REGIONAL TRANSIT SCREENING PLATFORM

dvrpc

TRANSIT NETWORK GAP ANALYZER

Where are there gaps in the transit network?
Evaluate in-demand connections between transit supportive origins and destinations where transit is not available or not competitive with vehicles using a composite measure.

Goal

The goal of the Network Gap Analysis was to identify in-demand connections between transit supportive places where transit was either not available or not competitive. The results highlight opportunities for transit service improvements or expansion.

Data Sources and Preparation

The Network Gap Analysis relied on General Transit Feed Specification (GTFS) transit routes and schedules, DVRPC's regional travel demand model (TIM 2.3), CTPP, and National Employment Time Series (NETS) datasets.

DVRPC's regional model, TIM 2.3 was calibrated to a 2015 base year, incorporating transit routes and schedules from GTFS provided by each transit agency. TIM 2.3 allows for detailed transit queries such as scheduled transfer wait time and how the transit distance compared to the driving distance. Since it was already calibrated using a variety of available survey data, TIM 2.3 was also used to estimate the total travel demand between TAZ's throughout the region.

CTPP data from 2006-2010 was projected to 2015 to gather information about population and zero-car household density. 2013 NETS data was also projected to 2015 and used to find employment density. These three pieces of information were used to calculate the 2015 DVRPC Transit Score at the TAZ level, indicating the underlying transit supportiveness of each zone in the region, based on land use densities.

Methodology

The Network Gap Analysis examined three attributes of each Origin-Destination (OD) pair of TAZs in the DVRPC region: Directness, Density, and Demand.

Directness

The directness of transit service for an OD pair depends on the circuitousness of the route and transfers. Specifically, is the shortest available distance that can be traveled via transit longer than the driving distance? Is the transit travel time longer than the estimated driving time? How many transfers are required to get from origin to destination via transit? Finally, how long is the scheduled wait time for those transfers? These questions were answered using the daily

average (for all time periods) collected from TIM 2.3. As shown in Table 1, points were assigned based on the answers and were summed to determine the directness score for the OD pair.

Table 1:

Question	**Scoring**
Is there a valid transit connection?	Yes = Answer remaining questions No = 6 (do not answer further questions)
Is transit distance longer than highway distance?	Yes = 1 No = 0
Is transit time longer than highway time?	Yes = 1 No = 0
Is a transfer required to get from O to D?	Yes = 1 No = 0 (do not answer further questions)
How many?	1 = 0 2 or more = 1
What is the total scheduled transfer wait time?	If 1 transfer, >= 10 minutes = 1 < 10 minutes = 0 If 2 or more transfers >= 20 minutes = 2 < 20 minutes = 0
Directness Score	**Sum of All Points**

The directness score ranges from 0-6. A score of 6 is reserved for OD pairs with no transit service between them. Served OD pairs received a score of 0-5 based on how well served they are. A score of 0 represents well served OD pairs, where direct transit service is available and competitive with driving. A score of 5 represents OD pairs that are not well served; where transit service is circuitous and transfers require long wait times. The higher the directness score, the more room for improvement.

Density

Density is a measure of transit supportiveness using DVRPC's 2015 Transit Score. Transit Score categorizes TAZs into five bins from low to high based on the density of population, employment, and zero-car households. A high Transit Score means the zone is dense enough to support transit service. For this analysis, the categories were assigned a numerical value from 1 to 5. The value for the origin was added to the value for the destination to determine the density score. Density score ranges from 2-10 and the higher the density score, the more transit supportive the OD pair.

Demand

Demand is the total number of trips, using all modes, between each OD pair based on the regional travel model. Approximately 86% of the OD pairs in the region had no demand between them and were given a demand score of 0. The rest were split into 2 bins, and given a score of 1 (9% of the region's OD pairs) or 2 (5% of the region's OD pairs).

These 3 variables - directness, density, and demand - were combined to calculate the overall network gap score. The directness score was multiplied by the density score. The results are weighted by demand when displayed. Therefore, OD pairs identified as a transit gap that also have relatively high demand for travel between them show up as a higher priority. The highest scoring places overall represent in-demand connections between transit supportive places where transit is not available or not competitive.

Results

The results are presented in two ways. First, a regional summary map shows TAZs symbolized by the demand weighted average network gap score. The summary for each zone is determined by the average network gap score from that zone to every other zone and to that zone from every other zone. The resulting average is then weighted by demand. The darker the color, the higher priority the transit gap.

Second, the results are presented in an interactive web map. The web map allows users to identify and prioritize transit gaps to and from specific areas of interest. Once users select an area of interest, either by TAZ(s) or municipality, the tool calculates and displays the demand weighted average network gap score between that area and every other TAZ in the region. Users can choose whether they are interested in trips to or from their selected area. The resulting map displays zones with substantial demand to or from the selected area. The darker the color, the higher priority the transit gap in relation to the selected area.