Orientation in Objects

Integrierst du schon oder branchst du noch?

Müssen sich Feature Branches und CI widersprechen?

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Version: 1.2

Gliederung

Orientation in Objects

- That's just, like, your opinion, man
- This aggression will not stand, man
- Let’s go bowling

Gliederung

Orientation in Objects

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Been there, done that

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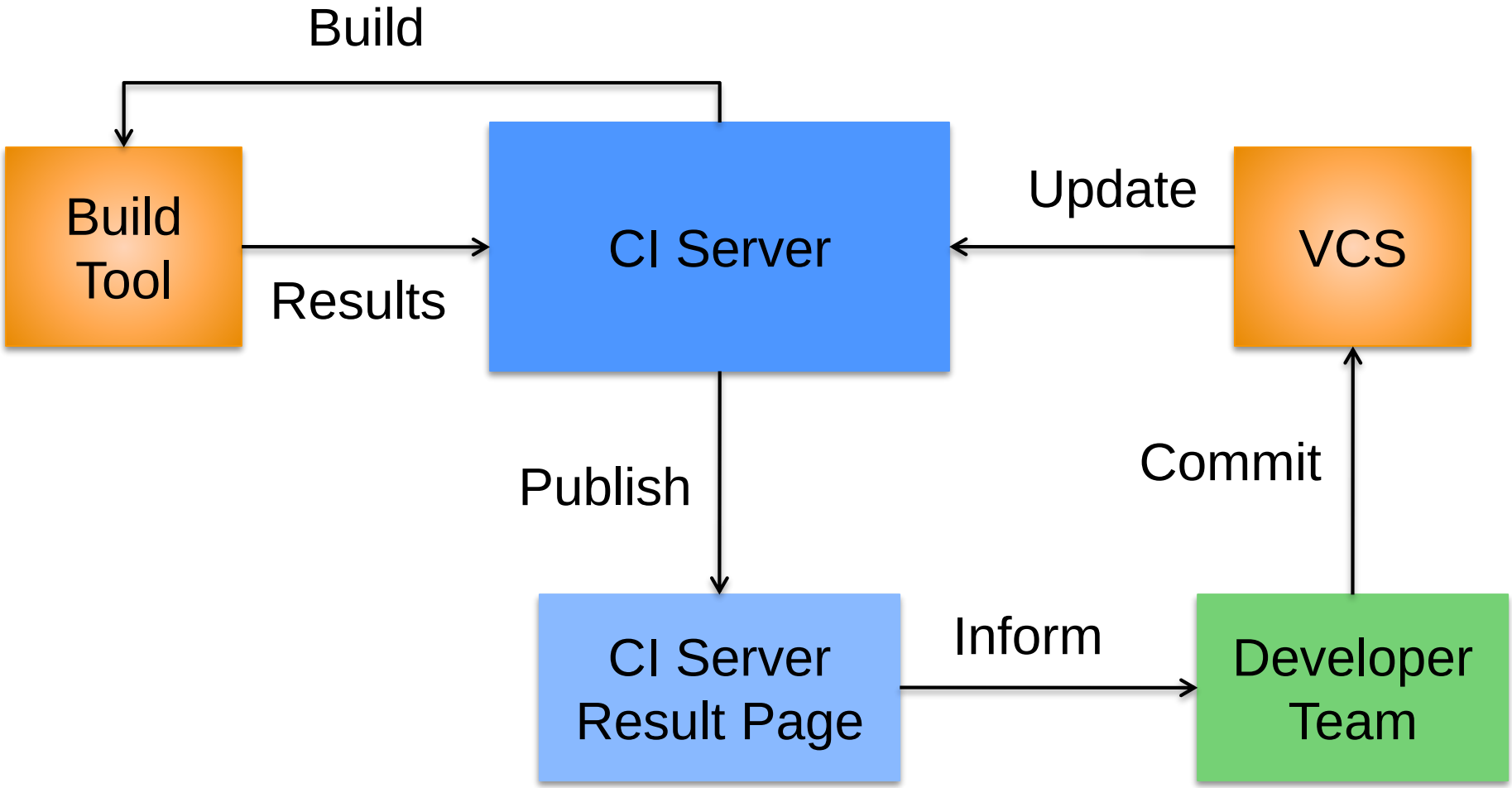

