Database Systems on Modern CPU Architectures

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Chair for Database Systems

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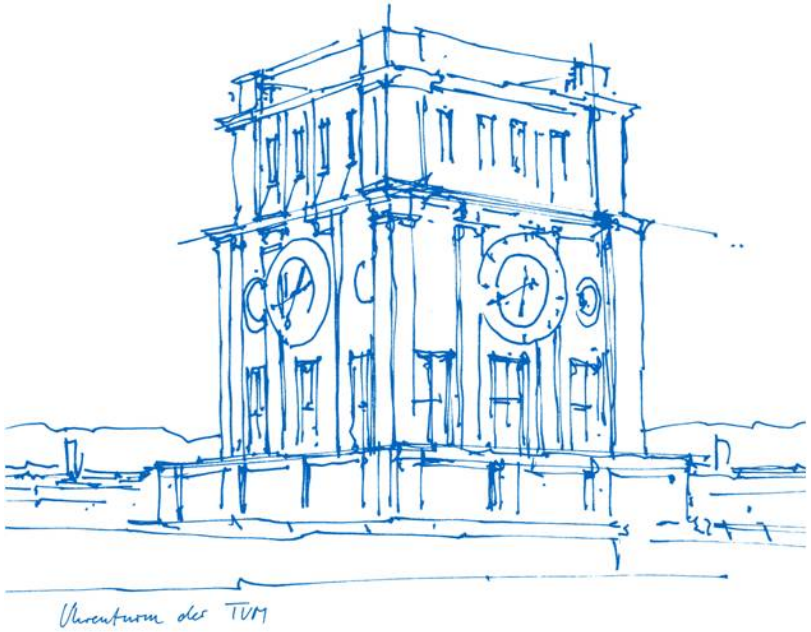
kohna@in.tum.de



Organisation

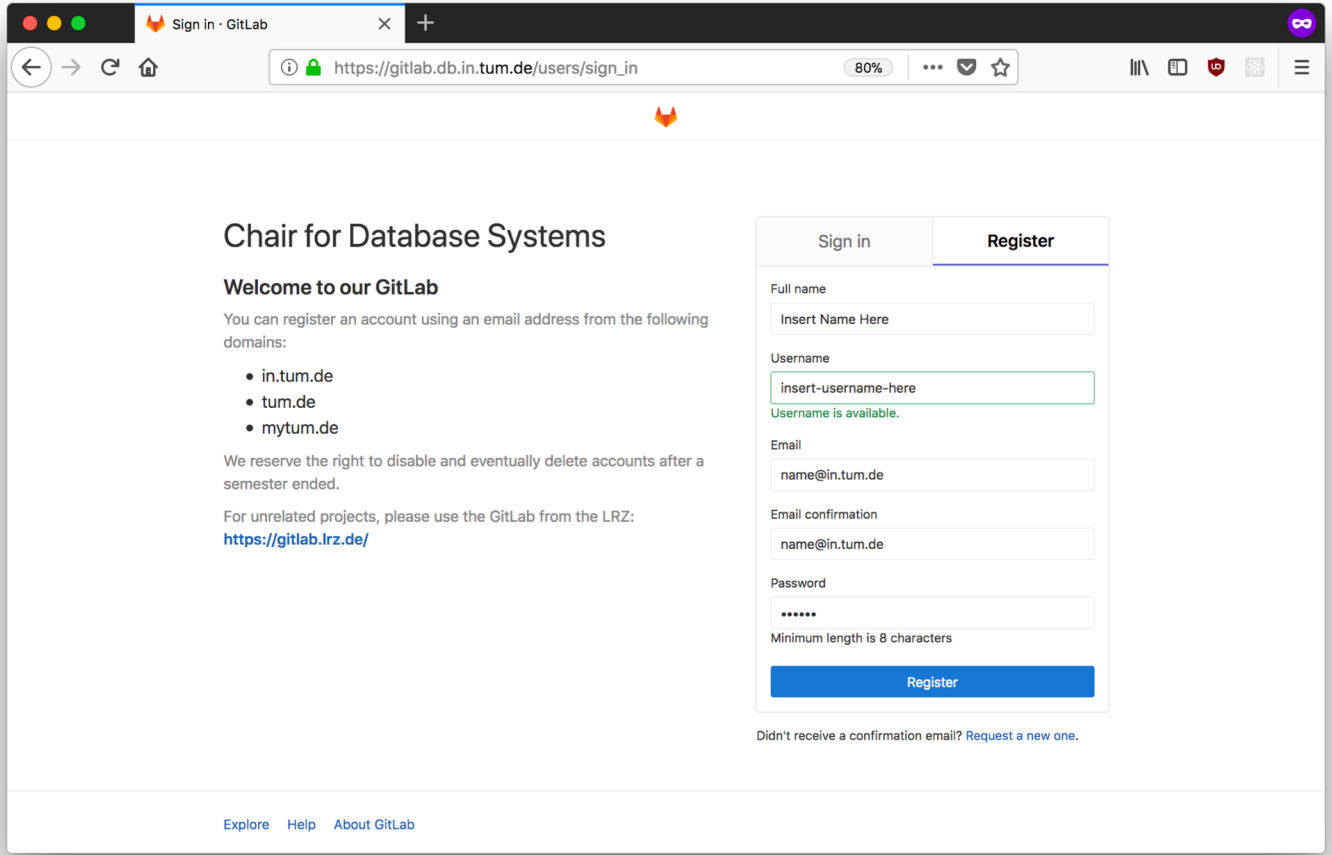
- Lecture + Tutorial: Tuesdays from 14:00 – 17:00. (Next week: C++ crash course)
- Programming assignments every 2 weeks starting now. (probably 7)
- Announcements on the website & **Mattermost**.
- Assignments managed via **GitLab** (**CI**). (Due Tuesdays at 14:00)
- No teams.
- Bonus system:
  - **0.3** / **0.4** grade bonus on final exam. (>= 75% of all points)
  - **+4** points for correct implementation of assignments.
  - **+1** points for code quality per assignment. (>= 1 point for implementation)

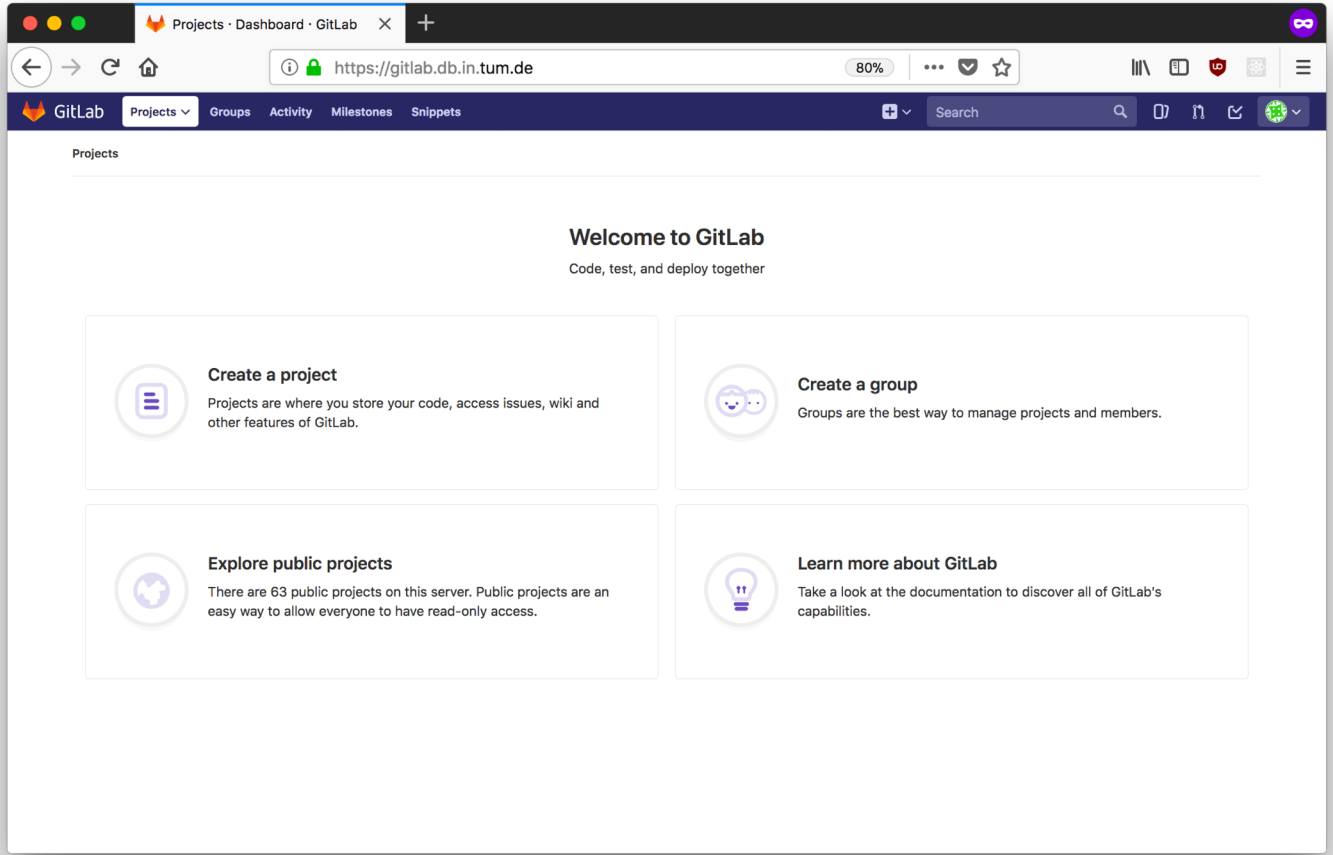
GitLab

Mattermost®

GitLab

Mattermost®


Sign in · GitLab
https://gitlab.db.in.tum.de/users/sign_in
80%
Chair for Database Systems
Welcome to our GitLab
You can register an account using an email address from the following domains:
in.tum.de
tum.de
mytum.de
We reserve the right to disable and eventually delete accounts after a semester ended.
For unrelated projects, please use the GitLab from the LRZ:
https://gitlab.lrz.de/
Sign in
Register
Full name
Insert Name Here
Username
insert-username-here
Username is available.
Email
name@in.tum.de
Email confirmation
name@in.tum.de
Password
Minimum length is 8 characters
Register
Didn't receive a confirmation email? Request a new one.
Explore
Help
About GitLab


