



分支開發流程和策略

<http://ihower.tw>

2014/11

我是誰

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 - <http://ihower.tw>
- Instructor at ALPHA Camp
 - <http://alphacamp.tw>
- Git user since 2008

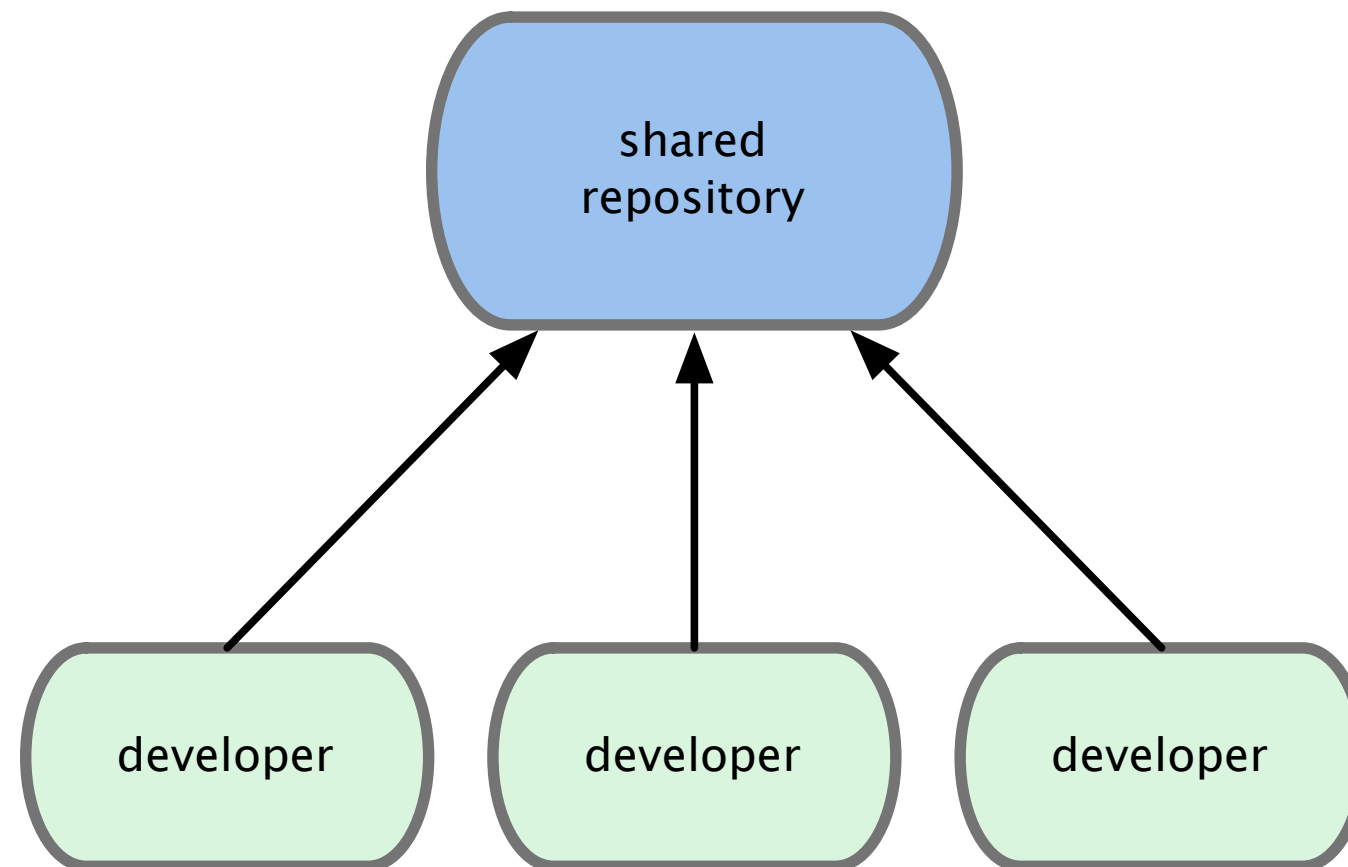


Git 的分支開發流程和策略

I. 常見的 Remote Repositories 的管理方式

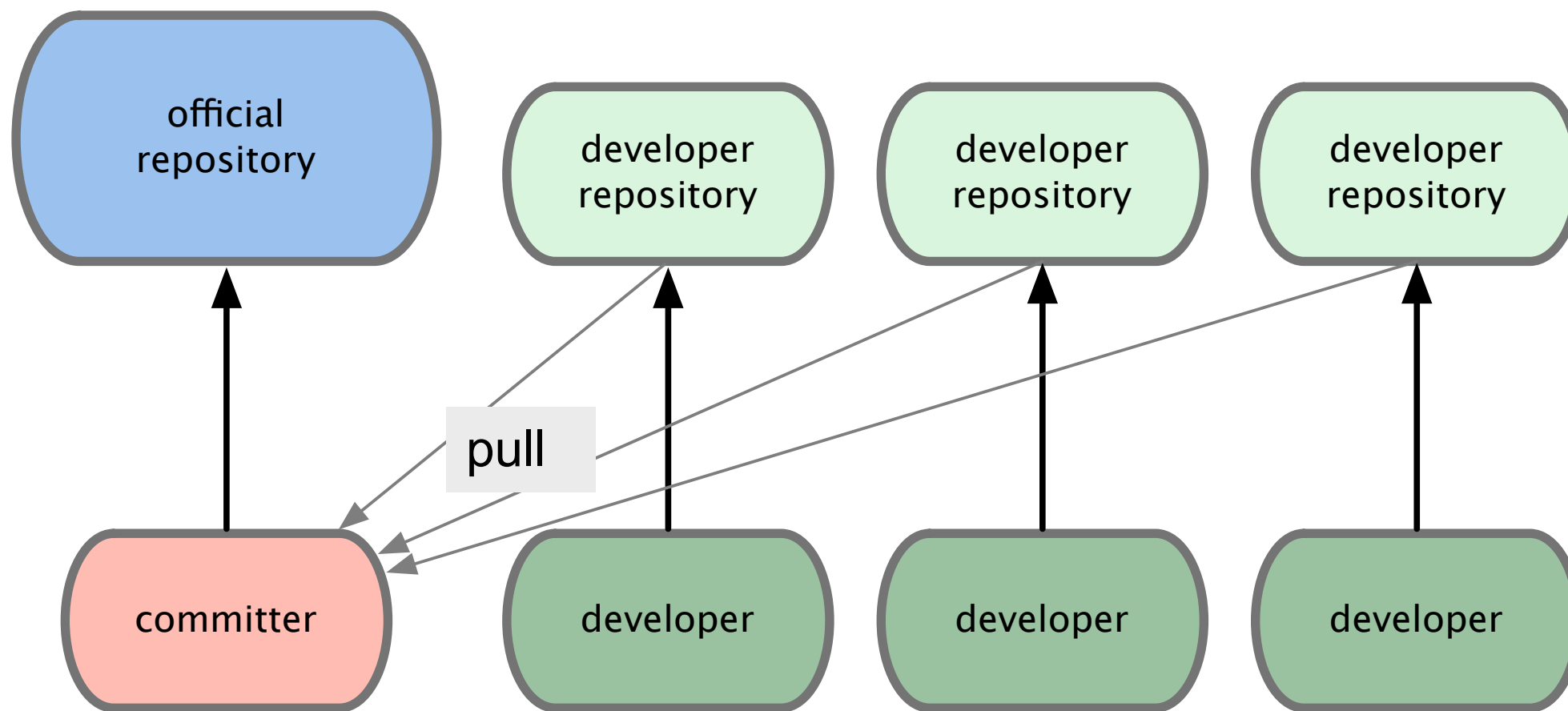
集中式工作流程

團隊內部私有專案，大家都有權限 Push 到共用的 Repository



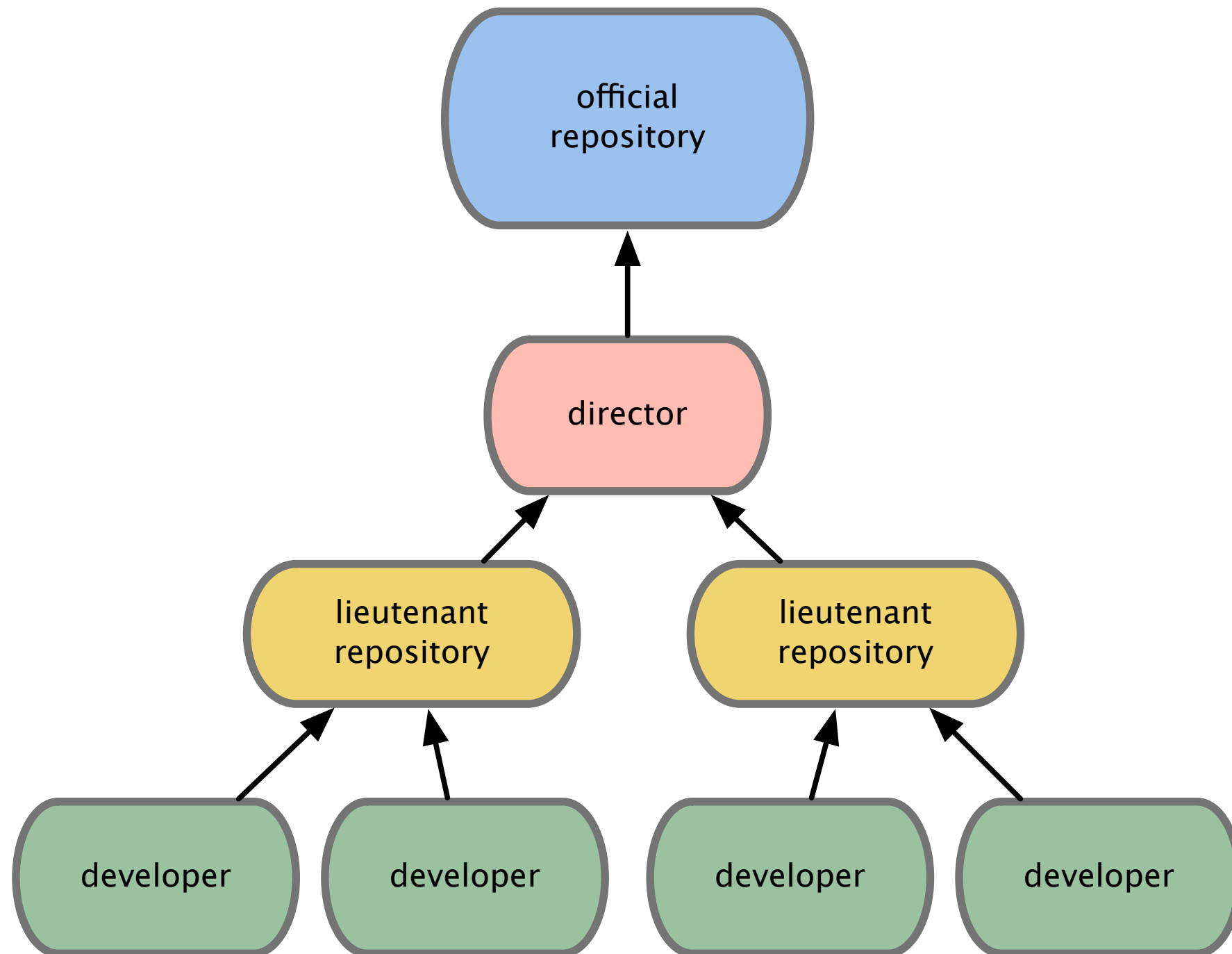
集成管理員工作流程

適合一般 Open Source 專案，只有少部分人有權限可以 Push 到 Repository，其他開發者用 request pull 請求合併。
例如 GitHub 提供的 Fork 和 Pull Request 功能



司令官與副官工作流程

多層權限控管，適合大型 Open Source 專案，例如 Linux Kernel



2. 團隊如何管理 Branches 分支?

Case Study

- Github flow
- Rails
- CMake
- Homebrew
- Gitflow


Github flow

- master 是 stable/production 可佈署的版本
- 任何開發從 master branch 分支出 feature branch
- 送 pull request 開始進行討論、code review 和測試
- 最後合併回 master 代表可以佈署了

<https://guides.github.com/introduction/flow/index.html>

GitHub Guides

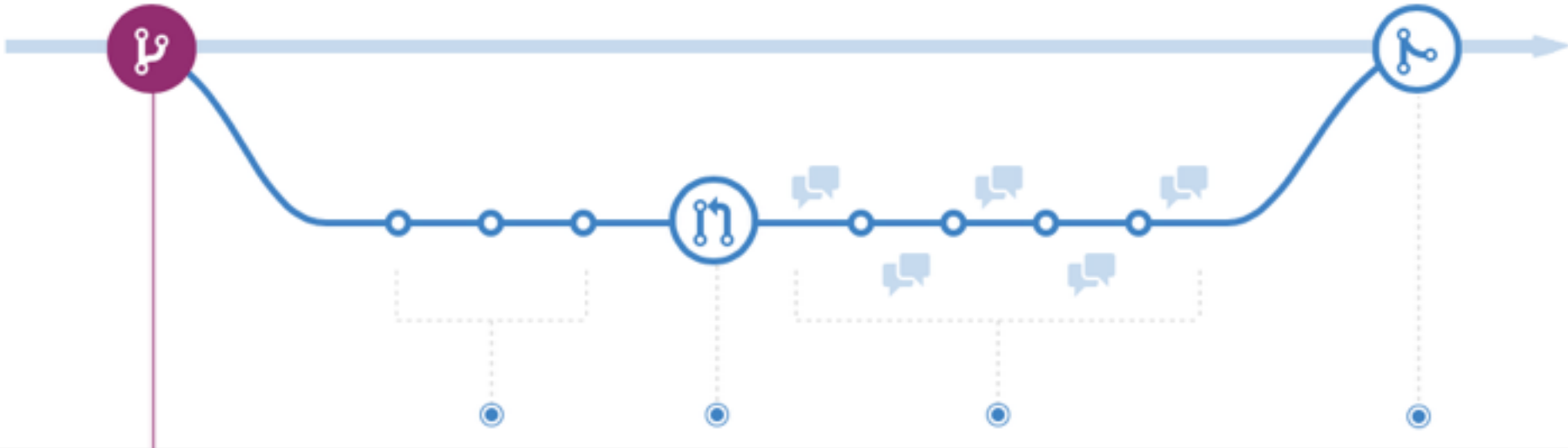
Video GuidesSupportGitHub.com



Understanding the GitHub Flow

🕒 5 minute read

GitHub Flow is a lightweight, branch-based workflow that supports teams and projects where deployments are made regularly. This guide explains how and why GitHub Flow works.



pros and cons

- 簡單、清楚、容易了解
- 搭配 Github 的 Pull Request 介面
- 沒有 release branch，東西一進 master 就上 production
- Web app 如果有問題很容易 revert，如果是 desktop/mobile 軟體就 GG 了

Ruby on Rails

- Rails 目前的版本是 4.1
- master 是開發版本，開發下一次的主要版本 4.2
- feature branches 審核完後，合併進 master
- maintenance branches，用 cherry-pick 做 backporting
 - 2-3-stable 已停止維護
 - 3-2-stable security fixes
 - 4-0-stable bugs fixes
 - 4-1-stable bugs fixes

RAILS

Stage

BRANCHES

2-3-stable

3-2-stable

4-1-stable

master

REMOTES

origin

TAGS

SUBMODULES

OTHER

rails (branch: master)

AllLocal"master"

Subject

masterorigin/masterMerge pull request #17408 from bf4/fix_rbx_test

Fix rbx generated Gemfile regex

Merge pull request #17310 from pabloh/optimize_strftime

Optimize TimeWithZoneTest#strftime

Merge pull request #16229 from byroot/stop-swallowing-url-generation-errors

UrlGenerationError are not caught as 404 anymore

Merge pull request #17405 from DanOlson/rewhere

Allow Relation#rewhere to work with infinite range values

Merge pull request #17374 from maurogeorge/scope-exception

Raises ArgumentError when try to define a scope without a callable

Merge pull request #14143 from derekprior/dp-compound-index-ordering

Use type column first in multi-column indexes

Merge pull request #17362 from bronze/fix_debug_exceptions_app

Show the user's application in the source window and select the correct trace list, closes #17312

Add back --skip-turbolinks and remove --skip-gems

Merge pull request #17330 from DanOlson/rewhere

Fix Relation.rewhere to work with Range values

