

The Drupal Framework: A Case Study to Evaluate Variability Testing Techniques

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Where do I come from?

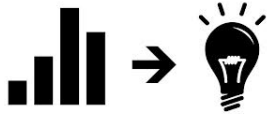




Motivation



Drupal Framework Case Study



Insights



Evaluation



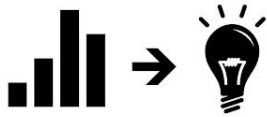
Conclusions



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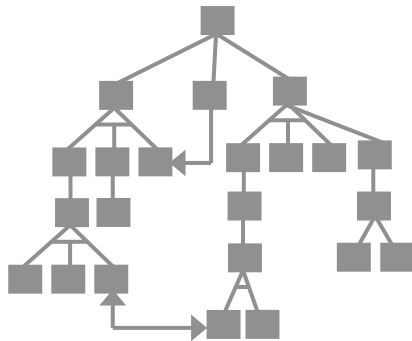
Evaluation



Conclusions

Motivation

- Testing all the products of an SPL is often unfeasible, there are too many!

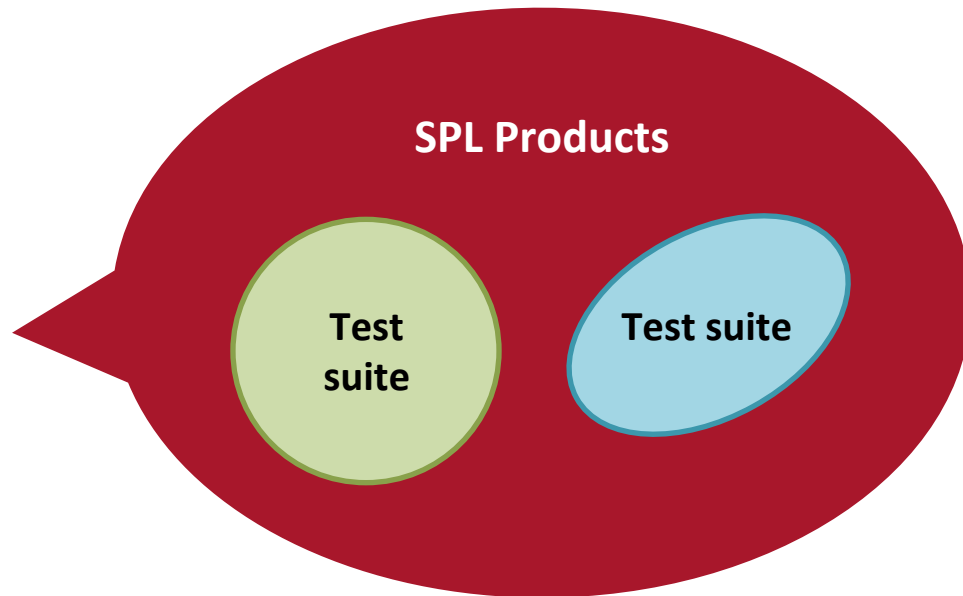
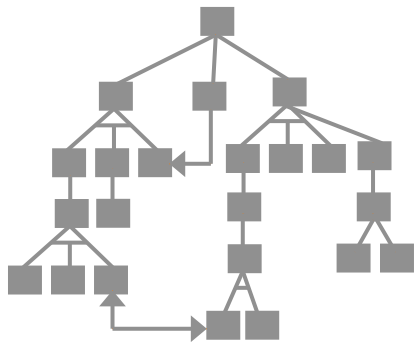


**Too many
products**



Motivation. Test Case Selection

- *Test case selection techniques* reduce the test space by selecting a portion of the products to be tested.



Motivation. Test Case Prioritization

- *Test case prioritization techniques* schedule test cases for execution in an order that attempts to increase their effectiveness at meeting some performance goal (Rothermel et al. 2001)



Ana B. Sánchez, Sergio Segura and Antonio Ruiz Cortés.

