

Don't Reinvent the Wheel: Towards Automatic Replacement of Custom Implementations with APIs

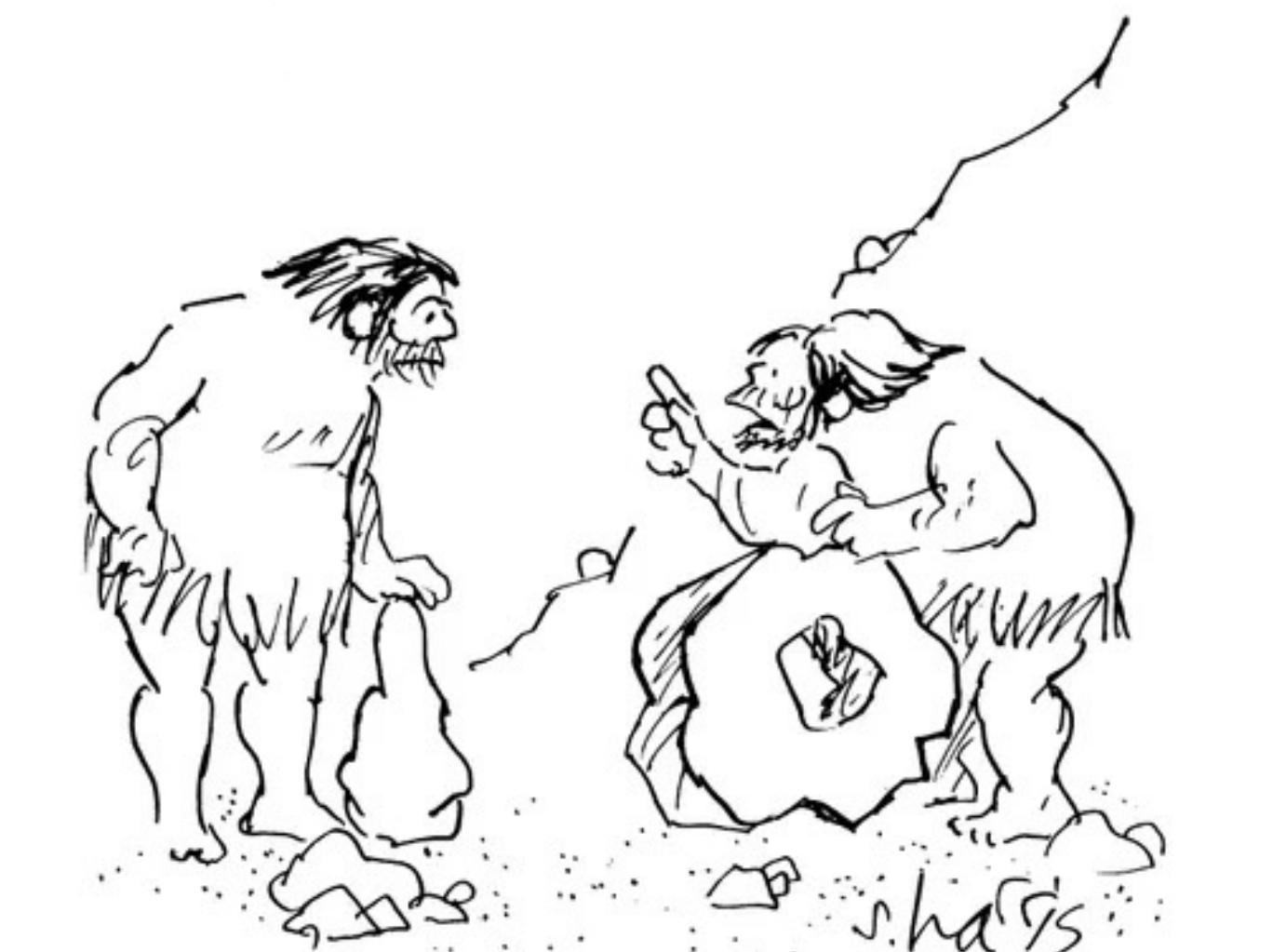
ICSME 2022

Rosalia Tufano, Emad Aghajani, Gabriele Bavota

SEART @ Software Institute,
Università della Svizzera italiana
(USI), Switzerland

