Mozilla’s Issue Resolution Process

Interview Plan

1. Participant's Background in SE
2. Mozilla's Issue Resolution Process
3. Presentation of Our Research Findings
4. Q&A for Getting Feedback About Our Findings

Participant's Background

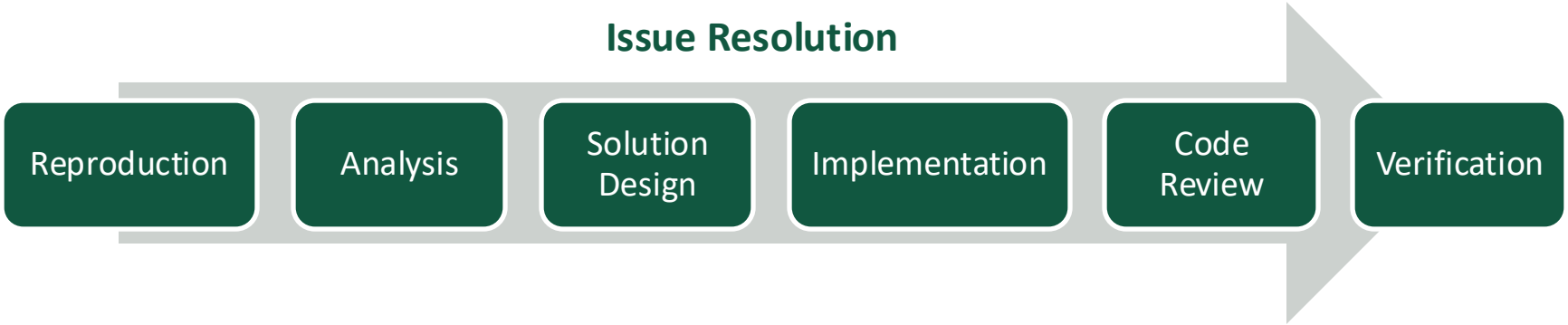
- Development and issue resolution experience at Mozilla
- Current/past positions at Mozilla (including years)
- Mozilla's products/components you have worked on

Mozilla’s Issue Resolution Process

- Is there an overall issue resolution process prescribed by Mozilla?

Research Goals

1. Understand how Mozilla developers resolve issues in practice



Research Goals

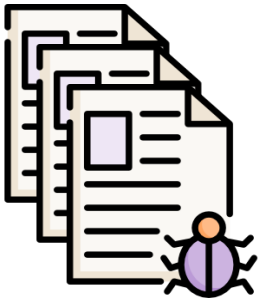
1. Understand how Mozilla developers resolve issues in practice

2. Identify **issue resolution patterns** (common workflows to solve issues)

3. Derive actionable guidelines for Mozilla stakeholders to solve issues

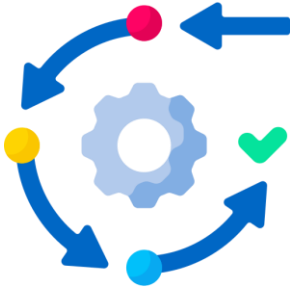
Identifying the Resolution Process

Issue Report Discussions



Human Annotators

Issue Resolution Process

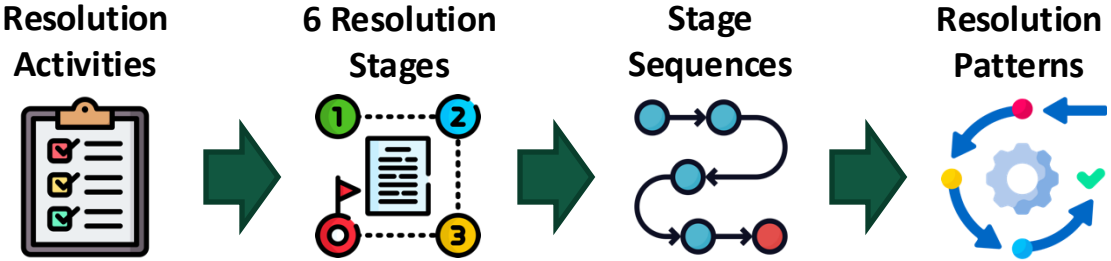


Issues = Bugs, new features, enhancements, …

Issue Report Analysis

Qualitative Annotation of Issue Report Discussion

Identifying Issue Resolution Patterns



Example

Issue Resolution Activities

- REPRODUCTION_ATTEMPT
- PROBLEM_CAUSE
- PROBLEM_REVIEW
- PROBLEM_CAUSE
- POTENTIAL_SOLUTION
- POTENTIAL_SOLUTION
- CODE_IMPLEMENTATION