Merge pull request #17397 from prathamesh-sonpatki/fix-type-boolean-error-msg-ci-skip

Fix typo in error message when non-boolean value is assigned to boolean column

Merge branch 'rishijain-update_docs_1'

Making the actionmailer docs more explicit to understand [ci skip]

Prefix internal method with _

Add CHANGELOG entry for #17064

Use new hash syntax

:scissors:

Merge pull request #17064 from frenkel/fix_select_tag_include_blank

Author

Yves Senn

Date

October

Benjamin Fleischer

October

Andrew White

October

Pablo Herrero

October

Andrew White

October

Jean Boussier

October

Sean Griffin

October

Dan Olson

October

Yves Senn

October

Mauro George

October

Yves Senn

October

Derek Prior

October

Rafael Mendonça F...

October

Byron Bischoff

October

Rafael Mendonça F...

October

Matthew Draper

October

Dan Olson

October

Rafael Mendonça F...

October

Prathamesh Sonpatki

October

Zachary Scott

October

Rishi Jain

October

Rafael Mendonça F...

October

Rafael Mendonça F...

October

Rafael Mendonça F...

October

Rafael Mendonça F...

October

Rafael Mendonça F...

October

Subject: Merge pull request #17408 from bf4/fix_rbx_test

Author: Yves Senn <yves.senn@gmail.com>

Date: Tue Oct 28 2014 16:29:28 GMT+0800 (CST)

SHA: 6c3bc9697641ba29959ca191c45e2d4a39a23d34

Refs: masterorigin/master

Parent: 00de820f0a072c2139cd7cd8b73a534b75261f8b

Parent: a7fd386b63752df861398ec74ae2ad945ec33741

Merge pull request #17408 from bf4/fix_rbx_test

Fix rbx generated Gemfile regex

56324 commits loaded

Console

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GitHub

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rails / rails

★ Star23,641Fork9,039

IssuesPull requestsLabelsMilestones

is:pr is:open

New pull request

432 Open ✓ 10,731 Closed

AuthorLabelsMilestonesAssigneeSort

Fix stale nested transaction records ✓

#17422 opened 5 hours ago by jaredjenkins

0

Fix guides snippet for registering a custom asset pipeline processor ✓ docs

#17420 opened 9 hours ago by pwnall

2

Add (failing) test for `:some_method.to_proc`-type callback filter ✗

#17413 opened 22 hours ago by janraasch

0

document change_column and change_column_default for abstract_mysql_adapter [ci skip] ✓ docs

#17411 opened a day ago by mcfiredrill

7

Avoid TZInfo::AmbiguousTime exceptions on non-DST to non-DST transitions. ✓

#17409 opened a day ago by philr

3

Specify in doc that `to_prepare` call back are run once in production

#17403 opened 2 days ago by bobbus

0

Show correct routes prefix with namespace ✓

#17389 opened 4 days ago by takady

0

ActionMailer https on URL with force_ssl = true ✓ actionmailer

#17388 opened 4 days ago by akampjes

9

pros and cons

- 基本上就是 Github flow 加上 maintenance branches 維護舊版的設計
- 非常多的 Open Source 專案採用這種形式
- 版本號(Tag)打在 master 上，透過 preview 和 beta 的版本號進行提前釋出