Schlüssel zum Erfolg

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- „Continuous Integration” Artikel von Martin Fowler im Jahr 2000
  - *„[…] focus […] on the key practices that make up effective CI”*
- Key Practice Nr. 4 *„Everyone Commits To The Mainline Every Day*”
  - Falls möglich auch häufiger um Konflikte früh zu entdecken
  - Auch Ermunterung, Arbeit in Happen von wenigen Stunden aufzuteilen
- Begriff der „Mainline” ist auch an andere Stellen sehr zentral
  - *„Pretty much everyone should work off this mainline most of the time.*”
- Branches werden als überbeanspruchtes VCS Feature betrachtet
  - *„Keep your use of branches to a minimum”*

A different sort of animal?

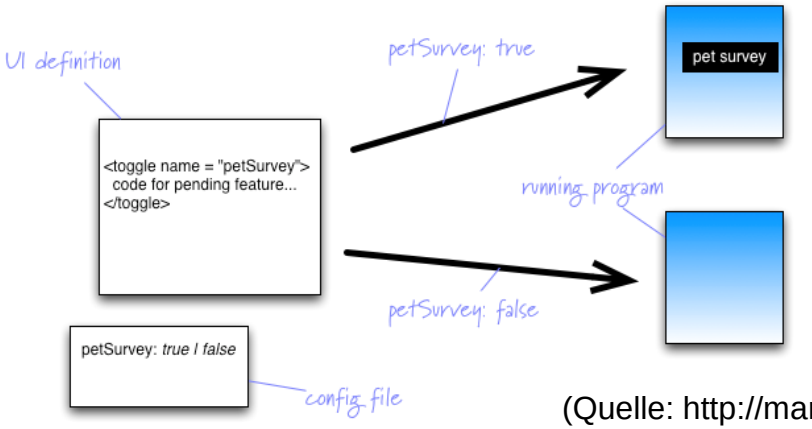
Orientation in Objects

- Technische Empfehlungen muss man im zeitlichen Kontext sehen
  - tl;dr : Das war vor Git und Branches mit SVN waren damals kein Spaß
- Eigener „FeatureBranch” Artikel von Martin Fowler im Jahr 2009
  - „*practice of [DVCS] feature branching and how it fits in with CI*”
- Ursprüngliche Kernaussage bleibt bestehen
  - „*So unless feature branches only last less than a day, **running a feature branch is a different animal to CI**. I've heard people say they are doing CI because they are running builds, perhaps using a CI server, on every branch with every commit. **That's continuous building**, and a Good Thing, but there's no integration, so **it's not CI**.*”
- Neben „Semantic Conflicts” Probleme bei “OpportunisticRefactoring”

Alternative „Feature Toggles”

Orientation in Objects

- „Feature Toggles” als mögliche Alternative zu „Feature Branches”
  - „*mechanism for pending features taking longer than a […] release cycle*”
- Erlaubt Feature Aktivierung bzw. Deaktivierung zur Laufzeit
  - Standardtechnik mit dedizierten Tools (Togglz, FF4J, …)
- Hat wie jede Technik auch eine Menge bestimmter Nachteile
  - „*kind of technical debt*”, Code wird trotz Toggle in Produktion released

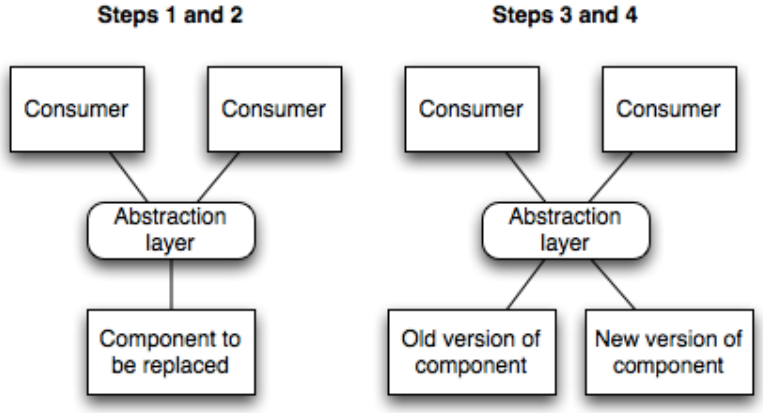


(Quelle: http://martinfowler.com/bliki/FeatureToggle.html)

