Validation in CarpeDM - Tests

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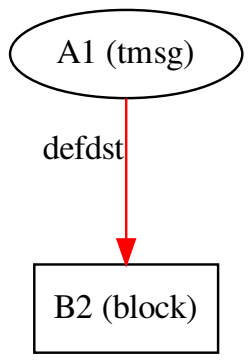
Agenda

- Test the validation of schedules – node types and edge types
- Minimal test schedules
- Forbidden schedules
- Additional topics
  - Whitebox tests with coverage tools
  - Documentation
  - Source code formatting
  - doxygen

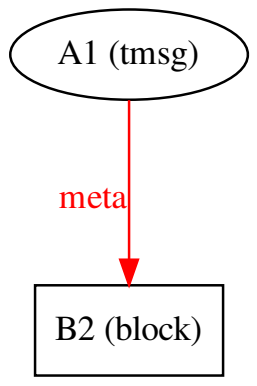
Test the validation of schedules – node types and edge types

- We have 11 node types: block, blockfixed, flow, flush, listdst, noop, qbuf, qinfo, switch, tmsg, wait.
- 16 edge types: altdst, baddefdst, defdst, dynid, dynpar0, dynpar1, flowdst, flushovr, listdst, meta, priolo, priohi, prioil, switchdst, target (command), target (switch).
- Thus, we have 11*16*11 = 1936 combinations (test schedules) of two nodes connected by one edge to check.
- 149 test schedules are valid, 1787 test schedules are invalid.

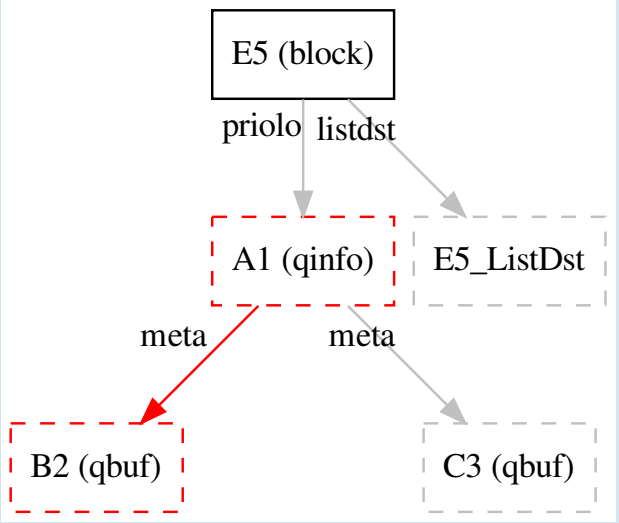
Test the validation of schedules – node types and edge types



Valid schedule



Invalid schedule



Repaired schedule

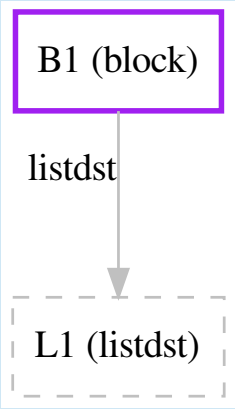
Minimal test schedules

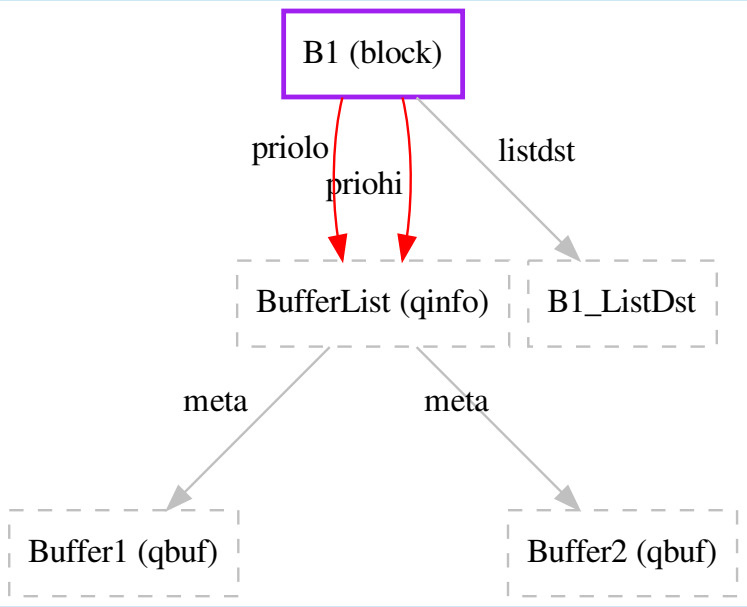
- The idea is to test with minimal schedules: one edge connecting two nodes.
- Second idea is to test the validation rule (Source: ConstellationRules). This requires to enlarge some schedules.

Forbidden schedules

- Examples for forbidden schedules, which can be loaded into the data master. The forbidden schedules contain meta nodes.
- Do exist forbidden schedules without meta nodes?

