UiO : University of Oslo

Volunteer Computing Experience with ATLAS@Home

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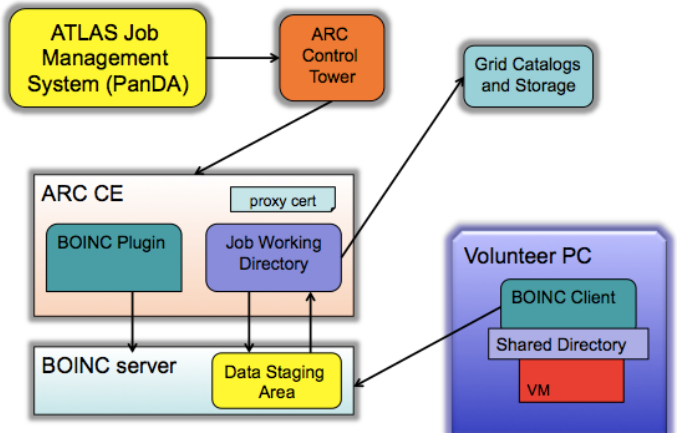
Volunteer Computing

- People volunteering their PC's spare CPU cycles for science/ mathematics/bitcoins…
- The most commonly used software is BOINC
- Why ATLAS@Home?
  - Free resources in a time of flat funding
  - Outreach and connecting to the public

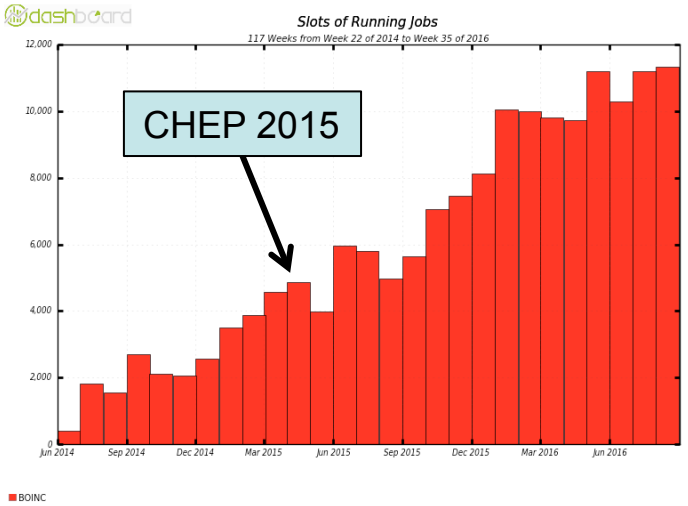
ATLAS@Home jobs

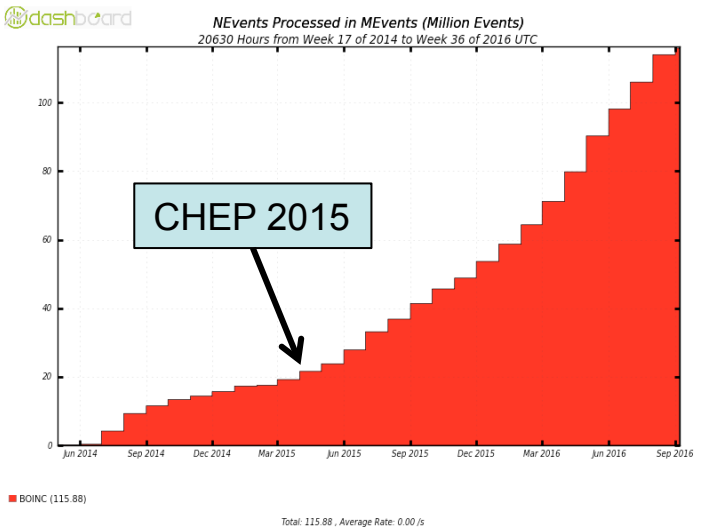
- Volunteers run ATLAS MC simulation jobs inside a CERNVM Virtual Machine
  - 70% of our volunteers run Windows
- Jobs are taken from the ATLAS job management system (Panda) and submitted to BOINC server through ARC CE
  - No grid credentials distributed to volunteers



