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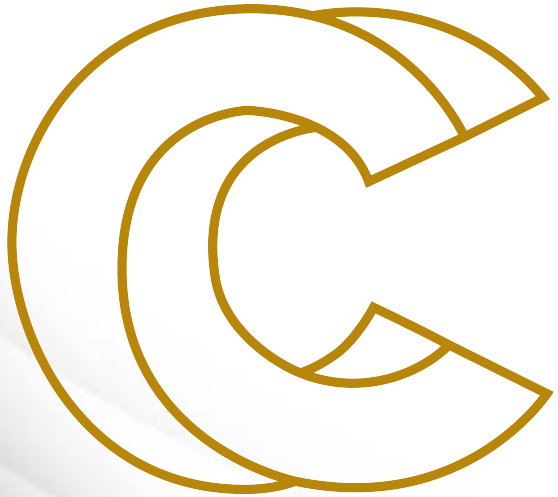

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Source control managment with Git at Gitlab, Github and Bitbucket

Leon Kos, University of Ljubljana

22 April 2021, Zoom meeting

Source control managment with Git at Gitlab, Github and Bitbucket

Leon Kos, University of Ljubljana, LECAD laboratory

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Source code management (SCM) with Git provides support for versioning with branching and merging in a collaborative work. Git as distributed SCM is usually connected to a central Git server that provides web functionality for source review, pull requests and integration with other services such as continuous integration (CI) and code documentation. In this seminar we will take a look into Git development process and popular servers and integrated services (CI, Read the docs). How to Git version large files in HPC environment along with code and documention will be discussed from practical and data provenance viewpoint.

Git – daily work from command line

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Setup

1. Add ~/.ssh/id_rsa.pub to the list of SSH keys on the portal
2. git clone ssh://git@git…/…git
3. git branch –r
4. git checkout develop
5. git add .gitignore

Develop

1. git status
2. git add file …
3. git pull
4. git status
5. git commit –m “Short description of changes”
6. git push

