The static check needle in the warnings haystack

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Examples of Static Analysis Tools

- gcc
- dtc
- smatch
- sparse

What is the problem?

Premise

There many warnings reported by the static analysis tools against existing code

It can be difficult to determine what new warnings a code change has created when so many warnings already exist

Thus many developers and maintainers do not check for new warnings

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True or False?

Look at an example

```
$ git checkout master
$ git log -n1 --oneline
4f5cafb5cb84 Linux 5.4-rc3

$ rm ${KBUILD_OUTPUT}/drivers/of/overlay.o
$ make W=3 drivers/of/overlay.o >/dev/null 2>&1
$ rm ${KBUILD_OUTPUT}/drivers/of/overlay.o
$ make W=3 drivers/of/overlay.o 1>/dev/null 2>old_warnings


$ git checkout 5.4-rc3_test_v3
$ git log -n2 --oneline
d85d7811732f of: drivers/of/overlay.c (v3) add new_func()
4f5cafb5cb84 Linux 5.4-rc3

$ rm ${KBUILD_OUTPUT}/drivers/of/overlay.o
$ make W=3 drivers/of/overlay.o >/dev/null 2>&1
$ rm ${KBUILD_OUTPUT}/drivers/of/overlay.o
$ make W=3 drivers/of/overlay.o 1>/dev/null 2>new_warnings
```

(1) Many warnings?

```
$ wc -l old_warnings; wc -l new_warnings
1318 old_warnings
1320 new_warnings
```

Yes

(2) Hard to find new warnings?

```
$ wc -l old_warnings; wc -l new_warnings
1318 old_warnings
1320 new_warnings

$ diff -u old_warnings new_warnings | wc -l
127
```

