# TRANSIMS Version 6.0 – *June 2014*

### SysLib

Vehicle flag was removed from Execution Services. Version 6.0 programs will no longer automatically attempt to convert vehicle IDs and vehicle types from Version 4.0/5.0 format to Version 6.0 conventions. NewFormat will need to be executed to make this conversion more reliably. The Static Services were updated to include all of the new Performance data fields.

### File\_Service

Refinements were made to the Performance file fields

### Data\_Service

Refinements and corrections were made to the Performance data structures and data manipulation methods.

### Flow\_Time\_Service

Link travel times when all lanes are blocked or prohibited was modified from free flow travel time to maximum travel time (e.g., 0.1 mph).

### Router\_Service

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### Simulator\_Service

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### NewFormat 6.0.9

The Version 4.0 Trip and Plan files now require a Vehicle and Vehicle Type file to convert to Version 6.0 format.

### LinkSum 6.0.9

NEW\_PERFORMANCE\_FILE keys were added to write a summarized Performance file. The processing of Link Data and Link Direction files was expanded to include all of the new Performance fields. The Network Performance Report was enhanced to ignore turn counts when a Turn Delay file is not include.

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### Selection\_Service

SELECT\_PRIORITIES key was added to limit path building to trips with a specified priority range.

### Data\_Service

Volume\_Array and Vol\_Spd\_Period\_Array data structures were added. Read\_Performance, Write\_Performance, Read\_Link\_Data and Write\_Link\_Data methods were added to process these data structures.

### Router 6.0.28

Refinements were made to the link gap calculations. PERCENT\_TIME\_DIFFERENCE, MINIMUM\_TIME\_DIFFERENCE, MAXIMUM\_TIME\_DIFFERENCE, PERCENT\_COST\_DIFFERENCE, MINIMUM\_COST\_DIFFERENCE, and MAXIMUM\_COST\_DIFFERENCE keys were added to control iterative path building procedures. INITIALIZE\_TRIP\_PRIORITY and SELECT\_PRIORITIES keys were added to the control the priority processing option.

### CountSum 6.0.7

CountSum was modified to utilize Vol\_Spd\_Period\_Arrays rather than Perf\_Period\_Arrays for volume and speed processing.

### Validate 6.0.5

Perf\_Period\_Arrays were replaced with Volume\_Arrays for Link\_Data and Performance inputs and outputs.

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### Router 6.0.29

Additional logic was added to properly handle the situation where paths are built based on update priorities, but reskimming is disabled.

### ArcPlan 6.0.6

A bug was fixed in converting the origin-destination activity locations of problem files.

### NewFormat 6.0.10

A bug was fixed in converting the turning movement data from an old performance file.

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### File\_Data\_Service

Logic was added to Performance\_Data, Turn\_Delay\_Data, and Flow\_Time\_Service to avoid updating time periods prior to the Re-Route time specified in the Router. Logic was added to the External ID processing in plan data to avoid processing leg records for Plans with problems.

### PlanPrep 6.0.2

REPAIR\_PLAN\_LEGS key was added to activate plan logic checks that detect and repair plan legs with negative travel times.

### Router 6.0.32

The Re-Route logic was modified to copy the plan records or legs prior to the re-route time as opposed to re-calculating the flow based on current link travel times. The logic was also modified to re-calculate the link travel times after the re-route time based on existing volumes and modified network attributes (e.g., lane closures or other lane use restrictions). Several improvements were implemented for managing memory between iterations. The OUTPUT\_ALL\_RECORDS key was added to enable the user to write all Performance and Turn Delay records even if the time period link has zero volume.

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### Router 6.0.33

Multi-threaded data processing issues were addressed in the link and trip gap calculations for memory-based processing of the dynamic traffic assignment method that minimizes vehicle hours of travel.