Gitlab

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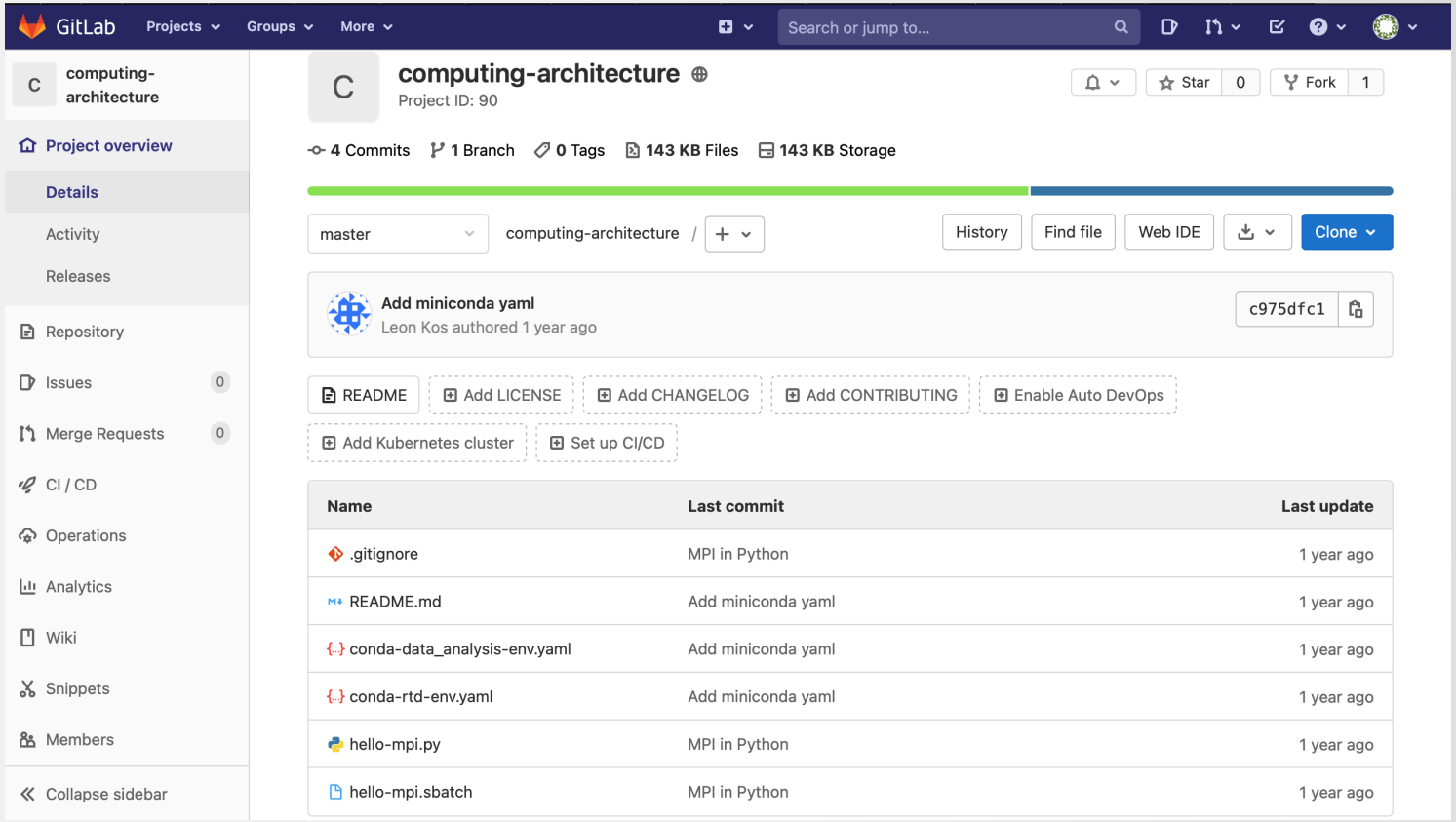
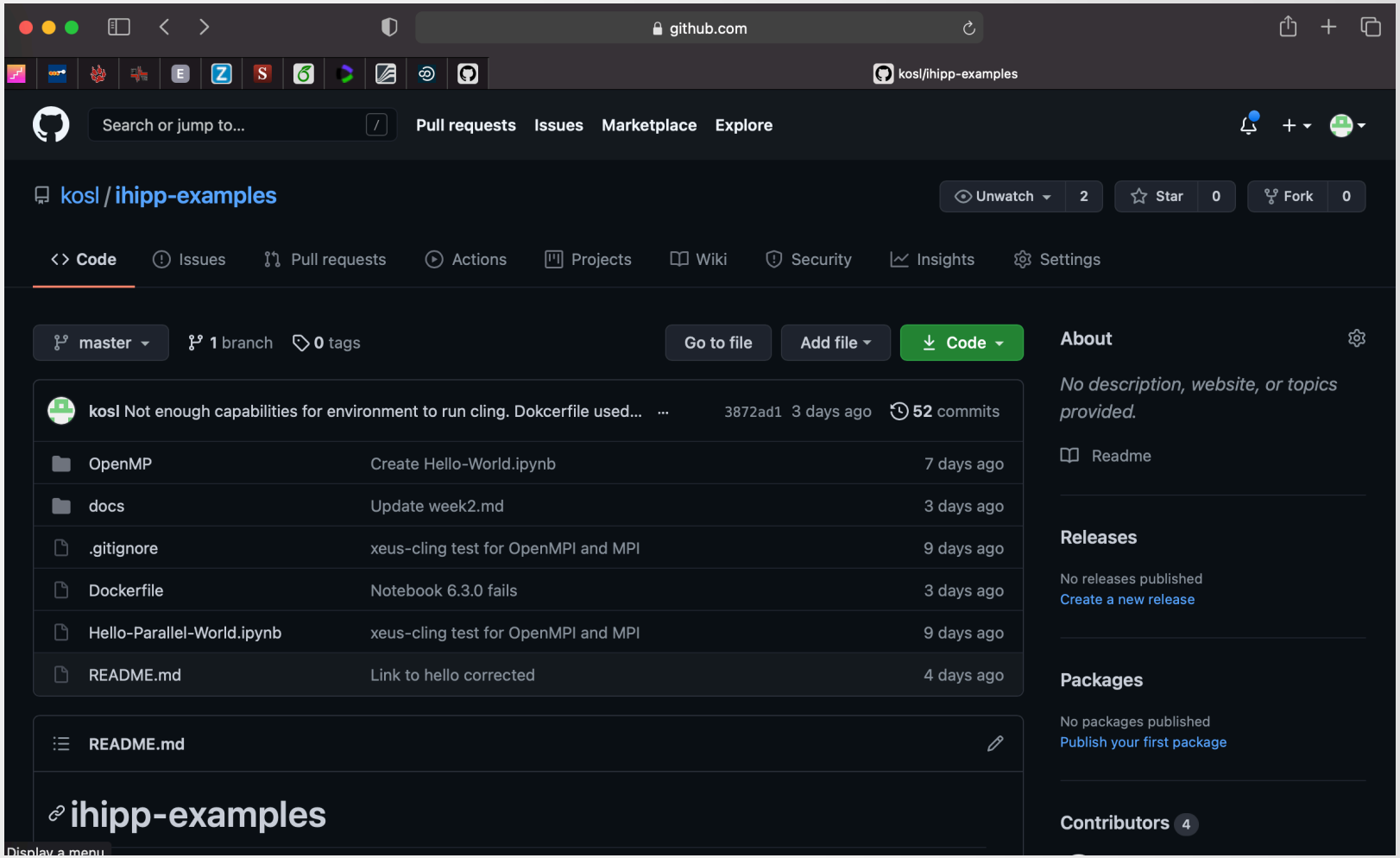
- Good for institutional hosting by deploying Community Edition gitlab.com/gitlab-org/gitlab
- Not that open anymore (Free trials) https://gitlab.com/explore
- Integrated Wiki, Snippets, Analytics
- Continous Integration with Kubernetes
- Demo of projects at https://gitlab.eudat.eu/eudat-prace-2019