Experience so far

- Steady growth of volunteers
- 11-12k “running” job slots
  - Including those queued/ suspended on the PC
- Translates to around 2-3k equivalent Grid job slots
- Providing 1-2% of overall ATLAS CPU





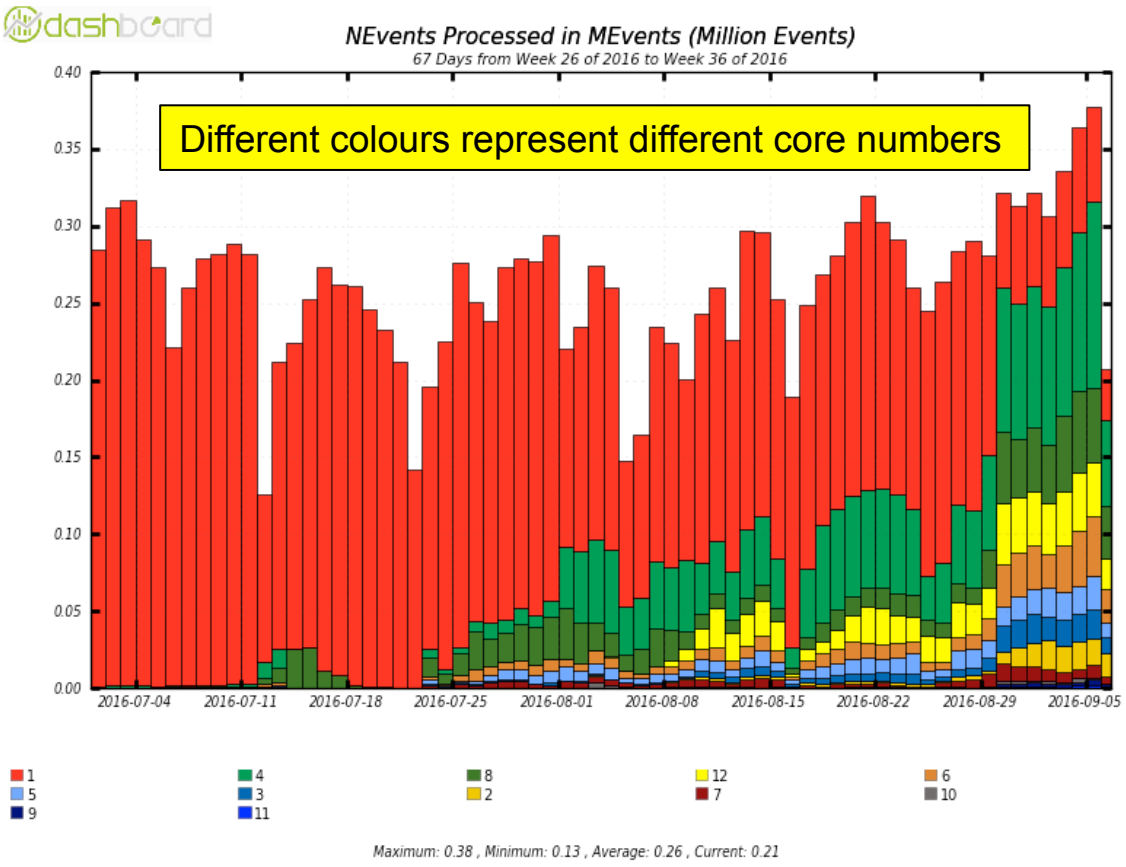
Multicore support

- The limiting factor for many volunteers is the memory ATLAS software consumes
  - 2.3GB for VM + overhead -> max 1 job per 4GB
- In July 2016 a multicore version of ATLAS@Home was introduced
  - A “beta app” at first: volunteers had to opt-in to run it
  - From end August in production
- The app uses as many cores as available on the PC (up to 12)
- The VM is started with this many cores and memory=2.5GB + 0.8GB * ncores
  - 2 cores needs 4.1GB memory
  - 12 cores needs 12.1GB memory
- Before the job starts the ATLAS wrapper sets the number of cores for the job to use based on how many cores the VM has

