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# Development process and user contributions

MITK Users Meeting 2015  
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**dkfz.**

GERMAN  
CANCER RESEARCH CENTER  
IN THE HELMHOLTZ ASSOCIATION



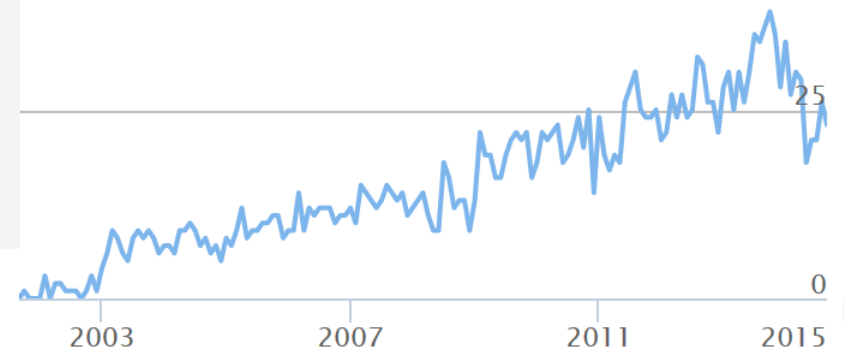
50 Years – Research for  
A Life Without Cancer

- Research software is usually written by students and scientists who have differing knowledge about and interest in software engineering
- Funding for pure software engineering activities is limited
- Conflicting goals, like innovation, reliability and safety, interface stability etc.

## In a Nutshell, MITK...

- ... has had 27,997 commits made by 153 contributors representing 613,614 lines of code
- ... is mostly written in C++ with an average number of source code comments
- ... has a well established, mature codebase maintained by a very large development team with stable Y-O-Y commits
- ... took an estimated 165 years of effort (COCOMO model) starting with its first commit in September, 1997 ending with its most recent commit 4 days ago