Alternative „Branch by Abstraction”

Orientation in Objects

- „Branch by Abstraction” als mögliche Alternative zu Branches
  - „*alternative […] when making large-scale changes to your system*”
- Betroffener Systemteil erhält eine eigene Abstraktionsschicht
  - Diese erledigt notwendige Delegierung zwischen alten und neuem Code
- Auch dieser Ansatz kann Nachteile haben
  - Sockelkosten bei „*big ball of mud”*, Gefahr bei fehlender „*exit strategy”*



(Quelle: https://continuousdelivery.com/2011/05/make-large-scale-changes-incrementally-with-branch-by-abstraction/)

Are you not entertained?

Orientation in Objects

- Damit sind durch CI alle Version Control Probleme gelöst, oder?
- Kann etwas passieren wenn alle täglich in „Mainline" einchecken?
- Aus Artikel „SCM: Continuous vs. Controlled Integration" von 2008
  - **Mainline instability**: „*All the changes directly hit the mainline, so making it unstable is relatively easy. Developers always work against the latest sources instead of against well-known releases*"
  - **Unnecessary bug spreading**: „*bug entering the mainline will be spread to all developers in a short time [and] several developers will end up fixing [it]"*
  - **No checkpoints**: „*developers can't enjoy the benefits of using a version control which helps them to keep track of small intermediate changes"*

The Future of CI

Orientation in Objects

- „Continuous Integration" Buch von 2007 (M. Fowler Signature Series)
  - „*two key complaints from those who have been practicing CI for a while.*"
  - „*How can I prevent broken builds? How can I get my builds to run faster?*"

- Problem „*[Continuous Integration] is still a rather reactionary practice.*"
  - Im Sinne von, dass man zum Testen nach Mainline einchecken muss

- Epilog „*The Future of CI*" nennt zwei Lösungsansätze

  - **Two-Phase Commit**: „*Before the repository accepts the code, it runs an integration build on a separate machine. Only if […] successful will it commit the code […].*"

  - **Personal Builds**: „*[…] capability for a developer to run an integration build using the integration build machine and his local changes along with any other changes committed to the version control repository.*"

Same difference?