Issue Resolution Steps/Stages

- REPRODUCTION
- ANALYSIS
- SOLUTION DESIGN
- IMPLEMENTATION

Pattern Derivation

Stages Sequence

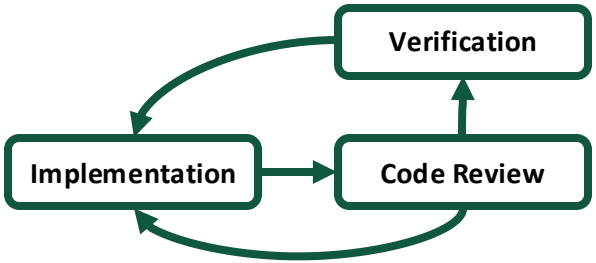
Issue #585832 =>	REP → ANLYS → SOL_DES → IMPL
Issue #1253516 =>	REP → ANLYS → SOL_DES → IMPL
Issue #916390 =>	REP → ANLYS → SOL_DES → IMPL → CR
Issue #687929 =>	ANLYS → SOL_DES → REP → IMPL → CR → VER
Issue #1519164 =>	ANLYS → SOL_DES → REP → IMPL → CR → VER
Issue #833964 =>	REP → ANLYS → SOL_DES → IMPL → CR → IMPL → VER

Issue Resolution Pattern

REP,ANLYS,SOL_DES,IMPL,(IMPL|CR|VER)?

