

RELEASE FLOW PROPOSAL

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ABSTRACT. In this document software product release process is proposed and discussed.

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1. INTRODUCTION

Release flow is a set of steps to perform to release upcoming version of software product. Main aim of this document is to present simple and working model of software release using Semantic versioning [1], Azure pipelines and Mainline development [2]. Mainline development is also known as GitHub flow. Current document is motivated by Microsoft's *Adopt a GIT branching strategy* available at [3]. Below picture shows main idea of GitHub flow itself

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Sources: <https://github.com/kolosovpetro/ReleaseFlowProposal>

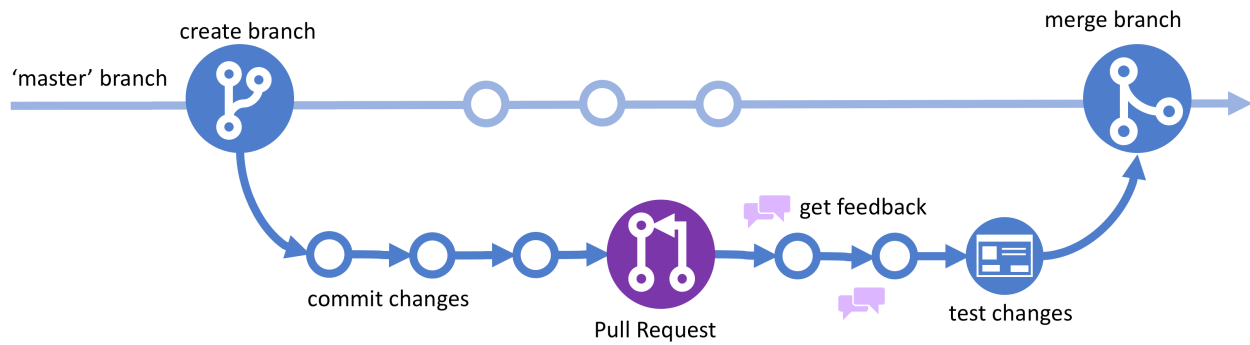


Figure 1. GitHub Flow diagram.

- **Master** – branch that contains tested, validated and verified code, ready to be released and deployed to production.
- **Feature** – branch that contains implementation of a new feature according to sprint plan. The **feature** branch is based onto **master**.
- **Bugfix** – branch that contains non-critical bug fix. The **bugfix** branch is based onto **master**, and merged back to **master** after fix is done.
- **Release/v*** – branch that contains upcoming release state of software product, serves to keep small changes and updates to **CHANGELOG** file. The **Release/v*** branch is based onto **master**. The **Release/v*** branch is considered to be long-living branch, it should not be deleted after code is deployed to production. After release is completed it is merged back to **master**.
- **Hotfix** – branch that contains critical bug fix. It is used to patch production environment and must be released as quick as possible. The **hotfix** branch is based onto the latest released **Release/v*** branch. After hotfix is released it is merged back to its base **Release/v*** and Cherry-picked [4] by **master**.

1.1. **Release process.** Having all above, assume we have initial semantic version of our application as **v1.0.0**, so that we must release upcoming version. The version **1.0.0** has

been tested by QA team, so that release was approved by whole team. General release steps to perform are following

- (1) **Code phase.** Software engineer creates pull request from recent **feature** branch to **master** branch, this pull request triggers Continuous Integration (CI) to start, CI runs tests, code quality checks etc., but deployment is not started yet, only CI.
- (2) **Code phase.** After all CI checks passed, pull request reviewed by team and every comment from code review is fixed – the **feature** branch is ready to be merged into **master** branch. No CI/CD pipeline triggered by the merge.
- (3) **Code phase.** Next, release engineer reviews software product changes documenting them in **CHANGELOG** file. Release engineer decides on the next Semantic Version [1] increment. For example, software product has breaking changes, then release engineer decides to increment the major part of semantic version, so that `v0.1.1` -> `v1.0.0`
- (4) **Code phase.** Release engineer creates new release as follows
 - Checkout to release branch: `git checkout -b release/v1.0.0`
 - Adding minor changes and **CHANGELOG** file update
 - Push release branch to remote: `git push origin release/v1.0.0`
 - Create tag: `git tag -a v1.0.0 -m "Release v1.0.0"`
 - Push tag: `git push origin v1.0.0`
- (5) **Build phase.** When new **TAG** is pushed to the remote repository, the build pipeline is being triggered [5], initializing the build phase of DevOps cycle. Therefore, the code is being built, tested and specific artifacts are being created and published.
- (6) **Release phase.** Release engineer validates the build artifacts, underlying infrastructure and deployment automations, ensuring smooth and reliable upcoming deployment.
- (7) **Deploy phase.** There are a few deployments scheduled including the environments **DEV**, **QA**, **UAT**. Deployments to **QA** and **UAT** environments are to be approved by designated personnel, meanwhile **DEV** environment to be deployed automatically.

