Model Checking Contest results for 2015

Fabrice Kordon — LIP6, Univ. P. & M. Curie, France
Hubert Garavel — Inria/LIG, France
Lom Messan Hillah — LIP6 & Univ. Paris Ouest Nanterre, France
Francis Hulin-Hubard — LSV, CNRS/ENS de Cachan, France

Emmanuel Paviot-Adet — LIP6 & Univ. Paris Descartes, France
Loïg Jézequel, IRCCyN, Univ. Nantes, France
César Rodrígez — LIPN, Univ. Paris 13, France

MCC 2015

Objectives…

- **Promote model checking tools**
  - Compare and debug
  - Enhance reproducibility of results
    - **BenchKit + dedicated environment**
    - **Submission available online**
  - Encourage tools and tool support
    - **Observatory for the community**
- **Creating a common benchmark**
  - Models from various origins (more to tell later)
    - **PNML is a good tool for this**
- **Competing tools not only dedicated to Petri nets**
  - Tools coming from other communities

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  - **BenchKit + dedicated environment**
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All of this…
in the model checking contest

Creating a common benchmark

- Models from various origins (more to tell later)
  - **PNML is a good tool for this**

Competing tools not only dedicated to Petri nets

- Tools coming from other communities

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MCC 2015 Model Checking Contest — who does what?

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Managing Models

Hubert Garavel (Inria)

Lom Hillah (UPO)

Managing Execution + analysis

Fabrice Kordon (UPMC)

Francis Hulin-Hubard (CNRS)

Loïg Jezequel (U. Nantes)

Emmanuel Paviot-Adet (UP5)

César Rodríguez (UP13)

Managing Formulas

Alban Linard (Inria)

MCC 2015 Tools submitted this year

- **Cunf**
  - Univ. paris 13
- **GreatSPN-Meddly**
  - Univ. Torino
- **ITS-Tools**
  - UPMC
- **LoLA 2.0**
  - Univ. Rostock
- **LTSMin**
  - Univ. Twente
- **Marcie**
  - Univ. Cottbus
- **pnmc**
  - IRT Sain-Exupéry
- **PNXDD**
  - UPMC
- **StrataGEM 0.5.0**
  - Univ. Geneva
- **TAPAAL**
  - Univ. Aalorg
  - 4 variants

Thank you very much

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- **Cunf**
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All VM will be published

Reproducibility can be achieved
Soon on the web site

Thank you very much

- IRT Saint-Exupery
- **PNXDD**
  - UPMC
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Machines for processing

	bluewhale03	Ebro	Quadhexa-2	Small (cluster)	Total
Cores	40 @ 2.8GHz	64 @ 2.7GHz	24 @ 2.66GHz	5x24 @ 2.4GHz	-
Memory (GB)	512	1024	128	5x64	-
Used Cores (1 per VM) for sequential tools	31 31 VM in //	63 63 VM in //	7 7 VM in //	5x3, 5x3 VM in //	-
Used Cores (4 per VM) for parallel tools	36, 9 VM in //	60, 15 VM in //	20, 5 VM in //	5x12, 5x3 VM in //	-
Number of runs	42 406	79 534	20 748	26 390	**169 078**
Total CPU required	400d, 12h, 48m, 36s	713d, 04h, 30m, 32s	175d, 17h, 25m, 55s	249d, 19h, 19m, 20s	**1539d, 6h, 4m, 23s**
Total CPU	**about 4 years, 2 months and 18 days**				-
Time spent to complete benchmarks	**about 23 days and 12 hours**				-
VM boot time of VMs + management (overhead)	**58 d, 16h, 59m (Included in total CPU)**				-

Machines for processing

	bluewhale03	Ebro	Quadhexa-2	Small (cluster)	Total
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Used Cores (4 per VM) for parallel tools	36, 9 VM in //	60, 15 VM in //	20, 5 VM in //	5x12, 5x3 VM in //	-
Number of ru				26 390	**169 078**
Total CPU require				9d, 19h, 9m, 20s	**1539d, 6h, 4m, 23s**
Total CP					-
Time spent to complet benchmark					-
VM boot time of VMs + management (overhead)	**58 d, 16h, 59m (Included in total CPU)**				-

8 times more CPU than in 2014

2.5 more values to compute and smarter formulas too

Thank you very much

Université de Genève
Rostock University
Université Paris Ouest
Université P. & M. Curie

Categories of models

«known» models

- Those from past years
  - **Test the tool as used by its developers**

«Stripped» models

- «known» (original archive) and set as «surprise» ones
  - **Test the tool as used by «newbies»**

«Surprise» models

- New models proposed by the community this year
  - **Test the tool as used by «newbies» +**
  - **new situations for the tool**

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Categories of models

- «known» models
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    - **Test the tool as used by «newbies»**
- «Surprise» models
  - New models proposed by the co
    - **Test the tool as used by «newbies»**
    - **new situations for the tool**

Coefficients (after pool)

«known» = x1
«stripped» = x3
«surprise» = x4

Execution consistency

On the same machine
«known» / «stripped»
colored + associated P/T

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New models for 2015

- **A. Ahmad**
  - IOTPpurchase
- **H. Evrard**
  - Raft
- **M. Heiner**
  - PhaseVariation
- **J. Jourdan-Lu & E. Léo**
  - Parking
- **F. Kordon**
  - BridgesAndVehicle, SafeBus, SmallOperatingSystem, SwimmingPool
- **T. Shmeleva**
  - HypercubeGrid
- **K. Wolf**
  - IBM319, IBM5964, IBM703
- **I. Zaïtsev**
  - SquareGrid

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  - …ingsystem,
  - SwimmingPool
- **T. Shmeleva**
  - HypercubeGrid
- **K. Wolf**
  - …5964, IBM703

With scaling parameters

121 models in fact

Thanks!!!

We really need various models

Already from past years

404 instances of models

M. Curie - CC2015

MCC 2015 Examinations

- StateSpace
- Reachability
  - ReachabilityBounds
  - ReachabilityCardinality
  - ReachabilityComputeBounds
  - ReachabilityDeadlock
  - ReachabilityFireability
  - ReachabilityFireabilitySimple
- CTL
  - CTLCardinality
  - CTLFireability
  - CTLFireabilitySimple
- LTL
  - LTLCardinality
  - LTLFireability
  - LTLFireabilitySimple

The protocol

- **May 1st, delivery of disk images**
  - Qualification phase
  - Completed by mid May
  - 25 000 test runs
- **May 20, starting to operate tools**
  - 169 078 runs distributed over 4 different machines over Europe
  - VM with 4 cores / 16GB
    - **ITS-Tools, LTSMin, TAPAAL(MC), TAPAAL-OTF(PAR), StrataGEM0.5.0**
  - WM with 1 core / 16 GB
    - **Cunf, LoIA 2.0, Marcie, pnmc,PNXDD, TAPAAL(SEQ), TAPAAL-OTF(SEQ)**
  - Time confinement, 1h

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    - **Cunf, LoIA 2.0, … …AL-OTF(SEQ)**
  - Time confineme…

