

SUMO - More on... Software Tests

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Chapter 1. Introduction

Document Information

This document is a part of *SUMO* - Simulation of Urban *MO*bility. SUMO is an open source microscopic road traffic simulation. It can be found under <http://sumo.sourceforge.net/>.

This document fits to version 0.9.5. We will try to keep it up-to-date with the next versions.

Document Scope

Since version 0.9.3 we support some basic tests which prove the software functionality. The number of the available tests is not that large, yet, but it will hopefully grow with time. This chapter describes how to set up the testing system and how to use it.

Document Audience

This document contains information for *developers* who extend SUMO and want to assure their changes work properly.

Document Structure

At first, the acceptance tests that come with the package are described.

Chapter 2. Acceptance Testing using TextTest

About

We use "TextTest [<http://texttest.carmen.se/>]" to test whether the software still behaves as expected. What this application does is simply to compare an application's output (both normal and errors) and optionally also the files written by the application with previously generated files.

There are some advantages and disadvantages of this approach. On the one hand, you can guarantee that the application is doing what is wanted by comparing all outputs with files you think are right. But this is also the problem with this approach: you do not have the assurance that the files you are comparing the current outputs to ARE right - you have to check these by hand.

Anyhow, for the current progress stage, this approach should be used, because a) the tests are quite small and errors can be easily seen b) it is working.

Install

At first, you have to download and install "TextTest [<http://texttest.carmen.se/>]" from <http://texttest.carmen.se/>. The installation seems to be not that easy at first, but if you just follow the steps described in TextTest's documentation, you'll have the system up and running in some minutes. Before continuing, please check whether the tests included with the TextTest distribution run before proceeding.

After installing TextTest, you have to set an environment variable in order to make the system run:

- TEXTTEST_HOME

Set it to the path SUMO-tests are located in (`<SUMO_DIST>/tests` for the tests that come with the distribution)

This environment variable forces TextTest to use the specified directory as source of tests.

This should be all on installing the tests-subsystem so far...

Running the Tests

Within the `<SUMO>/tests` - folder you can find batch-files which start TextTest. "runAll-Tests.bat" starts TextTest for testing all applications located in the folder, "runNetconvert-Tests.bat" will only show tests for NETCONVERT, "runDuarouterTests.bat" only those for DUAROUTER etc.

Setting up new Tests

Please follow the instructions for TextTest. In the following, the TextTest configuration for each application will be discussed.

Coverage

As said before, further tests have to be added. The following tests are currently available:

DFROUTER

Table 2.1. Tests for DFROUTER

Test Set Description	
<i>Tests whether showing meta-information works</i>	
Path	Description
dfrouter/meta/help	checks whether printing help works
dfrouter/trips/noop	checks what happens when no argument is given
<i>Checks whether the detector types are computed properly</i>	
Path	Description
dfrouter/detector_types/messstrecke	Example using the dlr-testtrack
<i>Checks whether the detector pois are written correctly</i>	
Path	Description
dfrouter/detector_pois/messstrecke	Example using the dlr-testtrack
<i>Checks whether the routes are computed correctly</i>	
Path	Description
dfrouter/routes/messstrecke	Example using the dlr-testtrack
<i>Checks whether error handling works</i>	
Path	Description
dfrouter/errors/false_net	Tests what happens if an unknown network is passed
dfrouter/errors/no_output	Tests what happens if no output is given
dfrouter/errors/unknown_option	Tests what happens if an unknown option is passed

Recent changes:

- Test for `--version` was removed in version 0.9.5

DUAROUTER

Table 2.2. Tests for DUAROUTER

Test Set Description	
<i>Tests whether showing meta-information works</i>	
Path	Description
duarouter/meta/help	checks whether printing help works
duarouter/trips/noop	checks what happens when no argument is given
<i>Checks whether the import of route alternatives works</i>	

