

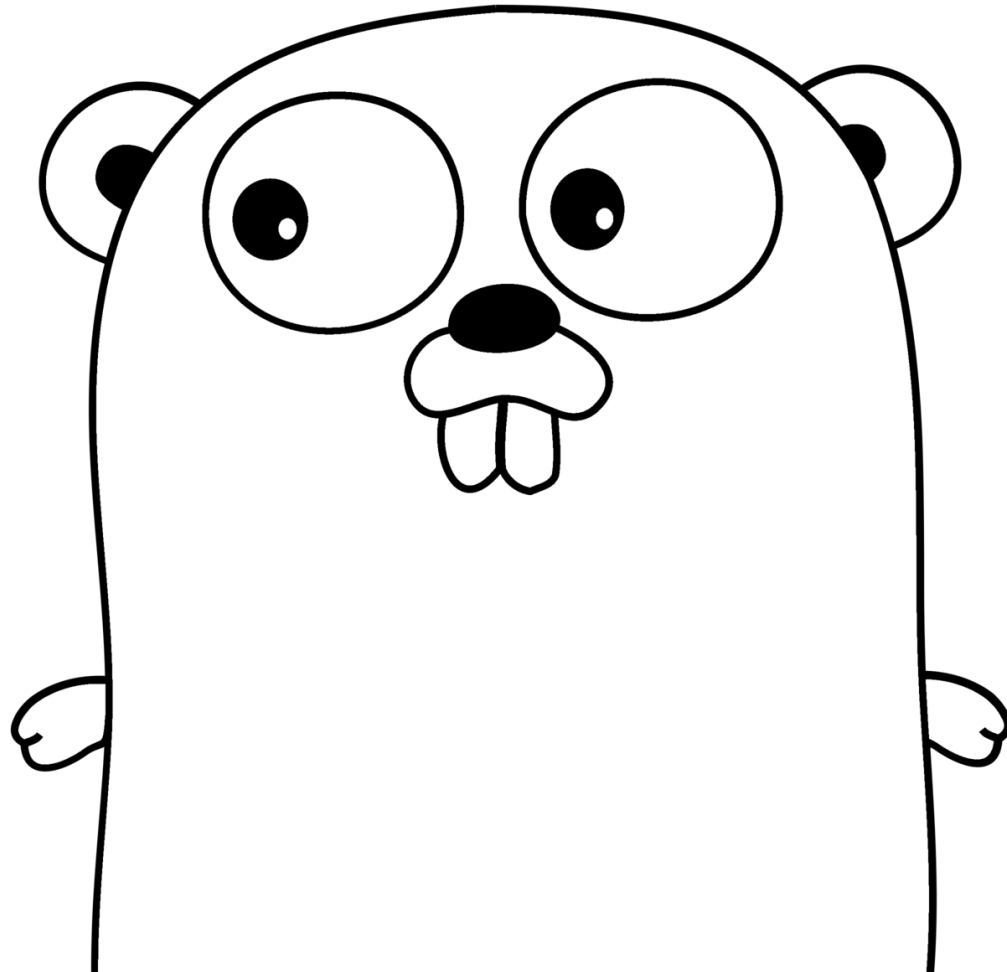
# DevOps automation with Go

Oliver Fuerst, Restorepoint

June 24, 2021

## About me

- Software engineer for more than 20 years
- Discovered Go in 2017 ❤️
- Lead developer at Restorepoint since 2019