Multicore results

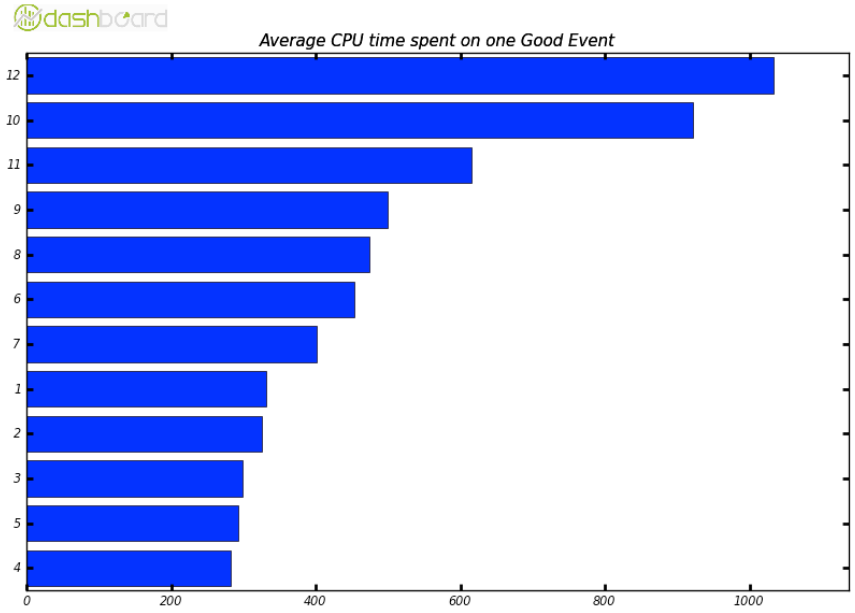
Volunteers like it!

"By the way, I really like the Multicore Version, its probably the best change you have made since I started with Atlas :-)"

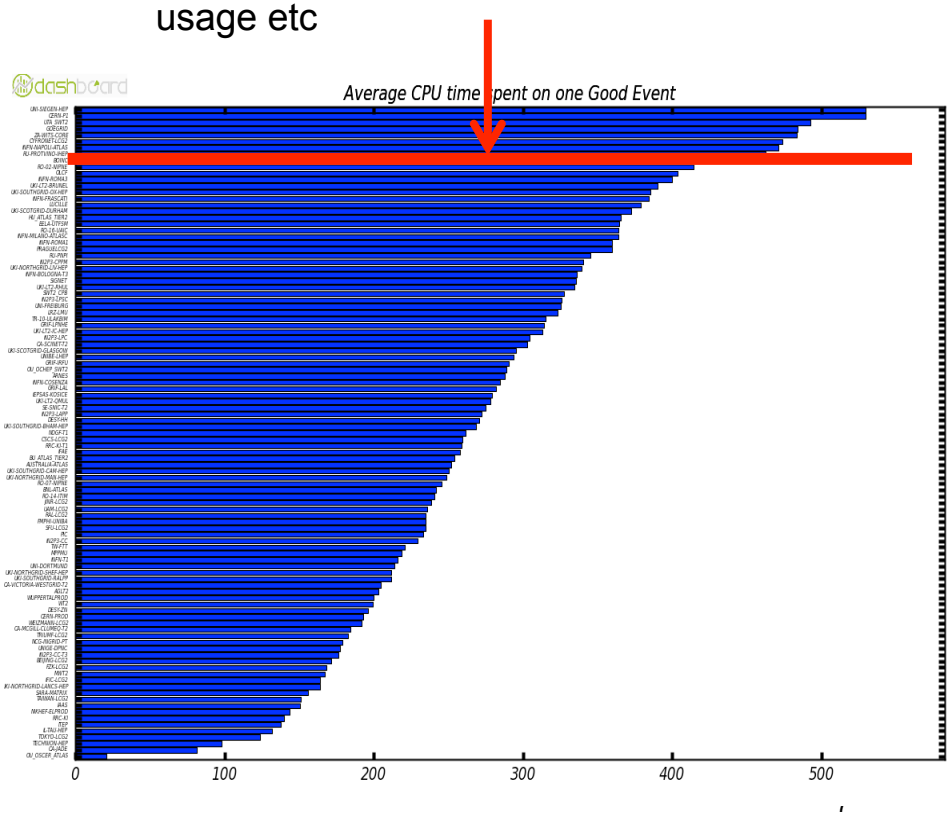


ATLAS@Home performance

- Running more than 8 cores showed very bad performance
- On 12 Sept the max core limit was reduced to 8

