

TRANSIMS Version 5

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ACCESS_FILE

Names: ACCESS_FILE and NEW_ACCESS_FILE

Used In:

ArcNet
ConvertTrips Default Control K
LocationData
Microsimulator
NewFormat
PathSkim
Router
TransimsNet

To be defined

Process Links → Access Link

- **Version 5 does not need Process Links**
 - Link-offsets are used to build direct two-way connections
 - Access Links are only used for special connections
 - Two-way or one-way links between nodes, locations, parking lots, and transit stops



- **Version 4 process links are required to connect**
 - activity locations ↔ parking and activity locations ↔ transit stops
- **Version 5 access links may connect**
 - locations ↔ parking, locations ↔ stops, locations ↔ nodes
 - locations ↔ locations, stops ↔ stops, nodes ↔ nodes
 - parking ↔ stops, parking ↔ nodes, stops ↔ nodes
- **Walk links with travel time, distance, and cost**
- **Transit stops no longer need activity locations**
 - Activity locations with a zero zone number are deleted

ACTIVITY_FILE

Name: ACTIVITY_FILE

Used In:

NewFormat

To be defined

ARC_ACCESS_FILE

Names: ARC_ACCESS_FILE, NEW_ARC_ACCESS_FILE

Used in ArcNet

To be defined

ARC_ACCESSIBILITY_FILE

Names: ARC_ACCESSIBILITY_FILE, NEW_ARC_ACCESSIBILITY_FILE

Used in ArcPlan

To be defined

ARC_BANDWIDTH_FILE

Names: ARC_BANDWIDTH_FILE, NEW_ARC_BANDWIDTH_FILE

Used in ArcpLAN

To be defined

ARC_CENTERLINE_FILE

Names: ARC_CENTERLINE_FILE, NEW_ARC_CENTERLINE_FILE

Used in ArcNet

To be defined

ARC_CONNECTION_FILE

Names: ARC_CONNECTION_FILE, NEW_ARC_CONNECTION_FILE

Used in ArcNet

To be defined

ARC_DETECTOR_FILE

Names: ARC_DETECTOR_FILE, NEW_ARC_DETECTOR_FILE

Used in ArcNet

To be defined

ARC_DISTANCE_CONTOUR_FILE

Names: ARC_DISTANCE_CONTOUR_FILE, NEW_ARC_DISTANCE_CONTOUR_FILE

Used in ArcPlan

To be defined

ARC_LANE_USE_FILE

Names: ARC_LANE_USE_FILE, NEW_ARC_LANE_USE_FILE

Used in ArcNet

To be defined

ARC_LINK_FILE

Names: ARC_LINK_FILE, NEW_ARC_LINK_FILE

Used in ArcNet

To be defined

ARC_LOCATION_FILE

Names: ARC_LOCATION_FILE, NEW_ARC_LOCATION_FILE

Used in ArcNet

To be defined

ARC_NODE_FILE

Names: ARC_NODE_FILE, NEW_ARC_NODE_FILE

Used in ArcNet

To be defined

ARC_PARKING_DEMAND_FILE

Names: ARC_PARKING_DEMAND_FILE, NEW_ARC_PARKING_DEMAND_FILE

Used in ArcPlan

To be defined

ARC_PARKING_FILE

Names: ARC_PARKING_FILE, NEW_ARC_PARKING_FILE

Used in ArcNet

To be defined

ARC_PHASING_PLAN_FILE

Names: ARC_PHASING_PLAN_FILE, NEW_ARC_PHASING_PLAN_FILE

Used in ArcNet

To be defined

ARC_PLAN_FILE

Names: ARC_PLAN_FILE, NEW_ARC_PLAN_FILE

Used in ArcPlan

To be defined

ARC_POCKET_FILE

Names: ARC_POCKET_FILE, NEW_ARC_POCKET_FILE

Used in ArcNet

To be defined

ARC_PROBLEM_FILE

Names: ARC_PROBLEM_FILE, NEW_ARC_PROBLEM_FILE

Used in ArcPlan

To be defined

ARC_RIDERSHIP_FILE

Names: ARC_RIDERSHIP_FILE, NEW_ARC_RIDERSHIP_FILE

Used in ArcPlan

To be defined

ARC_ROUTE_NODES_FILE

Names: ARC_ROUTE_NODES_FILE, NEW_ARC_ROUTE_NODES_FILE

Used in ArcNet

To be defined

ARC_SIGN_FILE

Names: ARC_SIGN_FILE, NEW_ARC_SIGN_FILE

Used in ArcNet

To be defined

ARC_SIGNAL_FILE

Names: ARC_SIGNAL_FILE, NEW_ARC_SIGNAL_FILE

Used in ArcNet

To be defined

ARC_SNAPSHOT_FILE

Names: ARC_SNAPSHOT_FILE, NEW_ARC_SNAPSHOT_FILE

Used in ArcSnapshot

To be defined

ARC_STOP_DEMAND_FILE

Names: ARC_STOP_DEMAND_FILE, NEW_ARC_STOP_DEMAND_FILE

Used in ArcPlan

To be defined

ARC_STOP_GROUP_FILE

Names: ARC_STOP_GROUP_FILE, NEW_ARC_STOP_GROUP_FILE

Used in ArcPlan

To be defined

ARC_SUBZONE_DATA_FILE

Names: ARC_SUBZONE_DATA_FILE, NEW_ARC_SUBZONE_DATA_FILE

Used in ArcNet

To be defined

ARC_TIME_CONTOUR_FILE

Names: ARC_TIME_CONTOUR_FILE, NEW_ARC_TIME_CONTOUR_FILE

Used in ArcPlan

To be defined

ARC_TIMING_PLAN_FILE

Names: ARC_TIMING_PLAN_FILE, NEW_ARC_TIMING_PLAN_FILE

Used in ArcNet

To be defined

ARC_TRANSIT_DRIVER_FILE

Names: ARC_TRANSIT_DRIVER_FILE, NEW_ARC_TRANSIT_DRIVER_FILE

Used in ArcNet

To be defined

ARC_TRANSIT_ROUTE_FILE

Names: ARC_TRANSIT_ROUTE_FILE, NEW_ARC_TRANSIT_ROUTE_FILE

Used in ArcNet

To be defined

ARC_TRANSIT_STOP_FILE

Names: ARC_TRANSIT_STOP_FILE, NEW_ARC_TRANSIT_STOP_FILE

Used in ArcNet

To be defined

ARC_TURN_PENALTY_FILE

Names: ARC_TURN_PENALTY_FILE, NEW_ARC_TURN_PENALTY_FILE

Used in ArcNet

To be defined

ARC_ZONE_FILE

Names: ARC_ZONE_FILE, NEW_ARC_ZONE_FILE

Used in ArcNet

To be defined

COMPARE_PERFORMANCE_FILE

Used in LinkSum

To be defined

COMPARE_PLAN_FILE

Used in PlanCompare

To be defined

CONNECTION_FILE

Names: CONNECTION_FILE, NEW_CONNECTION_FILE

Used In:

- ArcNet
- ArcPlan
- ArcSnapshot
- IntControl
- LinkDelay
- LinkSum
- Microsimulator
- NewFormat
- PathSkim
- PlanSelect
- PlanSum
- Router
- TransimsNet

Formerly known as lane_connectivity, this is a list of intersection connections in the network. A typical field definition (.def) file is as follows:

```
TRANSIMS50, TAB_DELIMITED, 1
LINK, INTEGER, 1, 10
DIR, INTEGER, 2, 1
TO_LINK, INTEGER, 3, 10
LANES, STRING, 4, 8, LANE_RANGE_TYPE
TO_LANES, STRING, 5, 8, LANE_RANGE_TYPE
TYPE, STRING, 6, 8, CONNECTION_TYPE
PENALTY, UNSIGNED, 7, 5, IMPEDANCE
SPEED, DOUBLE, 8, 5.1, KPH
CAPACITY, UNSIGNED, 9, 8, VPH
NOTES, STRING, 10, 128
```

The fields are defined as follows:

Table 1 CONNECTION_FILE Field Definitions

Field(s)	Description	Use	Default Units
LINK	The link number (an integer)	Key	
DIR	Direction on the link AB=0, BA=1	Req.	
TO_LINK	Outbound Link	Req.	
LANES	Range of inbound lanes, numbered from right to left	Req.	Note 1
TO_LANES	Range of outbound lanes, numbered from right to left	Req.	Note 1
TYPE	Connection Type	Req.	Note 2
PENALTY	Penalty for the movement	Opt.	Seconds
SPEED	Maximum turning speed	Opt.	m/s
CAPACITY	Hourly vehicle capacity for the turn	Opt.	veh/hr
NOTES	Character string for user notes	Opt.	

Note 1: Could either be a single lane number, or a range, e.g., 1..2

Note 2: Connection types include NO_TYPE, THRU, R_SPLIT, L_SPLIT, R_MERGE, L_MERGE, RIGHT, LEFT, UTURN

The following figure and table shows some examples.

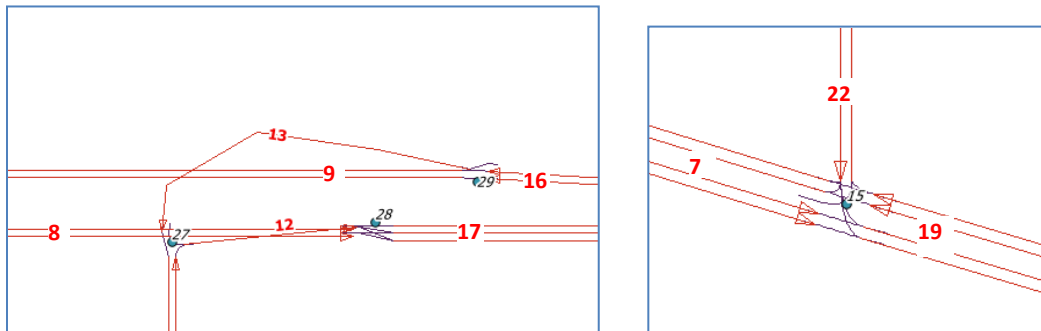


Table 2 CONNECTION_FILE Example

LINK	DIR	TO_LINK	LANES	TO_LANES	TYPE	PENALTY	SPEED	CAPACITY	NOTES
16	0	13	R1	1	R_SPLIT	0	0	0	Off Ramp
16	0	9	1..2	1..2	THRU	0	0	0	Thru lanes at off ramp
8	0	17	1..2	1..3	THRU	0	0	0	Thru lanes at on ramp
12	0	17	1	1..2	R_MERGE	0	0	0	On ramp
7	0	19	1..2	1..2	THRU	0	0	0	Eastbound thru lanes
7	0	22	L1	1	LEFT	0	0	0	Eastbound left turn
19	1	22	1	1	RIGHT	0	0	0	Westbound right turn
19	1	7	1..2	1..2	THRU	0	0	0	Westbound thru lanes

LINK	DIR	TO_LINK	LANES	TO_LANES	TYPE	PENALTY	SPEED	CAPACITY	NOTES
22	1	7	1	1..2	RIGHT	0	0	0	Southbound right turn
22	1	19	1	1..2	LEFT	0	0	0	Southbound left turn

Differences from Version 4

Lane numbering has changed significantly from version 4. In version 5, lanes are numbered from right to left, and pocket lanes are treated separately.