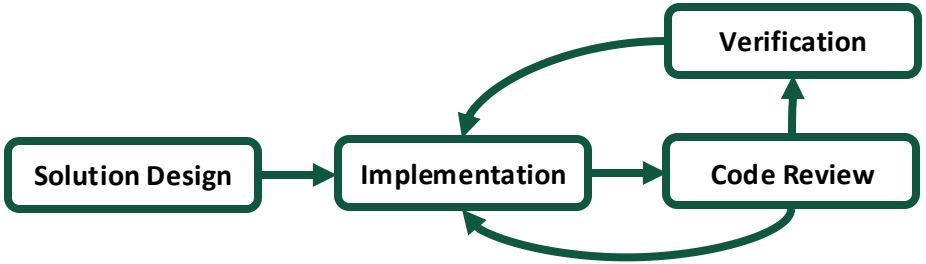
More Pattern Examples

(IMPL,(CR|VER))+



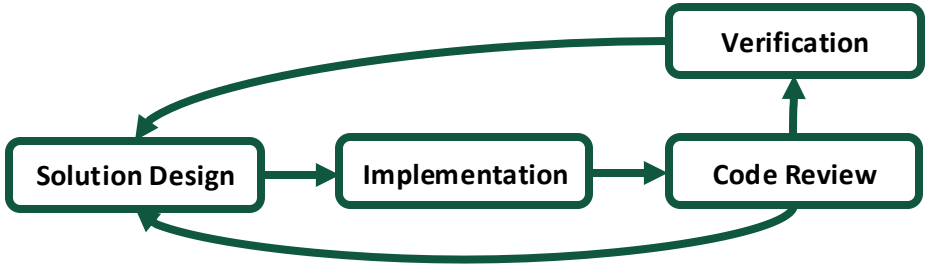
28 Issues

SOL_DES,(IMPL,(CR|VER))+



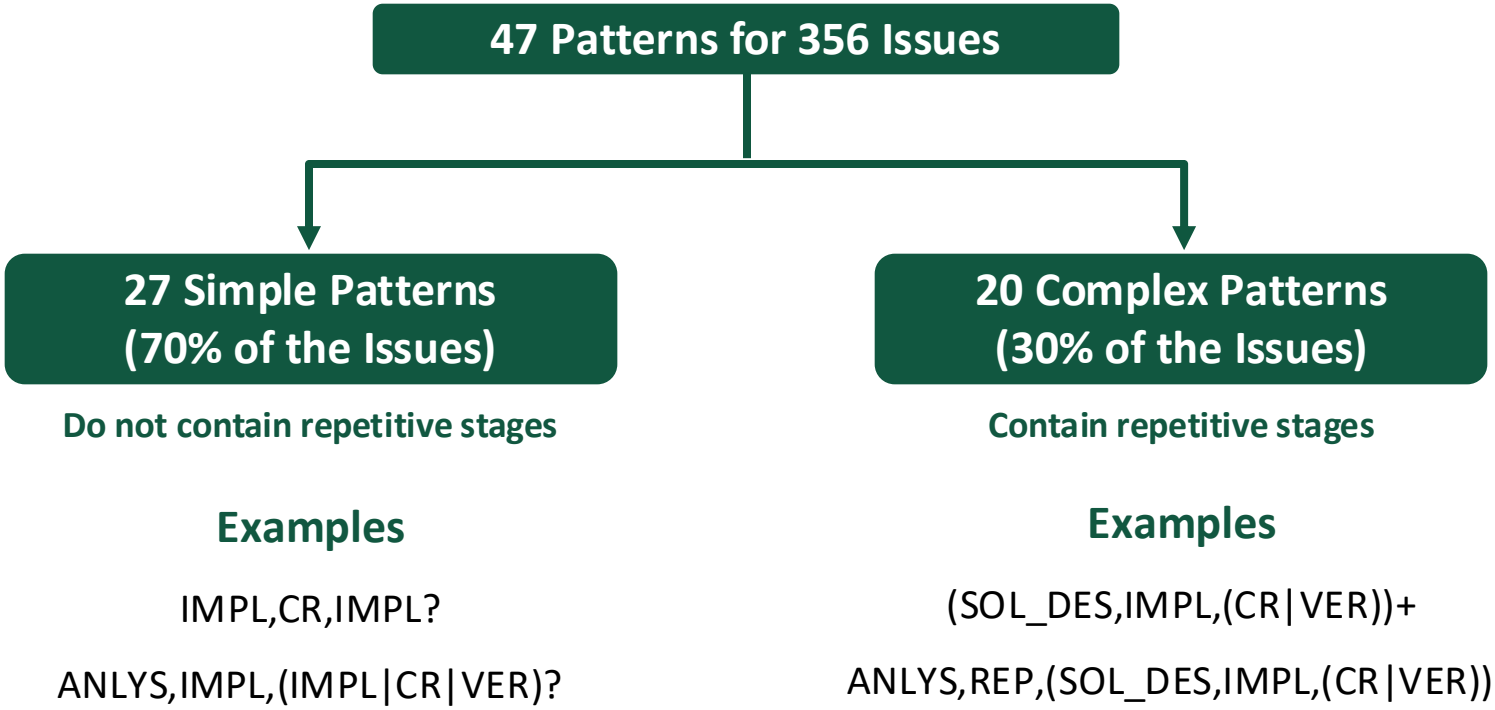
13 Issues

(SOL_DES,IMPL,(CR|VER))+

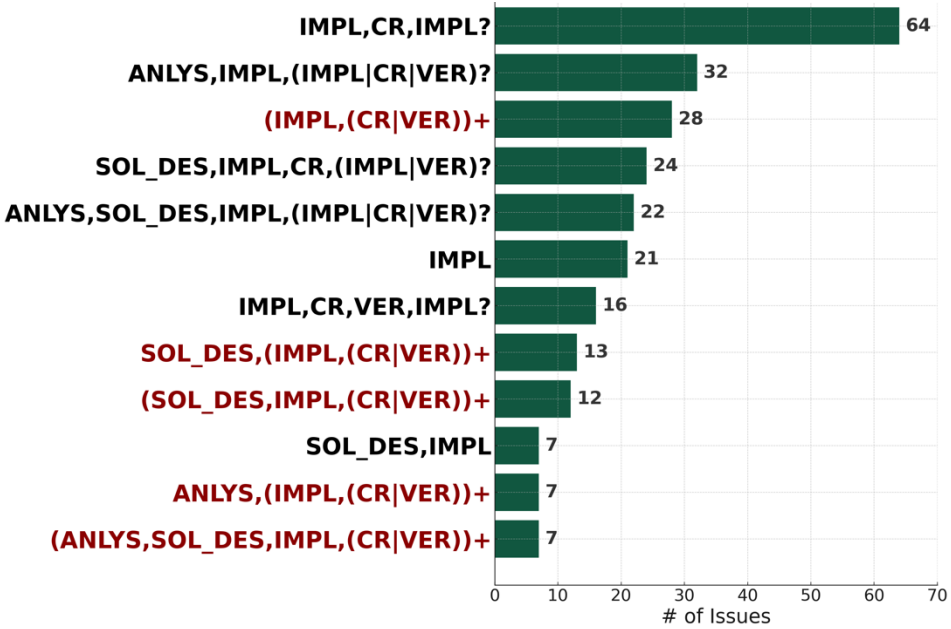


12 Issues

Overview of the Derived Patterns



Key Findings

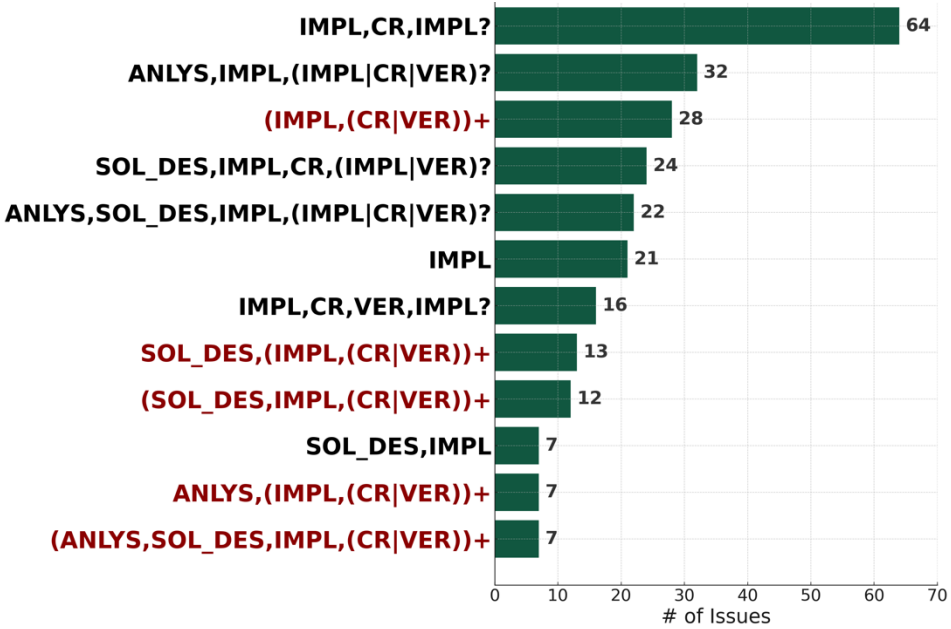


REP = Reproduction, ANLYS = Analysis, SOL_DES = Solution Design,
IMPL = Implementation, CR = Code Review, VER = Verification

- Mozilla's issue resolution process deviates from a linear process