Projects · Dashboard · GitLab
https://gitlab.db.in.tum.de
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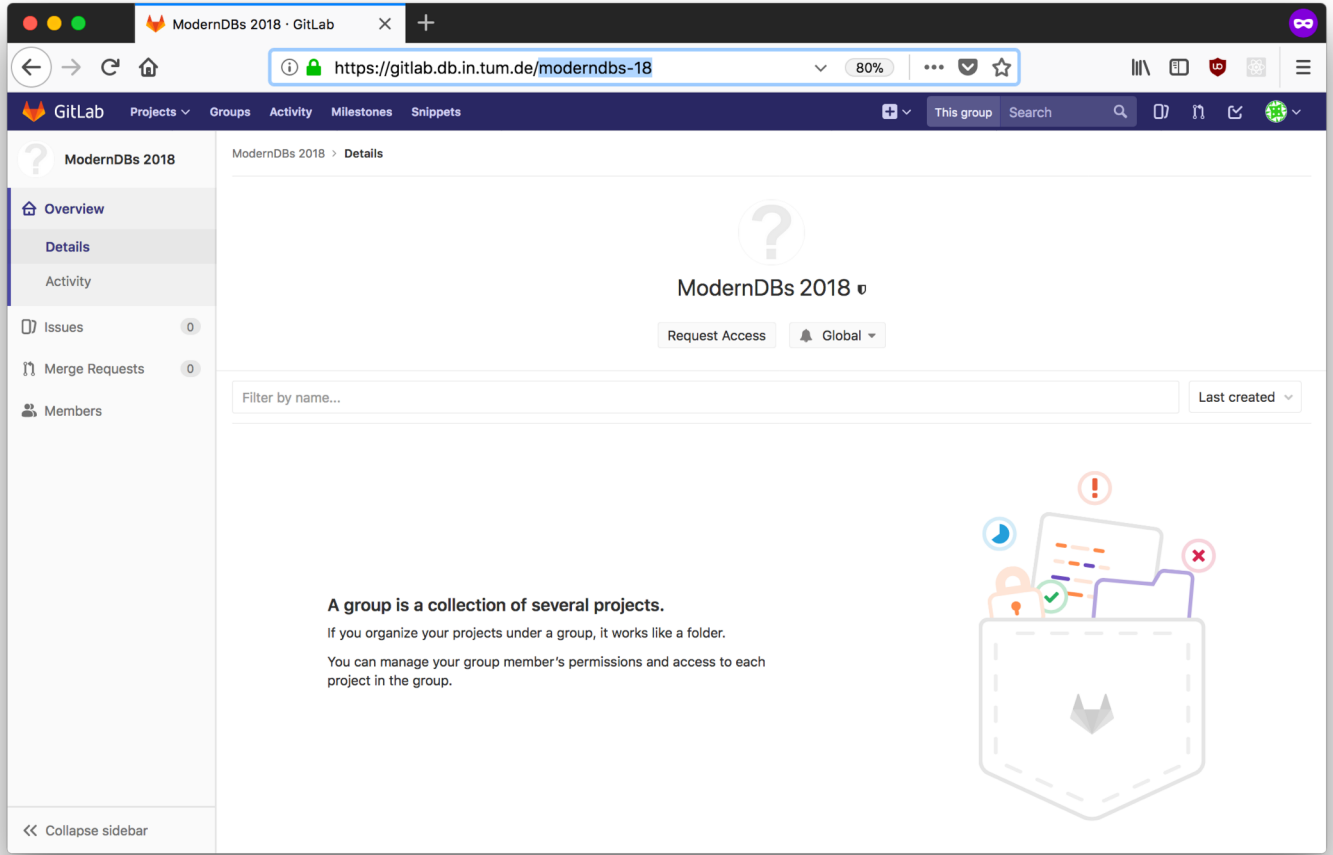
GitLab
Projects
Groups
Activity
Milestones
Snippets
Search
Projects
Welcome to GitLab
Code, test, and deploy together
Create a project
Projects are where you store your code, access issues, wiki and other features of GitLab.
Create a group
Groups are the best way to manage projects and members.
Explore public projects
There are 63 public projects on this server. Public projects are an easy way to allow everyone to have read-only access.
Learn more about GitLab
Take a look at the documentation to discover all of GitLab's capabilities.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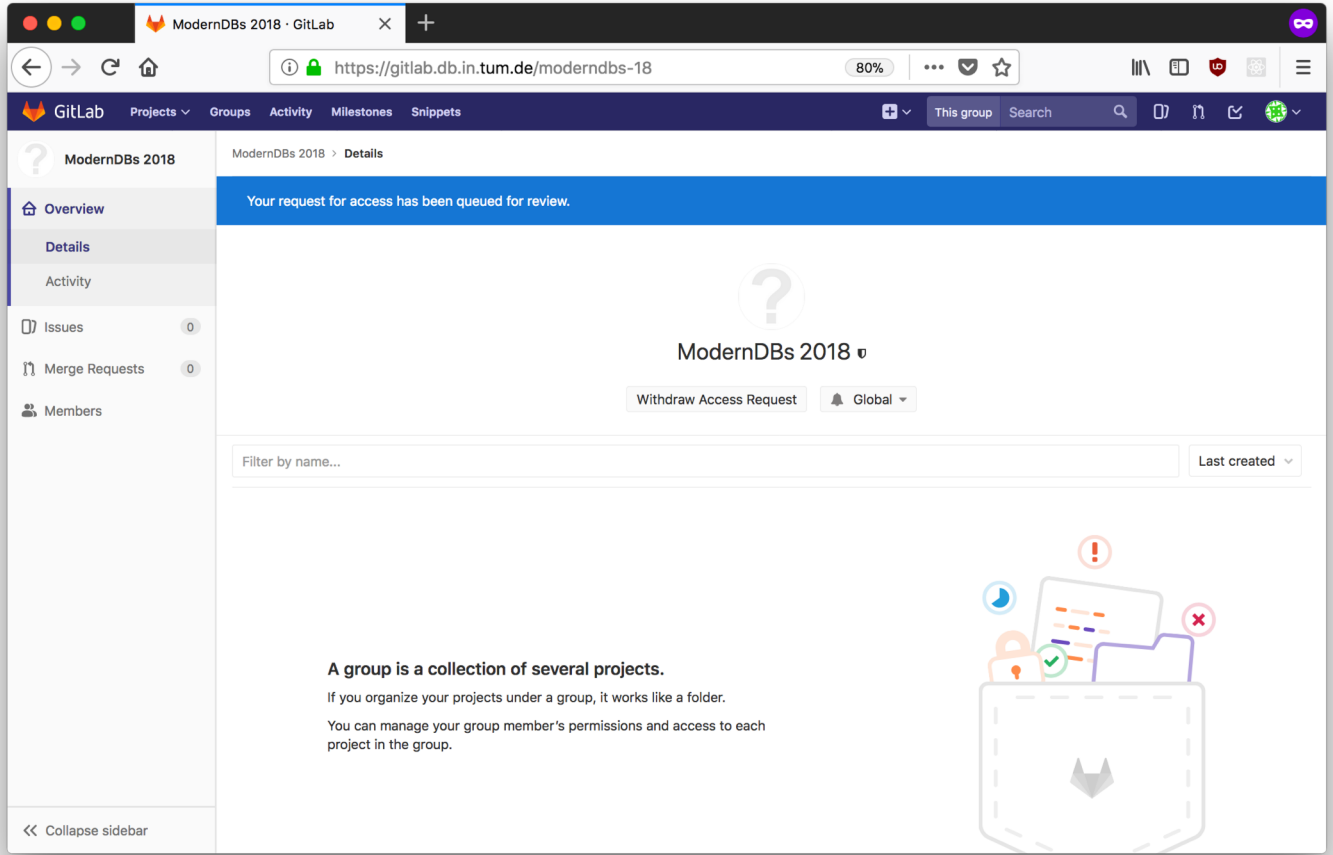
ModernDBs 2018 › Details
ModernDBs 2018
Request Access
Global
Filter by name...
Last created
A group is a collection of several projects.
If you organize your projects under a group, it works like a folder.
You can manage your group member's permissions and access to each project in the group.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Merge Requests 0
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Your request for access has been queued for review.
ModernDBs 2018
Withdraw Access Request
Global
Filter by name...
Last created
A group is a collection of several projects.
If you organize your projects under a group, it works like a folder.
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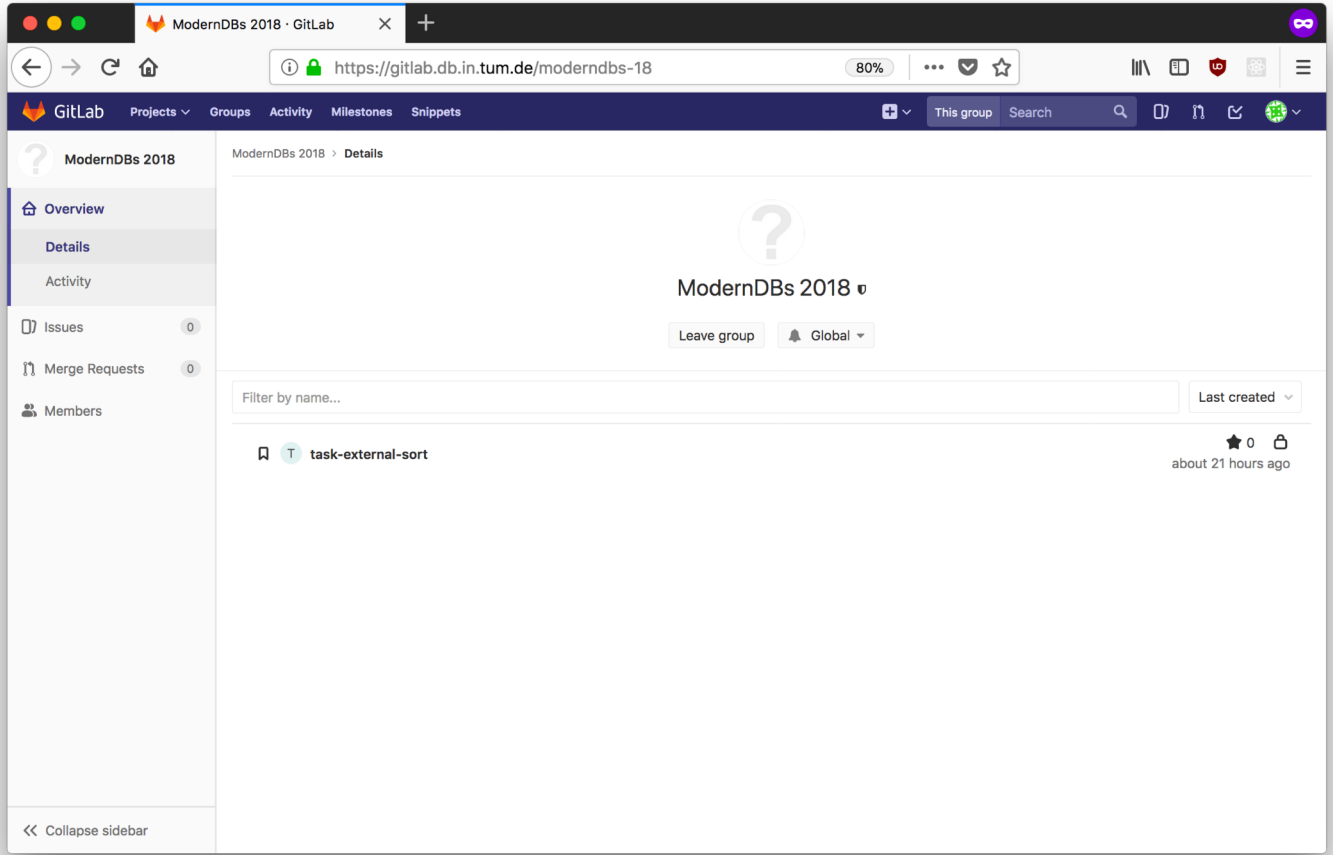
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ModernDBs 2018 › Details
ModernDBs 2018
Leave group
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task-external-sort
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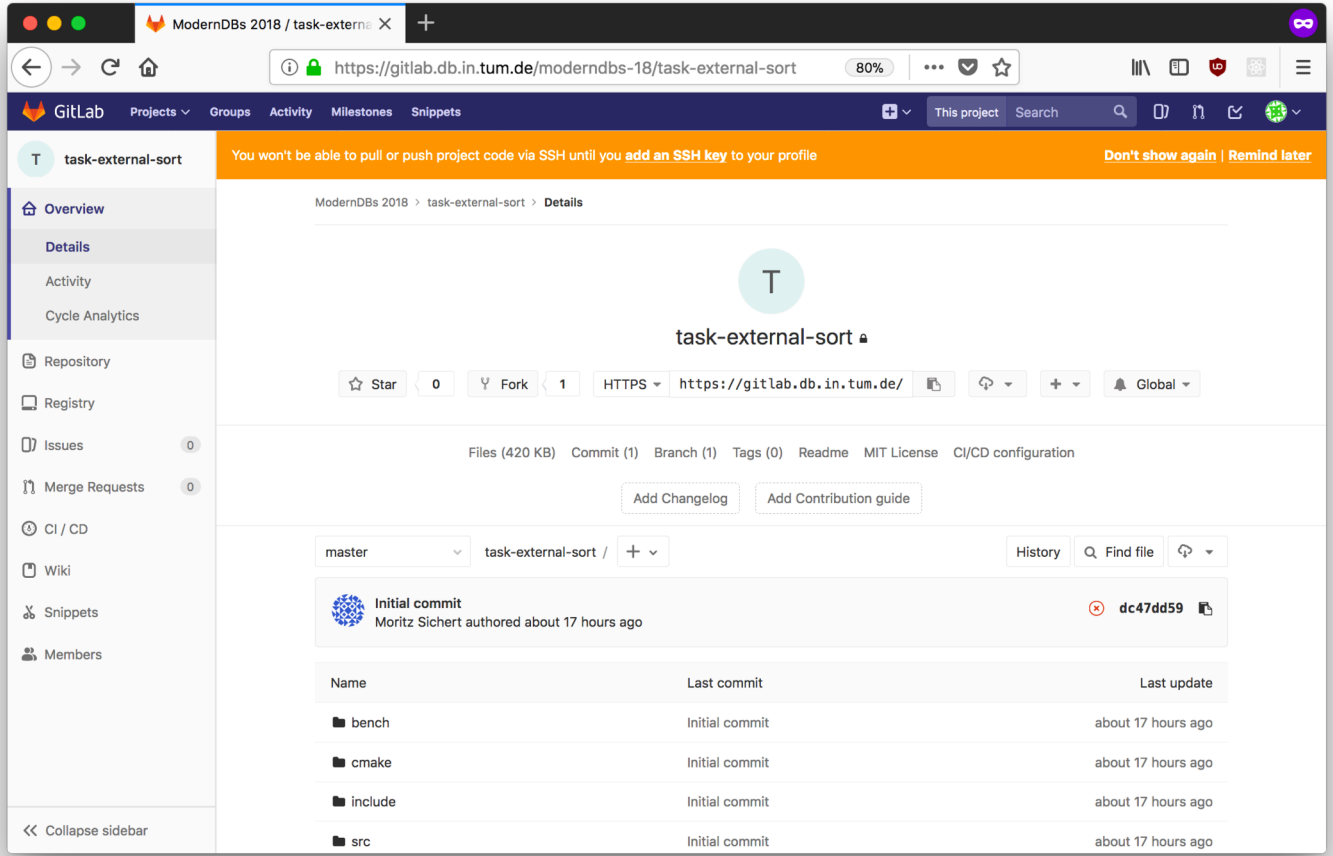
about 21 hours ago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This project
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You won't be able to pull or push project code via SSH until you add an SSH key to your profile
Don't show again | Remind later
Overview
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Fork 1
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Add Changelog
Add Contribution guide
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Find file
Initial commit
Moritz Sichert authored about 17 hours ago
dc47dd59
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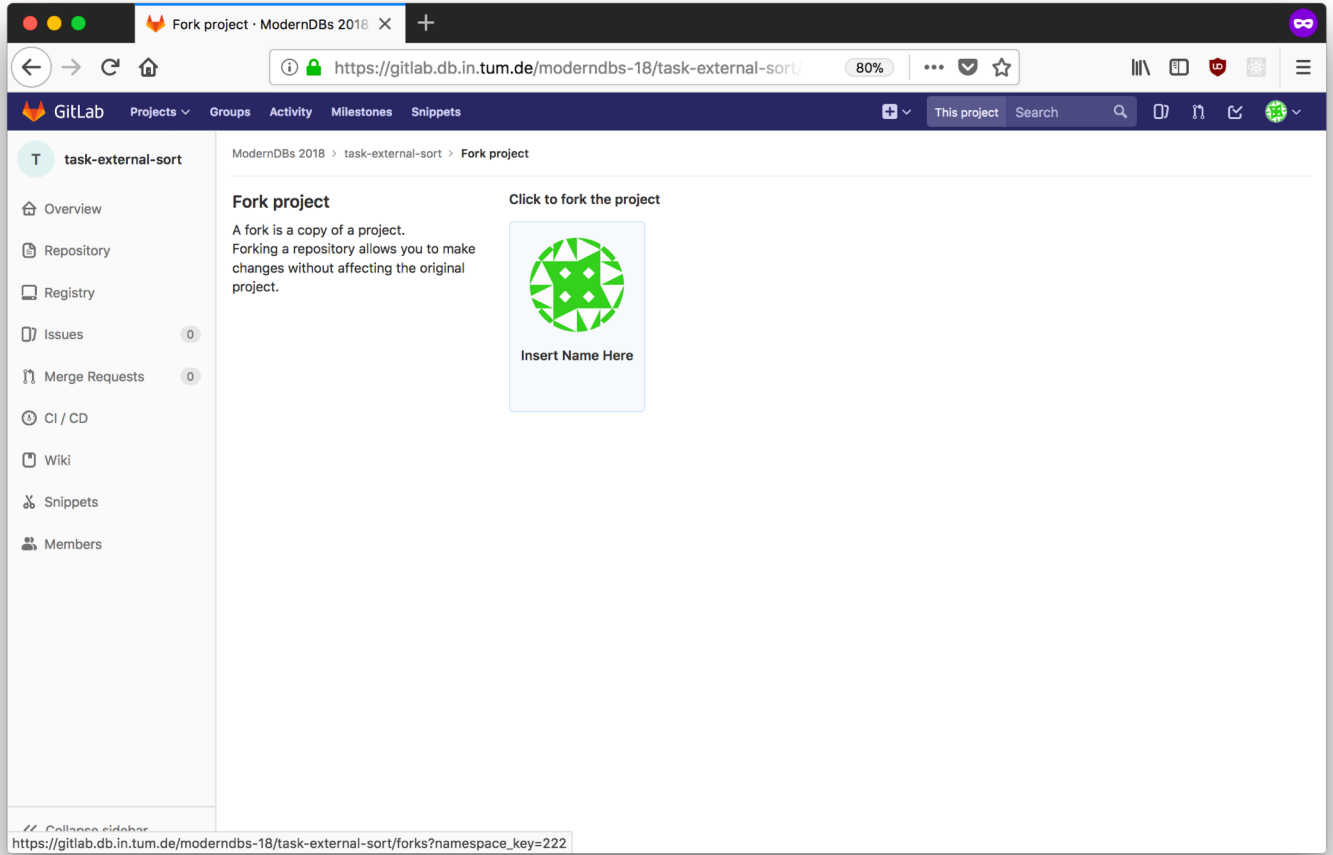
Fork project · ModernDBs 2018
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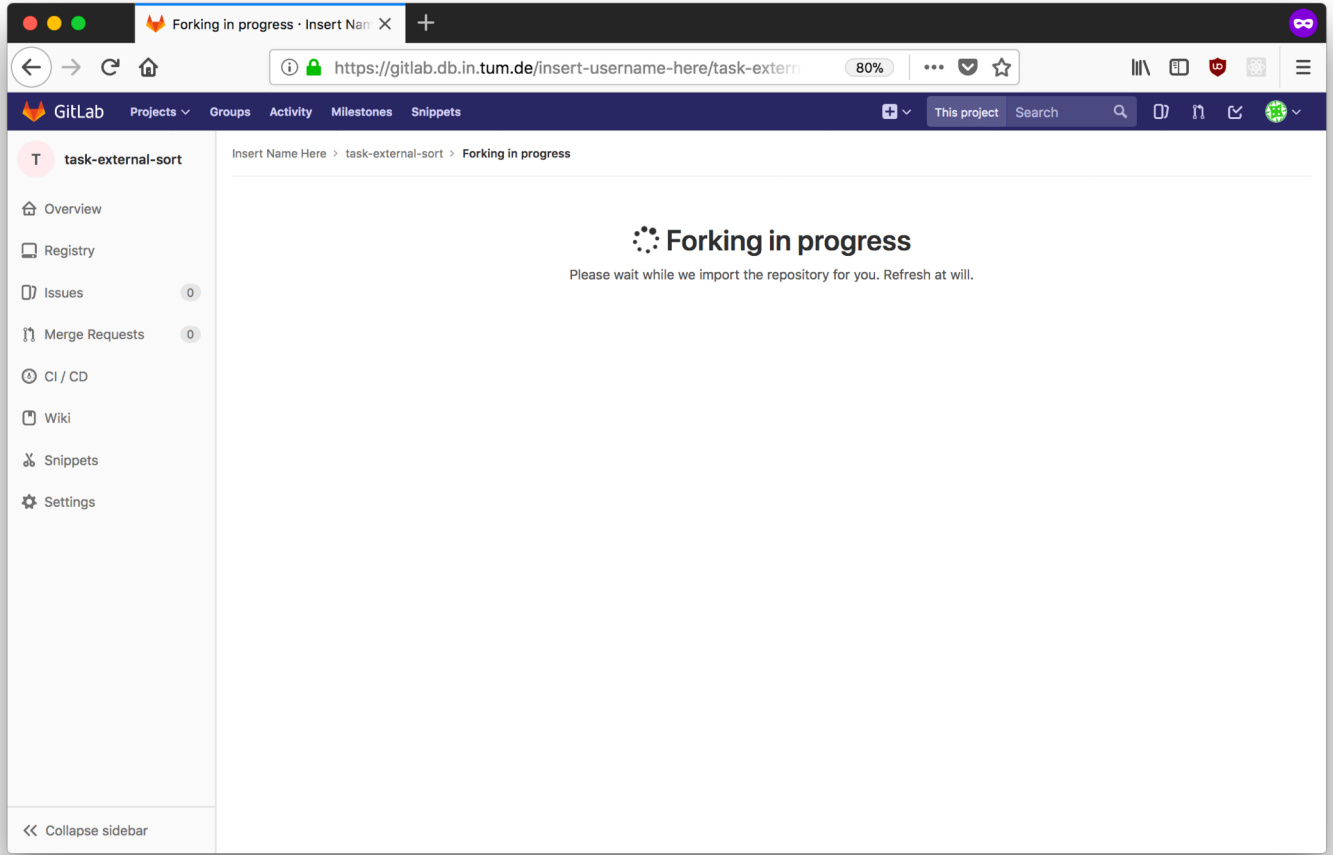
ModernDBs 2018 › task-external-sort › Fork project
Fork project
A fork is a copy of a project.
Forking a repository allows you to make changes without affecting the original project.
Click to fork the project
Insert Name Here
https://gitlab.db.in.tum.de/moderndbs-18/task-external-sort/forks?namespace_key=222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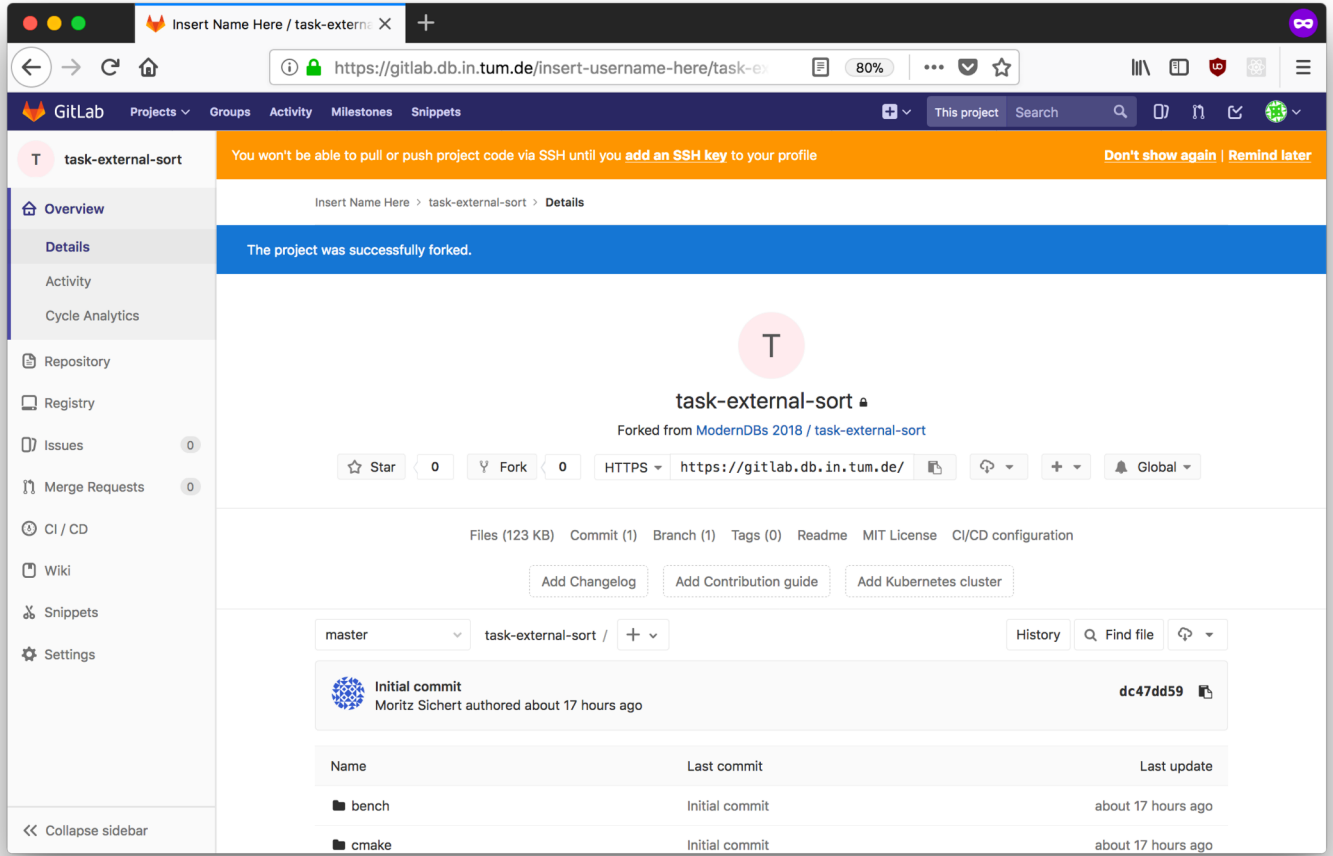
Forking in progress
Please wait while we import the repository for you. Refresh at will.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You won't be able to pull or push project code via SSH until you add an SSH key to your profile
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The project was successfully forked.
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task-external-sort
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Branch (1)
