Total number of routes serving stops in the given geographic area.
Census Places Summary Report	*Total Urban Stops*	Total number of stops within the given geographic area located in a urban census block.
Census Places Summary Report	*Total Rural Stops*	Total number of stops within the given geographic area located in an rural census block.
Census Places Summary Report	*Urbanized Areas*	Total number of Urbanized Areas within the geographic area.
Census Places Summary Report	*Urban Clusters*	Total number of Urban Clusters within the geographic area.
Census Place Extended Report	*Geo ID*	Identification number associated with the geographic area.
Census Place Extended Report	*Name*	Name of the geographic area.
Census Place Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.

Census Place Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the square miles of the geographic area. This metric is date-independent.
Census Place Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.
Census Place Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip is calculated as the difference between the arrival time to the first stop of the trip and the departure time from the last stop of the trip. Service hours may be calculated for a specific date (or a set of dates) specified using the calendar. The number reported is cumulative over the selected dates.
Census Place Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date (or a set of dates) specified using the calendar. The number reported is cumulative over the selected dates.
Census Place Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the square miles of the geographic area.
Census Place Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.
Census Place Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Census Place Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Census Place Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by the total population of the area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Census Place Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by the total population of the area. X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
Census Place Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
Census Place Extended Report	*Urban Service Stops*	Total number of times the stops within the urban census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Census Place Extended Report	*Rural Service Stops*	Total number of times the stops within the rural census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.

Census Place Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Census Place Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Census Place Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Census Place Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
Census Place Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).

Census Place Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of people employed residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Census Place Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Census Place Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.
Census Place Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Census Place Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).
Census Place Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.

Census Place Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.
Census Place Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).
Census Place Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
Census Place Extended Report	*Minimum Fare*	If available, this field points to the minimum fare for the given geographic area during the selected date(s).
Census Place Extended Report	*Average Fare*	If available, this field points to the average fare for the given geographic area during the selected date(s).
Census Place Extended Report	*Median Fare*	If available, this field points to the median fare for the given geographic area during the selected date(s).
Census Place Extended Report	*Maximum Fare*	If available, this field points to the maximum fare for the given geographic area during the selected date(s).
Congressional Districts Summary Report	*Geo ID*	Identification number associated with the geographic area.

Congressional Districts Summary Report	*Name*	Name of the geographic area.
Congressional Districts Summary Report	*Population*	Total population of the geographic area.
Congressional Districts Summary Report	*Employment (RAC)*	Total number of people employed residing in the geographic area.
Congressional Districts Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area.
Congressional Districts Summary Report	*Land Area*	Total land area of the geographic area in square miles.
Congressional Districts Summary Report	*Water Area*	Total water area of the geographic area in square miles.
Congressional Districts Summary Report	*Total Agencies*	Total number of transit agencies operating in the given geographic area.
Congressional Districts Summary Report	*Total Routes*	Total number of routes serving stops in the given geographic area.

Congressional Districts Summary Report	*Total Urban Stops*	Total number of stops within the given geographic area located in a urban census block.
Congressional Districts Summary Report	*Total Rural Stops*	Total number of stops within the given geographic area located in an rural census block.
Congressional Districts Summary Report	*Urbanized Areas*	Total number of Urbanized Areas within the geographic area.
Congressional Districts Summary Report	*Urban Clusters*	Total number of Urban Clusters within the geographic area.
Congressional District Extended Report	*Geo ID*	Identification number associated with the geographic area.
Congressional District Extended Report	*Name*	Name of the geographic area.
Congressional District Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes operated within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
Congressional District Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the square miles of the geographic area. This metric is date-independent.

Congressional District Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.
Congressional District Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date (or a set of dates) specified using the calendar. The services hours reported are cumulative over the selected dates.
Congressional District Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date or a set of dates specified using the calendar. The service miles reported are cumulative over the selected dates.
Congressional District Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the square miles of the geographic area.
Congressional District Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.
Congressional District Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Congressional District Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Congressional District Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by total population of the area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Congressional District Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total population of the area. X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
Congressional District Extended Report	*Urban Service Stops*	Total number of times the stops within the urban census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Congressional District Extended Report	*Rural Service Stops*	Total number of times the stops within the rural census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Congressional District Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.

Congressional District Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Congressional District Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Congressional District Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
Congressional District Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
Congressional District Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.

Congressional District Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Congressional District Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.
Congressional District Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Congressional District Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).
Congressional District Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Congressional District Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.

