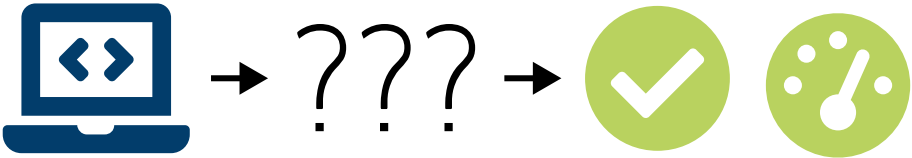

CONTINUOUS INTEGRATION FOR HPC CODES

JLESC, April 17, 2024 | Jakob Fritz, Robert Speck | Jülich Supercomputing Centre, Forschungszentrum Jülich

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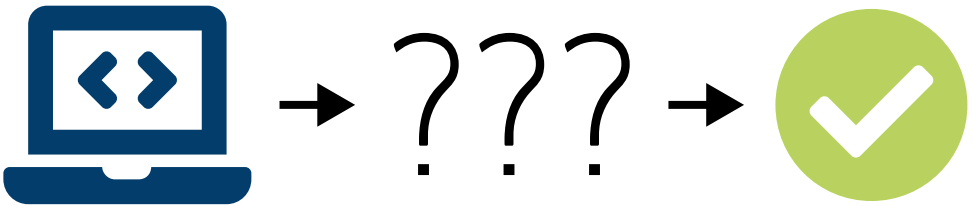
- Syncing Github to Gitlab

Continuous Benchmarking
- How to store results
- How to visualize results

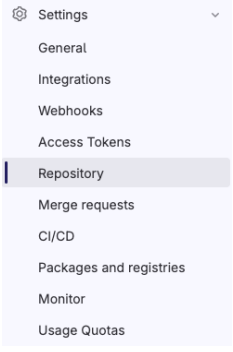
Continuous Integration for HPC

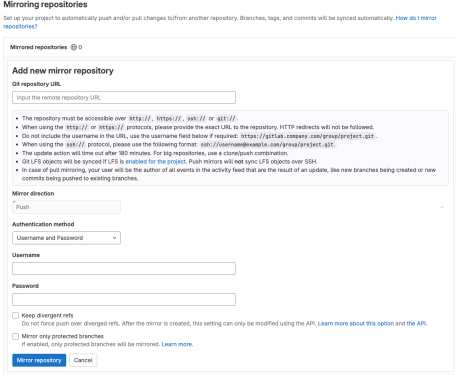


Continuous Integration for HPC

Syncing with Gitlab tools

Use Push-Mirror (can be found in the settings). Pull-Mirror only available in paid versions





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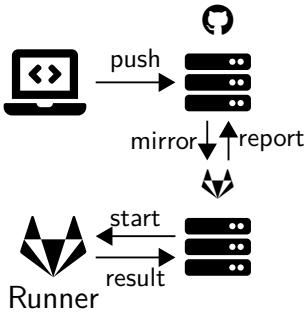
Continuous Integration for HPC

Syncing Github to Gitlab

- Already shown last year



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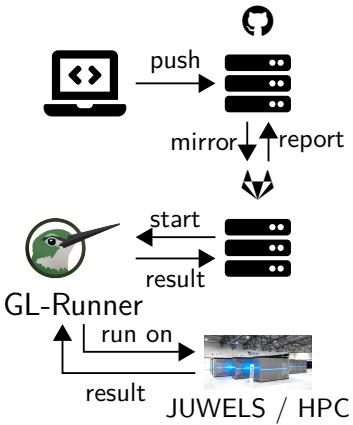
- Now used to trigger Jacamar and run on cluster with GPU usage (for testing)



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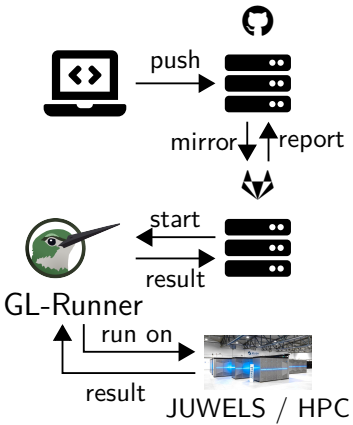
Continuous Integration for HPC

Syncing Github to Gitlab

- Already shown last year
- Now used to trigger Jacamar and run on cluster with GPU usage (for testing)
- Returning results back to repository (Gitlab & Github) is of different difficulty. Success/Failure is easy; numbers are more difficult.
- Numbers are not only for benchmarking, but already for testing, (e.g. test coverage)