CMake

<http://public.kitware.com/Wiki/Git/Workflow/Topic>

- master 預備釋出的版本，feature branches 從這裡分支出去
- feature branch 完成後，合併進 next
- next 整合版本，完成的 feature branch 先合併到這裡進行測試
 - 在 next 測好的 feature branch，才合併進 master
 - 可以將 master 合併進 next，減少之後的 code conflicts
 - 不會將 next 合併進 master
- nightly 每天 1:00 UTC 自動從 next branch 分支出來跑自動測試

CMAKE

Stage

BRANCHES

master

REMOTES

origin

TAGS

SUBMODULES

OTHER

CMake (branch: master)

AllLocal"master"

Q Subject, Author, SHA

Subject	Author	Date
origin/next Merge branch 'master' into next	Brad King	October 27, 2014
Merge topic 'CTestCustom-suppress-sphinx-icon-warning' into next	Brad King	October 27, 2014
CTestCustom: Suppress sphinx warning about missing favicon	Brad King	October 27, 2014
Merge topic 'cpack-rpm-pre-post-install' into next	Brad King	October 27, 2014
CPackRPM: Support PREUN and POSTUN requirements	Evgeny Kalishenko	October 27, 2014
CPackRPM: Support pre(post) install scripts	Evgeny Kalishenko	October 27, 2014
Merge topic 'osx-gnu-fortran-deployment' into next	Brad King	October 27, 2014
OS X: Detect deployment target flags from GNU Fortran compilers	Brad King	October 27, 2014
Merge topic 'wince-tests' into next	Brad King	October 27, 2014
Tests: Run Tutorial steps 1-4 as tests for Windows CE	Pascal Bach	October 27, 2014
Merge branch 'master' into next	Brad King	October 27, 2014
Merge branch 'master' into next	Brad King	October 27, 2014
master origin/master Merge topic 'autorcc-depends'	Brad King	October 27, 2014
Merge branch 'release'	Brad King	October 27, 2014
Merge topic 'FPHSA-deref'	Brad King	October 27, 2014
Merge topic 'revert-definition-map-lookup'	Brad King	October 27, 2014
CMake Nightly Date Stamp	Kitware Robot	October 27, 2014
origin/nightly Merge topic 'find-boost-no-reroot' into next	Chuck Atkins	October 27, 2014
FindBoost: fix find_library call when using "re-rooting"	Guillaume Papin	October 27, 2014
Merge topic 'refactor-search-path-construction' into next	Brad King	October 27, 2014
Revert topic 'refactor-search-path-construction'	Brad King	October 27, 2014
Merge topic 'FPHSA-deref' into next	Rolf Eike Beer	October 27, 2014
FPHSA: remove unneeded variable dereferencing	Rolf Eike Beer	October 27, 2014
Merge topic 'autorcc-depends' into next	Stephen Kelly	October 27, 2014
QtAutogen: Regenerate qrc files if their input changes (#15074)	Stephen Kelly	October 27, 2014
Merge topic 'revert-definition-map-lookup' into next	Brad King	October 27, 2014

Subject: Merge topic 'autorcc-depends'

Author: Brad King <brad.king@kitware.com>

Date: Mon Oct 27 2014 23:29:17 GMT+0800 (CST)

Committer: CMake Topic Stage <kwrobot@kitware.com>

Date: Mon Oct 27 2014 23:29:17 GMT+0800 (CST)

SHA: a2456e157223255f0e2a71f2ddd510510e42b9e4

Refs: master origin/master

Parent: 0f068c177c3834aacc1b27e32c318b53adad06f9

Parent: 6e1c359fe9bee71c421a671108176d47fb415d93

Gist it

Merge topic 'autorcc-depends'

6e1c359f QtAutogen: Regenerate qrc files if their input changes (#15074)

a2995318 QtAutogen: Expand rccfiles into a vector early in the autogen process.

26006 commits loaded

Console

pros and cons

- 個別 feature branch 的狀態很清楚
- 需要發行 binary release 的軟體需要較正式、較花時間的釋出過程(feature branch -> next -> master -> release branch)。來確保釋出的軟體有足夠的測試。
- 但是線圖其實很不好追蹤，很多 merge commits 跟真正的 commits 混雜在一起
- Revert a merge commit 其實不好做

Homebrew

- 只有 master branch，沒有 merge commit
- 所有 feature branch 一律 rebase 和 squashed 後進主幹

LOCAL

Stage

BRANCHES

master

REMOTES

origin

TAGS

SUBMODULES

OTHER


local (branch: master)


AllLocal"master"


Q Subject, Author, SHA


Subject	Author	Date
master origin/master libuv 1.0.0-rc2 (devel)	take_cheeze	Octob
Dynamically link perl lib to system version.	blogabe	Octob
mkvtoolnix: update 7.3.0 bottle.	BrewTestBot	Octob
mkvtoolnix 7.3.0	David Christenson	Octob
zeromq: update 4.0.5_1 bottle.	BrewTestBot	Octob
czmq: add 2.2.0_1 bottle.	BrewTestBot	Octob
fontforge: update 20141014 bottle.	BrewTestBot	Octob
fontforge: general fixes.	Dominyk Tiller	Octob
google-appengine 1.9.14	Brett Koonce	Octob
appengine-java-sdk 1.9.14	Brett Koonce	Octob
go-appengine-sdk (amd64) 1.9.14	Brett Koonce	Octob
go-appengine-sdk (386) 1.9.14	Brett Koonce	Octob
libpgp-error: update 1.17 bottle.	BrewTestBot	Octob
libpgp-error 1.17	chdiza	Octob
scala: link docs correctly for IDEA.	Martin Burger	Octob
terraform: update 0.3.1 bottle.	BrewTestBot	Octob
terraform 0.3.1	John Eckhart	Octob
pidgin: update 2.10.10 bottle.	BrewTestBot	Octob
Pidgin 2.10.10	Arlo Breault	Octob
autojump: fix HEAD	Dominyk Tiller	Octob
cppcheck: update 1.67 bottle.	BrewTestBot	Octob
cppcheck 1.67	Filip Gospodinov	Octob
syncthing: update 0.10.3 bottle.	BrewTestBot	Octob
syncthing 0.10.3	Martin Schurig	Octob
tor: update 0.2.5.10 bottle.	BrewTestBot	Octob
tor: 0.2.5.10 stable/strip devel	Arlo Breault	Octob

Subject: libuv 1.0.0-rc2 (devel)

Author:  take_cheeze <takechi101010@gmail.com>

Date:  Sat Oct 25 2014 16:48:50 GMT+0800 (CST)

Committer:  Misty De Meo <mistydemeo@gmail.com>

Date:  Sun Oct 26 2014 04:06:30 GMT+0800 (CST)

SHA: 35d3af4ff562d6130a29e954a9dfb62ef56289be

Refs: **master** origin/master

Parent: f7b4c9e0e7ab8f0bde765a47f24d11aa11a3d038

libuv 1.0.0-rc2 (devel)

Closes #33575.

Gist it

38161 commits loaded

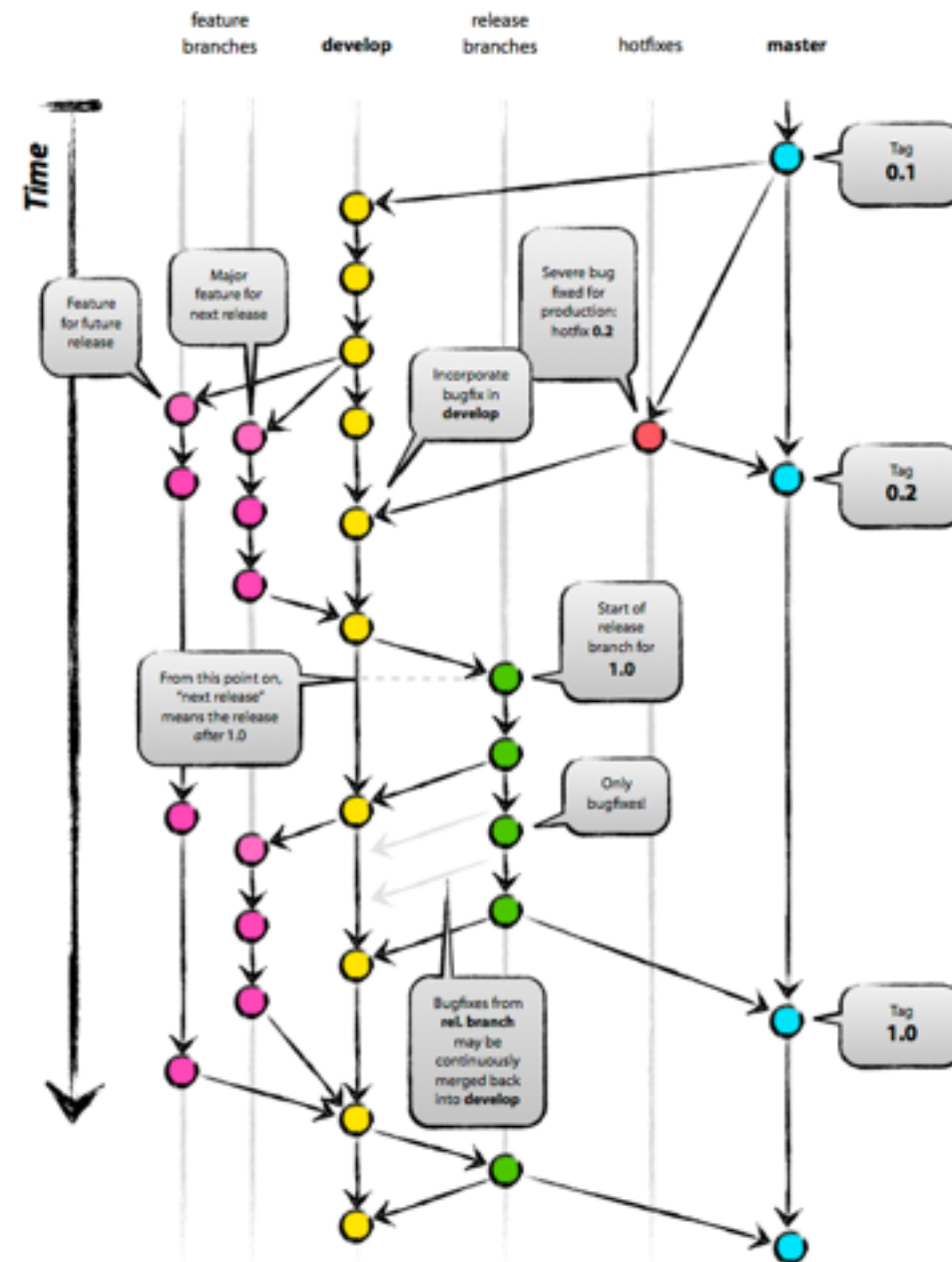
Console

pros and cons

- Homebrew 不只把 Git 當 VCS，甚至當成 delivery 部署機制
- 歷史紀錄超級 Readable 容易讀
- 沒有 release branch，釋出很快。有 bug 也很容易 revert、re-apply 或 bisect
- 合併前的 branch commits 訊息丟失

