The Impact of Product Development on the Lifecycle of Defects

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Overview

- Project Background
- Defect Lifecycle
- Product Development
- Defect Lifecycle - in Context of Product Development
- Impact of Product Development
- Summary & Further Questions
- Embedded software system

![Diagram of embedded software system]

- Generic User Interface
- Software System
  - App. 1
  - App. 2
  - App. 3
  - ... (ellipsis)
  - App. n
- Runtime Kernel & Drivers
- Real-time Operating System
- Hardware & Firmware
Project Background
Data from the studied project

- **Issue repository**
  - 3,000+ resolved issue reports
  - 68% defects, 32% enhancements
  - This study considers only defects

- **Release database**
  - 130+ releases (main releases, integration releases, …)
  - This study: 14 consecutive releases on the main line (ca. 2 years)
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Defect Lifecycle
Overview of main points

Why is it important to know open defects per release?
→ Accurate historical data, e.g., to construct defect prediction models
Defect Lifecycle
Where does the data come from?

issue repository

release database

$R_i$

$R_r$

$R_f$

trace back file version history

file 1

file 2

file 3

$t$
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Product Development
Organization of software development

Adjusted to specific product requirements

Integration branch

Product branch

Main line of development

Feature complete version
Rule: Changes on the integration or product branch are merged back to the main branch
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Defect Lifecycle
... in context of product development

- defect reported
- defect fixed

\[ R_r \quad R_f \]

- \[ R'_f \]
defect fixed
Defect Lifecycle
... in context of product development

- defect introduced
- defect reported
- defect fixed

Rudolf Ramler, DEFECTS 2008
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### Impact of Product Development

#### Number of defects ...

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<thead>
<tr>
<th>Release</th>
<th>Defects introduced</th>
<th>Defects reported</th>
<th>Defects fixed</th>
<th>Defects open</th>
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</table>
Impact of Product Development
Number of open defects per release

- Due to branches
- Due to main line
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Summary & Further Questions
Accurate historical data on open defects considered important, e.g., for creating defect prediction models.

Open defects were derived from the defect lifecycle.

Defects reported on product and integration branches impact the number of open defects on the main line.

Accurate historical data requires to include the defects reported on product and integration branches.

Product and integration branches are a consequence of the product development strategy.
Further Questions

- Is the presented case representative?
- How to cope with incomplete defect data (before product development and integration)?
- Can prediction work in this context at all?

Thank you!