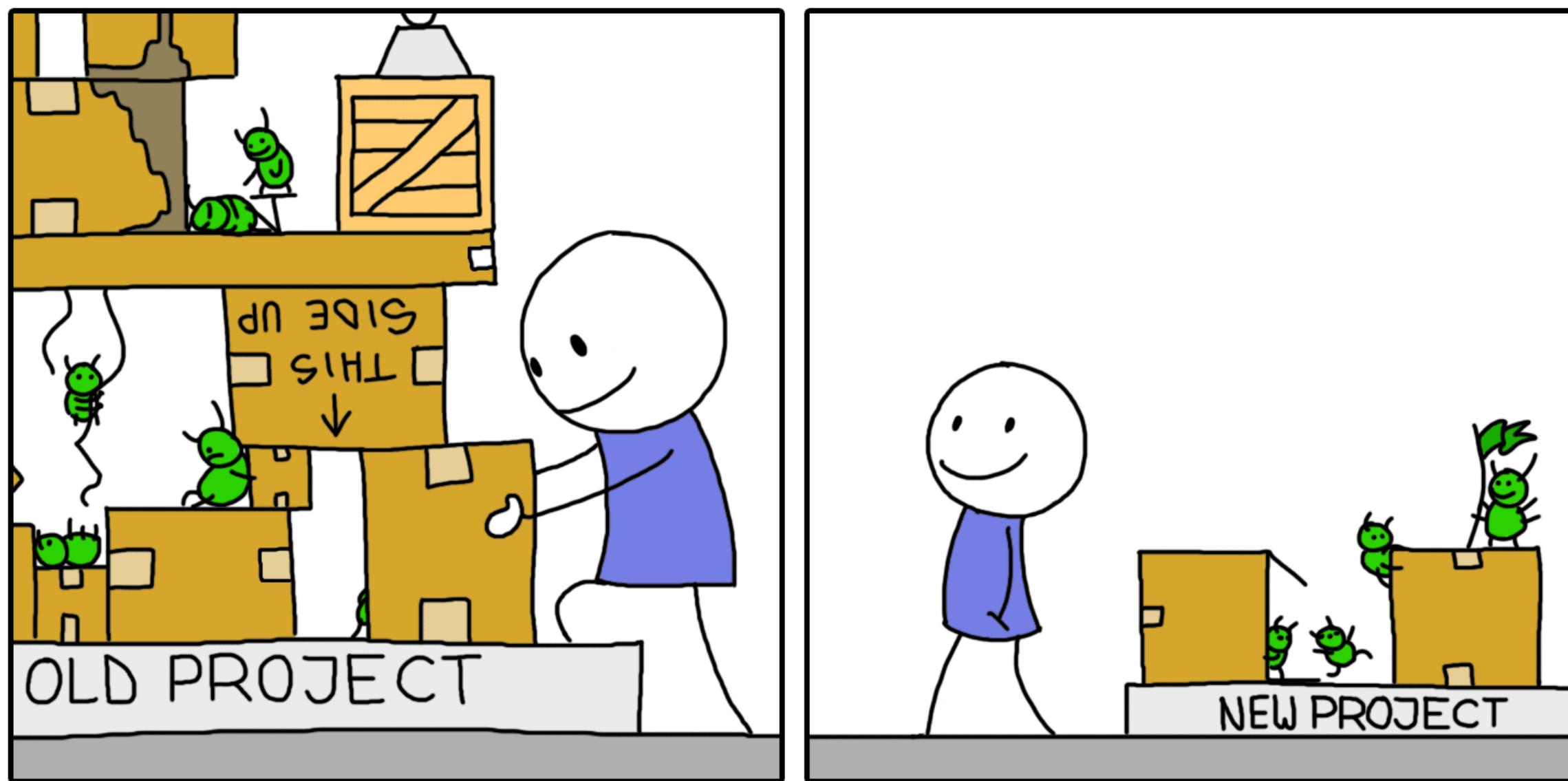
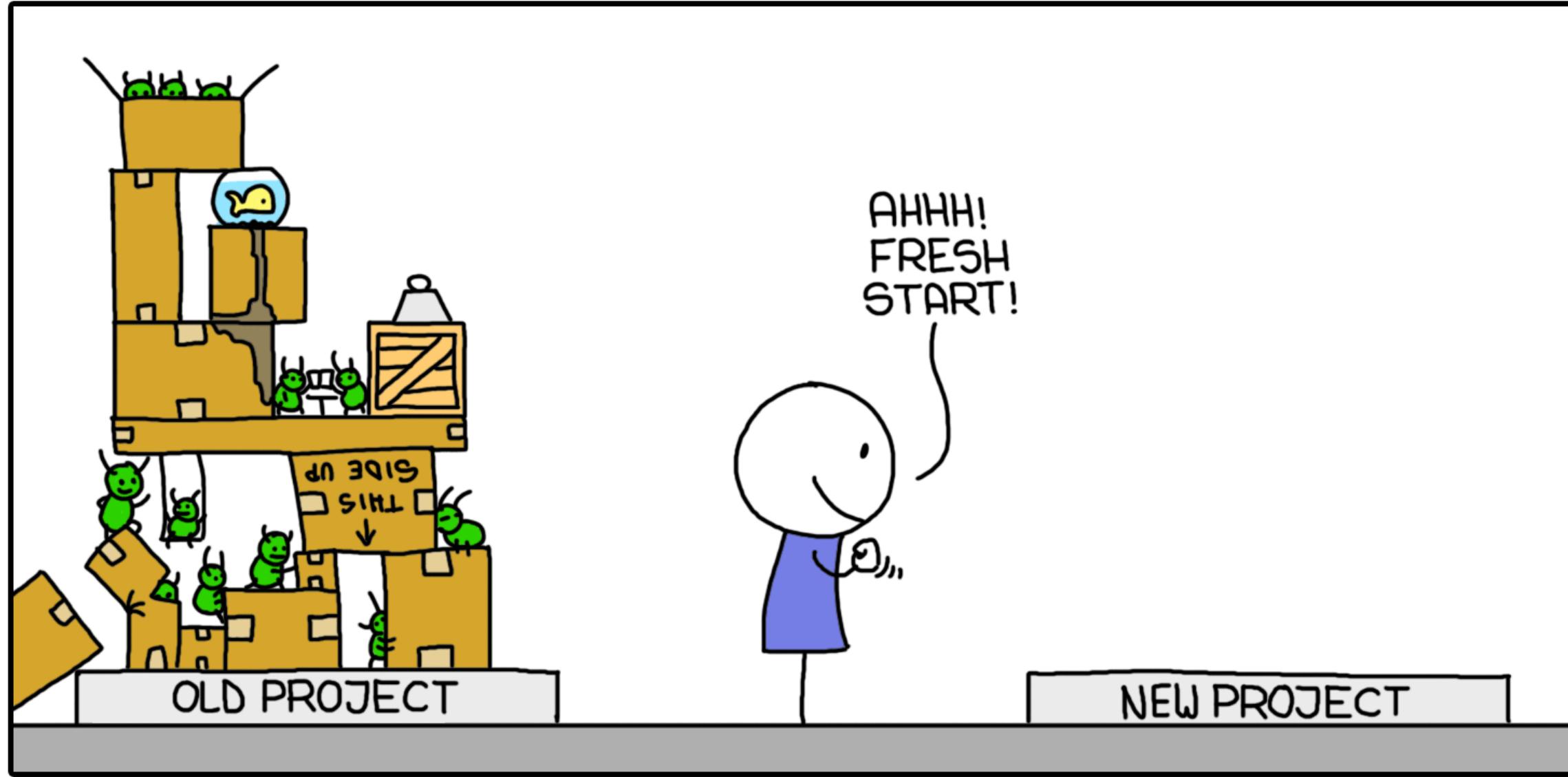


SEART



"IT MAY NOT BE A PERFECT WHEEL, BUT IT'S
A STATE-OF-THE-ART WHEEL."