A Comparison of Test Case Prioritization Criteria for Software Product Lines.
International Conference on Software Testing, Verification, and Validation
(2014).

Different prioritization criteria lead to different orderings of the same test set.



Motivation

How to evaluate these variability testing techniques?



Artificial Variability Models



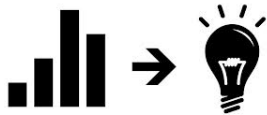
Non distribution of faults



Motivation



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Our approach. The Drupal Framework

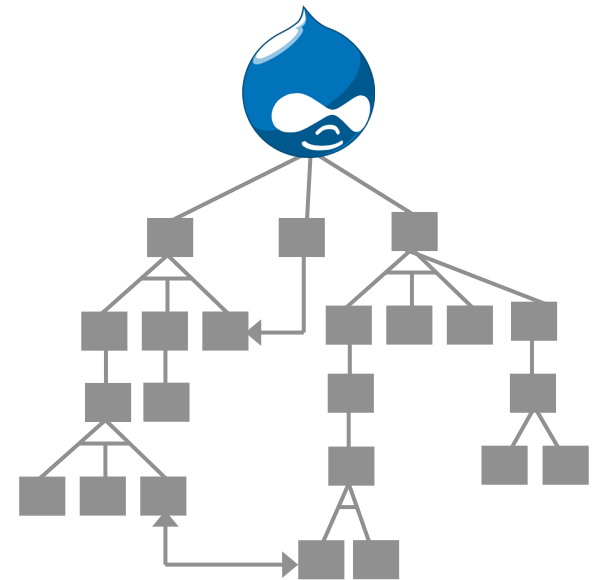


DrupalTM

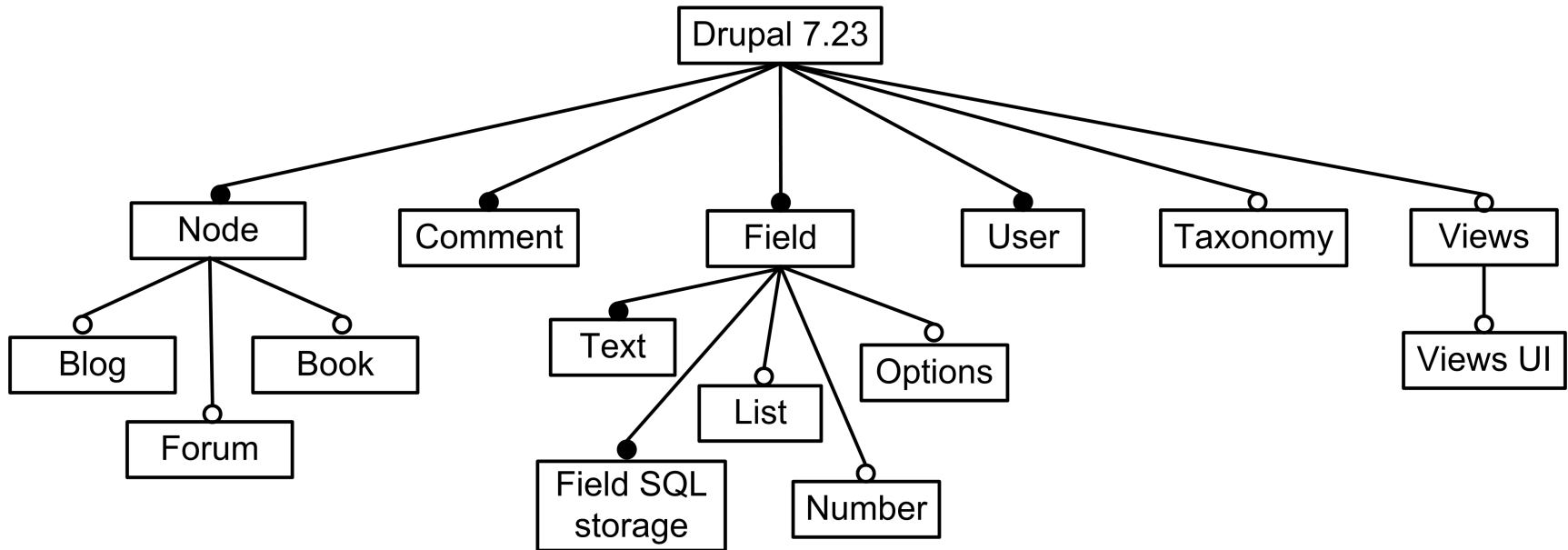
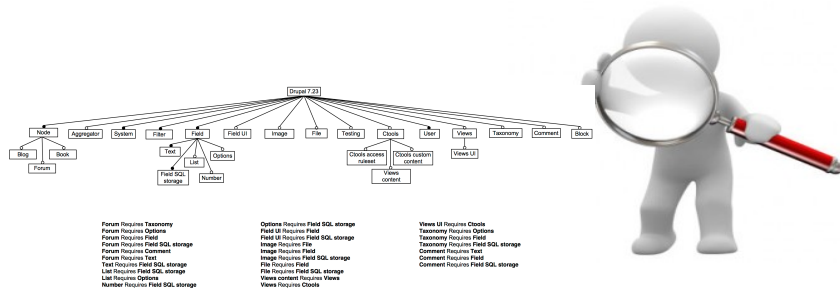
1. Available code
2. Detailed fault reports
3. Automated test cases
4. Extensive documentation
5. > 630,000 users and developers
6. > 14,000 modules

