PathSkim

Version 5.0.23

Revision History
May 2013 - Created by Volpe Center

The **PathSkim** program is used to:

1. Generate skims from a link delay file
2. Generate skims from link travel time information

Syntax is PathSkim [-flag] [control_file]

The control_file is the file name of an ASCII file that contains the control strings expected by the program. The control_file is optional. If a file name is not provided, the program will prompt the user to enter a file name. The flag parameters are also optional. Any combination of the following flag parameters can be included on the command line:

Optional Flags:
-Q[uiet] = execute without screen messages
-H[elp] = show program syntax and control keys
-C[ontrol] = create/update a default control file
-K[eyCheck] = list unrecognized control file keys
-P[ause] = pause before exiting
-N[oPause] = never pause before exiting
-D[etail] = execute with detailed status messages
-X[ML] = write an XML file with control keys

The program automatically creates a printout file based on the control file name. If the filename includes an extension (e.g., ".ctl"), the extension is replaced with ".prn". The printout file will be created in the current working directory and will overwrite an existing file with the same name.

Version 5 Features

PathSkim is a new program that did not exist in version 4 TRANSIMS. It offers

- Multiple methods for automatically selecting origins and destinations
- Multiple or merged variable length time periods
  - Start or end time points
- One-to-many path building and save only skim data
  - No need to write/read plans
- Location/zone/district skims

- Multi-threading and time-period based partitioning

As such, it can simplify the router stabilization process. In version 4, router stabilization involves two steps. First, the router is used to generate a set of travel plans. Then, PlanSum is used to summarize those plans and provide zone skims. PathSkim, however, generates skims directly from the link delay file.

Control Key List

The list of control file keys appears in the tables below:

- Req / Opt indicates whether the key is **req**uired or **opt**ional
- The types include **Text**, Input **File**name, **New** file, **Bool**ean, **Path** (to a file), **Time**, **Int**eger, **Dec**imal, and **List** of items
- The Default is the default value, used if the key does not appear in the control file.
- I/O/P indicates Input, Output or Parameter.

For a more detailed description of the Parameter control keys, refer to the Parameter Reference. For a more detailed description of the Input or Output control keys, refer to the File Reference. These two documents also provide the possible values or range of values allowed for each control key listed below. For instance, files can usually be output to numerous formats beyond TAB_DELIMITED for additional post-processing / file manipulation actions.

Configuration Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
TITLE	Opt	Text		P
REPORT_FILE	Opt	File		O
REPORT_FLAG	Opt	Bool	FALSE	P
PAGE_LENGTH	Opt	Int	65	P
PROJECT_DIRECTORY	Opt	Path		P
DEFAULT_FILE_FORMAT	Opt	Text	TAB_DELIMITED	P
TIME_OF_DAY_FORMAT	Opt	Text	DAY_TIME	P
MODEL_START_TIME	Opt	Time	0:00	P
MODEL_END_TIME	Opt	Time	24:00:00	P
MODEL_TIME_INCREMENT	Opt	Time	15 minutes	P
UNITS_OF_MEASURE	Opt	Text	METRIC	P
RANDOM_NUMBER_SEED	Opt	Int	0	P
MAX_WARNING_MESSAGES	Opt	Int	100000	P
MAX_WARNING_EXIT_FLAG	Opt	Bool	TRUE	P
MAX_PROBLEM_COUNT	Opt	Int	0	P
NUMBER_OF_THREADS	Opt	Int	1	P

System File Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
NODE_FILE	Req	File		I
NODE_FORMAT	Opt	Text	TAB_DELIMITED	P
LINK_FILE	Req	File		I
LINK_FORMAT	Opt	Text	TAB_DELIMITED	P

Control File Keys:	Req/Opt	Type	Default	I/O/P
CONNECTION_FILE	Req	File		I
CONNECTION_FORMAT	Opt	Text	TAB_DELIMITED	P
LOCATION_FILE	Req	File		I
LOCATION_FORMAT	Opt	Text	TAB_DELIMITED	P
POCKET_FILE	Opt	File		I
POCKET_FORMAT	Opt	Text	TAB_DELIMITED	P
LANE_USE_FILE	Opt	File		I
LANE_USE_FORMAT	Opt	Text	TAB_DELIMITED	P
TURN_PENALTY_FILE	Opt	File		I
TURN_PENALTY_FORMAT	Opt	Text	TAB_DELIMITED	P
PARKING_FILE	Opt	File		I
PARKING_FORMAT	Opt	Text	TAB_DELIMITED	P
ACCESS_FILE	Opt	File		I
ACCESS_FORMAT	Opt	Text	TAB_DELIMITED	P
TRANSIT_STOP_FILE	Opt	File		I
TRANSIT_STOP_FORMAT	Opt	Text	TAB_DELIMITED	P
TRANSIT_FARE_FILE	Opt	File		I
TRANSIT_FARE_FORMAT	Opt	Text	TAB_DELIMITED	P
TRANSIT_ROUTE_FILE	Opt	File		I
TRANSIT_ROUTE_FORMAT	Opt	Text	TAB_DELIMITED	P
TRANSIT_SCHEDULE_FILE	Opt	File		I
TRANSIT_SCHEDULE_FORMAT	Opt	Text	TAB_DELIMITED	P
TRANSIT_DRIVER_FILE	Opt	File		I
TRANSIT_DRIVER_FORMAT	Opt	Text	TAB_DELIMITED	P
HOUSEHOLD_FILE	Opt	File		I
HOUSEHOLD_FORMAT	Opt	Text	TAB_DELIMITED	P
SELECTION_FILE	Opt	File		I
SELECTION_FORMAT	Opt	Text	TAB_DELIMITED	P
LINK_DELAY_FILE	Opt	File		I
LINK_DELAY_FORMAT	Opt	Text	TAB_DELIMITED	P
VEHICLE_FILE	Opt	File		I
VEHICLE_FORMAT	Opt	Text	TAB_DELIMITED	P
VEHICLE_TYPE_FILE	Opt	File		I
VEHICLE_TYPE_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_SKIM_FILE	Opt	New		O
NEW_SKIM_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_PLAN_FILE	Opt	New		O
NEW_PLAN_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_PROBLEM_FILE	Opt	New		O
NEW_PROBLEM_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_LINK_DELAY_FILE	Opt	New		O
NEW_LINK_DELAY_FORMAT	Opt	Text	TAB_DELIMITED	P