CODE REUSE













```
236 -     private int indexOf(String s, String[] array) {  
237 -         for(int i = 0; i < array.length; ++i) {  
238 -             if(s.equals(array[i])) {  
239 -                 return i;  
240 -             }  
241 -         }  
242 -         return -1;  
243 -     }
```

Hey! You can replace this functionality with the
Apache Commons API contains

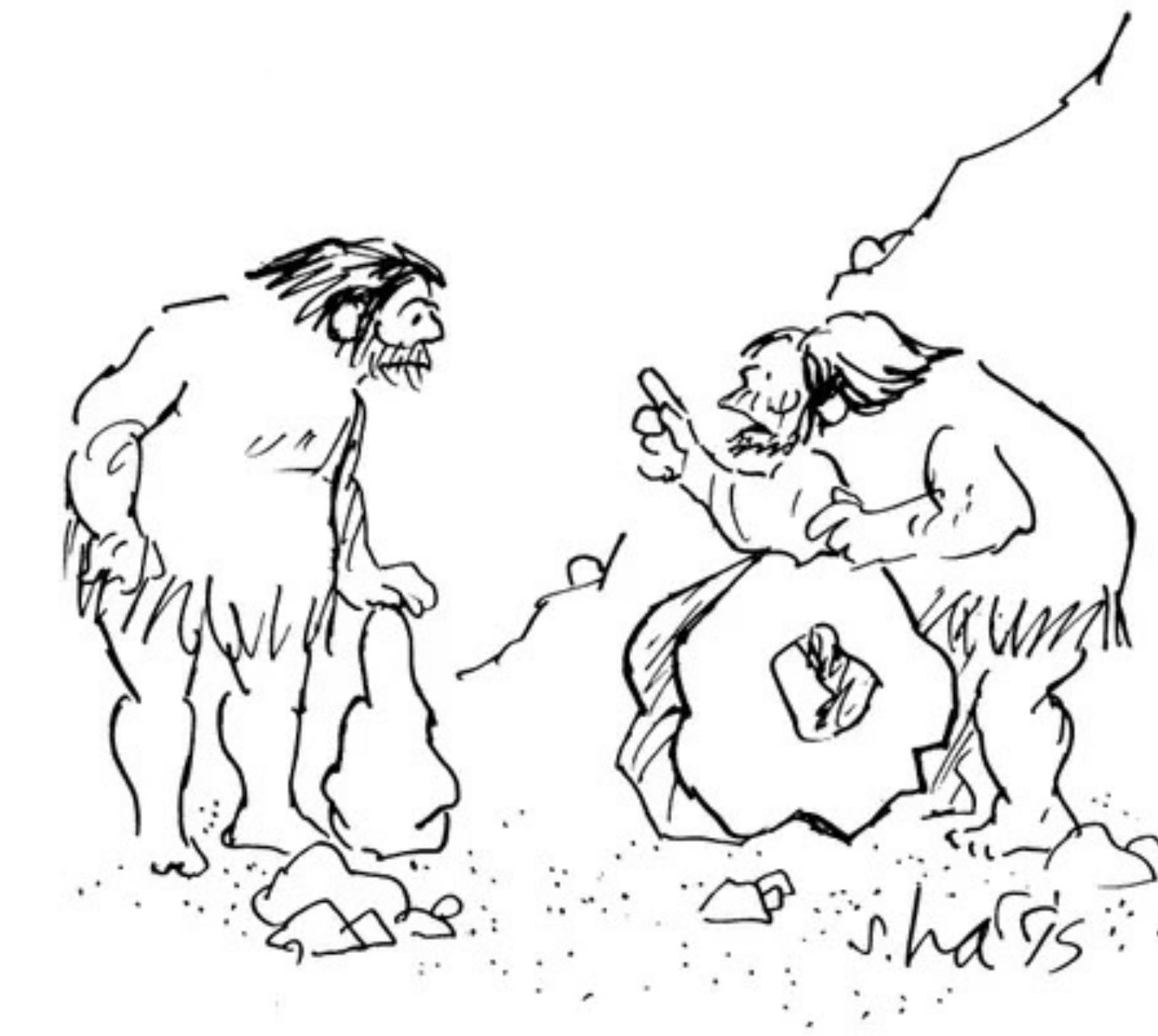
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REplacing cus **T**om **I**mplementation **W**ith **A**PIs