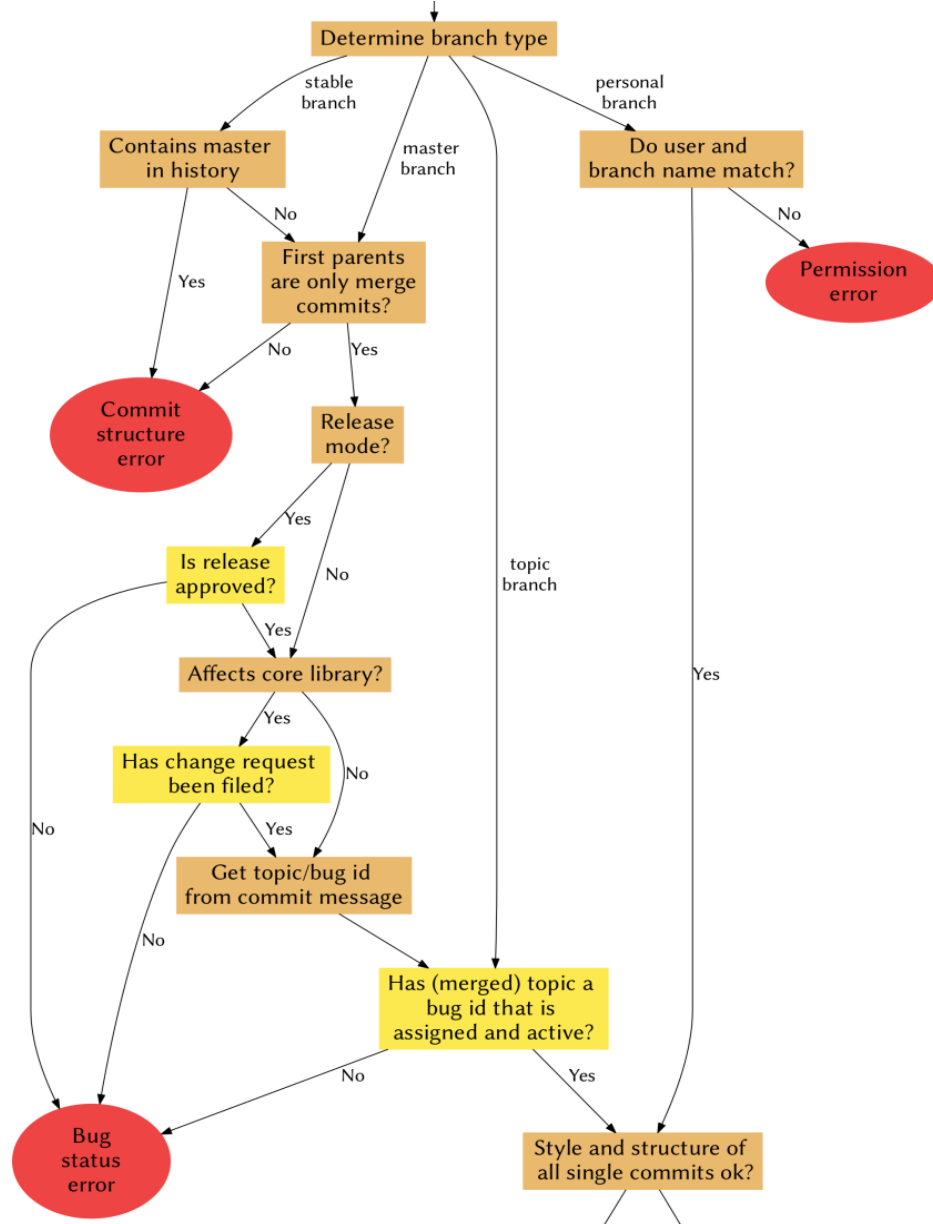
## Contributors per month



Source: Open HUB, <https://www.openhub.net/p/mitk>

# MITK: Development process overview

- File issues for all bugs and features: Bugzilla on <http://bugs.mitk.org>
- Enforced branchy workflow → traceability of all changes
- Continuous integration with locking
- Part of the team has established a QM system for medical device development according to ISO 13485



Site	Build Name	Files	Error	Warn	Error	Warn	Not Run	Fail	Pass	Build Time	Labels
mbnarc03.int.dkfz-heidelberg.de	Darwin 11.4.2 gcc-4.2-QE-4.8.1-Release	7	0	0	0	77	0	0	302	Jun 26, 2013 19:29 CEST	(12 labels)
mbn014.wntvm	mbn05-continuous-linux-mtk	8	0	0	0	58	0	0	282	Jun 26, 2013 19:22 CEST	(12 labels)
mbnarc03.int.dkfz-heidelberg.de	mbn05-continuous-windows-mtk	7	0	0	0	4	0	0	302	Jun 26, 2013 19:21 CEST	(12 labels)
mbnarc03.int.dkfz-heidelberg.de	Darwin 11.4.2 gcc-4.2-QE-4.8.1-Release	1	0	0	0	52	0	0	302	Jun 26, 2013 19:19 CEST	(12 labels)
mbn014.wntvm	mbn05-continuous-windows-mtk	1	0	0	0	2	0	0	302	Jun 26, 2013 19:05 CEST	(12 labels)
mbnarc03.int.dkfz-heidelberg.de	Darwin 11.4.2 gcc-4.2-QE-4.8.1-Release	1	0	0	0	141	0	0	302	Jun 26, 2013 18:00 CEST	(12 labels)
mbn014.wntvm	mbn05-continuous-windows-mtk	1	0	0	0	35	0	0	302	Jun 26, 2013 17:48 CEST	(12 labels)
mbn014.wntvm	mbn05-continuous-linux-mtk	1	0	0	0	73	0	0	282	Jun 26, 2013 17:48 CEST	(12 labels)
mbnarc03.int.dkfz-heidelberg.de	Darwin 11.4.2 gcc-4.2-QE-4.8.1-Release	3	0	0	0	51	0	0	302	Jun 26, 2013 17:23 CEST	(12 labels)
mbn014.wntvm	mbn05-continuous-linux-mtk	3	0	0	0	23	0	0	282	Jun 26, 2013 17:12 CEST	(12 labels)

**ZERTIFIKAT**  
Nr. Q1N 05 12 57646 001

Zertifizierungsinhaber: Deutsches Krebsforschungszentrum  
Abt. Medizinische und Biologische Informatik  
Im Neuenheimer Feld 280  
69120 Heidelberg  
DEUTSCHLAND

Betriebsstätte(n): Deutsches Krebsforschungszentrum Abt. Medizinische und Biologische Informatik  
Im Neuenheimer Feld 280, 69120 Heidelberg, DEUTSCHLAND

Zertifizierungszeichen: TÜV SÜD

Geltungsbereich: Design, Entwicklung und Produktion von medizinischer Bildverarbeitungssoftware zur Diagnose- und Therapiesteuerung

Angewandte Norm(en): ISO 13485:2003  
Medizinprodukte - Qualitätsmanagementsysteme - Anforderungen für regulatorische Zwecke  
Medical Devices - Quality Management Systems - Requirements for regulatory purposes

Die Zertifizierungsstelle von TÜV Product Service GmbH bescheinigt, dass das oben genannte Unternehmen ein Qualitätsmanagementsystem eingeführt hat und anwendet, das den Anforderungen der genannten Norm(en) entspricht. Unzulässige Inzidenzen sind zu beachten.