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Continuous Integration for HPC

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- Now used to trigger Jacamar and run on cluster with GPU usage (for testing)
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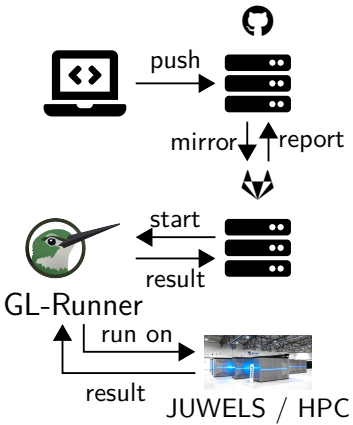
- Numbers are not only for benchmarking, but already for testing, (e.g. test coverage)
- Artifacts created in Jacamar returned to Gitlab. Transfer to Github already present, but transfer between Github workflows of the same commit still needs development



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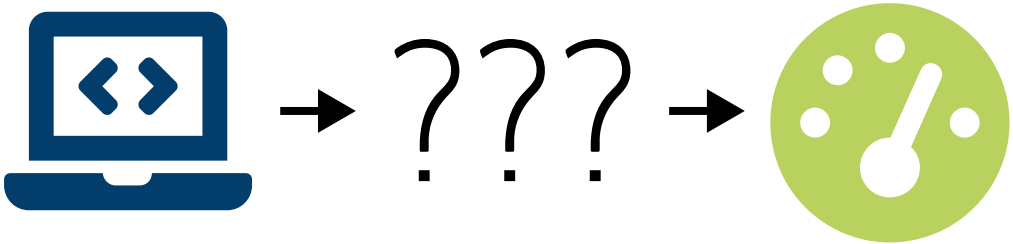
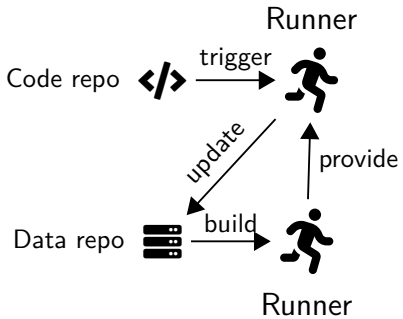
Continuous Benchmarking



Continuous Benchmarking

How to store results

- Storage of results from benchmarks can be in separate repo
- For few metrics and/or meta-data a database can be used (e.g. sqlite) in a repository (therefore, versioned)



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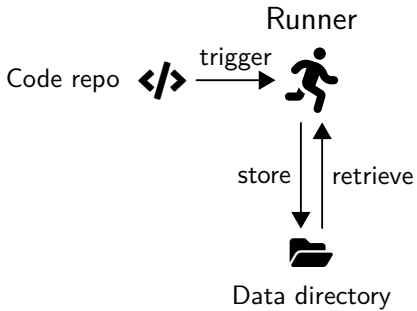
Continuous Benchmarking

How to store results

- Storage of results from benchmarks can be in separate repo
- For few metrics and/or meta-data a database can be used (e.g. sqlite) in a repository (therefore, versioned)
- For larger amounts of data, a file-dump or git-annex or datalad could be used (not done myself)



Continuous Benchmarking

How to visualize results

For large visualizations, a server with e.g. Graphana could be used

$\Rightarrow$ Backend server needed

$\Rightarrow$ Faster to provide updated data

Continuous Benchmarking

How to visualize results

For large visualizations, a server with e.g. Graphana could be used

⇒ Backend server needed

⇒ Faster to provide updated data

For smaller versions, static html with embedded JS is an alternative (e.g. via plotly)

⇒ Simple webserver sufficient

⇒ Easily scalable, as only static html-files are served

Continuous Benchmarking

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For smaller versions, static html with embedded JS is an alternative (e.g. via plotly)

⇒ Simple webserver sufficient

⇒ Easily scalable, as only static html-files are served

This could be combined with Jupyter NB for easy development and with mkdocs if multiple pages shall be deployed.