### Simulator\_Service

Several control keys were deleted and added to enables changes to the simulation method by time of day and subarea. TIME\_STEPS, UNSIMULATED\_SUBAREAS, MACROSCOPIC\_SUBAREAS, MESOSCOPIC\_SUBAREAS, and MICROSCOPIC\_SUBAREAS keys were removed. These keys were replaced with SIMULATION\_TIME\_BREAKS, SIMULATION\_GROUP\_SUBAREAS, GROUP\_PERIOD\_METHODS, UNSIMULATED\_TIME\_STEPS, MACROSCOPIC\_TIME\_STEPS, MESOSCOPIC\_TIME\_STEPS, and MICROSCOPIC\_TIME\_STEPS. This structure enables the user to define different levels of simulation detail by time of day and subarea. It also permits each simulation method to use a different time step. The implementation is still a work in progress.

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### SysLib

A number of improvements were made to the multi-threading classes avoid racing problems and create greater consistency in the method names. A Compress method was added to the String class to remove all white space from the string.

### LocationData 6.0.2

The PARKING\_FILE key was added to avoid warning messages when an Access file is provided. Logic to link activity locations to transit stops on the same link was added to supplement the connections provided by the Access file for calculating the walk access to transit weight.

### ArcPerf 6.0.7

A bug was fixed in setting up the new Arc Performance file.

vehicle loading once the priority loading time parameter is reached.

### Router 6.0.36

A walk length calculation and the problem counts for file-based output. Vehicle tracking within a tour was implemented. Park-n-Ride return trips were forced to return to the same park-n-ride lot. The PRELOAD\_TRANSIT\_VEHICLES key was added to enable the program to preload transit vehicles onto each link by time of day based on the current travel times and route schedules. Preloading is done prior to each feedback iteration.

### ArcPlan 6.0.7

A few drawing bugs were fixed for transit plans that do not include walk details.

### LineSum 6.0.3

The average trip lengths for aggregate columns were corrected in the line report.

### NewLandUse 6.0.4

This is a new program for redistributing population and employment data between zones based on a variety of development density objectives focused primarily on transit-oriented developments and regional activity centers.

### TcadImport 6.0.0

This is a new program to read matrix data from a dBase or text file and create the corresponding TransCAD matrix file.

### Simulator\_Service

Logic was added to the Macroscopic simulation method to use link capacity as the exit flow rate for the link. Logic was added to enable some Macroscopic lane changing and to give priority to delayed travelers. Significant changes were made to the multi-threading logic to improve record locking and reduce processing time. The node-based process approach was replaced with a link-based processing approach with link-based record locking to avoid competing data updates. The output classes was restructured to support parallel processing more effectively.

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### File\_Data\_Service

Logic was added to detect and correct trip and plan records that contain negative trip start or plan departure times.

### TransitNet 6.0.8

Error detection was added for situations where transit lines have less than two stops.

### LinkSum 6.0.10

The units for V/C ratios and capacities were corrected.

### Simulator\_Service

Many changes / corrections were made to the link cell and output processing.

### Simulator 6.0.1

Macroscopic simulation is ready for significant testing.

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### ArcNet 6.0.3

Enhancements were made to the lane connection logic to draw curved shapes associated with very short links.

### TransimsNet 6.0.10

### Existing and new keys were implemented for editing TRANSIMS link and node files and their related attribute files (i.e., locations, parking, access links, connections, pocket lanes, lane uses, turn penalties, signs, and signals). UPDATE\_NODE\_RANGE, UPDATE\_ZONE\_RANGE, UPDATE\_LINK\_RANGE, DELETE\_NODE\_RANGE, DELETE\_ZONE\_RANGE, and DELETE\_LINK\_RANGE are used to specify a list of records in the control files to update or delete data records. UPDATE\_NODE\_FILE, UPDATE\_ZONE\_FILE, UPDATE\_LINK\_FILE, DELETE\_NODE\_FILE, DELETE\_ZONE\_FILE, and DELETE\_LINK\_FILE keys are available to implement the range logic using data files. If the UPDATE\_NODE\_DATA\_FLAG, UPDATE\_ZONE\_DATA\_FLAG, and UPDATE\_LINK\_DATA\_FLAG are true, the update files are interpreted as standard TRANSIMS node and link files for updating fields or adding new records to an existing network.