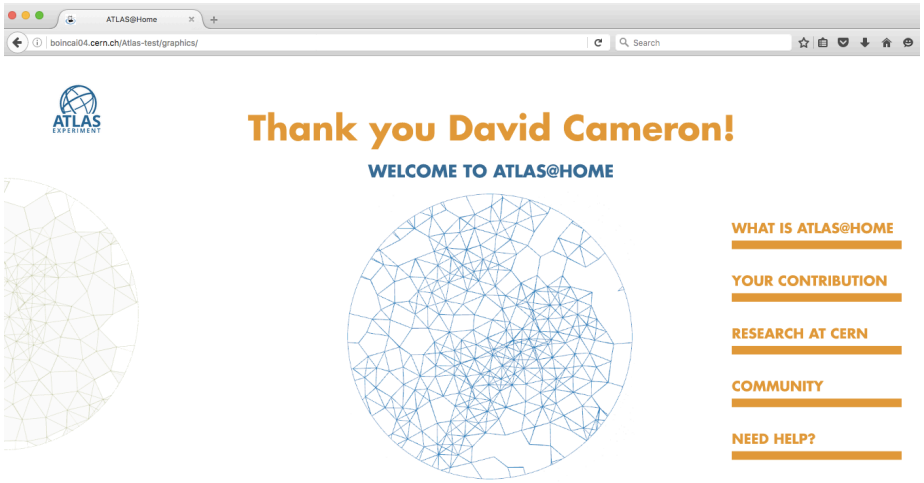


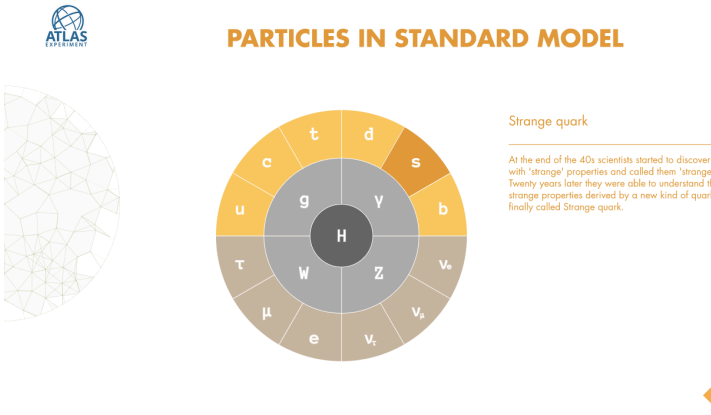
- ATLAS@Home is among the slowest Grid sites (but not the worst!)
- Expected due to non-dedicated hardware, configuring < 100% CPU usage etc



Graphical interface

- A personalised portal to ATLAS@Home
- Runs inside web server inside VM
- Volunteer clicks “show graphics” in BOINC client GUI to launch browser





Volunteers

- Two of our top volunteers are clusters/office PCs of ATLAS institutes
  - MPI Munich (Stefan Kluth)
  - Prague (Jiri Chudoba)
- Realising one original aim of the project
- Are we at the limit of BOINC expert volunteers?
  - Need to understand why people leave (a survey is planned)
  - How to attract non-tech people