Tags (0)
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Add Changelog
Add Contribution guide
Add Kubernetes cluster
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Moritz Sichert authored about 17 hours ago
dc47dd59
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Last commit
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Initial commit
about 17 hours ago
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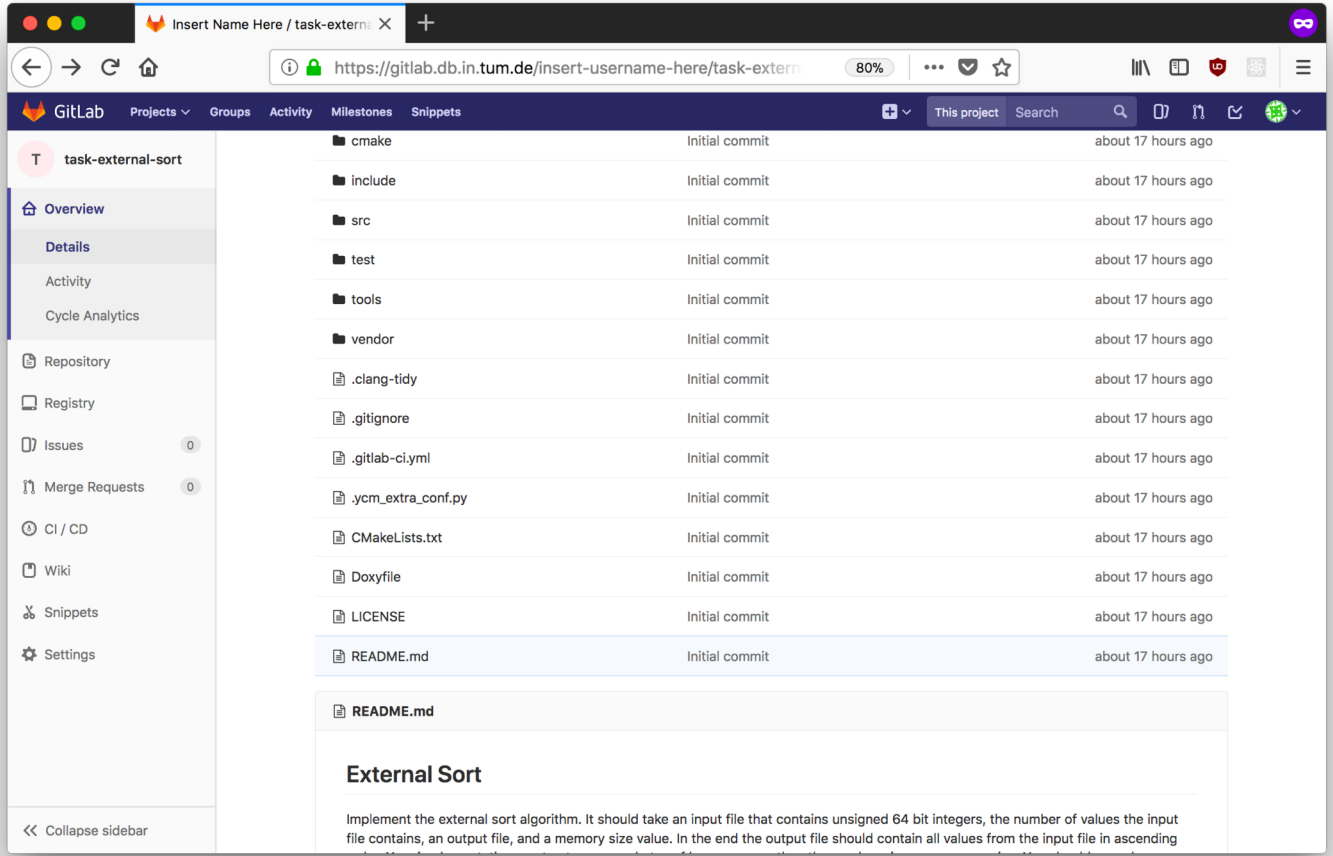
Initial commit
about 17 hours ago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.ycm_extra_conf.py Initial commit about 17 hours ago
CMakeLists.txt Initial commit about 17 hours ago
Doxyfile Initial commit about 17 hours ago
LICENSE Initial commit about 17 hours ago
README.md Initial commit about 17 hours ago
README.md
External Sort
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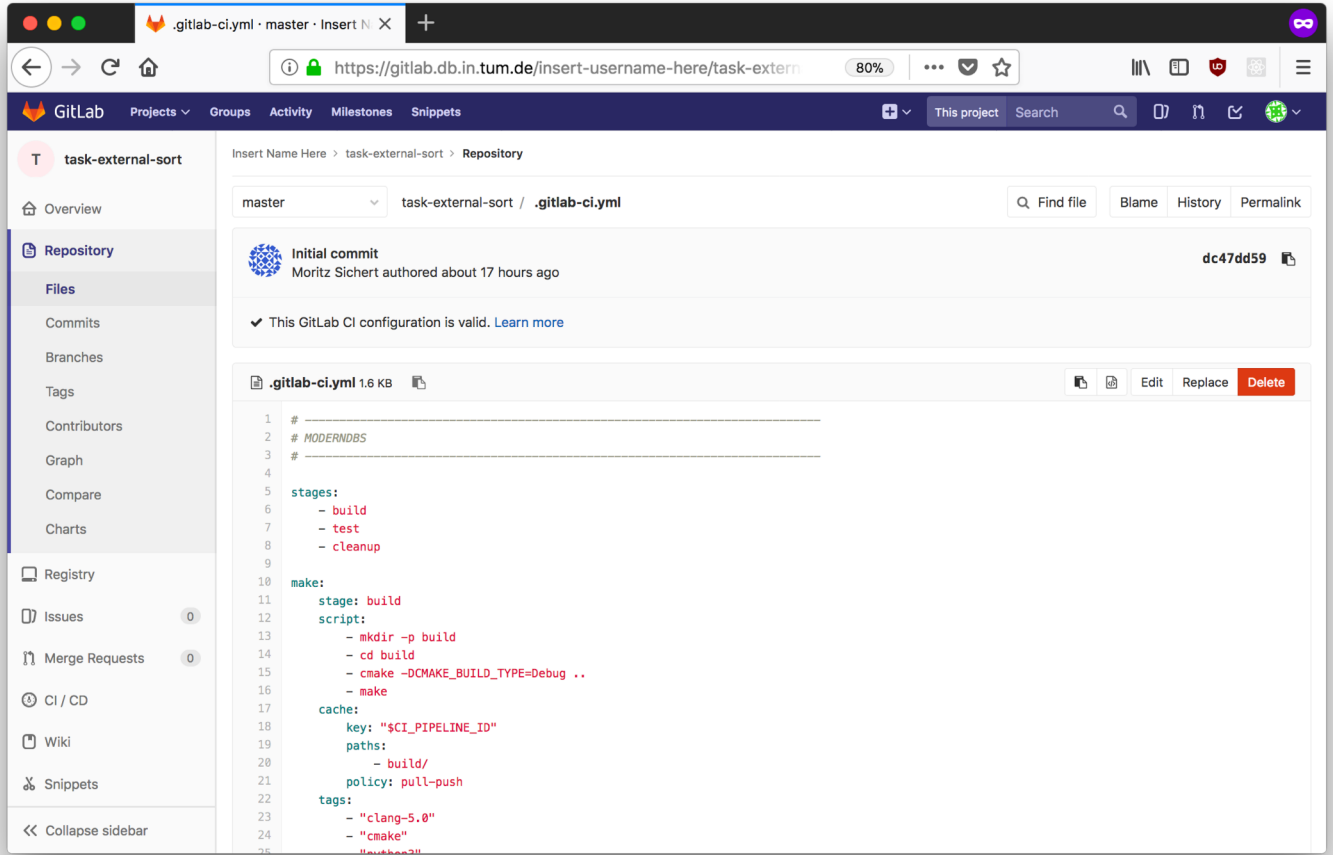
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This GitLab CI configuration is valid. Learn more
.gitlab-ci.yml 1.6 KB
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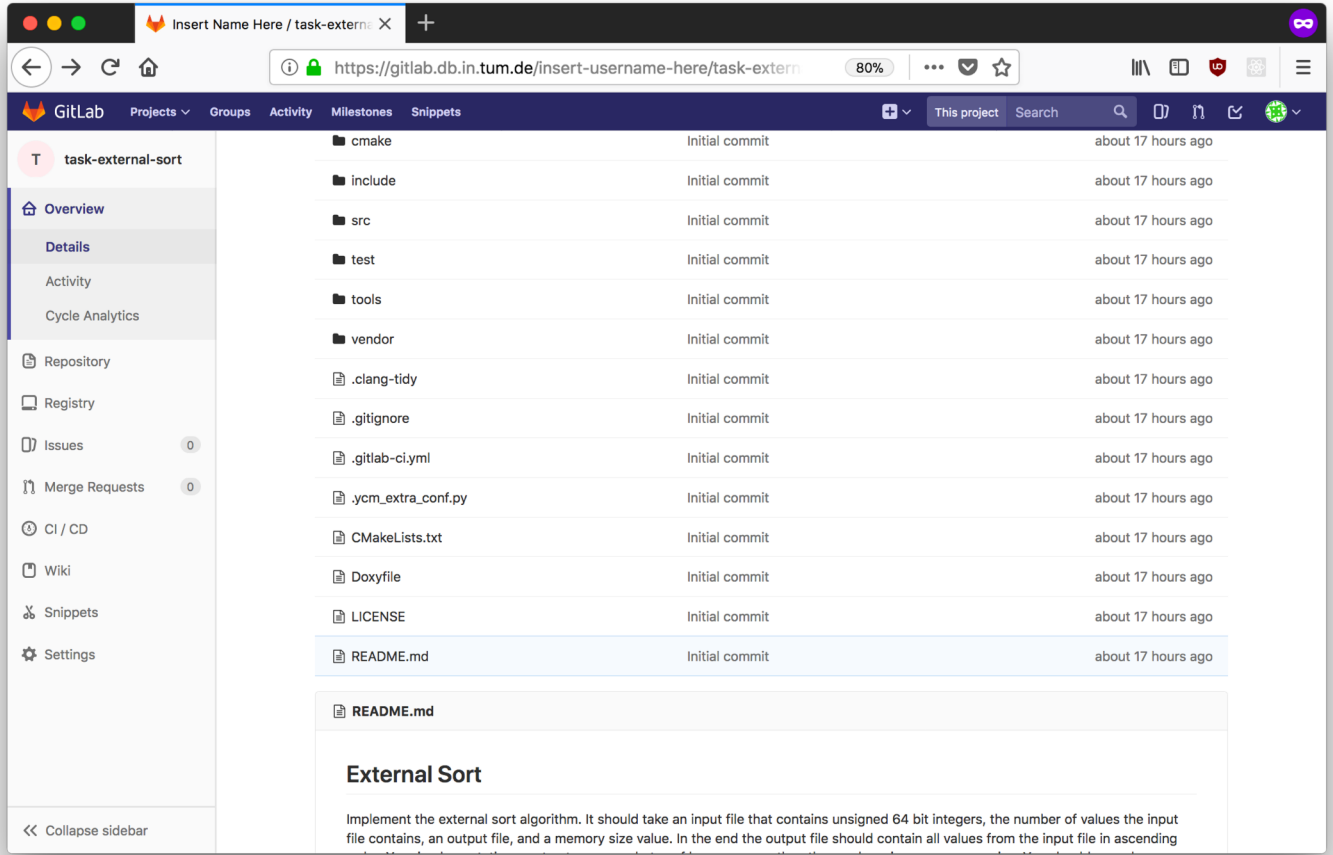
stages:
- build
- test
- cleanup
make:
stage: build
script:
- mkdir -p build
- cd build
- cmake -DCMAKE_BUILD_TYPE=Debug ..
- make
cache:
key: "$CI_PIPELINE_ID"
paths:
- build/
policy: pull-push
tags:
- "clang-5.0"
- "cmake"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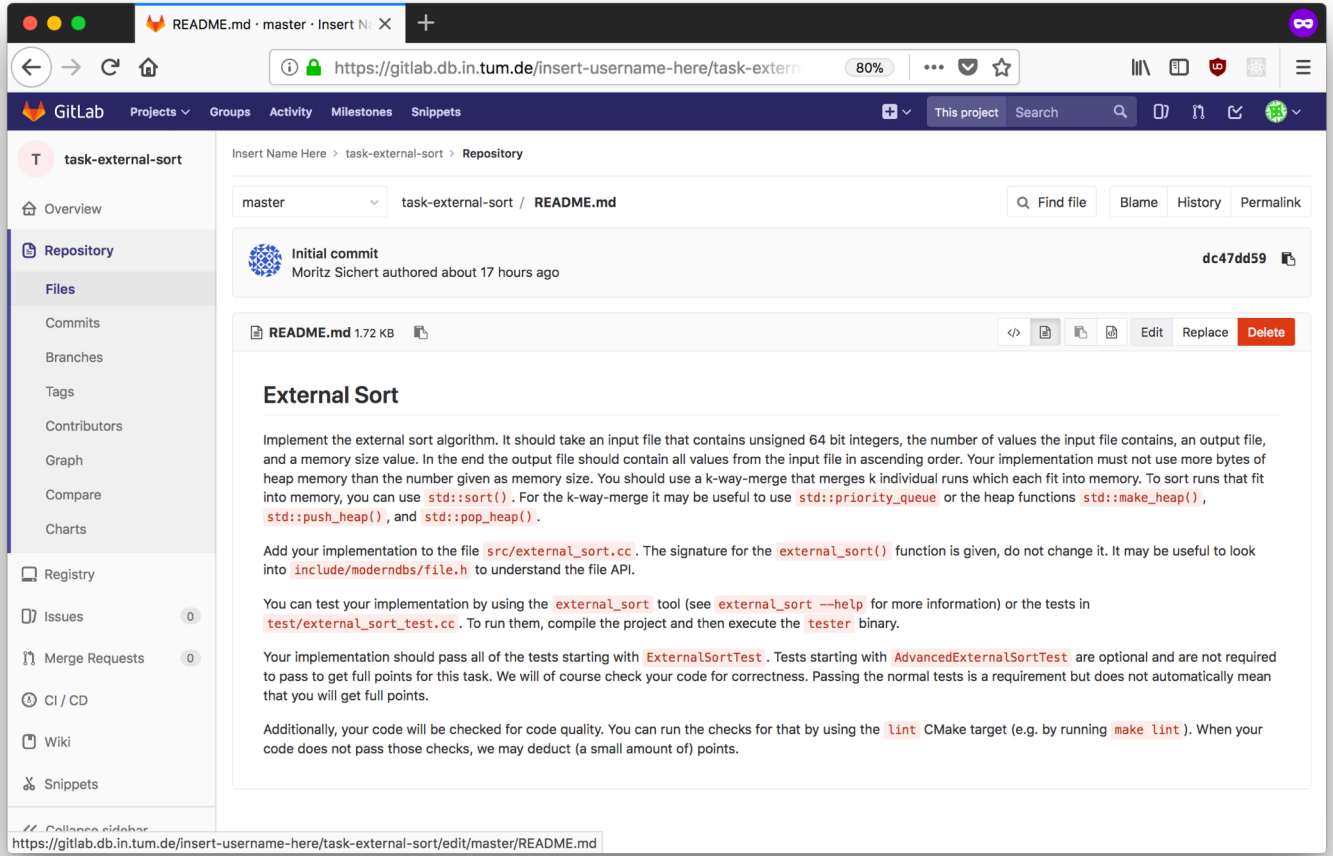
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Insert Name Here › task-external-sort › Repository
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task-external-sort / README.md
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Moritz Sichert authored about 17 hours ago
dc47dd59
README.md 1.72 KB
Edit
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External Sort
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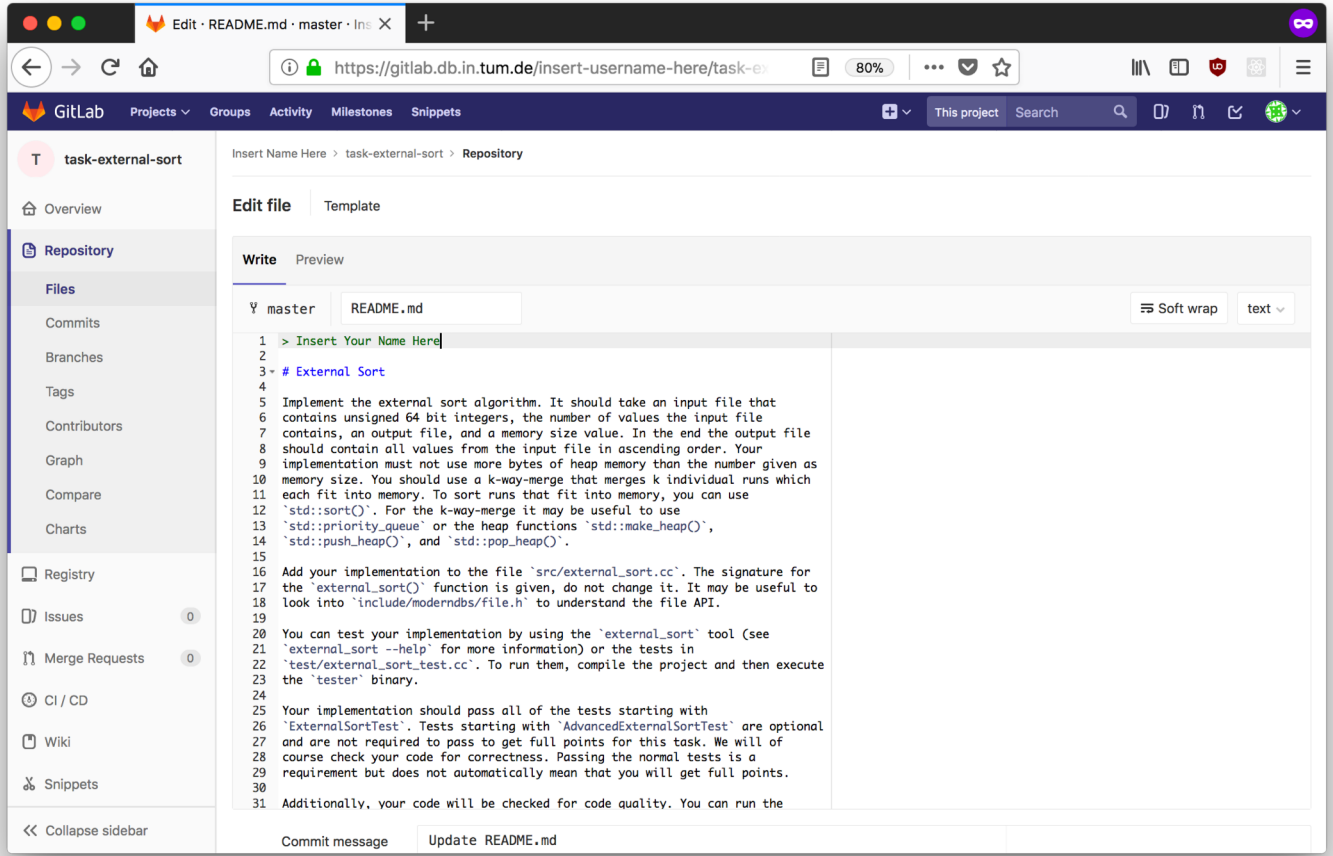
Add your implementation to the file src/external_sort.cc. The signature for the external_sort() function is given, do not change it. It may be useful to look into include/moderndbs/file.h to understand the file API.
You can test your implementation by using the external_sort tool (see external_sort --help for more information) or the tests in test/external_sort_test.cc. To run them, compile the project and then execute the tester binary.
Your implementation should pass all of the tests starting with ExternalSortTest. Tests starting with AdvancedExternalSortTest are optional and are not required to pass to get full points for this task. We will of course check your code for correctness. Passing the normal tests is a requirement but does not automatically mean that you will get full points.
Additionally, your code will be checked for code quality. You can run the checks for that by using the lint CMake target (e.g. by running make lint). When your code does not pass those checks, we may deduct (a small amount of) points.
https://gitlab.db.in.tum.de/insert-username-here/task-external-sort/edit/master/README.md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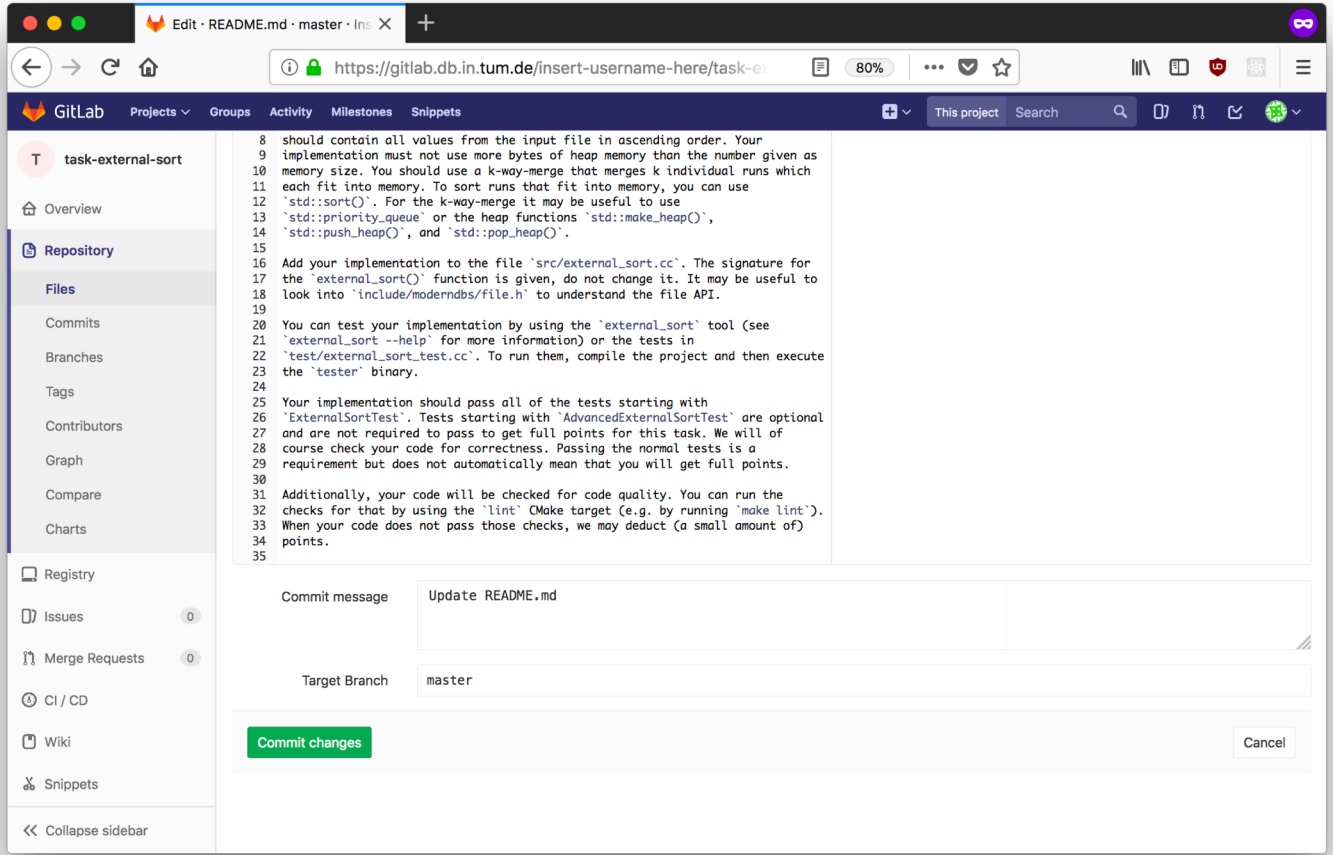
3 # External Sort
4
5 Implement the external sort algorithm. It should take an input file that
6 contains unsigned 64 bit integers, the number of values the input file
7 contains, an output file, and a memory size value. In the end the output file