File Service Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
NOTES_AND_NAME_FIELDS	Opt	Bool	FALSE	P
SKIM_OD_UNITS	Opt	Text	ZONES	P
SKIM_TIME_PERIODS	Opt	List	ALL	P
SKIM_TIME_INCREMENT	Opt	Time	0 minutes	P
SKIM_TOTAL_TIME_FLAG	Opt	Bool	FALSE	P
SKIM_TRAVEL_TIME_FORMAT	Opt	Text	SECONDS	P
SKIM_TRIP_LENGTH_FORMAT	Opt	Text	METERS	P
NEAREST_NEIGHBOR_FACTOR	Opt	Dec	0 percent	P
MERGE_TIME_PERIODS	Opt	Bool	FALSE	P
SKIM_FILE_HEADERS	Opt	Bool	TRUE	P
ZONE_EQUIVALENCE_FILE	Opt	File		I
ZONE_LOCATION_MAP_FILE	Opt	File		I

Path Building Service Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
IMPEDANCE_SORT_METHOD	Opt	Bool	FALSE	P
SAVE_ONLY_SKIMS	Opt	Bool	FALSE	P
WALK_PATH_DETAILS	Opt	Bool	FALSE	P
IGNORE_VEHICLE_ID	Opt	Bool	FALSE	P
LIMIT_PARKING_ACCESS	Opt	Bool	TRUE	P
ADJUST_ACTIVITY_SCHEDULE	Opt	Bool	TRUE	P
IGNORE_ACTIVITY_DURATIONS	Opt	Bool	FALSE	P
IGNORE_TIME_CONSTRAINTS	Opt	Bool	FALSE	P
END_TIME_CONSTRAINT	Opt	Time	0 minutes	P
IGNORE_ROUTING_PROBLEMS	Opt	Bool	FALSE	P
PERCENT_RANDOM_IMPEDANCE	Opt	Dec	0 percent	P
TRAVELER_TYPE_SCRIPT	Opt	File		I
TRAVELER_PARAMETER_FILE	Opt	File		I
WALK_SPEED	Opt	Dec	1.0 mps	P
BICYCLE_SPEED	Opt	Dec	4.0 mps	P
WALK_TIME_VALUES_*	Opt	List	20.0 impedance/second	P
BICYCLE_TIME_VALUES_*	Opt	List	15.0 impedance/second	P
FIRST_WAIT_VALUES_*	Opt	List	20.0 impedance/second	P
TRANSFER_WAIT_VALUES_*	Opt	List	20.0 impedance/second	P
PARKING_TIME_VALUES_*	Opt	List	0.0 impedance/second	P
VEHICLE_TIME_VALUES_*	Opt	List	10.0 impedance/second	P
DISTANCE_VALUES_*	Opt	List	0.0 impedance/meter	P
COST_VALUES_*	Opt	List	0.0 impedance/cent	P
FREEWAY_BIAS_FACTORS_*	Opt	List	1	P
EXPRESSWAY_BIAS_FACTORS_*	Opt	List	1	P
LEFT_TURN_PENALTIES_*	Opt	List	0 impedance	P

Control File Keys:	Req/Opt	Type	Default	I/O/P
RIGHT_TURN_PENALTIES_*	Opt	List	0 impedance	P
U_TURN_PENALTIES_*	Opt	List	0 impedance	P
TRANSFER_PENALTIES_*	Opt	List	0 impedance	P
STOP_WAITING_PENALTIES_*	Opt	List	0 impedance	P
STATION_WAITING_PENALTIES_*	Opt	List	0 impedance	P
BUS_BIAS_FACTORS_*	Opt	List	1	P
BUS_BIAS_CONSTANTS_*	Opt	List	0 impedance	P
RAIL_BIAS_FACTORS_*	Opt	List	1	P
RAIL_BIAS_CONSTANTS_*	Opt	List	0 impedance	P
MAX_WALK_DISTANCES_*	Opt	List	2000 meters	P
WALK_PENALTY_DISTANCES_*	Opt	List	2000 meters	P
WALK_PENALTY_FACTORS_*	Opt	List	0	P
MIN_WAIT_TIMES_*	Opt	List	0 seconds	P
MAX_NUMBER_OF_TRANSFERS_*	Opt	List	3	P
MAX_PARK_RIDE_PERCENTS_*	Opt	List	50 percent	P
MAX_KISS_RIDE_PERCENTS_*	Opt	List	35 percent	P
KISS_RIDE_TIME_FACTORS_*	Opt	List	2.5	P
KISS_RIDE_STOP_TYPES	Opt	Text	EXTERNAL	P
MAX_KISS_RIDE_DROPOFF_WALK	Opt	Dec	100 meters	P
TRANSIT_PENALTY_FILE	Opt	File		I
PARKING_PENALTY_FILE	Opt	File		I
DEFAULT_PARKING_DURATION	Opt	Time	0.0 hours	P
MAX_NUMBER_OF_PATHS	Opt	Int	4	P
MAX_LEGS_PER_PATH	Opt	Int	1000	P
FARE_CLASS_DISTRIBUTION	Opt	List	0	P
LOCAL_ACCESS_DISTANCE	Opt	Dec	2000 meters	P
LOCAL_FACILITY_TYPE	Opt	Text	EXTERNAL	P
LOCAL_IMPEDANCE_FACTOR	Opt	Dec	0	P
MAX_CIRCUITY_RATIO	Opt	Dec	0	P
MIN_CIRCUITY_DISTANCE	Opt	Dec	2000 meters	P
MAX_CIRCUITY_DISTANCE	Opt	Dec	20000 meters	P
MIN_DURATION_FACTORS	Opt	List	0.1, 0.5, 0.8, 1.0	P

