4th Grid PLUGTESTS
N-Queens and FlowShop Contest
Final version on 1st November 2007 3rd day!
CNIC PREMISES
Beijing - CHINA
29th October - 1st November 2007

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Jury of N-Queens Contest

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Jury of FlowShop Contest

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Target date for the results & prize decision

On Thursday 1st November 2007
http://www.etsi.org/plugtests/grid/conference.htm
18:00 or 19:00 - 21:30 : Prize Ceremony/DINNER
The gala dinner for the contest Prize Ceremony was hold at the Jade hotel (http://echogrid.ercim.org/content/view/3/4/) where the winners of the IV GRIDS@Work contest received their award.

Our sponsors : LIAMA, SGI, HP, Lenovo, Terage, Huawei
LIAMA: http://liama.ia.ac.cn/wiki/
SGI: http://www.sgi.com
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Terage: http://www.terage.com.cn
Huawei: http://www.huawei.com/
+ SCCAS (CNIC)

FlowShop - 2 TEAMS

"BUPT FlowShop" – BUPT - China

BUPT - Beijing University of Posts and Telecommunications, China
Beijing University of Posts and Telecommunications
Name of group: BUPT-FLOWSHOP

List of names for the certificate (if any):

Xiaohong Huang	Yujie Su	Tao Ding
Zheng Sun	Qian Huang	Feng Kong
Jiangtao Yin	Xiaoqiang Hu	Chao Liu
Yu E Zheng	Xiaoqiang Hu	Qiang Wang

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"TansPUTers – FlowShop" - POZNAN - Poland

POZNAN - Poznan University of Technology, Poland

transPUTers - FlowShop Team

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N-Queens - 6 TEAMS

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“BUPT N-Queens” - China

BUPT - Beijing University of Posts and Telecommunications, China
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Name of group: BUPT-FLOWSHOP

List of names for the certificate (if any)

Xiaohong Huang	Yujie Su	Tao Ding
Zheng Sun	Qian Huang	Feng Kong
Jiangtao Yin	Xiaoqiang Hu	Chao Liu
Yu E Zheng	Xiaoqiang Hu	Qiang Wang

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"OutPUT N-Queens" – POZNAN - Poland

OutPUT team - N-Queens Team

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"KAAPI-MOAIS" - France

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"Grid-TU" - Tsinghua University - China

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> The two TU teams have different members and leaders

FlowShop Rules & Criteria

Sunday 28 October Jury clarification

The FlowShop 10 Taillard instances to be used are, as said before, in the Summary in this url

http://ina2.eivd.ch/Collaborateurs/etd/problemes.dir/ordonnancement.dir/flowshop.dir/best_lb_up.txt
ta021-025 2297 | 2099 | 2326 | 2223 | 2291
20 x 20
ta026-030 2226 | 2273 | 2200 | 2237 | 2178
20 x 20
This corresponds to Taillard, 20 jobs 20 machines
http://ina2.eivd.ch/Collaborateurs/etd/problemes.dir/ordonnancement.dir/flowshop.dir/tai20_20.txt

The 10 instances must be solved exactly with proof of optimality

This means that the program must both found the exact solution and prove that it is the optimal solution (by calculation).

The allocated time for each team is one hour including the deployment time.

If more than one team solved correctly the problem, the winner will be the one who solved the problem

in the less elapsed time.

This mean that your strategy will be to use the optimised number of workers to compute the 10 Taillard instances in the shortest amount of time.

Last year, during the 3rd Grid Plugtests in France, in the FlowShop, the winner team "Kanban" computed the 10 Taillard instances in 553s on 207 workers.

In option:

I would suggest FlowShop teams BUPT-FlowShop and TransPUTers to compute many times the 10 Taillard instances on all available clusters to activate all workers with by example

- 10 Taillard instances many times on Grid5000
- 10 Taillard instances many times on Intrigger
- 10 Taillard instances many times on DAS
- 10 Taillard instances many times on PoweRcost

The FlowShop instances to be used are
Summary
http://ina2.eivd.ch/Collaborateurs/etd/problemes.dir/ordonnancement.dir/flowshop.dir/best_lb_up.txt

ta021-025 20 x 20	2297	2099	2326	2223	2291
ta026-030 20 x 20	2226	2273	2200	2237	2178

To know more about the FlowShop contest please look at
http://www.lifl.fr/~talbi/challenge2007

For the FlowShop contests, the Taillard references are
http://ina2.eivd.ch/collaborateurs/etd/problemes.dir/ordonnancement.dir/ordonnancement.html

The FlowShop contest is based on the 10 instances (ta021 to ta030, noted #21 to #30 in this contest report) scheduling 20 jobs on 20 machines (*20x20*) <<http://ina2.eivd.ch/collaborateurs/etd/problemes.dir/ordonnancement.dir/flowshop.dir/tai20_20.txt bad url ??>>

http://mistic.heig-vd.ch/taillard/problemes.dir/ordonnancement.dir/flowshop.dir/tai20_20.txt

http://ina2.eivd.ch/collaborateurs/etd/problemes.dir/ordonnancement.dir/jobshop.dir/tai20_20.txt

The allocated time for each team is one hour.