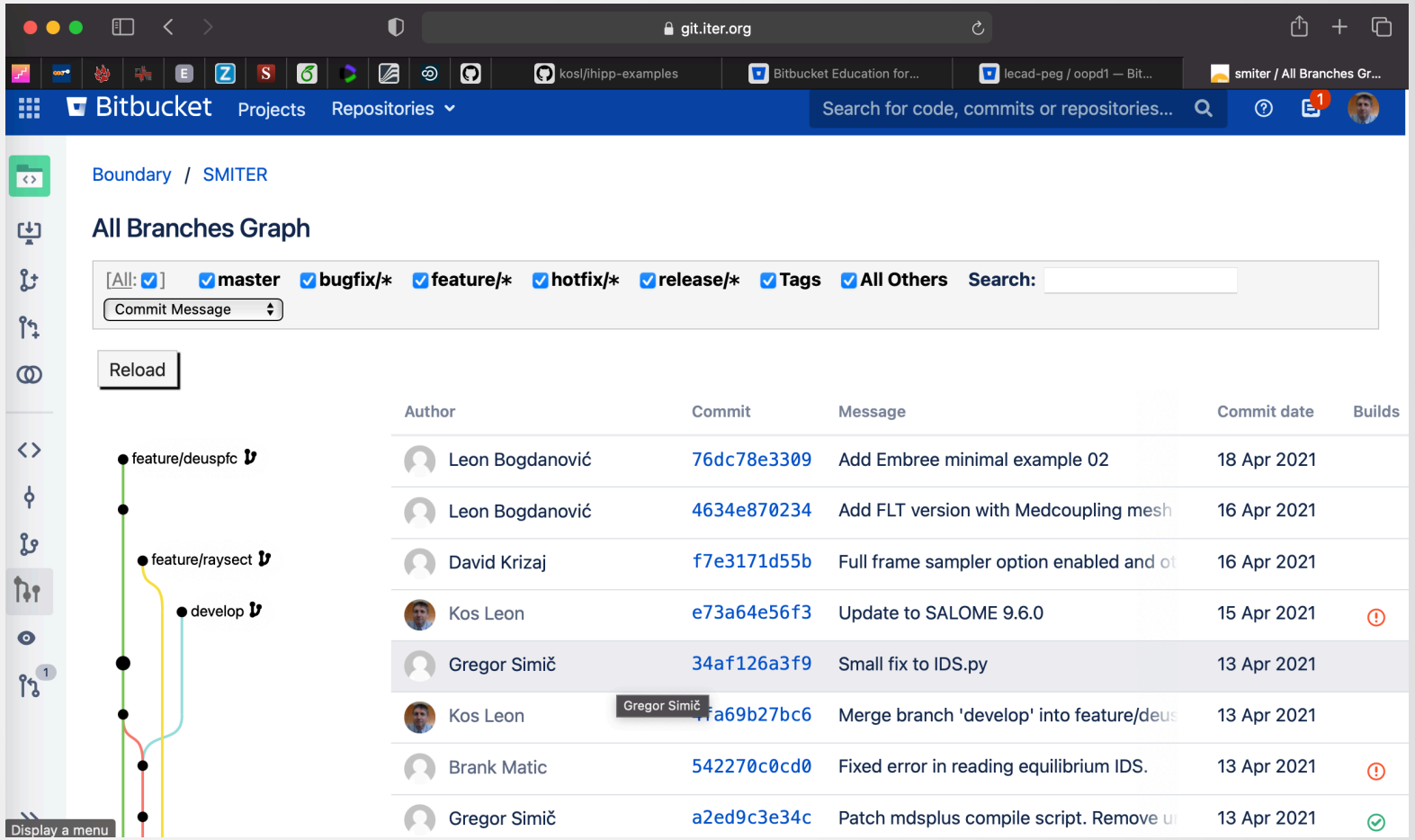
Github

- Open source hosting friendly (e.g. https://github.com/torvalds/linux)
- Integration to many other websites (Overleaf, Binder, CIrcleCI, …)
- Private repositories, Gists
- Not that great interface
- Many source code rendering and integrated editors
- Github desktop for beginners
- *.githhub.io websites
- Actions
- Demo of project at https://github.com/kosl/ihipp-examples