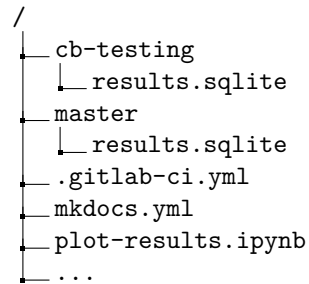
⇒ Simple creation of sites and automatic creation of menu and footers

Continuous Benchmarking

How to visualize results

Example for website with Jupyter Notebooks and mkdocs

- Separate sqlite-files for each branch

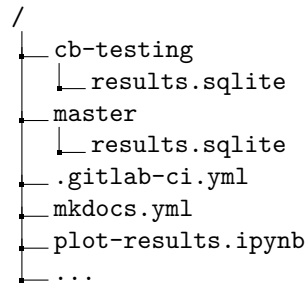


Continuous Benchmarking

How to visualize results

Example for website with Jupyter Notebooks and mkdocs

- Separate sqlite-files for each branch
- Usage of template file of Jupyter NB
- This get copied for each branch automatically in CI

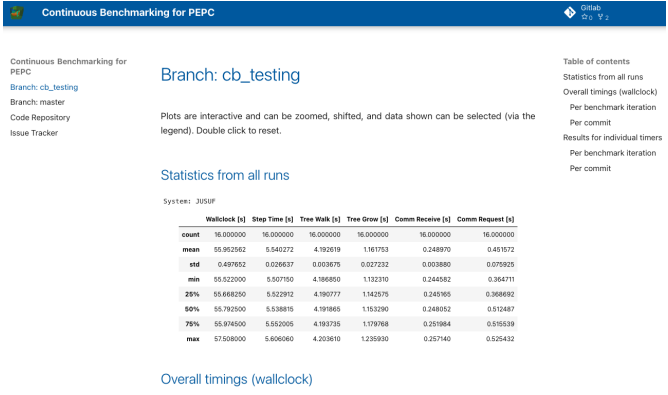


Continuous Benchmarking

How to visualize results

Example for website with Jupyter Notebooks and mkdocs

- Separate sqlite-files for each branch
- Usage of template file of Jupyter NB
- This get copied for each branch automatically in CI
- Created website



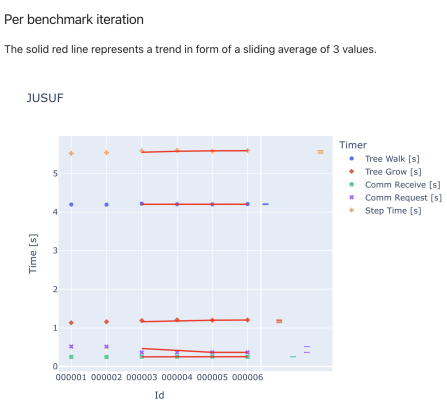
	Wallclock [s]	Step Time [s]	Tree Walk [s]	Tree Grow [s]	Comm Receive [s]	Comm Request [s]
count	16.000000	16.000000	16.000000	16.000000	16.000000	16.000000
mean	55.952562	5.540272	4.192619	1.161753	0.248970	0.451572
std	0.497652	0.026637	0.003675	0.027232	0.003880	0.075925
min	55.522000	5.507150	4.186850	1.132310	0.244582	0.364711
25%	55.668250	5.522912	4.190777	1.142575	0.245165	0.368692
50%	55.792500	5.538815	4.191865	1.153290	0.248052	0.512487
75%	55.974500	5.552005	4.193735	1.179768	0.251984	0.515539
max	57.508000	5.606060	4.203610	1.235930	0.257140	0.525432

Continuous Benchmarking

How to visualize results

Example for website with Jupyter Notebooks and mkdocs

- Separate sqlite-files for each branch
- Usage of template file of Jupyter NB
- This get copied for each branch automatically in CI
- Created website
- With interactive graphs



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Thank you for your attention!

Link to GitHub2Lab:
`https://github.com/jakob-fritz/github2lab_action`

Link to CB-Website of PEPC:
`https://slpp.pages.jsc.fz-juelich.de/pepc/pepc/`

PEPC

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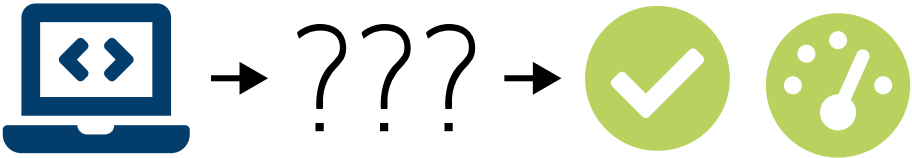
Thank you for your attention!

If you are interested in the details of the codes or have questions,
feel free to contact me!
j.fritz@fz-juelich.de



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