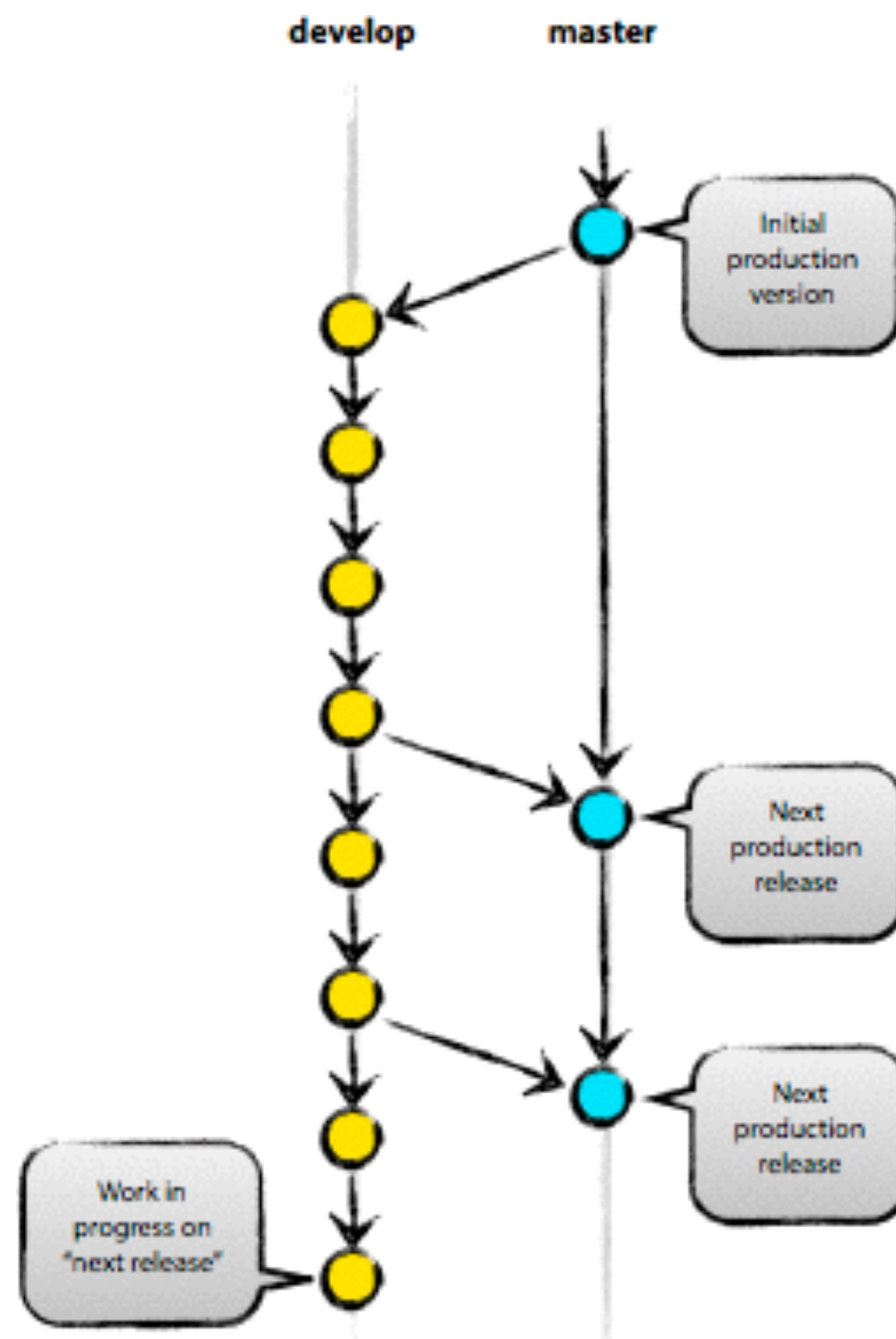
Git flow

<http://nvie.com/posts/a-successful-git-branching-model/>



兩個主要分支

- master: 穩定的 production 版
- develop: 開發版本，從 master 分支出來

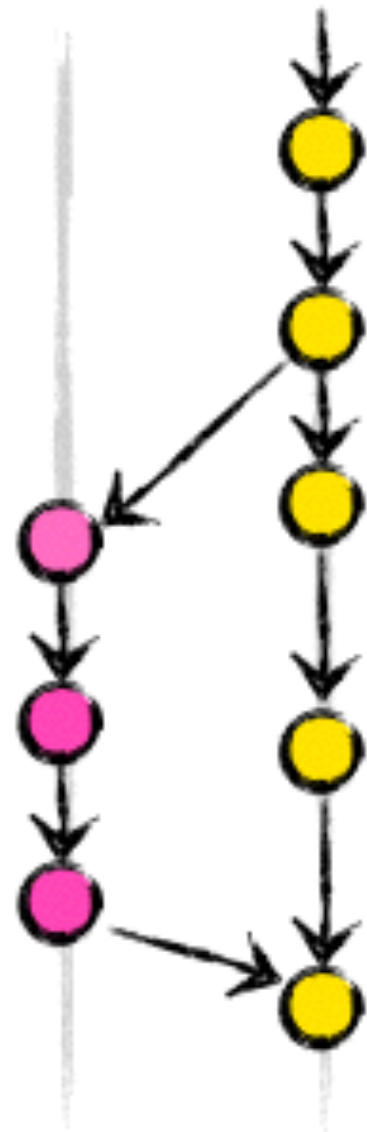


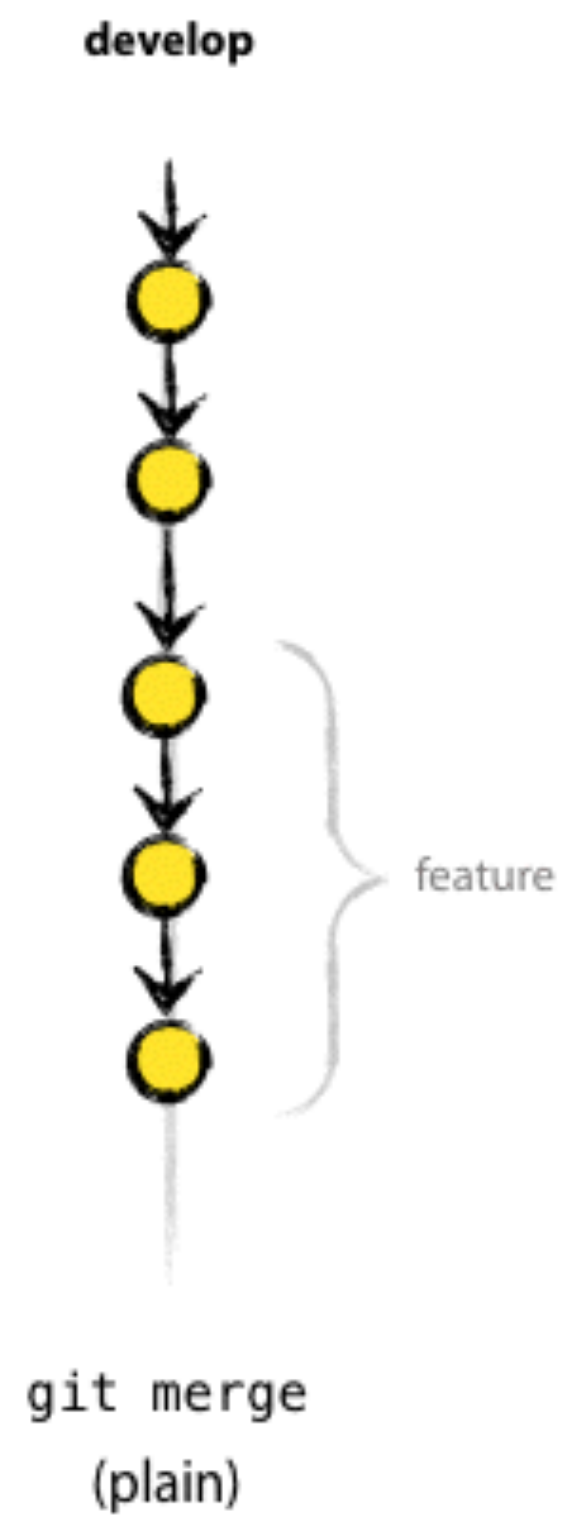
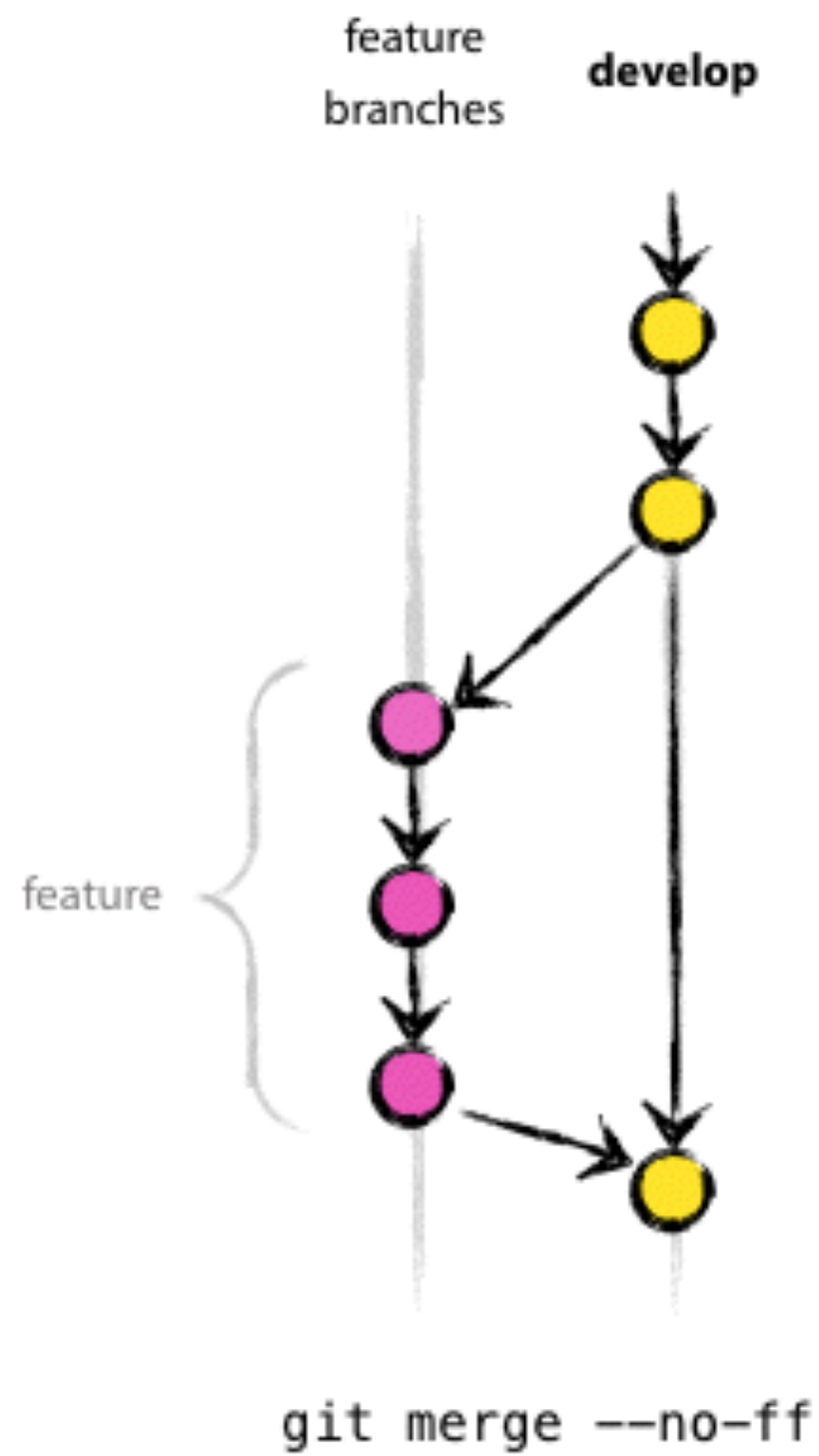
三種支援性分支(I)