REplacing cus Tom Implementation W ith APIs

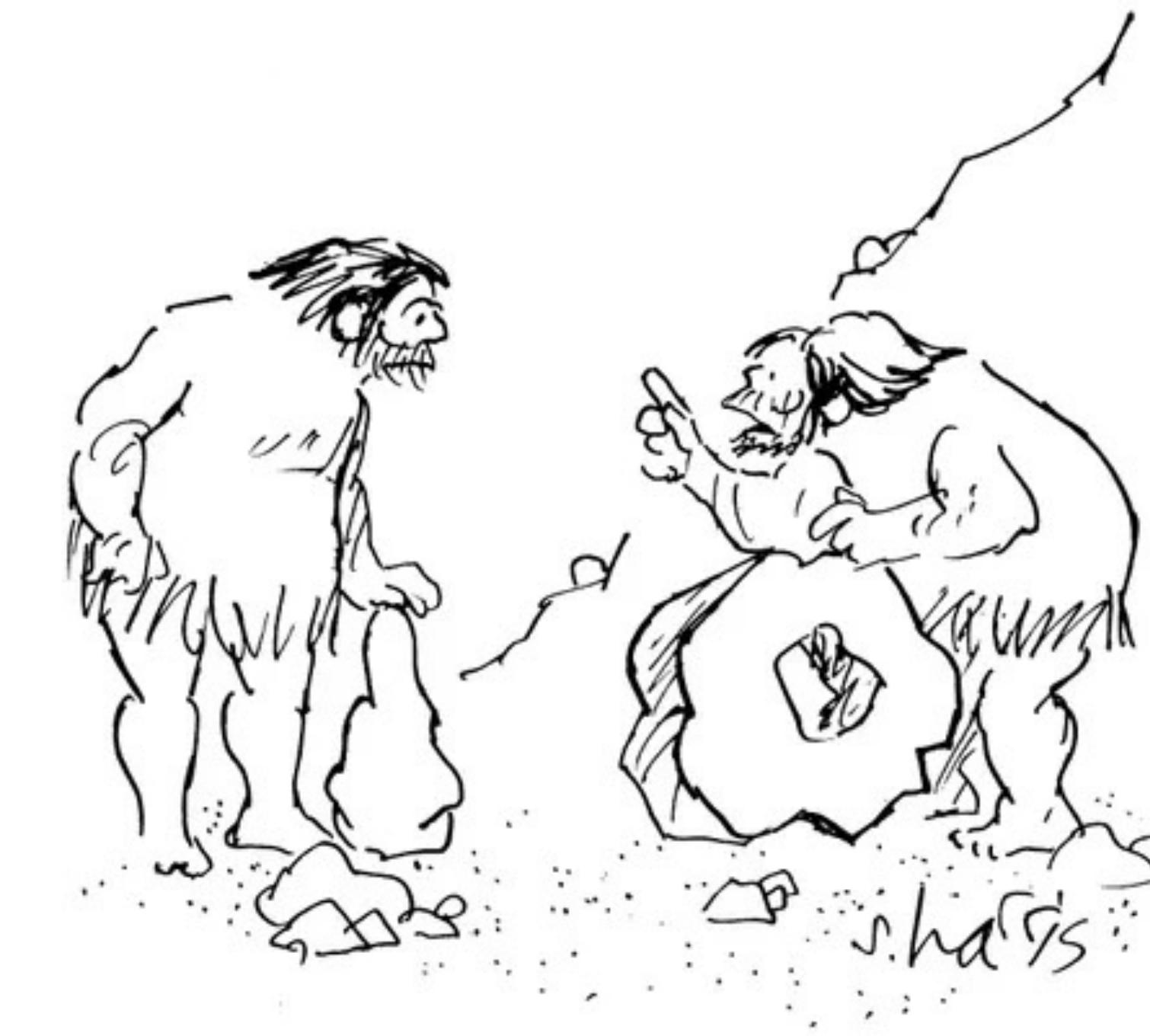


REplacing cus Tom Implementation W ith APIs



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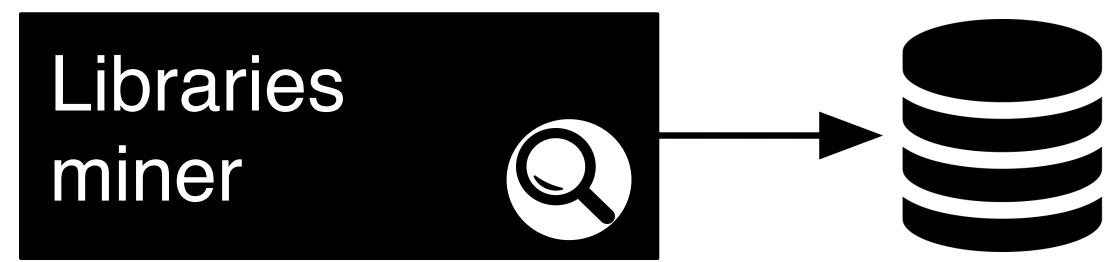
To what extent is it possible to automatically
identify method-to-API replacements?

REplacing cus **T**om **I**mplementation **W**ith **A**PIs

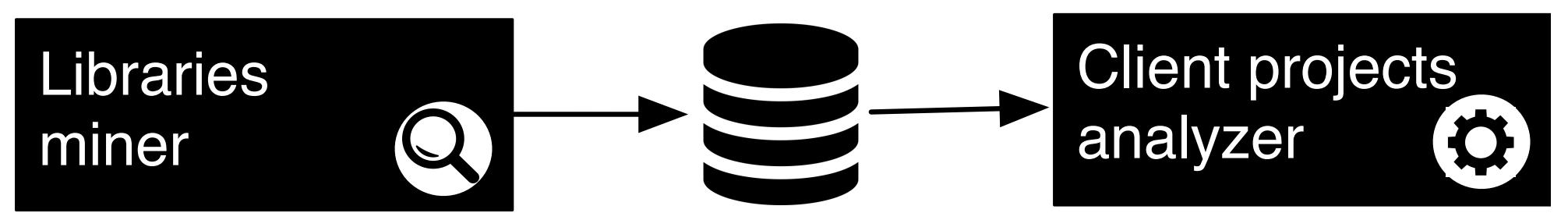
REplacing custom Implementation With APIs

Libraries
miner 

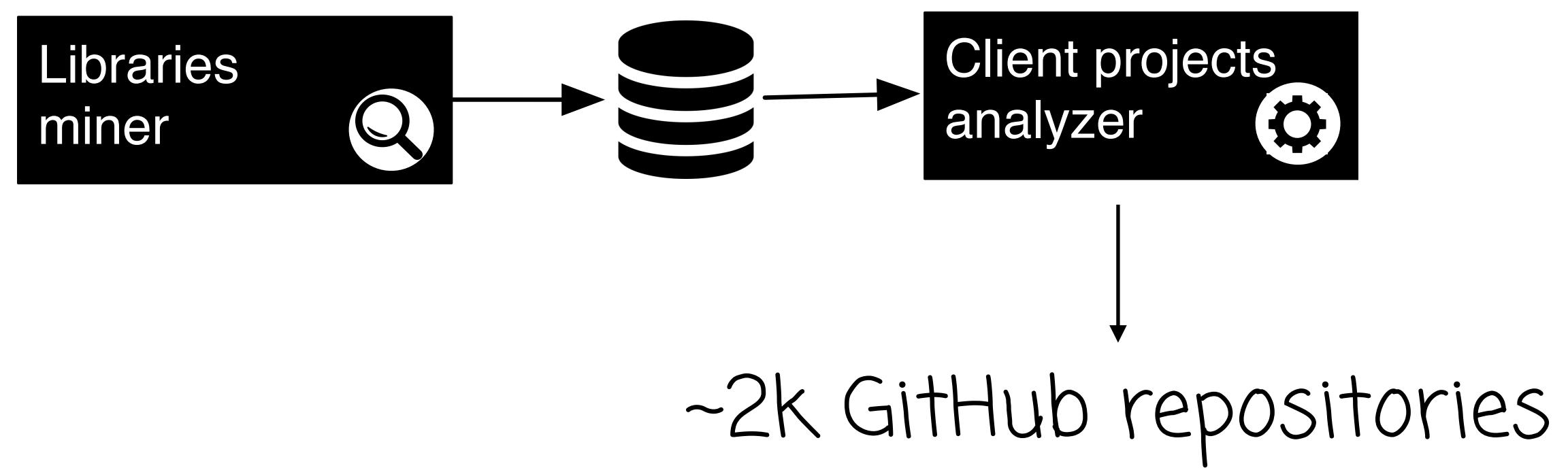
REplacing custom Tomcat Implementation With APIs