Congressional District Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).
Congressional District Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
Congressional District Extended Report	*Minimum Fare*	If available, this field points to the minimum fare for the given geographic area during the selected date(s).
Congressional District Extended Report	*Average Fare*	If available, this field points to the average fare for the given geographic area during the selected date(s).
Congressional District Extended Report	*Median Fare*	If available, this field points to the median fare for the given geographic area during the selected date(s).
Congressional District Extended Report	*Maximum Fare*	If available, this field points to the maximum fare for the given geographic area during the selected date(s).
Urban Areas Summary Report	*Geo ID*	Identification number associated with the geographic area.
Urban Areas Summary Report	*Name*	Name associated with the geographic area.

Urban Areas Summary Report	*Population*	Total population of the geographic area.
Urban Areas Summary Report	*Employment (RAC)*	Total number of people employed residing in the geographic area. Metric is calculated using Residence Area Characteristic (RAC) data.
Urban Areas Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.
Urban Areas Summary Report	*Land Area*	Total land area of the geographic area in square miles.
Urban Areas Summary Report	*Water Area*	Total water area of the geographic area in square miles.
Urban Areas Summary Report	*Total Agencies*	Total number of transit agencies operating in the given geographic area. An agency with at least one stop in the geographic area is counted.
Urban Areas Summary Report	*Total Routes*	Total number of routes serving stops in the given geographic area.
Urban Areas Summary Report	*Total Stops*	Total number of stops within the given geographic area.

Urban Area Extended Report	*Geo ID*	Identification number associated with the geographic area.
Urban Area Extended Report	*Name*	Name of the geographic area.
Urban Area Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
Urban Area Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the square miles of the geographic area. This metric is date-independent.
Urban Area Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.
Urban Area Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date (or a set of dates) specified using the calendar. The number reported is cumulative over the selected dates.
Urban Area Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date (or a set of dates) specified using the calendar. The reported number is cumulative over the selected dates.
Urban Area Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the square miles of the geographic area.

Urban Area Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.
Urban Area Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Urban Area Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Urban Area Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by total population of the area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Urban Area Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total population of the area. X is the population search radius and N is the minimum level of service set by the user.
Urban Area Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Urban Area Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Urban Area Extended Report	*Percent of Population Unserved*	100 minus percent of population served.

Urban Area Extended Report	*Service Stops*	Total number of times the stops within the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Urban Area Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Urban Area Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Urban Area Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Urban Area Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
Urban Area Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Urban Area Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.

Urban Area Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
Urban Area Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Urban Area Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Urban Area Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.
Urban Area Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Urban Area Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Urban Area Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).

Urban Area Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Urban Area Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.
Urban Area Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).
Urban Area Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
Urban Area Extended Report	*Minimum Fare*	If available, this field points to the minimum fare for the given geographic area during the selected date(s).
Urban Area Extended Report	*Average Fare*	If available, this field points to the average fare for the given geographic area during the selected date(s).
Urban Area Extended Report	*Median Fare*	If available, this field points to the median fare for the given geographic area during the selected date(s).
Urban Area Extended Report	*Maximum Fare*	If available, this field points to the maximum fare for the given geographic area during the selected date(s).

Aggregated Urban Areas Summary Report	*Geo ID*	Identification number associated with the geographic area.
Aggregated Urban Areas Summary Report	*Name*	Name of the geographic area.
Aggregated Urban Areas Summary Report	*Population*	Total population of the geographic area.
Aggregated Urban Areas Summary Report	*Employment (RAC)*	Total number of people employed residing in the geographic area. Metric is calculated using Residential Area Characteristic (RAC) data.
Aggregated Urban Areas Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.
Aggregated Urban Areas Summary Report	*Land Area*	Total land area of the geographic area in square miles.
Aggregated Urban Areas Summary Report	*Water Area*	Total water area of the geographic area in square miles.
Aggregated Urban Areas Summary Report	*Urban Areas*	Total number of urbanized areas aggregated to generate this report.

Aggregated Urban Areas Summary Report	*Total Routes*	Total number of routes serving stops in the given geographic area.
Aggregated Urban Areas Summary Report	*Total Stops*	Total number of stops within the given geographic area. This metric is date independent, i.e., stops may or may not be served on the selected date(s).
Aggregated Urban Areas Extended Report	*Name*	Name of the geographic area.
Aggregated Urban Areas Extended Report	*Fare*	If available, this field points to the fare information of the services provided by agencies on the selected date(s). The fair information is published by transit agencies in their GTFS data.
Aggregated Urban Areas Extended Report	*Connected Communities*	List of geographic areas of same type that are connected to the area of interest through routes that are served on the selected date(s).
Aggregated Urban Areas Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
Aggregated Urban Areas Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the area of the geographic area. This metric is date independent, i.e., the counted stops may or may not be served on the selected date(s).
Aggregated Urban Areas Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by service miles. The stops counted here may or may not be served. Service Miles is date dependent.