Figure 1 Lane Number Difference Between V4 and V5

This simplifies the lane connectivity edits. In version 4, the edits would often cascade from one intersection to another.

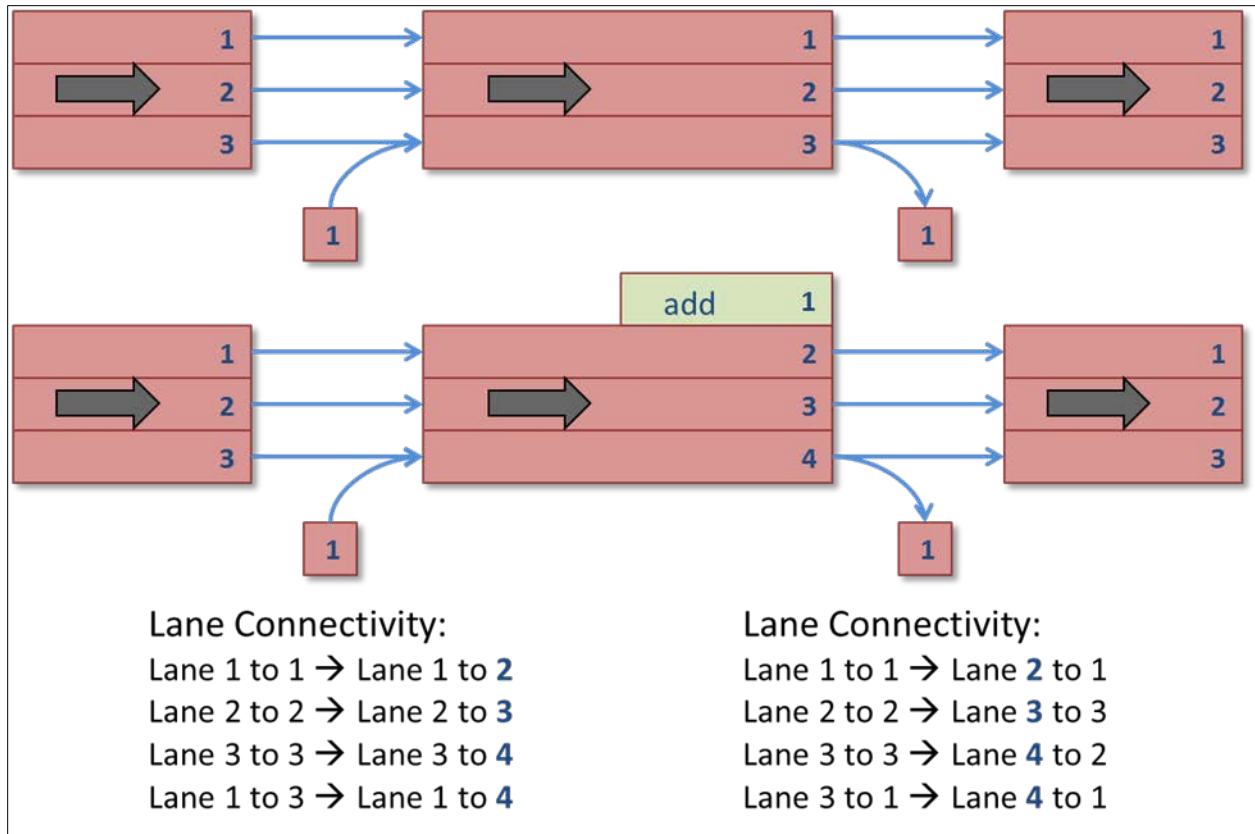


Figure 2 Version 4 Lane Connectivity Edits

In version 5, the edits are simpler:

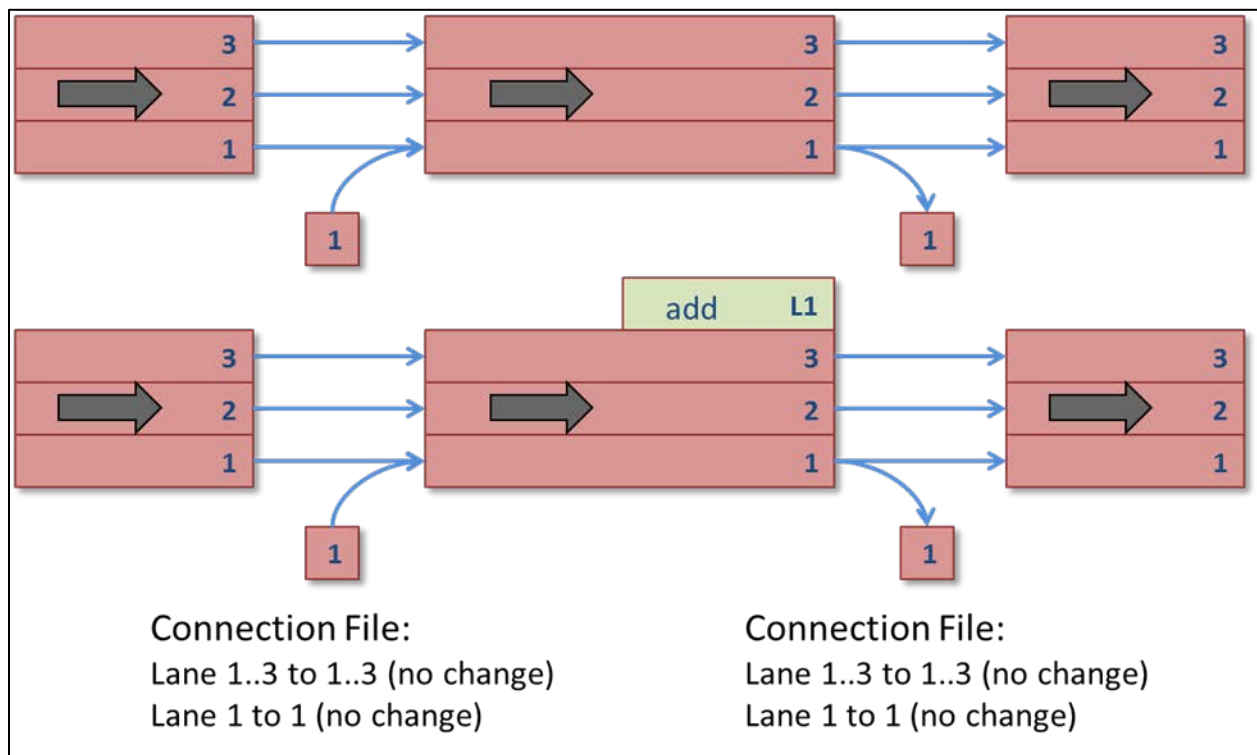


Figure 3 Version 5 Connection Edits

CONVERSION_SCRIPT

UserPrograms
NetPrep

This is an optional key though it may be required for specific applications. The conversion script key value is a directory with the conversion script filename appended to it. NetPrep is the primary program in TRANSIMS 5 which uses a TRANSIMS UserProgram-type script for input. The programming language for the script is described in the UserPrograms documentation. By default the data field names found in the GIS link file are copied to the corresponding name in the TRANSIMS link file. If the GIS link file was created using ArcNet, this means the data from the GIS file will automatically be copied to the TRANSIMS fields (provided the input and output files are in the same general file structure (i.e., Version4 vs. Version5)). If the GIS link file includes different field names or different units of measure, a conversion script is typically used to manipulate the data or map the input field names to the output field names. The input link shape file fields are referenced as "Link.field" and the TRANSIMS link fields are referenced as NewLink.field".

An example of a conversion script appears below:

NewLink.USE = "ANY"
NewLink.LINK = Link.ID

NewLink.LENGTH = 1609 * Link.LENGTH

```
NewLink.LANES_AB = Link.AB_LANE  
NewLink.LANES_BA = Link.BA_LANE
```

```
NewLink.SPEED_AB = Link.AB_PKSPD  
NewLink.SPEED_BA = Link.BA_PKSPD
```

```
NewLink.FSPD_AB = Link.SPDLIM  
NewLink.FSPD_BA = Link.SPDLIM
```

```
NewLink.CAP_AB = Link.AB_CAP  
NewLink.CAP_BA = Link.BA_CAP
```

```
IF (Link.FT == 1) THEN  
    NewLink.TYPE = "FREEWAY"  
ELSE IF (Link.FT == 2) THEN  
    NewLink.TYPE = "Expressway"  
ELSE IF (Link.FT == 3) THEN  
    NewLink.TYPE = "Principal"  
ELSE IF (Link.FT == 4) THEN  
    NewLink.TYPE = "Major"  
ELSE IF (Link.FT == 5) THEN  
    NewLink.TYPE = "Minor"  
ELSE IF (Link.FT == 6) THEN  
    NewLink.TYPE = "Collector"  
ELSE IF (Link.FT == 7) THEN  
    NewLink.TYPE = "Local"  
ELSE IF (Link.FT == 8) THEN  
    NewLink.TYPE = "Local"  
ELSE IF (Link.FT == 9) THEN  
    NewLink.TYPE = "Frontage"  
ELSE IF (Link.FT == 20) THEN  
    NewLink.TYPE = "External"  
ENDIF ENDIF ENDIF ENDIF ENDIF ENDIF ENDIF ENDIF ENDIF  
  
RETURN (1)  
END
```

COST_DISTRIBUTION_FILE

```
NEW_COST_DISTRIBUTION_FILE  
    PlanCompare
```

DELETE_LINK_FILE

```
DELETE_LINK_FILE  
    NetPrep
```

The delete link file is optional and if specified defines a series of link numbers where the pocket lanes, activity locations, parking lots, processing links and link are deleted. The lane connectivity at both ends of the link is also updated. Each record in the file is interpreted as a comma separated list of link ranges. A link range is specified using two period (e.g., 100..200). The file could also be a simple list of link numbers. The values in the link range and the link file are combined if both keys are provided.

DELETE_NODE_CONTROL_FILE

DELETE_NODE_CONTROL_FILE

IntControl Default Control Key

DELETE_NODE_FILE

DELETE_NODE_FILE

NetPrep

The delete node file is optional and if specified defines a series of node numbers where the lane connectivity, traffic control warrants, and node are deleted. Each record in the file is interpreted as a comma separated list of node ranges. A node range is specified using two period (e.g., 100..200). The file could also be a simple list of node numbers. The values in the node range and the node file are combined if both keys are provided.