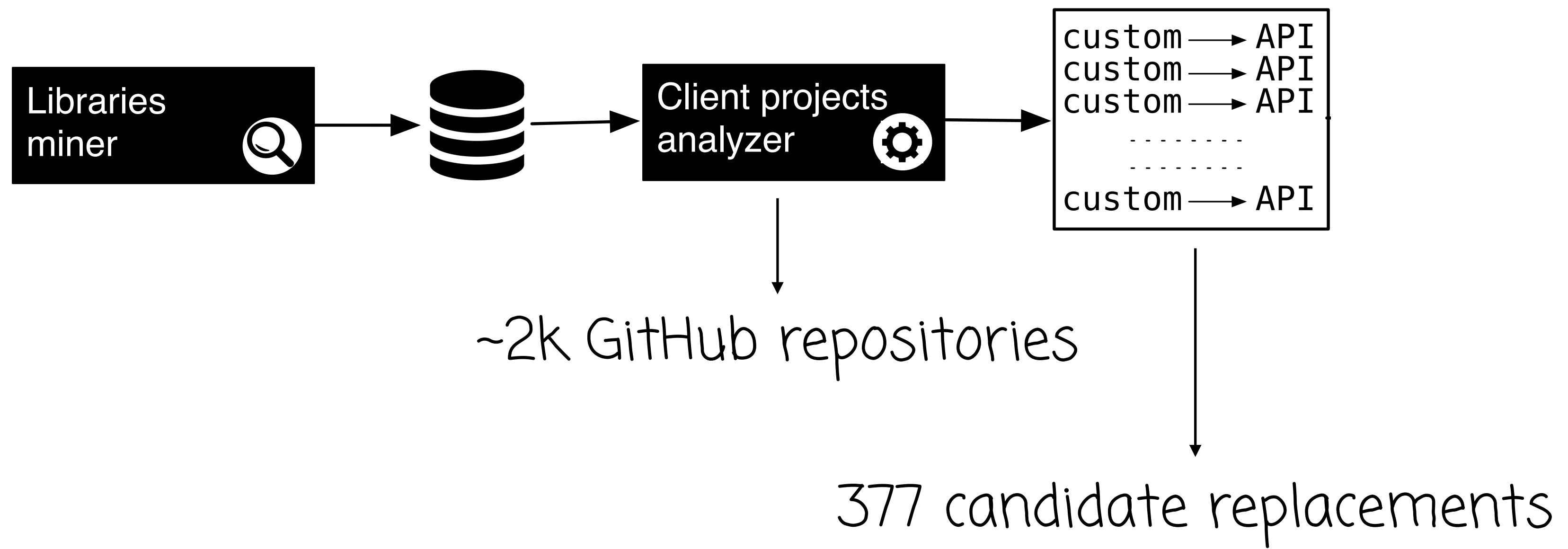
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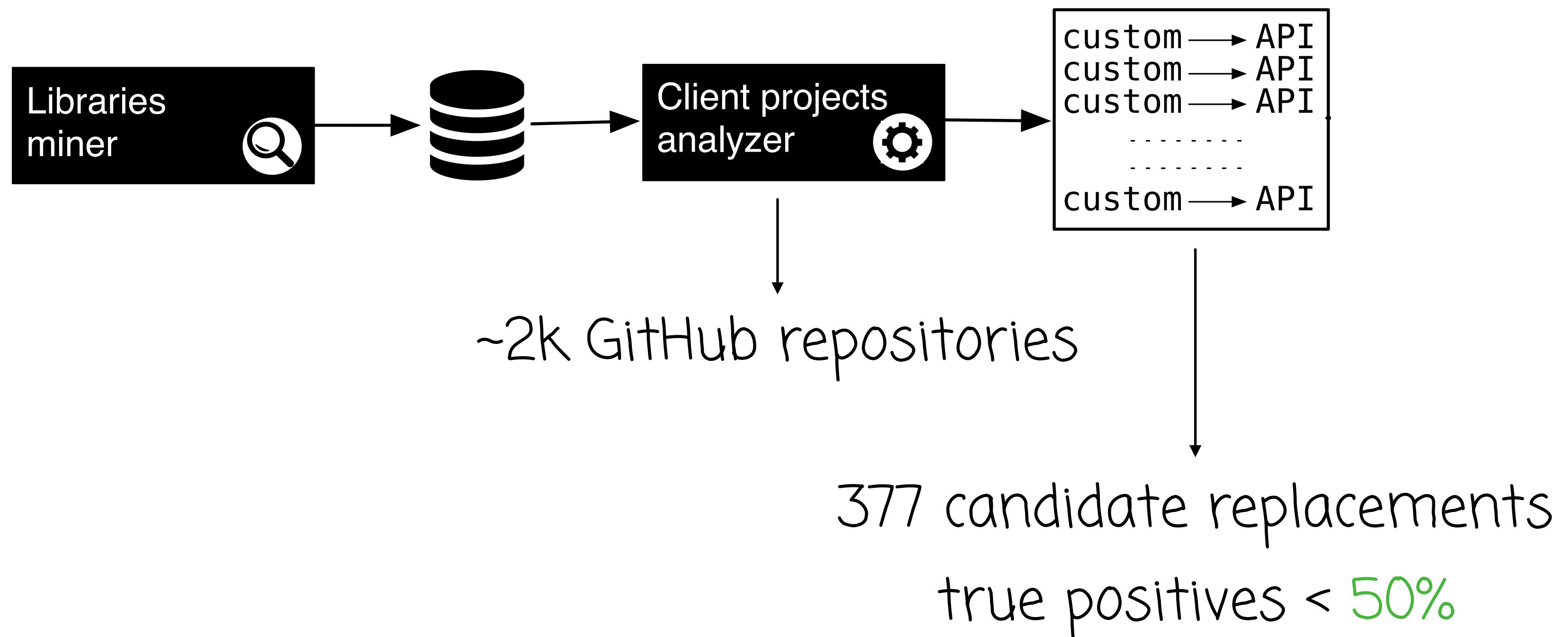
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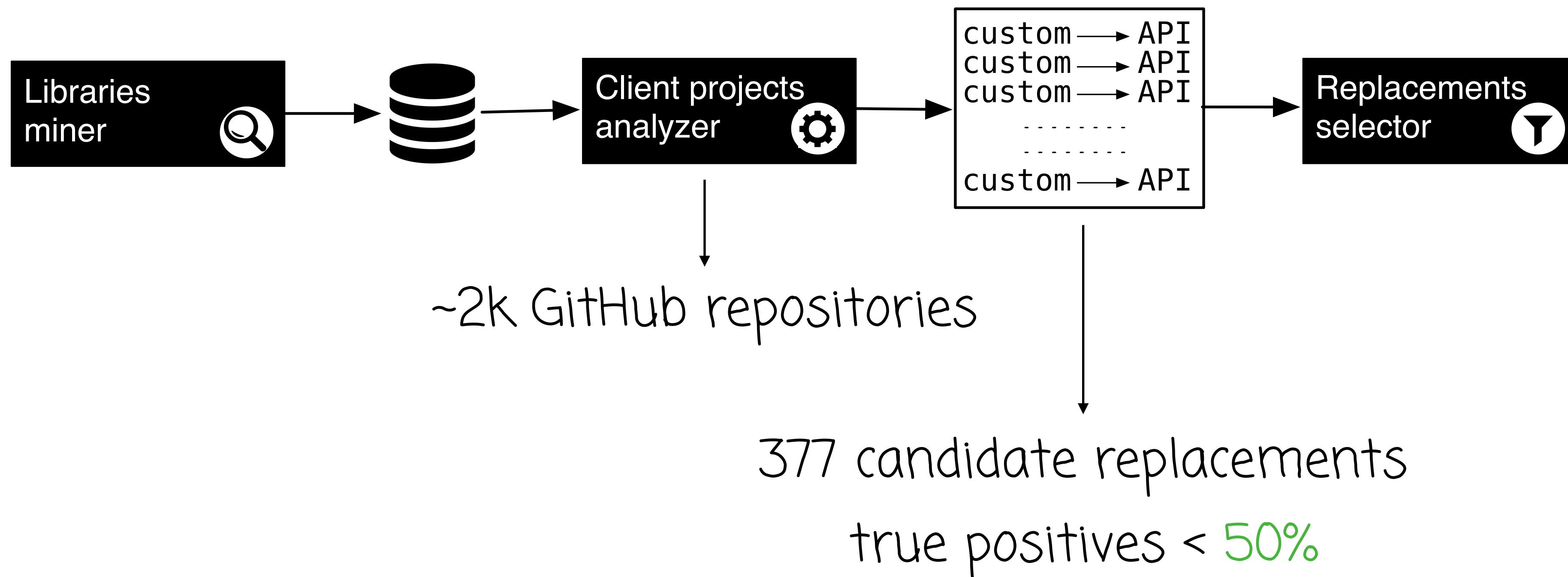
REplacing custom implementation \rightarrow WAPIs