Naive analysis suggests two new lines of warning messages

But diff of old vs new warnings show 127 lines differ

```
$ diff -u old_warnings new_warnings
--- old_warnings	2019-10-25 18:32:19.038898851 -0500
+++ new_warnings	2019-10-25 18:33:02.970900167 -0500
@@ -1250,69 +1250,71 @@
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/of_private.h:66:5: note: previous declaration of '__of_attach_node_sysfs' was here
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/of_private.h:144:13: warning: redundant redeclaration of '__of_detach_node_sysfs' [-Wredundant-decls]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/of_private.h:67:6: note: previous declaration of '__of_detach_node_sysfs' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:44:1: warning: padding struct size to alignment boundary [-Wpadded]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:75:22: warning: padding struct to align 'cset' [-Wpadded]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:140:1: warning: redundant redeclaration of 'of_overlay_notifier_register' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:136:5: note: previous definition of 'of_overlay_notifier_register' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:150:1: warning: redundant redeclaration of 'of_overlay_notifier_unregister' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:146:5: note: previous definition of 'of_overlay_notifier_unregister' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:27:1: warning: redundant redeclaration of 'new_func' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:26:6: note: previous definition of 'new_func' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:47:1: warning: padding struct size to alignment boundary [-Wpadded]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:78:22: warning: padding struct to align 'cset' [-Wpadded]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:143:1: warning: redundant redeclaration of 'of_overlay_notifier_register' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:139:5: note: previous definition of 'of_overlay_notifier_register' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:153:1: warning: redundant redeclaration of 'of_overlay_notifier_unregister' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:149:5: note: previous definition of 'of_overlay_notifier_unregister' was here
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'dup_and_fixup_symbol_prop':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:217:31: warning: conversion to '__kernel_size_t' from 'int' may change the sign of the result [-Wsign-conversion]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:220:19: warning: conversion to 'int' from '__kernel_size_t' may change the sign of the result [-Wsign-conversion]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:242:24: warning: conversion to 'int' from '__kernel_size_t' may change the sign of the result [-Wsign-conversion]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:247:26: warning: conversion to 'int' from '__kernel_size_t' may change the sign of the result [-Wsign-conversion]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:255:36: warning: conversion to 'size_t' from 'int' may change the sign of the result [-Wsign-conversion]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:260:25: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:220:31: warning: conversion to '__kernel_size_t' from 'int' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:223:19: warning: conversion to 'int' from '__kernel_size_t' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:245:24: warning: conversion to 'int' from '__kernel_size_t' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:250:26: warning: conversion to 'int' from '__kernel_size_t' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:258:36: warning: conversion to 'size_t' from 'int' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:263:25: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'find_dup_cset_node_entry':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:539:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:539:1: warning: redundant redeclaration of '__compiletime_assert_539' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:539:1: note: previous declaration of '__compiletime_assert_539' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:539:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:542:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:542:1: warning: redundant redeclaration of '__compiletime_assert_542' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:542:1: note: previous declaration of '__compiletime_assert_542' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:542:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'find_dup_cset_prop':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:573:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:573:1: warning: redundant redeclaration of '__compiletime_assert_573' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:573:1: note: previous declaration of '__compiletime_assert_573' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:573:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:576:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:576:1: warning: redundant redeclaration of '__compiletime_assert_576' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:576:1: note: previous declaration of '__compiletime_assert_576' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:576:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'changeset_dup_entry_check':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:611:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:611:1: warning: redundant redeclaration of '__compiletime_assert_611' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:611:1: note: previous declaration of '__compiletime_assert_611' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:611:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:614:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:614:1: warning: redundant redeclaration of '__compiletime_assert_614' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:614:1: note: previous declaration of '__compiletime_assert_614' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:614:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'init_overlay_changeset':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:776:2: warning: conversion to 'size_t' from 'int' may change the sign of the result [-Wsign-conversion]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:835:2: warning: conversion to 'long unsigned int' from 'int' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:779:2: warning: conversion to 'size_t' from 'int' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:838:2: warning: conversion to 'long unsigned int' from 'int' may change the sign of the result [-Wsign-conversion]
```

```
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'free_overlay_changeset':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:850:29: warning: conversion to 'long unsigned int' from 'int' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:853:29: warning: conversion to 'long unsigned int' from 'int' may change the sign of the result [-Wsign-conversion]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: At top level:
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1066:1: warning: redundant redeclaration of 'of_overlay_fdt_apply' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1011:5: note: previous definition of 'of_overlay_fdt_apply' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1069:1: warning: redundant redeclaration of 'of_overlay_fdt_apply' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1014:5: note: previous definition of 'of_overlay_fdt_apply' was here
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'node_overlaps_later_cs':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1102:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1102:1: warning: redundant redeclaration of '__compiletime_assert_1102' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1102:1: note: previous declaration of '__compiletime_assert_1102' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1102:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1106:3: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1106:1: warning: redundant redeclaration of '__compiletime_assert_1106' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1106:1: note: previous declaration of '__compiletime_assert_1106' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1106:3: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1105:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1105:1: warning: redundant redeclaration of '__compiletime_assert_1105' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1105:1: note: previous declaration of '__compiletime_assert_1105' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1105:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1109:3: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1109:1: warning: redundant redeclaration of '__compiletime_assert_1109' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1109:1: note: previous declaration of '__compiletime_assert_1109' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1109:3: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'overlay_removal_is_ok':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1139:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1139:1: warning: redundant redeclaration of '__compiletime_assert_1139' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1139:1: note: previous declaration of '__compiletime_assert_1139' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1139:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1142:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1142:1: warning: redundant redeclaration of '__compiletime_assert_1142' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1142:1: note: previous declaration of '__compiletime_assert_1142' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1142:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'of_overlay_remove':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1198:29: warning: conversion to 'long unsigned int' from 'int' may change the sign of the result [-Wsign-conversion]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1201:29: warning: conversion to 'long unsigned int' from 'int' may change the sign of the result [-Wsign-conversion]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: At top level:
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1260:1: warning: redundant redeclaration of 'of_overlay_remove' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1183:5: note: previous definition of 'of_overlay_remove' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1263:1: warning: redundant redeclaration of 'of_overlay_remove' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1186:5: note: previous definition of 'of_overlay_remove' was here
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: In function 'of_overlay_remove_all':
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:1: warning: redundant redeclaration of '__compiletime_assert_1275' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:1: note: previous declaration of '__compiletime_assert_1275' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:1: warning: redundant redeclaration of '__compiletime_assert_1275' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:1: note: previous declaration of '__compiletime_assert_1275' was here
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1275:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:1: warning: redundant redeclaration of '__compiletime_assert_1278' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:1: note: previous declaration of '__compiletime_assert_1278' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:1: warning: redundant redeclaration of '__compiletime_assert_1278' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:1: note: previous declaration of '__compiletime_assert_1278' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1278:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
 /local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c: At top level:
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1283:1: warning: redundant redeclaration of 'of_overlay_remove_all' [-Wredundant-decls]
-/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1269:5: note: previous definition of 'of_overlay_remove_all' was here
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1286:1: warning: redundant redeclaration of 'of_overlay_remove_all' [-Wredundant-decls]
+/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:1272:5: note: previous definition of 'of_overlay_remove_all' was here
```