Bitbucket

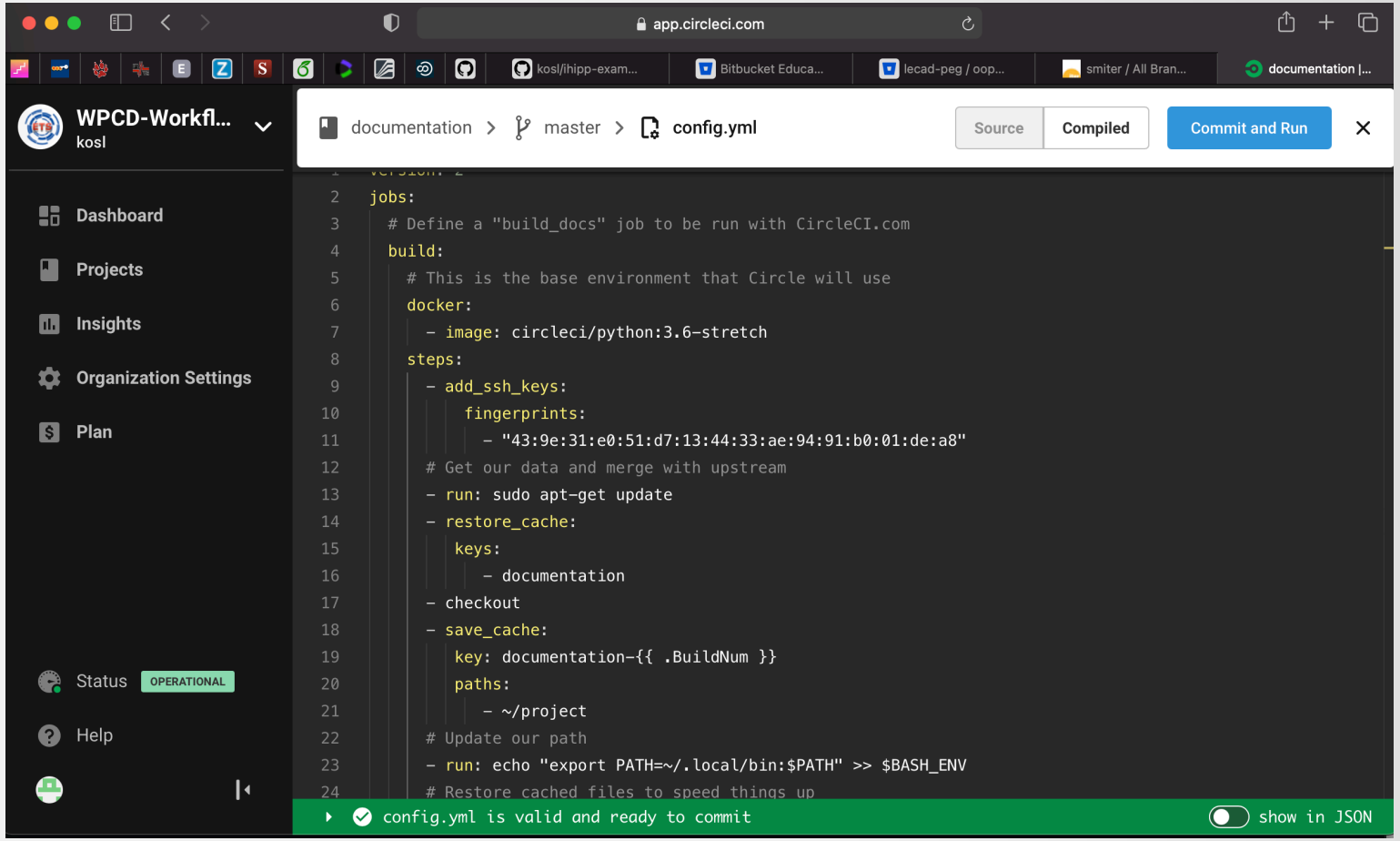
- Commercial hosting only
- Form 2024 only as cloud offering
- Great Web based integration (Confluence tools, Stash, Jira, Bamboo, Servicedesk, …)
- Free for academic hosting https://bitbucket.org/product/education Private repositories
- Limited source code rendering and integrated editors
- Demo of the project at https://bitbucket.org/lecad-peg/oopd1/
- Demo of Bamboo CI agent



Continous Integration (Circle CI)