8 should contain all values from the input file in ascending order. Your
9 implementation must not use more bytes of heap memory than the number given as
10 memory size. You should use a k-way-merge that merges k individual runs which
11 each fit into memory. To sort runs that fit into memory, you can use
12 `std::sort()`. For the k-way-merge it may be useful to use
13 `std::priority_queue` or the heap functions `std::make_heap()`,
14 `std::push_heap()`, and `std::pop_heap()`.
15
16 Add your implementation to the file `src/external_sort.cc`. The signature for
17 the `external_sort()` function is given, do not change it. It may be useful to
18 look into `include/moderndbs/file.h` to understand the file API.
19
20 You can test your implementation by using the `external_sort` tool (see
21 `external_sort --help` for more information) or the tests in
22 `test/external_sort_test.cc`. To run them, compile the project and then execute
23 the `tester` binary.
24
25 Your implementation should pass all of the tests starting with
26 `ExternalSortTest`. Tests starting with `AdvancedExternalSortTest` are optional
27 and are not required to pass to get full points for this task. We will of
28 course check your code for correctness. Passing the normal tests is a
29 requirement but does not automatically mean that you will get full points.
30
31 Additionally, your code will be checked for code quality. You can run the
Commit message
Update README.md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You can test your implementation by using the `external_sort` tool (see `external_sort --help` for more information) or the tests in `test/external_sort_test.cc`. To run them, compile the project and then execute the `tester` binary.
Your implementation should pass all of the tests starting with `ExternalSortTest`. Tests starting with `AdvancedExternalSortTest` are optional and are not required to pass to get full points for this task. We will of course check your code for correctness. Passing the normal tests is a requirement but does not automatically mean that you will get full points.
Additionally, your code will be checked for code quality. You can run the checks for that by using the `lint` CMake target (e.g. by running `make lint`). When your code does not pass those checks, we may deduct (a small amount of) points.
Commit message
Update README.md
Target Branch
master
Commit changes
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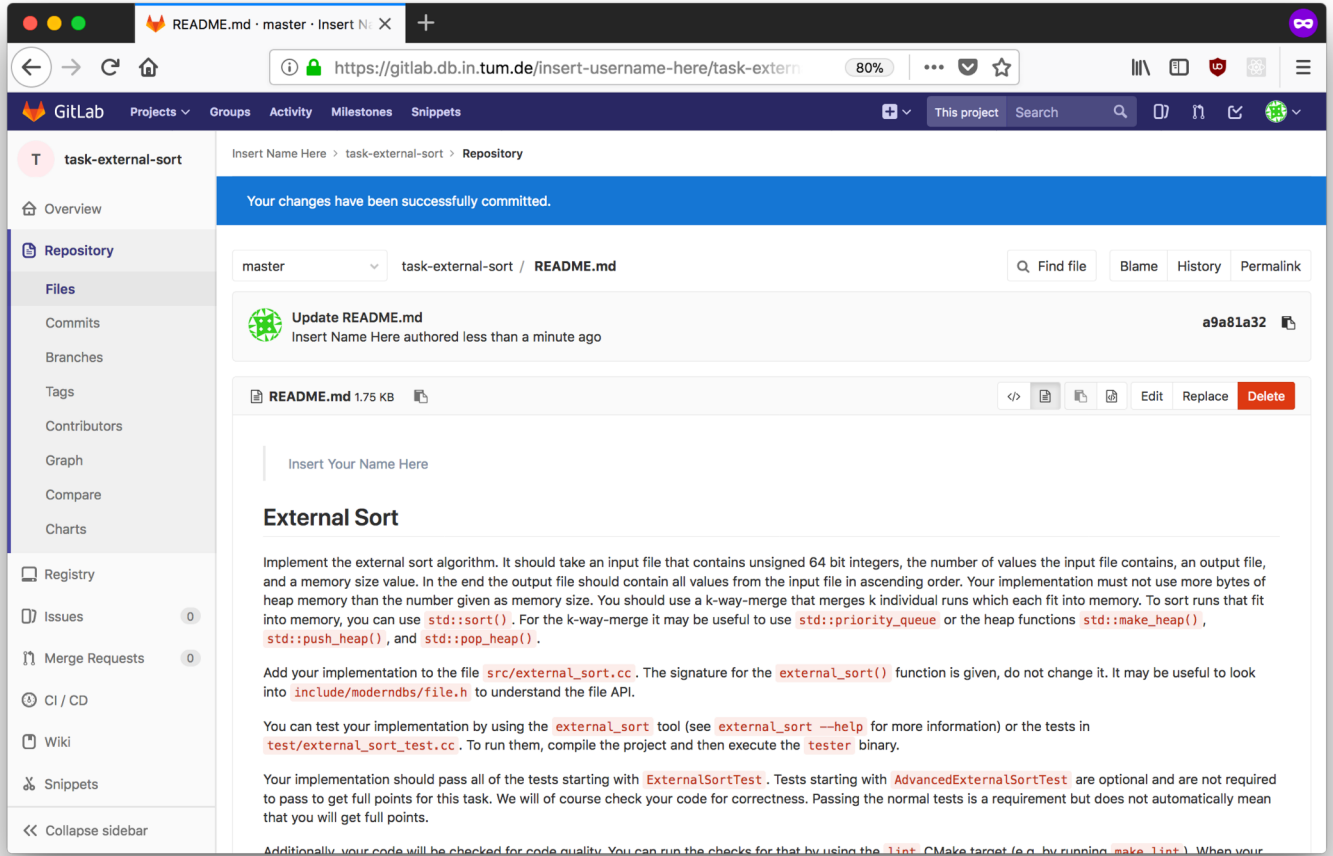
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Insert Name Here › task-external-sort › Repository
Your changes have been successfully committed.
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README.md 1.75 KB
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External Sort
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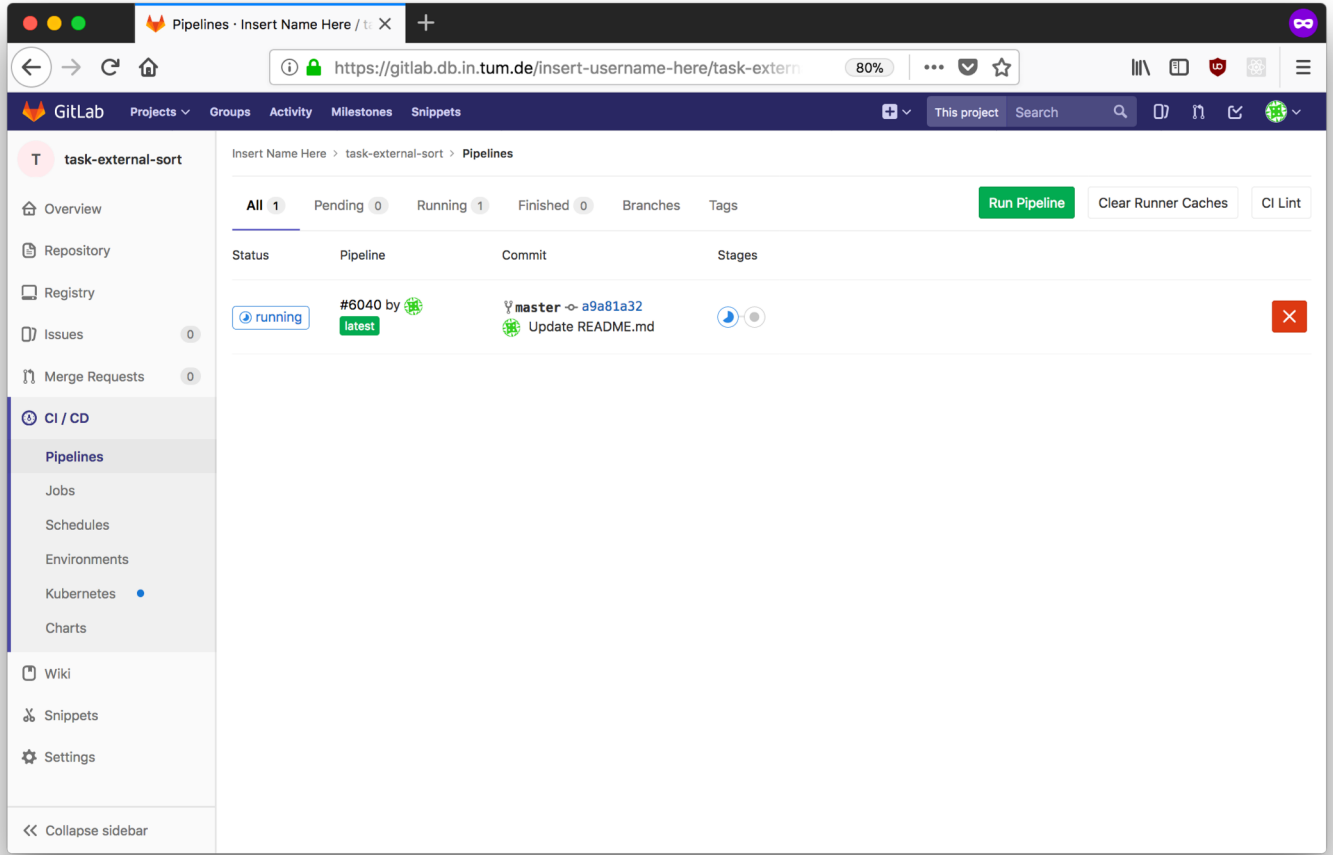
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Overview
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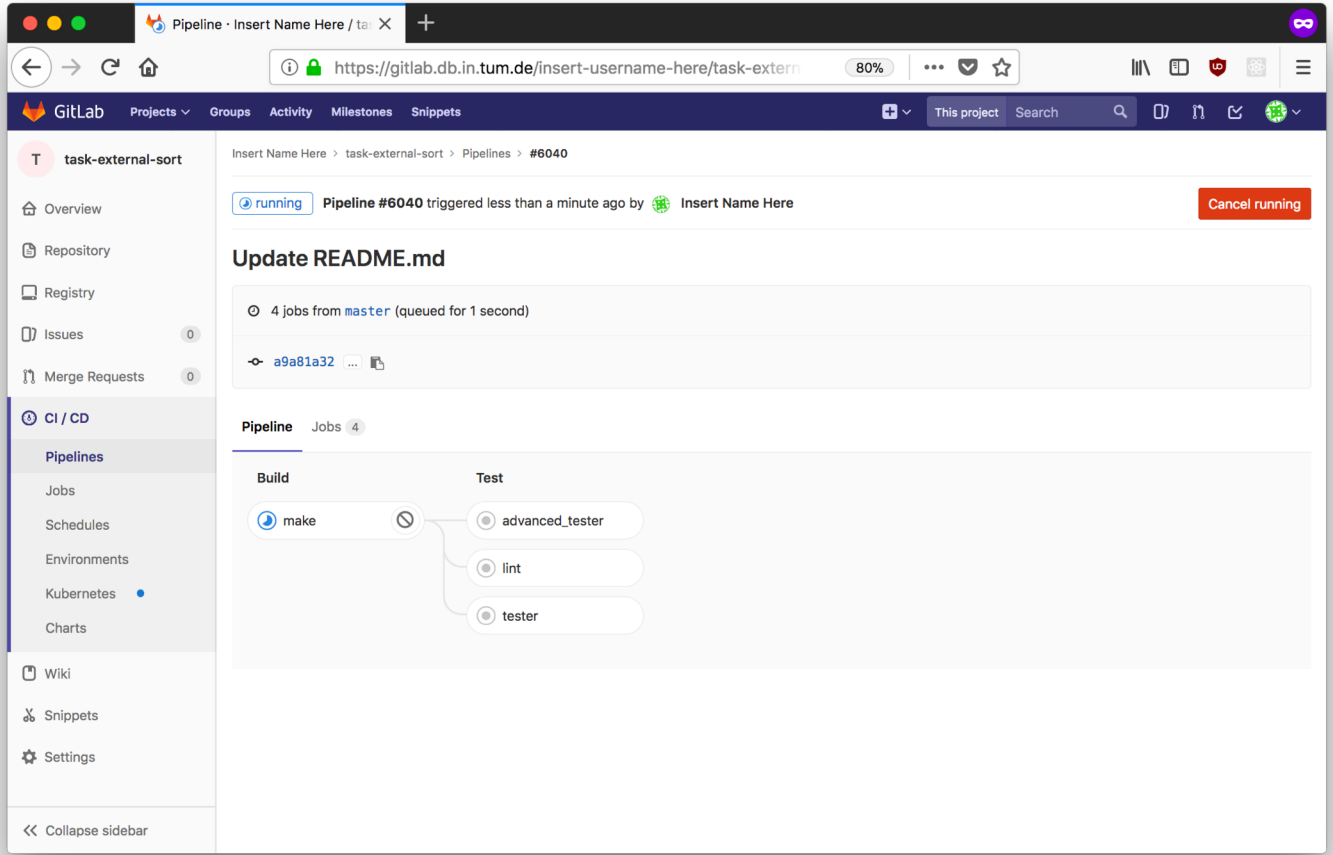
Registry
Issues 0
Merge Requests 0
CI / CD
Pipelines
Jobs
Schedules
Environments
Kubernetes
Charts
Wiki
Snippets
Settings
Collapse sidebar
Insert Name Here › task-external-sort › Pipelines
All 1
Pending 0
Running 1
Finished 0
Branches
Tags
Run Pipeline
Clear Runner Caches
CI Lint
Status
Pipeline
Commit
Stages
running
#6040 by
latest
master a9a81a32
Update README.md