### PlanSum 6.0.8

The performance file output logic was expanded to calculate additional attributes using methods that are more consistent with the Router.

### Router 6.0.39

Improvements were made in the DTA and DUE logic to limit path building to trips with significant differences, but also update the travel times for plans that are not re-built. A bug in the speed calculations for trips that only use a small segment of a link were also corrected.

### Simulator 6.0.2

Modifications were made to the vehicle loading queue to minimize conflicts between threads. Improvements were made to Macroscopic speed processing and transfers between Unsimulated subareas. Mesoscopic logic was implemented for lane changing, plan following, random slow downs, traffic controls, and speed calculations. Output processing and reporting was also improved.

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### ArcPlan 6.0.8

Vehicle Type and Priority selection keys were added.

### PlanSelect 6.0.3

Vehicle Type selection key was added.

### Simulator 6.0.3

The simulator service code was restructured to process links using a node thread to enable alternating approach ordering for macroscopic simulations. CAPACITY\_FACTOR key was added to implement a global calibration factor for macroscopic simulations.

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### Router 6.0.40

Logic was added to identify and correct negative start times before the time sorting index is created to avoid sort problems in the output plan file.

### Simulator 6.0.4

Logic was added to properly record entries from and exits to parking lots in the performance file entry and exit fields. Corrections were made to the way capacity factors are implemented in macroscopic simulations.

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### ArcPerf 6.0.8

A bug was fixed in the lane-miles calculation.

### ArcSnapshot 6.0.2

An override was included for the default time range of the Summary\_Time\_Increment key to permit the program to output snapshot files at one second increments.

### TransimsNet 6.0.12

Link length calculation was added to the link read method when the input length is zero. The logic was modified to process lane-use files in update/delete processing.

### IntControl 6.0.3

Error detection messages were added for signal nodes that do not have approach links.

### NetPrep 6.0.14

Changes were made to the transit mode and vehicle type mapping to minimize confusion and enhance flexibility.

### Router 6.0.42

BRT mode codes and BRT\_BIAS\_FACTOR and BRT\_BIAS\_CONSTANT keys were added to model BRT services more accurately.

### Simulator 6.0.8

Logic was added to include Look Ahead and Lane Changing logic in Mesoscopic simulations. Internal traveler and vehicle numbers were modified to accommodate multi-cell vehicle processing. A bug was fixed in the multi-threading logic.

### TransitNet 6.0.10

Additional error message information was included related to mode and vehicle type.

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### SysLib

A number of refinements were made to improve Linux compatibility. Additional methods and functionality was added to Equiv\_Data classes.

### Select\_Service

SELECT\_SUBAREA\_POLYGON was renamed to SELECTION\_POLYGON and SELECT\_SUBAREAS was added to select plan records based on the subarea code in the node file.

### Router\_Service

Bugs were fixed in the way access links are integrated into the transit path building process.

### Simulator\_Service

Multi-cell vehicles were implemented and a vehicle type mapping bug was fixed.

### ArcPerf 6.0.8

Selection by polygon and subarea code were added.

### ArcPlan 6.0.9

Selection by polygon and subarea code were added, and the Equiv logic was updated.

### ArcRider 6.0.10

Selection by polygon and subarea code were added and the Equiv logic was updated.

### ArcSnapshot 6.0.3

Selection by polygon and subarea code were added.

### LinkSum 6.0.11

Selection by polygon and subarea code were added and the Equiv logic was updated.

### NetPrep 6.0.16

Additional enhancements were made to the mode and vehicle type mapping keys. The logic to check transit routes on one-way streets was improved.

### PathSkim 6.0.8

Corrections to the transit path building logic were included.

### TransimsNet 6.0.13

Transit Stop and Access Link processing was added.