- Feature branches
 - 開發新功能或修 bugs
 - 從 develop 分支出來
 - 完成後 merge 回 develop
 - 如果開發時間較長，則需定期同步 develop 主幹的程式(初學可用 merge，建議改用 rebase)，不然最後會合併不回去。

feature
branches

develop



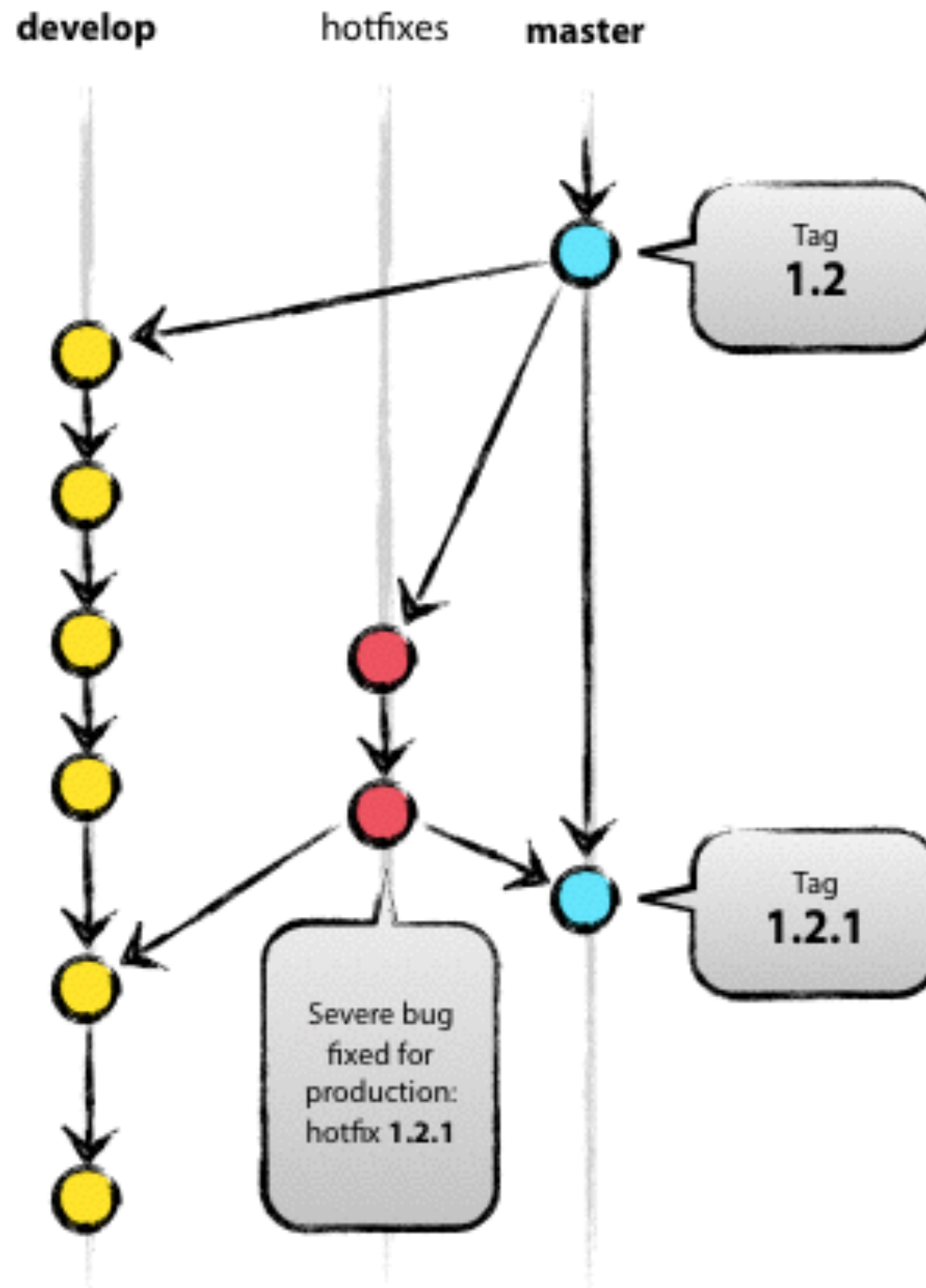


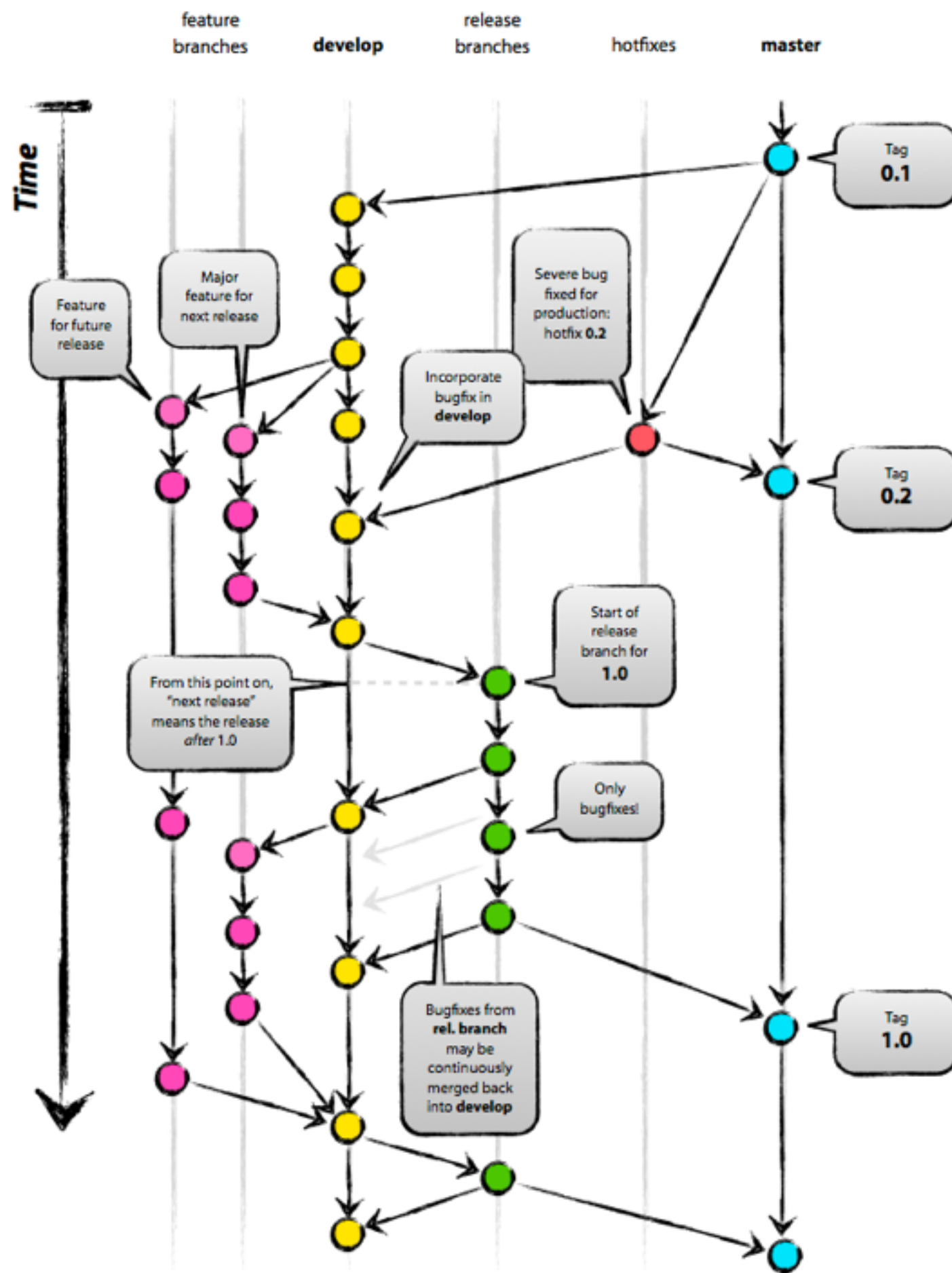
三種支援性分支(2)