- 18 patterns are found in 80% of the issues
- Pattern diversity is observed throughout Firefox's 14 years of evolution (2010-23)
- Complex patterns are frequent in issues about code design, defective functionality, feature dev., and Firefox's user interface (UI)
- Issue resolution is more diverse in issues about defective functionality, code design, and UI

Q1: To what extent do Mozilla developers follow Mozilla's issue resolution process?

Key Findings



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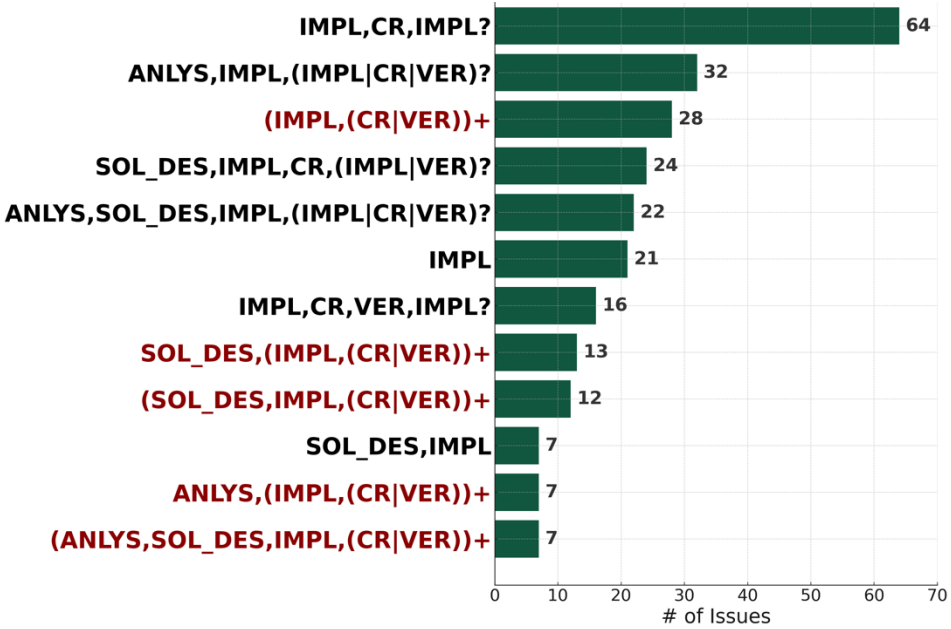
Q2: What workflows for solving issues do you use more frequently?