Aggregated Urban Areas Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date or a set of dates specified using the calendar. The reported number is cumulative over the selected dates.
Aggregated Urban Areas Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date (or a set of dates) specified using the calendar. The reported number is cumulative over the selected dates.
Aggregated Urban Areas Extended Report	*Service Miles Per Square Mile*	Service miles divided by the square miles of the geographic area.
Aggregated Urban Areas Extended Report	*Miles of Service Per Capita*	Service miles divided by the population of the geographic area.
Aggregated Urban Areas Extended Report	*Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Aggregated Urban Areas Extended Report	*Percent of Population Served*	Population served divided by total population of the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Aggregated Urban Areas Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total population of the area. X is the population search radius and N is the minimum level of service set by the user.

Aggregated Urban Areas Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
Aggregated Urban Areas Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Aggregated Urban Areas Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Aggregated Urban Areas Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
Aggregated Urban Areas Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
Aggregated Urban Areas Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of people employed residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Aggregated Urban Areas Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Aggregated Urban Areas Extended Report	*Percent of Employees Served (WAC)*	Employment Served (WAC) divided by the number of people residing in the given geographic area.
Aggregated Urban Areas Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Aggregated Urban Areas Extended Report	*Percent of Employees Unserved (WAC)*	100 minus percent of Employees Served (WAC).
Aggregated Urban Areas Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of people employed working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Aggregated Urban Areas Extended Report	*Service Stops*	Total number of times the stops within the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Aggregated Urban Areas Extended Report	*Population Served By Service*	Summation of Population Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Aggregated Urban Areas Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.

Aggregated Urban Areas Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
ODOT Transit Regions Summary Report	*Geo ID*	Identification number associated with the geographic area.
ODOT Transit Regions Summary Report	*Name*	Name associated with the geographic area.
ODOT Transit Regions Summary Report	*Population*	Total population of the geographic area.
ODOT Transit Regions Summary Report	*Employment (RAC)*	Total number of people employed residing in the geographic area. Metric is calculated using Residence Area Characteristic (RAC) data.
ODOT Transit Regions Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.
ODOT Transit Regions Summary Report	*Land Area*	Total land area of the geographic area in square miles.
ODOT Transit Regions Summary Report	*Water Area*	Total water area of the geographic area in square miles.

ODOT Transit Regions Summary Report	*Total Agencies*	Total number of transit agencies operating in the given geographic area. An agency with at least one stop in the geographic area is counted.
ODOT Transit Regions Summary Report	*Total Routes*	Total number of routes serving stops in the given geographic area.
ODOT Transit Regions Summary Report	*Total Urban Stops*	Total number of stops within the given geographic area located in a urban census block.
ODOT Transit Regions Summary Report	*Total Rural Stops*	Total number of stops within the given geographic area located in an rural census block.
ODOT Transit Regions Summary Report	*Urbanized Areas*	Total number of Urbanized Areas within the geographic area.
ODOT Transit Regions Summary Report	*Urban Clusters*	Total number of Urban Clusters within the geographic area.
ODOT Transit Regions Summary Report	*Counties*	List of the counties within the geographic area.
ODOT Transit Region Extended Report	*Geo ID*	Identification number associated with the geographic area.

ODOT Transit Region Extended Report	*Name*	Name of the geographic area.
ODOT Transit Region Extended Report	*Route Miles*	Summation of the lengths of the routes within the given geographic area. Length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
ODOT Transit Region Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the area of the geographic area. This metric is date-independent.
ODOT Transit Region Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.
ODOT Transit Region Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date or a set of dates specified using the calendar. The reported number is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date or a set of dates specified using the calendar. The reported number is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the area of the geographic area.
ODOT Transit Region Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.

ODOT Transit Region Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
ODOT Transit Region Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
ODOT Transit Region Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by total population of the area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
ODOT Transit Region Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total population of the area. X is the population search radius and N is the minimum level of service set by the user.
ODOT Transit Region Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
ODOT Transit Region Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
ODOT Transit Region Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
ODOT Transit Region Extended Report	*Urban Service Stops*	Total number of times the stops within the urban census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.

ODOT Transit Region Extended Report	*Rural Service Stops*	Total number of times the stops within the rural census blocks of the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
ODOT Transit Region Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
ODOT Transit Region Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
ODOT Transit Region Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.

ODOT Transit Region Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
ODOT Transit Region Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
ODOT Transit Region Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.
ODOT Transit Region Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
ODOT Transit Region Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
ODOT Transit Region Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).