Flow-Time Service Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
UPDATE_FLOW_RATES	Opt	Bool	FALSE	P
CLEAR_INPUT_FLOW_RATES	Opt	Bool	FALSE	P
UPDATE_TURNING_MOVEMENTS	Opt	Bool	FALSE	P
UPDATE_TRAVEL_TIMES	Opt	Bool	FALSE	P
LINK_DELAY_UPDATE_RATE	Opt	Int	0	P
LINK_DELAY_FLOW_FACTOR	Opt	Dec	1	P
EQUATION_PARAMETERS_*	Opt	List	BPR, 0.15, 4.0, 0.75	P

PathSkim Control Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
ROUTE_FROM_SPECIFIED_LOCATIONS	Opt	List	ALL	P
ROUTE_TO_SPECIFIED_LOCATIONS	Opt	List	ALL	P
ROUTE_AT_SPECIFIED_TIMES	Opt	List	ALL	P
ROUTE_BY_TIME_INCREMENT	Opt	Time	0 minutes	P
ROUTE_WITH_TIME_CONSTRAINT	Opt	Text	START_TIME	P
ROUTE_WITH_SPECIFIED_MODE	Opt	Text	DRIVE	P
ROUTE_WITH_USE_RESTRICTION	Opt	Text	CAR	P
ROUTE_USING_VEHICLE_TYPE	Opt	Int	1	P
ROUTE_USING_TRAVELER_TYPE	Opt	Int	0	P
ROUTE_FROM_SPECIFIED_ZONES	Opt	List	ALL	P
ROUTE_TO_SPECIFIED_ZONES	Opt	List	ALL	P
ORIGIN_LOCATIONS_PER_ZONE	Opt	Int	0	P
DESTINATION_LOCATIONS_PER_ZONE	Opt	Int	0	P
LOCATION_SELECTION_METHOD	Opt	Text	RANDOM	P
ORIGIN_ZONE_FILE	Opt	File		I
DESTINATION_ZONE_FILE	Opt	File		I
ORIGIN_LOCATION_FILE	Opt	File		I
DESTINATION_LOCATION_FILE	Opt	File		I
NEW_ORIGIN_LOCATION_FILE	Opt	File		O
NEW_DESTINATION_LOCATION_FILE	Opt	File		O
PATHSKIM_REPORT_*	Opt	Text		P

Report Options:
ZONE_EQUIVALENCE

Notes

Each '_FILE' key has a corresponding '_FORMAT' key. The following file formats can be used for input and output files: TEXT, BINARY, FIXED_COLUMN, COMMA_DELIMITED, SPACE_DELIMITED, TAB_DELIMITED, CSV_DELIMITED, DBASE, SQLITE3, VERSION3. The default format is TAB_DELIMITED.

New Control Keys

DESTINATION_LOCATION_FILE

When the LOCATION_SELECTION_METHOD is “USER”, specifies the locations that will be used for each destination zone.

DESTINATION_LOCATIONS_PER_ZONE

The number of destination locations per zone can range from 0 to 100. The default is 0, and it indicates that all locations should be used. TRANSIMS actually calculates Location – Location travel times, and this determines the number of locations that should be used to determine an average travel time to a zone.

LOCATION_SELECTION_METHOD

RANDOM: USER, RANDOM, CENTROID, DISTRIBUTED

For zone-zone paths, the actual paths are selected from locations within the zone. The number of locations selected per zone is given by DESTINATION_LOCATIONS_PER_ZONE and ORIGIN_LOCATIONS_PER_ZONE. This parameter determines how the locations are selected within the zone

RANDOM (the default): random locations are selected

CENTROID: locations are selected near the zone centroid

DISTRIBUTED: locations are spatially distributed around the zone.

USER: user specified

MERGE_TIME_PERIODS

Indicates whether the time periods uses in a skim are to be merged, or reported separately. Default value is FALSE. Valid values include TRUE/FALSE, YES/NO, 1/0, T/F, Y/N

NEAREST_NEIGHBOR_FACTOR

Adjusts skim values for intra-zonal skims. Default value is 0.5. Valid values range from 0.0 to 1.0. (See output_skims.cpp)

NEW_ORIGIN_LOCATION_FILE

Zone to zone paths are based on certain locations chosen within each zone. These locations might be all of the locations in a zone, or a subset. The NEW_ORIGIN_LOCATION_FILE lists, for each zone, the origin locations that were used for path building.

NEW_DESTINATION_LOCATION_FILE

Zone to zone paths are based on certain locations chosen within each zone. These locations might be all of the locations in a zone, or a subset. The NEW_DESTINATION_LOCATION_FILE lists, for each zone, the destination locations that were used for path building.

NEW_SKIM_FILE

The output file for the skims. Its columns are defined as follows:

ORIGIN - The origin location index (zone, location or district)
DESTINATION - The destination location index (zone, location or district)
PERIOD - Time period for this skim (an integer that corresponds to SKIM_TIME_PERIODS, or SKIM_TIME_INCREMENT)
COUNT - Number of location/time period pairs considered for this origin-destination pair
WALK - Walking time, typically in seconds
DRIVE - Driving time, typically in seconds
OTHER - Other time, typically in seconds
LENGTH - Length of the trip, typically in meters
COST - Out of pocket cost of the trip in cents
IMPEDANCE – Total impedance for the trip

ORIGIN_LOCATION_FILE

When the LOCATION_SELECTION_METHOD is “USER”, specifies the locations that will be used for each origin zone.

ORIGIN_LOCATIONS_PER_ZONE

The number of origin locations per zone can range from 0 to 100. The default is 0, and it indicates that all locations should be used. TRANSIMS actually calculates Location – Location travel times, and this determines the number of locations that should be used to determine an average travel time from a zone.

ROUTE_AT_SPECIFIED_TIMES

Either this key or the ROUTE_BY_TIME_INCREMENT key is used to determine the time intervals for which PathSkim should calculate skims. The default is ALL, but this may be any time interval, or set of multiple time intervals. Examples of valid values might be

ALL
0..97200 seconds
0.0..27.0 hours
0:00..27:00
6:00..6:30, 8:00..8:15, 8:15..8:30

ROUTE_BY_TIME_INCREMENT

Either this key or the ROUTE_AT_SPECIFIED_TIMES key is used to determine the time intervals for which PathSkim should calculate skims. The default is 0 (e.g., look at ROUTE_AT_SPECIFIED TIMES). Valid non-zero values range from 2 to 240 minutes. For example, if 15 minutes is used, it will calculate skims for 0:00..0:15, 0:15..0:30, 0:30..0:45, 0:45..1:00, 1:00..1:15, and so on.

