



# Citizen Cyberlab and SFT - End Project Review

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Overview of the outcomes

# OUTCOMES OF CITIZEN CYBERLAB



# A

## Outcomes of Citizen Cyberlab

- Today (30/11) the 3-year EU Project **Citizen Cyberlab** completes
  - After 1 month of extension
  - CERN's role : *“Create a Particle Physics e-learning pilot project where volunteers tune a Monte-Carlo event generator, for studying their learning behavior”*





# A

## Outcomes of Citizen Cyberlab

1. The **Virtual Atom Smasher** game
  - **Interactive** Monte-Carlo (Pytia8) tuning interface
  - Contains **explanations** for the parameters
  - **Progressive** difficulty till explored the full palette of generator parameters
  - Integrated behavior **monitoring**
2. The **CERN Computing Challenges**
  - Few day long volunteer computing events for **testing** and **promoting**



A<sub>1</sub>

# Outcomes of Citizen Cyberlab

The screenshot displays the Citizen Cyberlab interface. On the left, a sidebar shows 'Connected machines: 2', 'Live event rate: 607 /s', and a 'Waiting? Play a game' button. The main area is titled 'Overview of Job Metrics' and features a circular gauge with various parameters like  $1-\gamma$ ,  $1-\beta$ ,  $1-\alpha$ ,  $1-\delta$ ,  $1-\epsilon$ , and 'ppb'. A 'RUNNING' status indicator is present. Below the gauge, there are tabs for 'Knowledge', 'Papers', 'Teams', and 'Forum'. The central part of the interface shows a 3D visualization of a particle detector, likely a bubble chamber, with a complex internal structure. To the right, a 'D parameter at 91 GeV' section displays a histogram of simulation data (blue) and reference data (black). Below this, there are two data cards: 'Charged multiplicity distribution' with a value of  $0.48 \pm 30.55$  and ' $K^{*\pm}(892)$  spectrum' with a value of  $0.75 \pm 0.39$ . Further down, there is a ' $\phi$  spectrum' and ' $K^{*0}(892)$  spectrum' section. A text box explains the D parameter: 'The D Parameter is 0 for a "2D event" - with all particles flowing in a single plane, like a sheet of paper, and D=1 for a "3D" event with activity distributed evenly in all 3 dimensions. The fact that this distribution is peaked near zero shows that events tend to be "planar". The degree of non-planarity is very sensitive to alphaS and is measured by how far this distribution extends away from zero.' Below this, it says 'This histogram is sensitive to: TimeShower.alphaSvalue' and 'Good Match' with 'Events: 223000'. At the bottom left, there are 'Help', 'Abort', and 'View' buttons. At the bottom right, there is a navigation bar with numbered icons 1 through 6, and a lock icon.



A<sub>1</sub>

# Outcomes of Citizen Cyberlab

- Problems encountered
  - **Multiple interface re-designs** : Complicated subject, not a single solution available → Try and error
  - **Collaboration issues** : Infrastructure tools ought to be built by other collaborators were not ready on time → Overload reached me
  - **Lack of coordination** : Supervisor left for Australia → Infrequent meetings, major changes after every meeting