ODOT Transit Region Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
ODOT Transit Region Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.
ODOT Transit Region Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).
ODOT Transit Region Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
ODOT Transit Region Extended Report	*Minimum Fare*	If available, this field points to the fare minimum for the given geographic area during the selected date(s).
ODOT Transit Region Extended Report	*Average Fare*	If available, this field points to the fare average for the given geographic area during the selected date(s).
ODOT Transit Region Extended Report	*Median Fare*	If available, this field points to the fare median for the given geographic area during the selected date(s).
ODOT Transit Region Extended Report	*Maximum Fare*	If available, this field points to the fare maximum for the given geographic area during the selected date(s).

Stops Summary Report	*Agency ID*	Agency ID reported in the transit agency GTFS feed.
Stops Summary Report	*Agency Name*	Agency name reported in the transit agency GTFS feed.
Stops Summary Report	*Stop ID*	Unique stop identification number reported in the transit agency GTFS feed.
Stops Summary Report	*Stop Name*	Name of a stop reported in the transit agency GTFS feed.
Stops Summary Report	*County*	The County in which the stop is located.
Stops Summary Report	*Urban Area*	The Urban Area in which the stop is located.
Stops Summary Report	*ODOT Transit Region*	The ODOT Transit Region in which the stop is located.
Stops Summary Report	*Congressional District*	The Congressional District in which the stop is located.

Stops Summary Report	*Census Place*	The Census Place in which the stop is located.
Stops Summary Report	*Routes Stop Belongs To*	Unique route ID (or IDs) that the stop belongs to.
Stops Summary Report	*Visits*	Number of times the stops is visited during the selected dates.
Stops Summary Report	*Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the stop. This metric is date-independent, i.e., the stop may or may not be served on the selected date(s).
Stops Summary Report	*Urban Population Served*	Total population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the stop. This metric is date-independent, i.e., the stop may or may not be served on the selected date(s).
Stops Summary Report	*Rural Population Served*	Total population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the stop. This metric is date-independent, i.e., the stop may or may not be served on the selected date(s).
Stops Summary Report	*Employment Served (RAC)*	Total number of employed people residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the stop. This metric is date-independent, i.e., the stop may or may not be served on the selected date(s).
Stops Summary Report	*Employees Served (WAC)*	Total number of employed people working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the stop. This metric is date-independent, i.e., the stop may or may not be served on the selected date(s).

Stops Summary Report	*Urban Population*	Urban population count within an X-mile radius of a stop. The default value for X is 0.25 miles. However, the value of the radius can be changed by the user on the text box shown on the upper right corner of the report and then pressing the <Submit> button.
Stops Summary Report	*Rural Population*	Rural population count within an X-mile radius of a stop. The default value for X is 0.25 miles. However, the value of the radius can be changed by the user on the text box shown on the upper right corner of the report and then pressing the <Submit> button.
Stops Summary Report	*Urban area with over 50k population*	The population of the urban area with population over 50,000 in which the stop is located. If the value is 0, it means that the stop is either not located in an urban area, or the population of the area is less than 50,000.
Stops Summary Report	*Latitude*	Latitude of the stop
Stops Summary Report	*Longitude*	Longitude of the stops
Routes Summary Report	*Agency ID*	Identification number reported in the transit agency GTFS feed.
Routes Summary Report	*Agency Name*	Agency name reported in the transit agency GTFS feed.
Routes Summary Report	*Route ID*	Unique route identification number reported in the transit agency GTFS feed.

Routes Summary Report	*Route Name*	Route short name as reported in the transit agency GTFS feed.
Routes Summary Report	*Route Long Name*	Route long name as reported in the transit agency GTFS feed.
Routes Summary Report	*Route Type*	Type of transportation used on a route: 0-Tram, Streetcar & Light rail 1-Subway & Metro 2-Rail 3-Bus 4-Ferry 5-Cable car 6-Gondola & Suspended cable car 7-Funicular
Routes Summary Report	*Route Length*	Length of the longest route variant for the given route.
Routes Summary Report	*Total Stops*	Total number of stops on the route.
Routes Summary Report	*Counties*	Counties in which the route operates.
Routes Summary Report	*Urban Areas*	Urban Areas in which the route operates.
Routes Summary Report	*Census Places*	Census Places in which the route operates.

Routes Summary Report	*Congressional Districts*	Congressional Districts in which the route operates.
Routes Summary Report	*ODOT Transit Regions*	ODOT Transit Regions in which the route operates.
Routes Summary Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the route stops. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Routes Summary Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the route stops. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Routes Summary Report	*Service Stops*	Number of stops scheduled on all trips in a route. The service stops for a route is calculated as its stop count multiplied by the number of visits per stop.
Routes Summary Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the route stops. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Routes Summary Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of the route stops. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.