- **Release branches**
 - 準備要 release 的版本，只修 bugs
 - 從 develop 分支出來
 - 完成後 merge 回 master 和 develop

三種支援性分支(3)

- Hotfix branches
 - 等不及 release 版本就必須馬上修 master 趕著上線
 - 會從 master 分支出來
 - 完成後 merge 回 master 和 develop





pros and cons

- 第一個出名的、有形式的 Git 分支工作流程
- 很清楚的追蹤 feature, release, hotfix 等 branches，確保釋出和審核流程
- 有點複雜，不適合小專案或 Open Source 專案
- 不適合頻繁釋出(Continuous Deployment)

Discussions

- Rebase before merge
- Feature branch issue
- Code review policy
- Release branch

I. Rebase before merge

- 在 merge 前，做不做 rebase 整理 commits?
- 建議能力和時間所及，就去做

rebase + merge 的完美合併法

(假設我們要將 feature branch 合併回主幹 develop)

- 原因

- feature branch 很亂，不時 merge 與主幹同步
- feature branch 有 typo，commit 訊息想改
- feature branch 有些 commits 想合併或拆開

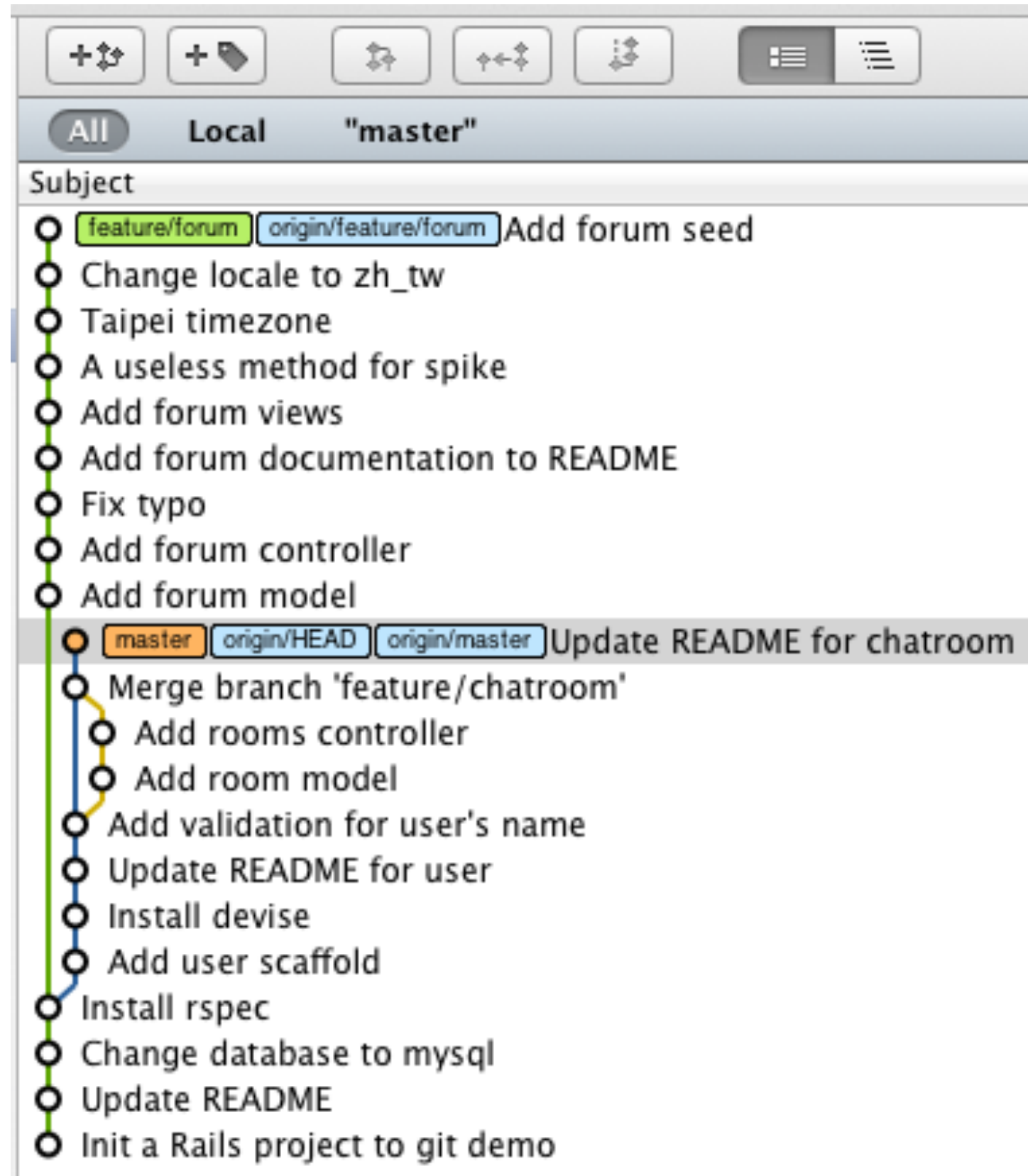
- 作法

- 先在 feature branch 做 `git rebase develop -i`
- (反覆整理直到滿意) `git rebase 分岔點 -i`
- 在從 develop branch 做 `git merge feature --no-ff`