Our approach. The Drupal Feature model

Module .info files
+
Drupal documentation
+
Module JIT

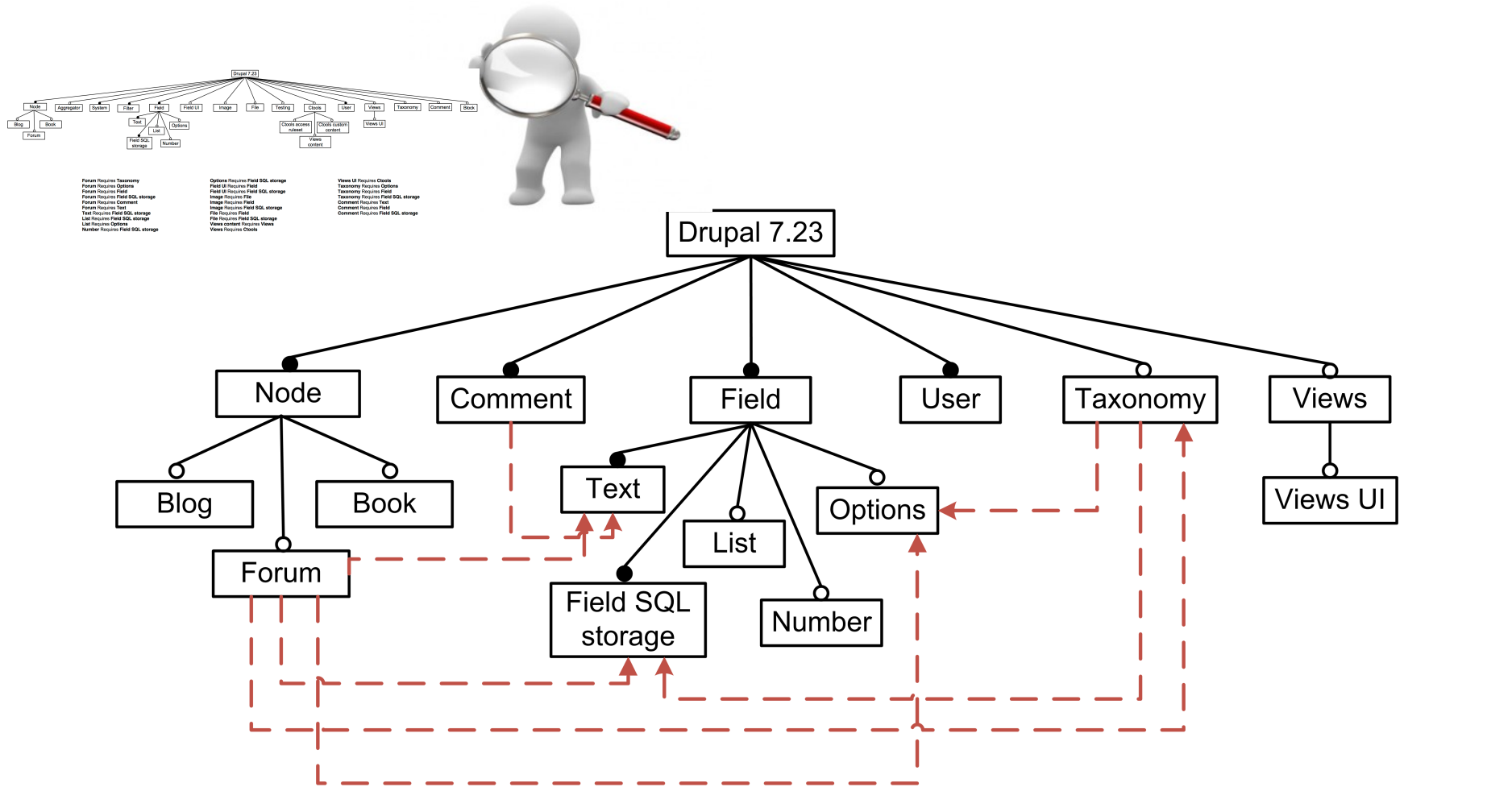


Our approach. The Drupal feature model



28 features in total in our study

Our approach. The Drupal feature model



57.1% of CTCR in our study

Our approach. Drupal features data

Where Drupal feature data
and faults were obtained from?

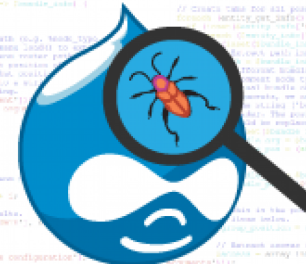


```
28 <div id="top">
29
30 <div id="top_nav">
31 <ul>
32 <li><a href="#">Link</a></li>
33 <li><a href="#">Link</a></li>
34 </ul>
35 </div><!-- /top_nav -->
36
37 <form action="/search/node" method="post"
38 id="search-theme-form">
39 <div id="search" class="container-inline">
40 <div class="form-item">
41 <input type="text" maxlength="128"
42 name="search_theme_form_keys" id="edit-search-theme-form-keys"
43 size="15" value="" title="Enter the terms you wish to search
44 for." class="form-text" />
45 </div><!-- /form-item -->
46
47 <input type="image" src="files/icons/
48 ico_search.jpg" name="op" value="Search" id="search_icon" />
49 <input type="hidden" name="form_token"
50 id="edit-search-theme-form-token" />
51 <input type="hidden" name="form_id"
52 id="edit-search-theme-form" value="search_theme_form" />
53 </div><!-- /search -->
54 </form>
55 </div><!-- /top -->
```