DESTINATION_LOCATION_FILE

DESTINATION_LOCATION_FILE

PathSkim

NEW_DESTINATION_LOCATION_FILE

PathSkim

DESTINATION_ZONE_FILE

DESTINATION_ZONE_FILE

PathSkim

DETECTOR_FILE

DETECTOR_FILE

ArcNet

IntControl Default Control Key

Microsimulator

NewFormat

NEW_DETECTOR_FILE

IntControl Default Control Key

NewFormat

DIRECTIONAL_DATA_FILE

DIRECTIONAL_DATA_FILE

LinkData
NEW_DIRECTIONAL_DATA_FILE
LinkData

GROUP_TRAVEL_FILE

NEW_GROUP_TRAVEL_FILE
LinkSum

HOUSEHOLD_FILE

Names: HOUSEHOLD_FILE, NEW_HOUSEHOLD_FILE

Both HOUSEHOLD_FILE and NEW_HOUSEHOLD_FILE are used in
ConvertTrips
NewFormat

Additionally, HOUSEHOLD_FILE is used in
Simulator
PathSkim
RandomSelect
Router

The household file key is appended to the PROJECT_DIRECTORY key to specify the file name for the input household file copied to the output household file by the program. One household is generated for each trip in the input trip tables.

The version 5 household file replaces the household and population files in version 4. A Version 5 .def file for the household file is as follows:

TRANSIMS50, TAB_DELIMITED, 2, NESTED
HHOLD, INTEGER, 1, 10
LOCATION, INTEGER, 2, 10
PERSONS, INTEGER, 3, 2, NEST_COUNT
WORKERS, INTEGER, 4, 2
VEHICLES, INTEGER, 5, 2
PERSON, INTEGER, 1, 5, NO, NESTED
AGE, INTEGER, 2, 3, YEARS, NESTED
RELATE, STRING, 3, 12, RELATE_TYPE, NESTED
GENDER, STRING, 4, 8, GENDER_TYPE, NESTED
WORK, STRING, 5, 6, TRUE/FALSE, NESTED
DRIVE, STRING, 6, 6, TRUE/FALSE, NESTED

Table 3 HOUSEHOLD_FILE Field Definitions

Field(s)	Description	Default Units
HHOLD	Household number	
LOCATION	Location (activity location) for the household	
PERSONS	Number of persons in the household	
WORKERS	Number of workers	
VEHICLES	Number of vehicles	
PERSON	(nested field) Person number	
AGE	(nested field) Age of that person	Years
RELATE	(nested field) Relationship of that person. Options include blank, NO_RELATE, HEAD_HHOLD, SPOUSE, CHILD, FAMILY	
GENDER	(nested field) Gender of that person. Options include NO_SEX, MALE, FEMALE	MALE
WORK	(nested field) Is that person a worker (TRUE, FALSE)	TRUE
DRIVE	(nested field) Does that person drive (TRUE, FALSE)	TRUE

An example, with one person, is as follows:

Table 4 HOUSEHOLD_FILE Example

HHOLD	LOCATION	PERSONS	WORKERS	VEHICLES	
PERSON	AGE	RELATE	GENDER	WORK	DRIVE
1	41	1	1	1	
1	25		MALE	TRUE	TRUE

INPUT_LINK_FILE

INPUT_LINK_FILE

NetPrep

The link file key is optional (depending on the purpose of using NetPrep). It specifies the name of a shapefile containing the links in the network. If an input node shapefile is provided, the node coordinates will be extracted from the shapefile point location. If an input node shapefile is not provided, the node coordinates will be extracted from the first and last points in the input link shapefile. The value for this key specifies the relative path of the directory and the filename of the input link shapefile. Note that this file MUST have a “.shp” extension. Use of a “.txt” extension file for the value of this key will result in processing error(s). When this key is included, a [conversion script](#) is likely to be needed as well.

INPUT_NODE_FILE

INPUT_NODE_FILE

NetPrep

The input node file key is optional. It specifies the name of a shapefile containing the nodes in the network. If a node shapefile is provided, the node coordinates will be extracted from the point locations in this shapefile. If a node shapefile is not provided, the node coordinates will be extracted from the first and last points in the input link shapefile.

INPUT_SIGN_FILE

INPUT_SIGN_FILE

IntControl Default Control Key

INPUT_SIGNAL_FILE

INPUT_SIGNAL_FILE

IntControl Default Control Key

INPUT_SPDCAP_FILE

INPUT_SPDCAP_FILE

NetPrep

INPUT_ZONE_FILE

INPUT_ZONE_FILE

NetPrep

The network zone table key is optional. If provided, it specifies the filename and relative path of the input zone file. For example, the value “network/Input_Zone.txt” could be used, given that the Project Directory key has been set to a value of “../” (quotation marks should not be included). If a Project Directory key is not specified, the full path of the input zone file should be used instead. The zone file contains: the zone number (ZONE), X and Y coordinates in UTM meters (X_COORD, Y_COORD), and an area type (AREATYPE) code between 1 and 8. If a zone file is not provided, the zone centroids are extracted from the node file. In this case, all area types will be equal to 2. The input zone file, if produced by NetPrep, can be used subsequently as one of the network files

KEEP_LINK_FILE

KEEP_LINK_FILE

NetPrep

The keep link file key is optional and specifies the full path and file name of the file that lists the link IDs that need to be retained in the highway network. The NetPrep 5 program deletes and/or replaces certain links that are not required for the highway simulation. If transit routes will be included in the network, the links associated with transit stations and stops should not be removed from the network. The TransimsNet program retains all the links specified in the keep link file even when they are not required for the highway simulation. This functionality is sometimes necessary for highway networks to prevent programmatic deletion of important links by TRANSIMS. A sample keep link file is shown below.

LINK
72
612
4050
4088
5988
6201

12006
12009
20133

KEEP_NODE_FILE

KEEP_NODE_FILE

NetPrep

The keep node file key is optional and specifies the full path and file name of the file that lists the node IDs that need to be retained in the highway network. In TRANSIMS Version 5, this functionality is located in NetPrep V5; previously, it was incorporated into TransimsNet V4. The NetPrep 5 program removes nodes that are not required for the highway simulation. If transit routes will be included in the network, the nodes associated with transit stations and stops should not be removed from the network. The TransimsNet program retains all the nodes specified in the keep node file even when they are not required for the highway simulation. This functionality is sometimes necessary for highway networks to prevent programmatic deletion of important nodes by TRANSIMS. Typically, few nodes are adversely affected by the TRANSIMS network pruning algorithm, but when this issue is present, subsequent network synthesis and trip assignment, routing, and simulation can result. A sample keep node file is shown below:

NODE

288
583
3930
3931
3932
3933
3934
3935
3936

LANE_USE_FILE

LANE_USE_FILE

ArcNet
IntControl Default Control Key
LinkSum
Microsimulator
NewFormat
PathSkim
PlanSelect
PlanSum
Router

NEW_LANE_USE_FILE

NewFormat

LINK_ACTIVITY_FILE

NEW_LINK_ACTIVITY_FILE

LinkSum

LINK_DATA_FILE

NEW_LINK_DATA_FILE

LinkData

LINK_DELAY_FILE

LINK_DELAY_FILE is an input to ArcPlan, IntControl , LinkDelay, NewFormat, PathSkim, PlanSelect, PlanSum, and Router

NEW_LINK_DELAY_FILE is an output from LinkDelay, NewFormat, PathSkim, PlanSum, Router

If the input LINK_DELAY_FILE key is provided to the router, the program uses the information in the link delay file to initialize the link flows and travel times for each time period. The header record in the link delay file is used to determine the size of each time period. The time periods are typically 15 minutes long. If a link delay file is not provided (or the key is "NULL"), free flow speeds are used for all times of day. Free flow speeds are also used for all links and time periods not included in the link delay file.

The NEW_LINK_DELAY_FILE is the output file of link delays. By default, it produces flows and travel times at 15-minute increments (Table 3). The Version 4 LINK_DELAY file had volume, an integer number of vehicles entering or exiting the link during a time period. The Version 5 LINK_DELAY file has flow, which is not necessarily integer (for example, a vehicle traversing half of the link would add 0.5 to the flow).

A .def file is as follows

```
TRANSIMS50, TAB_DELIMITED, 1
LINK, INTEGER, 1, 10
DIR, INTEGER, 2, 1
START, TIME, 3, 16, HOUR_CLOCK
END, TIME, 4, 16, HOUR_CLOCK
FLOW, DOUBLE, 5, 8.1, VEHICLES
TIME, TIME, 6, 8.1, SECONDS
```

Table 5 LINK_DELAY_FILE Field Definitions

Field(s)	Description	Default Units
LINK	Link Number	
DIR	Direction (0 = A->B, 1 = B->A)	
START	Starting time of day	HOUR_CLOCK

Field(s)	Description	Default Units
END	Ending time of day	HOUR_CLOCK
FLOW	Distance traveled by vehicles on the link during the START-END interval divided by the link length. Travel units could be VEHICLES, PERSONS, or Passenger Car Equivalents	VEHICLES
TIME	Travel time: link length x VHT / VMT	SECONDS

Table 6 LINK_DELAY_FILE Example

LINK	DIR	START	END	FLOW	TIME
11	0	0:00	0:15	2.7	83.4
11	1	0:00	0:15	0.7	83.4
...
11	0	7:00	7:15	147	114.9
11	1	7:00	7:15	83.5	85.9
11	0	7:15	7:30	159.2	128.4
11	1	7:15	7:30	95	87.8
11	0	7:30	7:45	190.5	184.5
11	1	7:30	7:45	97.2	88.3
11	0	7:45	8:00	191.5	186.9
11	1	7:45	8:00	98.2	88.6
11	0	8:00	8:15	208.7	235.7
11	1	8:00	8:15	121.8	97
11	0	8:15	8:30	227.5	308.1
11	1	8:15	8:30	115	93.8
11	0	8:30	8:45	229.7	317.8
11	1	8:30	8:45	122.7	97.4
...
11	1	23:45	24:00:00	18.3	83.4

LINK_DETAIL_FILE

NEW_LINK_DETAIL_FILE

NetPrep

LINK_EQUIVALENCE_FILE

LINK_EQUIVALENCE_FILE

LinkSum

PlanSum

LINK_NODE_EQUIVALENCE

LINK_NODE_EQUIVALENCE_FILE

TransimsNet

The LINK_NODE_EQUIVALENCE file control key has not yet been implemented in TransimsNet 5.0.