### TripSum 6.0.3

Selection by polygon and subarea code were added and the Equiv logic was updated.

### Validate 6.0.6

Selection by polygon and subarea code were added and the Equiv logic was updated.

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### SysLib

Methods were added to the System and Control key processing to check for empty key values. Enhancements were made to time processing to avoid range problems for time periods greater than 30 hours.

### Data\_Service

Improvements were made to the way nested timing and phasing plans are processed. The units used for performance measure data were made more universally consistent and straightforward. Range checks for external ID processing were added to avoid problems caused by missing data fields. Transit ridership summary methods were expanded to accommodate both internal and external ID data. NO\_PRIORITY was added to the priority processing options to assist in flagging selected and unselected trip and plan records.

### Select\_Service

PERCENT\_TRIP\_DIFFERENCE, MINIMUM\_TRIP\_DIFFERENCE, and MAXIMUM\_TRIP\_DIFFERENCE keys were added to select plans that have significantly larger travel times than the original trip schedule.

### Router\_Service

The path building and tracing logic was enhanced to properly record the use of access links within transit paths.

### Simulator\_Service

The changes to the performance data structure was integrated along with improvements to the way problems are reported.

### ArcNet 6.0.4

The enhancements to the signal timing and phasing processing were incorporated.

### ArcPerf 6.0.8

The changes to the performance data structures were incorporated.

### ArcPlan 6.0.10

LOCATION was added to the problem display methods to draw the problem locations of Simulator wait time problems.

### LinkSum 6.0.12

Corrections were made to a number of reports and output files that process performance data.

### NewFormat 6.0.11

Adjustments were made to account for the changes made to performance and signal timing and phasing plan data structures.

### PathSkim 6.0.9

The transit path building logic was improved.

### PlanSelect 6.0.4

The plan leg selection logic was re-arranged to properly separate performance-based attributes from link-based attributes in selecting plans and subareas. Node-based subarea selection was also added.

### Router 6.0.49

Internal memory structures and processing methods were reorganized to enable selection of a subset of plans for re-routing, but also save the volumes related to un-selected plans. The Priority codes were expanded to flag plans as selected and un-selected. This was needed for additional DTA or DUE processing based on changes to a subset of plans. Processing checks related to transit path building were corrected. The trip-based time difference selection keys were included.

### SimSubarea 6.0.2

SUBAREA\_UPDATE\_FLAG was added to update an existing subarea classification without requiring a merged set of polygon files.

### Simulator 6.0.10

The refinements to the Simulator\_Service were incorporated.

### SubareaNet 6.0.3

Corrections and improvements were made to Access, Connection, Timing Plan and Phasing Plan processing. Nested record issues were addressed several of these files. Transit stop processing was updated.

### Validate 6.0.7

Corrections to time range processing were integrated.

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### SysLib

The logic for estimating the size of very large nested files was improved.

### Data\_Service

The System file read methods were modified to accept an input file handle as a method parameter.

### Relocate 6.0.2

New program to update trip and plan records based on changes in network files.

### TripSum 6.0.4

Selection by Vehicle Type was added.

### TripPrep 6.0.2

Selection by Vehicle Type was added.

### Validate 6.0.12

CHECK\_NETWORK\_FLAG, NEW\_PROBLEM\_NODE\_FILE, NEW\_PROBLEM\_LINK\_FILE, and NEW\_PROBLEM\_COORDINATE\_FILE keys added to enable the Validate program to check the network coding and write warning messages related to coding problem locations.

### TransitNet 6.0.11

Logic was added to check the lane connectivity of transit routes.

### TransimsNet 6.0.17

REPAIR\_CONNECTIONS key was added to validate and update the lane connection records at selected or all intersections based on changes in pocket or general purpose lanes or connection angles.

### Router 6.0.51

The DUE logic with selected trip records was modified to avoid updating NO\_PRIORITY trips in subsequent iterations.