There are 10 Taillard instances of the FlowShop problem 20 jobs on 20 machines (as referred in http://www.lifl.fr/~talbi/challenge2007)

The 10 instances must be solved exactly with proof of optimality

This means that the program must both found the exact solution and prove that it is the optimal solution (by calculation).

If more than one team solved correctly the problem, the winner will be the one who solved the problem in the less elapsed time.

If there are 2 teams who solved the problem in the same amount of time, then we will consider the most important number of workers (total number of CPU).

If no team is able to complete all 10 instances, then we will look for the effective (#21 to #30) instances calculated, its elapsed time and the corresponding number of workers

1st November 2007 CONTEST RESULTS

- *The 3rd N-Queens Prize winners (2 teams ex-aequo) are*
  - ***Grid-TU - Tsinghua University – China***
    - *Calculated N=22 Queens in 19 mn 36s and deployed 1735 workers*
  - ***BUPT - Beijing University of Posts and Telecommunications, China***
    - *Calculated N=22 Queens in 24 mn 31s and deployed 2925 workers*

- *The 2nd N-Queens Prize winner is ACT - Beihang University - China*
  - *sucessfuly deployed 3888 workers*

- *The 1st N-Queens Prize winner is KAAPI-MOAIS - France*
  - *with ~40 379 Billions solutions found deployed on 3654 workers*

- *computed for the first time N=23 in 35 mn 7s and N=22 in 3 mn 21s*

- **The winner of the FlowShop contest is POZNAN - TransPUTers from Poland !**
  - **2146 s, 3185 Workers**

N-QUEENS REFERENCES

N	Solutions
4	2
5	10
6	4
7	40
8	92
9	352
10	724
11	2,680
12	14,200
13	73,712
14	365,596
15	2,279,184
16	14,772,512
17	95,815,104
18	666,090,624
19	4,968,057,848
20	39,029,188,884
21	314,666,222,712
22	2,691,008,701,644
23	24,233,937,684,440
24	227,514,171,973,736
25	2,207,893,435,808,352

Record published at
http://www.research.att.com/cgi-bin/access.cgi/as/njas/sequences/eisA.cgi?Anum=A059963

2007 Schedule

Username	Team nb	**Team name**
team4	**1**	BUPT Flow
team2	**2**	POZNAN TransPUTers
team2	**3**	POZNAN OutPUT
team4	**4**	BUPT Queen
team6	**5**	Tsinghua TU
team5	**6**	Tsinghua ChinaGrid
team7	**7**	ACT
team1	**8**	MOAIS Grenoble

Schedule

Tuesday		Wednesday		Thursday	
Slot Nb, Team Nb, Team name		*Slot Nb, Team Nb, Team name*		*Slot Nb, Team Nb, Team name*	
1.0800	6 Tsinghua ChinaGrid	2.0800	5 Tsinghua TU	3.0800	5 Tsinghua TU
1.0930	7 ACT	2.0930	7 ACT	3.0930	6 Tsinghua ChinaGrid
1.1100	3 POZNAN OutPUT	2.1100	1 BUPT Flow	3.1100	3 POZNAN OutPUT
1.1230		2.1230	*buffer (not allocated for the moment)*	3.1230	4 BUPT Queen
1.1400	1 BUPT Flow	2.1400			
1.1530	4 BUPT Queen	2.1530	2 POZNAN TransPUTers		
1.1700		2.1700	8 MOAIS Grenoble		
	2 POZNAN TransPUTers				
	8 MOAIS Grenoble				

IV Plugtests Grid Descriptors

- **Grid5000** (4080 max)
- **Intrigger** (450 max)
- **PoweRcost** (180 max)
- **DAS** (300 max)

N-Queens

Team : ChinaGrid TU (Username=team5)

Records of ChinaGrid TU:

Start Time:

- 08:28 on Intrigger
- 08:40 on Grid5000 (first run started at 08:28 aborted)