Key Findings



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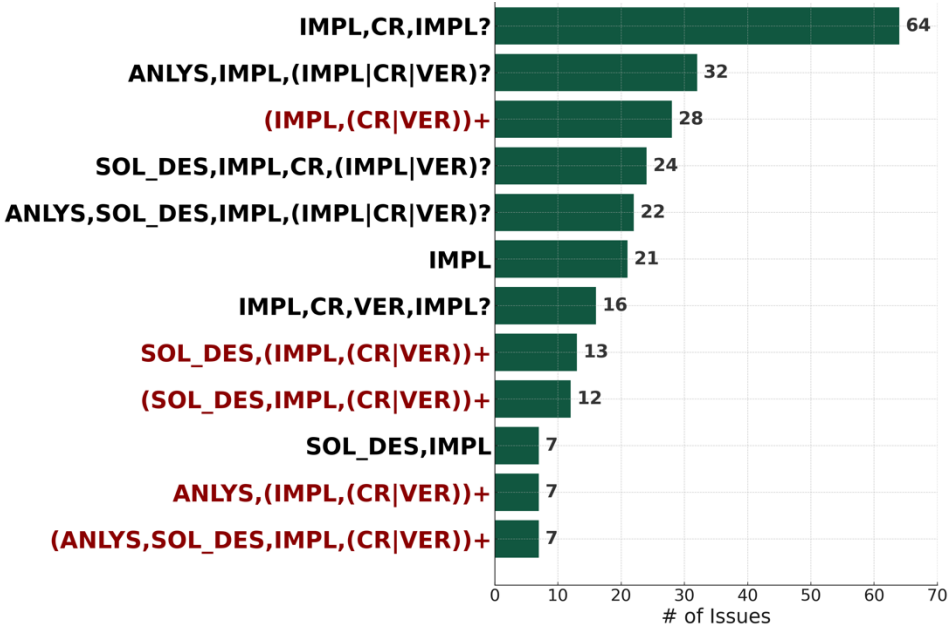
Q3: In your opinion, could the identified issue resolution patterns be useful in any way for Mozilla stakeholders? If yes, how?

Key Findings



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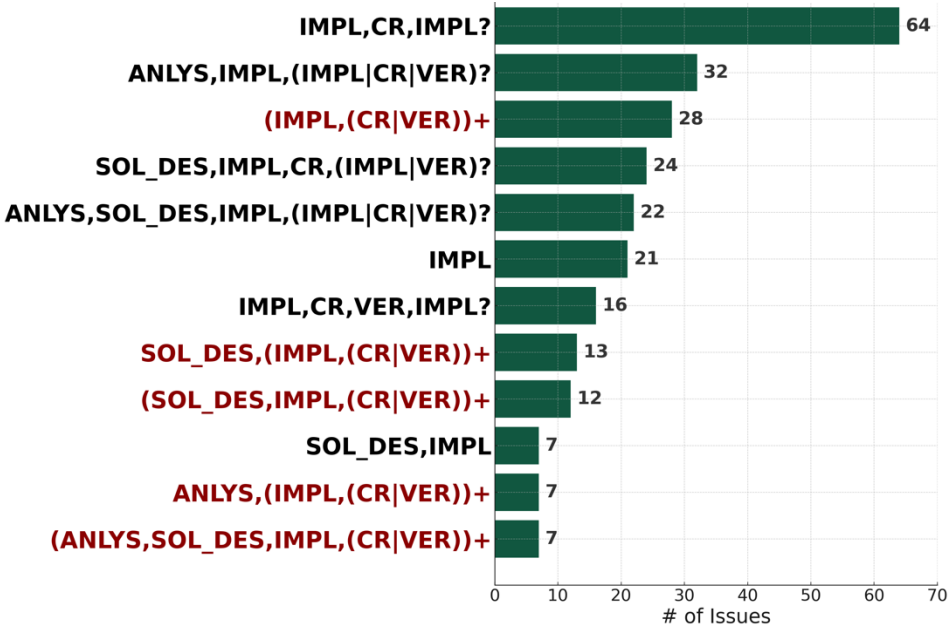
Q4. Could the patterns be used to train new Mozilla developers on how to solve issues? If yes, how?