(2) Hard to find new warnings?

```
$ wc -l old_warnings; wc -l new_warnings
1324 old_warnings
1326 new_warnings

$ diff -u old_warnings new_warnings | wc -l
128
```

Yes

The problem commit

```
$ git diff master 5.4-rc3_test_v3
diff --git a/drivers/of/overlay.c b/drivers/of/overlay.c
index c423e94baf0f..435f2272306a 100644
--- a/drivers/of/overlay.c
+++ b/drivers/of/overlay.c
@@ -23,6 +23,9 @@

 #include "of_private.h"

+void new_func(phandle phandle) { }
+EXPORT_SYMBOL(new_func);
+
 /**
  * struct target - info about current target node as recursing through overlay
  * @np:                          node where current level of overlay will be appl
```

(3) Don't check for new warnings?

Who in this room ever checks their submissions for new warnings?

What percentage of submissions?

Counter example

A different simple commit

Commit that adds a warning

(warning message reformatted for readability)

```
$ git checkout resolver_new_warnings
$ git log -n2 --oneline
8a55f0697865 of: drivers/of/resolver.c new warnings for make W=1, W=2,
4f5cafb5cb84 Linux 5.4-rc3


$ rm drivers/of/resolver.o; make W=1 drivers/of/resolver.o
  ...
  CC      drivers/of/resolver.o

drivers/of/resolver.c:350:6: warning: no previous prototype
                             for 'htsc_ex_02_p_3_new_func'
                             [-Wmissing-prototypes]
```

New warning is obvious, right?

Many subsystems build with no errors for “make W=1”

Thus it is easy to see newly created warnings for W=1

New warning is obvious, right?

(build in source tree)

```
$ env | grep KBUILD_OUTPUT

$ rm drivers/of/resolver.o; \
  make W=1 drivers/of/resolver.o
  ...
  CC      drivers/of/resolver.o
drivers/of/resolver.c:350:6: warning: no previous prototype for 'ht
sc_ex_02_p_3_new_func' [-Wmissing-prototypes]
```

New warning is obvious, right?

(build external to source tree)

```
$ env | grep KBUILD_OUTPUT
KBUILD_OUTPUT=../build/dragon_linus_5.4-rc

$ rm ${KBUILD_OUTPUT}/drivers/of/resolver.o; \
  make W=1 drivers/of/resolver.o
  ...
  CC      drivers/of/resolver.o
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/reso
lver.c:350:6: warning: no previous prototype for 'htsc_ex_02_p_3_ne
w_func' [-Wmissing-prototypes]
```

build internal vs. external

(build in source tree)

```
  CC      drivers/of/resolver.o
drivers/of/resolver.c:350:6: warning: no previous prototype for 'ht
sc_ex_02_p_3_new_func' [-Wmissing-prototypes]
```

(build external to source tree)

```
  CC      drivers/of/resolver.o
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/reso
lver.c:350:6: warning: no previous prototype for 'htsc_ex_02_p_3_ne
w_func' [-Wmissing-prototypes]
```

So what?

You are probably thinking:

> If Frank is complaining about that, he isn't smart enough to be a kernel developer.
>
> He probably isn't even smart enough to tie his own shoes.

So what?

There are many sources of noise that distract from being able to focus on the messages from the static analysis tools

- Some noise is minor
- Some noise is major

But when all sources of noise add up, the result is that it can be hard to isolate new warnings

Some solutions seem easy

original:

```
$ rm ${KBUILD_OUTPUT}/drivers/of/resolver.o;          \
>    make W=1 drivers/of/resolver.o
```

```
make[1]: Entering directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_5.4-rc'
  GEN     Makefile
  CALL    /local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/checksyscalls.sh
  CALL    /local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/atomic/check-atomics.sh
  CC      drivers/of/resolver.o
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/resolver.c:350:6: warning: no previous prototype for 'htsc_ex_
make[1]: Leaving directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_5.4-rc'
```

remove noise:

```
$ rm ${KBUILD_OUTPUT}/drivers/of/resolver.o;          \
>    make W=1 drivers/of/resolver.o  2>&1 1>/dev/null \
>       | sed "s|`get_CURDIR`/||g"
```

```
drivers/of/resolver.c:350:6: warning: no previous prototype for 'htsc_ex_02_p_3_new_func' [-Wmissing-prototypes]
```