### Simulator 6.0.14

READ\_ALL\_PLANS\_INTO\_MEMORY and AVERAGE\_LEGS\_PER\_TRIP were added to reduce read time when sufficient memory is available for all plans. A bug was fixed in tracking vehicle types for multi-cell vehicles. A bug processing lane-use records by time of day. NEW\_SNAPSHOT\_METRIC\_FLAG was added to export compressed snapshots in metric units as required by the older visualizer software. Link length and cell boundary checks were added to ensure vehicles can move to the next link. Vehicle removal logic was centralized to ensure multi-cell vehicles are removed at the end of trips and as a result of processing errors.

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### SysLib

A correction was made to Static\_Service to properly handle taxi and restricted use types.

### File\_Data\_Service

Methods were added to the File\_Service class to simplify the way system files are accessed. UPDATE\_LINK\_BEARINGS and LINK\_BEARING\_WARNING keys were added to Data\_Service to control bearing calculations. Methods to fix lane ID ranges were added. The Flow\_Time\_Service was modified to make the vehicle hours of travel consistent with the updated travel time.

### LinkSum 6.0.14

Time ratio calculation were corrected in the output summary file.

### Router 6.0.56

The speed update functions were changed to save the travel time and vehicle hours of travel in the performance file based on the current volume rather than the travel time from the previous iteration. The method of loaded non-selected paths was changed from Update\_Plan to Copy\_Plan methods to minimize volume time shifts. Problem output was fixed for the last memory iteration.

### Router\_Service

The logic was modified to enable integration with the Simulator. Copy\_Plan method was included to reload existing plans.

### Simulator 6.0.16

Options were included to integrate path building into the Simulator.

### Simulator\_Service

Refinements were added to avoid wait time problems from vehicles with very slow acceleration rates.

### SubareaNet 6.0.4

Detector records were stored in memory to avoid problems processing signal records.

### NewFormat 6.0.11

Additional logic was introduced to improve the conversion of signal phasing plans from Version 4 to 6.

### TransimsNet 6.0.20

Signal processing was added and additional capabilities were added to the connection repair logic.

### TransitNet 6.0.12

Additional lane connectivity checks were included.

### Validate 6.0.13

Additional network validation logic was include.

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### Data\_Service

Additional logic was added to the Read\_Performance method to count the number of time increments within each aggregate time period even when there is no traffic in a given time increment.

### ArcNet 6.0.5

Additional logic checks and warning messages were added to catch network coding errors.

### PerfPrep 6.0.2

The MERGE\_TRANSIT\_DATA key was expanded to control the processing of multiple data types (vehicles, passenger car equivalents, and persons) from the transit network and/or ridership files to merge with a highway performance file.

### LinkSum 6.0.16

PERSON\_BASED\_STATISTICS key was added to generate network performance reports and summary files using persons rather than passenger car equivalent volumes.

### Router\_Service

A bug was fixed in the Load\_Flow method of the path builder related to the calculation of loaded travel time of copied plans.

### Router 6.0.57

Incorporates the bug fix in the Load\_Flow method and distorted trip gap convergence statistics.

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### SysLib

Def\_Fields method was added to return a list of field names from a definition file without opening the file. Db\_Header now clears the record buffer after closing a file so that problems are not created for dBase files that are re-opened.

### Draw\_Service

Lane width can now be read if vehicle shapes are requested, but network lanes are not.

### Converge\_Service

New service derived from Select Service containing convergence related control keys original limited to the Router. These keys are now available to the integrated Router-Simulator tool.

### Flow\_Time\_Service

The Update\_Travel\_Times method was enhanced to calculate turning movement delays based on sign and signal timing information by time of day. This is the HCM algorithm integrated into Router-based travel time updates.

### Data\_Service

Read\_Link\_Direction method was added to standardize reading of link direction files.

### ArcSnapshot 6.0.5

The default cell size is now calculated based on vehicle type lengths. Bugs were fixed in the vehicle shape drawing methods.