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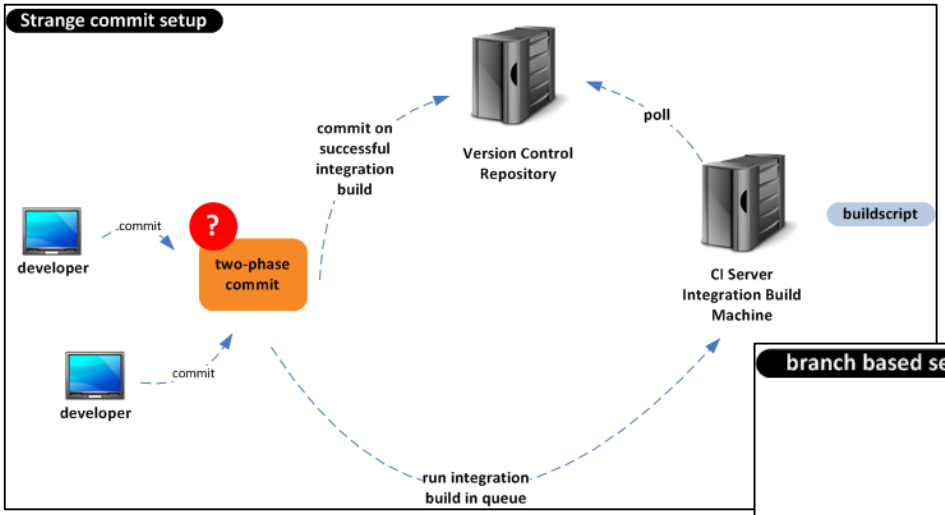
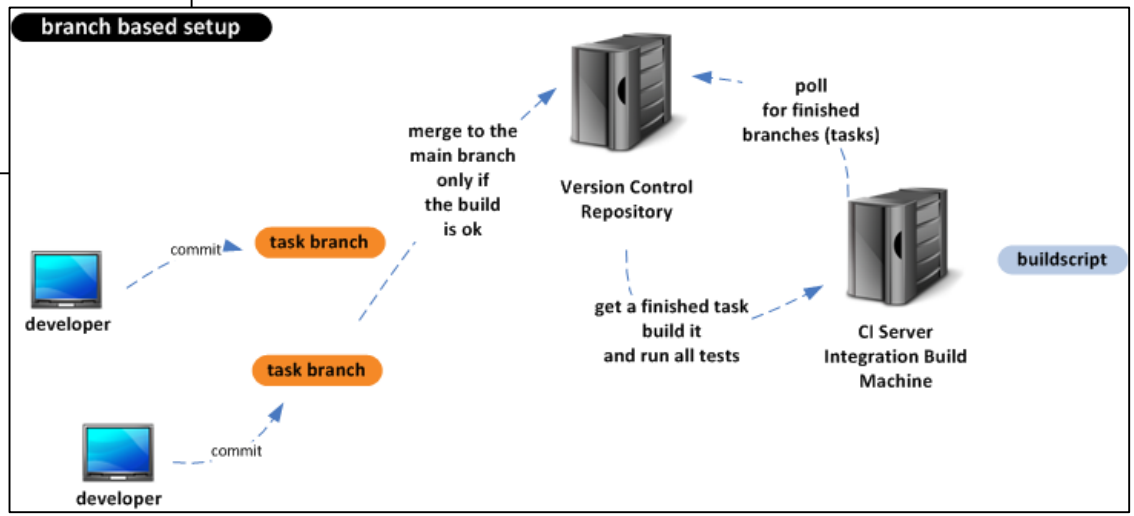
- „*Obvious answer* ” in Blog „Continuous integration future?” von 2008
  - Commit to branch, rebase onto master, run tests, merge up if tests pass





(Quelle: http://blog.plasticscm.com/2008/03/continuous-integration-future.html)

Und in der anderen Ecke…

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- „*Branching is the answer, isn't it?*”
- Linus Torvalds arbeitet bei der Linux Entwicklung auch mit Branches
  - „*The linux-next tree has something like 8600 commits, and I've merged about 5600 in the last few days.*”
  - „*Only 17 of the merges had any conflicts. And only a couple of those were annoying. The rest is all git doing all the work.*”
- Und die gezeigten Branching Alternativen haben auch Schwächen
  - Reaktivierung von altem Code via Toggles (Knight Capital 2012)
  - Verlust von 460 Millionen Dollar in 45 Minuten
- Also doch alle lieber mit Branches arbeiten, oder?

So nicht (1)

Orientation in Objects

- Es gibt zahlreiche zu vermeidende „*Branching Anti-Patterns*”
  - Branches sind kein automatischer Erfolgsgarant

- **Merge Paranoia**
  - „*Merging is avoided at all cost, due to a fear of the consequences.*”

- **Merge Mania**
  - „*The team spends an inordinate amount of time merging software assets rather than developing them.*”

- **Big Bang Merge**
  - „*Merging has been deferred to the very end of the development effort and an attempt is made to merge all branches simultaneously.*”

So nicht (2)

Orientation in Objects

- **Never Ending Merge**
  - „*Merge activity never seems to end; there's always more to merge.*”
- **Wrong Way Merge**
  - „*A software asset is merged with a previous version.*”
- **Branch Mania**
  - „*Branches are created often and for no apparent reason.*”
- **Cascading Branches**
  - „*Branches are never merged back to the main development line.*”
- **Mysterious Branches**
  - „*Nobody can tell you what the branches are for.*”

