



How to automate runs of checkpatch, sparse, smatch, “checkdoc” ++

<https://lkml.org/lkml/2017/12/16/135>

<https://patchwork.kernel.org/patch/10174967/>

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Linux Plumbers Conference'18

Why, problems & how

Why:

- Make sure static checking tools gets run early - reduce review noise, avoid regressions

Problems:

- False negatives, differing policies, valid exceptions
- ~ All-or-nothing => nothing
- make C={1,2} not general enough for any tool
- Different tools, deviating output formats - unification?

How:

- Generalize make C={1,2}
- Support suppression syntax
- Parse tool output to unify/group

Implementation:

- Inspired by checkpatch -show-types:
 - Symbolic name + suppression opt
- Implements similar types for generic checkers
 - by simple regex syntax in config file
- Python script
 - V2 - v1: shell script, checkpatch only
 - Inspired by lkml exchanges!
 - Generic checker, specific checker subclasses
 - Address missing suppression features in other tools, make it more 'neat' to work with as well.
- TBD: Statistics, advanced smatch, coccielle

Before & after (sparse example)

```
ovo ~/build/kernel/master>make C=2 CF="-D__linux__ -Dlinux -D__STDC__ -Dunix -D__unix__ -Wsparse-all" M=drivers/net/wireless/ath/ar5523
CHECK /home/knuto/src/kernel/master/drivers/net/wireless/ath/ar5523/ar5523.c
/home/knuto/src/kernel/master/drivers/net/wireless/ath/ar5523/ar5523.c:925:14: warning: symbol '__ret' shadows an earlier one
/home/knuto/src/kernel/master/drivers/net/wireless/ath/ar5523/ar5523.c:925:14: originally declared here
/home/knuto/src/kernel/master/include/linux/slab.h:332:43: warning: dubious: x & !y
/home/knuto/src/kernel/master/include/linux/slab.h:332:43: warning: dubious: x & !y
/home/knuto/src/kernel/master/include/linux/slab.h:332:43: warning: dubious: x & !y
/home/knuto/src/kernel/master/drivers/net/wireless/ath/ar5523/ar5523.c:1517:28: warning: expression using sizeof(void)
Building modules, stage 2.
MODPOST 1 modules
ovo ~/build/kernel/master>
```

```
ovo ~/build/kernel/runchecks>make C=2 CF="--color -n -w --run sparse" M=drivers/net/wireless/ath/ar5523
CHECK /home/knuto/src/kernel/runchecks/drivers/net/wireless/ath/ar5523/ar5523.c
/home/knuto/src/kernel/runchecks/drivers/net/wireless/ath/ar5523/ar5523.c:925:14: SPARSE:SHADOW: warning: symbol '__ret' shadows an earlier one
/home/knuto/src/kernel/runchecks/drivers/net/wireless/ath/ar5523/ar5523.c:925:14: originally declared here
/home/knuto/src/kernel/runchecks/include/linux/slab.h:332:43: SPARSE:DUBIOUS_EXPR: warning: dubious: x & !y
/home/knuto/src/kernel/runchecks/include/linux/slab.h:332:43: SPARSE:DUBIOUS_EXPR: warning: dubious: x & !y
/home/knuto/src/kernel/runchecks/include/linux/slab.h:332:43: SPARSE:DUBIOUS_EXPR: warning: dubious: x & !y
/home/knuto/src/kernel/runchecks/drivers/net/wireless/ath/ar5523/ar5523.c:1517:28: SPARSE:SIZEOF_VOID: warning: expression using sizeof(void)
/home/knuto/src/kernel/runchecks/include/net/mac80211.h:2402:9: SPARSE:RETURN_VOID: warning: returning void-valued expression
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/home/knuto/src/kernel/runchecks/include/net/mac80211.h:2402:9: SPARSE:RETURN_VOID: warning: returning void-valued expression
Building modules, stage 2.
MODPOST 1 modules
ovo ~/build/kernel/runchecks>
```

Configuration + suppressions

scripts/runchecks.cfg:

```
checker checkpatch
addflags --quiet --show-types --strict --emacs
line_len 110

checker sparse
addflags -D__linux__ -Dlinux -D__STDC__ -Dunix -D__unix__ -Wsparse-all
cflags

# Name Regular expression for matching in checker output
typedef DECL symbol ',*' was not declared. Should it be static?
typedef SHADOW symbol '\w+' shadows an earlier one\n,*originally declared here
typedef TYPESIGN incorrect type in argument \d+ \(\(different signedness\)\n,*expected\n,*got
typedef RETURN_VOID returning void-valued expression
typedef SIZEOF_BOOL expression using sizeof bool
typedef SIZEOF_VOID expression using sizeof\(\void\)
typedef CONTEXT context imbalance in ',*'
typedef MEMCPY_MAX_COUNT \w+ with byte count of
typedef CAST_TO_AS cast adds address space to expression
typedef ADDRESS_SPACE incorrect type in .* \(\(different address spaces\)\n,*expected\n,*got
typedef PTR_INHERIT incorrect type in .* \(\(different base types\)\n,*expected\n,*got
typedef PTR_SUBTRACTION_BLOWS potentially expensive pointer subtraction
typedef VLA Variable length array is used
```

...

runchecks.cfg in the ar5523 directory:

```
checker sparse

except SHADOW ar5523.c
except DUBIOUS_EXPR ar5523.c
#except SIZEOF_VOID ar5523.c

pervasive RETURN_VOID
□
```