Pool sent to participating tool developers + MCCC

Various answers (opposite ;-) interesting points

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The protocol

- **Mid June, analysis of outcomes**
  - 24 GByte of logs and CSV files
    - **Analysis must be automated**
    - **~12KLOC Ada + ~200 LOC bash (but CPU problems solved)**
- **Evaluation of «good results»**
  - Pass 1, computing results for the majority in a «line»
    - **All tools for an examination for a model instance**
  - Pass 2, evaluating tool reliability
    - **Only considering cases where the majority is 3 and more**
  - Pass 3, reconstructing the results using tool rates
    - **Help to decide when only 2 different answers**
    - **A result must be of confidentiality 0.9 or more**
    - **Some results are tagged «insecure»**
  - Pass 4 computing points
    - **«insecure» results not considered when counting points**

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Scoring

StateSpace, 10 / 2 / 2 / 2
Deadlock, 16
Other formulas, 1 per formula

Bonus for a «line»

+2 for the fastest tool
+2 for the smallest memory footprint

No penalty for mistakes

Difficult to identify «good solutions»
Problem raised very late

Techniques reported by tools

Tools	parallelism	Techniques
Cunf	/	NET_UNFOLDING SAT_SMT
GreatSPN-Meddly	/	DECISION_DIAGRAMS SYMMETRIES
LoLA 2.0	/	EXPLICIT SEQUENTIAL_PROCESSING STATE_COMPRESSION STUBBORN_SETS SYMMETRIES TOPOLOGICAL
Marcie	/	DECISION_DIAGRAMS SEQUENTIAL_PROCESSING UNFOLDING_TO_PT
pnmc	/	DECISION_DIAGRAMS USE_NUPN
PNXDD	/	DECISION_DIAGRAMS SEQUENTIAL_PROCESSING TOPOLOGICAL
TAPAAL (SEQ)	/	EXPLICIT STRUCTURAL_REDUCTION
TAPAAL-OTF (SEQ)	/	EXPLICIT STRUCTURAL_REDUCTION
ITS-Tools	MC	CEGAR COLLATERAL_PROCESSING DECISION_DIAGRAMS SAT_SMT TOPOLOGICAL USE_NUPN
LTSMin	PAR	DECISION_DIAGRAMS PARALLEL_PROCESSING STATIC_VARIABLE_REORDERING USE_NUPN
StrataGEM0.5.0	MC	COLLATERAL_PROCESSING DECISION_DIAGRAMS TOPOLOGICAL
TAPAAL(MC)	MC	EXPLICIT STRUCTURAL_REDUCTION
TAPAAL-OTF(PAR)	PAR	EXPLICIT STRUCTURAL_REDUCTION

Detailed results (extraction)

### tool	Input	Examination	nb cores	time flag	memory flag	re
Cunf	Angiogenesis-PT-05	StateSpace	1	OK	OK	DNC
GreatSPN-Meddly	Angiogenesis-PT-05	StateSpace	1	OK	OK	42734900 ? ? ?
ITS-Tools	Angiogenesis-PT-05	StateSpace	4	OK	OK	42734935 ? ? ?
LoLA2.0	Angiogenesis-PT-05	StateSpace	1	OK	OK	DNC
LTSMin	Angiogenesis-PT-05	StateSpace	4	OK	OK	42734935 ? 5 ?
Marcie	Angiogenesis-PT-05	StateSpace	1	OK	OK	42734935 4.868
pnmc	Angiogenesis-PT-05	StateSpace	1	OK	OK	42734935 ? 5 40
PNXDD	Angiogenesis-PT-05	StateSpace	1	DNF	OK	DNF
StrataGEM0.5.0	Angiogenesis-PT-05	StateSpace	4	OK	OK	42734935 ? ? ?
TAPAAL-OTF(PAR)	Angiogenesis-PT-05	StateSpace	4	OK	OK	13762040 ? ? ?
TAPAAL-OTF(SEQ)	Angiogenesis-PT-05	StateSpace	1	DNF	OK	DNF
TAPAAL(MC)	Angiogenesis-PT-05	StateSpace	4	DNF	OK	DNF
TAPAAL(SEQ)	Angiogenesis-PT-05	StateSpace	1	DNF	OK	DNF

Detailed results (extraction)

results	techniques	max memory (MB)	CPU (ms)	Time (ms)	i/o wait (ms)	Status	
DNC	-	79.290	30.00	14.00	0.00	normal	r003
42734900 ? ? ?	DECISION_DI	112.440	724.00	796.00	40.80	normal	r004
42734935 ? ? ?	DECISION_DI	368.960	15019.00	7064.00	175.50	normal	r005
DNC	-	79.250	39.00	53.00	9.90	normal	r006
42734935 ? 5 ?	DECISION_DI	9792.570	52136.00	14718.00	30.50	normal	r007
42734935 4.8687E+0008 5 40	SEQUENTIAL	3977.730	8841.00	9375.00	19.80	normal	r008
42734935 ? 5 40	DECISION_DI	2457.240	7989.00	8349.00	20.20	normal	r011
DNF	-	10314.270	3565296.00	3600000.00	20.00	timeout	r012
42734935 ? ? ?	TOPOLOGICA	2069.140	49149.00	34611.00	143.00	normal	r013
13762040 ? ? ?	PARALLEL_PI	2710.710	5034530.00	1259637.00	20.10	normal	r009
DNF	-	6482.090	3598968.00	3600000.00	61.20	timeout	r010
DNF	-	5467.640	3612091.00	3600000.00	6888.60	timeout	r001
DNF	-	4680.540	3600000.00	3600000.00	393.70	timeout	r002

Detailed results (extraction)

run id	flags:bonus:scores:mask	estimated result	
n-ebro-14321423030002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423220002	TFF:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423400002	FFF:PM:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423580002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423720002	FFF:--:12:T - T -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423880002	FFF:--:16:T T T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424480002	FFF:--:14:T - T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321430890002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321429810002	FFF:--:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424040002	TFT:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424290002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321422530002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321422750002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92

Detailed results (extraction)

Consistency checks

- Colored versus equivalent P/T nets
- «known» models versus «stripped» models

run id	flags:bonus:scores:mask	estimated result	
n-ebro-14321423030002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423220002	TFF:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423400002	FFF:PM:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423580002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423720002	FFF:--:12:T - T -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423880002	FFF:--:16:T T T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424480002	FFF:--:14:T - T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321430890002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321429810002	FFF:--:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424040002	TFT:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424290002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321422530002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321422750002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92

Detailed results (extraction)

Elaboration of flags

- Result appears to be faulty
- Inconsistency between colored and its equivalent P/T
- Inconsistency between «known» and «stripped»

run id	flags:bonus:scores:mask	estimated result	
n-ebro-14321423030002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423220002	TFF:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423400002	FFF:PM:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
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n-ebro-14321423880002	FFF:--:16:T T T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321424480002	FFF:--:14:T - T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
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n-ebro-14321422750002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92

Detailed results (extraction)