Beitrag Nr.: 70108914  
Gültig bis: 2016-12-31

Datum: 2005-12-08  
Seite 1 von 1

TÜV Product Service GmbH  
TÜV SÜD Gruppe - Zertifizierungsstellen  
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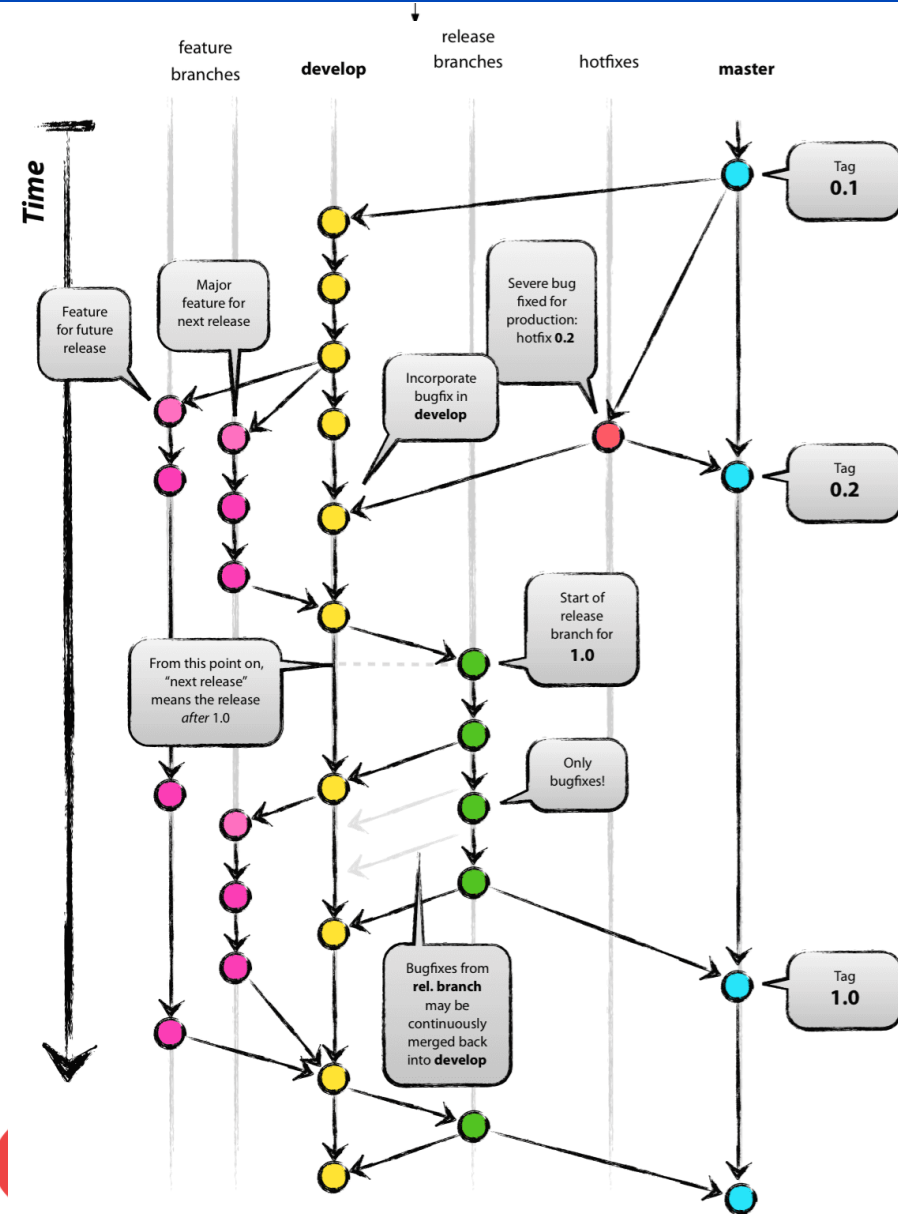
Akreditiert durch  
Deutscher Akkreditationsrat  
DIN EN ISO 9001:2008  
ZL 023:999 06 12-08

## Organizational specifics

- Compulsory bug squashing for all students
- New PhD students start with an introductory project
  - Often refactoring or cleanup of some topic
  - Goal: software improvement and knowledge transfer
- Yearly Hackfests & technical retreats

- No „real“ release branch → special release phase (goal: 3 weeks)
- Master gets locked, developers have to apply for merge permission
- Special bug squashing: installer testing and fixing
- Rotating roles of responsibility
- Release manager: overall bug management
- Testing manager: validation checklist management
- Promoter: documentation, release notes, wikipedia etc.

- Basically CTest/CDash
- Enforced branchy workflow
- Custom hooks
  - Bug status: core modification,
  - release phase etc.
  - Branching structure
  - CDash status
  - Update of tickets
- CDash extension:  
mark builds as critical (continuous)



## Regulatory aspects

- First MITK-related QM work 2005
- Yearly ISO 13485 audits till 2013
- Cooperation with industry partners (CHILI and Mint Medical)
- Liver surgery planning and CoreApp viewer as applications
- Processes designed to be QM compatible (traceability etc.)
  
- Internal QM work is currently on hold, organizational structure will be reworked
- Several FDA/CE cleared products use MITK





- More distributed contributors
- Improve external involvement
- Modernize tools:
  - Code Review
  - CI
  - Integration of source code and ticket system

Thank you for  
your attention!

Please enjoy  
your stay at DKFZ!

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