Top participants

ATLAS/CERN people*

Rank	Name	Recent average credit	Total credit	Country	Participant since
1	MPI für Physik	192,525	26,032,672	Germany	20 Mar 2015, 9:41:04 UTC
2	scubadude79	69,515	3,259,802	United States	2 Jul 2014, 4:09:07 UTC
3	David	64,062	28,869,581	Switzerland	20 Jun 2014, 11:19:25 UTC
4	47an	53,744	3,877,790	Sweden	14 Jan 2015, 22:21:54 UTC
5	Yeti	47,945	15,682,358	Germany	20 Jul 2014, 10:50:08 UTC
6	Mumps [MM]	44,242	7,629,784	United States	4 Jan 2015, 2:53:29 UTC
7	Claus Varming Lund	33,948	8,193,133	Denmark	8 Mar 2015, 13:53:43 UTC
8	Toby Broom	29,614	7,895,785	Switzerland	1 Jul 2014, 2:04:37 UTC
9	Alejandro V. Mena	28,469	3,410,940	Mexico	25 Jun 2014, 6:21:34 UTC
10	Bowmore	22,766	387,083	United States	13 Jan 2015, 15:20:00 UTC
11	Wenjing Wu	21,010	286,908	China	23 Jun 2014, 2:32:15 UTC
12	LHCb-BO	20,260	1,381,526	Italy	14 Jun 2016, 7:15:31 UTC
13	rbpeake	19,806	5,200,347	United States	27 Jun 2014, 23:07:23 UTC
14	Ewin	18,491	1,224,228	Australia	30 Jun 2015, 8:57:07 UTC
15	Scott Stewart	17,862	4,056,572	United States	23 Nov 2015, 15:44:57 UTC
16	Fuzzy Duck	17,359	3,155,527	Vietnam	3 Dec 2015, 21:29:46 UTC
17	scole of TSBT	15,447	335,930	Anguilla	25 Sep 2014, 20:16:14 UTC
18	pool.gridcoin.co	14,868	2,111,315	International	16 Dec 2015, 19:53:54 UTC
19	Jiri Chudoba	14,492	12,706,758	Czech Republic	11 Mar 2016, 15:16:15 UTC
20	Andrej Filipcic	14,262	3,361,574	Slovenia	3 Jun 2014, 17:11:52 UTC

*apologies if you are ATLAS/CERN and not recognised here

Message boards: http://atlasathome.cern.ch/forum_index.php

Volunteer feedback

Message 3624 - Posted: 22 Jan 2016, 15:40:19 UTC | Hide | Move | Banish author | Delete

Last modified: 22 Jan 2016, 15:46:45 UTC

I see new users again and again complain that Atlas doesn't run well on their PCs or they don't produce succesfull results.

Please, check this list and be shure to check **really all Details**, all are important.

1) Do you use an actual BOINC-x64-Client ? At the Moment, 7.6.22 does it very well

2) Do you have installed VirtualBox ? At the Moment, Vers. 5.0.14 is doing very well

3) You should install the ExtensionPack according to your VirtualBox-Version. So, if you are running

4) Check, if VT-X in your BIOS is switched on

5) Check, if you have have enough RAM for Atlas available. Each Atlas-Task Needs 2,1 GB free RAM.

6) Check that your Windows-Firewall lets the communication work. BOINC.EXE and VBoxHeadless.exe Need out- and incoming communications.

7) Try to run only 1 Atlas at a time until you got it succesfull working
..... A) You can suspend the other Tasks manually
..... B) you can use an app_config.xml

8) Atlas connects on different ports to their Servers as BOINC-Users are used. You will have to open these ports:
..... HTTP (Port 80)
..... HTTP Proxy (Port 31

Many dedicated volunteers who are way more likely to help with problems than we are

I join mjy's doubt. What about network connection failure? I've got a very unstable wireless connection and usually I can't contribute to Atlas@home. The last weeks I'm crunching hard here only because I'm living together with a 30-meter ethernet cable. This is temporary, my parents will come back. :)

Future Work

- Enhancing the graphical interface to show real time information
  - Visualisation of events simulated, resources used etc
- Integration with ATLAS Event Service [link to talk], designed for opportunistic resources
- Expanding the volunteer base beyond the tech-savvy
- Proper accounting/recognition for contributing institutes
- New ATLAS workflows (although simulation currently provides enough workload)
- Alternatives to VirtualBox
  - eg native virtualisation platforms, docker on linux

Conclusions

- ATLAS@Home provides a useful non-negligible contribution to ATLAS computing resources
- It has been shown to be a viable lightweight solution for small sites
- New developments (multicore, graphics) keep volunteers interested and motivated
  - But a technology change is probably needed to attract the wider public
- Please join us!

http://atlasathome.cern.ch