Will My Patch Make It? And How Fast?

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I do hold out hope that Google does come around and works to fix their codebase to get it merged upstream to stop the huge blockage that they have now caused in a large number of embedded Linux hardware companies […] But I need the help of the Google developers to make it happen, without them, nothing can change.


Greg Kroah-Hartman
Integration Process
Integration Process

Reviewing  Integration  Staging
Integration Process

contributor 1

contributor 2

contributor 3

Reviewing  Integration  Staging
Integration Process

contributor 1

contributor 2

contributor 3

Reviewing  Integration  Staging
Integration Process

Reviewing → Integration → Staging

contributor 1 → linux-usb
contributor 2 → lkml
contributor 3 → linux-scsi
Integration Process

contributor 1

contributor 2

contributor 3

Reviewing

Integration

Staging

linux-usb

lkml

linux-scsi
Integration Process

contributor 1  →  linux-usb
contributor 2  →  lkml
contributor 3  →  linux-scsi

Reviewing  ⚐ihn  Integration  ⚐ihn  Staging
Integration Process

contributor 1 -> linux-usb
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Reviewing  Integration  Staging
Integration Process

contributor 1 → linux-usb

contributor 2 → lkml

contributor 3 → linux-scsi

subsystem maintainer 1

Reviewing → Integration → Staging

Monday, 3 June, 13
Integration Process

contributor 1 → linux-usb

contributor 2 → lkml

contributor 3 → linux-scsi

subsystem maintainer

Reviewing  Integration  Staging

Monday, 3 June, 13
Integration Process

Reviewing → Integration → Staging
Integration Process

contributor 1 → linux-usb

contributor 2 → lkml

contributor 3 → linux-scsi

subsystem maintainer 1

Maintainer

Reviewing   Integration   Staging
Integration Process

contributor 1 → linux-usb
contributor 2 → lkml
contributor 3 → linux-scsi

Reviewing → Integration → Staging

Linus Torvalds
Integration Process

contributor 1  ➔  linux-usb

contributor 2  ➔  lkml

contributor 3  ➔  linux-scsi

subsystem maintainer 1

maintainer

Linus Torvalds

Reviewing  ➔  Integration  ➔  Staging
Integration Process

Reviewing → Integration → Staging

contributor 1 → linux-usb → subsystem maintainer 1 → maintainer → Linus Torvalds → linux 3.5

contributor 2 → lkml → subsystem maintainer 1 → maintainer

contributor 3 → linux-scsi → subsystem maintainer 1 → maintainer
Research Questions

RQ1: How many patches are merged?

RQ2: What kind of patch is merged more likely?

RQ3: What kind of patch is accepted faster?
Setup Of Case Study

- Contributor 1
  - linux-usb

- Contributor 2
  - lkml

- Contributor 3
  - linux-scsi

Integration

- Subsystem maintainer
  - subsystem maintainer

- Maintainer
  - Linus Torvalds

Staging

- Linux 3.5
Setup Of Case Study

Reviewing  Integration  Staging

contributor 1  linux-usb

contributor 2  lkml

contributor 3  linux-scsi

Linus Torvalds

linux 3.5

Monday, 3 June, 13
Setup Of Case Study

Linus Torvalds

Monday, 3 June, 13
Setup Of Case Study

Linus Torvalds

Reviewing  Integration  Staging

linux-usb

lkml

linux-scsi
Setup Of Case Study

Linus Torvalds

Reviewing → Integration → Staging
Setup Of Case Study

Reviewing
Integration
Staging
Setup Of Case Study

email1 → email patch1

email2 → email patch2

email3 → email patch3

...
Setup Of Case Study

email1 → email patch1

email2 → email patch2

email3 → email patch3

...
Setup Of Case Study

Reviewing
Integration
Staging
Setup Of Case Study

email1 ➞ email patch1 ➞ checksum1 ➞ commit patch1 ➞ commit1

email2 ➞ email patch2 ➞ checksum2 ➞ commit patch2 ➞ commit2

email3 ➞ email patch3 ➞ checksum3 ➞ commit patch3 ➞ commit3

Reviewing ➞ Integration ➞ Staging
Experience

5 Dimensions of 29 Patch Metrics
Building Decision Trees

- **size: LOC > 50**
  - **Is this first patch in thread?**
    - **not accepted**
  - **Number of reviewers > 3 ?**
    - accepted
    - not accepted

- **Number of review messages > 3 ?**
  - accepted
  - not accepted
RQ1: How many patches are merged?

RQ2: What kind of patch is merged more likely?

RQ3: What kind of patch is accepted faster?
RQ1: How many patches are merged?

RQ2: What kind of patch is merged more likely?

RQ3: What kind of patch is accepted faster?
RQ1: 33% of patches make it!

Year |
-----|
2005 |
2006 |
2007 |
2008 |
2009 |
2010 |
2011 |
2012 |

% accepted by Linus |
-----|
71.73% |
58.63% |
72.97% |
67.17% |
67.21% |
66.13% |
66.45% |
69.26% |

% rejected by Linus |
-----|
28.7% |
32.03% |
32.79% |
32.83% |
33.87% |
33.55% |
30.74% |
28.63% |
RQ1: Requiring 1~6 months!

Year | Percentage of Accepted Patches
--- | ---
2005 | 10%
2006 | 15%
2007 | 20%
2008 | 25%
2009 | 30%
2010 | 35%
2011 | 40%
2012 | 45%

Legend:
- Red: instantly
- Black: within_hour
- Green: within_month
- Yellow: within_week
- Blue: within_day
- Cyan: within_quarter
- Purple: within_half_year
- Orange: within_year
- Pink: took_ages
RQ1: reviewing time speeds up & integration slows down
RQ1: How many patches are merged?

RQ2: What kind of patch is merged more likely?

RQ 3: What kind of patch is accepted faster?
RQ2: What kind of patch is merged more likely?
RQ2: What kind of patch is merged more likely?

precision: 73%
recall: 68.47%
RQ2: What kind of patch is merged more likely?


- precision: 73%
- recall: 68.47%
RQ2: What kind of patch is merged more likely?

precision: 73%
recall: 68.47%
RQ2: What kind of patch is merged more likely?

precision: 73%
recall: 68.47%
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Acceptance is determined by integration phase.