Test Set Description	
Path	Description
duarouter/alternat- ives/increasing_time	plain old style alternatives with increasing departue time
duarouter/alternat- ives/newstyle_colorcheck	as below, but color information is provided
duarouter/alternat- ives/newstyle_noid_increasing_time	new style alternatives with increasing departure times
duarouter/alternat- ives/newstyle_noid_one_time	new style alternatives with one departure time
duarouter/alternat- ives/newstyle_noid_unsorted_time	new style alternatives with random departure time with and - -unsorted set
duarouter/alternat- ives/newstyle_with_vehtype	newstyle_noid_increasing_time, but a (defined) vehicle type is used
duarouter/alternat- ives/newstyle_with_vehtype_nodef	newstyle_noid_increasing_time, but an (undefined) vehicle type is used
duarouter/alternat- ives/new- style_with_vehtype_with_class	newstyle_with_vehtype, but the vehicle type has a class
duarouter/alternatives/one_time	plain old style alternatives with one departue time
duarouter/alternatives/unsorted_time	plain old style alternatives with random departure time and - -unsorted set
<i>Checks whether the import of flows works</i>	
Path	Description
duarouter/flows/flows2routes	simple test with 100 vehicles and one departure time
duarouter/ flows/flows2routes_100s_interval	simple test with 100 vehicles with departure interval between 0 and 100s
duarouter/ flows/flows2routes_100s_interval_ext	The same as flows2routes_100s_interval but the interval is specified using an enclosing element
duarouter/ flows/ flows2routes_100s_interval_typedefined	flows2routes_100s_interval, but with a defined vehicle type
duarouter/ flows/ flows2routes_100s_interval_withcolor	flows2routes_100s_interval, but with an additional color information
duarouter/ flows/ flows2routes_100s_interval_withtype	flows2routes_100s_interval, but with an undefined vehicle type
duarouter/ flows/ flows2routes_100s_interval_withtype_ withclass	flows2routes_100s_interval_typedefined, but the vehicle type has a class
duarouter/ flows/flows2routes_200s_interval	simple test with 100 vehicles with departure interval between 0 and 200s
duarouter/ flows/flows2routes_200s_interval_ext	The same as flows2routes_200s_interval but the interval is specified using an enclosing element
duarouter/ flows/ flows2routes_100s_interval_withcolor	Checks whether defining colors works
duarouter/ flows/ flows2routes_100s_interval_withtype	Checks whether a given type is passed further

Test Set Description	
Path	Description
duarouter/ flows/ flows2routes_100s_interval_typedefined	Checks whether a defined type is passed further
duarouter/ flows/ flows2routes_100s_interval_withtype_ withclass	flows2routes_100s_interval_typedefined, but the vehicle type has a class
<i>Checks whether the import of trips works</i>	
Path	Description
duarouter/trips/increasing_time	100 trips, departure time is increasing
duarouter/ trips/increasing_time_notype	same as increasing_time, but no type is given in the trips
duarouter/ trips/increasing_time_typedefined	same as increasing_time, but a type is given and defined in the trips
duarouter/ trips/increasing_time_typedefined_withclass	same as increasing_time_typedefined, but the type has a class
duarouter/ trips/increasing_time_unsorted	same as increasing_time, but with --unsorted set
duarouter/ trips/increasing_time_withcolor	same as increasing_time, a color is given partially
duarouter/trips/one_time	100 trips, one departure time
duarouter/trips/one_time_notype	same as increasing_time, but no type is given in the trips
duarouter/trips/one_time_typedefined	same as increasing_time, but a type is given and defined in the trips
duarouter/trips/one_time_unsorted	the same, but with --unsorted set
duarouter/trips/unsorted_time	100 trips, random departure time, --unsorted set
duarouter/trips/unsorted_time_notype	same as unsorted_time, but no type is given in the trips
duarouter/ trips/unsorted_time_typedefined	same as unsorted_time, , but a type is given and defined in the trips
<i>Checks whether the import of routes (SUMO) works</i>	
Path	Description
duarouter/routes/increasing_time	100 routes (old style), departure time is increasing
duarouter/routes/one_time	100 routes (old style), one departure time
duarouter/routes/unsorted_time	100 routes (old style), random departure time, --unsorted set
duarouter/ routes/newstyle_withid_increasing_time	100 routes (new style, routes have an id), departure time is increasing
duarouter/ routes/newstyle_withid_one_time	100 routes (new style, routes have an id), one departure time
duarouter/ routes/newstyle_withid_unsorted_time	100 routes (new style, routes have an id), random departure time, --unsorted set
duarouter/ routes/newstyle_noid_increasing_time	100 routes (new style, routes have no id), departure time is increasing