Key Findings



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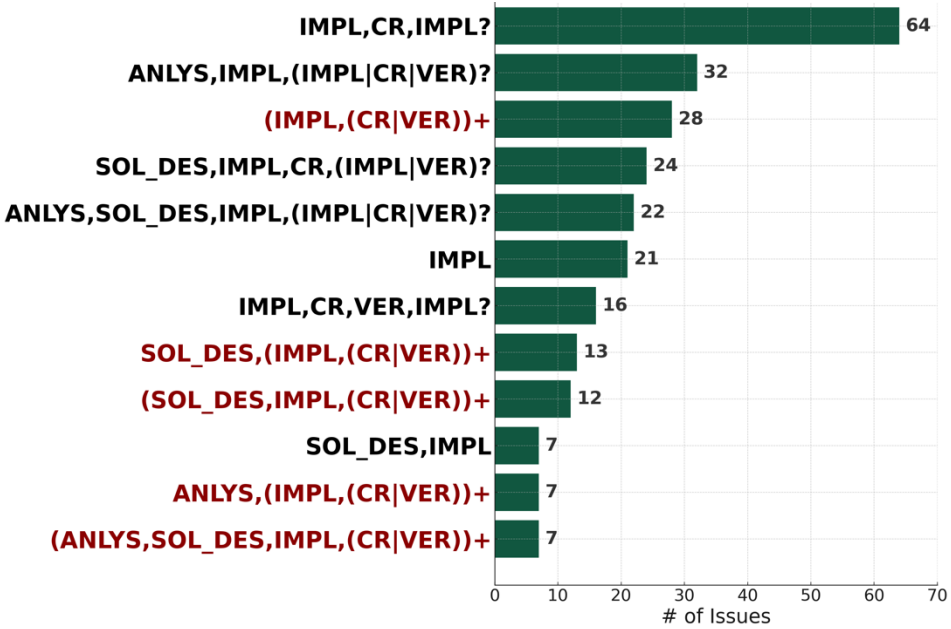
Q5. Could the patterns be used to estimate developers' efforts to solve issues? If yes, how?

Key Findings



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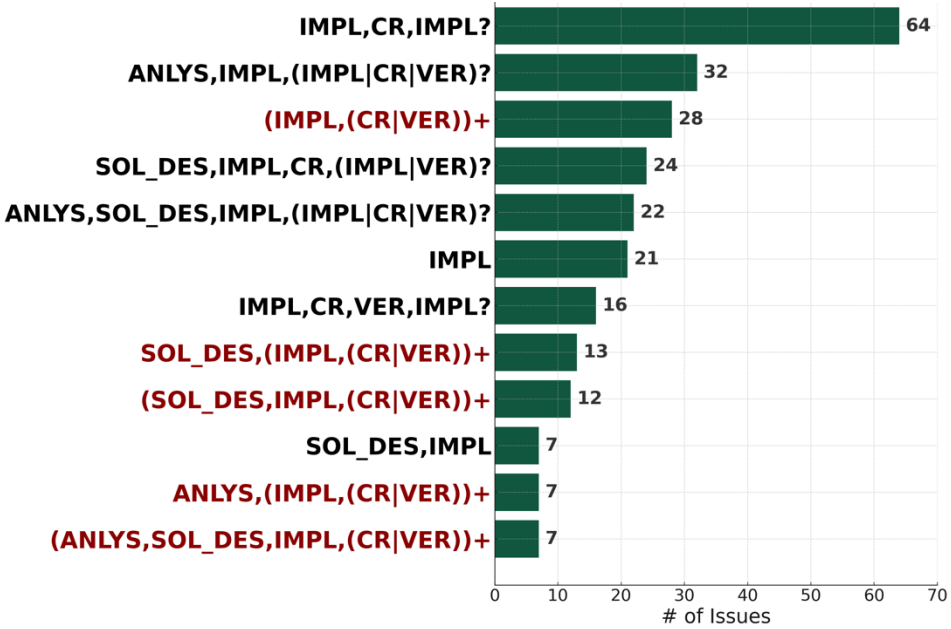
Q6. Could the patterns be used to solve new issues? If yes, how?

