



Continuous Integration

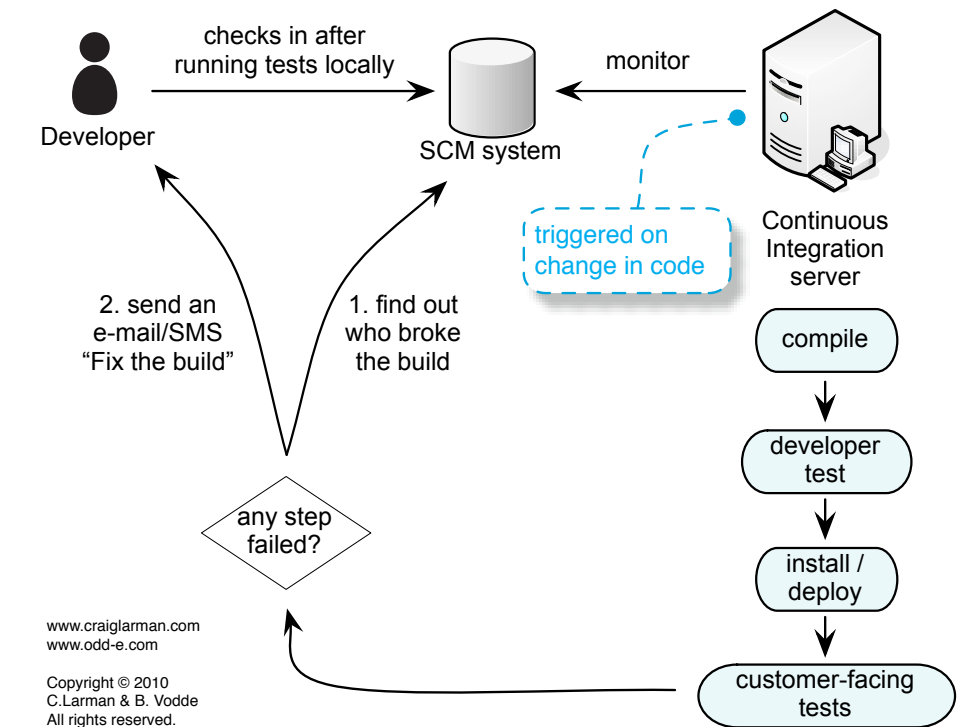


Dario Campagna

Continuous Integration

A software development practice to detect integration errors as quickly as possible.

- Members of the team integrate their work frequently
- Multiple integrations per day
- Automated verification of each integration



Software Systems

Common Issues

Combining the work of multiple developers is hard

Software systems are complex

A change to a single file can break the system

Usual Solution

Developers work on their own branches...

...to keep trunk/master stable

...to prevent treading on each other's toes



Long-lived Branches

Issues

Painful to integrate into mainline

Need of code freezes, integration and stabilization phases

Expensive and unpredictable process

Issues become more severe as

Team sizes grow

Branches become more long-lived



Continuous Integration to the Rescue

XP principle: if something is painful, we should do it more often, and bring the pain forward.

- Developers integrate all their work into trunk regularly
- Automated tests are run before and after the merge
- If automated tests fail, stop and fix immediately



Mustafasari, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=2816241>



Continuous Integration is...

Developer practice

It is about what people do, not about what tool they use

Adopting CI requires a change in human behavior

CI requires a change to the daily habits of developers

To keep a working system

CI means always having a stable system

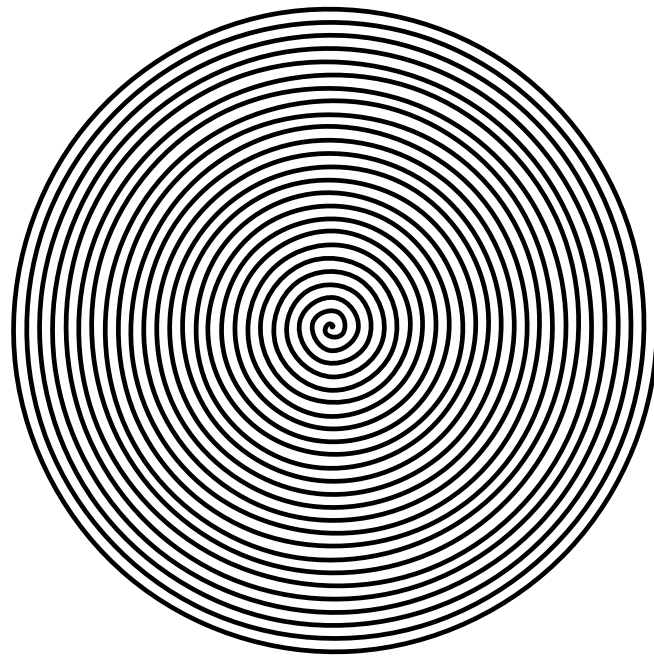
When a test fails the developer fixes it immediately

CI increase visibility by removing un-integrated WIP

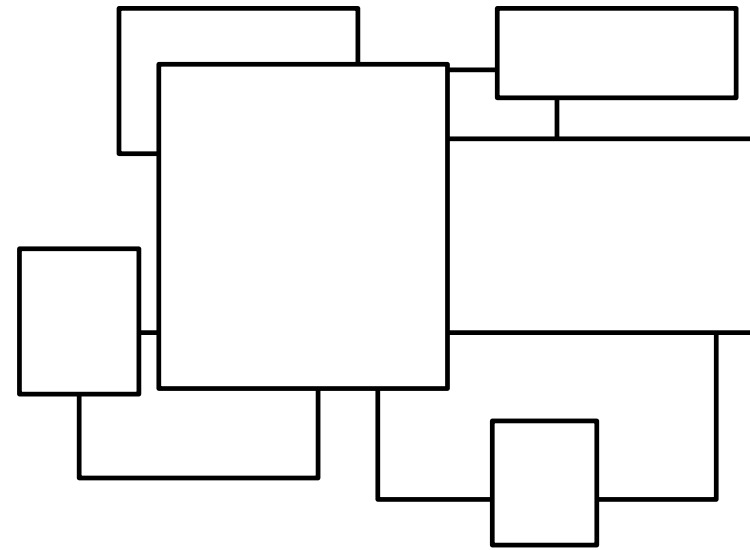


Continuous Integration is...