Code

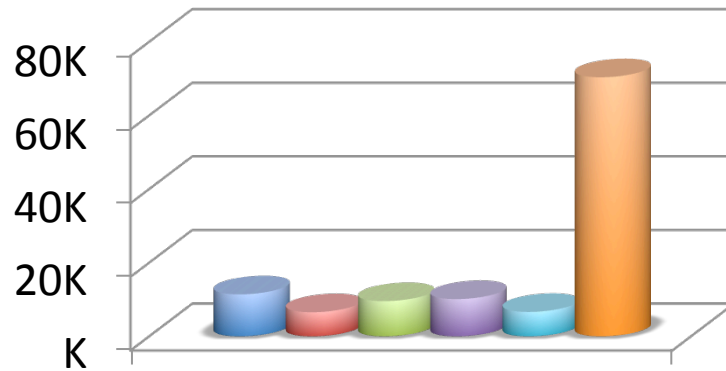


**Git
Repository**

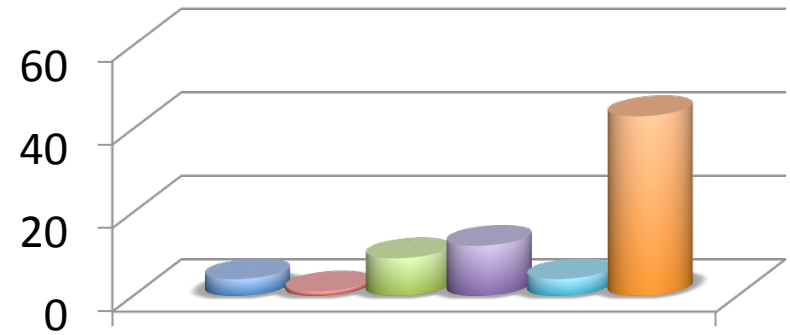


**Bug tracking
System**

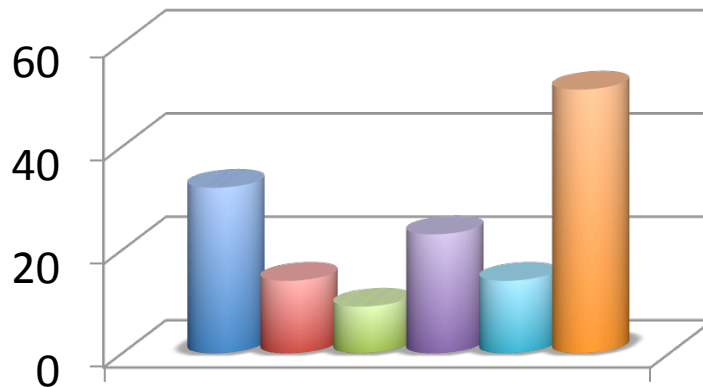
Our approach. Drupal features data



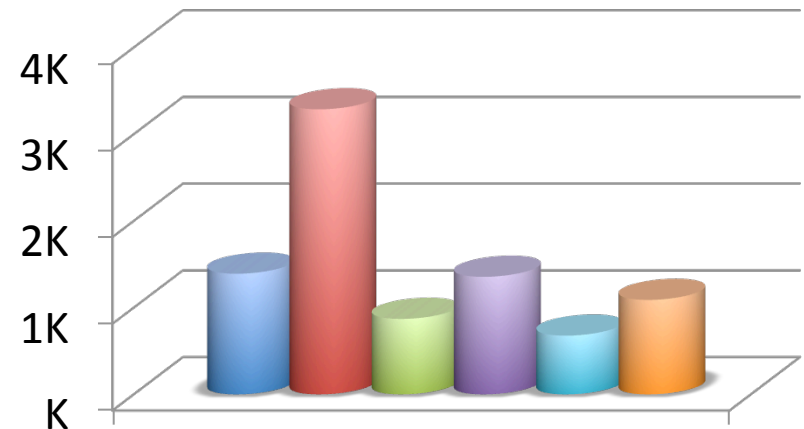
LoC



Changes



Test Cases



Assertions

Drupal modules: Node Comment Field User Taxonomy Views

Our approach. Faults in Drupal



v7.22

Faults

407



Severity	Faults
Minor	27
Normal	319
Major	44
Critical	17



v7.23

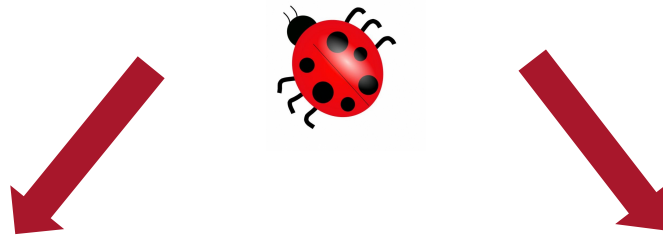
390



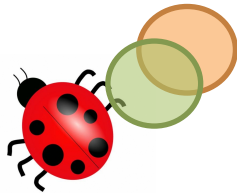
Severity	Faults
Minor	27
Normal	303
Major	42
Critical	18

