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

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Where do I come from?

Sevilla
Motivation

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

Drupal Framework Case Study

Insights

Evaluation

Conclusions
Our approach. The Drupal Framework

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?

- 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

Faults

<table>
<thead>
<tr>
<th>Severity</th>
<th>Faults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>27</td>
</tr>
<tr>
<td>Normal</td>
<td>319</td>
</tr>
<tr>
<td>Major</td>
<td>44</td>
</tr>
<tr>
<td>Critical</td>
<td>17</td>
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Faults in Drupal

12 integration faults in Drupal

11 caused by 2 modules

1 caused by 3 modules
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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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Can faults of Drupal v7.22 accelerate the detection of faults of Drupal v7.23?
Conclusions

A real variability-intensive system to evaluate testing techniques

Distribution of faults
Future Works

We are working with other real variability systems.
THANKS!

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Motivation

Ana B. Sánchez, Sergio Segura and Antonio Ruiz Cortés.  
A Comparison of Test Case Prioritization Criteria for Software Product Lines.  