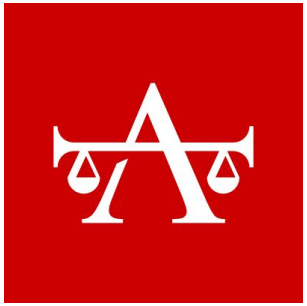


Arbiter2: Recent and Future Changes

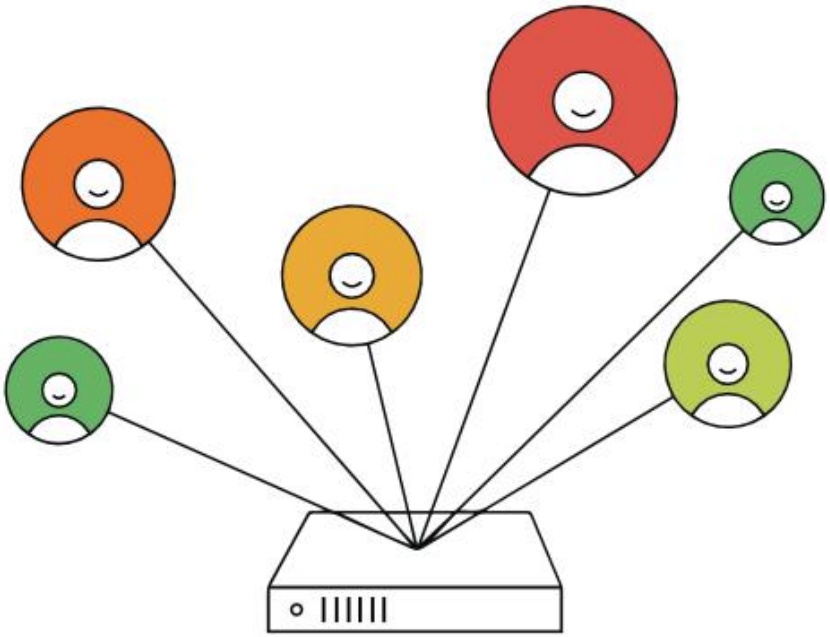
Dylan Gardner

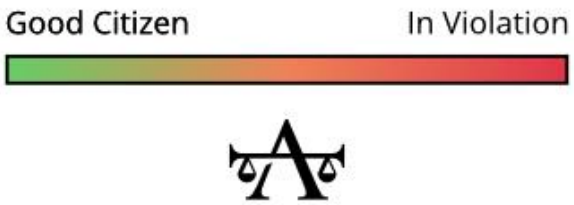
What is Arbiter2?