Faults in Drupal

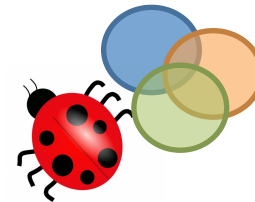
12 integration faults in Drupal



11 caused by 2 modules



1 caused by 3 modules

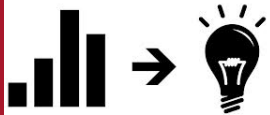




Motivation



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Conclusions

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**Feature
Size** **Faults**



**Feature
Changes** **Faults**



**Feature
Size** **Test
Cases**



**Optional
Features** **Faults**



**Core
Features** **Faults**

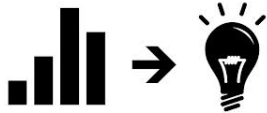
CTC ? Faults ?



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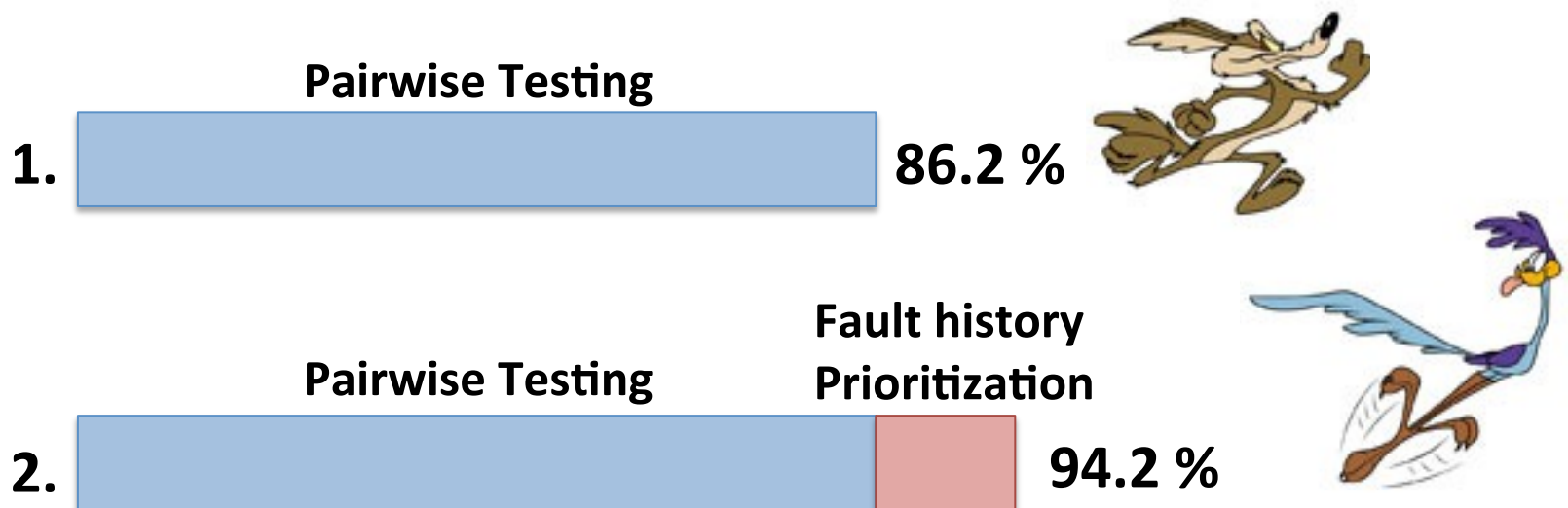
Evaluation



Conclusions

Evaluation

Can faults of Drupal v7.22 accelerate the detection of faults of Drupal v7.23?