ROUTE_FROM_SPECIFIED_LOCATIONS

Limits routing to a specified list of origin locations. The default is ALL locations.

ROUTE_FROM_SPECIFIED_ZONES

Limits routing to a specified list of origin zones. The default is ALL zones.

ROUTE_TO_SPECIFIED_LOCATIONS

Limits routing to a specified list of destination locations. The default is ALL locations.

ROUTE_TO_SPECIFIED_ZONES

Limits routing to a specified list of destination zones. The default is ALL zones.

ROUTE_WITH_SPECIFIED_MODE

Routes with a specific travel mode. The default is DRIVE, and valid values include WALK, BIKE, DRIVE, RIDE, TRANSIT, PNR_OUT, PNR_IN, KNR_OUT, KNR_IN, TAXI, OTHER, HOV2, HOV3, HOV4.

ROUTE_USING_VEHICLE_TYPE

Indicates a particular vehicle type to be used for routing.

ROUTE_USING_TRAVELER_TYPE

Indicates a particular traveler type to be used for routing.

ROUTE_WITH_USE_RESTRICTION

Indicates a particular use to be used for routing. The default is “CAR”, and valid values include ANY, WALK, BIKE, CAR, TRUCK, BUS, RAIL, SOV, HOV2, HOV3, HOV4, LIGHTTRUCK, HEAVYTRUCK, TAXI, RESTRICTED, NONE.

In earlier versions of PathSkim (prior to 5.0.13) this parameter was named “ROUTE_WITH_SPECIFIED_USE_TYPE.”

ROUTE_WITH_TIME_CONSTRAINT

Indicates the time constraint to be used for routing. The default is START_TIME, and valid values include NONE, START, ARRIVE, FIXED, DURATION, PASSENGER

SKIM_FILE_HEADERS

Default value is TRUE. Valid values include TRUE/FALSE, YES/NO, 1/0, T/F, Y/N

SKIM_OD_UNITS

The type of origin or destination. The default is ZONE, and valid values include DISTRICT, ZONE, LOCATION

SKIM_TIME_INCREMENT

Either this key or the SKIM_TIME_PERIODS key is used to determine the time intervals for which PathSkim should output skims. The default is 0 (i.e., look at SKIM_TIME_PERIODS). Valid non-zero values range from 5 to 240 minutes. For example, if 15 minutes is used, it will output skims for 0:00..0:15, 0:15..0:30, 0:30..0:45, 0:45..1:00, 1:00..1:15, and so on.

SKIM_TIME_PERIODS

Either this key or the SKIM_TIME_INCREMENT key is used to determine the time intervals for which PathSkim should output skims. The default is ALL, but this may be any time interval, or set of multiple time intervals. Examples of valid values might be

ALL
0..97200 seconds
0.0..27.0 hours
0:00..27:00
6:00..6:30, 8:00..8:15, 8:15..8:30

SKIM_TOTAL_TIME_FLAG

Default value is FALSE. Valid values include TRUE/FALSE, YES/NO, 1/0, T/F, Y/N

SKIM_TRAVEL_TIME_FORMAT

Default value is SECONDS. Valid values include SECONDS, MINUTES, HOURS, HOUR_CLOCK, DAY_TIME, TIME_CODE

SKIM_TRIP_LENGTH_FORMAT

Default value is METERS. Valid values include FEET, MILES, METERS, KILOMETERS

Examples

These examples use the following network. In this network, the large numbers are zones, and the small numbers represent locations within internal zone 1 and external zone 11.

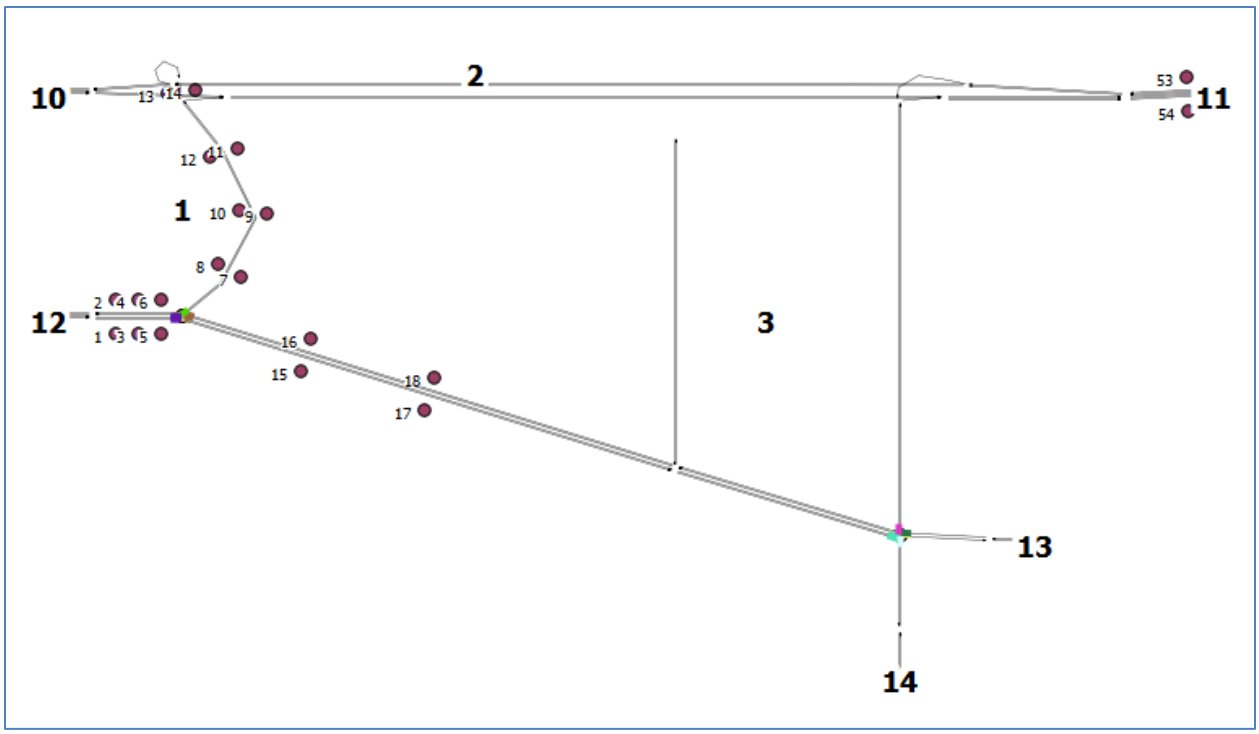

Figure 1 Network used for the examples

Example 1: Skims using free flow times

The first example simply uses information from the node, link, zone and location files to calculate zone-to-zone travel times.