Result confidence

- Decimal value
- TAPAAL and TAPAAL-OTF count for 1/2 (same algorithm)

run id	flags:bonus:scores:mask	estimated result	
n-ebro-14321423030002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423220002	TFF:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423400002	FFF:PM:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423580002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423720002	FFF:--:12:T - T -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423880002	FFF:--:16:T T T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
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Detailed results (extraction)

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Bonus!

run id	flags:bonus:scores:mask	estimated result	
n-ebro-14321423030002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423220002	TFF:--:ERR:X - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423400002	FFF:PM:10:T - - -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423580002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423720002	FFF:--:12:T - T -	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321423880002	FFF:--:16:T T T T	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
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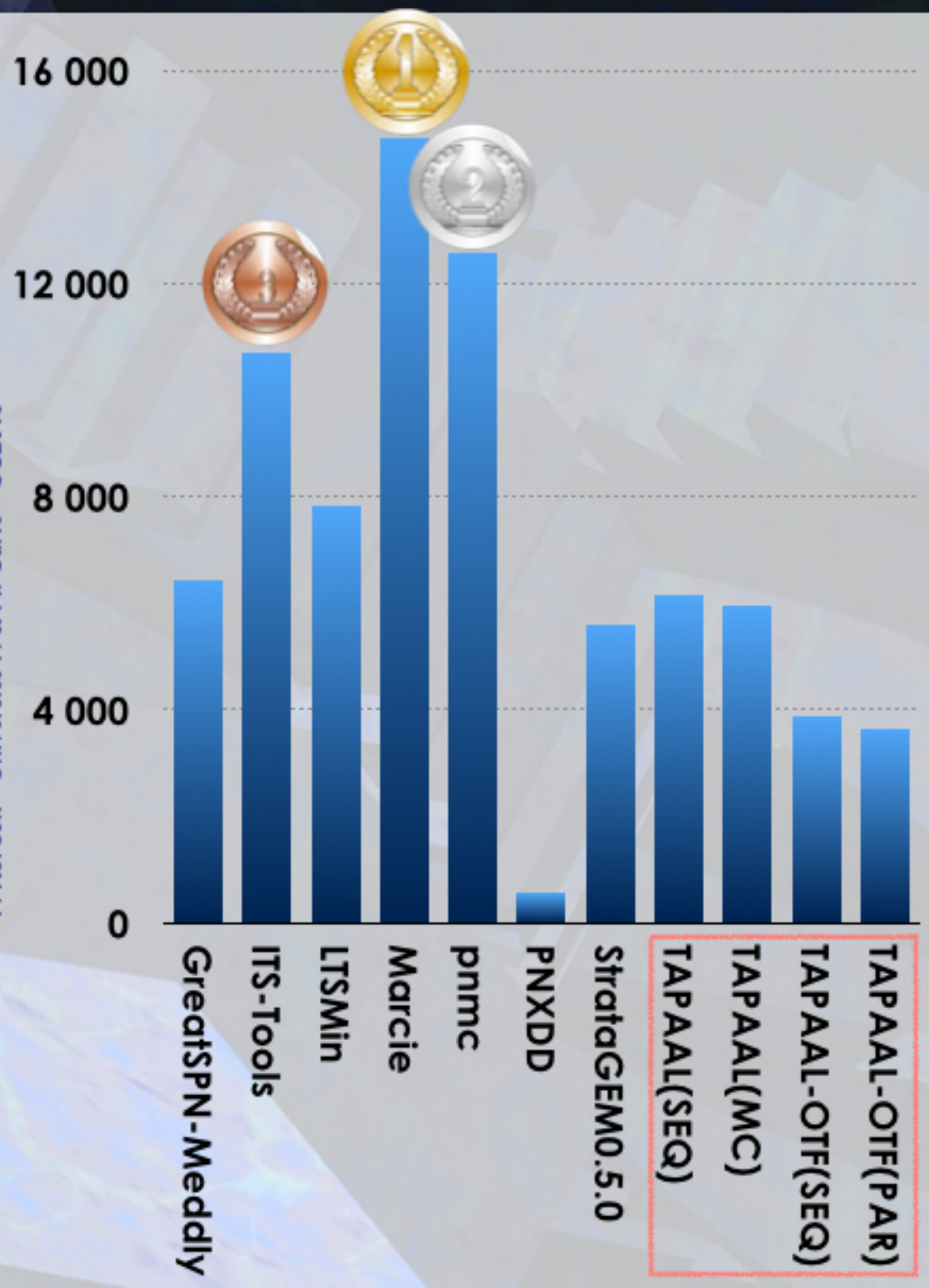
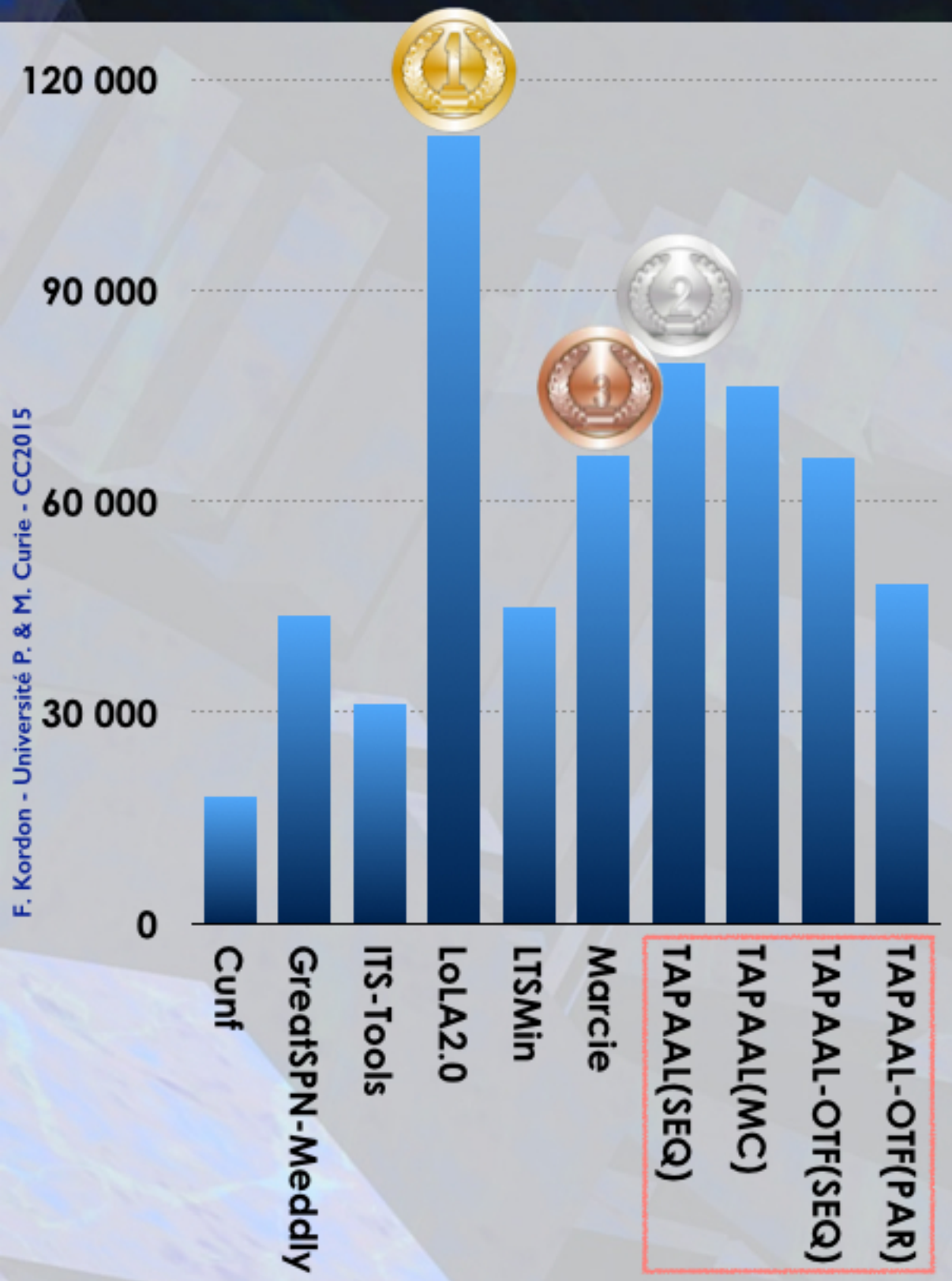
n-ebro-14321424290002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321422530002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92
n-ebro-14321422750002	FFF:--:0:?	42734935 4.8687E+0008 5 40	4.35 0.92 2.71 1.92