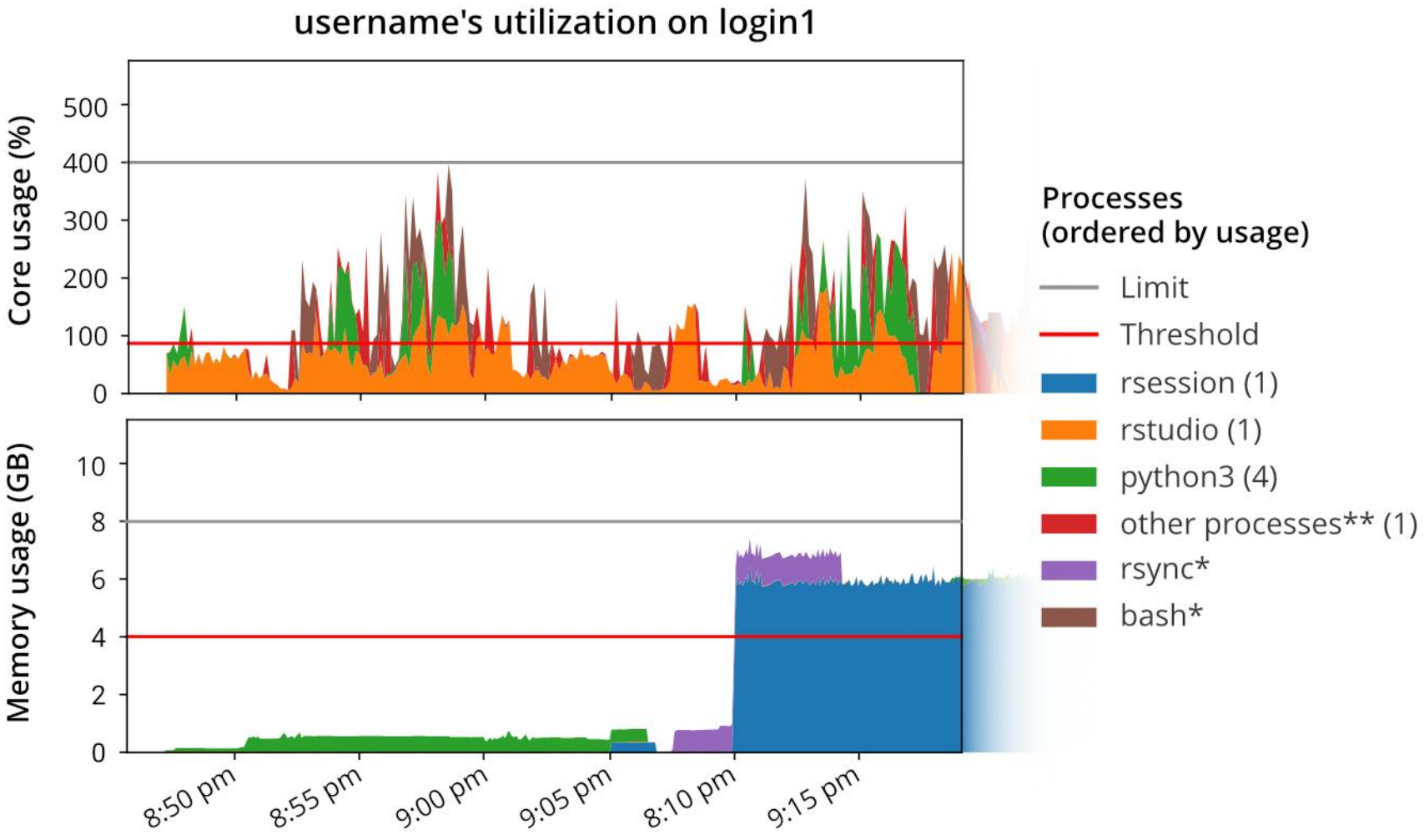
- Daemon that tries to prevent login nodes from getting bogged down due to unacceptable user usage
- Developed by the Center for High Performance Computing (CHPC) at the University of Utah
  - Me, Dylan Gardner (maintainer, student)
  - Robben Migacz (former student)
  - Brian Haymore
  - Help from other CHPC Staff (Paul, Anita, ...)
  - Modeled on previous work by Albert Lund (former grad student) “Arbiter1”
- Paper at PEARC, lightning talk at SC, poster at RMACC last year
- Open Source

What does it do?

- Monitors users on login nodes
- Determines whether their CPU and memory usage is in violation of the configured policy
- Limits the resources of those in violation using cgroups
  - Further limits resources upon repeated violations
- Emails users about correct usage on violation







Example email plot to users

**Whitelisted processes (don't count against the users)*

***Unaccounted process usage (i.e. short-lived processes); It is whitelisted.*

Released (v1.4.0) Bug fixes/changes

Bug fixes:

- Fixed incorrect memory quota reporting in emails
- Made log rotations consistent, even without violation events

v1.4.0 release was in May 2020

Released (v1.4.0) Changes

Changes:

- Cap the number of processes in plots and tables (configurable)
- Speed up shared (PSS) memory collection on kernels 4.4+
- Created a new tool that emails admins a summary of Arbiter2 activity within a period of time
- Created proof-of-concept script to export Arbiter2 metrics to a InfluxDB database

v1.4.0 release was in May 2020

Upcoming (v1.4.1) Bug fixes

Mostly improves non-CentOS 7 compatibility, to be released in a couple weeks once testing is complete.