Key Findings



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Q7. Could the patterns be used by Mozilla stakeholders to evaluate how well the issue resolution process is executed at Mozilla? If yes, how?

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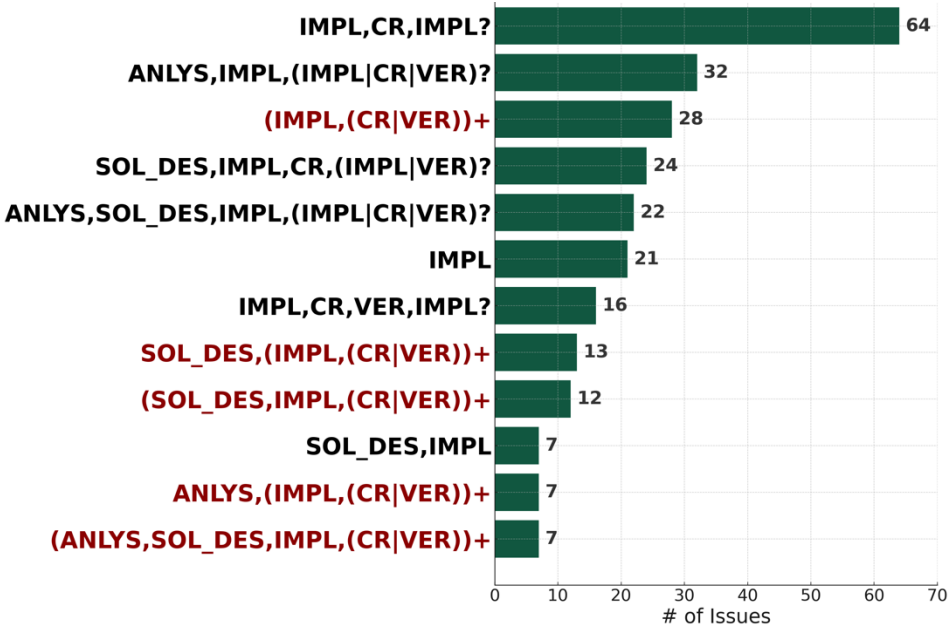

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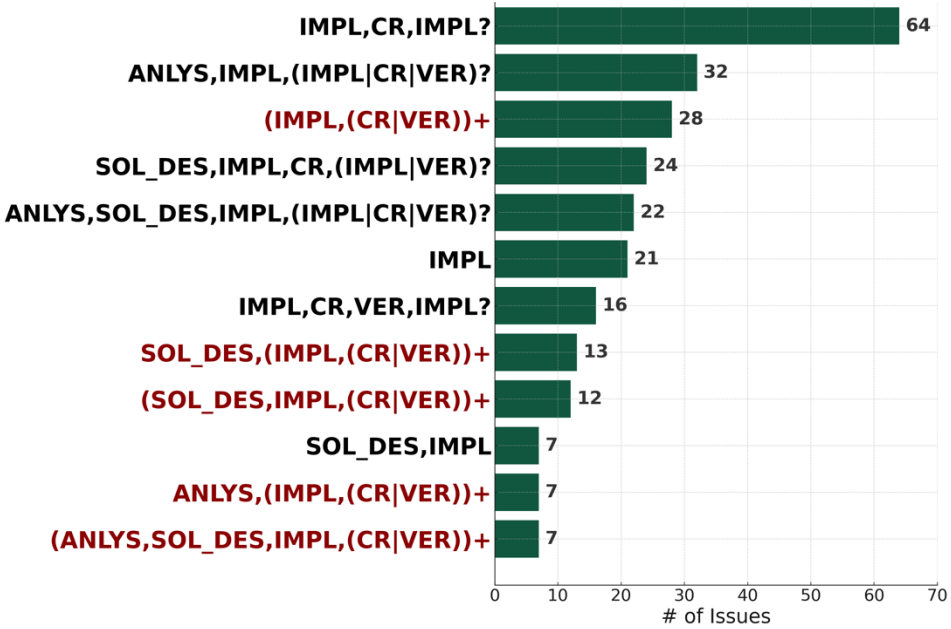
Q8. Can you think of other potential usages of the patterns to help improve Mozilla's issue resolution?