LINK_FILE

Names: LINK_FILE, NEW_LINK_FILE

Used In:

ArcNet
ArcPlan
ArcSnapshot
ConvertTrips
IntControl
LinkDelay
LinkSum
LocationData
Microsimulator
NetPrep
NewFormat
PathSkim
PlanSelect
PlanSum
ProblemSelect
Router
TransimsNet

The link file and new link file both refer to a list of links in the network. A typical field definition (.def) file is shown below. Note that the NEW_LINK_FILE key is a required control key in NetPrep 5 and specifies the relative location and the name of the output link file. This key may not be a required value in the other TRANSIMS program modules in which it is used. Also note that the definition (.def) file associated with the NEW_LINK_FILE produced by NetPrep does not contain a "NAME" field. Consequently, including a reference to a "NAME" field in a NetPrep conversion script (if one is used) will result in a run-time error that prevents the program from executing to completion. Refer to the Quick Reference and/or the Program Reference associated with each TRANSIMS module which uses link and new link files for additional details. The NetPrep conversion script is described in this document as well.

TRANSIMS50, TAB_DELIMITED, 1
LINK, INTEGER, 1, 10
NAME, STRING, 2, 40
NODE_A, INTEGER, 3, 10
NODE_B, INTEGER, 4, 10

LENGTH, DOUBLE, 5, 8.1, METERS
SETBACK_A, DOUBLE, 6, 5.1, METERS
SETBACK_B, DOUBLE, 7, 5.1, METERS
BEARING_A, INTEGER, 8, 4, DEGREES
BEARING_B, INTEGER, 9, 4, DEGREES
TYPE, STRING, 10, 12, FACILITY_TYPE
DIVIDED, UNSIGNED, 11, 1
AREA_TYPE, UNSIGNED, 12, 3
GRADE, DOUBLE, 13, 5.1, PERCENT
LANES_AB, UNSIGNED, 14, 2
SPEED_AB, DOUBLE, 15, 5.1, KPH
FSPD_AB, DOUBLE, 16, 5.1, KPH
CAP_AB, UNSIGNED, 17, 8, VPH
LANES_BA, UNSIGNED, 18, 2
SPEED_BA, DOUBLE, 19, 5.1, KPH
FSPD_BA, DOUBLE, 20, 5.1, KPH
CAP_BA, UNSIGNED, 21, 8, VPH
USE, STRING, 22, 128, USE_TYPE
NOTES, STRING, 23, 128

The fields are defined as follows:

Table 7 LINK_FILE Field Definitions

Field(s)	Description	Use	Default Units
LINK	The link number (an integer)	Key	
NAME	Typically, the name of the street	Opt.	
NODE_A	The node at one end of the link (an integer)	Req.	
NODE_B	The node at the other end of the link (an integer)	Req.	
LENGTH	Length of the link	Req.	M
SETBACK_A, SETBACK_B	When the link is drawn, the setback from each end to its corresponding node	Opt.	M
BEARING_A	Compass direction entering the link at the A end	Opt.	Degrees
BEARING_B	Compass direction exiting the link at the B end	Opt.	Degrees
TYPE	Facility type (functional classification) of the link	Req.	Note 1
DIVIDED	Is it a divided highway?	Opt.	
AREA_TYPE			
GRADE	Percent grade from A to B	Opt.	Pct.
LANES_AB, LANES_BA	Number of thru lanes in the indicated direction. For a one-way link going from A to B, LANES_BA = 0	Req.	
SPEED_AB, SPEED_BA	Speed limit in the indicated direction	Opt.	m/s
FSPD_AB, FSPD_BA	Free flow speed in the indicated direction	Opt.	m/s
CAP_AB, CAP_BA	Hourly vehicle capacity in the indicated direction (used for Volume / Capacity functions)	Opt.	veh/hr
USE	Vehicle types, modes, or use types permitted on the link	Req.	Note 2
NOTES	Character string for user notes	Opt.	

Note 1: Facility types include FREEWAY, EXPRESSWAY, PRINCIPAL, MAJOR, MINOR, COLLECTOR, LOCAL_THRU, LOCAL, FRONTAGE, RAMP, BRIDGE, TUNNEL, OTHER, WALKWAY, BIKEWAY, BUSWAY, LIGHTRAIL, HEAVYRAIL, FERRY, EXTERNAL

Note 2: Uses include ANY, WALK, BIKE, CAR, TRUCK, BUS, RAIL, SOV, HOV2, HOV3, HOV4, LIGHTTRUCK, HEAVYTRUCK, TAXI, RESTRICTED

Figure 1 and Table 2 illustrate a small example. Here, links 8 and 9 are freeway links, link 11 is a minor arterial, and links 12 and 13 are ramps. Typically, limited access roads are represented with separate links for each direction of travel, while other roads have a single link for both directions of travel (even if the road is divided).

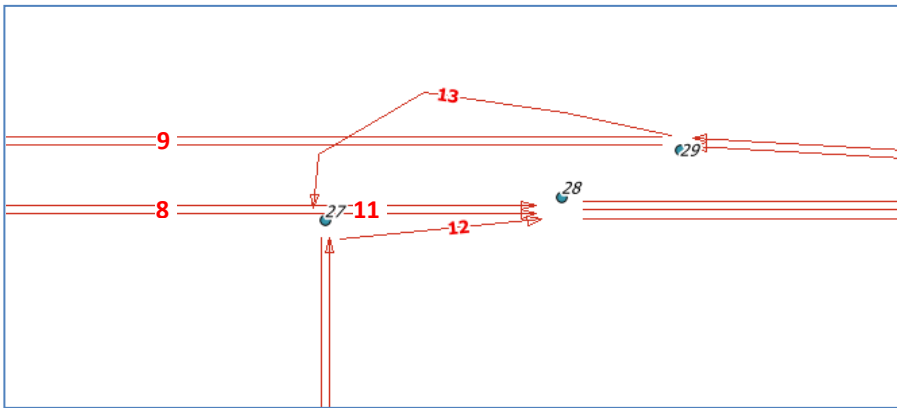


Figure 4 Example Links

Table 8 LINK_FILE Example

LINK	NAME	NODE_A	NODE_B	LENGTH	SETBACK_A	SETBACK_B	BEARING_A	BEARING_B	TYPE	DIVIDED	AREA_TYPE	GRADE
8	0	24	28	1650	9.1	9.1	90	90	FREEWAY	0	2	0
9	0	29	21	1650	7.5	7.5	270	270	FREEWAY	0	2	
11	0	16	27	1000	9.1	7.5	0	0	MINOR	0	2	
12	0	27	28	110	7.5	9.1	84	84	RAMP	0	2	
13	0	29	27	300	7.5	7.5	282	207	RAMP	0	2	

Table 8 (continued) LINK_FILE Example

LINK	LANES_AB	SPEED_AB	FSPD_AB	CAP_AB	LANES_BA	SPEED_BA	FSPD_BA	CAP_BA	USE	NOTES
8	2	97	96	4000	0	0	0	0	AUTO TRUCK BUS	
9	2	97	96	4000	0	0	0	0	AUTO TRUCK BUS	
11	1	43	43	800	1	43	43	800	AUTO TRUCK BUS	
12	1	72	71	1000	0	0	0	0	AUTO TRUCK BUS	
13	1	72	72	1000	0	0	0	0	AUTO TRUCK BUS	

LINK_NODE_LIST_FILE

LINK_NODE_LIST_FILE

LinkData

NEW_LINK_NODE_LIST_FILE

NetPrep

LINK_SUMMARY_FILE

NEW_LINK_SUMMARY_FILE

ArcSnapshot Default Control Ke

LINK_VOLUME_FILE

NEW_LINK_VOLUME_FILE

PlanSum

LOCATION_FILE

LOCATION_FILE

ArcNet
ArcPlan
ConvertTrips Default Control K
LinkSum
LocationData
Microsimulator
NewFormat
PathSkim
PlanSelect
ProblemSelect Default Control
Router
TransimsNet Default Control Ke

NEW_LOCATION_FILE

LocationData
NewFormat
TransimsNet Default Control Ke

MERGE_LINK_DELAY_FILE

MERGE_LINK_DELAY_FILE

LinkDelay

MERGE_PLAN_FILE

MERGE_PLAN_FILE

PlanPrep

MERGE_TRIP_FILE

MERGE_TRIP_FILE

TripPrep

NODE_FILE

Names: NODE_FILE, NEW_NODE_FILE

Used In:

- ArcNet
- ArcPlan
- ArcSnapshot
- ConvertTrips
- IntControl
- LinkDelay
- LinkSum
- LocationData
- Microsimulator
- NetPrep
- NewFormat
- PathSkim
- PlanSelect
- PlanSum
- ProblemSelect
- Router
- TransimsNet

This is a list of nodes in the network. A typical field definition (.def) file is as follows:

```
TRANSIMS50, TAB_DELIMITED, 1
NODE, INTEGER, 1, 10
X_COORD, DOUBLE, 2, 14.1, METERS
Y_COORD, DOUBLE, 3, 14.1, METERS
Z_COORD, DOUBLE, 4, 14.1, METERS
SUBAREA, INTEGER, 5, 4
NOTES, STRING, 6, 128
```

Essential information includes the node number (an integer) and the X and Y coordinates. These are typically UTM coordinates.

A new field, not in version 4, is the subarea.

Node numbers do not have to be consecutive. However, for external links (zone connectors), the TransimsNet program assumes that the lower node number attached to a zone connector represents the external station zone number. The simplest way to meet this requirement is to assign numbers higher than the highest external zone number all nodes that are NOT associated with zone centroids (internal or external). For example, if the internal zones are in the range 1 – 500, and external zone numbers are in 600 - 620, the non-centroid nodes might be given node numbers of 700 or higher.

An example of a node file appears below:

Table 9 NODE_FILE Example

NODE	X_COORD	Y_COORD	Z_COORD	SUBAREA	NOTES
600	180054.9	4768512.4	0.0	0	External Node
601	179481.0	4767920.0	0.0	0	External Node
602	179397.8	4767815.8	0.0	0	External Node
3802	179740.0	4767650.0	0.0	0	Subarea Node
3803	180724.8	4766966.0	0.0	0	Subarea Node
3808	178366.1	4768820.6	0.0	0	Subarea Node
4660	179865.9	4767545.0	0.0	0	Subarea Node
4665	179620.0	4767750.0	0.0	0	Subarea Node
8819	179705.0	4767730.0	0.0	0	Subarea Node
9511	179685.0	4767705.0	0.0	0	Subarea Node

OCCUPANCY_FILE

OCCUPANCY_FILE

ArcSnapshot Default Control Ke

ORIGIN_LOCATION_FILE

NEW_ORIGIN_LOCATION_FILE

PathSkim

ORIGIN_LOCATION_FILE

PathSkim

ORIGIN_ZONE_FILE

ORIGIN_ZONE_FILE

PathSkim

PARKING_FILE

NEW_PARKING_FILE

NewFormat

TransimsNet

PARKING_FILE

ArcNet

ArcPlan

ConvertTrips Default Control K

Microsimulator

NewFormat

PathSkim

Router

TransimsNet Default Control Ke

PARKING_PENALTY_FILE

PARKING_PENALTY_FILE

Microsimulator
PathSkim
Router

PERFORMANCE_DATA_FILE

NEW_PERFORMANCE_DATA_FILE

LinkSum

PERFORMANCE_FILE

NEW_PERFORMANCE_FILE

NewFormat

PERFORMANCE_FILE

ArcPlan
LinkSum
NewFormat

PERSON_FILE

PERSON_FILE

NewFormat

PHASING_PLAN_FILE

NEW_PHASING_PLAN_FILE

IntControl Default Control Key
NewFormat

PHASING_PLAN_FILE

ArcNet
IntControl Default Control Key
Microsimulator
NewFormat

PLAN_FILE

NEW_PLAN_FILE is an output file, used in NewFormat, PathSkim, PlanCompare, PlanPrep, PlanSelect, and Router

PLAN_FILE is an input file, used in ArcPlan, Simulator, NewFormat, PlanCompare, PlanPrep, PlanSelect, PlanSum and Router

This is the name of the file of travel plans. Travel plans may be partitioned, in which case the file will have a numeric suffix, e.g., TripPlan.0, TripPlan.1.

