How to build a FreeBSD CI/CD environment based on pot containers

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whoami(1)

- Luca Pizzamiglio aka pizzamig@
- FreeBSD enthusiast
- Port committer since August 2017
- Building packages at trivago

Motivations

CI/CD is a well established best practices in any modern software development process

Growing interest on build/test software on FreeBSD

- Improve portability
- Provide FreeBSD support
- Provide artifacts for FreeBSD

Lack of FreeBSD support on all major CI systems

- Exception for Cirrus CI
  - VM based support to FreeBSD

Ugly workarounds

rust-lang / libc

Watch 27 | Star 455 | Fork 356

Code | Issues 49 | Pull requests 15 | Projects 0 | Insights

Tree: b46b6e2e72 — libc / ci / docker / x86_64-unknown-freebsd / **Dockerfile** — Find file | Copy path

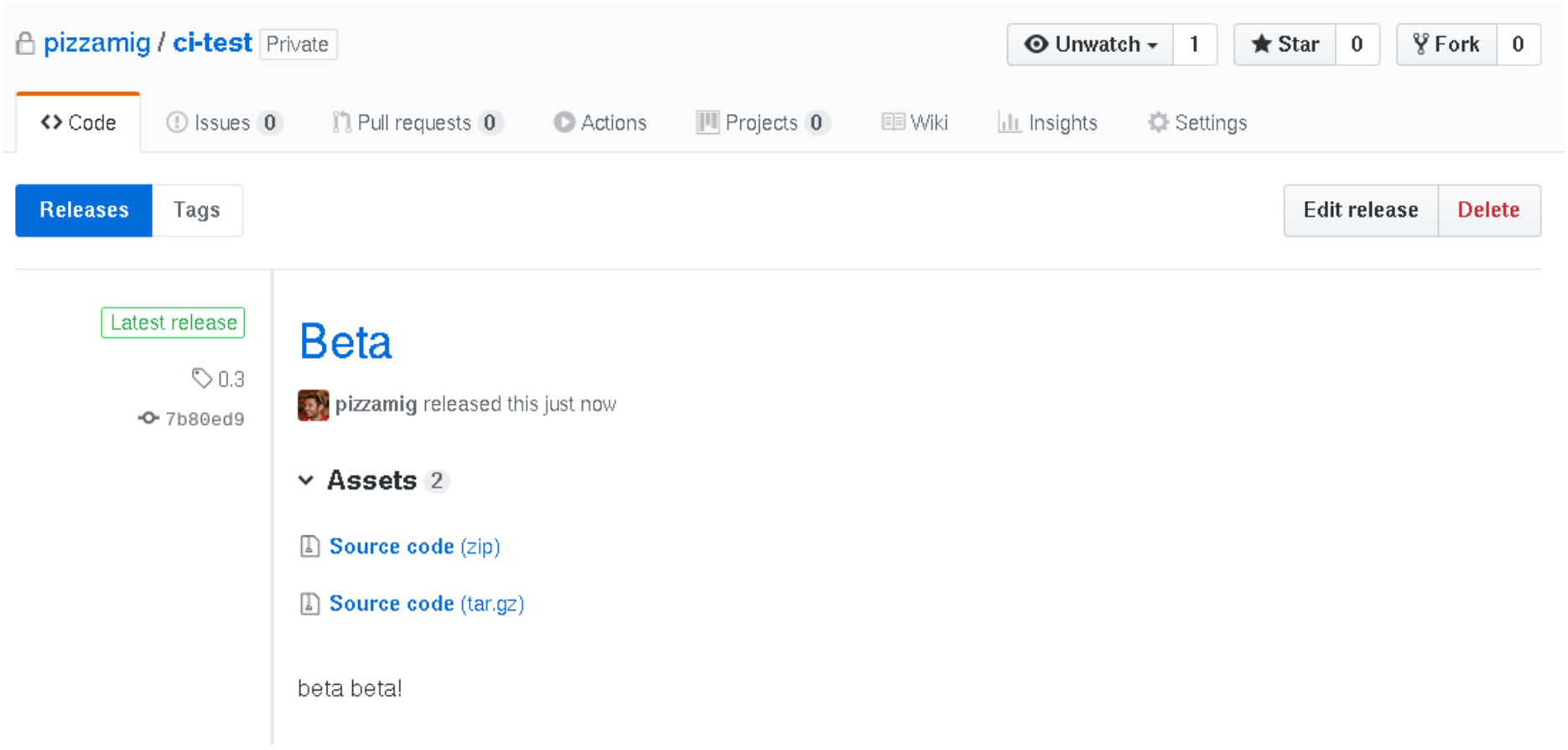
wezm Update FreeBSD docker CI to use FreeBSD 11.1 image — c1fa4b6 on Mar 15, 2018

