

Examples of CI/CD in research codebases using git-based websites and HPC

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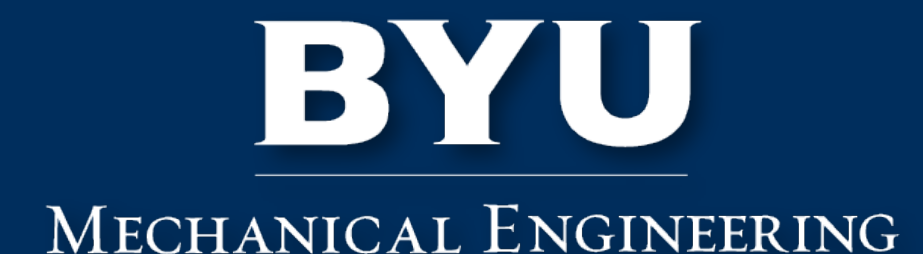
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Credits: <https://applitools.com/blog/7-pitfalls-production-testing/>



Outline

- **In this presentation**
 - 2 examples of CI/CD
 - Emphasis on gitlab functionalities
 - Some lessons learnt
- **The original need**
 - Build tests (many compilers): *example 1*
 - Regression test (many cases): *example 2*



GitLab

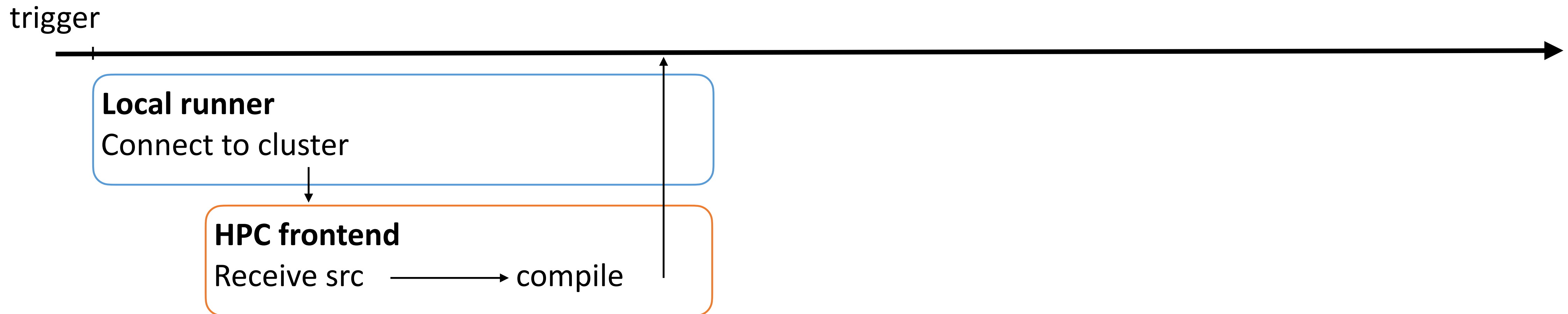
Oct/2013

Philippe Chatain



Example 1

- The code: **VPM4x - a research CFD (legacy) code**

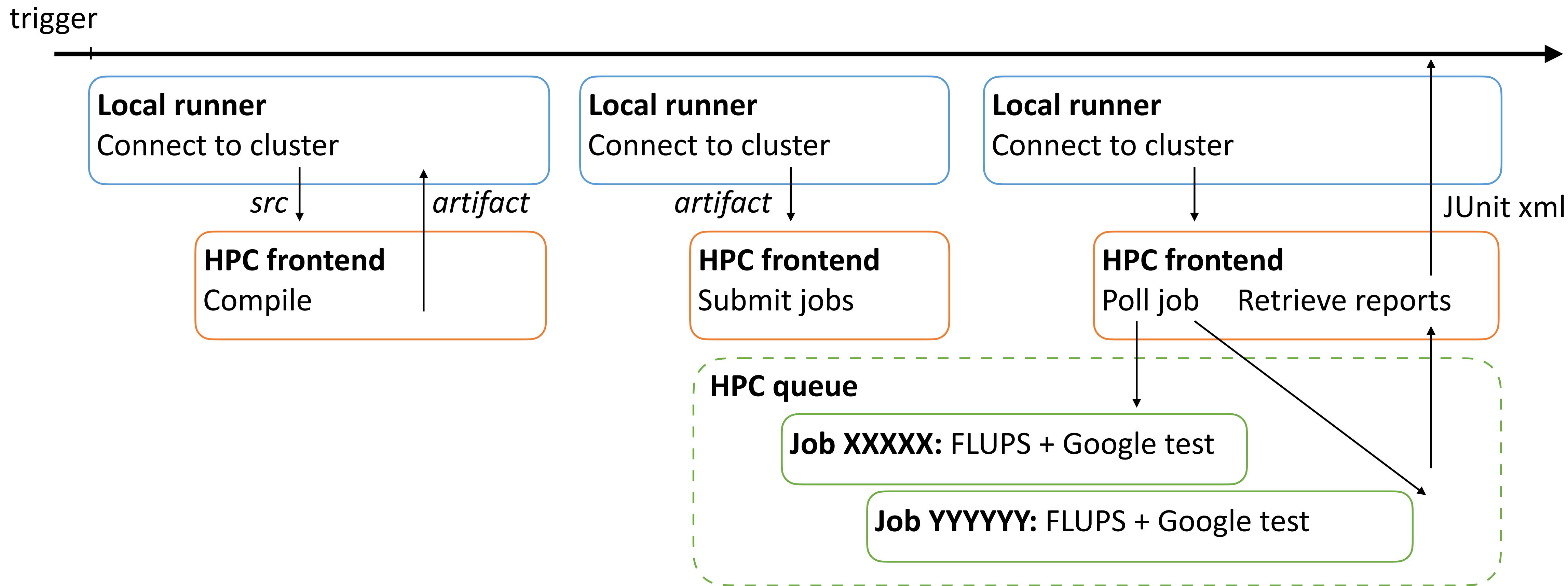


- **Comments:**

- ✓ Your test environment is your production environment
- ⚠ Not very portable
- ⚠ Support from local admin is required (dedicated HPC account)
- ⚠ Maintenance

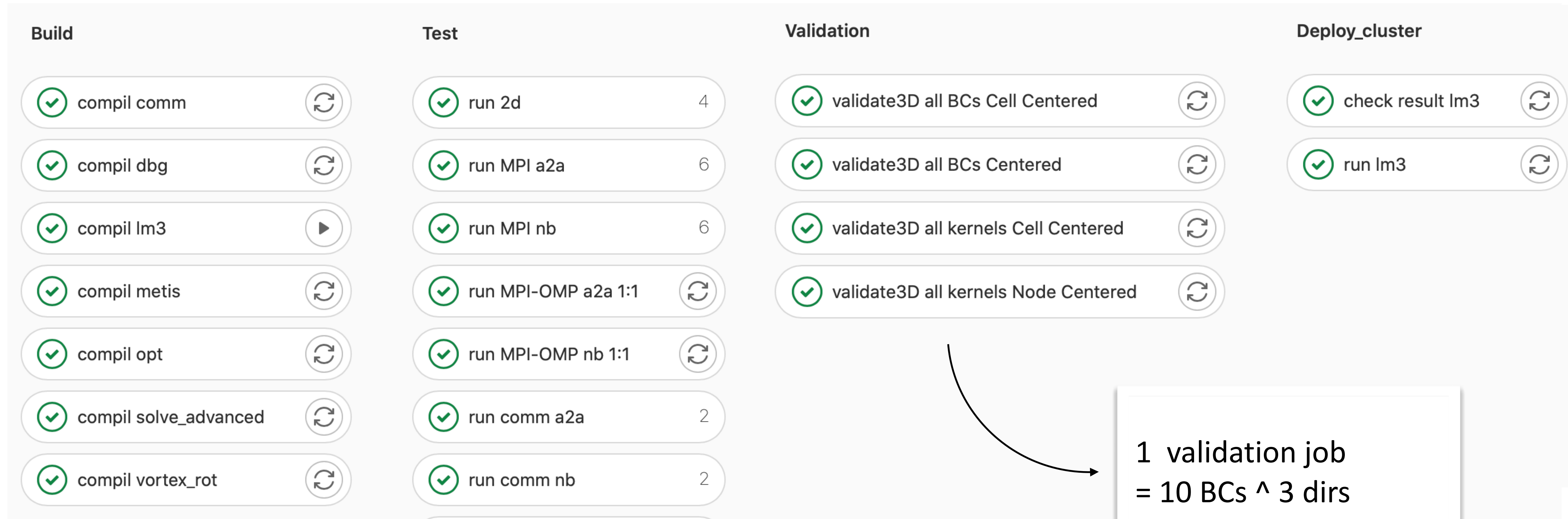
Example 2: intermediate (1)