Calculation: N=21 and N=22 many times
End Time: 09:40

Challenge	Elapsed	#CPU #Nodes #Workers	OK #Solutions ?
21	**9mn40**	**1989**	314,666,222,712
21	**8mn46**		314,666,222,712
21	**8mn34**		314,666,222,712
Results	**514s or N=21**	**1989 max number of workers**	**Total number of solutions found 943,998,668,136**

Comments for ChinaGrid TU:

- First team running on the first day!
- After first attempt at 08:28 aborted because 2 applications were running on Grid5000
- One job was restarted on Grid5000 at 08:40 (will end at 09:40)
- The job on Intrigger started at 08:28 will run until 09:28
- Monitoring systems does not show intensive cpu usage?
- Perhaps a deployment problem?
- AT 09:28 Intrigger job is over and the result is time out (no result)
- AT 09:40 the job on Grid5000 was aborted the calculations of N=21 are in the logs

Team : ACT (Username = team7)

Records of ACT:

Start Time: 09:45 on Grid5000
Calculation: try N=22 many times and N=21

22			2,691,008,701,644

End Time:

Challenge	**Elapsed**	**#CPU #Nodes #Workers**	**OK #Solutions ?**
21	**7mn57s**	**3492**	314,666,222,712
Results	**477s for**	**3492 max number of**	**Total number of**

	N=21	workers	solutions found 314,666,222,712
SECOND RUN 09:54 to 10:54			
22	**27mn39s**		2,691,008,701,644
18	**8mn42s**		666,090,624
18	**9mn28s**		666,090,624
18	**11mn26s**		666,090,624
			2,693,006,973,516
Results	**27mn39s for N=22 and 8mn42s for N=18**	**3888 max number of workers**	**Total number of solutions found** 2,693,006,973,516

Comment

- *3637 workers on Grid5000*
- *251 on Intrigger*

Comments for ACT:

- ACT was scheduled at 09:30 but the previous team had to stop at 09:40
- Explained that the strategy to deploy only on Grid5000 is not good for the 2nd Prize criteria (max number of workers). The Jury advised ACT to deploy on the other Grid Intrigger, PoweRcost and DAS ! Perhaps this was understood correctly at 10:10 (30mn after start o slot of time)
- N=21 job finished sucessfuly

Team : POZNAN OutPUT (Username = team3 or team2)

From left to right
Milosz Kmieciak (FlowShop),
Pawel Lichocki and Mariusz Mamonski (N-Queens)
and Ph.D.Grzegorz Pawlak, manager of the 2 groups FlowShop and N-Queens

Records of OutPUT:

Start Time: 11:12

Calculation: N=17 many many many ....times
End Time:

Challenge	**Elapsed**	**#CPU #Nodes #Workers**	**OK #Solutions ?**
17			95,815,104
1631 times	**between 25s and 60s**		
Results	**25s or N=17**	**1516 max number of workers**	**Total number of solutions found** 156,274,434,624
SECOND RUN			
16			
1379860 times			20,385,062,029,184 This includes N=17 from 1st run on PoweRcost

Grid5000 : 2433 workers (Threads)
InTrigger : 342 workers
DAS 58 workers
*total = **2866 workers**:*

For the 2nd run
PoweRcost was down
so POZNAN added the 17 compuations of 1st run
33 Threds added and 72 times N=17
used all the 3 other Grids

Comments for OutPUT:

- **Grid5000** (4080 max) 1275 workers, 37 submanagers, 1 manager
- **Intrigger** (450 max) 198 workers, 9 submanagers, 1 manager
- **PoweRcost** (180 max) 43 workers, 2 submanagers, 1 manager
- **DAS** (300 max) nothing nothing
- One node per host, not per cpu

Team : BUPT N-Queens (Username=team4)

From left to right, Tao Ding, Zheng Sun, Xiaohong Huang and Yujie Su

Records of BUPT N-Queens:

Start Time: 16:12
Calculation: N=22 and N=21 many times
End Time: 17:13

Challenge	Elapsed	#CPU #Nodes #Workers	OK #Solutions ?
21	**33mn42**		314666222712
22	**50m44**		2691008701644
20	**4mn10**		39029188884
22	**24mn31**		2691008701644
20	**10mn25**		39029188884
20	**4mn41**		39029188884
20	**4mn41**		39029188884
20	**4mn42**		39029188884
20	**4mn41**		39029188884
Results	**24mn31s or N=22**	**2925 max number of workers**	**Total number of solutions found 5,930,858,759,304**

Comments for:

- N=22 2 times
- N=21 1 time
- N=20 6 times

Number of workers

- Grid5000: 2499 (N=20) , 451 (N=22)