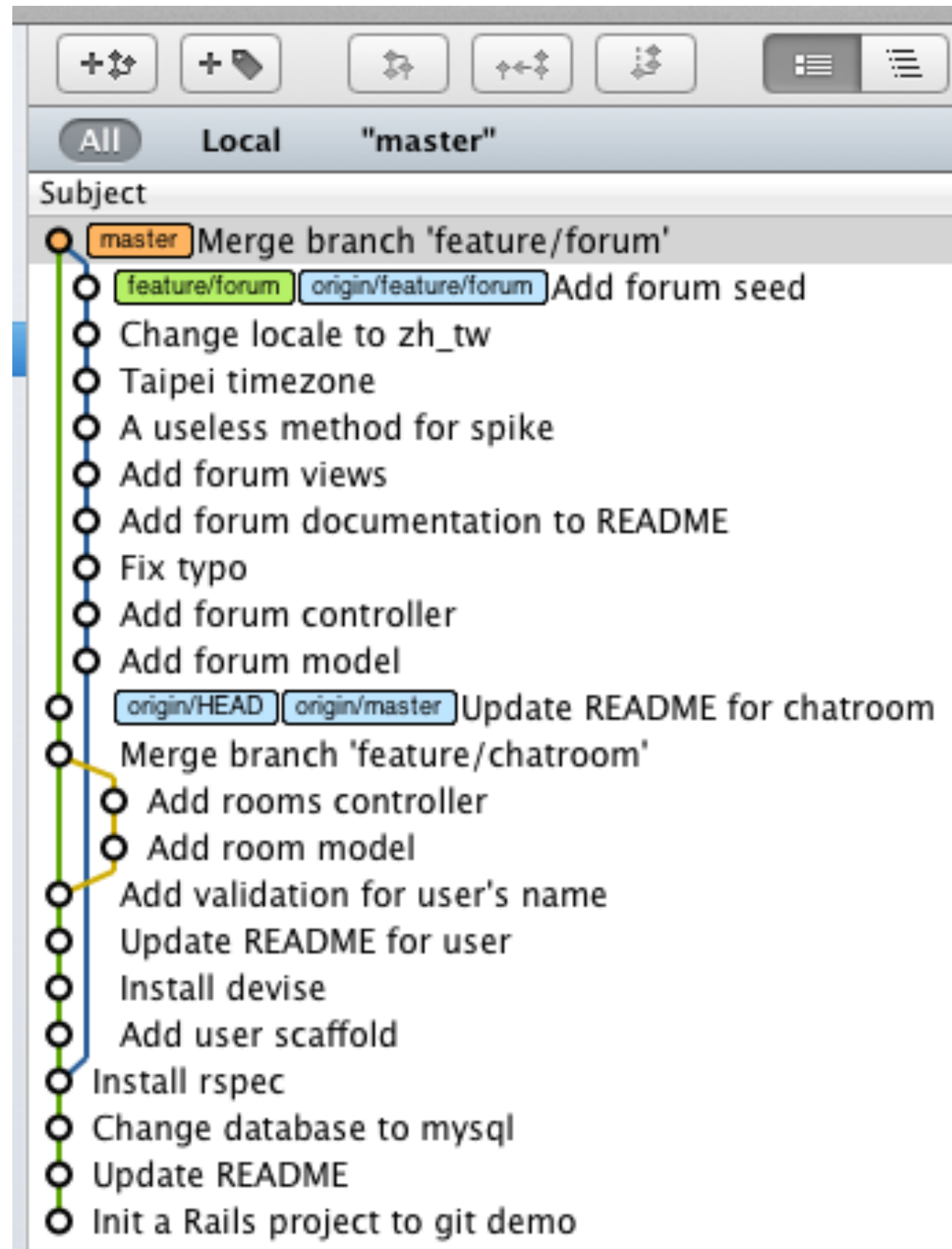
超級乾淨，每一次的 merge
commit 就代表一個功能完成



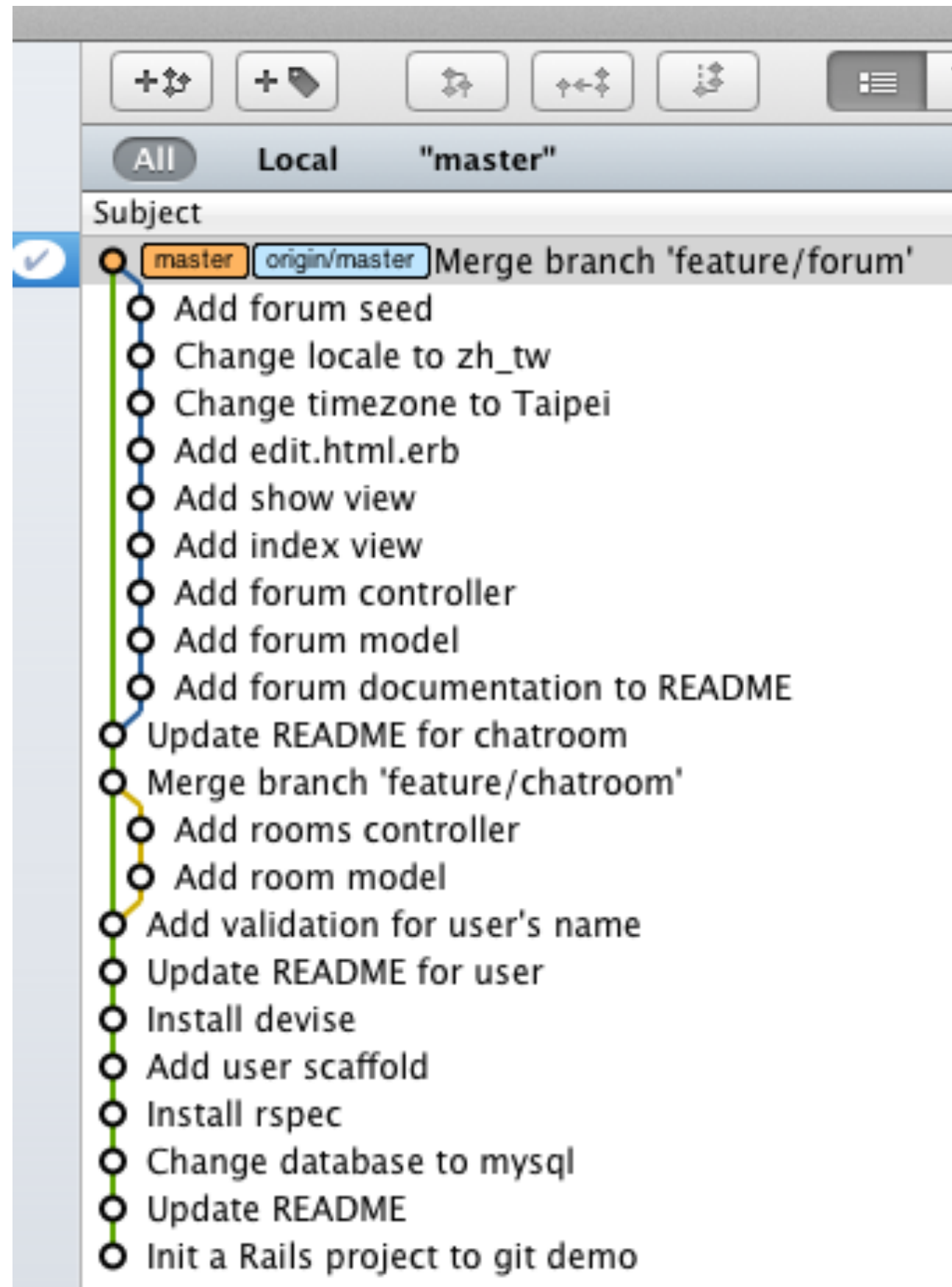
Demo (before merge)



Demo (normal merge)



Demo (rebase + merge)



注意事項 (I)

- 必須要加 `--no-ff` 才會有 merge commit。不然會是 fast-forward。
- rebase 之後的 feature branch 就不要再 push 出去了
- 如果有遠端的 feature branch，合併完也砍掉

注意事項 (2)

- 不求一次 rebase 到完美，不然中間的 conflict 會搞混。
- 可以一次改點東西就 rebase 一次，然後開個臨時的 branch 存檔起來，再繼續 rebase 自己直到滿意為止。

Rebase demo screencast

- <http://ihower.tw/blog/archives/6704>

2. Feature branch issue

- 根據 Feature 或 User Story 來建立 Branch 開發，直到 Branch 驗收完成才合併回主幹
- 可讓主幹總是 releasable
- 缺點是與主幹的分歧造成合併問題和不利於 CI
 - 主幹如果有更新，Feature Branch 必須經常去合併回來
 - Feature Branch 週期越短越好，幾天到不超過一個開發週期 (Iteration)
 - 不要同時開太多 Feature Branch (避免半成品)
 - 需要一個 Tech Lead 來負責主幹的合併

Feature Branch (cont.)

- 對 Open Source Project 來說非常有效率
 - Small core team 可以主導要不要接受 patch
 - Release date 不固定，可以慢慢考慮 patch
- 但對大型商業團隊來說，可能變成 Anti-pattern
(超長 branch 合併不回來)。團隊需要良好紀律：
 - codebase 需要良好模組化
 - 大家都乖乖定期更新主幹的 code，並且經常 commit 程式到主幹
 - Delivery team 不能因為時程壓力而輕率 merge

反思 Develop on Mainline ?

from Continuous Delivery ch.14

- 以唯一的 Mainline branch 作為開發用途
 - 還是可以開以不合併為前提的 branch，例如 release branch 或 spike 實驗
- Continuous Integration 最好做，程式碼總是 integrated 的狀態
- 開發者總是拿到最新的 code
- 避免開發後期 merge hell 和 integration hell 的問題
- 缺點：releasable 程度可能降低，必須在架構設計上有增量式開發的能力和技巧。

在單一Branch 上做 增量式開發的技巧

- **Feature Toggle**

<http://martinfowler.com/bliki/FeatureToggle.html>

- **Branch By Abstraction**

<http://continuousdelivery.com/2011/05/make-large-scale-changes-incrementally-with-branch-by-abstraction/>

Feature Toggle

- 功能完成，不代表業務面需要馬上上線
- 擔心 Feature branch 放太久臭掉?
- 建議先合併進主幹! 但是 UI 先藏起來即可!
- 甚至是設計權限，讓 admin 可以提早看到做 production 的線上測試

3. Code Review Policy

- 規定只有 project leaders 可以 commit/merge 進 develop branch。
- 規定只有 release team 可以管理 master branch。
- 其他開發者都開 topic branches，完成後發 pull request，做完 code review 後，沒問題才 merge 進 develop。
- 例如：GitHub 的 pull request 可以作，但沒有強制性



lhower 10

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Search...

rails / rails

Unwatch

Fork

7,740

1,322

Source

Commits

Network

Pull Requests (18)

Graphs

Branch: master

Open

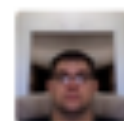
chriseppstein wants someone to merge 3 commits into rails:master from chriseppstein:body_attributes

#30

Discussion

Commits <> 3

Diff >> 6



chriseppstein opened this pull request September 19, 2010

Body attributes and some new Tag Helpers

Having a consistent convention for body classes makes styling easier :) This approach also let's the body live in the layout but still be modified by the template if necessary.

Open

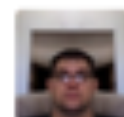
+ 239 additions

- 2 deletions

All Pull Requests



chriseppstein and jeremy are participating in this pull request.



chriseppstein added some commits

December 21, 2010

739108c New helper methods for working with tag attributes:

d299f22 Make it easier to manage the body tag in the layout from templates.

d337d1b Convert the default scaffold to use the body_tag helper.