A<sub>1</sub>

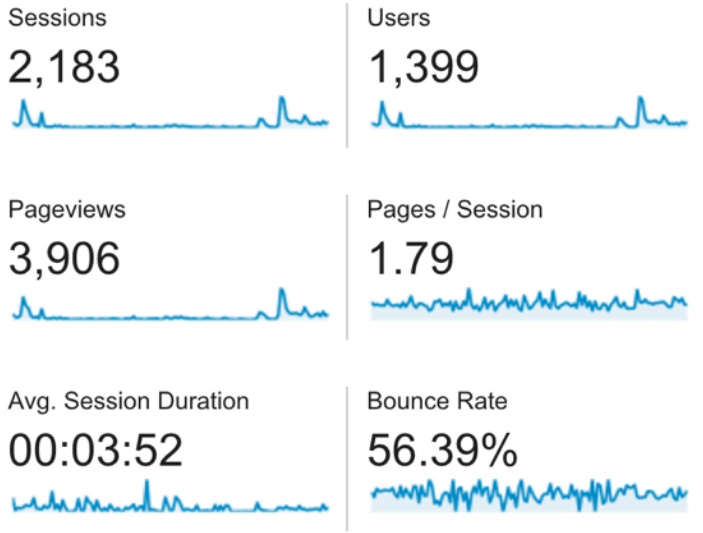
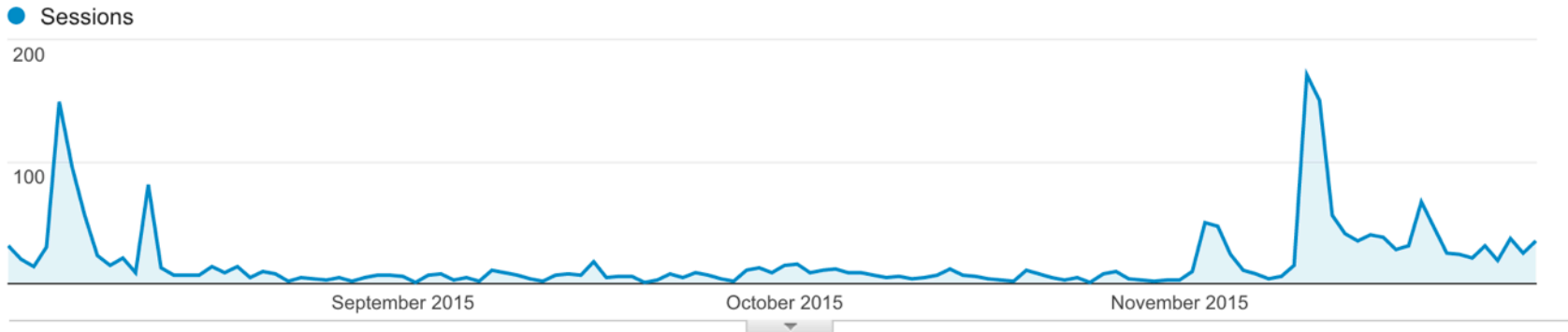
# Outcomes of Citizen Cyberlab

- We reached our **goal!**
  - Development completed on time
  - About **700** users registered  
*(only a small fraction is active though)*
  - Collected enough **data** for analyzing user behavior
- We created a **palette** of reusable software
  - Libraries and spin-offs
- We **exported** technology
  - WebAPI used by CitizenGrid

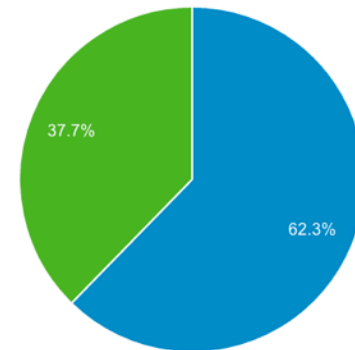


A<sub>1</sub>

# Outcomes of Citizen Cyberlab



■ New Visitor    ■ Returning Visitor



A<sub>1</sub>

# Outcomes of Citizen Cyberlab

The screenshot displays the CitizenGrid web interface. At the top, a dark blue navigation bar contains links for 'CitizenGrid', 'Dashboard', 'About us', 'Cyberlab', 'Documentation', and 'Contact us', along with a user profile 'Ioannis Charalampidis'. Below this, a lighter blue header features the CitizenGrid logo and a 'Current role: Application User' indicator. The main content area is titled 'CitizenGrid - Run A' and includes a sub-header 'Run an application client'. A prominent 'Launch Application' dialog box is centered on the screen. This dialog box has a title bar with a close button and contains the following information: a small application icon, 'Application: VAS', 'Launch type: Local (VirtualBox)', and 'Application group: vas-global'. At the bottom of the dialog are 'Close' and 'Launch' buttons. In the background, a card for 'Application: VAS' is visible, featuring a description: 'The Virtual Atom...' and 'knowledge of p...', a 'Launch Application Client Locally' button, and a section for 'Launch Application on a Cloud' with a table of 'Available Cloud Images'.

