

Internals of extended code coverage reports



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Linux 5.14-rc1 verification

Unsafes: 285	Safes: 847	Unknowns: 890
Bugs: 24		Timeout: 538
False positives: 261		

Coverage reports

- GCOV (human readable)
- LCOV (machine readable)
- Extended LCOV
- Klever

genhtml from LCOV

```
21999      : int ldv_random_int(int begin, int end)
22000      : {
22001      :   #line 55
22002  1 :   int ret;
22003      :   #line 57
22004  1 :   if (begin >= end)
22005      :           #line 58
22006  0 :           return begin;
22007      :   else {
22008      :       #line 60
22009  2 :       ret = ldv_undef_int();
22010      :       #line 61
22011  2 :       __VERIFIER_assume(ret >= begin);
22012      :       #line 62
22013  2 :       __VERIFIER_assume(ret < end);
22014      :       #line 63
22015  1 :       return ret;
22016      :   }
22017      : }
```

Additional CPA information

- Known explicit values
- Timers from analysis
- Counters from analysis
 - done by tags «ADD» and «TIMERS»

Representation: lcov

DA:22002,1

DA:22004,1

ADD:begin = {0}, end = {43}

DA:22006,0

DA:22009,2

DA:22011,2

ADD:begin = {0}

DA:22013,2

ADD:end = {43}

DA:22015,1

Representation: gcov

```
1: 22002:int ret;
1: 22004:[!(begin >= end)]
info begin = {0}, end = {43}
0: 22006:return begin;
2: 22009:ret = ldv_undef_int();
2: 22011:[__VERIFIER_assume(ret >= begin);]
info begin = {0}
2: 22013:[__VERIFIER_assume(ret < end);]
info end = {43}
1: 22015:return ret;
```

Representation: Klever

```
53 int ldv_random_int(int begin, int end)
54 {
55     int ret;
56
57     if (begin >= end)
58         begin = {0}, end = {43}
59         return begin;
60     else {
61         ret = ldv_undef_int();
62         ldv_assume(ret >= begin);
63         begin = {0}
64         ldv_assume(ret < end);
65         end = {43}
66         return ret;
67     }
68 }
```


Current interface

- CoverageCollector
 - fromReachedSet(Iterable<AbstractState> pReached, CFA pCfa)
 - fromCounterexample(ARGPath pPath, CFA pCfa)
- processStateForAdditionalInfo(AbstractState state)

Future work

- Develop comon interface
- Merge `klever_fixes` branch

Thank you!



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