Heptapod

Four years of Mercurial in GitLab and growing

Georges Racinet

Octobus, `https://octobus.net`

`https://heptapod.net`

Mercurial Conference – Paris 2023

GitLab

A well-known DevOps platform

- Pure Git hosting, with *Merge Requests* and *Issues*
- Built-in Continuous Integration and Delivery/Deployment (CI/CD)
- Many, many other built-ins and external service integrations

GitLab

A well-known DevOps platform

- Pure Git hosting, with *Merge Requests* and *Issues*
- Built-in Continuous Integration and Delivery/Deployment (CI/CD)
- Many, many other built-ins and external service integrations
- Open Core: Community Edition (CE) is Open Source
- In use by some major Free Software projects (Debian, Gnome. . .)

GitLab

A well-known DevOps platform

- Pure Git hosting, with *Merge Requests* and *Issues*
- Built-in Continuous Integration and Delivery/Deployment (CI/CD)
- Many, many other built-ins and external service integrations
- Open Core: Community Edition (CE) is Open Source
- In use by some major Free Software projects (Debian, Gnome. . .)
- Commercial offerings (online and on premises)

Heptapod, the software

Heptapod = GitLab CE + Mercurial

- GitLab CE (currently 15.4)
- Adds Mercurial support (currently 6.3)

Heptapod, the software

Heptapod = GitLab CE + Mercurial

- GitLab CE (currently 15.4)
- Adds Mercurial support (currently 6.3)
- Git working as in upstream GitLab

Heptapod, the software

Heptapod = GitLab CE + Mercurial

- GitLab CE (currently 15.4)
- Adds Mercurial support (currently 6.3)
- Git working as in upstream GitLab
- Evolve/Topics first class support
- Workflow: topics centered by default
  also supports more traditional Mercurial workflows

Heptapod, the software

Heptapod = GitLab CE + Mercurial

- GitLab CE (currently 15.4)
- Adds Mercurial support (currently 6.3)
- Git working as in upstream GitLab
- Evolve/Topics first class support
- Workflow: topics centered by default
  also supports more traditional Mercurial workflows
- Install options: (subset of GitLab install options)
  - Docker (monolithic)
  - Omnibus (Ubuntu 20.04 package)
  - From source

Current features

Mercurial integration

- push/pull: HTTP(S) and SSH
- Merge Requests for merge and changeset publication
- CI/CD with Heptapod Runner

Online platforms

Online platforms: heptapod.host

clever cloud

`https://about.heptapod.host`

- Fully integrated Heptapod hosting
- In partnership with Clever Cloud
  `https://clever-cloud.com`
- Billing based on *active* users

Online platforms: heptapod.host

Features

- Builtin CI/CD runners (billed by the second, several CPU/memory flavors)
- Container Registry
- GitLab Pages
- Full presentation with price simulations at `https://about.heptapod.host`

Online platforms: foss.heptapod.net

clever cloud

`https://foss.heptapod.net`

- Free of charge hosting for Free Software
- Sponsored by Octobus and Clever Cloud

Online platforms: foss.heptapod.net

clever cloud

`https://foss.heptapod.net`

- Free of charge hosting for Free Software
- Sponsored by Octobus and Clever Cloud
- Strong fleet of CI/CD runners donated by:
  - OSU OSL (https://osuosl.org)
  - OSCI (https://osci.io)
  - Clever Cloud (on-demand)

Online platforms: foss.heptapod.net

Some figures

- over 8000 registered users
- large and important projects (latest first)
  (1 kchs = 1000 changesets)

Online platforms: foss.heptapod.net

Some figures

- over 8000 registered users
- large and important projects (latest first)
  (1 kchs = 1000 changesets)
  - Tryton monorepo (96 kchs)

Online platforms: foss.heptapod.net

Some figures

- over 8000 registered users
- large and important projects (latest first)
  (1 kchs = 1000 changesets)
  - Tryton monorepo (96 kchs)
  - Mercurial itself (development, 51 kchs)

Online platforms: foss.heptapod.net

Some figures

- over 8000 registered users
- large and important projects (latest first)
  (1 kchs = 1000 changesets)
  - Tryton monorepo (96 kchs)
  - Mercurial itself (development, 51 kchs)
  - PyPy (100 kchs)

Online platforms: foss.heptapod.net

Some figures

- over 8000 registered users
- large and important projects (latest first)
  (1 kchs = 1000 changesets)
  - Tryton monorepo (96 kchs)
  - Mercurial itself (development, 51 kchs)
  - PyPy (100 kchs)
  - Heptapod web app (180 kchs)

Since Mercurial Paris 2019

We have come a very long way

Since Mercurial Paris 2019

We have come a very long way

- Fixed version: GitLab 10.1 (20 months behind)
  (catched up in 2020 at GitLab 12.2)