A<sub>2</sub>

# Outcomes of Citizen Cyberlab

- The CERN Computing Challenges
  - A few-day events for testing “volunteer computing from the web”
  - **First** on December 2014
  - **Current** on November 2015
  - Reaching out to **10,000** users
  - Perfect for testing technologies  
*(No long-term commitments, if something fails, that's ok)*





A<sub>2</sub>

# Outcomes of Citizen Cyberlab



**CERN Public  
Computing Challenge  
2015**

Help scientists simulate particle collisions.  
Contribute your computer's power.  
Earn challenge credits and badges.  
Learn about the origins of our Universe.

Help us translate the instructions into [another language](#).

Time left to participate:  
0d 3h 34m 57s

The graphic features a central burst of light with radiating lines in blue, green, and yellow. Below the text is a horizontal row of 20 national flags representing participating countries: Spain, France, Germany, United Kingdom, Italy, India, Greece, Mexico, Czech Republic, Norway, Poland, Portugal, Russia, Taiwan, Hungary, and Turkey.



A<sub>2</sub>

# Outcomes of Citizen Cyberlab

**Challenge Dashboard** Log-in and keep track of your progress

| Activity   | Progress                                       | Contribution   | Ranking   |
|--|--|--|---|
| How actively your virtual machine utilizes your CPU. | What fraction of the current job is completed. | How many simulation jobs your virtual machine has processed. | Your ranking among the volunteers in this challenge, by number of jobs completed. |
| 100 %<br>0 %   | 1 %<br>0 %                                     | 0  | 0   |

While waiting... do you want to learn while helping particle physicists?

**You are now ready to start computing!**

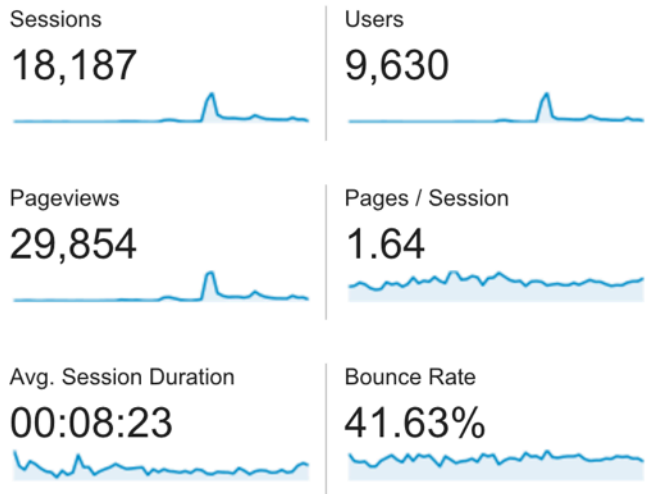
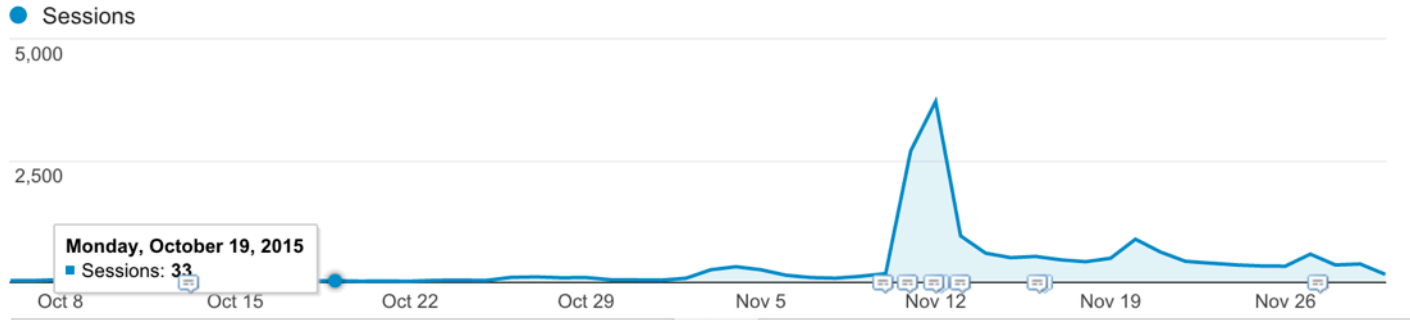
By clicking the *Start* button below, we are going to start a Virtual Machine in your computer, which is going to start performing virtual collisions and sending the statistics back to CERN.  
Click **Log-in to track your progress** on top right corner keep track of your progress!