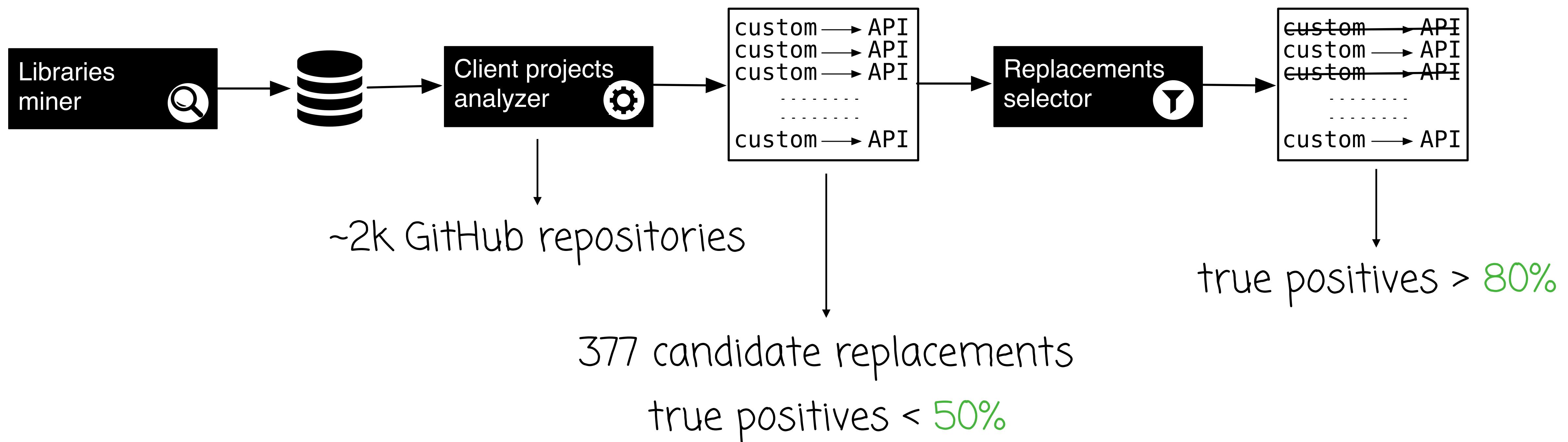
REplacing custom implementation \rightarrow WAPIs



REplacing custom implementation \rightarrow Tom I with APIs



REplacing custom implementation with APIs



Custom implementation

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Real replacement

```
150 -     return indexOf(messageType,  
150 +         allowedRequestMessageTypes) != -1;  
150 +     return contains(allowedRequestMessageTypes,  
150 +         messageType);
```

Custom implementation

```
38 -     public static String randomString(final int min, final int max) {  
39 -         int num = randomInt(min, max);  
40 -         byte[] b = new byte[num];  
41 -         for (int i = 0; i < num; i++) {  
42 -             b[i] = (byte) randomInt('a', 'z');  
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Real replacement

```
50 -     final String captcha = randomString(6, 8);  
39 +     String captcha = RandomStringUtils.randomAlphabetic(6);
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What about the commit messages?

"Use Apache Commons instead of redundant home-grown routines"

Custom implementation

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"Various improvements"