Since Mercurial Paris 2019

We have come a very long way

- Fixed version: GitLab 10.1 (20 months behind)
  (catched up in 2020 at GitLab 12.2)
- Online platforms: dev.heptapod.net (self-hosted by Octobus)

Since Mercurial Paris 2019

We have come a very long way

- Fixed version: GitLab 10.1 (20 months behind)
  (catched up in 2020 at GitLab 12.2)
- Online platforms: dev.heptapod.net (self-hosted by Octobus)
- No CI/CD (experimental patches by Logilab for GitLab Runner)

Since Mercurial Paris 2019

We have come a very long way

- Fixed version: GitLab 10.1 (20 months behind)
  (catched up in 2020 at GitLab 12.2)
- Online platforms: dev.heptapod.net (self-hosted by Octobus)
- No CI/CD (experimental patches by Logilab for GitLab Runner)
- No Git support!

Since Mercurial Paris 2019

We have come a very long way

- Fixed version: GitLab 10.1 (20 months behind)
  (catched up in 2020 at GitLab 12.2)
- Online platforms: dev.heptapod.net (self-hosted by Octobus)
- No CI/CD (experimental patches by Logilab for GitLab Runner)
- No Git support!
- No Mercurial pushes over SSH

Since Mercurial Paris 2019

We have come a very long way

- Fixed version: GitLab 10.1 (20 months behind)
  (catched up in 2020 at GitLab 12.2)
- Online platforms: dev.heptapod.net (self-hosted by Octobus)
- No CI/CD (experimental patches by Logilab for GitLab Runner)
- No Git support!
- No Mercurial pushes over SSH
- Fully relying on an internal conversion to Git (still needed for one secondary feature, can be disabled)

Help Needed

Financial support

A major effort such as Heptapod needs income.
Here are some channels to fund Heptapod:

Help Needed

Financial support

A major effort such as Heptapod needs income.
Here are some channels to fund Heptapod:

- Octobus provided support (standard contracts):

Help Needed

Financial support

A major effort such as Heptapod needs income.
Here are some channels to fund Heptapod:

- Octobus provided support (standard contracts):
  - SAAS: entry-level package for users of the online platforms

Help Needed

Financial support

A major effort such as Heptapod needs income.
Here are some channels to fund Heptapod:

- Octobus provided support (standard contracts):
  - SAAS: entry-level package for users of the online platforms
  - Premium, relevant for self-hosted installations

Help Needed

Financial support

A major effort such as Heptapod needs income.
Here are some channels to fund Heptapod:

- Octobus provided support (standard contracts):
  - SAAS: entry-level package for users of the online platforms
  - Premium, relevant for self-hosted installations
- Direct feature sponsoring (contact Octobus)

Help Needed

Financial support

A major effort such as Heptapod needs income.
Here are some channels to fund Heptapod:

- Octobus provided support (standard contracts):
  - SAAS: entry-level package for users of the online platforms
  - Premium, relevant for self-hosted installations
- Direct feature sponsoring (contact Octobus)
- OpenCollective donations
  `https://opencollective.com/heptapod`

Help Needed

Community management

For foss.heptapod.net:

- Hosting Requests
- Policy matters
- Treatment of Abuse Reports (spam only until now)

Help Needed

Code contribution

Five programming languages, making for a very rich landscape, many opportunities to contribute:

Help Needed

Code contribution

Five programming languages, making for a very rich landscape, many opportunities to contribute:

- Web application: Ruby (Rails) and JavaScript (VueJS)

Help Needed

Code contribution

Five programming languages, making for a very rich landscape, many opportunities to contribute:

- Web application: Ruby (Rails) and JavaScript (VueJS)
- HGitaly (Mercurial backend): Python and Rust

Help Needed

Code contribution

Five programming languages, making for a very rich landscape, many opportunities to contribute:

- Web application: Ruby (Rails) and JavaScript (VueJS)
- HGitaly (Mercurial backend): Python and Rust
- Heptapod Runner: Go