Start Settings Trash

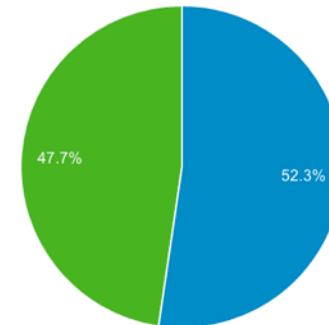
BOINC | About

A<sub>2</sub>

# Outcomes of Citizen Cyberlab



■ New Visitor ■ Returning Visitor



A<sub>2</sub>

# Outcomes of Citizen Cyberlab

- This year we introduced **CreditPiggy**
  - Web service for keeping track of user **credit** between various volunteer computing projects

The image displays two screenshots from the CreditPiggy web service. The left screenshot shows the login page with a purple piggy bank icon and the text "Creditpiggy Your virtual contribution piggy bank". It features social login options for Google, Facebook, Twitter, and Live, and an e-mail login section with a "CONTINUE" button. The right screenshot shows the dashboard for the "CERN Public Computing Challenge 2015", which includes a navigation menu, a user profile for "Anonymous User", and a summary table of performance metrics.

| CERN Public Computing Challenge 2015                                     |             |                  |
|--|-------------|------------------|
| Help scientists, test new technologies, become our next super volunteer! |             |                  |
| Overview   | Details     | Leaderboards     |
| In a glimpse   |             |                  |
| 73,208 jobs  | 54,145.67 h | 7,208,042 Kevts  |
| Successful Jobs  | CPU Time    | Simulated Events |
| 734 jobs   | 347.05 h    | 72,529 Kevts     |

\* We are on campaign CERN Computing Challenge till Dec. 1, 2015, midnight [SEE MORE DETAILS](#)

By-products of the development process (in addition to the game)

# SPIN-OFF PROJECTS

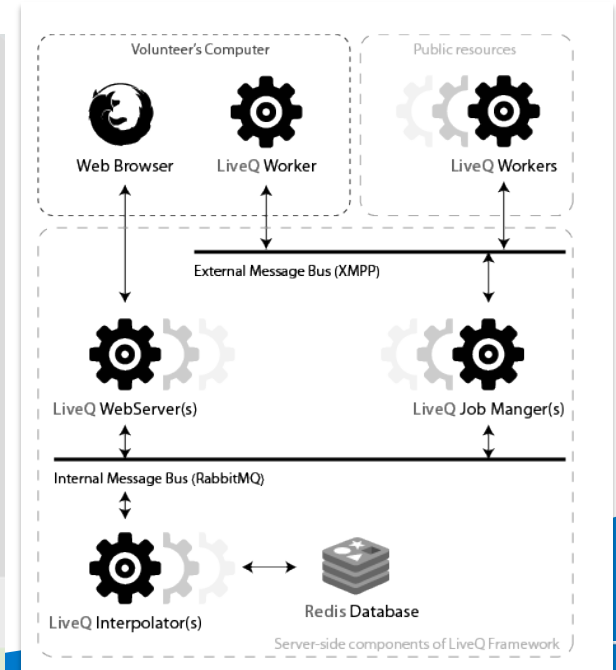
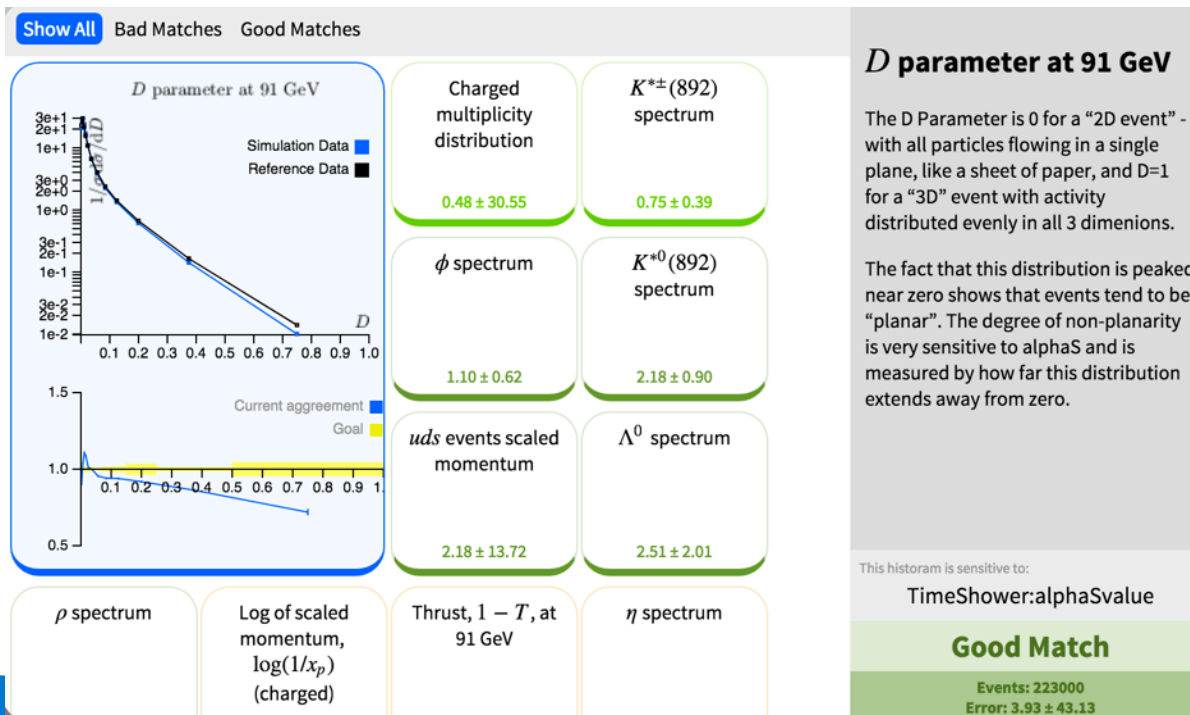