Control File

```
PROJECT_DIRECTORY                    ../

CONNECTION_FILE                      network/connection.txt
LINK_FILE                            network/link.txt
LOCATION_FILE                        network/Location.txt
NEW_SKIM_FILE                        results/Skim_NoLinkDelay.txt
NODE_FILE                            network/Node.txt
PARKING_FILE                         Network/parking.txt
TITLE                                PathSkim for SOV Skims
ZONE_FILE                            network/zone.txt
```

Resulting .prn file from the above control file

```
*****************************************
|                                       |
|        PathSkim - Version 5.0.23      |
|  Copyright 2012 by TRANSIMS Open-Source  |
|         Fri Apr 12 08:45:27 2013      |
|                                       |
*****************************************

Control File = PathSkimToyNoLinkDelay.ctl
Report File  = PathSkimToyNoLinkDelay.prn (Create)
```

```
PathSkim for SOV Skims

Project Directory = ../
Default File Format = TAB_DELIMITED
Time of Day Format = HOUR_CLOCK
Model Start Time = 0:00
Model End Time = 27:00
Units of Measure = METRIC
Random Number Seed = 1365770727
Number of Threads = 1

Input System Network Files:
Node File = ../network/Node.txt
Zone File = ../network/zone.txt
Link File = ../network/link.txt
Connection File = ../network/connection.txt
Parking File = ../Network/parking.txt
Location File = ../network/Location.txt

Output System Demand Files:
New Skim File = ../results/Skim_NoLinkDelay.txt

Data Service Controls:

Number of Time Periods = 108

Flow-Time Service Controls:

Path Building Parameters:

PathSkim Control Keys:

Number of Node File Records = 23

Number of Zone File Records = 8
Highest Zone Number = 14

Number of Link File Records = 24
Number of Directional Links = 37
Number of Connection File Records = 49

Number of Parking File Records = 60

Number of Location File Records = 60

Number of Selected Origin Zones  = 7
Number of Selected Destinations  = 7
Number of Specified Time Periods = 1
Number of Potential Skim Cells   = 49

New Skim File Period 0 Records = 39

Number of Output Origin Zones = 7 (100.0%)
Number of Output Destinations = 7 (100.0%)
Number of Output Time Periods = 1 (100.0%)
Number of Output Skim Cells   = 39 (79.6%)

Total Number of Problems = 392
Number of Path Building (#1) Problems = 392 (100.0%)
```

```
Fri Apr 12 08:45:27 2013 -- Process Complete (0:00:00)
```

Output Skim File (Skim_NoLinkDelay.txt)

In this file with one time period, the origins and destinations are zone numbers. The columns are defined as follows:

ORIGIN - The origin zone or location number
DESTINATION - The destination zone or location number
PERIOD - Time period for this skim
COUNT - Number of location pairs considered for this zone pair
WALK - Walking time in seconds
DRIVE - Driving time in seconds
OTHER - Other time in seconds
LENGTH - Length of the trip in meters
COST - Out of pocket cost of the trip in cents
IMPEDANCE – Total impedance for the trip

NUM_ORG=7; NUM_DES=7; PERIODS=0:00..27:00

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
1	1	0	274	30	44	0	584	0	1051
1	3	0	576	30	140	0	1889	0	2006
1	11	0	36	45	152	0	2988	0	2424
1	12	0	36	45	47	0	642	0	1378
1	13	0	36	45	157	0	2171	0	2472
1	14	0	36	45	160	0	2171	0	2505
3	1	0	512	30	132	0	1787	0	1924
3	3	0	992	30	48	0	642	0	1091
3	11	0	64	45	122	0	1821	0	2125
3	12	0	64	45	140	0	1953	0	2304
3	13	0	64	45	48	0	661	0	1380
3	14	0	64	45	50	0	661	0	1408
10	10	0	2	60	0	0	30	0	1200
10	11	0	4	60	94	0	2525	0	2138
11	1	0	36	45	163	0	3226	0	2534
11	3	0	64	45	137	0	2147	0	2275
11	10	0	4	60	101	0	2725	0	2212
11	11	0	2	60	0	0	30	0	1200
11	12	0	4	60	199	0	3780	0	3190
11	13	0	4	60	142	0	2220	0	2615
11	14	0	4	60	145	0	2220	0	2648
12	1	0	32	45	40	0	541	0	1302
12	3	0	64	45	140	0	1938	0	2305
12	11	0	4	60	188	0	3530	0	3082
12	12	0	2	60	0	0	30	0	1200
12	13	0	4	60	157	0	2220	0	2772
12	14	0	4	60	160	0	2220	0	2805
13	1	0	32	45	148	0	2055	0	2388
13	3	0	64	45	48	0	647	0	1381
13	11	0	4	60	127	0	1880	0	2465

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
13	12	0	4	60	157	0	2220	0	2772
13	13	0	2	60	0	0	30	0	1200
13	14	0	4	60	42	0	570	0	1625
14	1	0	32	45	152	0	2055	0	2420
14	3	0	64	45	50	0	646	0	1406
14	11	0	4	60	130	0	1880	0	2497
14	12	0	4	60	160	0	2220	0	2804
14	13	0	4	60	42	0	570	0	1624
14	14	0	2	60	0	0	30	0	1200

Example 2: Skims using simulated travel times from a Link Delay file

In this example, the origins and destinations are zone numbers. We choose four time periods, and to produce skims only from zone 1.