StateSpace Examination



- **The most attended one**
  - Participation is the highest (11)
- **PNXDD**
  - Java configuration problem
    - **No «Stripped» nor «Surprise»**
    - **Could not be detected during qualification**

All reachability Examinations



F. Kordon - Université P. & M. Curie - CC2015

Also quite successful

- Many tools participating (10)

ITS-Tools

- Bugs revealed
  - **Student work in formula converter**
  - **Bug in management of NUPN hierarchy**

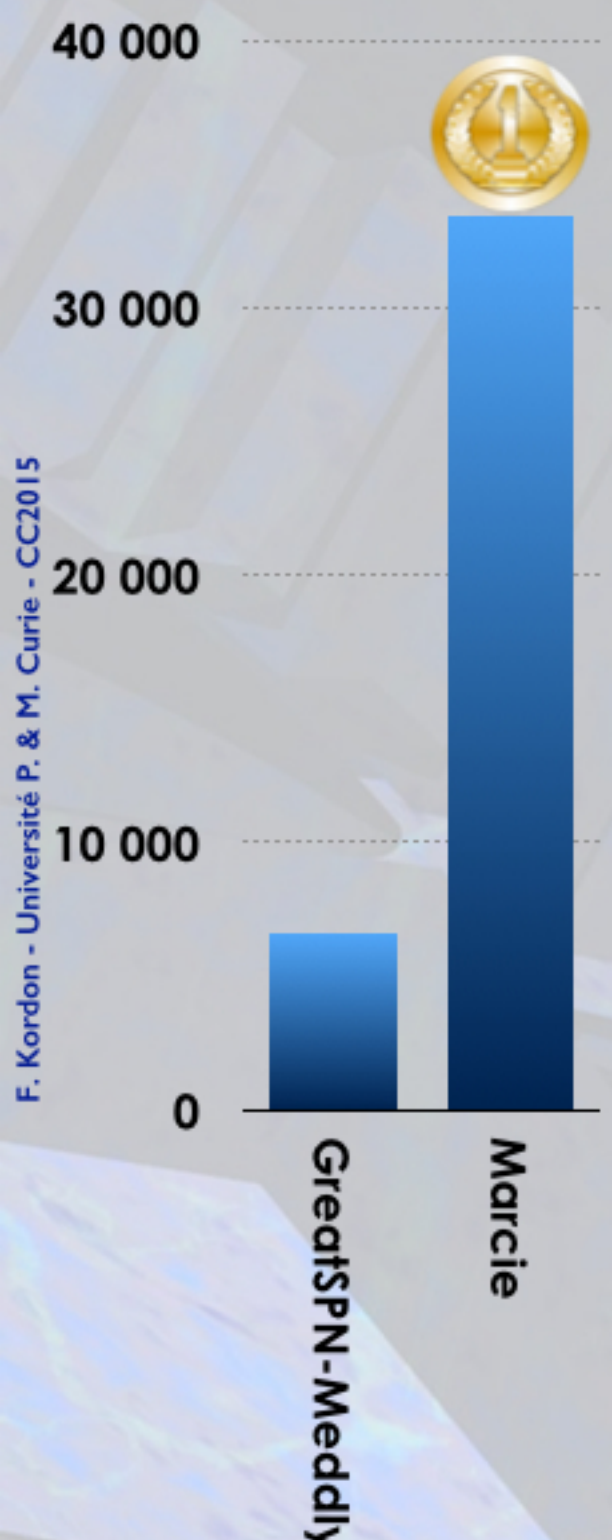
Too late!

Already years of CPU

TAPAAL

- First for ReachabilityDeadlock
- Bug revealed too
  - **In one variant**

All CTL Examinations



- Only a few participants
- GreatSPN-Meddly
  - Bug revealed
    - Some operators translation
    - The tool retired from CTL

Too late!

Already years of CPU

All LTL Examinations

- **No participant at all**
  - In the past, Neco did participate
    - **Neco is not maintained anymore**
  - Why is LTL not covered by tools?

Tool reliability

Bugs outlined (but too late)

Tools	Reliability	success	selected	Examinations
Cunf	96,96 %	4728	4 876	3 (Reach)
GreatSPN-Meddly	62,30 %	11 966	19 206	10 (Sate, Reach, CTL)
ITS-Tools	64,05 %	10 890	17 003	4 (Sate, Reach)
LoLA 2.0	97,80 %	25 796	26 378	6 (Reach)
LTSMin	79,13 %	13 995	17 687	5 (State, Reach)
Marcie	92,52 %	18 443	19 934	10 (Sate, Reach, CTL)
pnmc	99,59 %	741	744	1 (State)
PNXDD	88,89 %	56	63	1 (State)
STrataGEM0.5.0	100,00 %	243	243	1 (State)
TAPAAL (SEQ)	99,88 %	22 880	22 907	7 (State, reach)
TAPAAL(MC)	99,75 %	23 247	23 306	7 (State, reach)
TAPAAL-OTF (SEQ)	96,19 %	19 001	19 733	7 (State, reach)
TAPAAL-OTF(PAR)	88,43 %	15 253	17 248	7 (State, reach)

Tool reliability

Remind the Java problem

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Tool reliability

But a low number of answers…

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Origin of problems?