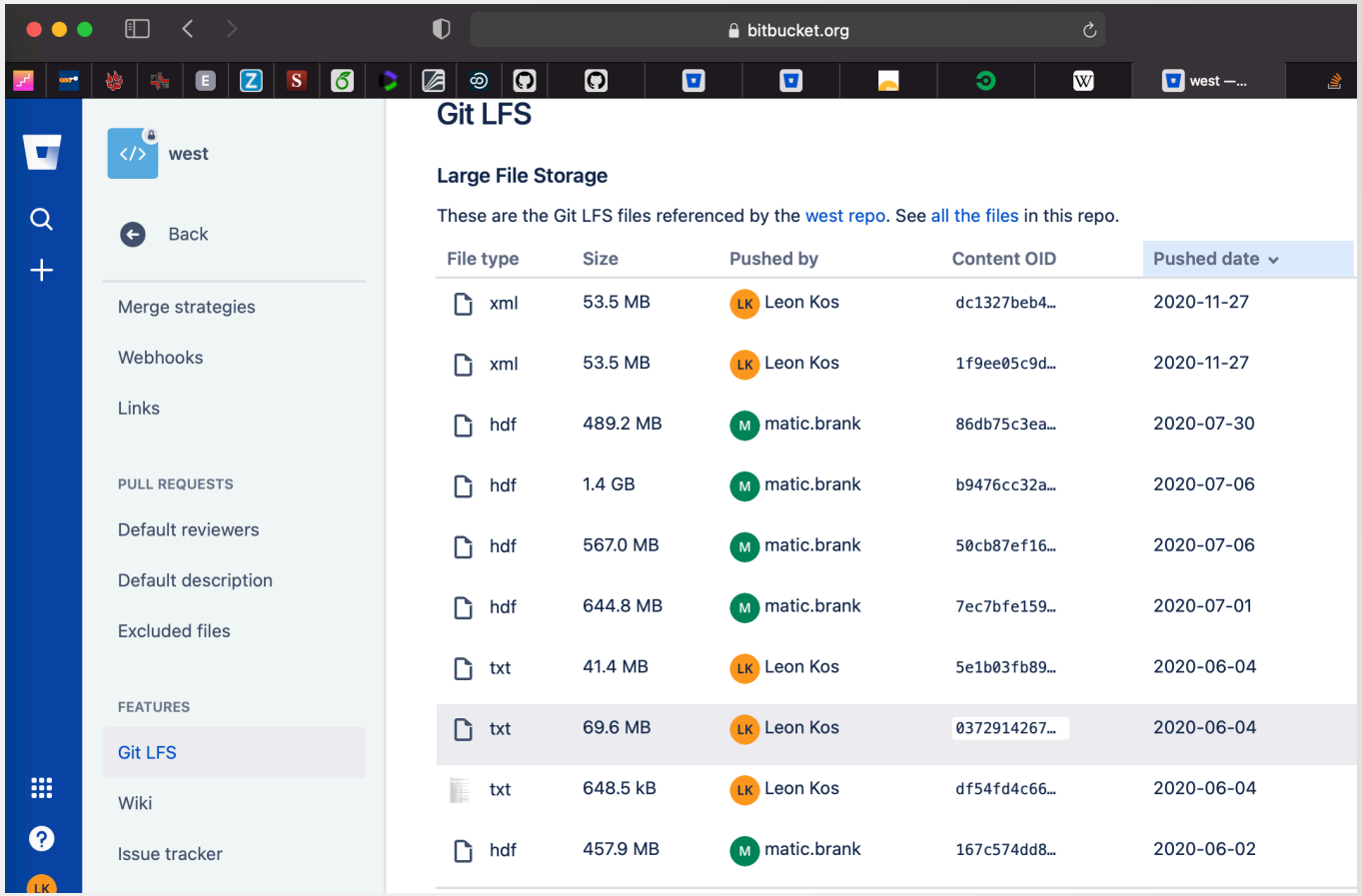
- Testing and building automatism
  - Testing on different compilers and platforms
  - Build Releases
  - Documentation
- Free minutes can be exausted unless caches are used for rebuild

Demo of CircleCI https://app.circleci.com/projects/github/WPCD-Workflows/documentation/config/



Git Large File Support (LFS)

- Install from https://git-lfs.github.com
  - git lfs install
  - git lfs track "*.stp”
  - git add .gitattributes
  - git lfs pull
- Limited storage size (5GB) on public repositories. Use git filter-repo to remove the objects from the repository.
- No site-wide cache!
  - Increased local storage
  - bandwidth