Control File

```
PROJECT_DIRECTORY                       ../

CONNECTION_FILE                     network/connection.txt
LINK_DELAY_FILE                     Results/3.Trip.Performance
LINK_FILE                           network/link.txt
LOCATION_FILE                       network/Location.txt
NEW_DESTINATION_LOCATION_FILE       results/New_SOV_Des_Loc_File.txt
NEW_ORIGIN_LOCATION_FILE            results/New_SOV_Ori_Loc_File.txt
NEW_SKIM_FILE                       results/Skim.txt
NODE_FILE                           network/Node.txt
PARKING_FILE                        network/parking.txt
ROUTE_FROM_SPECIFIED_ZONES                 1
ROUTE_BY_TIME_INCREMENT             15 minutes
SKIM_TIME_INCREMENT                 0 minutes               //---- 0, 5..240 minutes
SKIM_TIME_PERIODS                   6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
TITLE                               PathSkim for SOV Skims
ZONE_FILE                           network/zone.txt
```

Resulting .prn file

```
*****************************************
|                                       |
|        PathSkim - Version 5.0.23      |
|  Copyright 2012 by TRANSIMS Open-Source  |
|         Fri Apr 12 08:55:04 2013      |
|                                       |
*****************************************

Control File = PathSkimToy1.ctl
Report File  = PathSkimToy1.prn (Create)

PathSkim for SOV Skims

Project Directory = ../
Default File Format = TAB_DELIMITED
Time of Day Format = HOUR_CLOCK
Model Start Time = 0:00
Model End Time = 27:00
Units of Measure = METRIC
Random Number Seed = 1365771304
Number of Threads = 1
```

```
Input System Network Files:
Node File = ../network/Node.txt
Zone File = ../network/zone.txt
Link File = ../network/link.txt
Connection File = ../network/connection.txt
Parking File = ../network/parking.txt
Location File = ../network/Location.txt

Input System Demand Files:
Link Delay File = ../Results/3.Trip.Performance

Output System Demand Files:
New Skim File = ../results/Skim.txt

Skim Time Periods = 6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
Skim Time Increment = 0.00 minutes

Data Service Controls:

Number of Time Periods = 108

Flow-Time Service Controls:

Path Building Parameters:

PathSkim Control Keys:
Route By Time Increment = 15.00 minutes
Route From Specified Zones = 1

New Origin Location File = ../results/New_SOV_Ori_Loc_File.txt
New Destination Location File = ../results/New_SOV_Des_Loc_File.txt

Number of Node File Records = 23

Number of Zone File Records = 8
Highest Zone Number = 14

Number of Link File Records = 24
Number of Directional Links = 37

Number of Connection File Records = 49

Number of Parking File Records = 60

Number of Location File Records = 60

Number of Link Delay File Records = 7207
Number of Link Direction Records = 3302
Number of Link Connection Records = 3905

Number of Summary Time Periods = 108
Percent of Link Periods with Travel Time Data = 82.6%
Percent of Time Periods with Link Delay Data = 88.9%
Percent of Connection Periods with Travel Time Data = 73.8%
Percent of Time Periods with Connection Delay Data = 88.9%

Number of Selected Origin Zones  = 1
Number of Selected Destinations  = 7
Number of Specified Time Periods = 4
Number of Potential Skim Cells   = 28

New Skim File Period 0 Records = 6
New Skim File Period 1 Records = 6
New Skim File Period 2 Records = 6
New Skim File Period 3 Records = 6
```

```
Number of Output Origin Zones = 1 (100.0%)
Number of Output Destinations = 6 (85.7%)
Number of Output Time Periods = 4 (100.0%)
Number of Output Skim Cells   = 24 (85.7%)

Total Number of Problems = 430
Number of Path Building (#1) Problems = 430 (100.0%)

Fri Apr 12 08:55:04 2013 -- Process Complete (0:00:00)
```

Output Location File (New_SOV_Des_Loc_File.txt)

This is an output file, listing the locations that were used for each zone. Files can be produced listing both origin and destination locations.

```
ZONE   LOCATIONS
1      1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
3      19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50
10     51, 52
11     53, 54
12     55, 56
13     57, 58
14     59, 60
```

Output SkimFile (Skim.txt)

This table shows the skims from zone 1 to all of the other zones. It includes 4 time periods, as specified in the SKIM_TIME_PERIODS parameter in the control file.

NUM_ORG=1; NUM_DES=7; PERIODS=6:00..6:15, 8:00..8:15, 8:15..8:30, 8:30..9:00

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
1	1	0	274	30	45	0	584	0	1062
1	3	0	576	30	143	0	1889	0	2039
1	11	0	36	45	142	0	2988	0	2319
1	12	0	36	45	45	0	642	0	1355
1	13	0	36	45	167	0	2171	0	2576
1	14	0	36	45	168	0	2171	0	2580
1	1	1	274	30	47	0	584	0	1080
1	3	1	576	30	151	0	1889	0	2116
1	11	1	36	45	146	0	2988	0	2362
1	12	1	36	45	45	0	642	0	1357
1	13	1	36	45	176	0	2171	0	2665
1	14	1	36	45	176	0	2171	0	2665
1	1	2	274	30	49	0	584	0	1098
1	3	2	576	30	152	0	1889	0	2129
1	11	2	36	45	147	0	2988	0	2375
1	12	2	36	45	46	0	642	0	1363
1	13	2	36	45	177	0	2171	0	2675
1	14	2	36	45	177	0	2171	0	2673
1	1	3	548	30	48	0	584	0	1090
1	3	3	1152	30	151	0	1888	0	2120
1	11	3	72	45	147	0	2988	0	2371
1	12	3	72	45	45	0	642	0	1355
1	13	3	72	45	176	0	2171	0	2659

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
1	14	3	72	45	175	0	2171	0	2657

Example 3: Skims using specific activity locations

Here we generate skims from a few specified locations (in zone 1) to location 54 (the external zone 11)