Help Needed

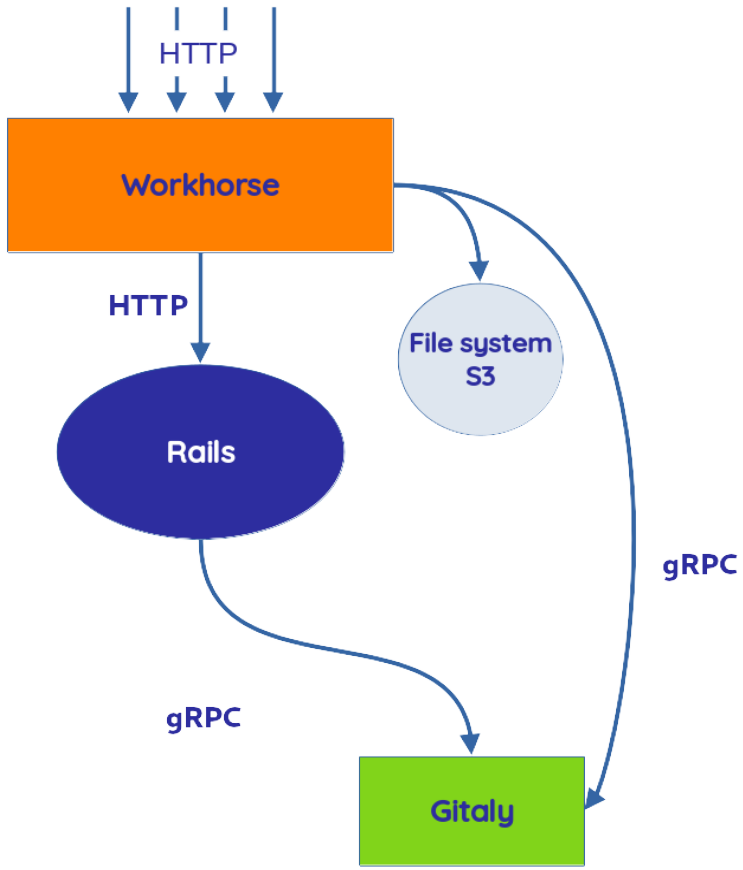
Code contribution

Five programming languages, making for a very rich landscape, many opportunities to contribute:

- Web application: Ruby (Rails) and JavaScript (VueJS)
- HGitaly (Mercurial backend): Python and Rust
- Heptapod Runner: Go
- Heptapod Workhorse (edge dispatcher): Go
- Heptapod Shell (incoming SSH): Go

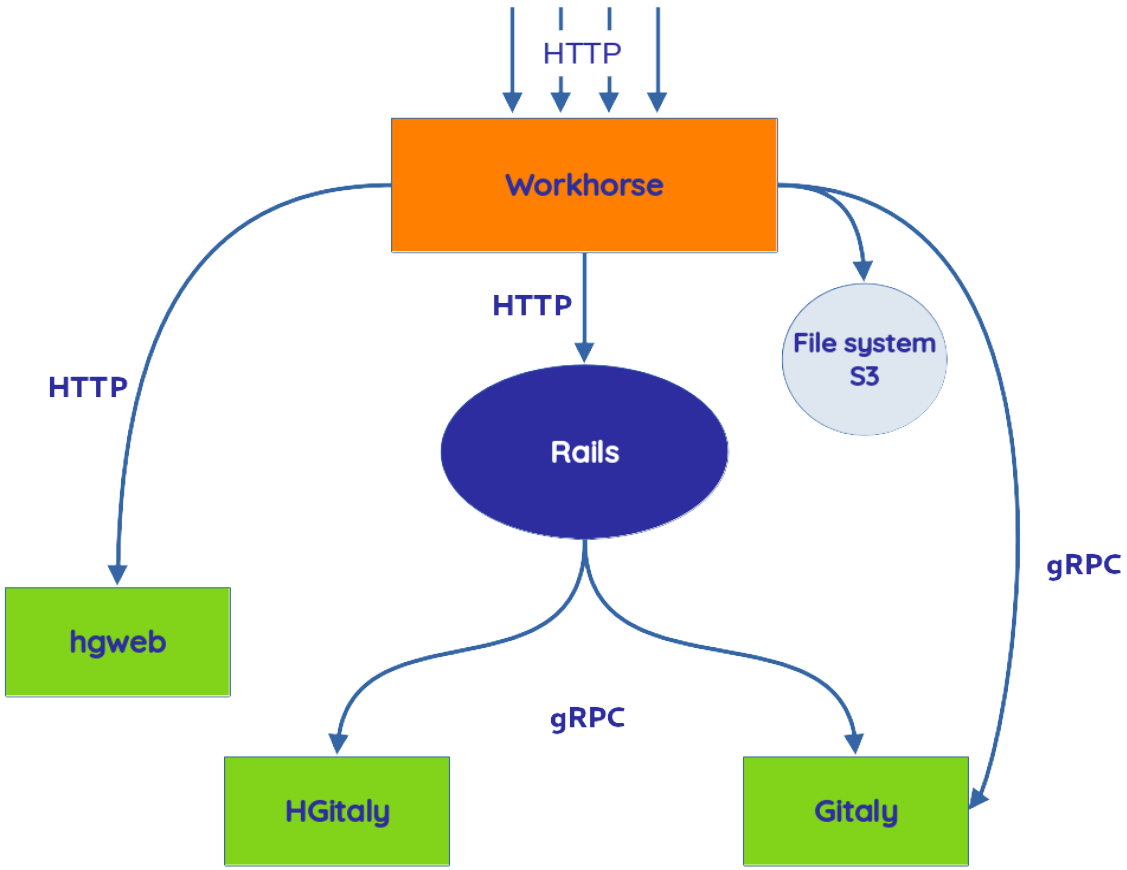
Simplified Architecture

GitLab



Simplified Architecture

Heptapod



Current development

Overview of active areas

We'll go into more detail about some in the next minutes.

