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Big Data and Quantum Computing



Centro Nazionale di Ricerca in HPC,
Big Data and Quantum Computing

Workplan and discussion for scale tests

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Introduction

Technical aspects:
see Tommaso T. talk

- Total of 70 worker nodes @INFN - NAPLES, shared with other projects, each with:
 - 502GB RAM;
 - 96 core in total, competing with other users;
- Access “grid-like” to the cluster (HTCondor), with CVMFS available (cern.ch & infn.it);
- Not all the cluster is currently active, due to cooling issues hopefully fixed before summer break.
Nodes will progressively be enabled, also based on the usage;

For the first phase of scale tests, a subset of such resources have been allocated “privately” for our flagship:

- 5 full worker nodes, extendable in case of need.

Work plan for next months

- During summer, we will start benchmarking the final deployment of the platform.
- A **first phase** (by the end of the MS10 - mid september) with individual tests on the upgraded platform with the offloading on the new resources.
 - During such tests, we don't expect shared usage (i.e. queueing). We will use the dedicated worker nodes for the flagship.
- A **second phase** (up to end of 2025) will follow: here concurrent execution can be expected, as well as final monitoring to ensure robustness of the platform, heterogeneous benchmarking of the various analyses "flavours".

To be defined

Work plan - Phase I

- During this phase, the idea is to “book” a slot where each user can do the desired tests with no concurrent usage.
- **Coordination tool:** Use this [spreadsheet](#) to reserve the slots where you would like to test the infrastructure.
- **Users involved:** All the users that have an ongoing use-case with the platform.
- **Issue tracking:** In case of problems, fill the [tracking document](#) for logging history.

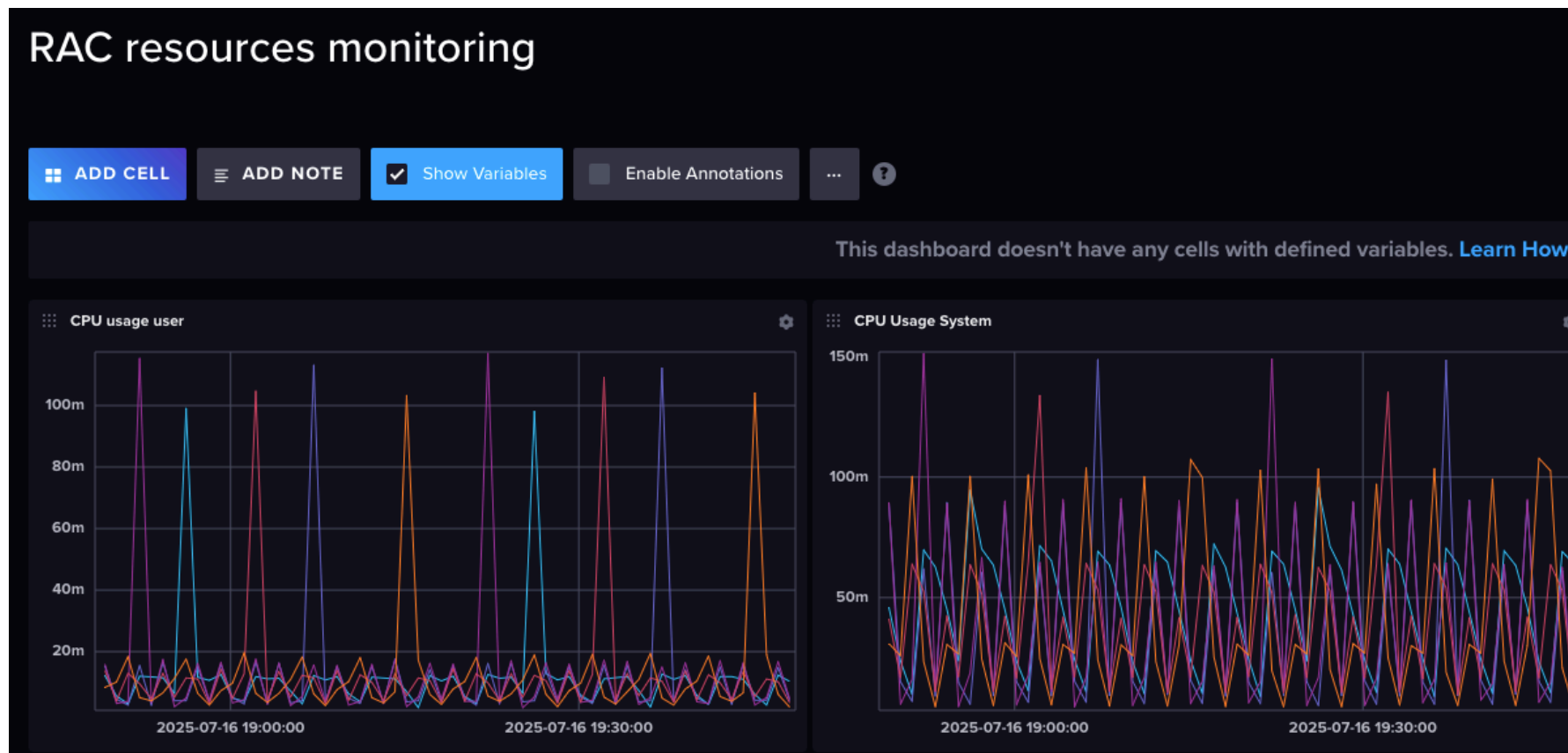
Maximum of days: my guess, no more than 8-10 days.