So nicht (3)

Orientation in Objects

- **Temporary Branches**
  - *„The purpose of a branch keeps changing; it effectively serves as a permanent ‘temporary’ workspace.”*
- **Volatile Branches**
  - *„An unstable branch is shared by other branches or merged into another branch.”*
- **Development Freeze**
  - *„All development activities are stopped during branching, merging and building new baseline.”*
- **Berlin Wall**
  - *„Branches are used to divide the development team members, rather than divide the work they are performing.”*

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Zwischenstand

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- CI und FBs sind per Definition widersprüchlich
  - *„By definition […] CI and FB […] are mutually exclusive. There *is* in fact a dichotomy.* ***You can do neither, one or the other, but not both at the same time.****”*
  - *„By definition, if you have code sitting on a branch, it isn't integrated.”*
- Aber Schutz der „Mainline” ist in beiden Ansätzen ein Kernaspekt
- Lediglich **WIE** geschützt wird ist unterschiedlich
  - Bei CI durch kontinuierliches Integrieren, Bauen und Testen
  - Bei FBs dadurch, dass erst abgeschlossener Code in Master einfließt

Keiner ist vollkommen

Orientation in Objects

- CI alleine verhindert keine *„bad checkins”*
  - *„The **more developers** you have on a project, the **higher the chances** are that one of those developers will check something really bad into source control and **disrupt everyone else's work**. It's simple statistics.”*

- Branches erzwingen Merges bei falschem Gefühl von Sicherheit
  - *„Branches may introduce a **false sense of safety**, as changes made in different branches will eventually be merged together (either manually or automatically), and **bugs may arise if these changes are […] incompatible**.”*

The Best Of All Possible Worlds (1)

Orientation in Objects

- Gibt es vielleicht einen pragmatischen Kompromiss?
- Aus „Using Git and feature branches effectively” von 2011
  - *„You can’t do decentralized versioning unless you also **decentralize** your **testing and integration**.”*
  - *„**effort** [for] testing and integration **scales exponentially** rather than linearly with amount of change.”*
  - *„decentraliz[ing] testing and integration **solve**[s most] **problems** before change is **pushed upstream**.”*
  - *„By **decentralizing** you have many **people working on smaller sets of changes** that are much easier to deal with: the **collaborative effort on testing decreases** and **when it all comes together you have a much smaller set of problems to deal with**.”*
- Tests bereits auf Branch Ebene **VOR** dem Merge zurück nach Master

The Best Of All Possible Worlds (2)

Orientation in Objects

- Dezentralisiertes Testen löst nicht Problem der „late integration”
- Disziplin im Entwicklerteam notwendig (wie bisher halt auch)
  - „***Rebase against main frequently*** *– If your feature branch is way behind, you have done something very wrong*”
  - „***Push as early as you can*** *– Feature branches are not about hiding change but about isolating change*”
  - „***Communicate*** *– Ask people to push their changes before [pushing] big changes*”
  - „***Pull change rather than pushing it –*** *Push only works in small teams. Pull forces people to communicate*”

The Best Of All Possible Worlds (3)

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- Lebensdauer der Branches beachten
  - Tasks (Features) innerhalb Branch überschaubar dimensionieren
  - Agile Methoden wie Scrum können hierbei helfen
  - „Feature Toggles” und „Branch by Abstraction” nutzen wenn es hilft

- Werkzeuge kennen und Konventionen für Umgang festlegen
  - Git Lernkurve nicht unterschätzen
  - Merging vs. Rebasing, Fast-Forward Merges vs. Merge Commits
  - „*[Don‘t] pick random […] points for development to begin with.*”
  - Zusammenarbeit durch „Pull Requests” und „Code Reviews“ fördern

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Noch mal Schritt für Schritt

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- Feature Branch erzeugen
- Continuous Integration für Feature Branch bereit stellen
- Im Feature Branch arbeiten
- Master Änderungen regelmäßig (!) in Feature Branch übernehmen
- Pull Request erstellen jedes Mal wenn „Up Merge” erfolgen soll
- „Up Merge” nach Master durchführen und danach deployen