# B

# Development By-products

1. **LiveQ [PY]** – A distributed, interactive queue for running and tuning in real-time the generator

– <https://github.com/wavesoft/LiveQ>



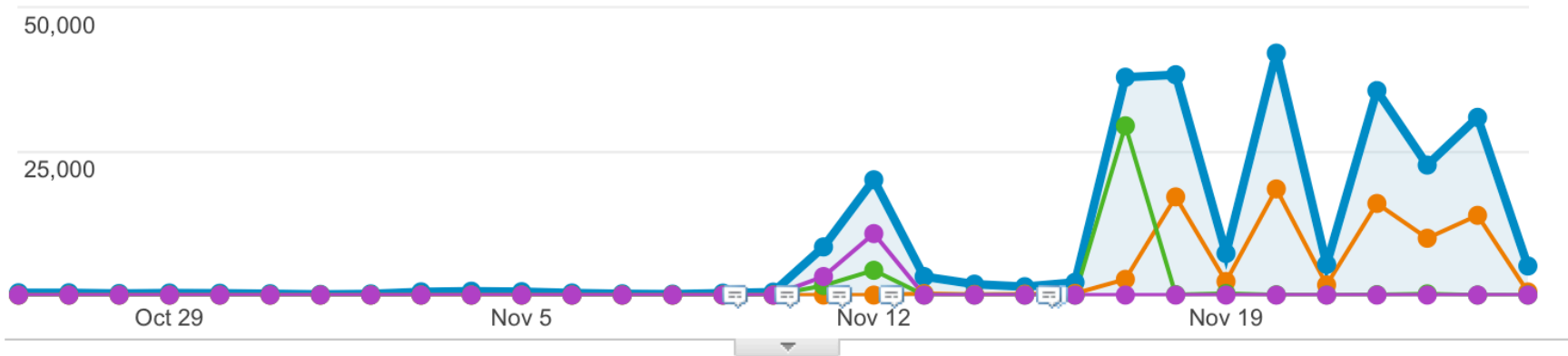
# B

## Development By-products

2. CCL-Tracker [JS] – An analytics toolset for interfacing complex javascript applications to an analytics server

– <https://github.com/wavesoft/ccl-tracker>

- Total Events
- vm:error:(Davix::stat) Error: Failure HTTP 404 : File not found after 10 attempts
- vm:error:There are no more jobs in the queue
- vm:error:curl: (22) The requested URL returned error: 504 Gateway Time-out