jeremy commented

January 10, 2011

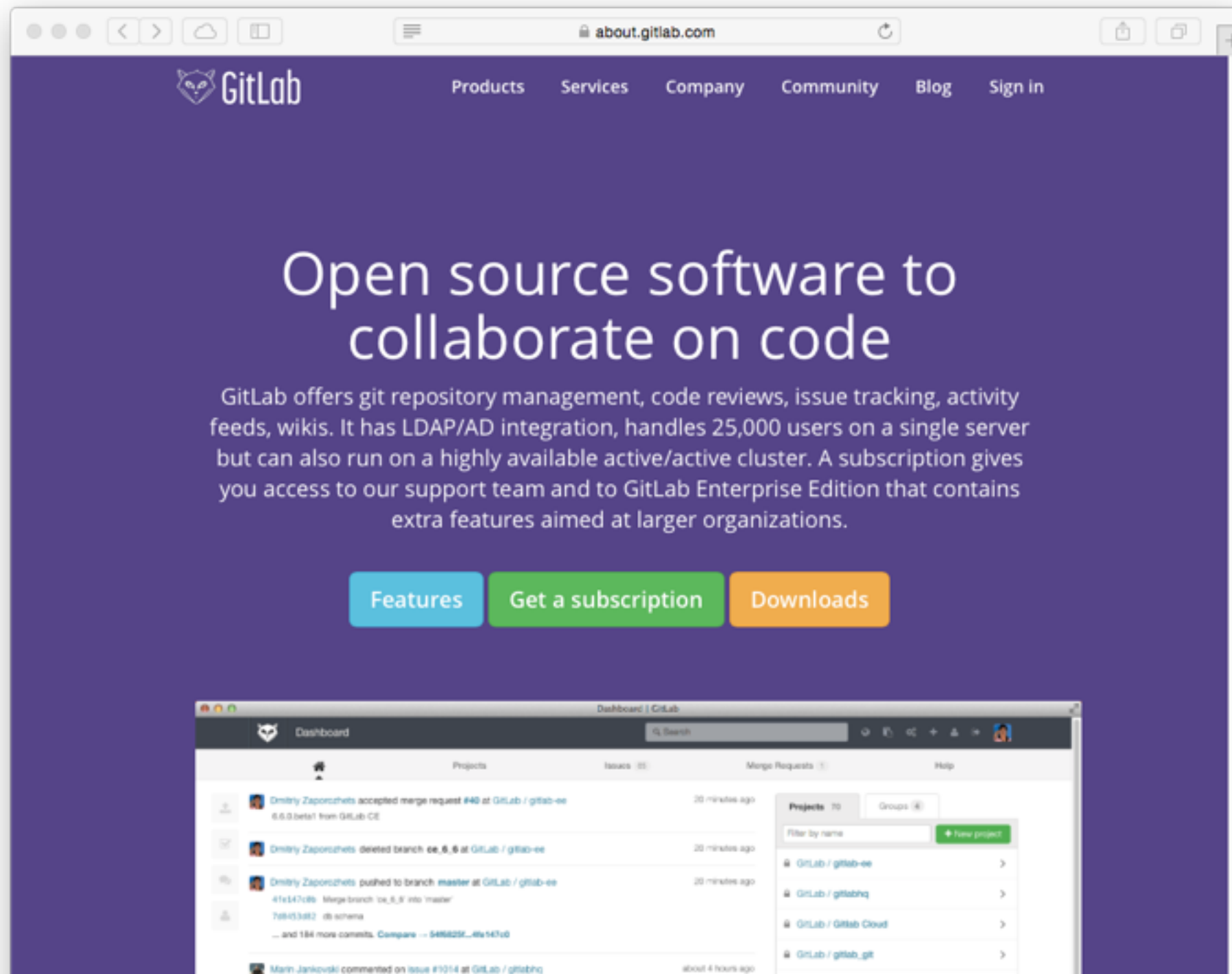
I like this idea (and I use a similar low-tech helper) but I'm concerned it introduces a broad API for such a simple task. And the API is all at the view level despite being request-wide state, so you can't add attributes in your controller.



chriseppstein commented

January 10, 2011

GitLab



GitLab is used in more than **100,000** organizations

gitlab.com

5 matches < > 🔍 branch ⚙ Done

Permissions

Users have different abilities depending on the access level they have in a particular group or project.

If a user is both in a project group and in the project itself, the highest permission level is used.

If a user is a GitLab administrator they receive all permissions.

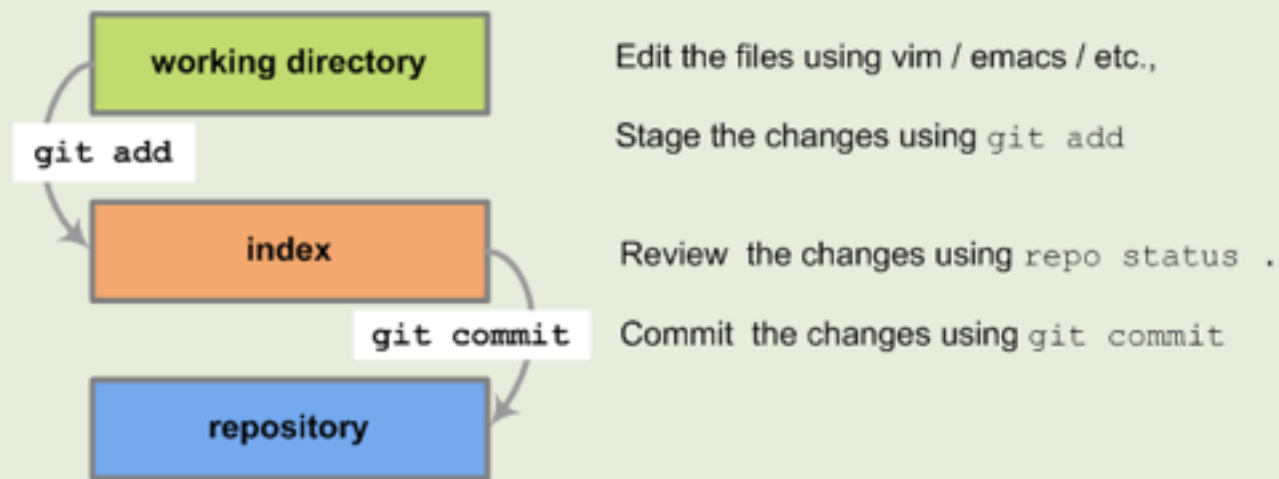
Project

Action	Guest	Reporter	Developer	Master	Owner
Create new issue	✓	✓	✓	✓	✓
Leave comments	✓	✓	✓	✓	✓
Pull project code		✓	✓	✓	✓
Download project		✓	✓	✓	✓
Create code snippets		✓	✓	✓	✓
Create new merge request			✓	✓	✓
Create new branches			✓	✓	✓
Push to non-protected branches			✓	✓	✓
Remove non-protected branches			✓	✓	✓
Add tags			✓	✓	✓
Write a wiki			✓	✓	✓
Manage issue tracker			✓	✓	✓
Manage labels			✓	✓	✓
Create new milestones				✓	✓
Add new team members				✓	✓
Push to protected branches				✓	✓
Enable/disable branch protection				✓	✓
Rewrite/remove git tags				✓	✓
Edit project				✓	✓
Add deploy keys to project				✓	✓

Android

- Repo is a repository management tool that we built on top of Git
- Gerrit is a web-based code review system for projects that use git

<https://source.android.com/source/developing.html>



Common Commands

<code>repo init</code>	initializes a new client	
<code>repo sync</code>	syncs client to repositories	
<code>repo start</code>	starts a new branch	
<code>git add</code>	stages files	<code>git diff</code>
<code>repo status</code>	shows status of current branch	working directory
<code>git commit</code>	commits staged files	index
<code>git branch</code>	shows current branches	repository
<code>git branch [branch]</code>	creates new topic branch	
<code>git checkout [branch]</code>	switches HEAD to specified branch	<code>git diff --cached</code>
<code>git merge [branch]</code>	merges [branch] into current branch	working directory
<code>git diff</code>	shows diff of unstaged changes	index
<code>git diff --cached</code>	shows diff of staged changes	repository
<code>git log</code>	shows history of current branch	
<code>git log m/[codeline]..</code>	shows commits that are not pushed	
<code>repo upload</code>	uploads changes to review server	

Facebook

- <http://phabricator.org/>

The screenshot shows the Phabricator web interface. The top navigation bar includes the Phabricator logo, a search bar, and user profile icons. The left sidebar contains several navigation links with icons and counts:

- Differential** (Review Code) - 105
- Maniphest** (Tasks and Bugs) - 20
- Pholio** (Review Mocks and Design)
- ChatLog** (IRC Logs)
- Feed** (Review Recent Activity)
- Phriction** (Wiki)
- Diffusion** (Host and Browse Repositories)
- Audit** (Browse and Audit Commits)

The main content area is divided into two sections:

My Eng Team

D9672 Remove `welcome.html` config option Accepted · Reviewers: chad	Jun 23 2014, 8:22 PM Author: epriestley
D8685 Action submenus Accepted · Reviewers: chad, btrahan	May 12 2014, 8:46 AM Author: epriestley

Needs Triage

T6157 Failing to parse patch with binary delta No Projects	Mon, Sep 22, 2:52 AM
T6155 Panels should be simply hidden to users without the permissions to see Dashboards	Mon, Sep 22, 11:19 AM
T6154 XHPAST fails to recognise some syntax errors XHPAST	Sun, Sep 21, 1:17 PM Assigned: joshuaspen

4. Release branch?

釋出週期越短
每天或 Continuous Deployment

釋出週期越長
數週或需要等 app store 審核



可以不需要 Release branch
直接主幹當 production 版

需要較穩定的
Release branches

開發與佈署流程

<http://ihower.tw/blog/archives/7798>

- 分支流程不只與開發相關，也與測試和軟體部署(釋出)流程相關
- 什麼時候，哪個分支跑 CI 自動測試?
- 什麼時候，哪個分支佈署到 Staging Server 進行人工測試?
 - 使用 Github flow 的話，需要讓每個 feature branch 都可以上 CI 和 staging server 環境
 - 或是採用 CMake 解法，有一個 next(staging) branch 專門用來整合跑 CI，這個 branch 不合併回 master

與專案管理的搭配

- Scrum (有 iteration 開發週期)
 - 比較適合搭配有 release branch 的 Git flow
- Kanban (沒有 iteration 開發週期)
 - 比較適合 Github flow 流程

結論

- Github flow 或 Gitflow 二選一
 - desktop/mobile software：用 Gitflow
 - 想要嚴謹的流程：用 Gitflow
 - 頻繁釋出的 Web app: 用 Github flow

謝謝，請多指教

<http://ihower.tw>



參考資料

- <http://ihower.tw/blog/category/git>
- <http://pragprog.com/screencasts/v-jwsceasy/source-control-made-easy>
- <http://www.youtube.com/watch?v=4XpnKHJAok8> Linux 的演講
- <http://www.softdevtube.com/2013/02/05/advanced-git/>
- <http://git-scm.com/book>
- Git from the bottom up
<http://ftp.newartisans.com/pub/git.from.bottom.up.pdf>
- Version Control with Git, O'Reilly
- <http://nfarina.com/post/9868516270/git-is-simpler>
- <http://think-like-a-git.net/sections/graph-theory.html>

- Git in Practice, Manning
- <https://peepcode.com/products/git>
- <https://peepcode.com/products/advanced-git>
- Git Internals, Peepcode
- Pragmatic Version Control Using Git, Pragmatic
- Pragmatic Guide to Git, Pragmatic
- Continuous Delivery Ch.14
- <https://www.atlassian.com/git/tutorials/comparing-workflows>
- <https://guides.github.com/introduction/flow/index.html>