Current development

Overview of active areas

We'll go into more detail about some in the next minutes.

- HGitaly: native Mercurial support

Current development

Overview of active areas

We'll go into more detail about some in the next minutes.

- HGitaly: native Mercurial support
- Performance and scalability

Current development

Overview of active areas

We'll go into more detail about some in the next minutes.

- HGitaly: native Mercurial support
- Performance and scalability
- Keeping up with GitLab (majority of the work)

Current development

Overview of active areas

We'll go into more detail about some in the next minutes.

- HGitaly: native Mercurial support
- Performance and scalability
- Keeping up with GitLab (majority of the work)
- Mercurial features

Three milestones were defined to switch from internal Git conversion to native Mercurial support.

Three milestones were defined to switch from internal Git conversion to native Mercurial support.

- HGitaly1: long done (changesets, branches and tags)

Three milestones were defined to switch from internal Git conversion to native Mercurial support.

- HGitaly1: long done (changesets, branches and tags)
- HGitaly2: all read-only requests (one last remaining feature)
  $\Longrightarrow$ allows to stop internal Git conversions

Three milestones were defined to switch from internal Git conversion to native Mercurial support.

- HGitaly1: long done (changesets, branches and tags)
- HGitaly2: all read-only requests (one last remaining feature)
  $\Longrightarrow$ allows to stop internal Git conversions
- HGitaly3: all Mercurial interactions
  $\Longrightarrow$ horizontal scaling (sharding), fleet of containers...

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow
  - Fixed number of worker processes: heavy requests can prevent faster requests to even run (starvation)

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow
  - Fixed number of worker processes: heavy requests can prevent faster requests to even run (starvation)
  - Python is memory hungry

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow
  - Fixed number of worker processes: heavy requests can prevent faster requests to even run (starvation)
  - Python is memory hungry
- Introducing RHGitaly

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow
  - Fixed number of worker processes: heavy requests can prevent faster requests to even run (starvation)
  - Python is memory hungry
- Introducing RHGitaly
  - Pure Rust HGitaly server
    it is to HGitaly what rhg is to hg

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow
  - Fixed number of worker processes: heavy requests can prevent faster requests to even run (starvation)
  - Python is memory hungry
- Introducing RHGitaly
  - Pure Rust HGitaly server
    it is to HGitaly what rhg is to hg
  - Very fast on a subset of the protocol
    e.g., changeset metadata from shortened hashes about 10 µs per changeset

Current development

Performance and scalability

- HGitaly currently at its limits on foss.heptapod.net
  - Python is slow
  - Fixed number of worker processes: heavy requests can prevent faster requests to even run (starvation)
  - Python is memory hungry
- Introducing RHGitaly
  - Pure Rust HGitaly server
    it is to HGitaly what rhg is to hg
  - Very fast on a subset of the protocol
    e.g., changeset metadata from shortened hashes about 10 µs per changeset
  - Fully asynchronous, hence no worker starvation (based on Tokio and Tonic)

Current development

Heptapod 0.36

Contents of the very next version, Heptapod 0.36

Current development

Heptapod 0.36

Contents of the very next version, Heptapod 0.36

- First version shipping RHGitaly (optional activation)

Current development

Heptapod 0.36

Contents of the very next version, Heptapod 0.36

- First version shipping RHGitaly (optional activation)
- GitLab 15.5

Contents of the very next version, Heptapod 0.36

- First version shipping RHGitaly (optional activation)
- GitLab 15.5
- Mercurial 6.4, Evolve 11.0 (Topic 1.0)

Current development

Heptapod 0.36

Contents of the very next version, Heptapod 0.36

- First version shipping RHGitaly (optional activation)
- GitLab 15.5
- Mercurial 6.4, Evolve 11.0 (Topic 1.0)
- Release candidate should happen next week

Current development

Heptapod 0.37/0.38

- No internal Git conversion by default (HGitaly2 milestone)
- RHGitaly active by default?
- Topic namespaces mapped to users and integrated with permissions
  $\Longrightarrow$ lower barrier to entry (drive-by contributors. . .)
- GitLab 15.x
- Mercurial LFS?
- Automatic clonebundles integration (core work is done)
- Workflow special cases (stacked topics. . .)

Long term developments

- HGitaly3 (distributed deployment, independently scalabile components)
- Full integration with IDEs (VSCode in GitLab)
- Gitpod equivalent?
- High Availability (HA) in HGitaly

Thank you for your attention

Your turn to speak

Any questions?