Routes Summary Report	*Service Miles*	Total miles driven by a transit agency over all round trips of a route running on the selected date(s). Service miles may be calculated for a specific date or a set of dates specified using the calendar.
Routes Summary Report	*Service Hours*	Total hours transit agency spends serving all round trips of the routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date or a set of dates specified using the calendar. The reported number is cumulative over the selected dates.
Routes Summary Report	*More..*	If available, this field contains a description of the route (the value is null otherwise).
Transit Hubs Summary Report	*ID*	ID number randomly assigned to the cluster.
Transit Hubs Summary Report	*Cluster Centroid Latitude*	Latitude of the transit hub centroid. This is calculated as the average of latitudes of stops in the cluster.
Transit Hubs Summary Report	*Cluster Centroid Longitude*	Longitude of the transit hub centroid. This is calculated as the average of longitudes of stops in the cluster.
Transit Hubs Summary Report	*Stops Count*	Total number of stops in the cluster.
Transit Hubs Summary Report	*Routes Count*	Total number of routes that serve stops in the cluster.

Transit Hubs Summary Report	*Agencies Count*	Total number of transit agencies that serve stops in the cluster.
Transit Hubs Summary Report	*Visits Count*	Total number of times the stops in the cluster are served on the given date(s). Visits for a stop is calculated as summation of number of times a stop is served on selected date(s), i.e., summation of number of trips/runs over all routes where the stop belongs to. The number reported is cumulative over the selected dates.
Transit Hubs Summary Report	*Park and Ride Lots Count*	Total number of park and ride lots within X distance of the cluster centroid.
Transit Hubs Summary Report	*Counties Count*	Total number of counties in which the cluster has at least one stop.
Transit Hubs Summary Report	*Census Places Count*	Total number of census places in which the cluster has at least one stop.
Transit Hubs Summary Report	*Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the cluster. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Transit Hubs Summary Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the cluster. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Transit Hubs Summary Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the cluster. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the

		selected date(s).
Transit Hubs Summary Report	*Urban Population*	Sum of the population of urban areas (areas with population over 2,500) that stops in the cluster are located in.
Transit Hubs Summary Report	*Transit Agencies*	List of transit agencies that serve stops in the cluster.
Transit Hubs Summary Report	*Stops*	Detailed list of stops in the cluster.
Transit Hubs Summary Report	*Routes*	Unduplicated detailed list of routes in the cluster.
Transit Hubs Summary Report	*Park and Ride Lots*	Detailed list of park and ride lots within the X-mile radius of the cluster centroid.
Transit Hubs Summary Report	*Census Places*	Census places in which the cluster has at least one stop.
Transit Hubs Summary Report	*Counties*	Counties in which the cluster has at least one stop.

Transit Hubs Summary Report	*Urban Areas*	Areas in which the cluster has at least one stop.
Transit Hubs Summary Report	*ODOT Transit Regions*	ODOT transit regions in which the cluster has at least one stop.
Key Transit Hubs Report	*ID*	ID number randomly assigned to the cluster.
Key Transit Hubs Report	*Cluster Centroid Latitude*	Latitude of the transit hub centroid. This is calculated as the average of latitudes of stops in the cluster.
Key Transit Hubs Report	*Cluster Centroid Longitude*	Longitude of the transit hub centroid. This is calculated as the average of longitudes of stops in the cluster.
Key Transit Hubs Report	*Stops Count*	Total number of stops in the cluster.
Key Transit Hubs Report	*Routes Count*	Total number of routes that serve stops in the cluster.
Key Transit Hubs Report	*Agencies Count*	Total number of transit agencies that serve stops in the cluster.