Pipeline · Insert Name Here / ta
https://gitlab.db.in.tum.de/insert-username-here/task-extern
80%
GitLab
Projects
Groups
Activity
Milestones
Snippets
This project
Search
task-external-sort
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Merge Requests 0
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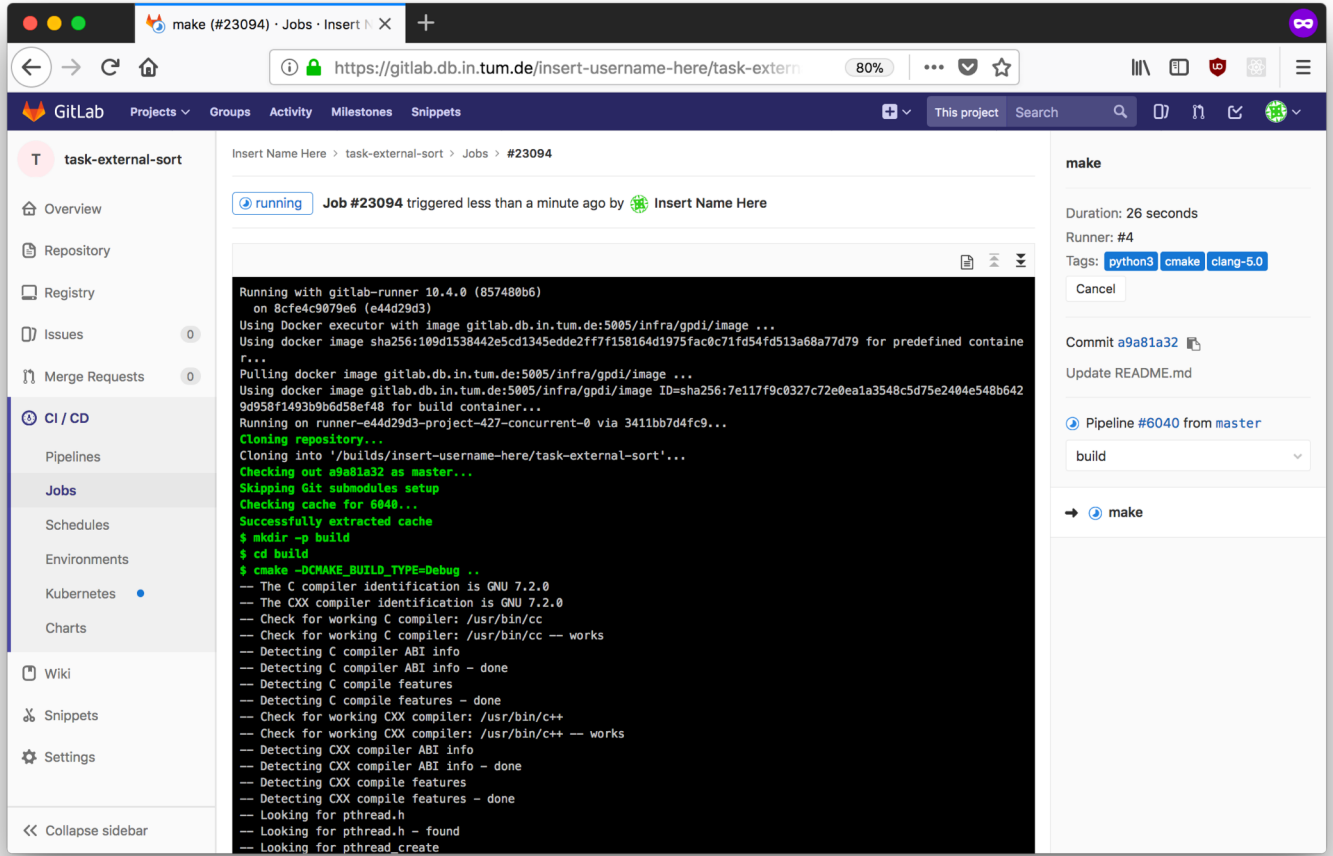
Settings
Collapse sidebar
Insert Name Here › task-external-sort › Pipelines › #6040
running
Pipeline #6040 triggered less than a minute ago by Insert Name Here
Cancel running
Update README.md
4 jobs from master (queued for 1 second)
a9a81a32
Pipeline
Jobs 4
Build
Test
make
advanced_tester
lint
tester