Some solutions seem easy

remove noise:

```
$ rm ${KBUILD_OUTPUT}/drivers/of/resolver.o;          \
>   make W=1 drivers/of/resolver.o  2>&1 1>/dev/null \
>      | sed "s|`get_CURDIR`/||g"
```

```
drivers/of/resolver.c:350:6: warning: no previous prototype for 'htsc_ex_02_p_3_new_func' [-Wmissing-prototypes]
```

Why `get_CURDIR` instead of `pwd`?

pwd usually works, but there are some corner cases where make $(CURDIR) != `pwd`

My get_CURDIR script invokes make to get $(CURDIR)

Examples of noise

Changing the value of “W=” can result in other files being rebuilt

Compiling those other files may generate warnings

Examples of noise - other files

```
$ rm ${KBUILD_OUTPUT}/drivers/of/overlay.o
$ make W=1 drivers/of/overlay.o
make[1]: Entering directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_5.4-rc'
  GEN     Makefile
  YACC    scripts/genksyms/parse.tab.[ch]
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/genksyms/parse.y: warning: 9 shift/reduce conflicts [-Wconflicts-
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/genksyms/parse.y: warning: 5 reduce/reduce conflicts [-Wconflicts
  HOSTCC  scripts/genksyms/parse.tab.o
  HOSTCC  scripts/genksyms/lex.lex.o
  HOSTLD  scripts/genksyms/genksyms
  CC      scripts/mod/empty.o
  MKELF   scripts/mod/elfconfig.h
  HOSTCC  scripts/mod/modpost.o
  CC      scripts/mod/devicetable-offsets.s
  HOSTCC  scripts/mod/file2alias.o
  HOSTCC  scripts/mod/sumversion.o
  HOSTLD  scripts/mod/modpost
  CC      kernel/bounds.s
  CC      arch/arm/kernel/asm-offsets.s
  CALL    /local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/checksyscalls.sh
  CALL    /local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/atomic/check-atomics.sh
  CC      drivers/of/overlay.o
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:26:6: warning: no previous prototype for 'new_func'
make[1]: Leaving directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_5.4-rc'
$ rm ${KBUILD_OUTPUT}/drivers/of/overlay.o
$ make W=1 drivers/of/overlay.o
make[1]: Entering directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_5.4-rc'
  GEN     Makefile
  CALL    /local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/checksyscalls.sh
  CALL    /local/frowand_nobackup/src/git_linus/linux--5.4-rc/scripts/atomic/check-atomics.sh
  CC      drivers/of/overlay.o
/local/frowand_nobackup/src/git_linus/linux--5.4-rc/drivers/of/overlay.c:26:6: warning: no previous prototype for 'new_func'
make[1]: Leaving directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_5.4-rc'
```

Examples of noise

gcc warnings include file line number

```
-drivers/of/overlay.c:776:2: warning: conversion to 'size_t' from 'int
-drivers/of/overlay.c:835:2: warning: conversion to 'long unsigned int
+drivers/of/overlay.c:779:2: warning: conversion to 'size_t' from 'int
+drivers/of/overlay.c:838:2: warning: conversion to 'long unsigned int
```

Examples of noise

gcc warnings include file line number

```
-drivers/of/overlay.c:776:2: warning: conversion to 'size_t' from 'int
-drivers/of/overlay.c:835:2: warning: conversion to 'long unsigned int
+drivers/of/overlay.c:779:2: warning: conversion to 'size_t' from 'int
+drivers/of/overlay.c:838:2: warning: conversion to 'long unsigned int
```

Line numbers can be filtered out before diff of old and new warnings

Resulting in another annoyance:

- The warning message in the diff does not show the line number, so it is hard to find the offending line

Examples of noise

Some macro expansions incorporate line number

The incorporated line number may be visible in a warning message

```
-drivers/of/overlay.c:1139:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
-drivers/of/overlay.c:1139:1: warning: redundant redeclaration of '__compiletime_assert_1139' [-Wredundar
-drivers/of/overlay.c:1139:1: note: previous declaration of '__compiletime_assert_1139' was here
-drivers/of/overlay.c:1139:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+drivers/of/overlay.c:1142:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
+drivers/of/overlay.c:1142:1: warning: redundant redeclaration of '__compiletime_assert_1142' [-Wredundar
+drivers/of/overlay.c:1142:1: note: previous declaration of '__compiletime_assert_1142' was here
+drivers/of/overlay.c:1142:2: warning: pointer of type 'void *' used in arithmetic [-Wpointer-arith]
```