### LineSum 6.0.4

NODE\_XY\_FILE and \_FORMAT keys were added to read node coordinates if the Access and On-Off report file options is selected. The output files for these two processing options include an ARCVIEW format option that creates point-based shapefiles for the report records.

### Relocate 6.0.7

Performance and Turn Delay file processing was added. NEW\_LOCATION\_PROBLEM\_FILE and NEW\_PARKING\_PROBLEM\_FILE keys were added to dump a list of locations and parking lots that could not be mapped to the target network. A bug was fixed in the processing the target parking file. The location and parking mapping methods were expanded to consider near-by locations in addition to the nearest location on the same link. Preference is given to link-based matches. In addition to replacing mapped origin and destination locations in the Trip file, the software now deletes records that are not in the target location file. Similar logic was included in the Plan file process with the exception that paths are deleted if the origin and destination are not on the original link.

### Router\_Service

Select\_Service and Converge\_Service were added to facilitate Simulator integration. Gap reporting and traveler scripting logic was incorporated as well.

### Router 6.0.60

Select\_Service and Converge\_Service data structures and control keys were moved into the Router\_Service or lower classes. Sign, Signal, Timing Plan, and Phasing Plan keys were added to activate the turn delay calculations using HCM signal delay methods. Gap processing and reporting was move to Converge\_Service.

### Simulator\_Service

If the ROUTING preprocessor key is defined, the Simulator\_Service is complied with Router path building and convergence logic.

### Simulator 6.0.17

If the ROUTING preprocessor key is defined, the Simulator includes path building and convergence processing logic.

### SubareaNet 6.0.6

Performance and Turn Delay file processing was added. Phasing Plan processing was modified to avoid problems caused by nested phasing records that are deleted due to missing lane connectivity.

### Validate 6.0.14

Logic was added to detect if the input traffic count file is in Link Data or Link Direction format. The permits edits to the output Volume-Count file to be read as an input traffic count file.

### LinkSum 6.0.17

NEW\_DATA\_SUMMARY\_PERIODS and NEW\_DATA\_SUMMARY\_RATIOS keys were added to enable multiple user-defined summary periods with multiple congested time ratio summaries. Refinements to the performance measure calculations were also implemented.

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### SysLib

The equation processor was expanded to include a time ratio constraint parameter for CONICAL functions.

### File\_Data\_Service

The Get\_Data method in the Performance data class was expanded to include a maximum travel time ratio and a delete travel time ratio parameter. The travel time function was modified to limit the delay on a given link or turning movement to a maximum of one hour. Logic was added to protect against integer overflow issues and travel times that are less than the free flow travel time. Time ratio constraints adjust the travel time and the volume for each time period. MAXIMUM\_TIME\_RATIO and EXCLUDE\_TIME\_RATIO keys were added.

### Flow\_Time\_Service

AVERAGE\_TRAVEL\_TIMES key was added to enable the user to enable or disable travel time averaging. The Update Travel Times method was enhanced to apply moving time averaging between iterations and time periods. Protection was added for integer overflow issues and travel times that are less than the free flow travel time. If signal timing plans and lane connectivity files are active, turn delays are calculated based on the turning volume and the green time allocated to the movement. Additional delay calculations are included for sign controlled intersections and freeway, expressway, and ramp junction points.

### Converge\_Service

The maximum link and trip gap calculations were corrected.

### Select\_Service

PERCENT\_PATH\_DIFFERENCE, MINIMUM\_PATH\_DIFFERENCE, and MAXIMUM\_PATH\_DIFFERENCE keys were added to select travelers based on the number of legs that are different between two plan records. The Select\_Path\_Difference method was added to calculate the differences.

### ArcPerf 6.0.10

The MAXIMUM\_TIME\_RATIO and EXCLUDE\_TIME\_RATIO keys were added.

### LineSum 6.0.6

The On-Off report logic was modified to create Shapefiles with stop and mode filters and station names.

