Increase Test Coverage in Linux-based OS

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What about QA? ....
Do we have the same growth? ....
Software development is hard. Testing that software is hard, too !!!

- Small test
  - Unit tests
  - Data corruption
  - Error conditions

- Medium Test
  - Interaction
  - Features

- Large tests
  - Real user scenarios,
  - Use real user data sources
The cost of a BUG !!!

Cost in $

0 10000 20000 30000 40000 50000 60000 70000 80000 90000 100000 110000 120000

Gather requirements  QA testing phase  Found in production
Why we are not enabling small tests?

- Make test
- Make check
- Make test
- Make check
How do we fix it in Clear Linux?
Examples of outputs

Testsuite summary for augeas 1.4.0

# TOTAL: 95
# PASS: 85
# SKIP: 10
# XFAIL: 0
# FAIL: 0
# XPASS: 0
# ERROR: 0

xmlsec1

merlin-xmldsig-twenty-three/signature-x509-is
Checking required transforms	OK
Checking required key data	OK
Create new signature	Fail
Verify new signature	Fail

merlin-xmldsig-twenty-three/signature-x509-ski
Checking required transforms	OK
Checking required key data	OK
Create new signature	Fail
Verify new signature	Fail

ACL Tests

*** malformed-restore.test ***
[19] $ rm tmp.acl -- ok
13 commands (13 passed, 0 failed)

*** sbits-restore.test ***
17 commands (17 passed, 0 failed)

*** utf8-filenames.test ***
7 commands (7 passed, 0 failed)
Examples of Parsers

```plaintext
# augeas
#
if ($line =~ /\# TOTAL: \+[0-9]+/ and $incheck == 1) {
    $total_tests += 1;
}
if ($line =~ /\# PASS: \+[0-9]+/ and $incheck == 1) {
    $total_pass += 1;
}
if ($line =~ /\# SKIP: \+[0-9]+/ and $incheck == 1) {
    $total_skip += 1;
}
if ($line =~ /\# FAIL: \+[0-9]+/ and $incheck == 1) {
    $total_fail += 1;
}
if ($line =~ /\#XFALL: \+[0-9]+/ and $incheck == 1) {
    $total_xfail += 1;
}
if ($line =~ /\# XPASS: \+[0-9]+/ and $incheck == 1) {
    $total_pass += 1;
}

# xmlsec1
#
if ($line =~ /\^ \[\s+\] \+OK\$/ and $incheck == 1) {
    $total_pass++;
    next;
} elsif ($line =~ /\^ \+FAIL\$/ and $incheck == 1) {
    $total_fail++;
    next;
} elsif ($line =~ /\^ \+Skip\$/ and $incheck == 1) {
    $total_skip++;
    next;
}

# ACL
#
if ($line =~ /\[0-9]+ commands \((\[0-9]+) passed, \((\[0-9]+) failed\)\)\) {
    $total_pass += 1;
    $total_fail += 2;
}
```
Full architecture

https://github.com/clearlinux/autospec/blob/master/autospec/count.pl
Shifting left quality in Clear Linux project

Component Development
Clear Linux Focus
Integration
CI
Release Process
Traditional QA

850000 tests
Shifting left CI
5000 tests
Continuous Integration
1000 tests
Results in Clear Linux project

- 39% of packages with tests
- 61% of packages without tests
- 97% pass rate
- 3% fail rate
History of growth
Wait … How many parsers do we have so far?

26 and counting ...

Thanks for the lack of standards …... 😞
Future Work
(How to solve this problems)

Exist in list of current parsers?

Machine Learning
Neural Network

New pattern
Human feedback

Human feedback
WE’RE HIRING
Thanks !!

Happy conference, happy testing, and may you always find (and fix) the bug you are looking for. !!!

James Whittaker et al