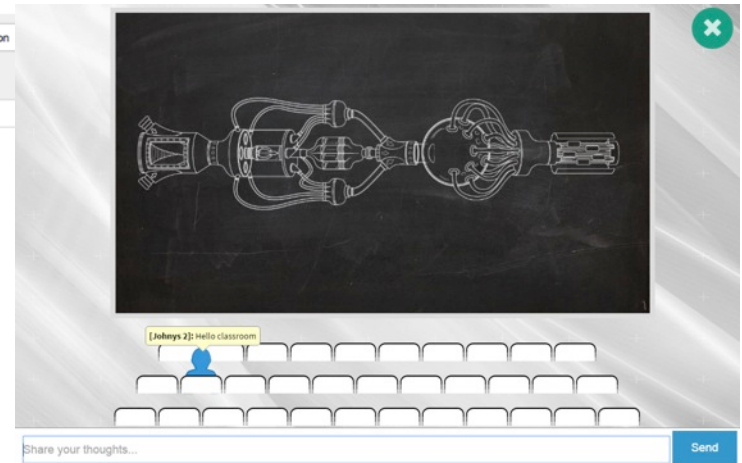
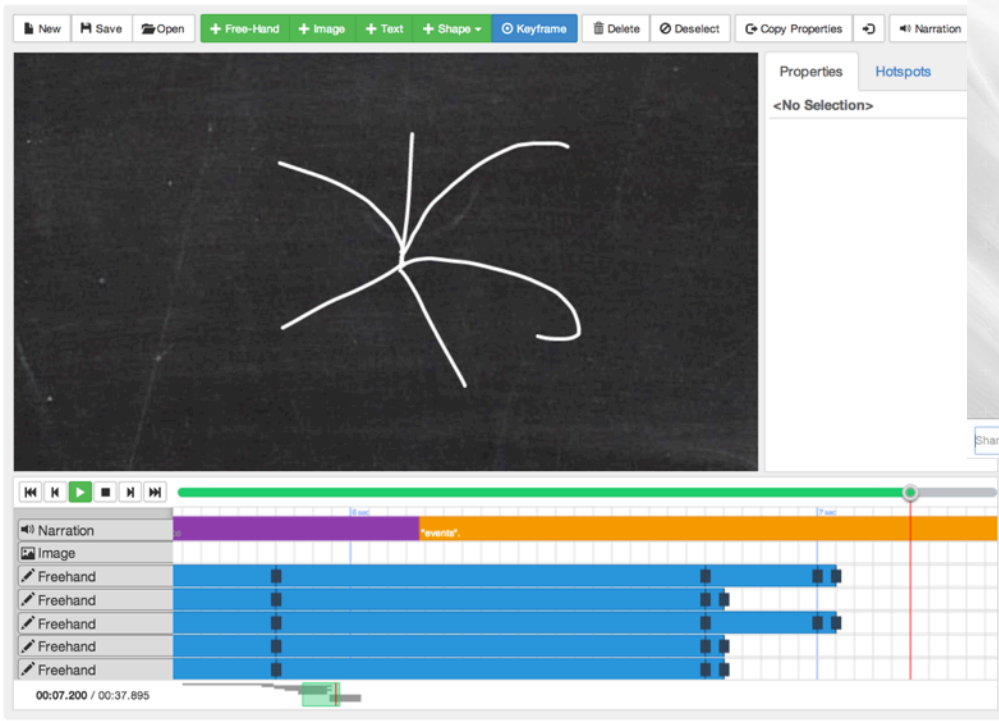


# B

## Development By-products

**3. TootR [JS]** – A web application for creating explanation videos, with Text-to-Speech narration

– <https://github.com/wavesoft/virtual-atom-smasher>



## B

# Development By-products

4. **DumbQ [SH/PY]** – A “dumb” scheduler that takes care of starting multiple volunteer computing projects in isolated containers in CernVM