3 contributors

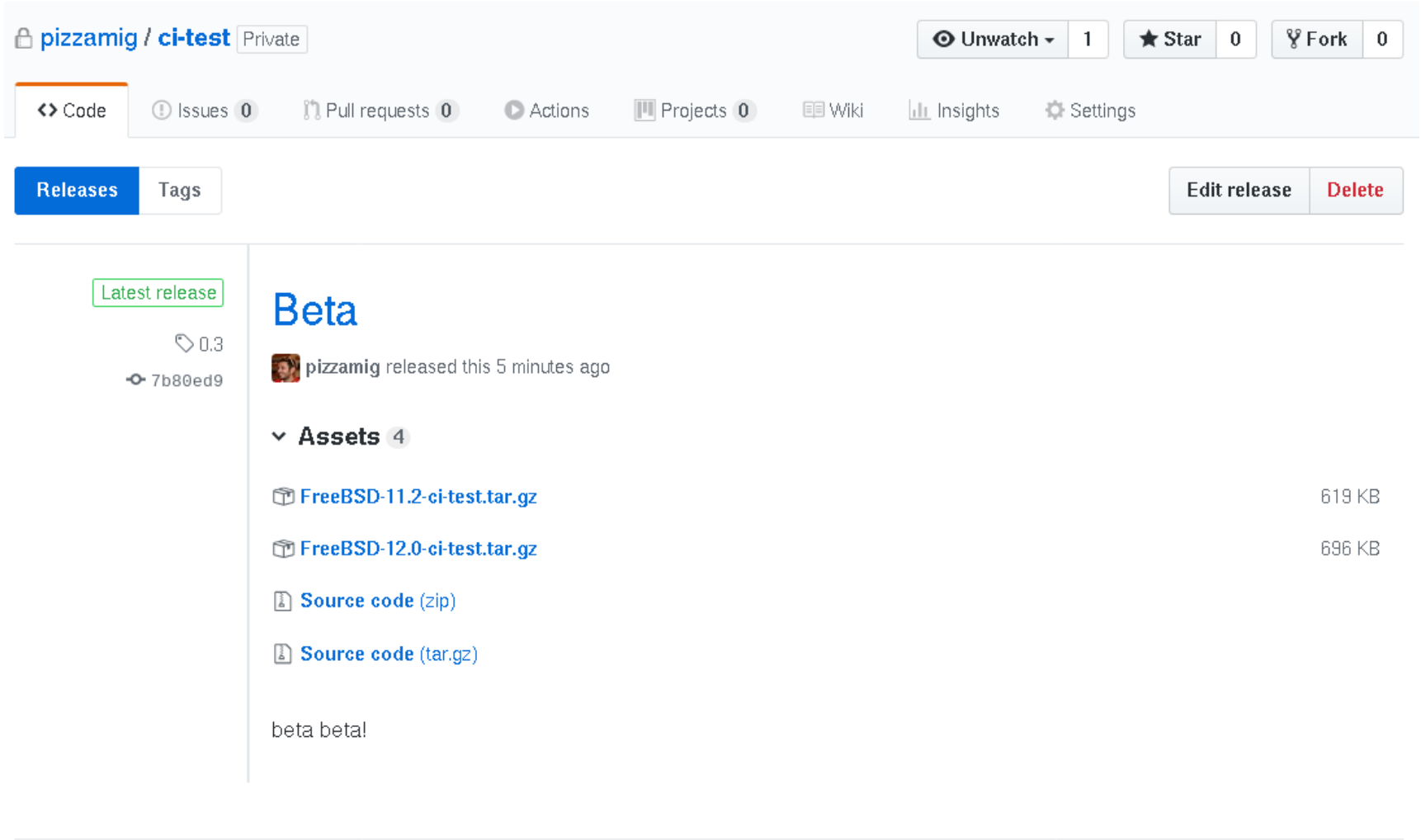
14 lines (10 sloc) | 448 Bytes — Raw | Blame | History

```
1  FROM wezm/port-prebuilt-freebsd11@sha256:43553e2265ec702ec72a63a765df333f50b1858b896e69385749e96d8624e9b0
2
3  RUN apt-get update
4  RUN apt-get install -y --no-install-recommends \
5    qemu genext2fs xz-utils
6  RUN apt-get install -y curl ca-certificates gcc
7
8  ENTRYPOINT ["sh"]
9
10 ENV PATH=$PATH:/rust/bin \
11     QEMU=2018-03-15/FreeBSD-11.1-RELEASE-amd64.qcow2.xz \
12     CAN_CROSS=1 \
13     CARGO_TARGET_X86_64_UNKNOWN_FREEBSD_LINKER=x86_64-unknown-freebsd11-gcc
```

My motivation 1/2



My Motivation 2/2



Then, what?

https://github.com/pizzamig/freebsd-ci

A command line tool to locally run a build process on FreeBSD

- Written in Rust

Still a lot limitations:

