

Beyond the Code: Mining Self-Admitted Technical Debt in Issue Tracker Systems

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研究動機

- 開発者が TD を申告する方法は2通りあると想定
 - SATD-C : ソースコードコメントによる申告
 - SATD-I : Issue による申告

Refactor :comment_personal_snippet to :create_note

Follow-up to https://dev.gitlab.org/gitlab/gitlabhq/merge_requests/2794

We should probably keep this confidential until that MR is merged to master and issue is made public.

The `:create_note` permission is being checked on the Noteable when replying to email notifications. The previous MR adds the `:create_note` permission to `ProjectSnippetPolicy`.

This is a duplicate of an existing `:comment_personal_snippet` permission. We should refactor uses of `:comment_personal_snippet` to use the common `:create_note` permission instead.

Related issues 0

Related merge requests 1

Remove the `comment\_personal\_snippet` permission !27999

Milestone 11.11

Time tracking No estimate or time spent

Due date None

Accepting merge requests

Plan [DEPRECATED] backend

technical debt

The image shows a GitLab merge request (MR) titled "Refactor :comment_personal_snippet to :create_note". The main content is a comment explaining the need to refactor permissions. A red box highlights the sentence: "This is a duplicate of an existing :comment_personal_snippet permission. We should refactor uses of :comment_personal_snippet to use the common :create_note permission instead." Two red arrows originate from this box. One arrow points to the "Accepting merge requests" button in the sidebar. The other arrow points to a zoomed-in view of the sidebar menu, where the "technical debt" label is highlighted with a red box. The sidebar also shows other items like "Plan [DEPRECATED]" and "backend".

SATD-I の例

Research Question

- RQ1

- SATD-CとSATD-Iはどの程度対応しているか？

- RQ2

- SATD-Iの種類は？

Issueを分析

- RQ3

- SATD-Iが導入される理由は？

- RQ4

- SATDが返済される理由は？

アンケート

対象プロジェクト

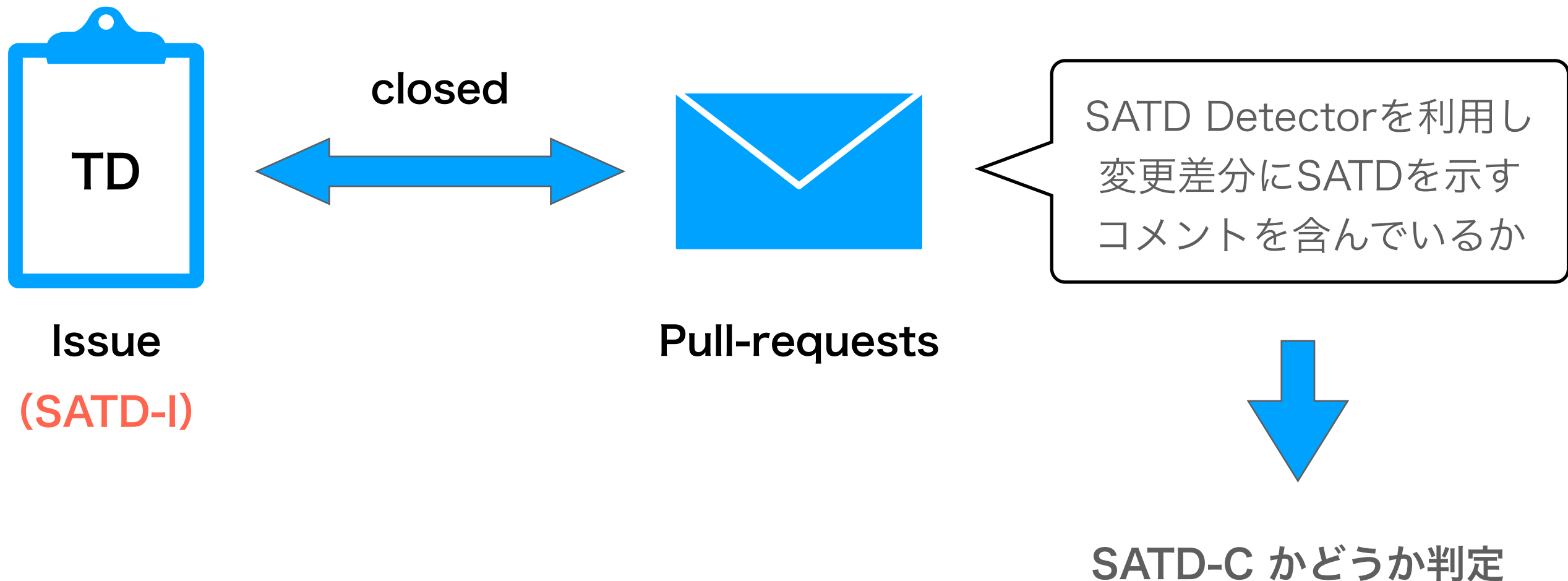
- GitLab, VScode, Influxdb, Saleor, Server
 - 期間：2018年12月15日～2019年6月15日
- フィルタリング条件
 - Issue で Technical Debt を扱っている
 - リポジトリのスター数の上位 5,000 件
 - SATD-I が 10 件以上含まれている

Repository	Tag	SATD-I	%
MICROSOFT/VSCODE	debt	132	46.2%
GITLAB/GILAB-CE	technical debt	117	40.9%
INFLUXDATA/INFLUXDB	Technical Debt	21	7.3%
MIRUMEE/SALEOR	technical debt	10	3.5%
NEXTCLOUD/SERVER	technical debt	6	2.1%
Total		286	100%