Key Findings



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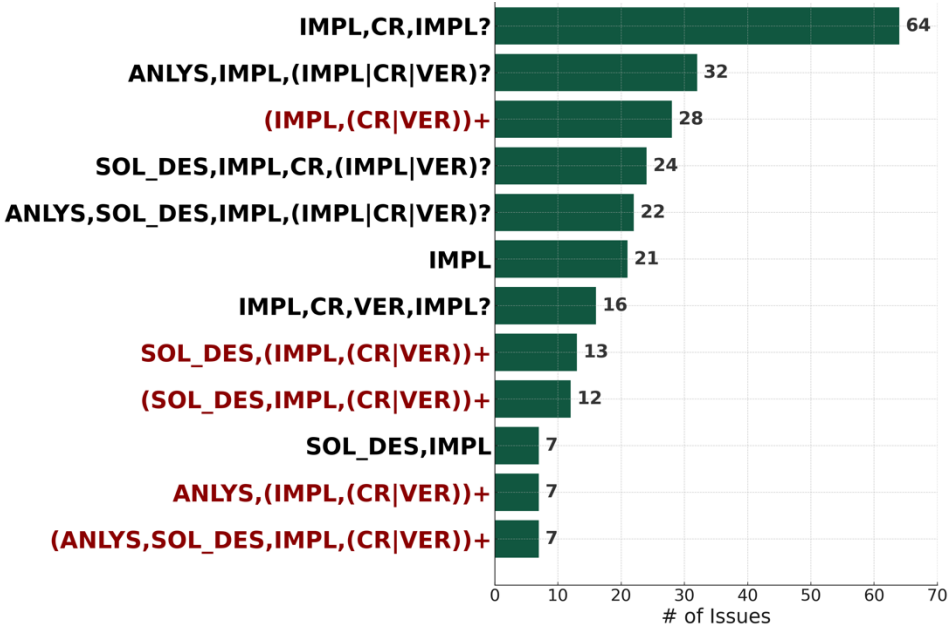
Q9. Do you think developers in other software systems follow a variety of workflows to resolve issues (as we found at Mozilla)?

Key Findings



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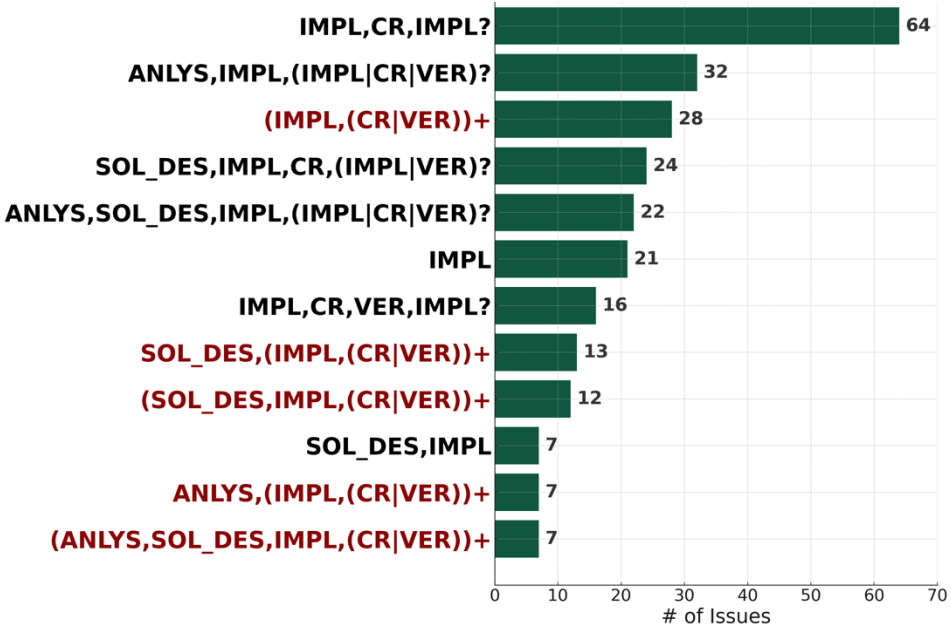
Q10. Do you have any additional thoughts about our identified issue resolution patterns for Mozilla?

Key Findings



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Q11. Do you think our findings improved your understanding of Mozilla's issue resolution process? If yes, how?