- (8) Finally, the `Release/v*` branch is merged back to `master` after deployment is complete.

Entire release process is shown on the picture below

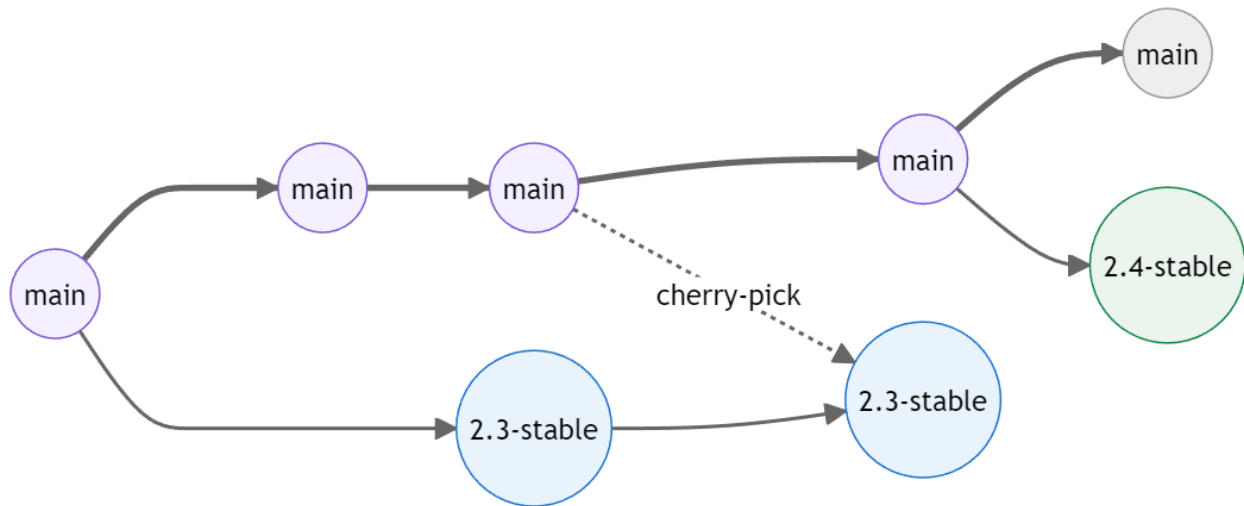


Figure 2. GitLab Flow diagram [6].

1.2. **Hotfix strategy.** Assume that our current released version of software product is `v0.2.0` and there is a critical bug appears. In order to release a hotfix the following set of steps to be executed:

- (1) Hotfix to be assigned to a software engineer.
- (2) Software engineer fixes critical bug and creates a pull request: `hotfix/id` -> `master`.
Yes, pull request is done to the `master` branch.
- (3) Pull request `hotfix/id` -> `master` is reviewed by team and merged.
- (4) Release engineer cherry-picks [4] recently merged hotfix from the `master` branch to the `release/v0.2.0` branch. Note that branch `release/v0.2.0` is long-living and kept minimum until next release.
- (5) Release engineer increments patch part of semantic version, e.g `v0.2.0` -> `v0.2.1`.
- (6) Release engineer creates and pushes new tag `v0.2.1`.
- (7) Hotfix deployment process is started after new tag is pushed.

2. CONCLUSIONS

In this document software product release process is proposed and discussed. Few useful GIT commands worth to remember:

- `git tag -a v0.1.0 -m "my version 0.1.0"`
- `git tag -d <tag_name>`
- `git push origin <tag_name>`
- `git push --delete origin <tag_name>`

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