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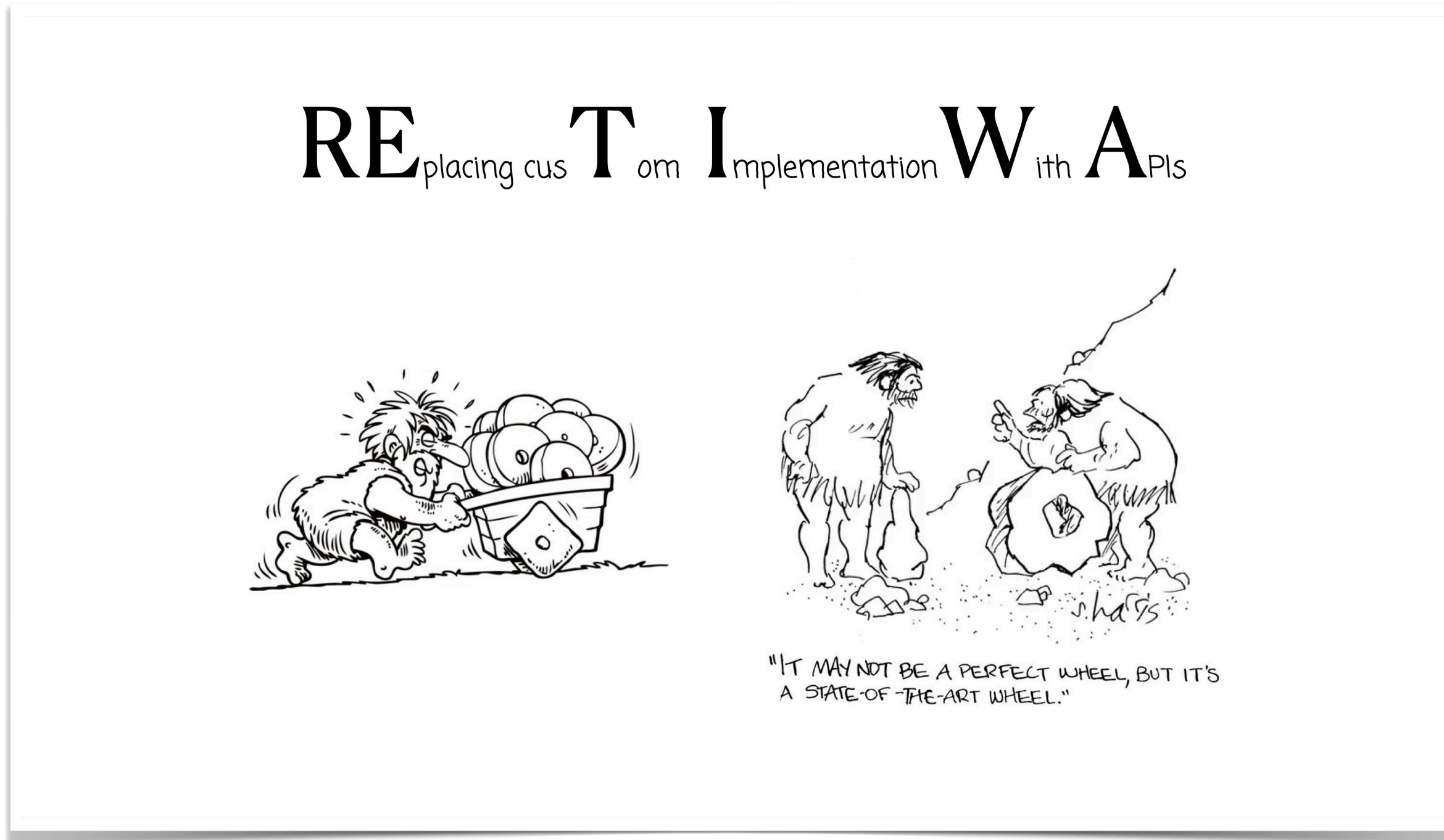
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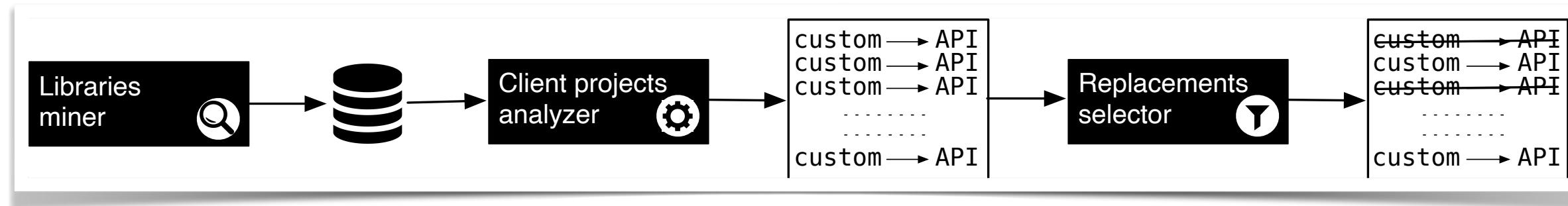