Key Transit Hubs Report	*Visits Count*	Total number of times the stops in the cluster are served on the given date(s). Visits for a stop are calculated as the summation of the number of times a stop is served on selected date(s), i.e., summation of number of trips/runs over all routes where the stop belongs to. The number reported is cumulative over the selected dates.
Key Transit Hubs Report	*Park and Ride Lots Count*	Total number of park and ride lots within X distance of the cluster centroid.
Key Transit Hubs Report	*Counties Count*	Total number of counties in which the cluster has at least one stop.
Key Transit Hubs Report	*Census Places Count*	Total number of census places in which the cluster has at least one stop.
Key Transit Hubs Report	*Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the cluster. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Key Transit Hubs Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the cluster. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Key Transit Hubs Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the cluster. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Key Transit Hubs Report	*Urban Population*	Sum of the population of urban areas (areas with population over 2,500) that stops in the cluster are located in.
Key Transit Hubs Report	*Transit Agencies*	List of transit agencies that serve stops in the cluster.
Key Transit Hubs Report	*Stops*	Detailed list of stops in the cluster.
Key Transit Hubs Report	*Routes*	Unduplicated detailed list of routes in the cluster.
Key Transit Hubs Report	*Park and Ride Lots*	Detailed list of park and ride lots within the X-mile radius of the cluster centroid.
Key Transit Hubs Report	*Census Places*	Census places in which the cluster has at least one stop.
Key Transit Hubs Report	*Counties*	Counties in which the cluster has at least one stop.
Key Transit Hubs Report	*Urban Areas*	Areas in which the cluster has at least one stop.

Key Transit Hubs Report	*ODOT Transit Regions*	ODOT transit regions in which the cluster has at least one stop.
Timing Connection Report	#	Randomly assigned row number.
Timing Connection Report	*Stop1 ID*	ID of the stop belonging to the selected route/trip. This stop is a connection to some other route.
Timing Connection Report	*Stop1 Name*	Name of the stop belonging to the selected route/trip. This stop is a connection to some other route.
Timing Connection Report	*Stop2 ID*	ID of the stop that is located within an X-mile radius of Stop1 and is served within the selected Time Window on the selected Date.
Timing Connection Report	*Stop2 Name*	Name of the stop that is located within an X-mile radius of Stop1 and is served within the selected Time Window on the selected Date.
Timing Connection Report	*Stop2 Agency*	The agency that serves Stop2.
Timing Connection Report	*Stop2 Route ID*	ID of the route to which Stop2 belongs.

Timing Connection Report	*Stop2 Route Name*	Name of the route to which Stop2 belongs.
Timing Connection Report	*Stop1 Arrival*	Time of arrival at Stop1.
Timing Connection Report	*Stop2 Departure*	Departure from Stop2.
Timing Connection Report	*Time Difference*	The difference between arriving at Stop1 and departing Stop2.
Connected Networks Summary Report	*Cluster ID*	Transit network cluster ID.
Connected Networks Summary Report	*Network Cluster Size*	Number of transit agencies that have at least one stop within the specified distance of at least one transit agency in the cluster.
Connected Networks Summary Report	*Connected Agency IDs*	Agency IDs corresponding with transit agencies that have at least one stop within the specified distance of any other agencies in the list.
Connected Networks Summary Report	*Connected Agency Names*	List of transit agencies that have at least one stop within the specified distance of any other agencies in the list.

Connected Agencies Summary Report	*Agency ID*	Identification number reported in the transit agency GTFS feed.
Connected Agencies Summary Report	*Agency Name*	Agency name reported in the transit agency GTFS feed.
Connected Agencies Summary Report	*Number of Connected Agencies*	Number of transit agencies that have at least one stop within the specified distance of the transit agency stops
Connected Agencies Summary Report	*Connected Agency Names*	Name of transit agencies that have at least one stop within the specified distance of the transit agency stops
Connected Agencies Summary Report	*Connected Agency IDs*	Agency IDs corresponding with transit agencies that have at least one stop within the specified distance of the transit agency stops
Connected Agencies Extended Report	*Name*	Agency name reported in the transit agency GTFS feed.
Connected Agencies Extended Report	*Number of Connections*	Number of transit stops that have at least one stop within the specified distance of the specified transit agency stops
Connected Agencies Extended Report	*Min Connection distance (ft.)*	Smallest distance in ft. between the transit stops of the specified transit agency with the current transit agency

Connected Agencies Extended Report	*Max Connection distance (ft.)*	Largest distance in ft. between the transit stops of the specified transit agency with the current transit agency
Connected Agencies Extended Report	*Average Connection distance (ft.)*	Average distance in ft. between the transit stops of the specified transit agency with the current transit agency
Connected Agencies Extended Report	*Connections*	List of transit stops within the specified distance of the specified transit agency stops and the distance between them in ft
Park and Ride Summary Report	*County ID*	County ID conforming to the census data.
Park and Ride Summary Report	*County Name*	County name.
Park and Ride Summary Report	*Total number of P&R lots*	Total number of park and ride lots in the county.
Park and Ride Summary Report	*Total parking spaces*	Total number of parking spaces in the county.
Park and Ride Summary Report	*Total accessible parking spaces*	Total number of handicap parking spaces in the county.

