

References

The source LNT and LOTOS files modelling the systolic convolution product are available from http://cadp.inria.fr/ftp/demos/demo_04.

The source LNT and LOTOS files modelling the REL/rel distributed algorithm are available from http://cadp.inria.fr/ftp/demos/demo_08.

The source LNT and LOTOS files modelling the CFS cluster file system are available from http://cadp.inria.fr/ftp/demos/demo_25.

The source LNT and LOTOS files modelling the HAVi leader election protocol are available from http://cadp.inria.fr/ftp/demos/demo_27.

The source LNT and LOTOS files modelling the Computer Integrated Manufacturing architecture are available from http://cadp.inria.fr/ftp/demos/demo_34.

The source LNT and LOTOS files modelling the turntable drilling system are available from http://cadp.inria.fr/ftp/demos/demo_39.

Scaling parameter

Parameter name	Parameter description	Chosen parameter values
N	N is the instance number	from 1 to 23

Size of the model

Parameter	Number of places	Number of transitions	Number of arcs	Number of units	HWB code
$N = 1$	61	53	210	24	3-20-46
$N = 2$	69	168	765	13	3-11-34
$N = 3$	108	100	272	17	9-9-45
$N = 4$	115	107	300	17	9-9-43
$N = 5$	115	257	1160	30	3-25-61
$N = 6$	124	118	372	25	7-13-60
$N = 7$	145	287	1240	17	5-10-43
$N = 8$	147	312	1378	17	5-10-43
$N = 9$	147	315	1583	19	5-11-47
$N = 10$	149	340	1721	19	5-11-47
$N = 11$	150	478	2705	33	4-25-74
$N = 12$	172	166	466	25	7-13-65
$N = 13$	173	159	401	19	7-10-53
$N = 14$	184	178	492	33	10-17-80
$N = 15$	192	475	1522	13	5-7-38
$N = 16$	196	392	1186	13	5-7-38
$N = 17$	248	591	2764	13	5-7-44
$N = 18$	252	543	2436	13	5-7-44
$N = 19$	272	586	2889	41	7-25-86
$N = 20$	273	518	1795	19	6-10-55
$N = 21$	306	298	700	39	10-20-97
$N = 22$	307	740	3829	41	7-25-89
$N = 23$	378	614	1969	19	6-10-55

Structural properties

ordinary — all arcs have multiplicity one yes

simple free choice — all transitions sharing a common input place have no other input place no ^(a)

^(a) stated by [CESAR.BDD](#) version 3.7 on all 23 instances (23 values of N).

extended free choice — all transitions sharing a common input place have the same input places	no	(b)
state machine — every transition has exactly one input place and exactly one output place	no	(c)
marked graph — every place has exactly one input transition and exactly one output transition	no	(d)
connected — there is an undirected path between every two nodes (places or transitions)	yes	(e)
strongly connected — there is a directed path between every two nodes (places or transitions)	no	(f)
source place(s) — one or more places have no input transitions	yes	(g)
sink place(s) — one or more places have no output transitions	?	(h)
source transition(s) — one or more transitions have no input places	no	(i)
sink transitions(s) — one or more transitions have no output places	?	(j)
loop-free — no transition has an input place that is also an output place	?	(k)
conservative — for each transition, the number of input arcs equals the number of output arcs	no	(l)
subconservative — for each transition, the number of input arcs equals or exceeds the number of output arcs	no	(m)
nested units — places are structured into hierarchically nested sequential units ⁽ⁿ⁾	yes	

Behavioural properties

safe — in every reachable marking, there is no more than one token on a place	yes	(o)
dead place(s) — one or more places have no token in any reachable marking	?	(p)
dead transition(s) — one or more transitions cannot fire from any reachable marking	?	(q)
deadlock — there exists a reachable marking from which no transition can be fired	?	(r)
reversible — from every reachable marking, there is a transition path going back to the initial marking	?	(s)
live — for every transition t , from every reachable marking, one can reach a marking in which t can fire	?	(t)

(b) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(c) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(d) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(e) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(f) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(g) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(h) stated by [CÆSAR.BDD](#) version 3.7 to be true on 9 instance(s) out of 23, and false on the remaining 14 instance(s).
(i) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(j) stated by [CÆSAR.BDD](#) version 3.7 to be true on 3 instance(s) out of 23, and false on the remaining 20 instance(s).
(k) stated by [CÆSAR.BDD](#) version 3.7 to be true on 19 instance(s) out of 23, and false on the remaining 4 instance(s).
(l) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(m) stated by [CÆSAR.BDD](#) version 3.7 on all 23 instances (23 values of N).
(n) the definition of Nested-Unit Petri Nets (NUPN) is available from <http://mcc.lip6.fr/nupn.php>
(o) safe by construction – stated by the [CÆSAR](#) compiler.
(p) stated by [CÆSAR.BDD](#) version 3.7 to be true on 3 instance(s) out of 23, false on the remaining 11 instance(s), and unknown on the remaining 9 instance(s).
(q) stated by [CÆSAR.BDD](#) version 3.7 to be true on 5 instance(s) out of 23, false on the remaining 9 instance(s), and unknown on the remaining 9 instance(s).
(r) stated by [CÆSAR.BDD](#) version 3.7 to be true on 10 instance(s) out of 23, false on the remaining 3 instance(s), and unknown on the remaining 10 instance(s).
(s) stated by [CÆSAR.BDD](#) version 3.7 to be false on 10 instance(s) out of 23, and unknown on the remaining 13 instance(s).
(t) stated by [CÆSAR.BDD](#) version 3.7 to be false on 11 instance(s) out of 23, and unknown on the remaining 12 instance(s).