Bug fixes:

- Fixed file-backed cache memory from being counted against users on non-CentOS 7 machines!
- Removed incorrect assumption that cpu and cpuacct cgroup controllers are symlinked together
- Added missing steps to install guide
- Fixed inaccurate process table averaging

Significant portions of the upcoming v1.4.1 bug fixes were made by INL, Installation feedback from other sites (NOAA, CSHL, NREL).

Upcoming (v1.4.1) Changes

Mostly improves non-CentOS 7 compatibility, to be released in a couple weeks once testing is complete.

Changes:

- Overhaul install guide to catch missing cases, work better on non-CentOS 7 boxes
- Optimized process data collection to reduce load Arbiter2 creates
- Creating Arbiter2 metrics exporter to Prometheus to better monitor login nodes and violations

Significant portions of the upcoming v1.4.1 changes were made by INL, Installation feedback from other sites (NOAA, CSHL, NREL).

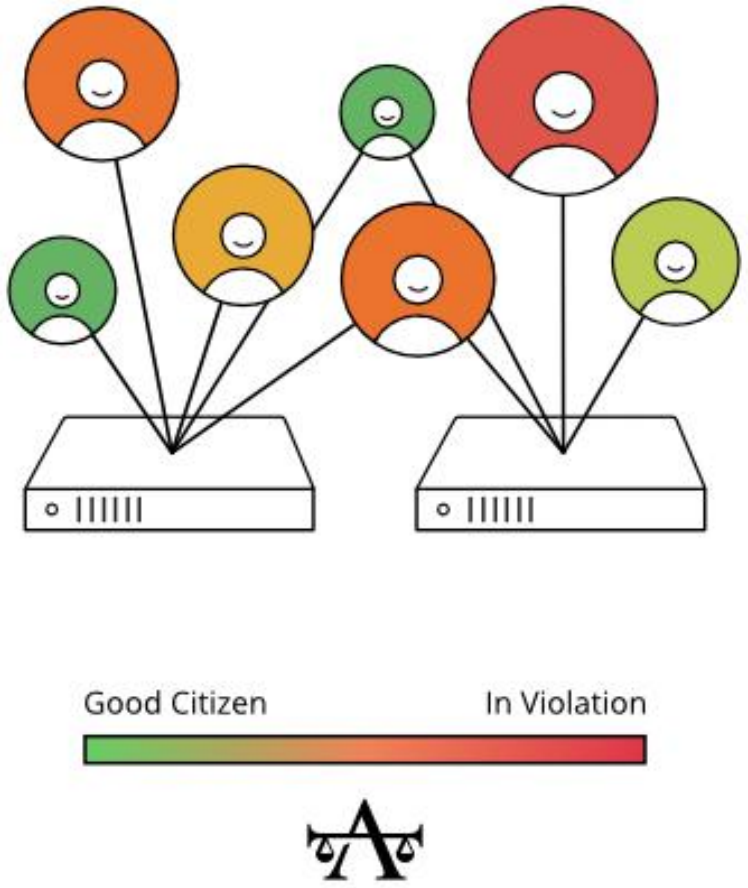
Future (v2) Changes

Planned Changes:

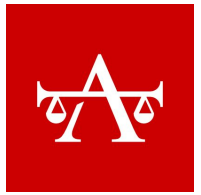
- Synchronization between Arbiter2 instances on login nodes via shared database
- cgroups v2?

Potential Ideas:

- Be able to dynamically set user states from command line
- Create cgroup and process interface so other tools (Arbiter exporter) can utilize that data



Questions or comments?



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Code (GPLv2 licensed):

https://gitlab.chpc.utah.edu/arbiter2/arbiter2

Presentations/Papers:

https://dylngg.github.io/resources/arbiterTechPaper.pdf
https://dylngg.github.io/resources/arbiterRMACC19Poster.pdf
https://dylngg.github.io/resources/arbiterPEARC19Slides.pdf