The version 5 plan file is significantly different from plan files in previous versions of TRANSIMS. Version 4 plan files must be converted, using NewFormat, for use in version 5.

All trip data and path legs are stored in a single nested record. This eliminates problems created by incomplete trips, and simplifies comparisons, update processing and sorting. The file Stores detailed information about each component of the path. This provides greater accuracy and fidelity, eliminates data estimates and approximations, and facilitates more detailed analysis of congested locations. The result is a significantly larger plan file with more information. Binary format should be used in most production runs of TRANSIMS.

The Version 5 plan file is a nested file that includes a primary trip record and several nested path records for each leg on the path. The primary trip record includes

- A full copy of the input trip file record
- Path departure and arrival times
- Trip travel time by mode (walk, drive, transit, wait, other)
- Total trip length, cost, and impedance

The nested path records include

- Mode, ID type, facility ID, travel time, distance, cost and impedance for each leg / link on the path

A .def file for the plan file is as follows:

```
TRANSIMS50, TAB_DELIMITED, 2, NESTED
HHOLD, INTEGER, 1, 10
PERSON, INTEGER, 2, 5
TOUR, INTEGER, 3, 3
TRIP, INTEGER, 4, 3
START, TIME, 5, 16, HOUR_CLOCK
END, TIME, 6, 16, HOUR_CLOCK
DURATION, TIME, 7, 16, HOUR_CLOCK
ORIGIN, INTEGER, 8, 10
DESTINATION, INTEGER, 9, 10
PURPOSE, INTEGER, 10, 2
MODE, STRING, 11, 12, MODE_TYPE
CONSTRAINT, STRING, 12, 14, CONSTRAINT_TYPE
PRIORITY, STRING, 13, 10, PRIORITY_TYPE
VEHICLE, INTEGER, 14, 4
PASSENGERS, INTEGER, 15, 2
TYPE, INTEGER, 16, 4
DEPART, TIME, 17, 16, HOUR_CLOCK
ARRIVE, TIME, 18, 16, HOUR_CLOCK
ACTIVITY, TIME, 19, 16, HOUR_CLOCK
WALK, TIME, 20, 12, SECONDS
DRIVE, TIME, 21, 12, SECONDS
TRANSIT, TIME, 22, 12, SECONDS
WAIT, TIME, 23, 12, SECONDS
```

OTHER, TIME, 24, 12, SECONDS
 LENGTH, INTEGER, 25, 10, METERS
 COST, FIXED, 26, 6.1, CENTS
 IMPEDANCE, UNSIGNED, 27, 10, IMPEDANCE
 NUM_LEGS, INTEGER, 28, 5, NEST_COUNT
 LEG_MODE, STRING, 1, 12, MODE_TYPE, NESTED
 LEG_TYPE, STRING, 2, 8, ID_TYPE, NESTED
 LEG_ID, INTEGER, 3, 10, NO, NESTED
 LEG_TIME, TIME, 4, 12, SECONDS, NESTED
 LEG_LENGTH, UNSIGNED, 5, 5, METERS, NESTED
 LEG_COST, FIXED, 6, 6.1, CENTS, NESTED
 LEG_IMPED, INTEGER, 7, 10, IMPEDANCE, NESTED

Fields in the plan file are as follows:

Table 10 PLAN_FILE Field Definitions

Field(s)	Description	Default Units
HHOLD	Household Number (from the trip file)	
PERSON	Person Number (from the trip file)	
TOUR	Tour Number (from the trip file)	
TRIP	Trip Number (from the trip file)	
START	Trip start time (from the trip file)	HOUR_CLOCK
END	Trip end time (from the trip file)	HOUR_CLOCK
DURATION	Activity duration at the end of this trip (used in tours, otherwise 0) (from the trip file)	HOUR_CLOCK
ORIGIN	Origin location (from the trip file)	
DESTINATION	Destination location (from the trip file)	
PURPOSE	Trip purpose (from the trip file)	
MODE	Mode (from the trip file). Options include WALK, BIKE, DRIVE, RIDE, TRANSIT, PNR_OUT, PNR_IN, KNR_OUT, KNR_IN, TAXI, OTHER, HOV2, HOV3, HOV4	MODE_TYPE
CONSTRAINT	Timing constraint (from the trip file) NONE, START, ARRIVE, FIXED, DURATION, PASSENGER	CONSTRAINT_TYPE
PRIORITY	Priority for the activity (from the trip file) LOW, MEDIUM, HIGH, CRITICAL	PRIORITY_TYPE
VEHICLE	Vehicle number (from the trip file) (generally 1)	
PASSENGERS	Passengers in the vehicle (from the trip file)	
TYPE	Vehicle type (from the trip file)	
DEPART	Departure time (from the router)	HOUR_CLOCK
ARRIVE	Arrival time	HOUR_CLOCK
ACTIVITY	Duration of the activity	HOUR_CLOCK
WALK	Time spent walking	SECONDS
DRIVE	Time spent driving	SECONDS
TRANSIT	Time spent in public transit	SECONDS
WAIT	Time spent waiting	SECONDS
OTHER	Time spent in other activities	SECONDS

Field(s)	Description	Default Units
LENGTH	Distance traveled	METERS
COST	Out of pocket cost	CENTS
IMPEDANCE	Total impedance	IMPEDANCE
NUM_LEGS	Number of legs in the trip	NEST_COUNT
LEG_MODE	(nested field) Mode for the leg	MODE_TYPE
LEG_TYPE	(nested field) Type of leg. LOCATION, PARKING, LINK	ID_TYPE
LEG_ID	(nested field) Identifier for the leg, a location or link id (Similar to version 4, if a link is traversed in the B->A direction, it is given a minus sign)	NO
LEG_TIME	(nested field) Time to traverse the leg	SECONDS
LEG_LENGTH	(nested field) Distance	METERS
LEG_COST	(nested field) Out of pocket cost	CENTS
LEG_IMPED	(nested field) Total Impedance	IMPEDANCE

The Primary Trip record (Table 5) contains two types of data. The first 16 columns are a copy of the input trip record; the last 12 columns are generated by the router, including trip departure and arrival time, length, cost and impedance.

Table 11 PLAN_FILE Example: Primary Trip Record

1	HHOLD	1	PERSON	1	TOUR	1	TRIP	7:18:02	START	7:33:15	END	4:58:07	DURATION	46	ORIGIN	54	DESTINATION	1	PURPOSE	DRIVE	MODE	NONE	CONSTRAINT	MEDIUM	PRIORITY	1	VEHICLE	0	PASSENGERS	1	TYPE	7:18:02	DEPART	7:21:27	ARRIVE	4:58:07	ACTIVITY	45.2	WALK	160	DRIVE	0	TRANSIT	0	WAIT	0	OTHER	2320	LENGTH	0.0	COST	2504	IMPEDANCE	10	NUM_LEGS
---	-------	---	--------	---	------	---	------	---------	-------	---------	-----	---------	----------	----	--------	----	-------------	---	---------	-------	------	------	------------	--------	----------	---	---------	---	------------	---	------	---------	--------	---------	--------	---------	----------	------	------	-----	-------	---	---------	---	------	---	-------	------	--------	-----	------	------	-----------	----	----------

The path records (Table 6) contain one record for each leg of the path. Each record contains the following information:

- Mode for the leg
- Type of leg, typically a link in the network, a parking location, or an activity location
- Leg identifier. Similar to version 4, if a link is traversed in the B->A direction, it is given a minus sign.
- Time to traverse the leg, in seconds
- Length of the leg, in meters
- Cost of the leg in cents (for example, a parking fee or toll would be placed here)
- Total leg impedance

Table 12 PLAN_FILE Example: Path Records

LEG_MODE	LEG_TYPE	LEG_ID	LEG_TIME	LEG_LENGTH	LEG_COST	LEG_IMPED
WALK	LOCATION	46	15.2	15	0.0	304
OTHER	PARKING	46	0	0	0.0	0
DRIVE	LINK	-22	15.5	185	0.0	155
DRIVE	LINK	19	37.6	525	0.0	376
DRIVE	LINK	11	83.4	1000	0.0	834
DRIVE	LINK	12	5.7	110	0.0	57
DRIVE	LINK	17	15.1	400	0.0	151
DRIVE	LINK	-26	2.7	70	0.0	27
OTHER	PARKING	54	0	0	0.0	0
WALK	LOCATION	54	30	30	0.0	600

POCKET_FILE

Names: POCKET_FILE, NEW_POCKET_FILE

Used In:

- ArcNet
- ArcPlan
- ArcSnapshot
- IntControl
- Microsimulator
- NewFormat
- PathSkim
- Router
- TransimsNet

This is a list of pocket lanes in the network. A typical field definition (.def) file is as follows:

```
TRANSIMS50, TAB_DELIMITED, 1
LINK, INTEGER, 1, 10
DIR, INTEGER, 2, 1
TYPE, STRING, 3, 12, POCKET_TYPE
LANES, UNSIGNED, 4, 2
LENGTH, DOUBLE, 5, 8.1, METERS
OFFSET, DOUBLE, 6, 8.1, METERS
NOTES, STRING, 7, 128
```

The fields are defined as follows:

Table 13 POCKET_FILE Field Definitions

Field(s)	Description	Use	Default Units
LINK	The link number (an integer)	Key	
DIR	Direction of the link AB=0, BA=1	Opt.	
TYPE		Req.	Note 1
LANES		Req.	
LENGTH	Length of the pocket	Req.	m
OFFSET		Req.	m
NOTES	Character string for user notes	Opt.	