– <https://github.com/wavesoft/dumbq>

| Console 1  | Console 2 | Console 3 | Console 4 | Console 5  | Console 6      |
|--|-----------|-----------|-----------|--|----------------|
| DumbQ Agent VM v1.0  |           |           |           |  | Machine Status |
| CPUs: 1, Load: 0.87, 0.74, 0.34, RAM/Free: 489/16, Swap/Free: 2537/2537, |           |           |           |  |                |
| Consoles: ALT+F3 (test4theory)   |           |           |           |  |                |
| Running Processes  |           |           |           |  |                |
| %CPU   | %MEM      | STARTED   | TIME      | COMMAND  |                |
| 14.8   | 5.3       | 08:46:07  | 00:00:32  | @vmfs2 -o allow_other,config=/etc/vmfs/config.d/cer  |                |
| 3.0  | 0.6       | 08:49:03  | 00:00:01  | /usr/bin/python /cvmfs/sft.cern.ch/lcg/externa       |                |
| 2.0  | 0.0       | 08:49:43  | 00:00:00  | sleep 10   |                |
| 1.0  | 0.0       | 08:45:52  | 00:00:02  | /sbin/init   |                |
| 1.0  | 0.0       | 08:45:54  | 00:00:02  | [kworker/u2:29]                                      |                |
| 0.7  | 0.0       | 08:45:52  | 00:00:01  | [ksoftirqd/0]  |                |
| 0.7  | 0.0       | 08:46:05  | 00:00:01  | [jbd2/sda1-0]  |                |
| 0.5  | 0.0       | 08:45:52  | 00:00:01  | [rcu_sched]  |                |
| 0.5  | 0.6       | 08:48:59  | 00:00:00  | /sbin/cgrulesengd -g cgrid                           |                |
| 0.3  | 0.0       | 08:45:54  | 00:00:00  | [kswapd0]  |                |
| 0.2  | 0.0       | 08:46:27  | 00:00:00  | /sbin/udevd -d                                       |                |
| 0.2  | 0.0       | 08:46:30  | 00:00:00  | /sbin/bootlogd -c -s -l /var/log/boot.log            |                |
| 0.2  | 3.3       | 08:48:56  | 00:00:00  | /usr/sbin/httpd                                      |                |
| 0.1  | 0.0       | 08:45:52  | 00:00:00  | [kworker/0:1]  |                |
| 0.1  | 0.0       | 08:46:04  | 00:00:00  | [kworker/0:1H]                                       |                |
| 0.1  | 0.1       | 08:48:56  | 00:00:00  | /bin/bash /cvmfs/sft.cern.ch/lcg/external/experiment |                |
| 0.1  | 0.5       | 08:49:04  | 00:00:00  | python /cvmfs/sft.cern.ch/lcg/external/experimental/ |                |
| 0.0  | 0.0       | 08:45:52  | 00:00:00  | [kthreadd]   |                |
| 0.0  | 0.0       | 08:45:52  | 00:00:00  | [kworker/0:0]  |                |

Exposes a web interface & comes with a .js library for receiving real-time updates from the hosted applications





# B

## Development By-products

**5. DataBridge Interface [SH]** – A simple queue interface using the DataBridge interface, developed by IT (Fabrizio Furano & Laurence Field).

- <https://github.com/wavesoft/databridge-interface>

The screenshot shows the GitHub repository page for `wavesoft/databridge-interface`. The repository is described as "A simple server/client interface to the DataBridge queue." It has 121 commits, 1 branch, 0 releases, and 1 contributor. The latest commit is by `wavesoft` with the message "Sleeping for random time on recovery" and a commit hash of `9ddb1f3`, made 2 days ago. The repository contains files such as `client`, `queue`, `server`, `.gitignore`, `LICENSE`, and `README.md`. The `README.md` file is currently selected and displayed at the bottom of the page. On the right side, there are options to clone the repository in desktop or download a ZIP file.

# B

## Development By-products

6. Challenge Web App [HTML/JS] – The web application that drives the CERN computing challenges

- <https://github.com/wavesoft/vlhc-challenge>

Challenge Dashboard

Log-in and keep track of your progress

| Activity   | Progress                                       | Contribution   | Ranking   |
|--|--|--|---|
| How actively your virtual machine utilizes your CPU. | What fraction of the current job is completed. | How many simulation jobs your virtual machine has processed. | Your ranking among the volunteers in this challenge, by number of jobs completed. |
| 80 %   | 16 %   | 0  | 0   |
| 70 %   | 15 %   |  |   |

While waiting... wanna help ATLAS look for Higgs?