### LinkSum 6.0.24

COMPARE\_LINK\_MAP\_FILE/FORMAT and NEW\_LINK\_DIRECTION\_FLIP keys were added to enhance the comparison of Performance files from different networks. The link map converts link numbers from the compare network to the input network. The flip key changes the definition of the project and base files. MAXIMUM\_TIME\_RATIO and EXCLUDE\_TIME\_RATIO keys were activated. Corrections were made to the percent time congested statistics. Turn delays were added to the vehicle/person hours of delay calculations.

### NewFormat 6.0.12

Corrections were made to the processing of Version 4 Activity and Plan files.

### PerfPrep 6.0.8

BASE\_PERFORMANC\_FILE/FORMAT, TIME\_CONSTRAINT\_FILE/FORMAT, NEW\_TIME\_RATIO\_FILE/FORMAT, and NEW\_DELETE\_RECORD\_FILE/FORMAT keys were added. MAX\_TRAVEL\_TIME\_RATIO and SET\_MIN\_TRAVEL\_TIME keys were deleted and replaced by the MAXIMUM\_TIME\_RATIO and EXCLUDE\_TIME\_RATIO keys or the Time Constraint File. Selection and Travel Time Updating logic was also added along with a DELETE\_PERFORMANCE\_RECORDS report.

### PlanCompare 6.0.2

PERCENT\_PATH\_DIFFERENCE, MINIMUM\_PATH\_DIFFERENCE, and MAXIMUM\_PATH\_DIFFERENCE keys were added to select plans based on the number of legs that differ.

### PlanPrep 6.0.3

Additional logic was added to the plan repair processing.

### Relocate 6.0.13

Considerable logic was added to check additional plan leg records and enhance the mapping of activity locations and parking lots. Path building logic was added to attempt to repair plans that travel through split links.

### Router\_Service

AVERAGE\_TRAVEL\_TIMES key and integer overflow logic were added. The memory processing logic for multiple threads was modified to minimize thread bottlenecks and data copying. The Load\_Flow method was modified to minimize time period shifts in reloading existing plans.

### Router 6.0.74

The random selection logic was tied to traveler and iteration IDs to avoid differences in thread processing. Logic was added to skip plans that include legs that are not in the network. The DUE selection logic was modified to consider the Priority weight in selecting trips to re-route during a given iteration. Trips without input plans are automatically included in the build list for the first iteration. Turn Delay output processing was added after the last iteration. Travel time averaging over time periods and iterations is user controlled. Multi-threaded memory processing is more efficient.

### SubareaNet 6.0.7

SUBAREA\_BUFFER\_DISTANCE key was added to automatically include a specified buffer area around a subarea polygon.

### SubareaPlans 6.0.1

Corrections were made in converting plans that start outside the subarea area or end outside the subarea.

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### SysLib

Additional options were added to the Performance processing codes.

### File\_Data\_Service

The vehicle hours of delay calculation within the Performance data structure was modified to apply flow rather than volume to the link travel time difference. This makes the delay values consistent with the vehicle hours of travel calculations.

### ArcPerf 6.0.11

The vehicle hours of delay calculations were updated.

### LinkSum 6.0.27

The vehicle hours of day calculations were updated. Logic was added to zero out comparison cells for links/directions that are not included in both networks. The link mapping logic for performance comparisons was expanded to permit multiple links to be mapped to a single links.

### NetMerge 6.0.0

New program to merge two TRANSIMS networks together.

### PathSkim 6.0.10

NEW\_ACCESSIBILITY\_FILE/FORMAT, ORIGIN\_WEIGHT\_FIELD, DESTINATION\_WEIGHT\_FIELD, and MAXIMUM\_TRAVEL\_TIME keys were added to generate zone-based summarizes of travel time accessibility measures based on origin and destination size values. This is typically used to calculate the number of jobs that can be reached from households in a given zone within a specified travel times by auto or transit.

### PerfPrep 6.0.10

The processing options and the travel time ratio checks were expanded. The vehicle hours of delay calculation was updated.