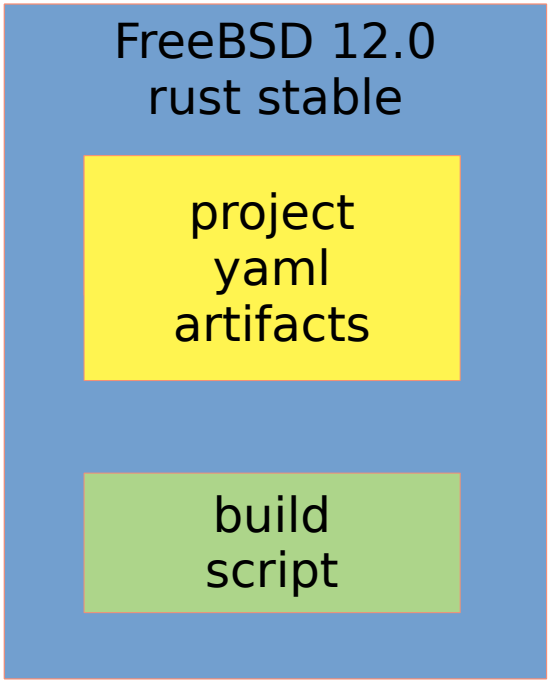
- Supports projects stored in github
- Supports rust projects

```
freebsd-ci -U username -P project [-T 1.0]
```

FreeBSD-ci

1. Download a github project and put it in a ZFS dataset
2. It parses the yaml file with instructions
3. From the images catalog, it clones the appropriate image and attach the ZFS dataset
4. It generates the build script
5. Run the build
6. Destroy the image
7. Revert the ZFS dataset and go back to point 3.

FreeBSD-ci



FreeBSD 11.2
rust stable

FreeBSD 11.2
rust beta

FreeBSD 11.2
rust nightly

FreeBSD 12.0
rust stable

FreeBSD 12.0
rust beta

FreeBSD 12.0
rust nightly

The yaml file

```
os: FreeBSD          # the operating system
                     # FreeBSD is the only one supported
FreeBSD:             # The FreeBSD version to use to build
    - '11.2'
    - '12.0'

update: true          # Run an update of the image before to build
                      # Update packages, toolchain, and so on
language: rust        # The project language

rust:                 # Which rust variant use to build
    - stable
    - nightly

no_deploy:            # Which combination shouldn't be deployed
    rust:
        - nightly
```

The build script template

```
#!/bin/sh
export HOME=/root
export PATH=/sbin:/bin:/usr/sbin:/usr/bin
PATH=$PATH:/usr/local/sbin:/usr/local/bin
PATH=/root/.cargo/bin:$PATH

if {{ update }} ; then
    rustup update
    pkg upgrade -y
fi

cd /mnt
if ! cargo clippy --release ; then
    exit 1
fi
if ! cargo build --release ; then
    exit 1
fi
if ! cargo test --release ; then
    exit 1
fi
if {{ upload }} ; then
    cargo install --path . -f
    tgt_dir="{{ os_family }}-{{ os_version }}-{{ project }}"
    tarball="{{ tarball }}"
    mkdir $tgt_dir
    mv $HOME/.cargo/bin/{{ project }} $tgt_dir
    tar zcf ${tarball} $tgt_dir
    if {{ delete_asset }} ; then
        curl -H "Authorization: bearer {{ token }}" \
            -X DELETE \
            https://api.github.com/repos/{{user}}/
{{project}}/releases/assets/{{asset_id}}
    fi
    curl -H "Authorization: bearer {{ token }}"\
        -H "Content-Type: application/gzip" \
        -X POST \
        --data-binary @${tarball} \
        https://uploads.github.com/repos/{{user}}/
{{project}}/releases/{{release_id}}/assets\?name\=${tarball}
fi
exit 0
```

Images catalog: the challange

We provide some pot flavors to generate images

```
#!/bin/sh

[ -w /etc/pkg/FreeBSD.conf ] && sed -i '' 's/quarterly/latest/' /etc/pkg/FreeBSD.conf
ASSUME_ALWAYS_YES=yes pkg bootstrap
touch /etc/rc.conf
sysrc sendmail_enable="NONE"

pkg install -y ca_root_nss curl

fetch -o /root/rustup.sh https://sh.rustup.rs
sh /root/rustup.sh -y --default-toolchain stable
export PATH="$HOME/.cargo/bin:$PATH"
echo setenv PATH $HOME/.cargo/bin:'$PATH' >> $HOME/.cshrc

rustup component add clippy-preview
rustup component add rustfmt

pkg clean -aqy
```

Next steps

Extend support

- More languages
- More platforms
- Better logging

Remote image catalog

- A system to download images from a remote catalog

Adopt an orchestration framework

- Nomad is a good candidate

Thanks!

Thanks a lot!

Questions?