- Intrigger: 366 (N=22) , 366 (N=20)
- PoweRcost: 60 (N=21) , 60 (N=20 four time)

Team : MOAIS (Username=team1)

Xavier Besseron

Records of MOAIS:

Start Time: D30 October Evening 19:30 aborted, restarted 19:55

- xx on xx
- xx on xx

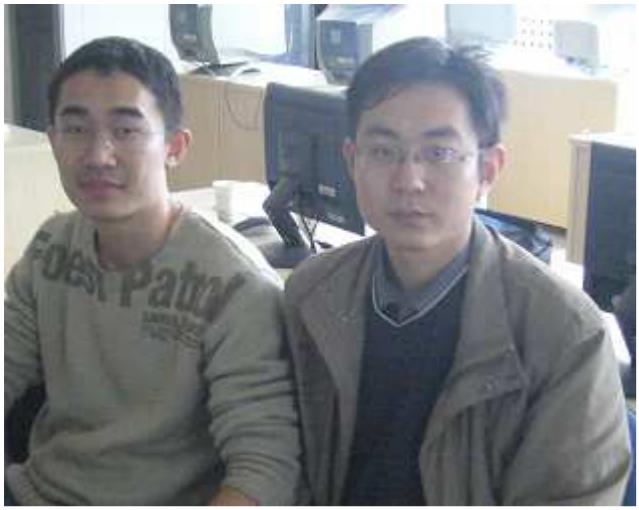
Calculation: N=23 and N=22 x 6 times
End Time: 20:55

Challenge	Elapsed	#CPU #Nodes #Workers	OK #Solutions ?
23	**2107s**		24233937684440
22	**212s**		2691008701644
22	**211s**		2691008701644
22	**204s**		2691008701644
22	**201s**		2691008701644
22	**205s**		2691008701644
22	**212s**		2691008701644
Results	**2107s for N=23 and N=22 201s**	**3654 max number of workers**	**Total number of solutions found 40,379,989,894,304**

The 2006 1st ProActive Prize winner was Eight Samourai with ~6 467 Billions (**6,467,003,374,188)** solutions found deployed on 2193 workers

MOAIS compared to last year Eight Queen team
6,467,003,374,188
40,379,989,894,304 this year ! From 6 467 Billions to 40 379 Billions : 6,24 times better

Team : Tsinghua TU (Username=team6)



Fro left to right

Records of Tsinghua TU:

Start Time:

- 08:30 only on Grid5000, there were a pb on the other clusters

Calculation: N=22 3 times on Grid5000
End Time: 09:30

Challenge	Elapsed	#CPU #Nodes #Workers	OK #Solutions ?
22	**30mn14s**		2691008701644
22	**19mn36s**		2691008701644
Results	**19mn36s or N=22**	**1735 max number of workers on Grid5000**	**Total number of solutions found 5,382,017,403,288**
Second RUN			

Comments for Tsinghua TU:

- **Grid5000** (4080 max) 1735 workers
- **Intrigger** (450 max) ABORTED for ext. reason
- **PoweRcost** (180 max) ABORTED for ext. reason
- **DAS** (300 max) ABORTED for ext. reason

FlowShop

Team POZNAN TransPUTers

During the night og 30 to 31 October 2007
used 3185 Workers
and Computed all 10 Taillard instances of 20x20 (see log and excel file)

Team : BUPT FlowShop (Username = team4)

From left to right, Tao Ding, Zheng Sun, Xiaohong Huang and Yujie Su

Xiaohong Huang

Records of BUPT FlowShop :

Start Time: 12:34, aborted because of a network failure (DNS)
13:43, new schedule
network done again at 14:03

14:48 network is back but team cannot clean the Grid and network admin (Clement) is out to Lunch!

Calculation: 10 instances
End Time:

Taillard	**#CPU #Nodes #Workers**	**OK #Solutions ?**
#30	**60 workers**	**?**

Instance	***Elapsed***	***Cmax***	***Schedule (solution)***
#21		*2297*	
#22		*2099*	
#23		*2326*	
#24		*2223*	
#25		*2291*	
#26		*2226*	
#27		*2273*	
#28		*2200*	
#29		*2237*	
#30	*987s*	*2178*	*2 6 11 5 12 17 0 1 14 9 10 4 16 3 18 7 19 8 15 13*
Total			
SECOND RUN			
#30	***695****s*	*2178*	*2 6 11 5 12 17 0 1 14 9 10 4 16 3 18 7 19 8 15 13* *Improved elapsed time during second run !* *Same amount of Workers = 60*

Comments :
Only one instance calculated