Note 1: Pocket types include LEFT_TURN, RIGHT_TURN, LEFT_MERGE, RIGHT_MERGE, POCKET_LANE, AUX_LANE

Figure 7 and Table 14 illustrate a small example.

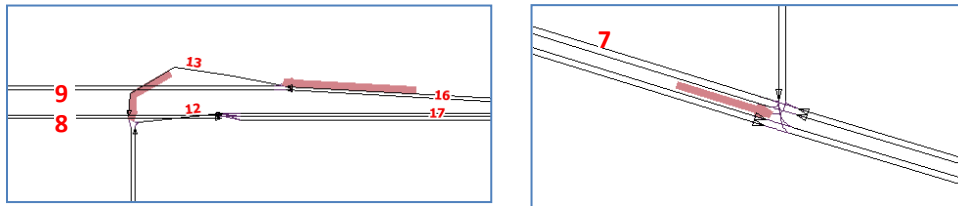


Table 14 POCKET_FILE Example

LINK	DIR	TYPE	LANES	LENGTH	OFFSET	NOTES
7	0	LEFT_TURN	1	50.0	0.0	Left Turn Lane
13	0	LEFT_TURN	1	100.0	0.0	Left Turn Lane
16	0	RIGHT_TURN	1	200.0	0.0	Pocket Lane for Right off-ramp

PROBLEM_FILE

The **NEW_PROBLEM_FILE** is output by the Router or Simulator to indicate trips that could not be routed or simulated. Other programs that use **NEW_PROBLEM_FILE** as output include NewFormat and PathSkim.

Programs that use **PROBLEM_FILE** as input include ArcPlan, NewFormat, and ProblemSelect

Problem codes output by the router and simulator are listed in Table 10. The first column is the problem number, the second is the code that is used in the TRANSIMS source code; the third is the problem name as shown in the problem file; the fourth is the most typical meaning.

Table 15 Problem Codes

No.	Code	Name	Most typical meaning
0	TOTAL_PROBLEM	Total	
1	PATH_PROBLEM	Path Building	No feasible path between the origin and destination. It could be caused by lane connectivity or one-way street conditions or by a network coding error.
2	TIME_PROBLEM	Time Schedule	This message indicates that the trip travel time exceeded the upper bound of the activity start time. It could be caused by excessive congestion or no path options.
3	ZERO_PROBLEM	Zero Length	The zero-node error occurs when the origin and the destination activity locations lie on the same link, at zero distance
4	TYPE_PROBLEM	Vehicle Type	The origin parking lot is located on a link that does not permit the corresponding vehicle type. This most often occurs when autos are loaded to transit only links or trucks to auto only links.
5	DIST_PROBLEM	Path Circuity	A circuity error indicates that the path building process was limited by one or more of the circuity parameters. It either means that a path does not exist or the path is highly circuitous. The user can set the maximum circuity ratio parameter to zero to eliminate these messages. If a path does not exist, a path building or time schedule message will be generated.
6	MODE_PROBLEM	Travel Mode	The Router records a travel mode error when the mode on the activity file cannot be built. This generally means that the transit, walk, or bike networks have not been enabled.
7	ACCESS_PROBLEM	Vehicle Access	An access error is generated when the vehicle listed in the activity file is not found in the vehicle file or when the vehicle is located at a parking lot that is not attached to the activity location with a process link.
8	WALK_PROBLEM	Walk Distance	This message is generated when the cumulative walk distance required by the path exceeds the MAX_WALK_DISTANCE parameter.
9	WAIT_PROBLEM	Wait Time	This message indicates that potential transit routes exist, but the wait time required to board the routes exceed the MAX_WAIT_TIME parameter. In the Simulator, a wait time problem is generated when a vehicle remains in the same cell unable to advance for an amount of time greater than the MAX_WAIT_TIME key. The most frequent cause of this problem is excessive congestion. It can also be caused by incorrect

No.	Code	Name	Most typical meaning
			signal coding that does not provide a phase for all the eligible movements.
10	LINK_PROBLEM	Walk Access	This message is generated when the link associated with the origin or destination activity location does permit travel by the chosen mode. It most often indicated a walk or bike access restriction at one of the trip ends.
11	LOAD_PROBLEM	Load Time	
12	PARK_PROBLEM	Park-&-Ride Lot	In order to building a park-&-ride trip (mode 5), the must be a parking lot designated with the PARKRIDE style in the general proximity of the trip origin. The MAX_PARK_RIDE_PERCENTAGE parameter determines how far away from the origin the software can search for possible park-&-ride lots. If no lots are found within the search area, the park-&-ride lot error message is recorded.
13	BIKE_PROBLEM	Bike Distance	This message is generated when the bicycling distance exceeds the MAX_BICYCLE_DISTANCE parameter.
14	DEPARTURE_PROBLEM	Departure Time	When a vehicle cannot start its trip at the time specified in the trip file plus the amount of slack time defined by the MAX_DEPARTURE_TIME_VARIANCE, a departure time problem is generated. The most frequent cause of this problem is excessive congestion close to the starting parking lot, which prevents the vehicle from being loaded onto the first link.
15	ARRIVAL_PROBLEM	Arrival Time	If a vehicle is still traveling at the time it is scheduled to arrive at its destination plus the slack time defined by the MAX_ARRIVAL_TIME_VARIANCE key, it will be removed from the network, and an arrival time problem error will be generated. The most frequent cause of this type of problem is congestion. You can allocate more time for the vehicle to finish its trip by adjusting the value for the END_TIME_CONSTRAINT key in the Router.
16	LINK_ACCESS_PROBLEM	Link Access	
17	CONNECT_PROBLEM	Link Connection	This message is generated when no lane connectivity exists between two successive links of the vehicle's path. This most often occurs when the network has been changed, but the travel plans have not been rebuilt. You should inspect the location generating the problem and

No.	Code	Name	Most typical meaning
			restore the lane connectivity or re-route the traveler.
18	PARKING_PROBLEM	Parking Access	This problem message is generated when a vehicle is not able to move from the parking lot to the first link in its journey. You should check that the link does not restrict vehicles of the particular vehicle type from using the link.
19	MERGE_PROBLEM	Lane Merging	
20	LANE_PROBLEM	Lane Changing	
21	TURN_PROBLEM	Turning Speed	
22	POCKET_PROBLEM	Pocket Merge	
23	SPACING_PROBLEM	Vehicle Spacing	
24	CONTROL_PROBLEM	Traffic Control	
25	USE_PROBLEM	Access Restriction	
26	STOP_PROBLEM	Transit Stop	
27	LOCATION_PROBLEM	Activity Location	
28	PASSENGER_PROBLEM	Vehicle Passenger	
29	DURATION_PROBLEM	Activity Duration	
30	KISS_PROBLEM	Kiss-&-Ride Lot	
31	VEHICLE_PROBLEM	Vehicle ID	
32	SORT_PROBLEM	Data Sort	
33	WALK_LOC_PROBLEM	Walk Location	
34	BIKE_LOC_PROBLEM	Bike Location	
35	TRANSIT_LOC_PROBLEM	Transit Location	
36	MATCH_PROBLEM	Person Match	
37	CONSTRAINT_PROBLEM	Schedule Constraint	
38	BOARDING_PROBLEM	Transit Capacity	
39	DWELL_PROBLEM	Transit Dwell	
40	TRANSFER_PROBLEM	Number of Transfers	
41	LOCAL_PROBLEM	Local Facility	

A router problem file includes one line for each problem trip. That line includes the following columns:

- Problem number
- Columns to identify the trip, including HHOLD, PERSON, TOUR, TRIP, START, END, DURATION, ORIGIN, DESTINATION, PURPOSE, MODE, CONSTRAINT, PRIORITY, VEHICLE, PASSENGERS, TYPE
- A notes column that contains the problem name (e.g., Path Building)

A simulator problem file is similar, with one line per problem trip (Table 11). That line includes the following columns:

- Problem number

- Columns to identify the trip, including HHOLD, PERSON, TOUR, TRIP, START, END, DURATION, ORIGIN, DESTINATION, PURPOSE, MODE, CONSTRAINT, PRIORITY, VEHICLE, PASSENGERS, TYPE
- Time of day
- Link
- Direction for the link
- Lane
- Offset (within the link)
- Route (for transit)
- A notes column that contains the problem name (e.g., Traffic Control)

Table 16 PROBLEM_FILE Example

PROBLEM	TRIP INFORMATION	TIME	LINK	DIR	LANE	OFFSET	ROUTE	NOTES
24	HHOLD, etc	0:04:12	7	1	2	1113.7	0	Traffic Control
23		4:38:20	1	0	L1	183.7	0	Vehicle Spacing
24		4:39:26	1	0	L1	191.2	0	Traffic Control
23		4:42:25	11	1	1	978.7	0	Vehicle Spacing

REPORT_FILE

Used in nearly every TRANSIMS program. The report file name is optional. If a file name is not provided, the program automatically creates a report file name based on the input control file name. The report file will overwrite an existing file with the same name if the Report Flag key is False or not specified.

RIDERSHIP_FILE

NEW_RIDERSHIP_FILE

NewFormat

RIDERSHIP_FILE

NewFormat

ROUTE_NODES_FILE

NEW_ROUTE_NODES_FILE

NewFormat

ROUTE_NODES_FILE

ArcNet

SELECTION_FILE

NEW_SELECTION_FILE is an output from NewFormat, PlanCompare, PlanSelect, ProblemSelect and RandomSelect.

SELECTION_FILE is an input to ArcPlan, NewFormat, PathSkim, PlanCompare, PlanPrep, PlanSum, ProblemSelect, Router, and TripPrep

The selection file key is appended to the value of the PROJECT_DIRECTORY key to identify the full path to a list of households and trips that will be processed by the router. A sample selection file is shown below (Table 10). It indicates the household, person, tour, trip and, for parallel processing applications, the partition of the router that will be used.

Table 17 SELECTION_FILE Example

HHOLD	PERSON	TOUR	TRIP	PARTITION
1	1	1	1	0
1	1	1	2	0
1	1	1	3	0
1	1	1	4	0
1	1	1	5	0
1	1	2	1	0
1	1	2	2	0
1	1	2	3	0
100	1	1	1	0
101	1	1	1	0
102	1	1	1	1
103	1	1	1	1
104	1	1	1	1
105	1	1	1	0
106	1	1	1	1
107	1	1	1	1
108	1	1	1	0
109	1	1	1	0

SHAPE_FILE

Names: SHAPE_FILE, NEW_SHAPE_FILE

Used In:

- ArcNet
- ArcPlan
- ArcSnapshot
- ConvertTrips
- IntControl
- LocationData
- NetPrep
- NewFormat
- TransimsNet

This is the name of the TRANSIMS shape file within the network directory, which provides plain text lists of shape points for links in the network. The full path and name for the shape file is constructed by appending the value of this key to the value of the PROJECT_DIRECTORY key.