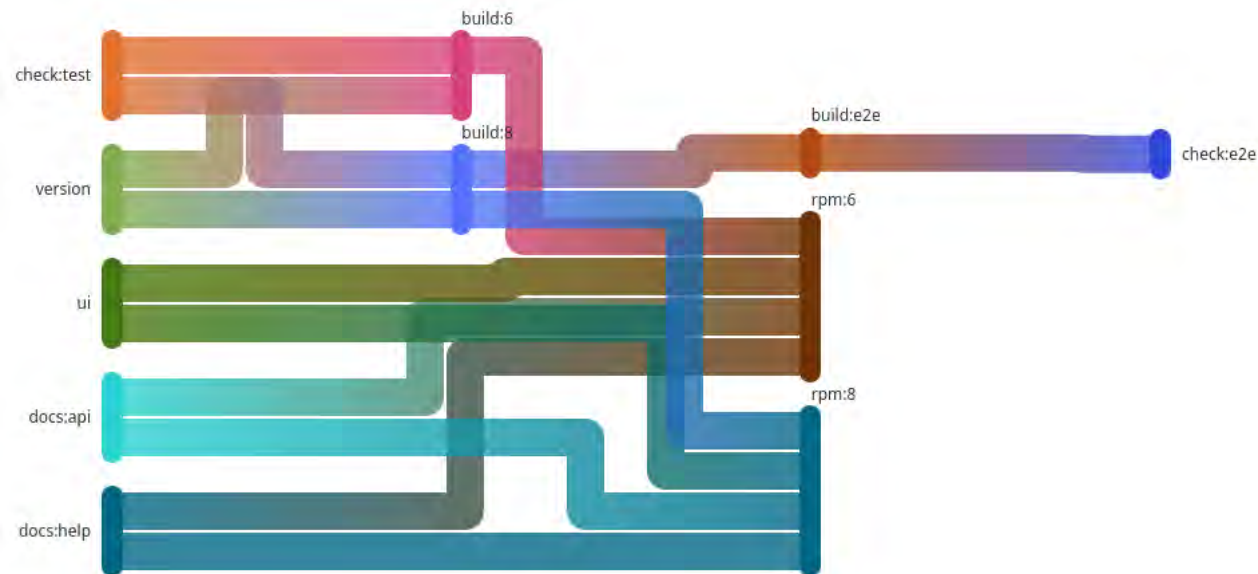
# Restorepoint

- Network automation, device backup and restore
- Go monolith
- Highly concurrent with scheduler, HTTP/FTP/TFTP server, Lua environment, ...
- Running on-premise or in customer cloud inside a Linux box
- Automatic or manual updates via update server
- Roughly 120,000 lines of Go code (not counting 2.8 million from external libs)
- Gitlab for the whole development lifecycle



# DevOps at Restorepoint

- Three different release versions
- Two target environments
- Weekly production releases
- Continuous development releases
- Multiple internal tools to make our lives easier



## Release API

- Avoids having to access support server from build server via SSH
- In use by multiple products
- Single binary systemd service



## Release API: Build server

- Build server packages final build artifacts into TGZ
- MD5 sums the release.tgz
- Sends additional meta data in the call to the release API
- Shared secret between build server and release API

```
STATUSCODE=$(curl \
  --silent --output /dev/stderr --write-out "%{http_code}" --request POST \
  --form "secret=$DEPLOY_SECRET" \
  --form "product=$CI_PROJECT_NAME" \
  --form "version=$VERSION" \
  --form "tag=$TAG" \
  --form "build=$BUILD" \
  --form "revision=$REVISION" \
  --form "commit=$COMMIT" \
  --form "file=@release.tgz" \
  --form "md5=$(md5sum release.tgz | cut -d ' ' -f 1)" \
  --form "log=$CHANGELOG" \
  --form "rpms=1" \
  "$RELEASE_SERVER")
```