Work plan - Phase I

- **Metrics collection:** we should have standardised ways of collecting metrics (to avoid apple-pear situations).
 - *Timestamps:* they can be taken from the “jupyter notebook” side, with time or datetime modules. The various analyses are different in flavour, but ideally times should be taken in the same blocks:
 - Pre-dask operations (any I/O, pre-processing, or client setting);
 - dask event loop(s) (time of dask workers operation);
 - Post-dask operations (if any): plots creation, stage-out on WLCG resources.
 - **Any ideas?**
- *Hardware resource usage:* we have a Influx-DB instance where all the resource usage metrics are stored.
 - Entrypoint: <https://influx.131.154.98.51.myip.cloud.infn.it/orgs/5d28c5bfd58d3854/dashboards/0f1c0a75eb223000>
 - Credentials: not sure if here is a good place to put them. Probably is best to give them privately later on :)

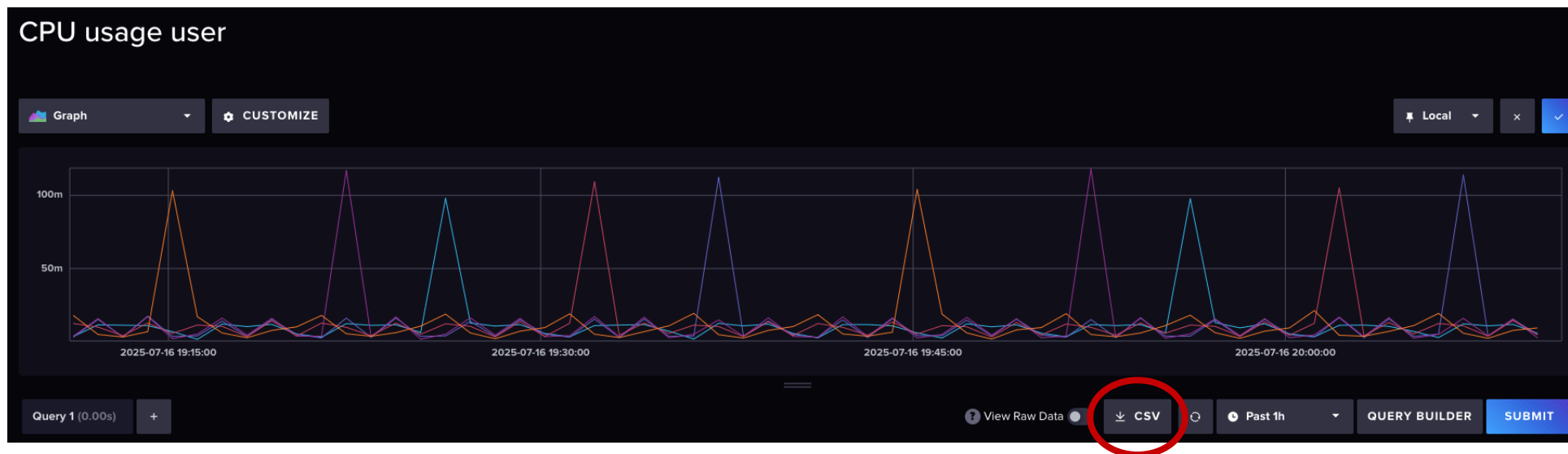


Work plan - Phase I



Work plan - Phase I