Tracts Summary Report	*Geo ID*	Identification number associated with the geographic area.
Tracts Summary Report	*Name*	Name associated with the geographic area.
Tracts Summary Report	*Population*	Total population of the geographic area.
Tracts Summary Report	*Employment (RAC)*	Total number of people employed residing in the geographic area. Metric is calculated using Residence Area Characteristic (RAC) data.
Tracts Summary Report	*Employees (WAC)*	Total number of people employed working in the geographic area. Metric is calculated using Working Area Characteristic (WAC) data.
Tracts Summary Report	*Land Area*	Total land area of the geographic area in square miles.
Tracts Summary Report	*Water Area*	Total water area of the geographic area in square miles.
Tracts Summary Report	*Total Agencies*	Total number of transit agencies operating in the given geographic area. An agency with at least one stop in the geographic area is counted.

Tracts Summary Report	*Total Routes*	Total number of routes serving stops in the given geographic area.
Tracts Summary Report	*Total Stops*	Total number of stops within the given geographic area.
Tracts Summary Report	*Urban Areas*	Total number of Urban Areas within the geographic area.
Tract Extended Report	*Geo ID*	Identification number associated with the geographic area.
Tract Extended Report	*Name*	Name of the geographic area.
Tract Extended Report	*Route Miles*	Summation of the lengths (in miles) of the routes within the given geographic area. The length of the longest trip of a route that is running on the selected date(s) is considered as the route length.
Tract Extended Report	*Stops Per Square Mile*	Stop count in the given geographic area divided by the square miles of the geographic area. This metric is date-independent.
Tract Extended Report	*Stops Per Service Mile*	Stop count in the given geographic area divided by Service Miles.

Tract Extended Report	*Service Hours*	Total hours a transit agency spends serving all round trips of routes within the given geographic area. The service hours for a trip are calculated as the difference between the arrival time to the first stop of the trip and the departing time from the last stop of the trip. Service hours may be calculated for a specific date or a set of dates specified using the calendar. The reported number is cumulative over the selected dates.
Tract Extended Report	*Service Miles*	Total miles driven over all round trips of routes running on the selected date(s) within the given geographic area. Service miles may be calculated for a specific date or a set of dates specified using the calendar. The reported number is cumulative over the selected dates.
Tract Extended Report	*Service Miles Per Square Mile*	Service Miles divided by the square miles of the geographic area.
Tract Extended Report	*Miles of Service Per Capita*	Service Miles divided by the population of the geographic area.
Tract Extended Report	*Urban Population Served*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Tract Extended Report	*Rural Population Served*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Tract Extended Report	*Percent of Population Served*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops within the given geographic area divided by total population of the area. This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Tract Extended Report	*Percent of Population Served at Level of Service*	Total unduplicated population of census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total population of the area. X is the population search radius and N is the minimum level of

		service set by the user.
Tract Extended Report	*Urban Population Served at Level of Service*	Total unduplicated population of urban census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Tract Extended Report	*Rural Population Served at Level of Service*	Total unduplicated population of rural census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Tract Extended Report	*Percent of Population Unserved*	100 minus percent of population served.
Tract Extended Report	*Service Stops*	Total number of times the stops within the geographic area are served on the given date(s). Service stops for a route is calculated as its stop count multiplied by the number of visits (i.e., trips or runs). The number reported is cumulative over the selected dates.
Tract Extended Report	*Urban Population Served By Service*	Summation of Population Served by Service over all urban census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.
Tract Extended Report	*Rural Population Served By Service*	Summation of Population Served by Service over all rural census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the given geographic area. Population served by service for a census block is calculated as the population of that block multiplied by the times that block is served on the selected date(s) by all agencies. The number reported is cumulative over the selected dates.