make (#23094) · Jobs · Insert
https://gitlab.db.in.tum.de/insert-username-here/task-extern
80%
GitLab
Projects
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Activity
Milestones
Snippets
This project
Search
task-external-sort
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Issues 0
Merge Requests 0
CI / CD
Pipelines
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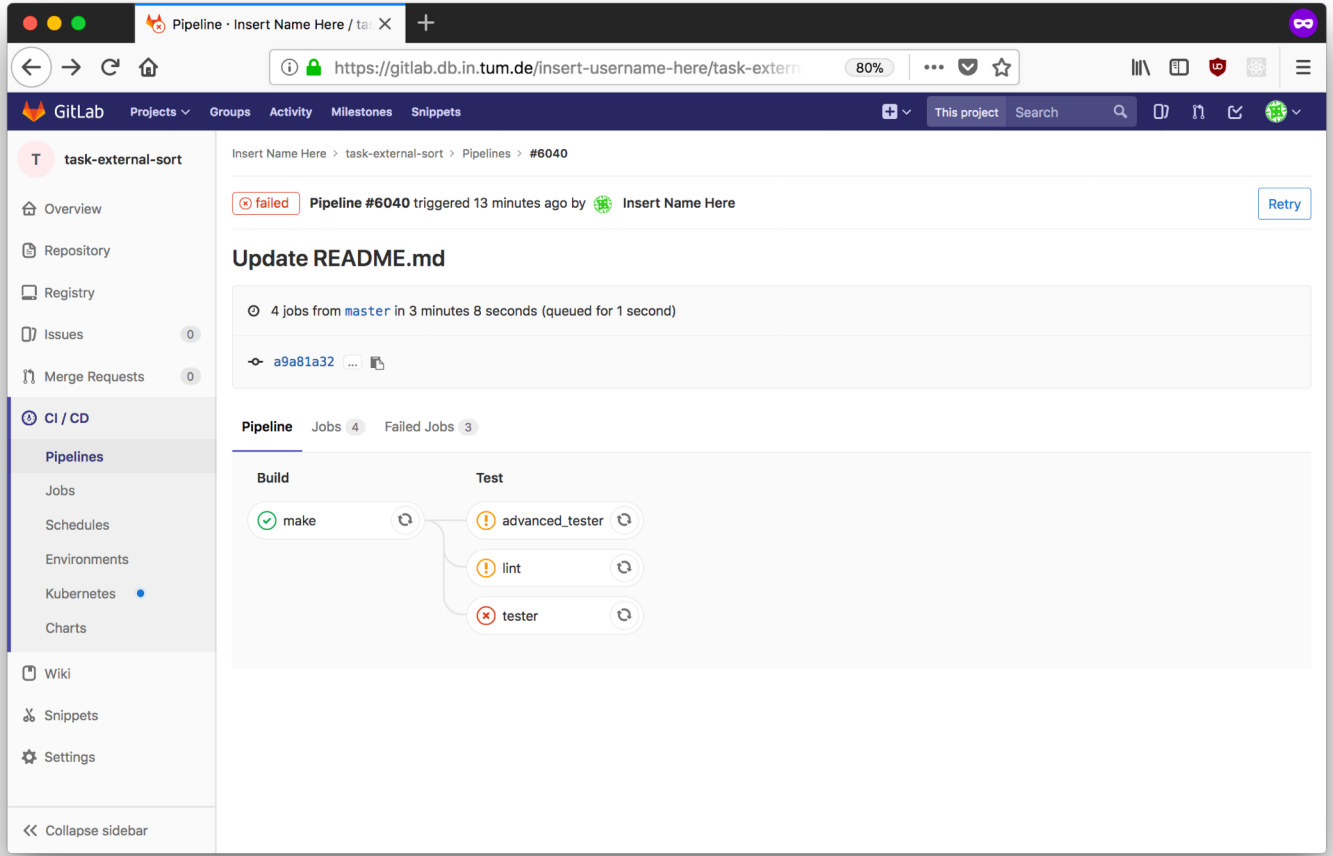
Settings
Collapse sidebar
Insert Name Here › task-external-sort › Jobs › #23094
running
Job #23094 triggered less than a minute ago by Insert Name Here
Running with gitlab-runner 10.4.0 (857480b6)
on 8cfe4c9079e6 (e44d29d3)
Using Docker executor with image gitlab.db.in.tum.de:5005/infra/gpdi/image ...
Using docker image sha256:109d1538442e5cd1345edde2ff7f158164d1975fac0c71fd54fd513a68a77d79 for predefined container...
Pulling docker image gitlab.db.in.tum.de:5005/infra/gpdi/image ...
Using docker image gitlab.db.in.tum.de:5005/infra/gpdi/image ID=sha256:7e117f9c0327c72e0ea1a3548c5d75e2404e548b6429d958f1493b9b6d58ef48 for build container...
Running on runner-e44d29d3-project-427-concurrent-0 via 3411bb7d4fc9...
Cloning repository...
Cloning into '/builds/insert-username-here/task-external-sort'...
Checking out a9a81a32 as master...
Skipping Git submodules setup
Checking cache for 6040...
Successfully extracted cache
$ mkdir -p build
$ cd build
$ cmake -DCMAKE_BUILD_TYPE=Debug ..
-- The C compiler identification is GNU 7.2.0
-- The CXX compiler identification is GNU 7.2.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Looking for pthread.h
-- Looking for pthread.h - found
-- Looking for pthread_create
make
Duration: 26 seconds
Runner: #4
Tags: python3 cmake clang-5.0
Cancel
Commit a9a81a32
Update README.md
Pipeline #6040 from master
build
make