My Achievements CPU-1 (test4theory)

Collisions generated with: herwig++

Collisions analyzed with: ATLAS\_2011\_S8924791, ATLAS\_2011\_S8971293, ATLAS\_2011\_S9126244, CMS\_2011\_S8950903

Status: Running

Beam: pp

Process: jets

Energy: 7.0

Stop

BOINC | About

# B

## Development By-products

**7. CreditPiggy [PY]** – An on-line “piggy bank” for volunteer’s credit. It comes with API libraries and system daemon for interfacing with any project

– <https://github.com/wavesoft/creditpiggy>

### My overall participation

CPU Time  
⌚ 574.62 h

Simulated Events  
⚡ 163,887 Kevts

Failed Simulations  
✖ 20 jobs

1,649

COINKS COLLECTED



RANKING

Disk Usage  
💾 7,543.48 Kb

Successful Jobs  
✔ 1,649 jobs

Discarded Jobs  
❌ 0 jobs

### Personal Achievements



# B

## Development By-products

9. **LibCernVM [C++]** – The library that does all the heavy-lifting for WebAPI : Install VirtualBox, install, configure, control and receive real-time events from a VM running in the user's computer
  - <https://github.com/wavesoft/libcernvm>
10. **CernVM WebAPI [C++]** – A browser extension that allows websites to launch and control Virtual Machines (used by more than 20,000 users)
  - <https://github.com/wavesoft/cernvm-webapi>



Who can take over when I leave CERN?

# **FUTURE SUPPORT OF THE OUTCOMES**





# My “Legacy” to SFT

science Signed in as: icharala Sig

Structure Compute ▾ Orchestration ▾ Current Project PH LHC@Home T4T ▾ Project Settings

Volumes Images Access & Security

Instance Name ▾ Filter Filter Launch Instance Terminate Instance

| Image Name                    | IP Address                                  | Size      | Key Pair     | Status | Availability Zone | Task | Power State | Time since created |
|-------------------------------|---|-----------|--------------|--------|-------------------|------|-------------|--------------------|
| SLC6 Server - x86_64 [130624] | 128.142.243.207<br>2001:1458:301:5e::100:49 | m1.medium | icharala-mac | Active | cern-geneva-c     | None | Running     | 2 years, 2 months  |
| SLC6 Server - x86_64 [130624] | 128.142.242.207<br>2001:1458:301:5c::100:49 | m1.medium | icharala-mac | Active | cern-geneva-a     | None | Running     | 2 years, 2 months  |
| SLC6 Server - x86_64 [130624] | 128.142.242.199<br>2001:1458:301:5c::100:41 | m1.medium | icharala-mac | Active | cern-geneva-a     | None | Running     | 2 years, 2 months  |
| SLC6 Server - x86_64 [130624] | 128.142.242.212<br>2001:1458:301:5c::100:4e | m1.medium | icharala-mac | Active | cern-geneva-a     | None | Running     | 2 years, 2 months  |
| SLC6 Server - x86_64 [130624] | 128.142.242.220<br>2001:1458:301:5c::100:56 | m1.medium | icharala-mac | Active | cern-geneva-a     | None | Running     | 2 years, 2 months  |
| SLC6 Server - x86_64 [130624] | 128.142.243.212<br>2001:1458:301:5e::100:4e | m1.medium | icharala-mac | Active | cern-geneva-c     | None | Running     | 2 years, 2 months  |
| SLC6 Server - x86_64 [130624] | 128.142.244.25<br>2001:1458:301:5f::100:13  | m1.medium | icharala-mac | Active | cern-geneva-c     | None | Running     | 2 years, 2 months  |



# C

## Future Support

- I have left a rich “legacy” ...
  - “PH LHC@Home T4T” **OpenStack** Project
  - “TH TEST4THEORY WEB” **Firewall** Set
  - On-line **48** Virtual Machines
  - Developing:
    - One **major** project (Virtual Atom Smasher)
    - Few **minor** projects (Challenge, CreditPiggy, WebAPI)
  - Maintaining:
    - Test4Theory BOINC Project
    - Game, Challenge and CreditPiggy Infrastructure



# C

## Future Support

- When I leave ...
  - Rich **documentation** will be in place
  - Can this be taken over by SFT?
  - Suggestions?