„Externaldata“ Git LFS support

- External repository to push assets
  - http for public hashes
  - ssh for private repos
- Site-wide cache possible
  - One copy only with symlinks

- Github example https://github.com/WPCD-Workflows/documentation/blob/master/Makefile
- GForge SSH Kerberos example https://gforge-next.eufus.eu/#/project/publicdb/scm/file/Makefile
- SMITER demo

```
# If the asset already exist the we don't want to change its timestamp as
# this may impact other's (re)builds. Therefore MD5 and timestamps needs
# to be backdated in this case.
% : %.md5-stamp
        if test -f $(ASSETDIR)/$(shell cat $^); \
        then touch -r $(ASSETDIR)/$(shell cat $^) -d "-1 minute" $^; \
             touch -r $^ -d "-1 minute" $(patsubst %.md5-stamp, %.md5, $^); \
        else make $(ASSETDIR)/$(shell cat $^); fi
        $(ASSET_LINK) $(ASSETDIR)/$(shell cat $^) $@

%.md5-stamp : %.md5
        cat $^ > $@

% : %.zip
        unzip -q -d $@ $^

# Downloads asset and makes it available to the group for linking to it
$(ASSETDIR)/% :
        if ! test -d $(ASSETDIR); \
           then mkdir -m 3775 -p $(ASSETDIR); \
           if test "x$(ASSETDIR_GROUP)" != "x"; \
                then chgrp $(ASSETDIR_GROUP) $(ASSETDIR); \
           fi; \
        fi
        curl --location --fail --insecure \
                --output $(ASSETDIR)/$(@F) $(EXTERNALDATA)/$(@F)
        if test $$(md5sum $(ASSETDIR)/$(@F)|cut -c 1-32) = $(@F) ; then \
          chmod g+rw $(ASSETDIR)/$(@F);\
        else\
          rm -f $(ASSETDIR)/$(@F); \
          echo "Error: Checksum of $(ASSETDIR)/$(@F) incorrect! Removing it.";\
          exit 1;\
        fi
```

Restructured text with Sphinx

- Repository should version
  - Source Code
  - Large data
  - Documentation
- Data provenance
- Containers?
- Binder?