We're Gonna Need a Bigger Boat

Orientation in Objects

- Und das soll ich jetzt alles von Hand machen?
  - Dezentrales Testen für jeden Branch einrichten
  - Änderungen aus Master nach erfolgreichem Test in Branch übernehmen
  - Pull Requests erstellen und verwalten

- Unterstützung durch Tools ist bereits vorhanden
  - Viele CI Server unterstützen Branch Erkennung
  - Für erkannte Branches dann automatisiert CI Prozesse erzeugbar
  - Automatisches Up und Down Merging üblicherweise auch möglich
  - Git Entwicklungsplattformen unterstützen bei Pull Request Verwaltung
  - Issue Tracker können oft direkt Feature Branches zu erzeugen

Demonstration

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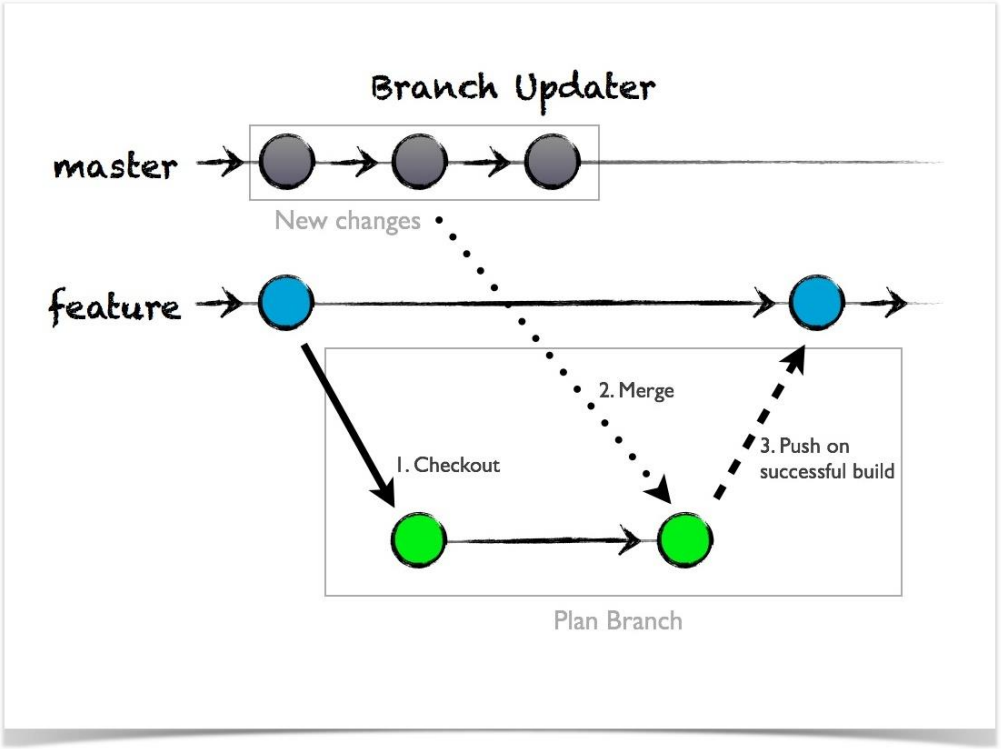

(Quelle: https://confluence.atlassian.com/bamboo/using-plan-branches-289276872.html)

Our two cents

Orientation in Objects

- Entwickler können durch DVCS und Branches häufiger committen
- Dezentrale Tests und Integration je Branch sind guter Master Schutz
- Pull Requests verbessern Kommunikation und Code Qualität weiter
- Feature Branches in Kombination mit CI bieten einen Weg den Master fehlerfrei zu halten, ohne auf die Vorteile automatisierter Testpraktiken zu verzichten
- CI Puristen sind vielleicht anderer Meinung ☺

If you remember one thing

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„Practicality beats purity”

(The Zen of Python, Tim Peters)

Literaturhinweise
(And Now for Something Completely Different)

