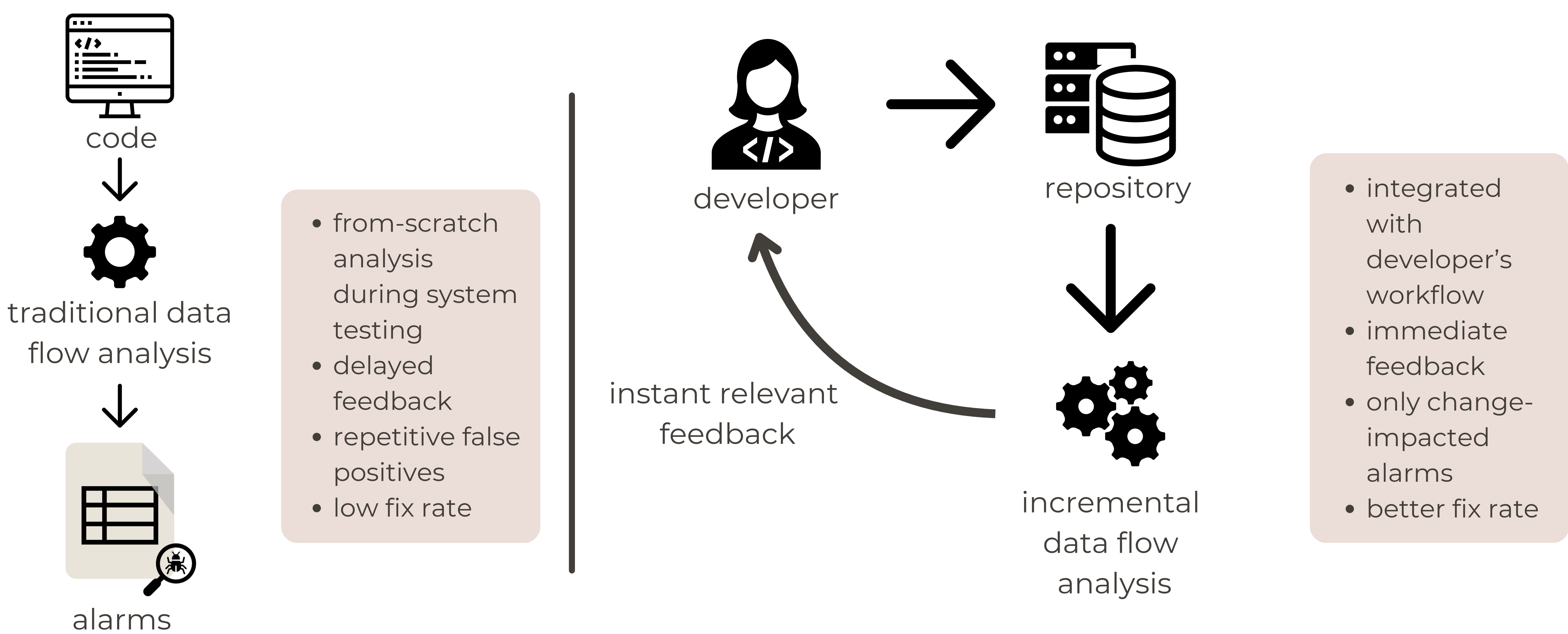


INCREMENTAL ANALYSIS FOR REVIEWING ALARMS

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Need for Incremental Analysis



- State-of-the-art research lacks incremental solution, losing insight into how changes impact alarms.
- Forward slicing, a classical approach, often yields numerous alarms, including many that are irrelevant to the recent change.
- We aim to develop an incremental analysis that naturally yields incremental solution, delivering rapid, relevant, and actionable alarms for developers.

Finding Relevant Alarms

```
1. a=0, b=0, ...
2. x=20;
3. if(x==20){
+ 4.   a=5;
5.   b=5;
6.   y=z/a;
7. }
8. a=5;
9. p=a/b;
```

ZERO DIVISION	BEFORE EDIT	AFTER EDIT		
		Ideal Incremental Analysis	State-of-the-art	Our Technique
at line 6	Examined Alarm found (True Positive)	Should be examined and not reported	Examined Alarm not found	Examined Alarm not found
at line 9	Examined Alarm found (False Positive)	Should not be examined	Examined Alarm found (False Positive)	Not examined

```
1. a=0, b=0, ...
2. x=20;
- 3. if(x==20){
+ 4. if(x==20 && z==10){
5.   b=5;
6.   y=z/a;
7. }
8. a=5;
9. p=a/b;
```

ZERO DIVISION	BEFORE EDIT	AFTER EDIT		
		Ideal Incremental Analysis	State-of-the-art	Our Technique
at line 6	Examined Alarm found (True Positive)	Should not be examined	Examined Alarm found (False Positive)	Not examined
at line 9	Examined Alarm found (False Positive)	Should be examined and reported	Examined Alarm found (True Positive)	Examined Alarm found (True Positive)

- We are leveraging a state-of-the-art incremental analysis tool to replace their algorithm with our own, which generates incremental solution.
- Through experiments, we aim to show that incremental solution effectively identifies change-impacted alarms.