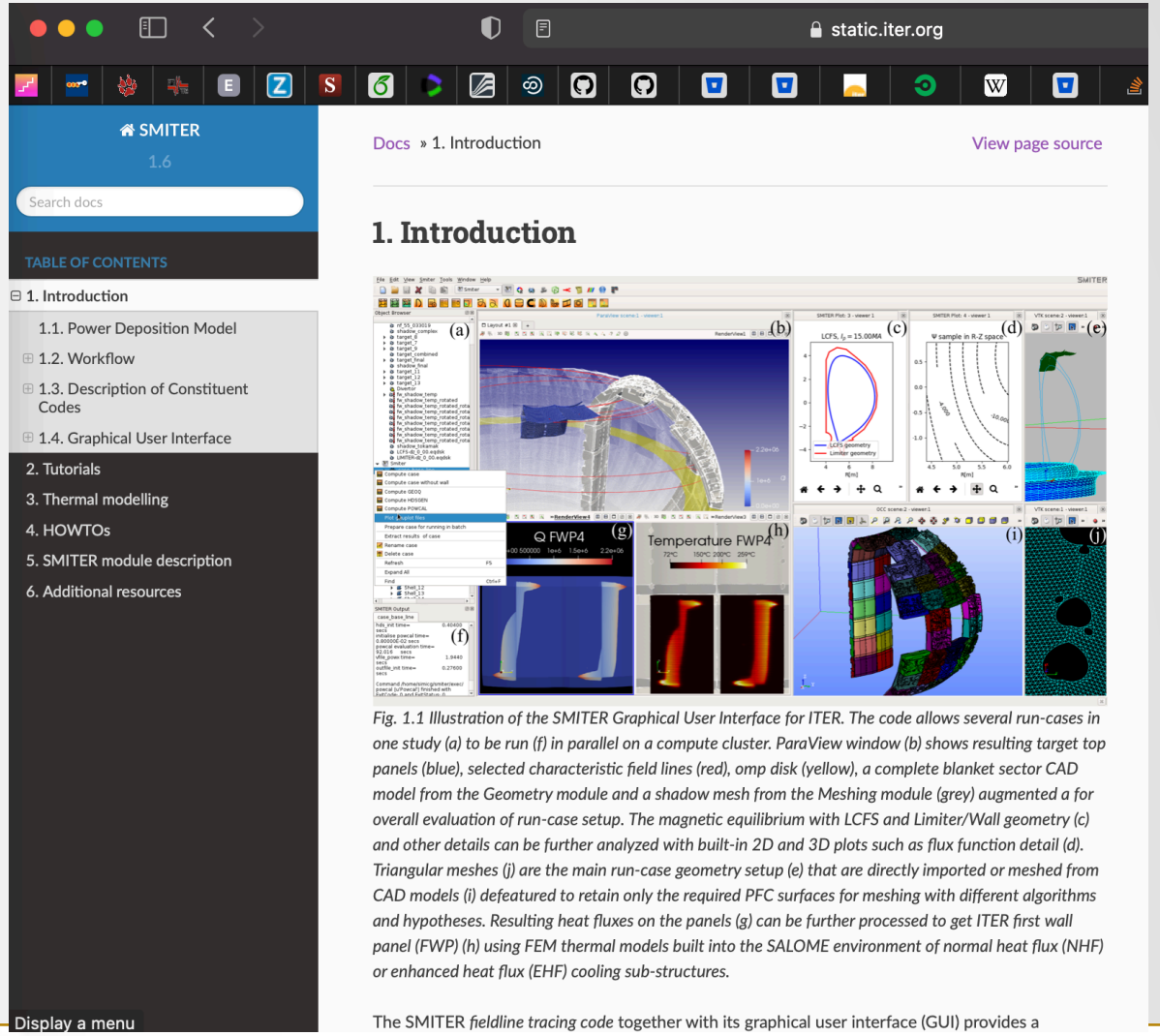


Fig. 1.1 Illustration of the SMITER Graphical User Interface for ITER. The code allows several run-cases in one study (a) to be run (f) in parallel on a compute cluster. ParaView window (b) shows resulting target top panels (blue), selected characteristic field lines (red), omp disk (yellow), a complete blanket sector CAD model from the Geometry module and a shadow mesh from the Meshing module (grey) augmented a for overall evaluation of run-case setup. The magnetic equilibrium with LCFS and Limiter/Wall geometry (c) and other details can be further analyzed with built-in 2D and 3D plots such as flux function detail (d). Triangular meshes (j) are the main run-case geometry setup (e) that are directly imported or meshed from CAD models (i) defeatured to retain only the required PFC surfaces for meshing with different algorithms and hypotheses. Resulting heat fluxes on the panels (g) can be further processed to get ITER first wall panel (FWP) (h) using FEM thermal models built into the SALOME environment of normal heat flux (NHF) or enhanced heat flux (EHF) cooling sub-structures.

The SMITER *fieldline tracing code* together with its graphical user interface (GUI) provides a

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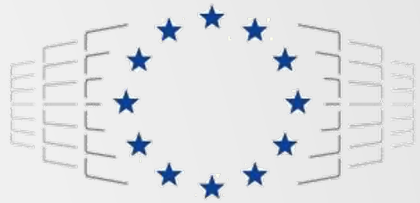
Thanks!



EuroHPC
Joint Undertaking

This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 951732. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Germany, Bulgaria, Austria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Sweden, United Kingdom, France, Netherlands, Belgium, Luxembourg, Slovakia, Norway, Switzerland, Turkey, Republic of North Macedonia, Iceland, Montenegro