Formula translations
PNML import

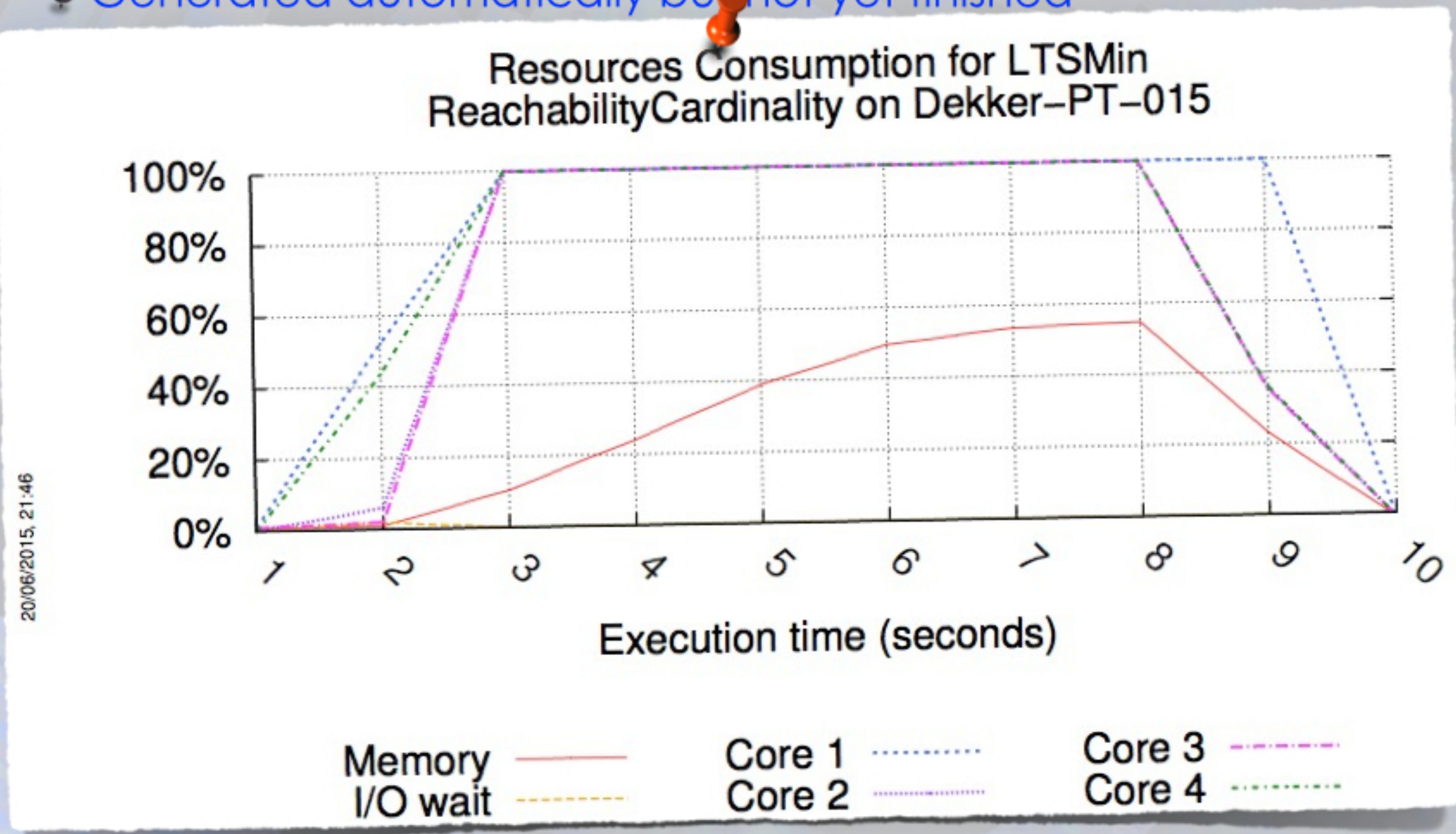
How to increase tool reliability?

A big benchmark is helpful
Comparison with other tools too

Later this summer

Full HTML report

- Generated automatically but not yet finished



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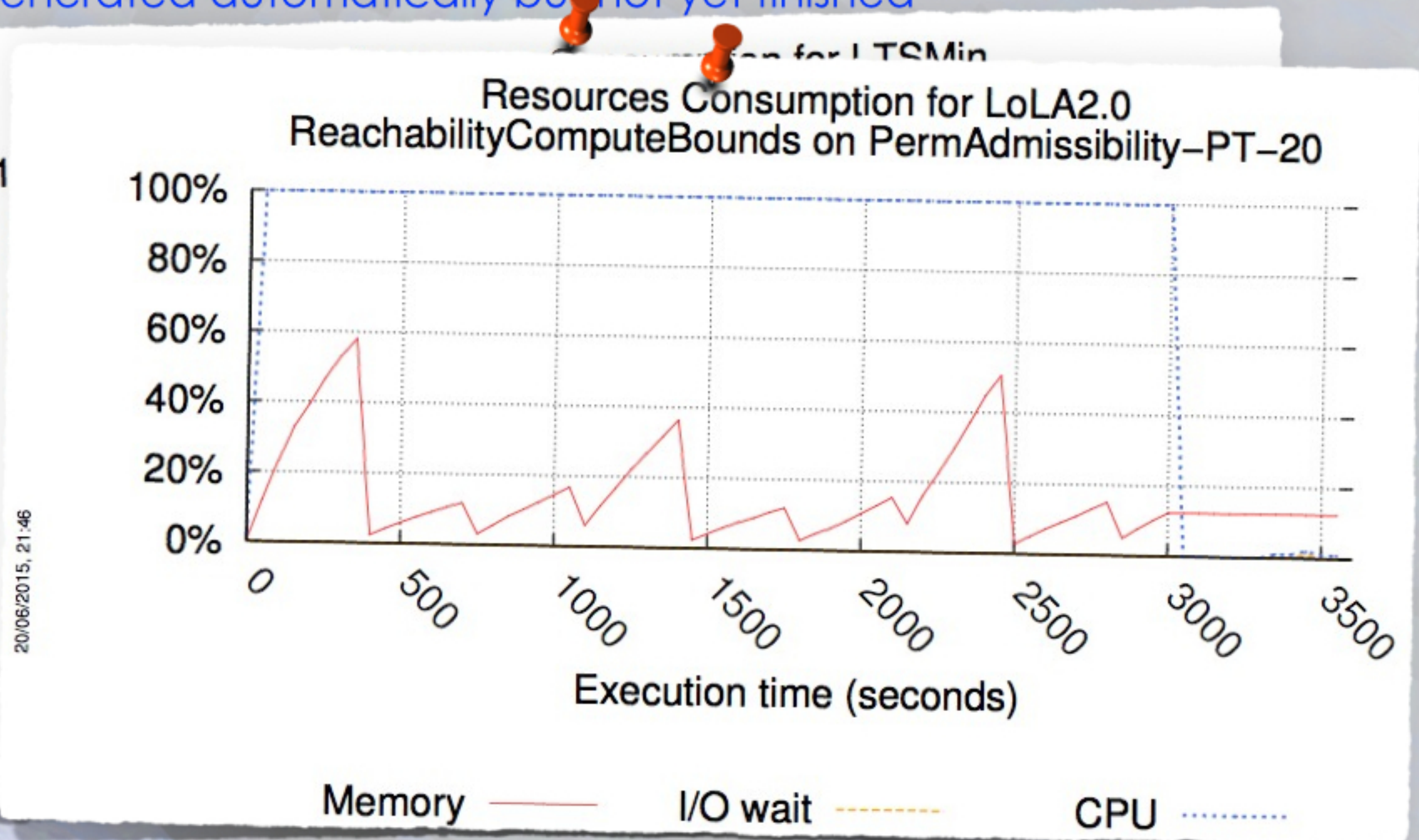