- The code: **FLUPS** - a new C/C++ library to solve Poisson equations



Example 2: intermediate (2)

- **Pipeline**



- **Demo:**

- <https://git.immc.ucl.ac.be/examples/flups/-/pipelines>

Example 2: intermediate (3)

- **Comments and tips**

- Trigger condition:
 - Specific branch, specific commit (regex), PR/MR ...
 - Different pipelines for different conditions

```
only:  
- /*$/i #basically always  
- merge_requests  
except:  
- /^dev_.*$/
```

```
workflow:  
  rules:  
    - if: '$CI_PIPELINE_SOURCE == "merge_request_event"'  
    - if: '$CI_COMMIT_BRANCH && $CI_OPEN_MERGE_REQUESTS'  
      when: never  
    - if: '$CI_COMMIT_BRANCH'
```

- “Need”: dependencies between runs

```
dependencies:  
- compil opt
```

```
needs: [compil opt]
```

- <https://git.immc.ucl.ac.be/examples/flups/-/pipelines/10298/dag>

Example 2: intermediate (4)

- **Comments and tips**

- Manual action:

- nice to limit load on external resources
- pipeline is “blocked” until manual action is run

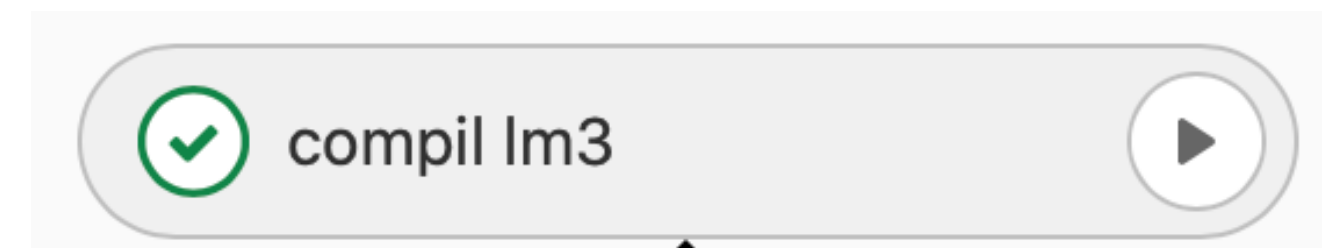
- Multiple runners:

- Jobs automatically distributed (when precedence permits)
- Can add “tags” to impose a given runner for a job

- Additional info when commits are added to merge requests

- https://git.immc.ucl.ac.be/examples/flups/-/merge_requests/42

```
when: manual
```



```
#10297
```

```
detached
```

```
compil lm3 :  
tags:  
- vanreeslab
```

Conclusion

- **The documentation is your friend (RTFM...)**
- **Examples of other codes is a good way to get started**
 - Nek5000: <https://github.com/Nek5000/Nek5000> (Jenkins)
 - Adflow: <https://github.com/mdolab/adflow> (Fortran with Python interface, Azure pipelines, code coverage)
 - PETSc: <https://gitlab.com/petsc/petsc> (C, multiple builds, pages)
 - FLUPS: Send me an email if you want to have access to the gitlab dcaprace@byu.edu
- **CI/CD will save you time eventually!**