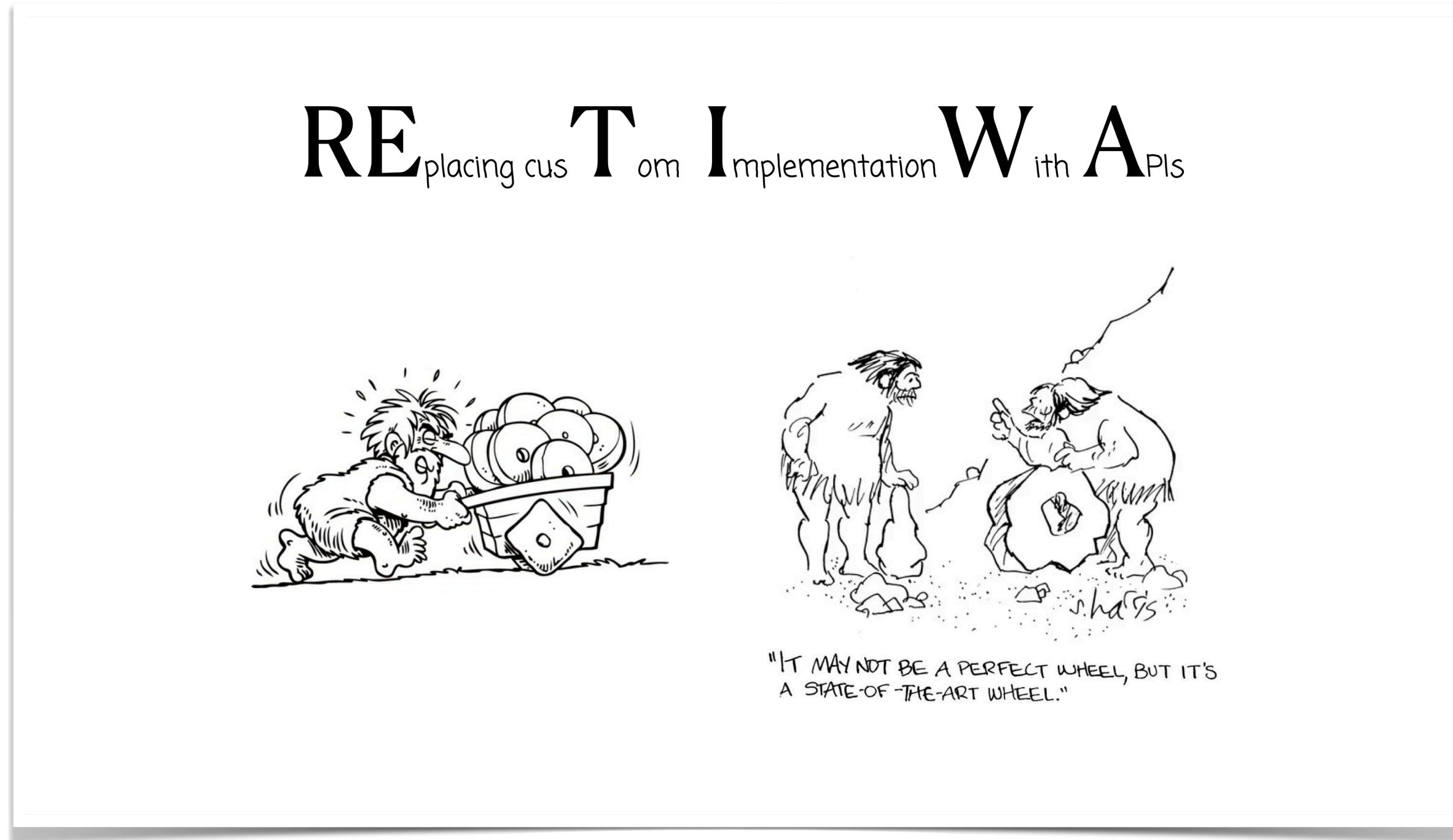
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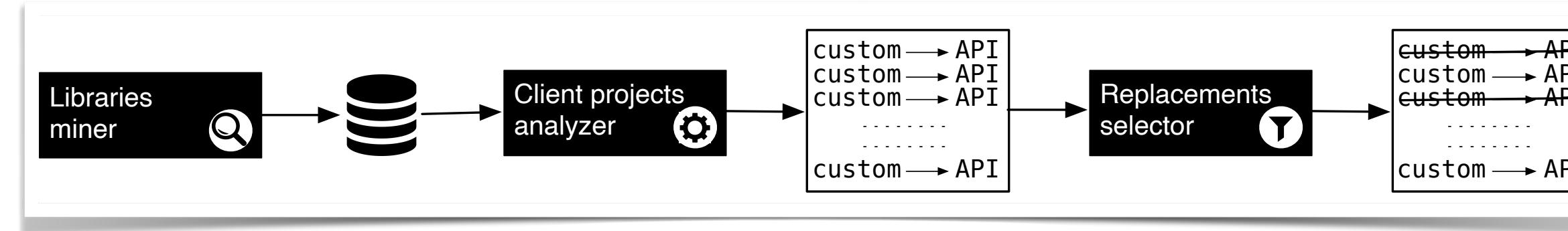
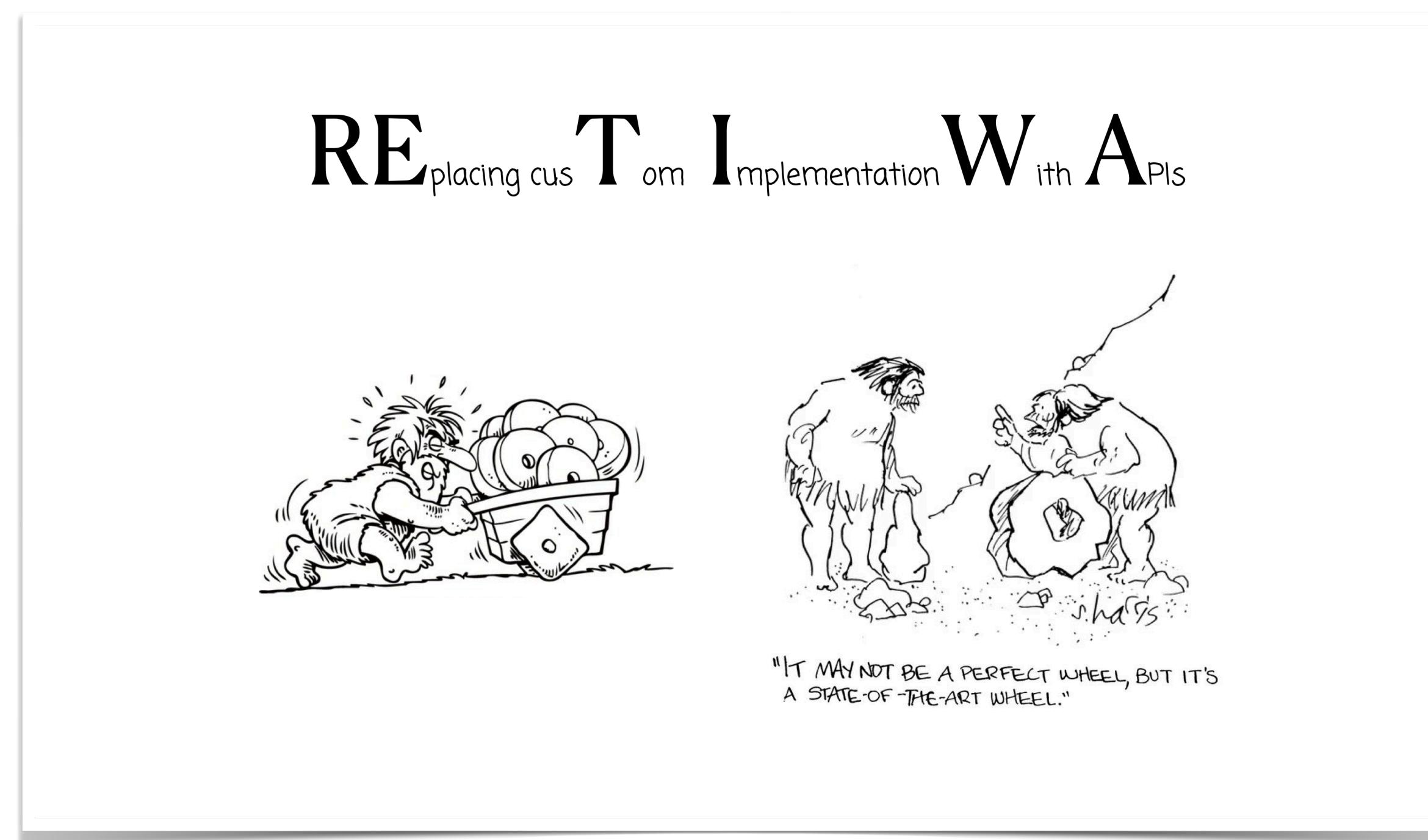
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