Pipeline · Insert Name Here / ta
https://gitlab.db.in.tum.de/insert-username-here/task-extern
80%
GitLab
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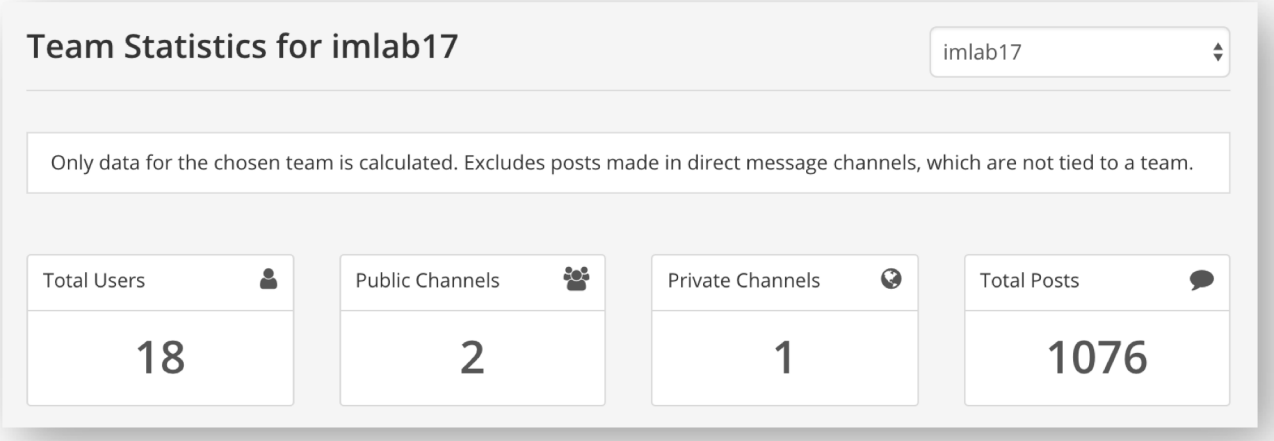
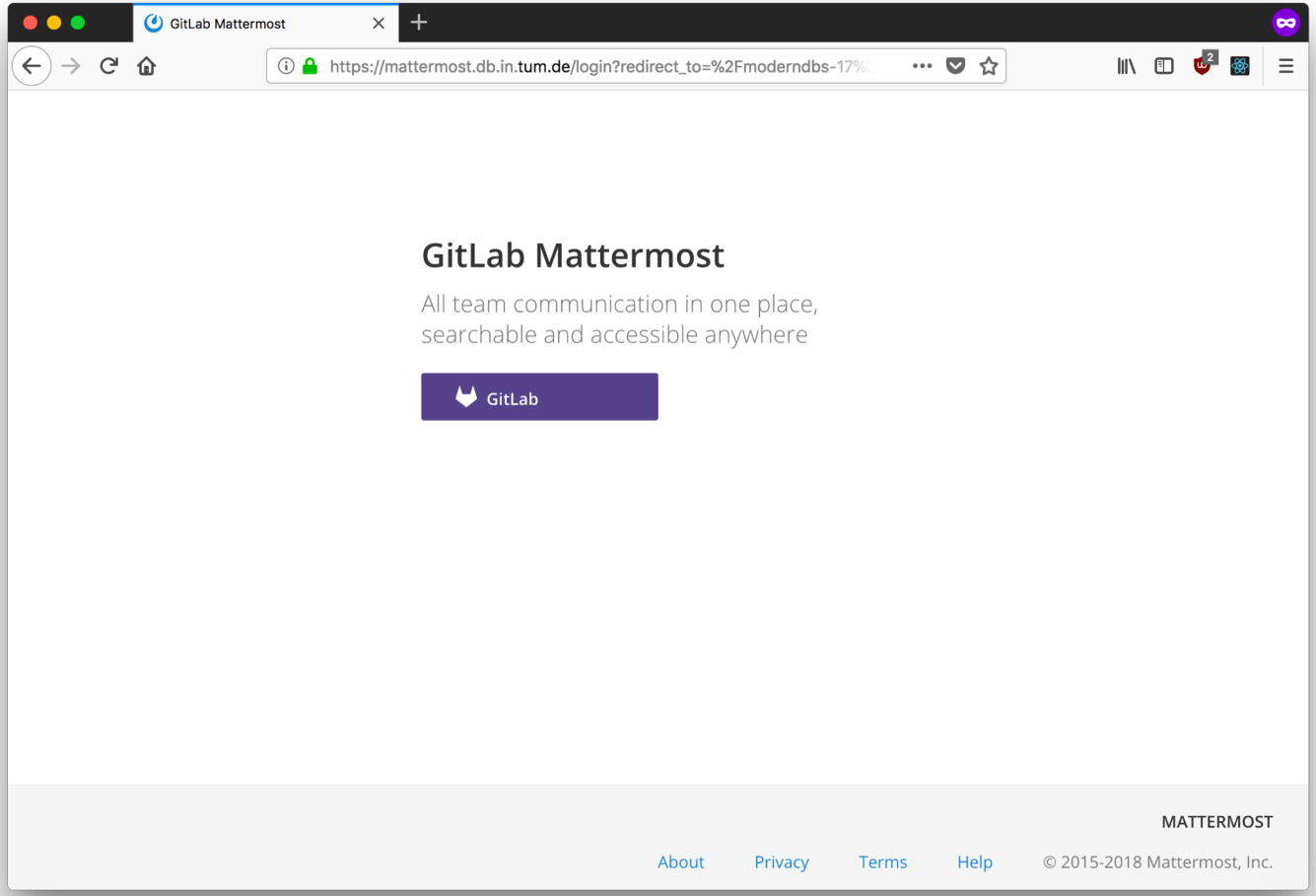
Collapse sidebar
Insert Name Here › task-external-sort › Pipelines › #6040
failed
Pipeline #6040 triggered 13 minutes ago by Insert Name Here
Retry
Update README.md
4 jobs from master in 3 minutes 8 seconds (queued for 1 second)
a9a81a32
Pipeline
Jobs 4
Failed Jobs 3
Build
Test
make
advanced_tester
lint
tester