Growing the system



growing



building

www.craiglarman.com
www.odd-e.com

Copyright © 2010
C.Larman & B. Vodde
All rights reserved.

Through small changes

CI needs small, incremental changes

Large changes can brake a system in large ways

Small changes integrate in the system easily



Continuous Integration is...

Integrate at least daily

Ability to split large changes

Speed of integration

Speed of feedback cycle

On the mainline

No long-lived branches

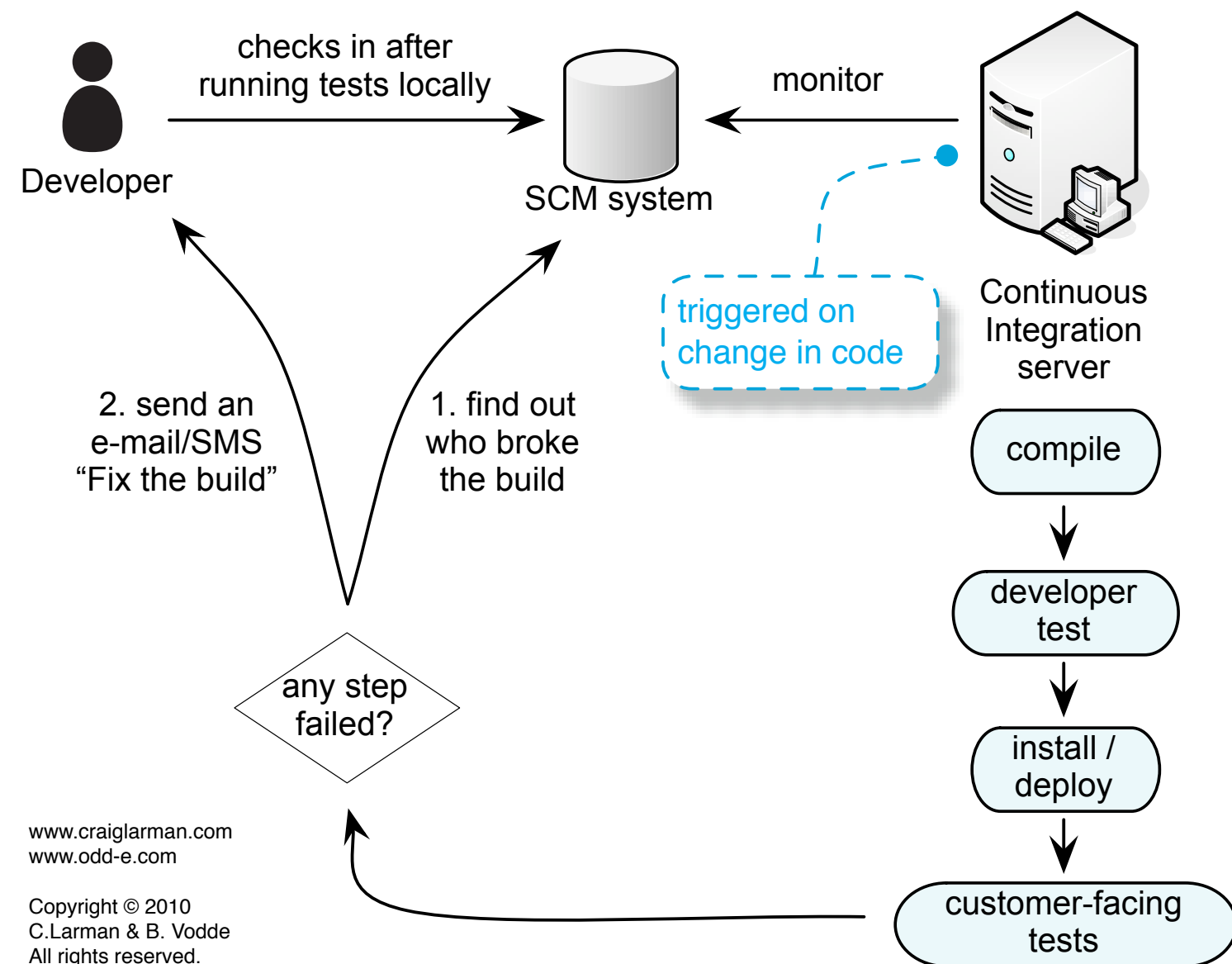
Release branches may be needed

Feature toggles, branch by abstraction



Continuous Integration is...

With the help of a CI system



With lots of automated tests

To have a CI system compile everything is not very useful

More automated tests means better safety net

More automated tests means more confidence the system is working



How to start? Change
developer behaviors and
setup a CI system.



References



Continuous Inegration

Martin Fowler

Continuous Integration

Paul M. Duvall

Accelerate

Nicole Forsgren Ph.D., Jez Humble, Gene Kim