### SubareaNet 6.0.8

The SAVE\_OUTSIDE\_NETWORK key was added. This option extracts a network outside of the subarea boundary that can be merged with subarea data to reconstruct a regional network with network changes or results within the subarea.

### SubareaPlans 6.0.2

Logic was added to detect situations where links in the plan file are not included in the subarea network file.

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### SysLib

Db\_Header was updated to detect a CSV file more effectively.

### File\_Service

The COUNT field in Skim files was populated.

### Data\_Service

EXCLUDE\_TIME\_RATIO key and Delete\_Time\_Ratio method/functionality was removed. Logic was added to several Read methods to detect and properly update the list data when multiple data files are combined. The Performance Data processing method was modified to ensure travel times are greater than or equal to free flow times.

### Flow\_Time\_Service

The Update\_Travel\_Times method was modified to use the Enter data in the volume-delay function rather than Volume data. The time calculation for collapsing restricted lanes was changed to weighted average.

### Router\_Service

Multi-thread logic was added to Skim processing.

### ArcPerf 6.0.12

EXCLUDE\_TIME\_RATIO key was removed and the modified Performance Data processing was used.

### FileFormat 6.0.5

DATA\_INDEX\_FIELD key was added to enable file merging based on a record index value.

### LinkSum 6.0.28

EXCLUDE\_TIME\_RATIO key was removed and the modified Performance Data processing was used.

### NetMerge 6.0.1

MERGE\_ZONE\_FILE key was added to merge zonal data. Performance and Turn Delay processing was implemented after the network merging is completed.

### NewFormat 6.0.12

MAXIMUM\_TIME\_RATIO key processing was added.

### PathSkim 6.0.11

Zone accessibility logic was modified to properly use and/or create locations mapped to external zone numbers.

### PerfPrep 6.0.12

EXCLUDE\_TIME\_RATIO key was removed and the modified Performance Data processing was used. SELECT\_LINKS, SELECT\_NODES, and SELECT\_FACILITY\_TYPES keys were implemented.

### Relocate 6.0.14

A memory leak was fixed related to shape processing.

### Router 6.0.76

Average time processing was excluded from the last iteration. Logic was added to update the Plan Depart and Arrival times based on differences in Trip Start and End times. Trip Gaps data was initialized when a Plan file, but no Trip file is provided.

### SubareaNet 6.0.10

RIDERSHIP file process was added. The SAVE\_OUTSIDE\_NETWORK logic was reworked to more efficiently create external network data.

### TripPrep 6.0.3

SHIFT\_START\_PERCENTAGE, SHIFT\_FROM\_TIME\_RANGE, and SHIFT\_TO\_TIME\_RANGE keys were added to select and reassign Trip start times from one time range to another.

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### Reschedule 6.0.2

PERFORMANCE\_FILE, TRANSIT\_DRIVER\_FILE, and PERFORMANCE\_UPDATE\_FILE/FORMAT keys were added in order to modify transit schedules based on the travel time differences between two link performance files.

### SubareaPlans 6.0.3

If a transit network is not provided, the plan conversion process will extract the drive to/from transit portion of a park-n-ride/kiss-n-ride trip and save it as a drive trip between the origin/destination and the park-n-ride lot.

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### Execution\_Service

A bug was fixed in the report appending logic.

### Simulator\_Service

Additional flexibility was added to compile with the ROUTING option, but to execute the program without routing. Additional CHECK messages were added to detect problems with array index problems.

### Simulator 6.0.18

Plan and Trip file processing was aligned with the ROUTING compile key and control key options to enable a program compiled with ROUTING activated to enable the option to skip the routing functionality and read an input plan file.

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### RiderSum 6.0.6

NEW\_STOP\_GROUP\_FILE key was added to output boarding and alighting data for a group of stops.

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### SysLib

Logic was added to create definition files for TransCAD binary and text files based on the TransCAD data dictionary.

### FileFormat 6.0.6

TransCAD file conversion capabilities were added.