## Release API: Update server

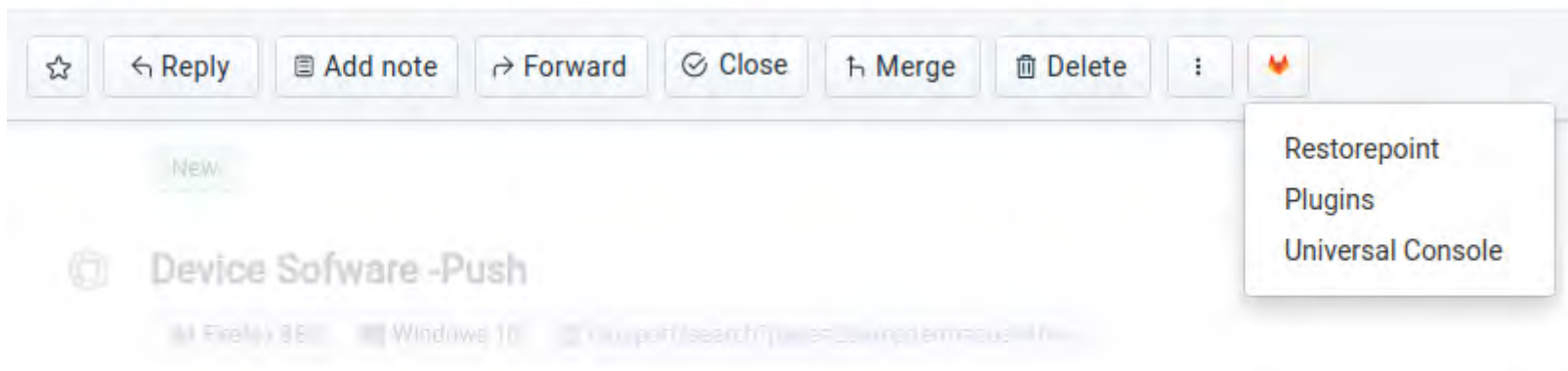
- Receives POST request from build server
- Checks required meta data fields have been passed
- Checks shared secret
- Writes release.tgz and calculates MD5 sum at the same time

```
hash := md5.New()
io.Copy(out, io.TeeReader(in, hash))
checksum := hex.EncodeToString(hash.Sum(nil))
if checksum != remoteChecksum {
    // Abort release
}
```

- Checks MD5 sum
- Writes meta data to release specific env file
- Passes release.tgz and env file to release script

# Freshdesk Gitlab Bridge

- Freshdesk for first line support
- Developers only deal with issues in Gitlab
- Support engineers decide when to escalate to devs
- Injects a button via Tampermonkey script into Freshdesk UI
- Copies all comments and attachments across and adds a link on both sides
- No duplicates





## Automatic version check

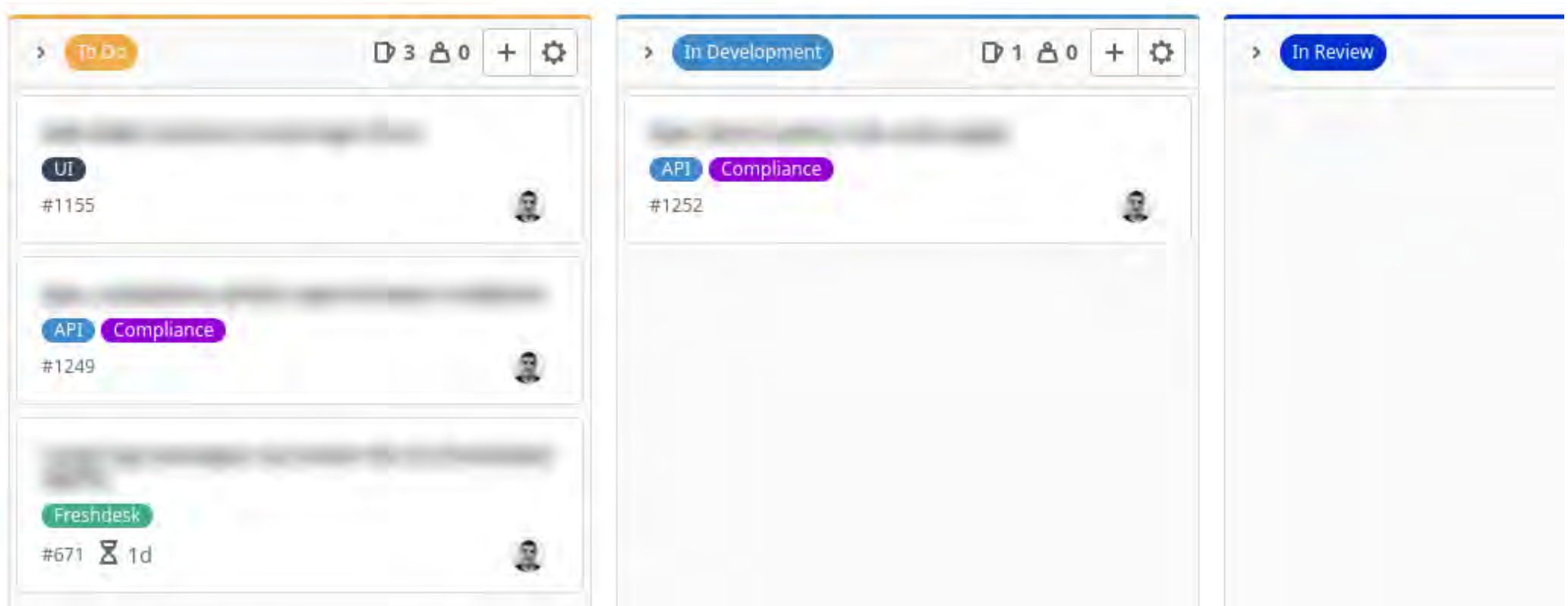
- Puts a warning on merge requests with mismatched versions on source and target branch
- Webhook to receive notification about new merge requests
- Uses Gitlab API to check version of source and target branch and to leave comment if required