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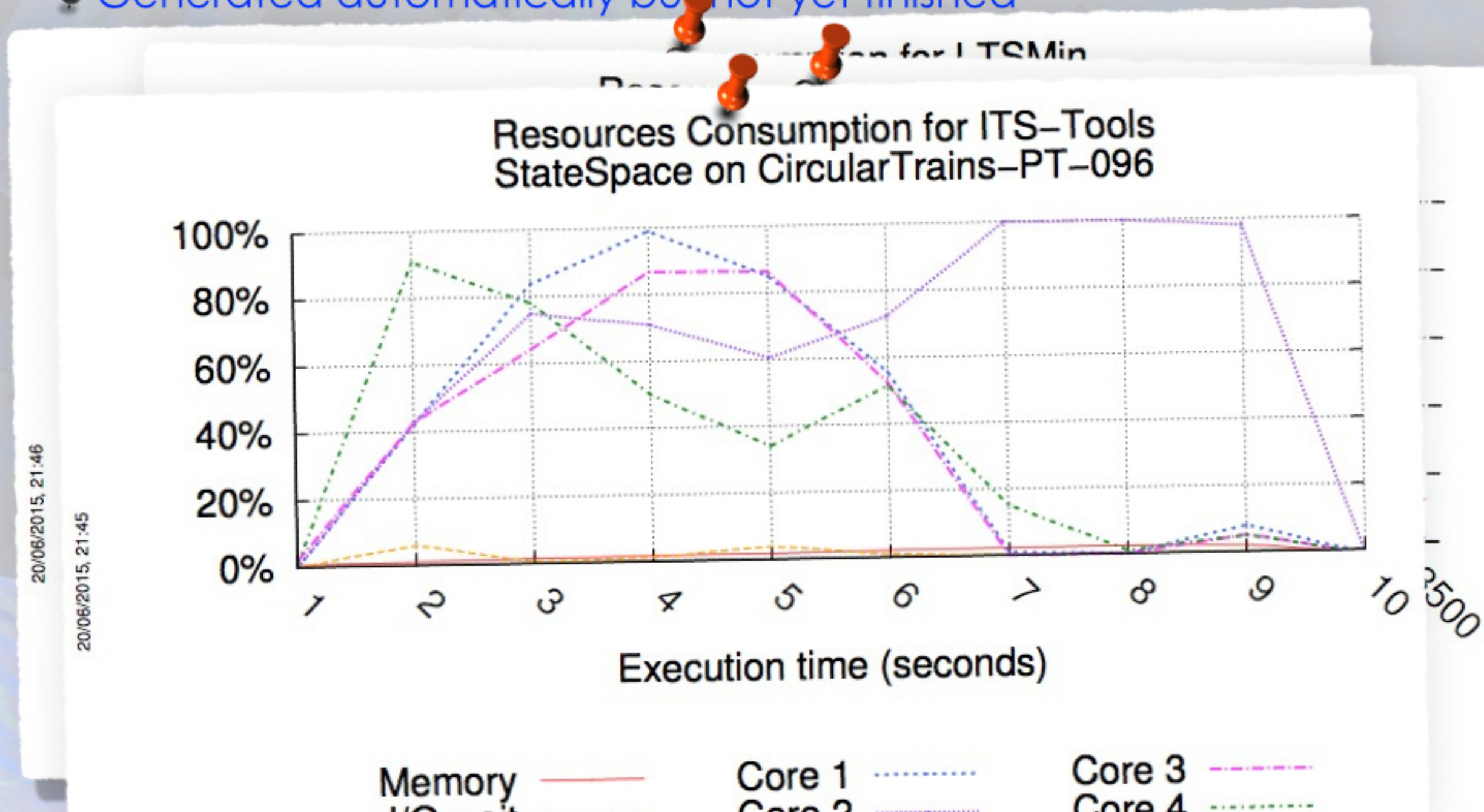

Summary about the Model Checking Contest

- **It gather new tools**
  - Even from other communities
    - **Bringing new experience**
- **Numerous improvements**
  - Models consistency checks
    - **Possibly some information stored as «tool specific» attributes next year**
    - **Simple to parse**
  - New formula generators (164 433 produced)
    - **Much smarter (SAT then model-check up to a given number of states)**
    - **Itself a complex problem**
- **Long term objective, see the evolution of tools**
  - Participate in their reliability
  - Identify «good techniques»
  - Promote a «simpler way» to express formula across tools

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Towards more universal model checkers?

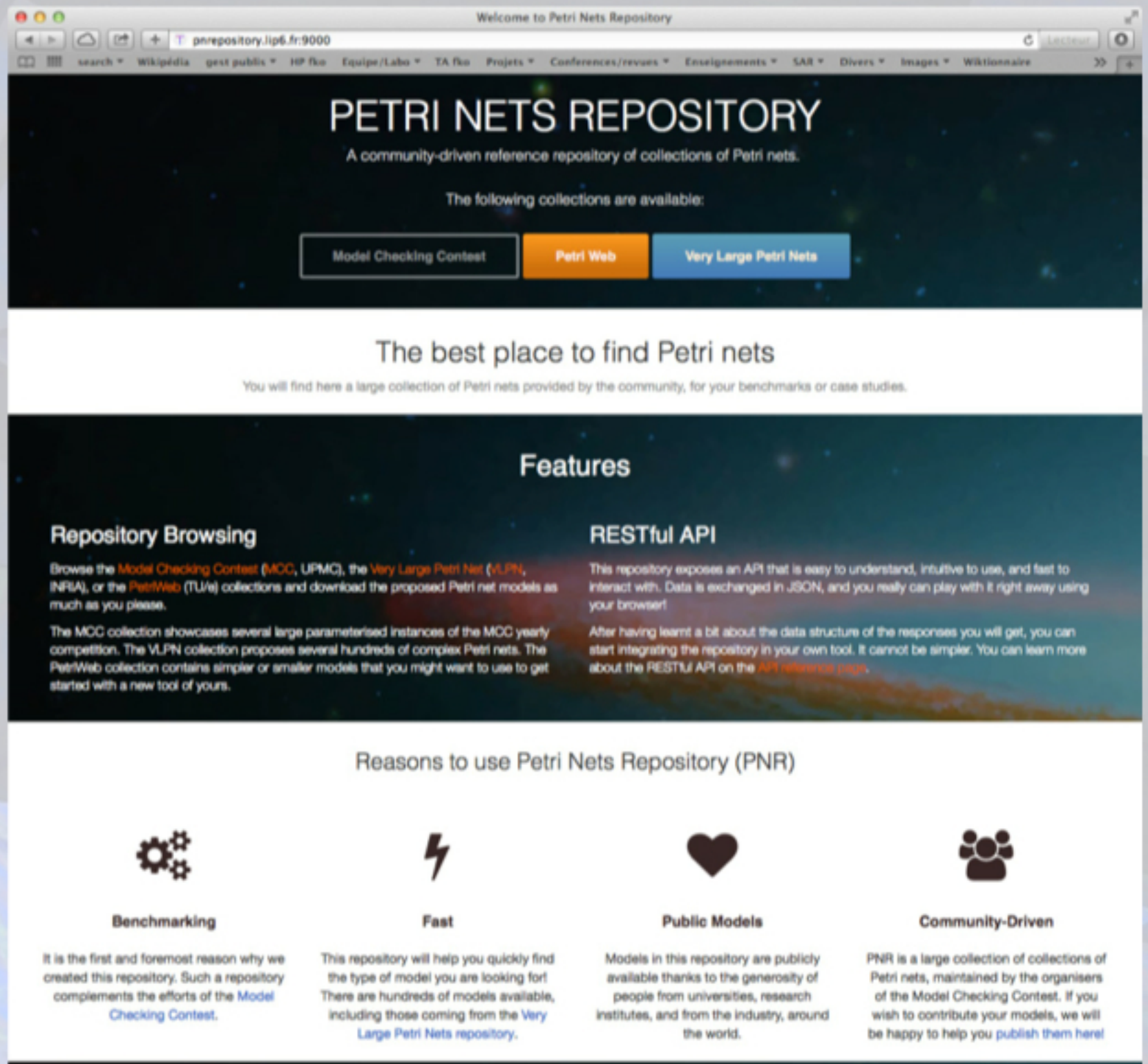
Engine connected to a «front-end»
Support of several notations
Like LTSMin, ITS-Tools, etc?