A typical field definition (.def) file is as follows:

```
TRANSIMS50, TAB_DELIMITED, 2, NESTED
LINK, INTEGER, 1, 10
POINTS, INTEGER, 2, 4, NEST_COUNT
NOTES, STRING, 3, 128
X_COORD, DOUBLE, 1, 14.1, FEET, NESTED
Y_COORD, DOUBLE, 2, 14.1, FEET, NESTED
```

An example of a shape file appears below. After the two-line header, the third line contains the link number and the number of shape points (n) for that link. The next n lines contain the X and Y coordinates of the shape points. The process is then repeated for the next link:

Table 18 SHAPE_FILE Field Definitions

LINK	POINTS
X_COORD	Y_COORD
62	10
6532.8	7935.0
6497.4	7870.7
6439.3	7832.0
6361.9	7822.2
6287.7	7838.2
6226.4	7883.5
6197.5	7938.3
6200.4	7996.4
6235.9	8070.5
6310.4	8109.2
63	11
6816.6	8115.8
6880.9	8093.2
6922.9	8044.6
6948.8	7977.0
6942.2	7912.7
6903.5	7854.6
6842.2	7815.9
6768.0	7802.8
6684.4	7822.2
6632.5	7870.7
6587.6	7935.0

The next two tables provide information on the links and nodes corresponding to the above shape file.

Table 19 Information for links 62 and 63

Link	Node A	Node B	Length	Bearing A	Bearing B	Type
62	123	132	656.2	196	73	RAMP
63	133	123	656.2	103	346	RAMP

Table 20 Information for nodes 123, 132, 133

Node	X_Coord	Y_Coord
123	6561.7	8038
132	6397.6	8136.5
133	6725.7	8136.5

This file indicates that link 62 and link 63 should be drawn as follows: Start at Node A for the link, go through the points in the shape file, end at Node B.

The link file indicates that link 62 runs from node 123 to 132, and that link 63 runs from node 133 to 123. The node file gives the location of these nodes. The end result is as follows (part of a cloverleaf freeway interchange):

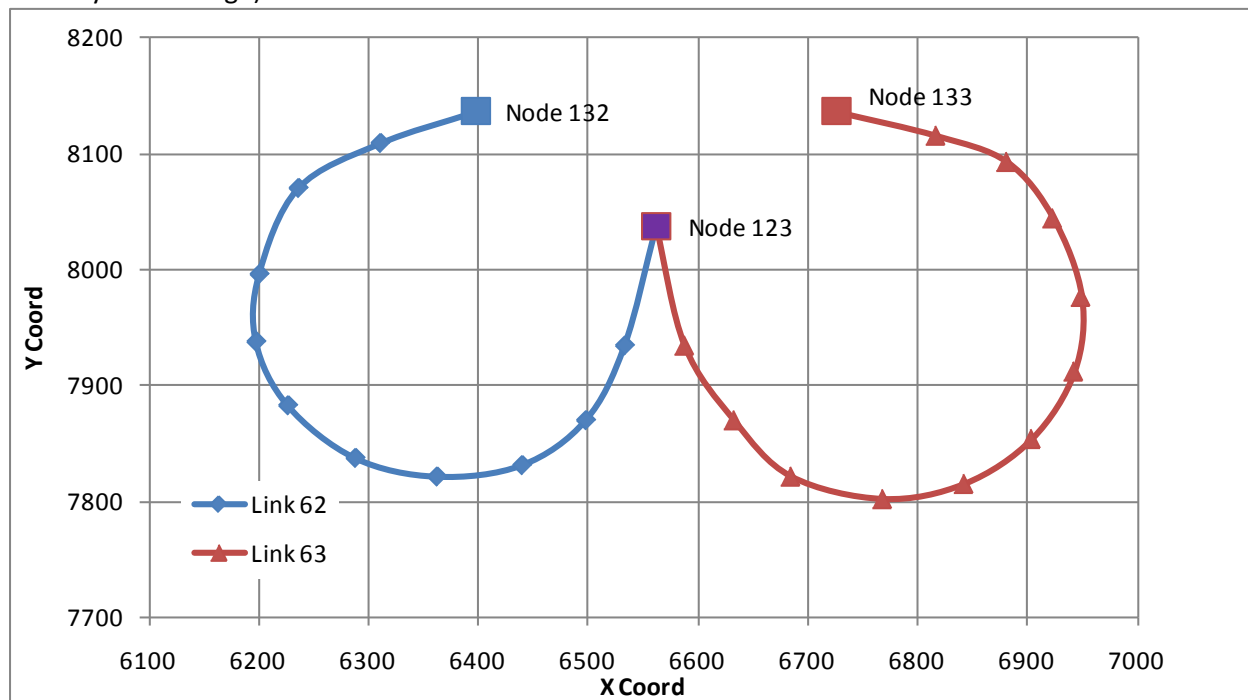


Figure 5 Links, nodes and shape points

Normally, TRANSIMS shape files are not created by hand, but are generated from ArcView shapefiles by programs such as GISNet. However, it might be necessary to clean-up a TRANSIMS shapefile by hand. In

this case shape points are added, deleted or corrected. The total number of shapepoints for the link must then also be checked and updated.

Although shapefiles are not absolutely necessary to run TRANSIMS, they are helpful for two reasons:

1. They enable a more realistic depiction of the network in a GIS
2. They ensure that TRANSIMSNet has the correct connection angles between links when generating connections within a network

SIGN_FILE

NEW_SIGN_FILE

IntControl Default Control Key
NewFormat
TransimsNet Default Control Ke

SIGN_FILE

ArcNet
IntControl Default Control Key
Microsimulator
NewFormat
TransimsNet Default Control Ke

SIGNAL_FILE

NEW_SIGNAL_FILE

IntControl Default Control Key
NewFormat
TransimsNet Default Control Ke

SIGNAL_FILE

ArcNet
IntControl Default Control Key
Microsimulator
NewFormat
TransimsNet Default Control Ke

SKIM_FILE

NEW_SKIM_FILE is written by

NewFormat
PathSkim

SKIM_FILE is read by

ConvertTrips
NewFormat

A skim file contains the skimmed travel times and impedances for various origin-destination pairs and time periods. It is used by ConvertTrips to provide initial travel times for a set of newly generated trips.

Features include the following

- Skim files include OD size and time period meta-data
- Partitioned time periods or merged time periods
- Location or zone-based origins and destinations
- Total travel time or time components (walk, drive, transit, wait, other)
- Trip length, cost, and impedance
- User-specified output units (e.g., minutes, miles)

A typical .def file for the skim file is as follows:

```
ORIGIN, UNSIGNED, 1, 5, ZONES
DESTINATION, UNSIGNED, 2, 5, ZONES
PERIOD, UNSIGNED, 3, 3
COUNT, INTEGER, 4, 5
WALK, TIME, 5, 12, SECONDS
DRIVE, TIME, 6, 12, SECONDS
OTHER, TIME, 7, 12, SECONDS
LENGTH, INTEGER, 8, 10, METERS
COST, INTEGER, 9, 5, CENTS
IMPEDANCE, INTEGER, 10, 10, IMPEDANCE
```

An example skim file (tab-delimited) appears below. The first line gives the number of origins, destinations and the time period span, e.g., NUM_ORG=7; NUM_DES=7; PERIODS=0:00..24:00

Table 21 SKIM_FILE Example

ORIGIN	DESTINATION	PERIOD	COUNT	WALK	DRIVE	OTHER	LENGTH	COST	IMPEDANCE
1	1	0	101	30	18	0	240	0	784
1	3	0	8	30	30	0	437	0	911
1	12	0	8	45	40	0	566	0	1305
3	1	0	8	30	30	0	437	0	911
3	3	0	220	30	16	0	215	0	770
3	13	0	4	45	41	0	550	0	1309
10	10	0	2	60	0	0	30	0	1200
11	11	0	2	60	0	0	30	0	1200
12	12	0	2	60	0	0	30	0	1200
13	13	0	2	60	0	0	30	0	1200
14	14	0	2	60	0	0	30	0	1200

SNAPSHOT_FILE

NEW_SNAPSHOT_FILE

ArcSnapshot
NewFormat

Simulator
SNAPSHOT_FILE
ArcSnapshot Default Control Ke
NewFormat

STOP_EQUIVALENCE_FILE

STOP_EQUIVALENCE_FILE
ArcPlan
PlanSum

SUBZONE_DATA_FILE

SUBZONE_DATA_FILE
ArcNet

SUBZONE_ZONE_FACTOR_FILE

SUBZONE_ZONE_FACTOR_FILE
LocationData

TIME_DISTRIBUTION_FILE_*

Required in ConvertTrips. **NEW_TIME_DISTRIBUTION_FILE** is used in PlanCompare

The time distribution file key is appended to the PROJECT_DIRECTORY key to specify the file name for the input trip time file for the trip group. If the trip time format is not specified and a Definition file is not found, the program assumes the file is in Version 3 format. The default Version 3 format is a tab-delimited text file with three floating point data fields and no header record. The first field is the start time in hours, the second field is the end time in hours, and the third field is the relative share of trips assigned to the period between the start time and end time. The shares are automatically normalized to 1.0, and are therefore NOT required to add up to 1.0. An example file appears below:

Table 22 TIME_DISTRIBUTION_FILE Example

Start	End	Share
0	5	0.005
5	6	0.02
6	7	0.04
7	8	0.075
8	9	0.1
9	10	0.06
10	14	0.16
14	15	0.06
15	16	0.07

Start	End	Share
16	17	0.08
17	18	0.09
18	19	0.08
19	20	0.06
20	21	0.04
21	22	0.03
22	23	0.02
23	24	0.01

TIMING_PLAN_FILE

NEW_TIMING_PLAN_FILE

IntControl Default Control Key
NewFormat

TIMING_PLAN_FILE

ArcNet
IntControl Default Control Key
Microsimulator
NewFormat

TOLL_FILE

TOLL_FILE

NewFormat

TRANSIT_DRIVER_FILE

NEW_TRANSIT_DRIVER_FILE

NewFormat

TRANSIT_DRIVER_FILE

ArcNet
ArcPlan
Microsimulator
NewFormat

TRANSIT_FARE_FILE

NEW_TRANSIT_FARE_FILE

NewFormat

TRANSIT_FARE_FILE

Microsimulator
NewFormat
PathSkim
Router

TRANSIT_PENALTY_FILE

TRANSIT_PENALTY_FILE

Microsimulator
PathSkim
Router

TRANSIT_ROUTE_FILE

NEW_TRANSIT_ROUTE_FILE

NewFormat

TRANSIT_ROUTE_FILE

ArcNet
ArcPlan
LocationData
Microsimulator
NewFormat
PathSkim
Router

TRANSIT_SCHEDULE_FILE

NEW_TRANSIT_SCHEDULE_FILE

NewFormat

TRANSIT_SCHEDULE_FILE

ArcNet
LocationData
Microsimulator
NewFormat
PathSkim
Router

TRANSIT_STOP_FILE

NEW_TRANSIT_STOP_FILE

NewFormat

TRANSIT_STOP_FILE

ArcNet
ArcPlan
LocationData
Microsimulator
NewFormat
PathSkim
Router

TRIP_COST_GAP_FILE

NEW_TRIP_COST_GAP_FILE

TRIP_FILE

NEW_TRIP_FILE is used by the following programs:

- ConvertTrips
- NewFormat
- TripPrep

TRIP_FILE is used by the following programs:

- ConvertTrips
- NewFormat
- RandomSelect
- Router
- TripPrep

The trip file key is appended to the PROJECT_DIRECTORY key to specify the file name for the input trip file copied to the output trip file by the program. The new trip file key is appended to the PROJECT_DIRECTORY key to specify the file name for the output trip file created by the program. The program generates one trip record for each trip in the input trip tables.