GitLab

Mattermost®


Team Statistics for imlab17
imlab17
Only data for the chosen team is calculated. Excludes posts made in direct message channels, which are not tied to a team.
Total Users
18
Public Channels
2
Private Channels
1
Total Posts
1076


GitLab Mattermost
https://mattermost.db.in.tum.de/login?redirect_to=%2Fmoderndbs-17%
GitLab Mattermost
All team communication in one place,
searchable and accessible anywhere
GitLab
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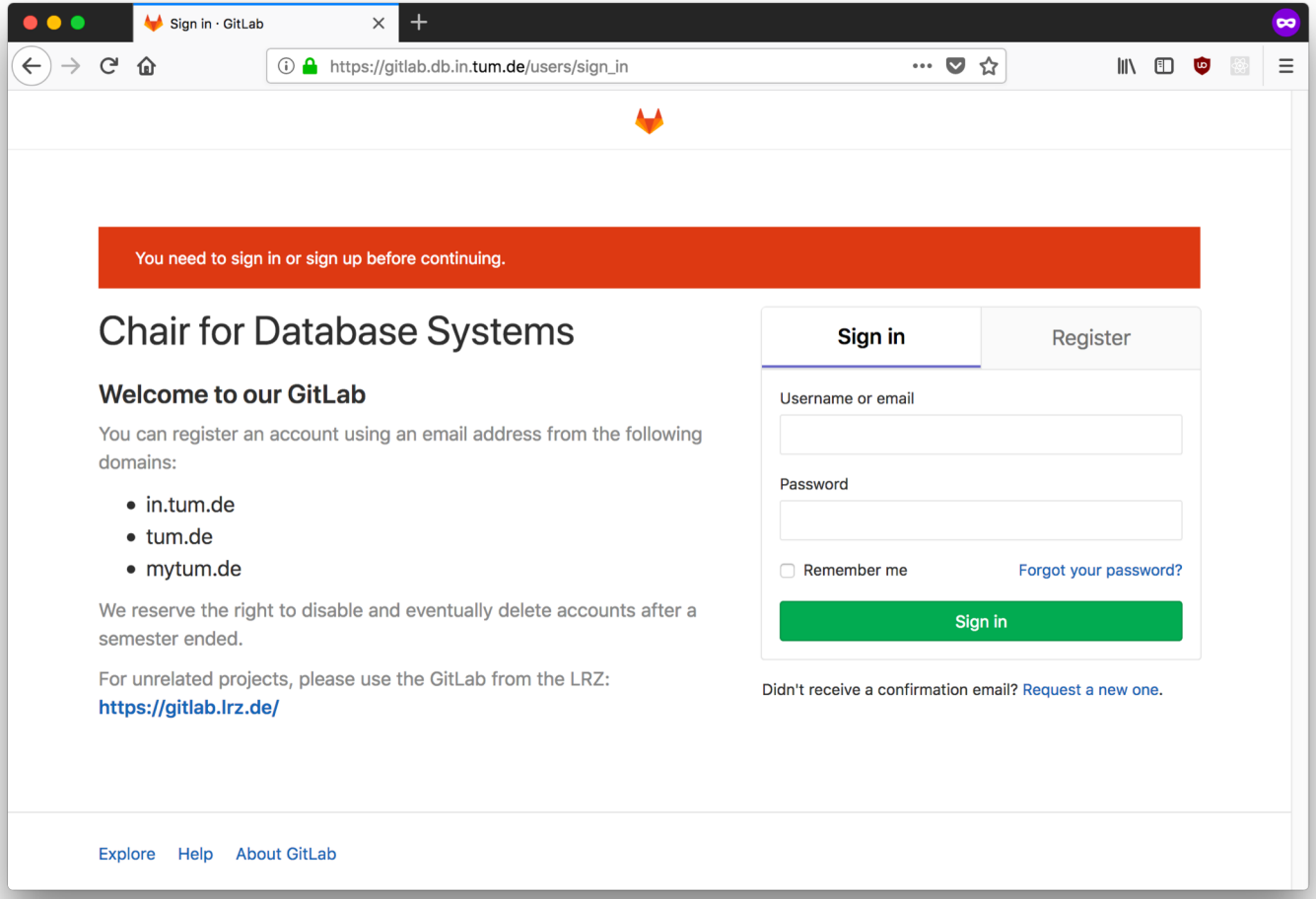
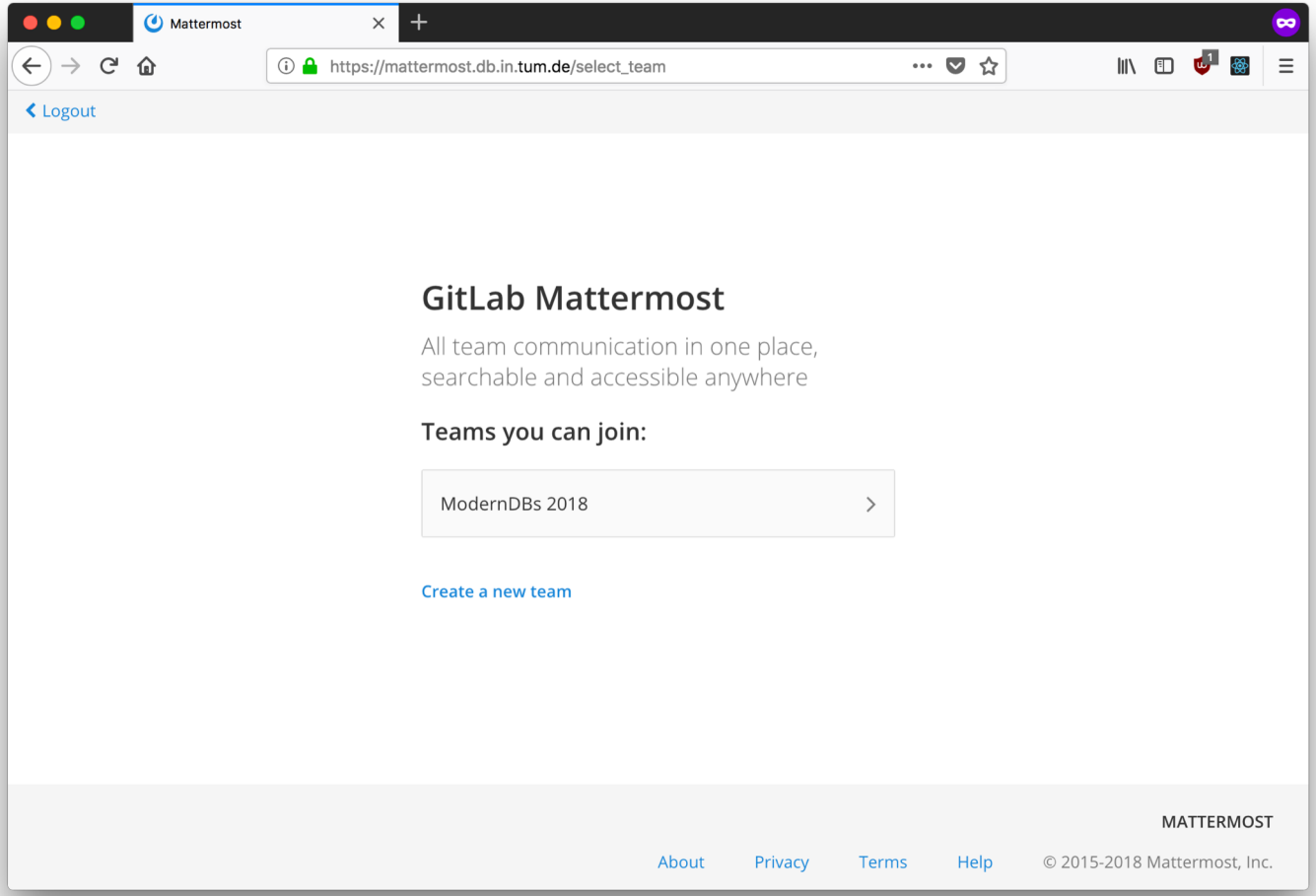

Sign in · GitLab
https://gitlab.db.in.tum.de/users/sign_in
You need to sign in or sign up before continuing.
Chair for Database Systems
Welcome to our GitLab
You can register an account using an email address from the following domains:
in.tum.de
tum.de
mytum.de
We reserve the right to disable and eventually delete accounts after a semester ended.
For unrelated projects, please use the GitLab from the LRZ:
https://gitlab.lrz.de/
Sign in
Register
Username or email
Password
Remember me
Forgot your password?
Sign in
Didn't receive a confirmation email? Request a new one.
Explore
Help
About GitLab


Mattermost
https://mattermost.db.in.tum.de/select_team
Logout
GitLab Mattermost
All team communication in one place,
searchable and accessible anywhere
Teams you can join:
ModernDBs 2018
Create a new team
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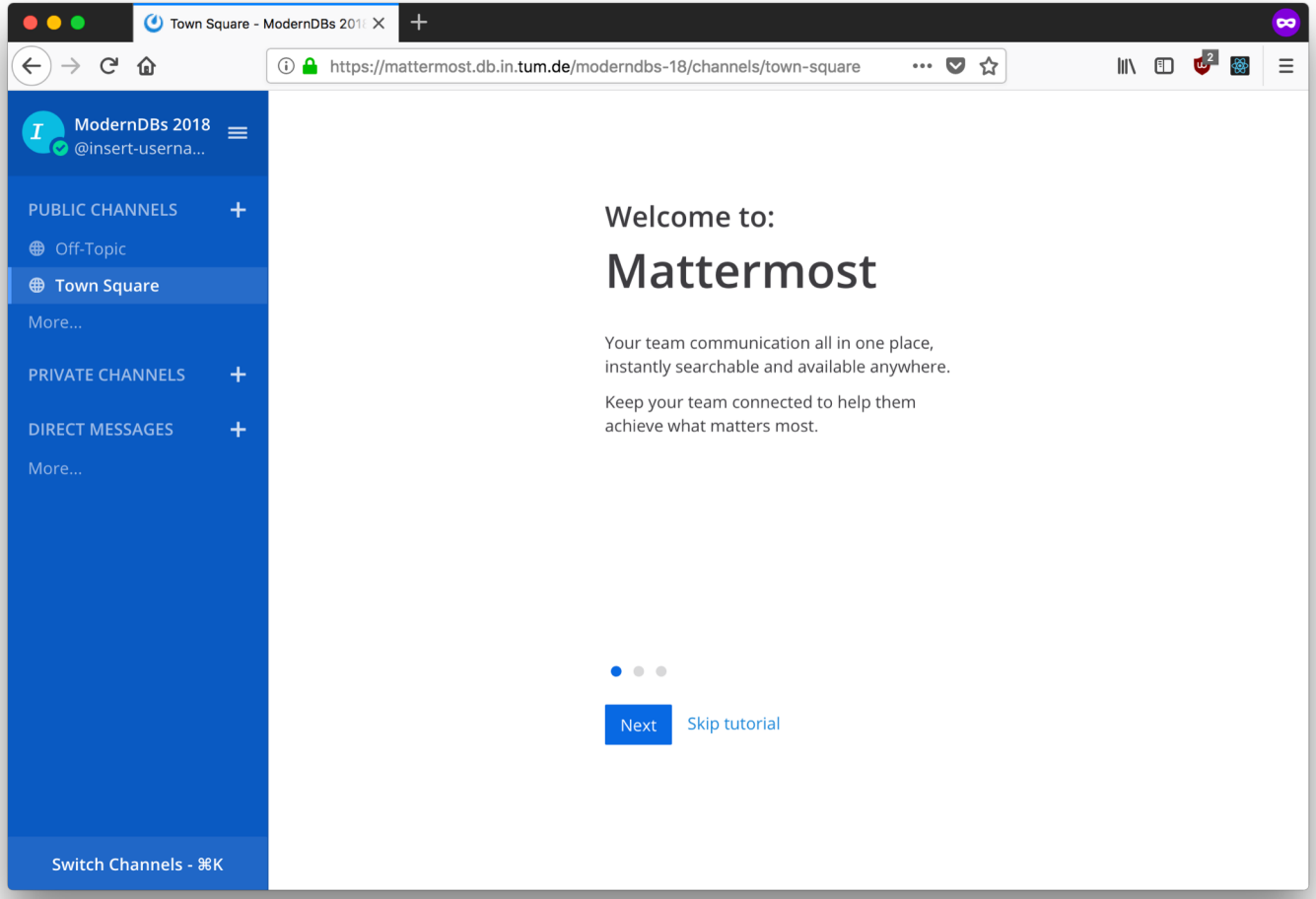
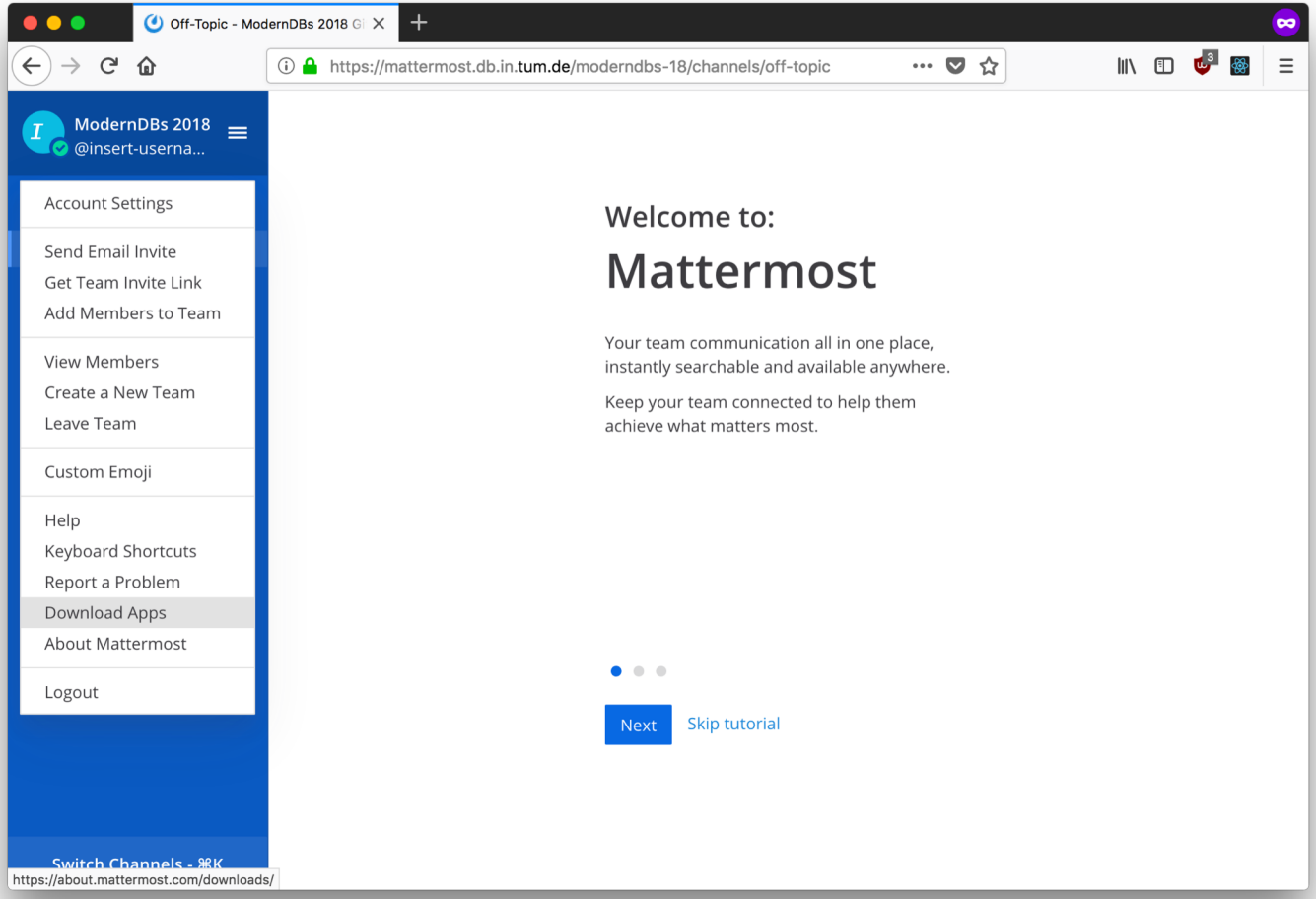

Town Square - ModernDBs 201
https://mattermost.db.in.tum.de/moderndbs-18/channels/town-square
ModernDBs 2018
@insert-userna...
PUBLIC CHANNELS
Off-Topic
Town Square
More...
PRIVATE CHANNELS
DIRECT MESSAGES
More...
Switch Channels - ⌘K
Welcome to:
Mattermost
Your team communication all in one place, instantly searchable and available anywhere.
Keep your team connected to help them achieve what matters most.
Next
Skip tutorial


Off-Topic - ModernDBs 2018
https://mattermost.db.in.tum.de/moderndbs-18/channels/off-topic
ModernDBs 2018
@insert-userna...
Account Settings
Send Email Invite
Get Team Invite Link
Add Members to Team
View Members
Create a New Team
Leave Team
Custom Emoji
Help
Keyboard Shortcuts
Report a Problem
Download Apps
About Mattermost
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Switch Channels - ⌘K
https://about.mattermost.com/downloads/
Welcome to:
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Your team communication all in one place, instantly searchable and available anywhere.
Keep your team connected to help them achieve what matters most.
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Skip tutorial

Questions?