The screenshot shows a comment from the **Administrator** (@root) posted 2 weeks ago. The comment text reads: "Resolved by [Oliver Fuerst](#) 2 weeks ago" followed by "Version mismatch detected. [@ofuerst](#) attempted to merge 5.3.1/fix/missing-user-on-connection-end (5.3.1) into 5.4/development (5.4). Source version 5.3.1 did not match target version 5.4." Below this is a "Collapse replies" button. A second comment from **Oliver Fuerst** (@ofuerst), also posted 2 weeks ago, responds with "Every time" and a shrugging emoji. The comment is marked as "Owner".

# Development workflow automation

- Five state issue labels:  
Open → **To Do** → **In Development** → **In Review** → **To Test** → **Testing** → Closed
- Automatically transition issues across when Merge Requests are opened or merged
- Uses same webhook as the automatic version check
- Greatly reduces amount of manual status updates



# Data race reporting

- Development builds have [race condition detection](https://blog.golang.org/race-detector) enabled
- Most race conditions happen during use and need to hit the *right* code path
- Internal test instances replicating common usage scenarios run race condition check once a day
- Check for data races in logs and create Gitlab issues for each entry
- If an issue already exists, add a comment instead
- Everything between start and end marker is copied to the issue description

```
WARNING: DATA RACE                                     // START
Write at 0x00c000087888 by goroutine 219:
  restorepoint/foo.(*Bar).Baz()                         // BECOMES THE TITLE
  ...
=====                                                // END
```

# Data race reporting: Issue

Software > Restorepoint > Issues > #1021

Open

Created 4 months ago by Administrator

Close issue



## Race condition in `...`

Write at 0x00c0023a03d0 by goroutine 81:

:141 +0xe1

Previous write at 0x00c0023a03d0 by goroutine 79:

:167 +0x230f

To Do

Add a to do



0 Assignees

Edit

None - assign yourself

Milestone

None

Edit

Iteration

None

Edit

Time tracking



No estimate or time spent

Due date

None

Edit

Labels

Edit

Race conditions ✕

Weight

None

Edit

Confidentiality

Edit

👁 Not confidential

Lock issue

Edit

# Automatic library versioning

- Multiple internal libraries
- Go module wants semantic version tags
- All libraries have a **tag** job which runs when changes are merged to a library's master branch
- Existing tags are read and a new tag with the patch version incremented by 1

```
tag:  
  image: restorepointsw/gitlab-auto-version  
  variables:  
    PRIVATE_TOKEN: "Needs to be a valid API token"  
  stage: tag  
  dependencies:  
    - build  
  script:  
    - /gitlab-auto-version  
  only:  
    - master
```

## We're hiring (remote UK/EU)

### Tired of the same old Go microservices on Kubernetes pitch?

We ship an on-premise Go monolith wrapped neatly in a Linux box every week and our customers love it!

We are looking for a driven and analytical software engineer, experienced in building applications in Go. Our main product is used by hundreds of customers worldwide to backup (and restore) thousands of network devices.

[www.restorepoint.com/careers/back-end-go-developer](https://www.restorepoint.com/careers/back-end-go-developer) (https://www.restorepoint.com/careers/back-end-go-developer)

Thank you

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<https://restorepoint.com>