In TRANSIMS 5, the trip file includes both trip and activity-related data. An example of trip file output appears below:

Table 23 TRIP_FILE Example

HHOLD	PERSON	TOUR	TRIP	START	END	DURATION	ORIGIN	DESTINATION	PURPOSE	MODE	CONSTRAINT	PRIORITY	VEHICLE	PASSENGERS	TYPE
1	1	1	1	7:33:28	7:48:30	9:43:48	41	54	1	DRIVE		MEDIUM	1	0	
1	1	1	2	17:32:17	17:45:16	0:05	54	26	1	DRIVE		MEDIUM	1	0	
1	1	1	3	17:50:16	17:53:07	1:08:59	26	41	1	DRIVE		MEDIUM	1	0	
1	1	2	1	19:02:06	19:07:33	0:05	41	19	1	DRIVE		MEDIUM	1	0	
1	1	2	2	19:12:33	19:23:46	1:49:17	19	56	1	DRIVE		MEDIUM	1	0	
1	1	2	3	21:13:03	21:29:43	0:00	56	41	1	DRIVE		MEDIUM	1	0	

Activity-related data include the household (HHOLD), person number (PERSON), tour number (TOUR), activity duration (DURATION), activity purpose (PURPOSE), activity constraint (CONSTRAINT), activity priority (PRIORITY), and traveler type (TYPE). Trip-related data include the trip number (TRIP), start time (START), end time (END), origin location (ORIGIN), destination location (DESTINATION), travel mode (MODE), vehicle number (VEHICLE) and number of passengers.

TRIP_TABLE_FILE_1

Used by ConvertTrips.

The trip table file key is appended to the PROJECT_DIRECTORY key to specify the file name for the input trip table file for the trip group. If the trip table format is not specified and a Definition file is not found, the program assumes the file is in Version 3 format. The default Version 3 format is a tab-delimited text file with three integer data fields and no header record. The first field is the origin zone number, the second field is the destination zone number, and the third field is the number of trips. An example appears below:

Table 24 TRIP_TABLE_FILE Example

ORG	DES	TRIPS
1	2	500
1	3	500
2	1	500
2	3	500
3	1	500
3	2	500
1	11	10000

TRIP_TIME_FILE

NEW_TRIP_TIME_FILE

PlanSum

TRIP_TIME_GAP_FILE

NEW_TRIP_TIME_GAP_FILE

PlanCompare

TURN_PENALTY_FILE

NEW_TURN_PENALTY_FILE

NewFormat

TransimsNet Default Control Ke

TURN_PENALTY_FILE

ArcNet

Microsimulator

NewFormat

PathSkim

Router

TransimsNet Default Control Ke

TURN_VOLUME_FILE

NEW_TURN_VOLUME_FILE

LinkSum
TURN_VOLUME_FILE
IntControl Default Control Key

UPDATE_LINK_FILE

UPDATE_LINK_FILE

TransimsNet Default Control Key

The update link file is optional and if specified defines a series of link numbers where the pocket lanes, activity locations, parking lots, and processing links are recalculated. The lane connectivity at both ends of the link is also updated. Each record in the file is interpreted as a comma separated list of link ranges. A link range is specified using two period (e.g., 100..200). The file could also be a simple list of link numbers. The values in the link range and the link file are combined if both keys are provided. In update mode, the program reads existing network files and deletes the existing records for the link and adds new records at the end of the file.

UPDATE_NODE_FILE

UPDATE_NODE_FILE

TransimsNet Default Control Key

The update node file is optional and if specified defines a series of node numbers where the lane connectivity and traffic control warrants are recalculated. Each record in the file is interpreted as a comma separated list of node ranges. A node range is specified using two period (e.g., 100..200). The file could also be a simple list of node numbers. The values in the node range and the node file are combined if both keys are provided. In update mode, the program reads existing network files and deletes the existing records for the node and adds new records at the end of the file.

VEHICLE_FILE

NEW_VEHICLE_FILE is used by the following programs:

- ConvertTrips
- NewFormat

VEHICLE_FILE is used by the following programs:

- ConvertTrips
- Simulator
- NewFormat
- PathSkim
- Router

The vehicle_file lists the vehicles in the network. Each vehicle is uniquely identified by a household number and a household vehicle number. The version 4 “Location” field becomes a “Parking” field. Finally, the version 4 vehicle type and subtype is combined into a version 5 vehicle type.

Table 25 VEHICLE_FILE Example

HHOLD	VEHICLE	PARKING	TYPE
1	1	41	1

VEHICLE_TYPE_FILE

NEW_VEHICLE_TYPE_FILE is used by the following programs:

NewFormat

VEHICLE_TYPE_FILE is used by the following programs:

ArcNet

ArcSnapshot

ConvertTrips

Microsimulator

NewFormat

PathSkim

Router

The V4 vehicle subtype no longer exists. Rather, there is a simple type index with valid values ranging from 1 to 99. Operating cost and vertical grade impacts have been added.

The default V4 conversion is $V5_Vehicle_Type = 10 * V4_Vehicle_Type + V4_Subtype$

Table 26 VEHICLE_TYPE_FILE Example

TYPE	LENGTH	MAX_SPEED	MAX_ACCEL	MAX_DECEL	OP_COST	USE	CAPACITY	LOADING	UNLOADING	METHOD	MIN_DWELL	MAX_DWELL	GRADE_1	GRADE_2	GRADE_3	GRADE_4	GRADE_5	GRADE_6	GRADE_7	GRADE_8	GRADE_9	GRADE_10
1	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
2	11.5	162	3	9	25	TRUCK	2	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
3	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
4	17.5	162	2	6	0	BUS	250	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
5	17.5	162	2	6	0	BUS	250	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
11	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
12	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
13	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
14	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
15	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
16	5.5	162	6	12	20	SOV	5	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
21	11.5	162	3	9	25	TRUCK	2	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
22	11.5	162	3	9	25	TRUCK	2	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
23	17.5	162	2	6	50	TRUCK	2	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1
24	17.5	162	2	6	50	TRUCK	2	3	2	SERIAL	0	0	1	1	1	1	1	1	1	1	1	1

VERSION4_PLAN_FILE

VERSION4_PLAN_FILE

ZONE_BOUNDARY_FILE

ZONE_BOUNDARY_FILE

LocationData

TransimsNet Default Control Key

ZONE_EQUIVALENCE_FILE

Used in:

ConvertTrips

LinkSum

PathSkim

PlanSum

The zone equivalence file is required for the trip adjustment factors. The key specifies the name of the file that defines a group of zones. Zone Groups typically represent large geographic areas or governmental entities (i.e., cities and counties). Each zone may only be associated with one Zone Group. The software generates warning messages if a zone is used more than once or appears to be missing from the sequence of zone numbers.

The zone equivalence file is a tab, space, or comma-delimited ASCII file with special format rules. A sample equivalence file is shown below.

```
1 0 Portland CBD - 1
1 1 1..16
2 0 West Suburbs - 2
2 1 79..307, 1248..1253
3 0 Southwest Suburbs - 3
3 1 308..403, 931..933
4 0 Southeast Suburbs - 4
4 1 404..557, 934..943, 1254..1258
5 0 East Portland - 55 1 561..563, 714..721, 731..738, 763..929, 949..961
6 0 East Suburbs - 6
6 1 558..560, 564..713, 722..730, 739..762, 1259..1260
7 0 West Portland - 7
7 1 17..78, 930, 944..948, 962, 1247
8 0 Clark County - 8
8 1 970..1246
```

If the file contains a header record, it is ignored by the software. The first integer on each subsequent record is the district or zone group number. This number is followed by an index number that is used to associate multiple records with a given district. If the index number is zero, the software interprets everything that follows the index number as the district label. The first 25 characters of the label are printed in reports.

If the index number is not zero, the values that follow are interpreted as a range of zone numbers.

Individual zone numbers and ranges of zone numbers can be specified on a given record. A range of zone numbers is specified using the first and last number in the sequence connected by two or more periods. For example, “79..307” represents all of the zone numbers between 79 and 307.

ZONE_FILE

Names: ZONE_FILE, NEW_ZONE_FILE

Used In:

- ArcNet
- ConvertTrips
- LocationData
- NetPrep
- NewFormat
- PathSkim
- TransimsNet

The TRANSIMS zone file provides a list of zones in the network. The full path and file name for the zone table is constructed by appending the value of this key to the value of the PROJECT_DIRECTORY key.

A typical field definition (.def) file is as follows:

```
TRANSIMS50, TAB_DELIMITED, 1
ZONE, INTEGER, 1, 10
X_COORD, DOUBLE, 2, 14.1, FEET
Y_COORD, DOUBLE, 3, 14.1, FEET
Z_COORD, DOUBLE, 4, 14.1, FEET
AREA_TYPE, INTEGER, 5, 3
NOTES, STRING, 6, 128
```

Essential information includes the zone number (an integer) and the X and Y coordinates. These are typically UTM coordinates.

Zone numbers do not have to be consecutive. However, external zones are typically assigned higher numbers than internal zones.

An example of a zone file appears below:

Table 27 ZONE_FILE Example

ZONE	X_COORD	Y_COORD	Z_COORD	AREA_TYPE	NOTES
1	4921.3	14763.8	0.0	2	Internal Zone
2	8202.1	14763.8	0.0	2	Internal Zone
20	6561.7	17060.3	0.0	0	External Zone

ZONE	X_COORD	Y_COORD	Z_COORD	AREA_TYPE	NOTES
21	9842.5	17060.3	0.0	0	External Zone

ZONE_LOCATION_MAP_FILE

NEW_ZONE_LOCATION_MAP_FILE

LocationData

ZONE_LOCATION_MAP_FILE

ConvertTrips

PathSkim

ZONE_TRAVEL_FILE

NEW_ZONE_TRAVEL_FILE

LinkSum