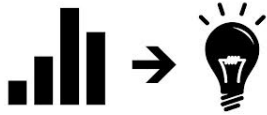




Motivation



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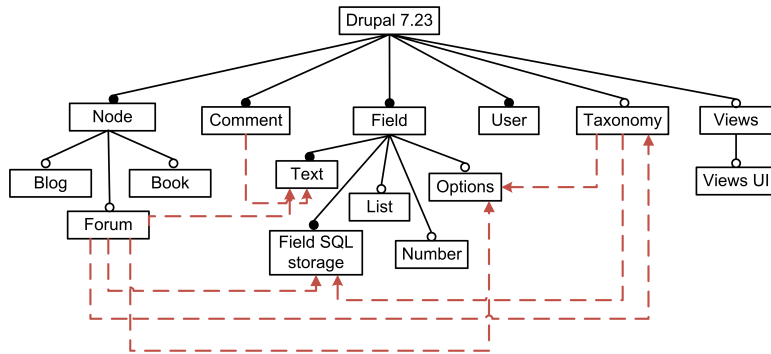
Evaluation



Conclusions

Conclusions

**A real variability-intensive system
to evaluate testing techniques**



**Distribution
of faults**

Future Works

**We are working with other
real variability systems.**



ERPs



ICST '14

THANKS!



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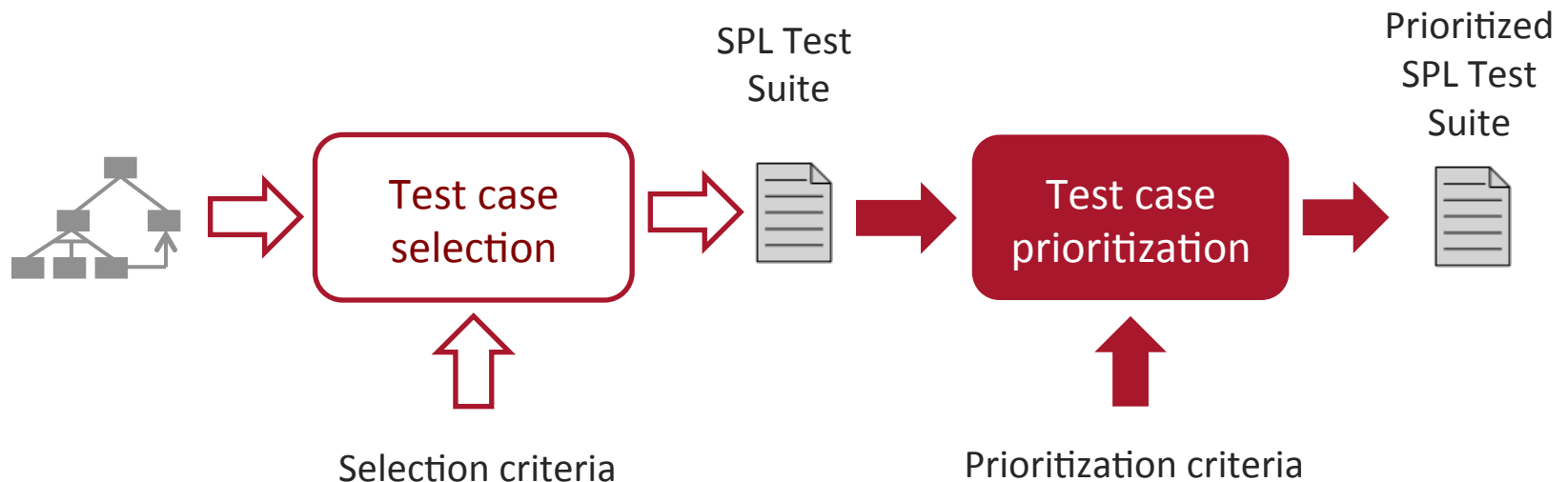


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site/anabsanchezjerez/](https://sites.google.com/site/anabsanchezjerez/)

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