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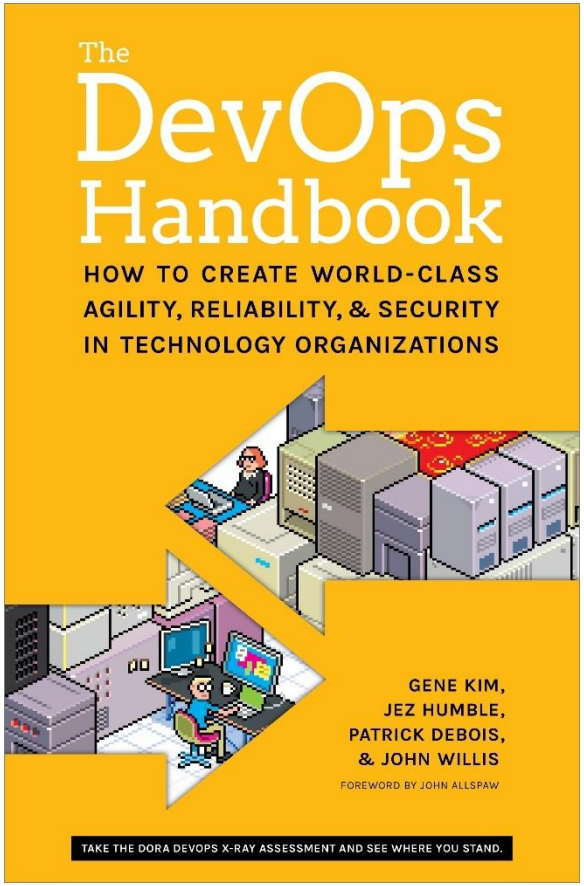

(Quelle: http://itrevolution.com/devops-handbook)

Links (1)

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- Martin Fowler Artikel
  - http://martinfowler.com/articles/continuousIntegration.html
  - http://martinfowler.com/bliki/FeatureBranch.html
  - http://martinfowler.com/bliki/OpportunisticRefactoring.html
  - http://martinfowler.com/bliki/FeatureToggle.html
  - http://martinfowler.com/bliki/BranchByAbstraction.html

- Feature Toggles are one of the Worst kinds of Technical Debt
  - https://dzone.com/articles/feature-toggles-are-one-worst

- Make Large Scale Changes Incrementally with Branch By Abstraction
  - https://continuousdelivery.com/2011/05/make-large-scale-changes-incrementally-with-branch-by-abstraction/

Links (2)

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- SCM: Continuous vs. Controlled Integration
  - http://www.drdobbs.com/architecture-and-design/scm-continuous-vs-controlled-integration/205917960
- Continuous integration future?
  - http://blog.plasticscm.com/2008/03/continuous-integration-future.html
- Linus Torvalds' comment on merging
  - https://plus.google.com/+LinusTorvalds/posts/fDENcrCqHmD
- Knightmare: A DevOps Cautionary Tale
  - https://dougseven.com/2014/04/17/knightmare-a-devops-cautionary-tale/

Links (3)

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- Software Branching and Parallel Universes
  - https://blog.codinghorror.com/software-branching-and-parallel-universes/
- Branch per task workflow explained
  - http://blog.plasticscm.com/2010/08/branch-per-task-workflow-explained.html
- Help me, because I think Martin Fowler has a Merge Paranoia
  - https://arialdomartini.wordpress.com/2011/11/02/help-me-because-i-think-martin-fowler-has-a-merge-paranoia/
- The Effect of Branching Strategies on Software Quality
  - https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/shihab-esem-2012.pdf

Links (4)

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- Linus Torvalds auf Linux Kernel Mailing Liste am 28.09.2010
  - https://lkml.org/lkml/2010/9/28/362
- Using Git and feature branches effectively
  - http://www.jillesvangurp.com/2011/07/16/using-git-and-feature-branches-effectively/
- Imitating pure continuous integration in branching workflows
  - https://www.atlassian.com/continuous-delivery/continuous-integration-workflows-for-feature-branching

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Fragen ?

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Vielen Dank für Ihre Aufmerksamkeit !

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