Test Set Description	
Path	Description
duarouter/ routes/newstyle_noid_one_time	100 routes (new style, routes have no id), one departure time
duarouter/ routes/newstyle_noid_increasing_time	100 routes (new style, routes have no id), increasing departure time
duarouter/ routes/newstyle_noid_unsorted_time	100 routes (new style, routes have no id), random departure time, - - unsorted set
duarouter/ routes/newstyle_increasing_colors	same as newstyle_noid_increasing_time, but colors are supplied partially
duarouter/ routes/newstyle_with_vehtype	Another (!!!) color check
duarouter/ routes/newstyle_with_vehtype	newstyle_withid_one_time, but the with a defined vehicle type
duarouter/ routes/newstyle_with_vehtype_nodef	newstyle_withid_one_time, but the with an undefined vehicle type
duarouter/ routes/newstyle_with_vehtype_withclass	newstyle_with_vehtype, but the vehicle type has a class
<i>Checks whether the DUA works</i>	
Path	Description
duarouter/dua/newstyle_dua3s_step1	the first step of the dua3s-example using current (new style) output; converts trips to routes and alternatives
duarouter/dua/newstyle_dua3s_step2	the second step of the dua3s-example using current (new style) output; converts alternatives from step 1 to routes and alternatives using weights
duarouter/dua/newstyle_dua3s_step3	the third step of the dua3s-example using current (new style) output; converts alternatives from step 2 to routes and alternatives using weights
duarouter/dua/oldstyle_dua3s_step2	the second step of the dua3s-example using old (style) output; converts alternatives from step 1 to routes and alternatives using weights
duarouter/dua/oldstyle_dua3s_step3	the third step of the dua3s-example using old (style) output; converts alternatives from step 2 to routes and alternatives using weights
<i>Checks whether error handling works</i>	
Path	Description
duarouter/errors/no_net	Tests what happens if the net is not given
duarouter/errors/false_net	Tests what happens if the net is not available
duarouter/errors/no_output	Tests what happens if the output is not given
duarouter/errors/false_output	Tests what happens if the output can not be written
duarouter/errors/no_input	Tests what happens if the input is not given
duarouter/errors/unknown_option	Tests what happens if an unknown option is passed

Recent changes:

- Test for `--version` was removed in version 0.9.5

JTRROUTER

Table 2.3. Tests for JTRROUTER

Test Set Description	
<i>Tests whether showing meta-information works</i>	
Path	Description
dfrouter/meta/help	checks whether printing help works
dfrouter/trips/noop	checks what happens when no argument is given
<i>Checks plain functioning</i>	
Path	Description
dfrouter/plain/plain	A basic test
dfrouter/plain/no_turnarounds	As plain, but turning around is prohibited (by setting the probability to zero)
dfrouter/plain/straight_only	As plain, but only moving forward is allowed (by setting all other probabilities to 0)
dfrouter/plain/straight_only	As straight_only, but the ending edge is a sink
<i>Checks whether the processing of turn definitions works</i>	
Path	Description
dfrouter/turns/definite_xml	Description of two routes using turn definitions in XML
dfrouter/turns/definite_csv	Description of two routes using turn definitions in CSV
<i>Checks whether error handling works</i>	
Path	Description
dfrouter/errors/no_net	Tests what happens if the net is not given
dfrouter/errors/false_net	Tests what happens if the net is not available
dfrouter/errors/no_output	Tests what happens if the output is not given
dfrouter/errors/false_output	Tests what happens if the output can not be written
dfrouter/errors/no_input	Tests what happens if the input is not given
dfrouter/errors/unknown_option	Tests what happens if an unknown option is passed