Forbidden schedules





Whitebox tests with coverage tools

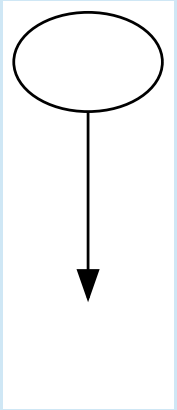
- Initial thought: What happens during tests? Are all rules tested?
- Use lcov for statement-by-statement code coverage.
- Needs extra compiler options to produce *.gcno, *.gcda files.
- Generates html-pages from source with coverage.
- Add target to Makefile for this
- Whitebox tests: check which lines are executed in the code to be tested.

Documentation

- Compare reference documentation FTN_dm_schedules with results from source.
- Are all node types and edge types documented?

Documentation

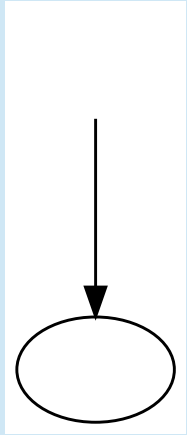
Edge Type	Node Type - Out-Edge, first node										
	block	blockalign	flow	flush	listdst	noop	qbuf	qinfo	switch	tmsg	wait
defdst	0..1	0..1	0..1	1	–	0..1	–	–	0..1	1	0..1
altdst	0..10	0..10	–	–	–	–	–	–	–	–	–
listdst	0..1	0..1	–	–	–	–	–	–	–	–	–
baddefdst	–	–	–	–	–	–	–	–	–	–	–
target (Switch)	–	–	–	–	–	–	–	–	0..1	–	–
target (Command)	–	–	0..1	0..1	–	0..1	–	–	–	–	0..1
flowdst	–	–	0..1	–	–	–	–	–	–	–	–
flushovr	–	–	–	0..1	–	–	–	–	–	–	–
switchdst	–	–	–	–	–	–	–	–	0..1	–	–
meta	–	–	–	–	–	–	–	2	–	–	–
priolo	0..1	0..1	–	–	–	–	–	–	–	–	–
priohi	0..1	0..1	–	–	–	–	–	–	–	–	–
prioil	0..1	0..1	–	–	–	–	–	–	–	–	–
dynid x	–	–	–	–	–	–	–	–	–	–	–
dynpar0	–	–	–	–	–	–	–	–	–	0..1	–
dynpar1	–	–	–	–	–	–	–	–	–	0..1	–
dyntef	–	–	–	–	–	–	–	–	–	–	–
dynres	–	–	–	–	–	–	–	–	–	–	–
any edge	0..15	0..15	1..3	1..3	0..	1..2	0..	2	1..3	1..3	1..2



Documentation

Edge Type	Node Type - In-Edge, second node										
	block	blockalign	flow	flush	listdst	noop	qbuf	qinfo	switch	tmsg	wait
defdst	0..1	0..1	0..1	0..1	–	0..1	–	–	0..1	0..1	0..1
altdst	0..10	0..10	0..10	0..10	–	0..10	–	–	0..10	0..10	0..10
listdst	0..1	0..1	–	–	–	–	–	–	–	–	–
baddefdst	–	–	–	–	–	–	–	–	–	–	–
target (Switch)	0..1	0..1	–	–	–	–	–	–	–	–	–
target (Command)	0..1	0..1	–	–	–	–	–	–	–	–	–
flowdst	0..1	0..1	0..1	0..1	–	0..1	–	–	0..1	0..1	0..1
flushovr	–	–	–	0..1	–	–	–	–	–	–	–
switchdst	0..1	0..1	0..1	0..1	–	0..1	–	–	0..1	0..1	0..1
meta	–	–	–	–	–	–	1	–	–	–	–
priolo	–	–	–	–	–	–	–	0..1	–	–	–
priohi	–	–	–	–	–	–	–	0..1	–	–	–
prioil	–	–	–	–	–	–	–	0..1	–	–	–
dynid x	–	–	–	–	–	–	–	–	–	–	–
dynpar0	0..1	0..1	0..1	0..1	–	0..1	–	–	0..1	0..1	0..1
dynpar1	0..1	0..1	0..1	0..1	–	0..1	–	–	0..1	0..1	0..1
dyntef	–	–	–	–	–	–	–	–	–	–	–
dynres	–	–	–	–	–	–	–	–	–	–	–
any edge	0..18	0..18	0..15	0..16	0	0..15	1	0..1	0..15	0..15	0..15

Validation CarpeDM schedules



Documentation

- Check edge types ‘dynid x’, ‘dyntef’, ‘dynres’
- Check node types ‘listdef’,

Source code formatting

- Use clang for formatting C++ source of SingleEdgeTest
- Add target to Makefile for this

doxygen

- Learn how to use doxygen
- Add doxygen comments to C++ source of SingleEdgeTest
- Add target for this to Makefile