Size of the marking graphs

Parameter	Number of reachable markings	Number of transition firings	Max. number of tokens per place	Max. number of tokens per marking
$N = 1$	$1.50099e+07$ ^(u)	?	1	20
$N = 2$	$1.08222e+06$ ^(v)	?	1	$\in [9, 11]$ ^(w)
$N = 3$	$1.78827e+08$ ^(x)	?	1	9
$N = 4$	$4.3674e+07$ ^(y)	?	1	9
$N = 5$	$\geq 3.07008e+09$ ^(z)	?	1 ^(aa)	$\in [13, 25]$ ^(ab)
$N = 6$	$2.10713e+07$ ^(ac)	?	1	13
$N = 7$	$6.3107e+07$ ^(ad)	?	1	$\in [6, 10]$ ^(ae)
$N = 8$	$3.17792e+07$ ^(af)	?	1	$\in [6, 10]$ ^(ag)
$N = 9$	$2.29916e+08$ ^(ah)	?	1	$\in [8, 11]$ ^(ai)
$N = 10$	$9.49448e+07$ ^(aj)	?	1	$\in [7, 11]$ ^(ak)
$N = 11$	$\geq 1.62316e+09$ ^(al)	?	1 ^(am)	$\in [13, 25]$ ^(an)
$N = 12$	$1.37111e+09$ ^(ao)	?	1	13
$N = 13$	$7.40115e+06$ ^(ap)	?	1	10
$N = 14$	$\geq 8.04698e+09$ ^(aq)	?	1 ^(ar)	17
$N = 15$	$2.01815e+07$ ^(as)	?	1	7
$N = 16$	$3.54506e+07$ ^(at)	?	1	7
$N = 17$	$\geq 9.50489e+07$ ^(au)	?	1 ^(av)	7
$N = 18$	$\geq 1.1051e+08$ ^(aw)	?	1 ^(ax)	7
$N = 19$	$\geq 1.65754e+10$ ^(ay)	?	1 ^(az)	$\in [11, 25]$ ^(ba)
$N = 20$	$\geq 4.13988e+09$ ^(bb)	?	1 ^(bc)	$\in [8, 10]$ ^(bd)
$N = 21$	$\geq 1.93218e+17$ ^(be)	?	1 ^(bf)	20
$N = 22$	$\geq 1.15976e+09$ ^(bg)	?	1 ^(bh)	$\in [9, 25]$ ^(bi)
$N = 23$	$\geq 3.75499e+10$ ^(bj)	?	1 ^(bk)	$\in [8, 10]$ ^(bl)

- (u) stated by [CÆSAR.BDD](#) version 3.7.
(v) stated by [CÆSAR.BDD](#) version 3.7.
(w) upper bound given by the number of leaf units.
(x) stated by [CÆSAR.BDD](#) version 3.7.
(y) stated by [CÆSAR.BDD](#) version 3.7.
(z) stated by [CÆSAR.BDD](#) version 3.7.
(aa) stated by the [CÆSAR](#) compiler.
(ab) upper bound given by the number of leaf units.
(ac) stated by [CÆSAR.BDD](#) version 3.7.
(ad) stated by [CÆSAR.BDD](#) version 3.7.
(ae) upper bound given by the number of leaf units.
(af) stated by [CÆSAR.BDD](#) version 3.7.
(ag) upper bound given by the number of leaf units.
(ah) stated by [CÆSAR.BDD](#) version 3.7.
(ai) upper bound given by the number of leaf units.
(aj) stated by [CÆSAR.BDD](#) version 3.7.
(ak) upper bound given by the number of leaf units.
(al) stated by [CÆSAR.BDD](#) version 3.7.
(am) stated by the [CÆSAR](#) compiler.
(an) upper bound given by the number of leaf units.
(ao) stated by [CÆSAR.BDD](#) version 3.7.
(ap) stated by [CÆSAR.BDD](#) version 3.7.
(aq) stated by [CÆSAR.BDD](#) version 3.7.
(ar) stated by the [CÆSAR](#) compiler.
(as) stated by [CÆSAR.BDD](#) version 3.7.
(at) stated by [CÆSAR.BDD](#) version 3.7.
(au) stated by [CÆSAR.BDD](#) version 3.7.
(av) stated by the [CÆSAR](#) compiler.
(aw) stated by [CÆSAR.BDD](#) version 3.7.
(ax) stated by the [CÆSAR](#) compiler.
(ay) stated by [CÆSAR.BDD](#) version 3.7.
(az) stated by the [CÆSAR](#) compiler.
(ba) upper bound given by the number of leaf units.
(bb) stated by [CÆSAR.BDD](#) version 3.7.

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- (bc) stated by the [CÆSAR](#) compiler.
 - (bd) upper bound given by the number of leaf units.
 - (be) stated by [CÆSAR.BDD](#) version 3.7.
 - (bf) stated by the [CÆSAR](#) compiler.
 - (bg) stated by [CÆSAR.BDD](#) version 3.7.
 - (bh) stated by the [CÆSAR](#) compiler.
 - (bi) upper bound given by the number of leaf units.
 - (bj) stated by [CÆSAR.BDD](#) version 3.7.
 - (bk) stated by the [CÆSAR](#) compiler.
 - (bl) upper bound given by the number of leaf units.