Recent changes:

- Test for `--version` was removed in version 0.9.5

NETCONVERT

Table 2.4. Tests for NETCONVERT

Test Set Description	
<i>Tests whether showing meta-information works</i>	
Path	Description
netconvert/meta/help	checks whether printing help works
netconvert/trips/noop	checks what happens when no argument is given
<i>Checks whether --speed-in-kmh works (in XML)</i>	
Path	Description
netconvert/ XML2/speed_in_kmh/cross_notypes_kmh	no types, speed in kmh
netconvert/ XML2/speed_in_kmh/cross_notypes_kmh_ v	the same, with verbose output
netconvert/ XML2/speed_in_kmh/cross_usingtypes_k mh	types, speed in kmh
netconvert/ XML2/speed_in_kmh/cross_usingtypes_k mh_v	the same, with verbose output
<i>Checks whether types may be used to describe edges (in XML)</i>	
Path	Description
netconvert/XML2/types/cross_notypes	no types
netconvert/ XML2/types/cross_notypes_v	the same, with verbose output
netconvert/ XML2/types/cross_usingtypes	with types
netconvert/ XML2/types/cross_usingtypes_v	the same, with verbose output
<i>Checks whether description of edge shapes works (in XML)</i>	
Path	Description
netconvert/ XML2/shapes/hokkaido-japan	a simple test for the hokkaido-network
<i>Checks whether setting connections and disabling addition of turnaround work</i>	
Path	Description
netconvert/ XML2/connections/cross3l_edge2edge_c onns	a simple test for setting connections edge-wise
netconvert/ XML2/connections/cross3l_lane2lane_c onns	a simple test for setting connections lane-wise
netconvert/ XML2/connections/cross3l_no_turnarou nds	a simple test to check whether appending turnarounds may be disabled
<i>Checks whether error handling works</i>	
Path	Description
netconvert/errors/false_output	Tests what happens if the output can not be written

Test Set Description	
Path	Description
netconvert/errors/no_output	Tests what happens if no output is given
netconvert/errors/xml_false_edg	Tests what happens if xml-edges can not be read
netconvert/errors/xml_no_edg	Tests what happens if no xml-edges are given
netconvert/errors/xml_false_nod	Tests what happens if xml-nodes can not be read
netconvert/errors/xml_no_nod	Tests what happens if no xml-nodes are given
netconvert/errors/unknown_option	Tests what happens if an unknown option is passed

Recent changes:

- Test for `--version` was removed in version 0.9.5

SUMO

Table 2.5. Tests for SUMO

Test Set Description	
<i>Tests whether showing meta-information works</i>	
Path	Description
sumo/meta/help	checks whether printing help works
sumo/trips/noop	checks what happens when no argument is given
<i>Checks whether routes are read</i>	
Path	Description
sumo/routes/new_style	checks whether newstyle routes are read properly
sumo/routes/old_style	checks whether oldstyle routes are read properly
<i>Checks whether outputs are generated properly</i>	
Path	Description
sumo/ routes/output/cross3ltl_emissions	checks whether emissions are written
sumo/ routes/out- put/cross3ltl_meandata_edges	checks whether mean data are written (edge-based)
sumo/ routes/out- put/cross3ltl_meandata_lanes	checks whether mean data are written (lane-based)
sumo/ routes/out- put/ cross3ltl_meandata_edges_constrained	checks whether mean data can be constrained (edge-based)
sumo/ routes/out- put/ cross3ltl_meandata_lanes_constrained	checks whether mean data can be constrained (lane-based)
sumo/routes/output/cross3ltl_rawdump	checks whether raw dump is written