Control File

```
PROJECT_DIRECTORY                    ../
CONNECTION_FILE                   Network/connection.txt
LINK_DELAY_FILE                   Results/3.Trip.Performance
LINK_FILE                         Network/link.txt
LOCATION_FILE                     Network/Location.txt
NEW_DESTINATION_LOCATION_FILE     results/New_Des_Loc_File.txt
NEW_ORIGIN_LOCATION_FILE          results/New_Ori_Loc_File.txt
NEW_SKIM_FILE                     results/Loc_Skim.txt
NODE_FILE                         Network/Node.txt
PARKING_FILE                      Network/parking.txt
ROUTE_BY_TIME_INCREMENT           15 minutes     //---- 0, 5..240 minutes
ROUTE_FROM_SPECIFIED_LOCATIONS    3..4,9..10,17..18
ROUTE_TO_SPECIFIED_LOCATIONS      54
SKIM_OD_UNITS                     LOCATIONS    //---- DISTRICT, ZONE, LOCATION
SKIM_TIME_INCREMENT               0 minutes    //---- 0, 5..240 minutes
SKIM_TIME_PERIODS                 6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
TITLE                             PathSkim for SOV Skims
ZONE_FILE                         Network/zone.txt
```

Resulting .prn file

```
*****************************************
|                                       |
|        PathSkim - Version 5.0.23      |
|  Copyright 2012 by TRANSIMS Open-Source  |
|         Fri Apr 12 09:22:26 2013      |
|                                       |
*****************************************
Control File = PathSkimToy2.ctl
Report File  = PathSkimToy2.prn (Create)

PathSkim for SOV Skims

Project Directory = ../
Default File Format = TAB_DELIMITED
Time of Day Format = HOUR_CLOCK
Model Start Time = 0:00
Model End Time = 27:00
Units of Measure = METRIC
Random Number Seed = 1365772946
Number of Threads = 1

Input System Network Files:
Node File = ../Network/Node.txt
Zone File = ../Network/zone.txt
Link File = ../Network/link.txt
Connection File = ../Network/connection.txt
Parking File = ../Network/parking.txt
Location File = ../Network/Location.txt

Input System Demand Files:
Link Delay File = ../Results/3.Trip.Performance
```

```
Output System Demand Files:
New Skim File = ../results/Loc_Skim.txt

Skim OD Units = LOCATIONS
Skim Time Periods = 6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
Skim Time Increment = 0.00 minutes

Data Service Controls:

Number of Time Periods = 108

Flow-Time Service Controls:
Path Building Parameters:

PathSkim Control Keys:
Route From Specified Locations = 3..4,9..10,17..18
Route to Specified Locations = 54
Route By Time Increment = 15.00 minutes
Number of Node File Records = 23

Number of Zone File Records = 8
Highest Zone Number = 14

Number of Link File Records = 24
Number of Directional Links = 37

Number of Connection File Records = 49

Number of Parking File Records = 60

Number of Location File Records = 60

Number of Link Delay File Records = 7207
Number of Link Direction Records = 3302
Number of Link Connection Records = 3905

Number of Summary Time Periods = 108
Percent of Link Periods with Travel Time Data = 82.6%
Percent of Time Periods with Link Delay Data = 88.9%
Percent of Connection Periods with Travel Time Data = 73.8%
Percent of Time Periods with Connection Delay Data = 88.9%

Number of Selected Origin Locations = 6
Number of Selected Destinations     = 1
Number of Specified Time Periods    = 1
Number of Potential Skim Cells      = 6

New Skim File Period 0 Records = 6
New Skim File Period 1 Records = 6
New Skim File Period 2 Records = 6
New Skim File Period 3 Records = 6

Number of Output Origin Locations = 6 (100.0%)
Number of Output Destinations     = 1 (100.0%)
Number of Output Time Periods     = 4 (400.0%)
Number of Output Skim Cells       = 24 (400.0%)

Fri Apr 12 09:22:26 2013 -- Process Complete (0:00:00)
```

Output SkimFile (Loc_Skim.txt)

This table shows the skims from locations 3,4,9,10,17 and 18 to location 54. It includes 4 time periods, as specified in the SKIM_TIME_PERIODS parameter in the control file.

NUM_ORG=6; NUM_DES=1; PERIODS=6:00..6:15, 8:00..8:15, 8:15..8:30, 8:30..9:00

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
3	54	0	1	45	167	0	3360	0	2578
4	54	0	1	45	167	0	3360	0	2578
9	54	0	1	45	113	0	2760	0	2030
10	54	0	1	45	113	0	2760	0	2030
17	54	0	1	45	181	0	2697	0	2715
18	54	0	1	45	181	0	2697	0	2715
3	54	1	1	45	176	0	3360	0	2666
4	54	1	1	45	176	0	3360	0	2666
9	54	1	1	45	113	0	2760	0	2038
10	54	1	1	45	113	0	2760	0	2038
17	54	1	1	45	189	0	2697	0	2791
18	54	1	1	45	189	0	2697	0	2791
3	54	2	1	45	181	0	3360	0	2710
4	54	2	1	45	181	0	3360	0	2710
9	54	2	1	45	113	0	2760	0	2034
10	54	2	1	45	113	0	2760	0	2034
17	54	2	1	45	188	0	2697	0	2784
18	54	2	1	45	188	0	2697	0	2784
3	54	3	2	45	180	0	3360	0	2701
4	54	3	2	45	180	0	3360	0	2701
9	54	3	2	45	113	0	2760	0	2036
10	54	3	2	45	113	0	2760	0	2036
17	54	3	2	45	187	0	2697	0	2773
18	54	3	2	45	187	0	2697	0	2773

Example 4: Centroid to Centroid Skims

This skim picks one location per zone, near the centroid of each zone.