Tract Extended Report	*Employment Served (RAC)*	Total number of unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Tract Extended Report	*Percent of Employment Served (RAC)*	Employment Served (RAC) divided by the number of people residing in the given geographic area.
Tract Extended Report	*Percent of Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Tract Extended Report	*Employment Served at Level of Service (RAC)*	Total unduplicated people employed residing in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Tract Extended Report	*Percent of Employment Unserved (RAC)*	100 minus percent of Employment Served (RAC).
Tract Extended Report	*Employment Served By Service (RAC)*	Summation of Employment Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employment Served by Service for a census block is calculated as the number of employed people residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Tract Extended Report	*Employees Served (WAC)*	Total number of unduplicated people employed working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of all stops in the geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Tract Extended Report	*Percent of Employees Served (WAC)*	Employees Served (WAC) divided by the number of people working in the given geographic area.
Tract Extended Report	*Percent of Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s) divided by total number of employed people working in the area. X is the population search radius and N is the minimum level of service set by the user.
Tract Extended Report	*Employees Served at Level of Service (WAC)*	Total unduplicated people employed working in census blocks whose centroids are located within an X-mile radius of any stop that is within the geographical area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.
Tract Extended Report	*Percent of Employee Unserved (WAC)*	100 minus percent of employees served (WAC).
Tract Extended Report	*Employees Served By Service (WAC)*	Summation of Employees Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop in the geographic area. Employees Served by Service for a census block is calculated as the number of employed people working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Tract Extended Report	*Service Days*	Set of days (from the selected days) in which at least one trip within the given geographic area is served.
Tract Extended Report	*Connected Communities*	List of geographic areas of the same type that are connected to the area of interest through routes that are served on the selected date(s).

Tract Extended Report	*Hours of Service*	Difference between the earliest arrival time and latest departure time of all transit stops within the given geographic area.
Tract Extended Report	*Minimum Fare*	If available, this field points to the minimum fare for the given geographic area during the selected date(s).
Tract Extended Report	*Average Fare*	If available, this field points to the average fare for the given geographic area during the selected date(s).
Tract Extended Report	*Median Fare*	If available, this field points to the median fare for the given geographic area during the selected date(s).
Tract Extended Report	*Maximum Fare*	If available, this field points to the maximum fare for the given geographic area during the selected date(s).
Employment Report	*Employment (RAC)*	Total number of employed people residing in the geographic area.
Employment Report	*Employees (WAC)*	Total number of employed people working in the geographic area.
Employment Report	*Employment Served (RAC)*	Total number of people employed residing in the geographic area and served by the agency on selected date(s).

Employment Report	*Employees served (WAC)*	Total number of people employed working in the geographic area and served by the agency on selected date(s).
Employment Report	*[Category] (RAC)*	Total number of people employed, belonging to the category, residing in the geographic area.
Employment Report	*[Category] (WAC)*	Total number of people employed, belonging to the category, working in the geographic area.
Employment Report	*[Category] - S (RAC)*	[Category] Served: Total number of unduplicated people employed, belonging to the category, residing in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop of the agency/geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Employment Report	*[Category] - SS (RAC)*	[Category] Served by Service: Summation of [Category] Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop of the agency/geographic area. [Category] Served by Service for a census block is calculated as the number of employed people, belonging to the category, residing in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Employment Report	*[Category] - SLOS (RAC)*	[Category] Served at Level of Service: Total unduplicated people employed, belonging to the category, residing in census blocks whose centroids are located within an X-mile radius of any stop of the agency/geographic area and served at least N-times on the selected date(s). X is the employment search radius and N is the minimum level of service set by the user.
Employment Report	*[Category] - S (WAC)*	[Category] Served: Total number of unduplicated people employed, belonging to the category, working in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop of the agency/geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).

Employment Report	*[Category] - SS (WAC)*	[Category] Served by Service: Summation of [Category] Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop of the agency/geographic area. [Category] Served by Service for a block is calculated as the number of employed people, belonging to the category, working in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Employment Report	*[Category] - SLOS (WAC)*	[Category] Served at Level of Service: Total unduplicated people employed, belonging to the category, working in census blocks whose centroids are located within an X-mile radius of any stop of the agency/geographic area and served at least N-times on the selected date(s). X is the employment search radius and N is the minimum level of service set by the user.
Title VI Report	*[Category]*	Total number of individuals belonging to the category and living in the geographic area.
Title VI Report	*[Category] - S*	Number of Individuals Served: Total number of unduplicated individuals, belonging to the category, in census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop of the agency/geographic area. Each census block is counted once (unduplicated). This metric is date-independent, i.e., the stops may or may not be served on the selected date(s).
Title VI Report	*[Category] - SS*	Number of Individuals Served by Service: Summation of [Category] Served by Service over all census blocks whose centroids are located within an X-mile radius (i.e., stop distance) of any stop of the agency/geographic area. [Category] Served by Service for a census block is calculated as the number of individuals, belonging to the category, in that block multiplied by the times that block is served on the selected date(s). The number reported is cumulative over the selected dates.
Title VI Report	*[Category] - SLOS*	Number of Individuals Served at Level of Service: Total unduplicated individuals, belonging to the category, in census blocks whose centroids are located within an X-mile radius of any stop of the agency/geographic area and served at least N-times on the selected date(s). X is the population search radius and N is the minimum level of service set by the user.