- Every source of metric, in the Influx dashboard, has an export option to CSV (for some reason it does not work on Google Chrome).



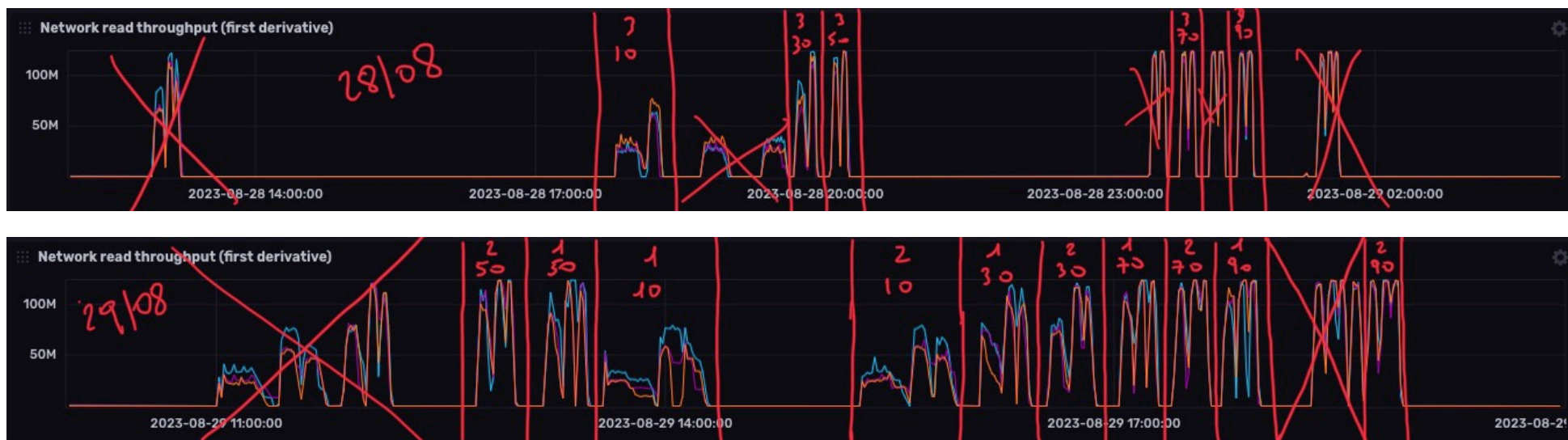
- Each user, during the time slot allocated, has to monitor the InfluxDB instance and export the metrics into a CSV file. This instance is not persistent, so export it immediately (a restart of the VMs will cause the history to reset).

Work plan - Phase I

- Metrics available:
 - CPU usage (system, user, system+user);
 - Memory usage (free, total, used, ...);
 - Network read (cumulative sum, throughput (derivative), ...)
 - Disk I/O (IOps in progress, read time, write time, ...)
 - Other (not sure if relevant)
 - **Any ideas?**

Examples

- Screenshots taken from a personal test (2023), done with the HNL search with the CMS Analysis Facility:



- Note the timestamps on the Jupyter notebook to correlate the results with the Influx metrics.



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Discussion time