Control File

```
PROJECT_DIRECTORY                    ../

CONNECTION_FILE                  network/connection.txt
DESTINATION_LOCATIONS_PER_ZONE       1
LINK_DELAY_FILE                  Results/3.Trip.Performance
LINK_FILE                        network/link.txt
LOCATION_FILE                    network/Location.txt
LOCATION_SELECTION_METHOD            CENTROID
ORIGIN_LOCATIONS_PER_ZONE            1
NEW_DESTINATION_LOCATION_FILE    results/New_Centroid_Des_File.txt
NEW_ORIGIN_LOCATION_FILE         results/New_Centroid_Ori_File.txt
NEW_SKIM_FILE                    results/SOV_Centroid_Skim.txt
NODE_FILE                        network/Node.txt
PARKING_FILE                     network/parking.txt
ROUTE_AT_SPECIFIED_TIMES         6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
ROUTE_BY_TIME_INCREMENT          0
SKIM_TIME_INCREMENT              0 minutes
SKIM_TIME_PERIODS                6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
TITLE                            PathSkim for Centroid Skims
ZONE_FILE                        network/zone.txt
```

Resulting .prn file

```
*****************************************
|                                       |
|        PathSkim - Version 5.0.23      |
|  Copyright 2012 by TRANSIMS Open-Source  |
|         Fri Apr 12 14:39:13 2013      |
|                                       |
*****************************************

Control File = PathSkimToy3.ctl
Report File  = PathSkimToy3.prn (Create)

PathSkim for Centroid Skims

Project Directory = ../
Default File Format = TAB_DELIMITED
Time of Day Format = HOUR_CLOCK
Model Start Time = 0:00
Model End Time = 27:00
Units of Measure = METRIC
Random Number Seed = 1365791953
Number of Threads = 1

Input System Network Files:
Node File = ../network/Node.txt
Zone File = ../network/zone.txt
Link File = ../network/link.txt
Connection File = ../network/connection.txt
Parking File = ../network/parking.txt
Location File = ../network/Location.txt

Input System Demand Files:
Link Delay File = ../Results/3.Trip.Performance

Output System Demand Files:
New Skim File = ../results/SOV_Centroid_Skim.txt

Skim Time Periods = 6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
Skim Time Increment = 0.00 minutes
Data Service Controls:
Number of Time Periods = 108
Flow-Time Service Controls:

Path Building Parameters:
PathSkim Control Keys:
Route At Specified Times = 6.0..6.25, 8.0..8.25, 8.25..8.5, 8.5..9.0
Route By Time Increment = 0.00 minutes
Origin Locations Per Zone = 1
Destination Locations Per Zone = 1
Location Selection Method = CENTROID
New Origin Location File = ../results/New_Centroid_Ori_File.txt
New Destination Location File = ../results/New_Centroid_Des_File.txt
Number of Node File Records = 23
Number of Zone File Records = 8
Highest Zone Number = 14
Number of Link File Records = 24
Number of Directional Links = 37
```

```
Number of Connection File Records = 49
Number of Parking File Records = 60
Number of Location File Records = 60
Number of Link Delay File Records = 7207
Number of Link Direction Records = 3302
Number of Link Connection Records = 3905
Number of Summary Time Periods = 108
Percent of Link Periods with Travel Time Data = 82.6%
Percent of Time Periods with Link Delay Data = 88.9%
Percent of Connection Periods with Travel Time Data = 73.8%
Percent of Time Periods with Connection Delay Data = 88.9%

Number of Selected Origin Zones  = 7
Number of Selected Destinations  = 7
Number of Specified Time Periods = 4
Number of Potential Skim Cells   = 196

New Skim File Period 0 Records = 32

New Skim File Period 1 Records = 32

New Skim File Period 2 Records = 32

New Skim File Period 3 Records = 32

Number of Output Origin Zones = 7 (100.0%)
Number of Output Destinations = 7 (100.0%)
Number of Output Time Periods = 4 (100.0%)
Number of Output Skim Cells   = 128 (65.3%)

Total Number of Problems = 68
Number of Path Building (#1) Problems = 68 (100.0%)

Fri Apr 12 14:39:13 2013 -- Process Complete (0:00:00)
```

Output Location File (New_Centroid_Des_File.txt)

This is an output file, listing the location that was used for each zone.

```
ZONE   LOCATIONS
1      9
3      47
10     51
11     53
12     55
13     57
14     59
```

Output SkimFile (Skim.txt)

This table shows a selection of the centroid-based skims. It includes 4 time periods, as specified in the SKIM_TIME_PERIODS parameter in the control file. Note that the values for the Zone 1 to Zone 11 skim are the same as those for the Location 9 to Location 54 skim in the previous example. This is because the chosen centroid for Zone 1 was Location 9, and the chosen centroid for Zone 11 was Location 53 (which is adjacent to Location 54).

```
NUM_ORG=7; NUM_DES=7; PERIODS=6:00..6:15, 8:00..8:15, 8:15..8:30, 8:30..9:00
```

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
1	3	0	1	30	140	0	2010	0	2007
1	11	0	1	45	113	0	2760	0	2030
1	12	0	1	45	55	0	800	0	1450
1	13	0	1	45	183	0	2450	0	2734
1	14	0	1	45	183	0	2450	0	2738
3	1	0	1	30	163	0	2010	0	2235
…	…	…	…	…	…	…	…	…	…
1	3	1	1	30	142	0	2010	0	2023
1	11	1	1	45	113	0	2760	0	2038
1	12	1	1	45	55	0	800	0	1453
1	13	1	1	45	190	0	2450	0	2799
1	14	1	1	45	190	0	2450	0	2799
3	1	1	1	30	164	0	2010	0	2247
…	…	…	…	…	…	…	…	…	…
1	3	2	1	30	142	0	2010	0	2031
1	11	2	1	45	113	0	2760	0	2034
1	12	2	1	45	55	0	800	0	1454
1	13	2	1	45	189	0	2450	0	2793
1	14	2	1	45	189	0	2450	0	2791
3	1	2	1	30	171	0	2010	0	2316
…	…	…	…	…	…	…	…	…	…
1	3	3	1	30	142	0	2010	0	2023
1	11	3	1	45	113	0	2760	0	2037
1	12	3	1	45	55	0	800	0	1450
1	13	3	1	45	188	0	2450	0	2780
1	14	3	1	45	188	0	2450	0	2779
3	1	3	1	30	167	0	2010	0	2279
…	…	…	…	…	…	…	…	…	…
14	13	3	1	60	89	0	570	0	2092