One more thing…

- **Enabling the use of more data for tool developers**
  - Original experience, PetriWeb
    - **Discontinued**
  - Bring models to the community
    - **Model Checking Contest**
    - **Other sources**

- **Provide a reference for benchmarking**
  - Such as BEEM (2007, but apparently discontinued)

Petri Net repository



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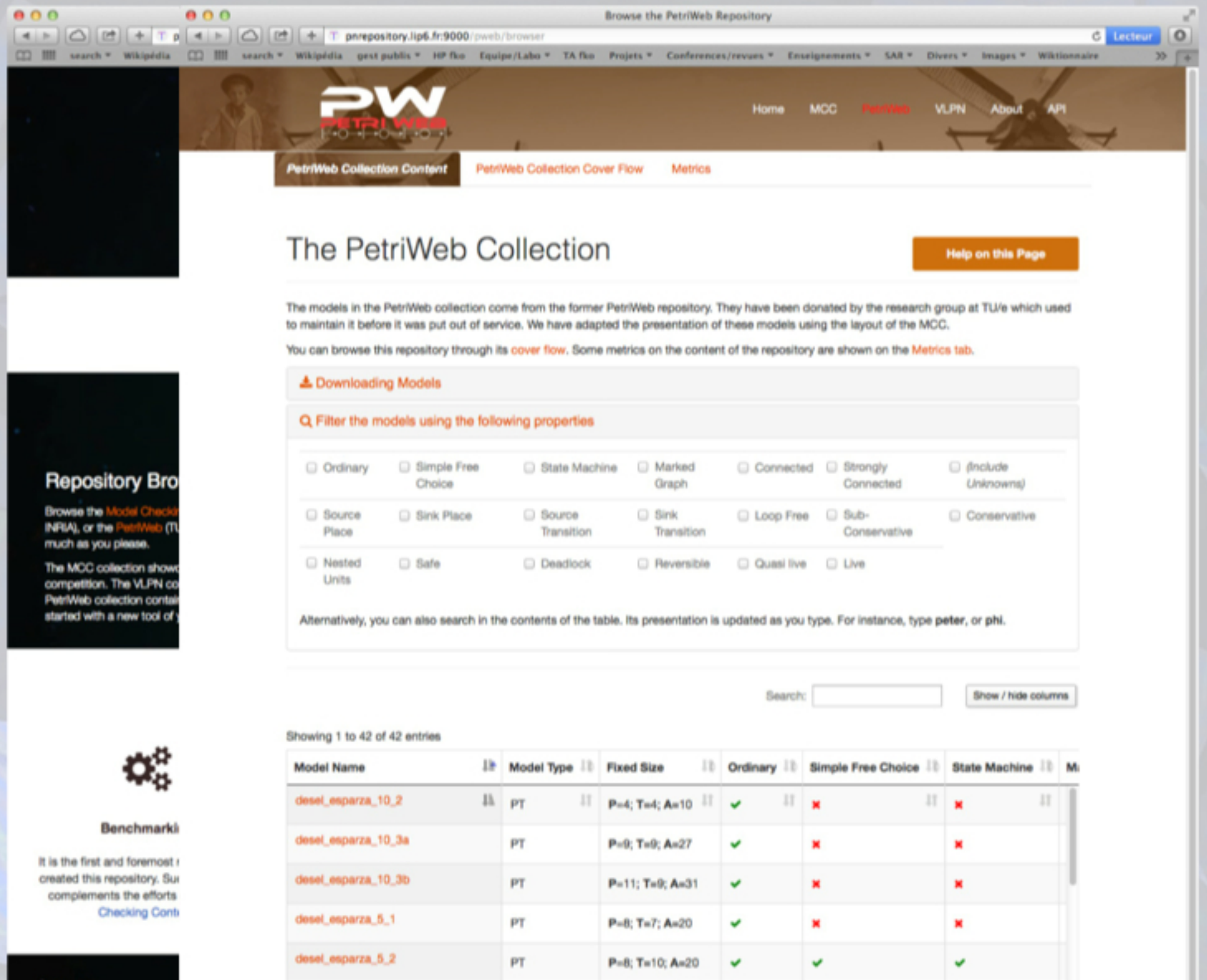