RQ1

SATD-CとSATD-Iはどの程度対応しているか？

- SATD-I であり SATD-C であるものがどの程度含んでいるか



RQ1

SATD-CとSATD-Iはどの程度対応しているか？

Table 2: Overlap between SATD-I and SATD-C

Repository	SATD-I	SATD-C	%
MICROSOFT/VSCODE	78	26	33.3%
GITLAB/GILAB-CE	89	22	21.7%
INFLUXDATA/INFLUXDB	0	-	-
MIRUMEE/SALEOR	0	-	-
NEXTCLOUD/SERVER	0	-	-
Total	167	48	28.7%

 pull-requests と結びついている SATD-I の数

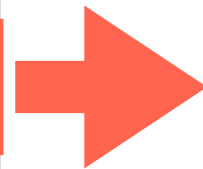
 SATD-I であり SATD-C である数

両方で TD を報告されている数は約 3 割

RQ2

SATDの種類は？

SATD-I Type	Rate [%]
Design	59.1
UI	10.1
Tests	8.7
Performance	8
Infrastructure	6.3
Documentation	4.2
Code style	2.8
Build	1.4
Security	1.1
Requirements	1.1



Design Type	Rate [%]
Complex code	43.8
Architecture	33.7
Clean up	18.9
Code duplication	3.5

- ・ 設計の SATD が一番多い
- ・ メソッドの実装不十分
- ・ パッケージ構成不十分

アンケート

I figured out that you closed the following issue from [repository name]:

[issue title] [issue link]

which is labeled as [TD-related tag].

I kindly ask you to answer the following questions:

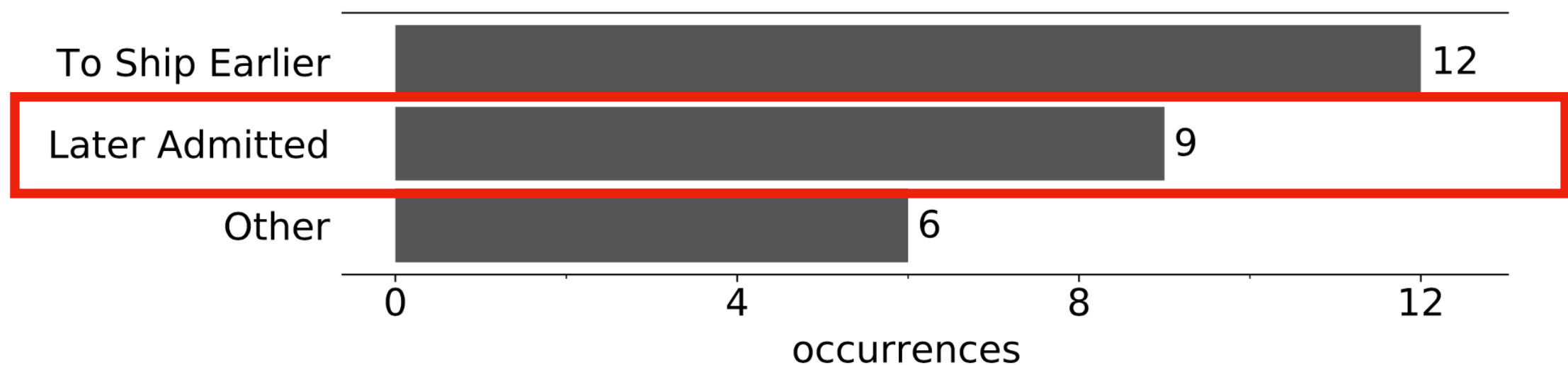
- 1. Why did you decide to pay this TD?*
 - 2. Could you describe the maintenance problems caused by this TD?*
 - 3. Could you classify this TD under the following categories:*
 - a. It was deliberately introduced to ship earlier*
 - b. When it was introduced, we were not aware about the best design*
 - c. Other answers (please clarify)*
-

Figure 3: Email sent to developers who paid SATD-I.

RQ3

SATD-Iが導入される理由は？

- 約44%がリリースを早めるためにSATD-Iを利用
- 約33%がのちにTDを確認してラベルを付与



RQ4

SATD-Iが返済される理由は？

Table 6: Reasons why developers pay SATD-I

Why did you decide to pay this TD?	Occ.	%
<i>To reduce TD interest</i>	19	65.5%
<i>To clean code</i>	8	27.6%
<i>To get familiarised with the codebase</i>	2	6.9%
<i>To collocate with other related work</i>	2	6.9%
<i>To increase test coverage</i>	1	3.5%

Table 7: Maintenance problems caused by technical debt

What problems are caused by this TD?	Occ.	%
<i>Code was difficult to evolve</i>	6	20.7%
<i>Duplicated code was demanding extra effort</i>	6	20.7%
<i>Code was difficult to read and understand</i>	6	20.7%
<i>Code performance was poor</i>	5	17.2%
<i>Code was error-prone</i>	4	13.8%
<i>UI presented visual defects</i>	1	3.5%

- 返済理由
 - TD の利息を減らすため
 - コードの整備
- TD が与える保守の問題
 - 開発の妨げ
 - 余分なコスト
 - コード理解の複雑化

まとめ

- SATD-Iについて分析調査
 - SATD は Issue とソースコードコメントのどちらか一方で報告するが多い
 - SATD-I は設計関連が一番多い
 - SATD を導入する理由はリリースや後付け
 - SATD を返済する理由は利息の低減やコード整備