Test Set Description	
Path	Description
sumo/ routes/out- put/cross3ltl_rawdump_withempty	checks whether raw dump is written (with - -dump-empty-edges)
sumo/ routes/output/cross3ltl_tripinfo	checks whether tripinfos are written
sumo/ routes/output/cross3ltl_vehroutes	checks whether vehroutes are written (buggy); see also sumo/extended/rerouter
<i>Checks whether variable speed signs work</i>	
Path	Description
sumo/exten- ded/vari- able_speed_signs/b0_offset_100	a scenario with begin time=0, first change at time=100
sumo/exten- ded/vari- able_speed_signs/b100_offset_0	a scenario with begin time=100, first change at time=0
sumo/exten- ded/vari- able_speed_signs/b100_offset_50	a scenario with begin begin time=100, first change at time=50
sumo/exten- ded/vari- able_speed_signs/b100_offset_100	a scenario with begin begin time=100, first change at time=100
sumo/exten- ded/vari- able_speed_signs/b100_offset_200	a scenario with begin time=100, first change at time=200
sumo/exten- ded/variable_speed_signs/begin_0	a scenario with begin time=0, first change at time=0
<i>Checks whether other emitters work</i>	
Path	Description
sumo/exten- ded/emit- ter/ 10_time_0_1_start0_0types_1route_noi d	ten vehicles, one second between starting at 0, random vehicle type (from 1), one route, no id
sumo/exten- ded/emit- ter/ 10_time_0_1_start5_0types_1route_noi d	ten vehicles, one second between starting at 0, random vehicle type (from 1), one route, no id, sim start at 5 (check whether previous vehicles are discarded)
sumo/exten- ded/emitter/base_vehtype1from2	as 10_time_0_1_start0_0types_1route_noid, but with a chosen vehicle type
sumo/exten- ded/emitter/base_vehtype2from2	as 10_time_0_1_start0_0types_1route_noid, but with two randomly chosen vehicle type
sumo/extended/emitter/base_withid	as 10_time_0_1_start0_0types_1route_noid, but with ids
sumo/extended/emitter/base_period10	as 10_time_0_1_start0_0types_1route_noid, but with a period of 10s
sumo/exten- ded/emitter/base_otherroute	as 10_time_0_1_start0_0types_1route_noid, but an- other route is used
sumo/exten-	as 10_time_0_1_start0_0types_1route_noid, but a ran-

Test Set Description	
Path	Description
ded/emitter/base_2randomroutes	dom route is used
sumo/exten- ded/emitter/base_exp_routes	as 10_time_0_1_start0_0types_1route_noid, with explicit routes
<i>Checks whether other additional structures work</i>	
Path	Description
sumo/extended/rerouter	Tests whether rerouter work; checks also whether vehroutes work properly when vehicles are rerouted
<i>Checks whether error handling works</i>	
Path	Description
sumo/errors/unknown_option	Tests what happens if an unknown option is passed
sumo/er- rors/meandata_edges_missing_begin1	Tests what happens if the first begin time is missing
sumo/er- rors/meandata_edges_missing_begin2	Tests what happens if the second begin time is missing
sumo/er- rors/mean- data_edges_missing_begin_divider	Tests what happens if a divider is given but no value in begins
sumo/er- rors/meandata_edges_missing_end1	Tests what happens if the first end time is missing
sumo/er- rors/meandata_edges_missing_end	Tests what happens if the second end time is missing
sumo/er- rors/mean- data_edges_missing_end_divider	Tests what happens if a divider is given but no value in ends
sumo/er- rors/meandata_edges_false_order	Tests what happens if a begin is larger than an end

Recent changes:

- Test for `--version` was removed in version 0.9.5