Petri Net repository

Browse the VLPN Petri Nets Repository

pnrepository.lip6.fr:9000/vlpn/browser

VLPN VERY LARGE PETRI NETS

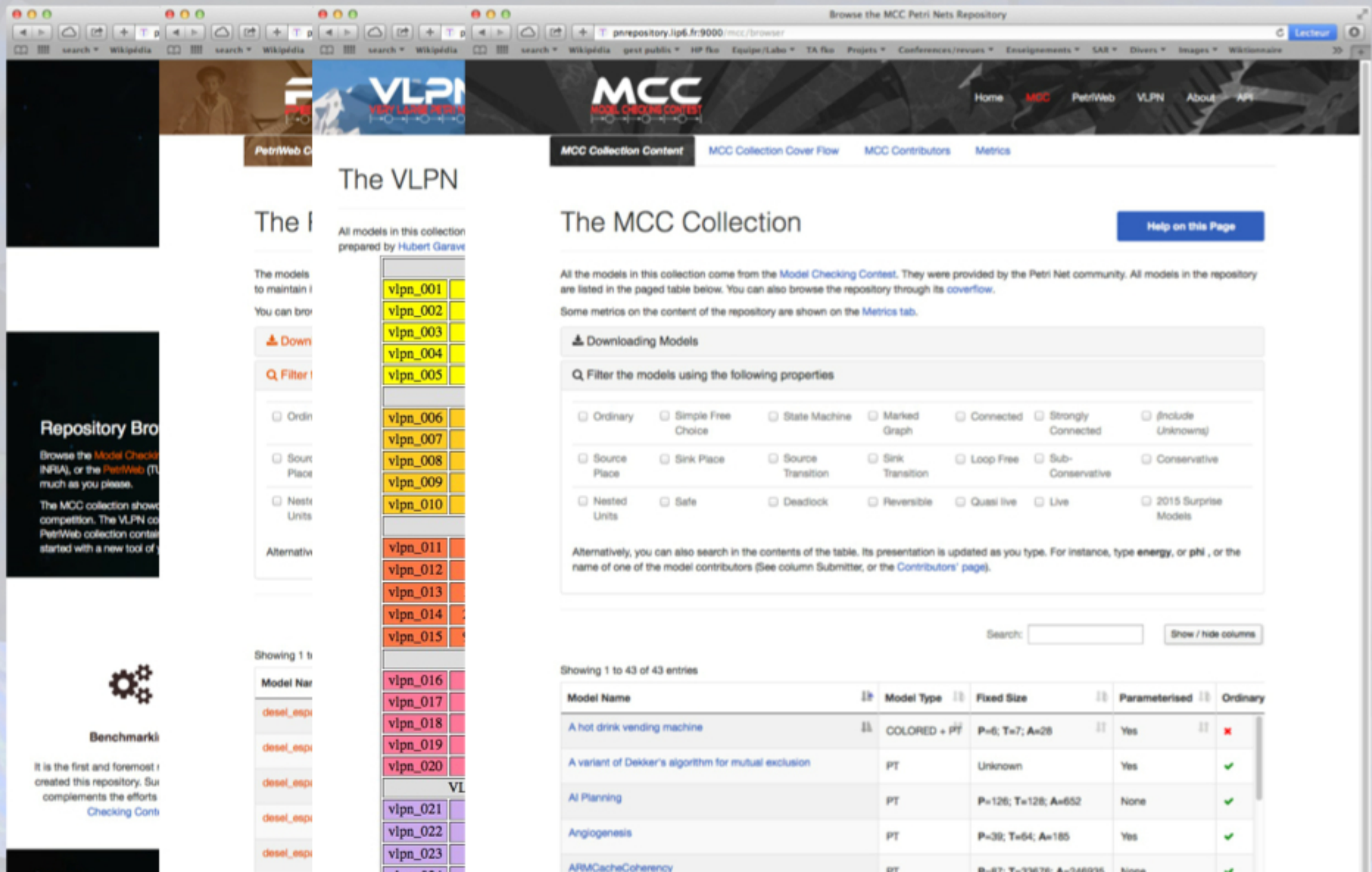
Home MCC PetriWeb VLPN About API

The VLPN Collection

All models in this collection come the CONVECS group at LIG. They were collected over several years within the context of the CADP tool. This collection of complex Petri nets was prepared by Hubert Garavel

VLPN group 1: nets containing redundant units							
vlpn_001	52 units	330 places	512 transitions	3–49–162	≥ 6.75209e+10 states	LOT	NUPN PNML PDF
vlpn_002	55 units	152 places	3213 transitions	8–28–91	1.52668e+14 states	LOT	NUPN PNML PDF
vlpn_003	69 units	176 places	134 transitions	16–35–91	1.13293e+13 states	LOT	NUPN PNML PDF
vlpn_004	72 units	218 places	215 transitions	5–62–143	≥ 9.14574e+09 states	LOT	NUPN PNML PDF
vlpn_005	81 units	199 places	219 transitions	19–51–120	2.46905e+12 states	LOT	NUPN PNML PDF
VLPN group 2: nets containing disconnected places or transitions							
vlpn_006	25 units	572 places	588 transitions	6–13–74	2.36483e+12 states	LOT	NUPN PNML PDF
vlpn_007	35 units	223 places	1088 transitions	18–18–75	3.29769e+13 states	LOT	NUPN PNML PDF
vlpn_008	37 units	644 places	660 transitions	7–19–104	3.85119e+14 states	LOT	NUPN PNML PDF
vlpn_009	200 units	199 places	699 transitions	––199	1.1418e+46 states	MCC	NUPN PNML PDF
vlpn_010	486 units	486 places	776 transitions	2–485–486	9.79474e+21 states	MCC	NUPN PNML PDF
VLPN group 3: unsafe nets							
vlpn_011	76 units	75 places	56105 transitions	––75	unknown state space	MCC	NUPN PNML PDF
vlpn_012	103 units	102 places	136662 transitions	––102	unknown state space	MCC	NUPN PNML PDF
vlpn_013	1409 units	1408 places	2400 transitions	––1408	unknown state space	MCC	NUPN PNML PDF
vlpn_014	2458 units	2457 places	5400 transitions	––2457	unknown state space	MCC	NUPN PNML PDF
vlpn_015	9154 units	9153 places	25110 transitions	––9153	unknown state space	MCC	NUPN PNML PDF
VLPN group 4: nets having one single unit							
vlpn_016	1 unit	2816 places	11520 transitions	1–1–12	2816 states	LOT	NUPN PNML PDF
vlpn_017	1 unit	5121 places	8961 transitions	1–1–13	5121 states	LOT	NUPN PNML PDF
vlpn_018	1 unit	6144 places	25600 transitions	1–1–13	6144 states	LOT	NUPN PNML PDF
vlpn_019	1 unit	11521 places	20225 transitions	1–1–14	11521 states	LOT	NUPN PNML PDF
vlpn_020	1 unit	25601 places	45057 transitions	1–1–15	25601 states	LOT	NUPN PNML PDF
VLPN group 5: nets having one more unit than the number of places (i.e., with no genuine NUPN structure)							
vlpn_021	118 units	117 places	176 transitions	––117	≥ 4.53408e+07 states	MCC	NUPN PNML PDF
vlpn_022	121 units	120 places	111160 transitions	––120	unknown state space	MCC	NUPN PNML PDF
vlpn_023	140 units	139 places	87 transitions	––139	≥ 4.07308e+07 states	MCC	NUPN PNML PDF

Petri Net repository



MCC 2015 Petri Net repository

Selection functions

Based on net characteristics

RESTful API to automate queries

Soon on the web

http://pnrepository.lip6.fr

A way to advertise your models

What next?

Full HTML report soon online

- Will be mostly generated automatically from the gathered data
- Image disks from virtual machines will be published too
  - **With all models**
  - **With all formulas**
  - **Reproducibility of experimentations is important**

PNRepository also online soon

- Please feed us with your models
  - **Used for the next editions of the MCC**
- If you have nice machines (but inactive)
  - **Please allow us to use them**

What next?

Full HTML report soon online

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Once again, thank you!

Université de Genève
Rostock University
Université Paris Ouest
Université P. & M. Curie

hundreds of days of CPU!

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And now...
let's have time for discussion

MCC
2015