Solution: proof of concept tool

A set of scripts and programs, controlled by script “warn_check”

Revisit initial example

```
$ git diff master 5.4-rc3_test_v3
diff --git a/drivers/of/overlay.c b/drivers/of/overlay.c
index c423e94baf0f..435f2272306a 100644
--- a/drivers/of/overlay.c
+++ b/drivers/of/overlay.c
@@ -23,6 +23,9 @@

 #include "of_private.h"

+void new_func(phandle phandle) { }
+EXPORT_SYMBOL(new_func);
+
 /**
  * struct target - info about current target node as recursing through overlay
  * @np:                         node where current level of overlay will be appl
```

Revisit initial example

```
$ warn_check --old-commit master --new-commit 5.4-rc3_test_v3
```

warn_check - lines of warnings

```
===============  Number of lines in warning reports

==========  wf=2 W=0  ==========
OLD: 0
NEW: 0

==========  wf=2 W=1  ==========
OLD: 0
NEW: 3

==========  wf=2 W=2  ==========
OLD: 1189
NEW: 1197

==========  wf=2 W=3  ==========
OLD: 3707
NEW: 3728

==========  wf=2 sparse  ==========
OLD: 0
NEW: 1
```

warn_check - warnings count

```
==============  Count of each type of warning

=========  wf=2 W=0  ==========

  old   new
----- -----

==========  wf=2 W=1  ==========

  old   new
----- -----
    0     1 * -Wmissing-prototypes

==========  wf=2 W=2  ==========

  old   new
----- -----
    4     4   -Wcast-align
   44    44   -Wnested-externs
    5     6 * -Wshadow
    8     8   -Wsign-compare
    6     6   -Wunused-macros
```

warn_check - warnings count

```
==========  wf=2 W=3  ==========

  old   new
----- -----
    4     4   -Wattributes
   15    15   -Wbad-function-cast
   43    43   -Wcast-qual
   56    56   -Wconversion
    2     2   -Wpacked
  119   119   -Wpadded
   41    41   -Wpointer-arith
   22    23 * -Wredundant-decls
  168   168   -Wsign-conversion
    1     1   -Wswitch-default

==========  wf=2 sparse  ==========

  old   new
----- -----
    0     1 * symbol 'new_func' was not declared. Should it be static?
```

warn_check - warnings diff

```
#####  filtered  #####

@ -762,6 +762,14 @@
 include/linux/of.h::13: note: shadowed declaration is here
  typedef u32 phandle;
              ^~~~~~~
+drivers/of/overlay.c: In function 'new_func':
+drivers/of/overlay.c::23: warning: declaration of 'phandle' shadows a global declaration
+ void new_func(phandle phandle) { }
+                       ^~~~~~~
+In file included from drivers/of/overlay.c::0:
+include/linux/of.h::13: note: shadowed declaration is here
+ typedef u32 phandle;
+             ^~~~~~~
 drivers/of/overlay.c: In function 'dup_and_fixup_symbol_prop':
 drivers/of/overlay.c::41: warning: comparison between signed and unsigned integer expres
   if (strnlen(prop->value, prop->length) >= prop->length)
```

warn_check - warnings diff

```
<<<<<  old  <<<<<

include/linux/of.h:28:13: note: shadowed declaration is here
 typedef u32 phandle;
             ^~~~~~~
drivers/of/overlay.c: In function 'dup_and_fixup_symbol_prop':
drivers/of/overlay.c:217:41: warning: comparison between signed and unsigned integer expre
  if (strnlen(prop->value, prop->length) >= prop->length)

>>>>>  new  >>>>>

include/linux/of.h:28:13: note: shadowed declaration is here
 typedef u32 phandle;
             ^~~~~~~
drivers/of/overlay.c: In function 'new_func':
drivers/of/overlay.c:26:23: warning: declaration of 'phandle' shadows a global declaration
 void new_func(phandle phandle) { }
                       ^~~~~~~
In file included from drivers/of/overlay.c:13:0:
include/linux/of.h:28:13: note: shadowed declaration is here
 typedef u32 phandle;
             ^~~~~~~
drivers/of/overlay.c: In function 'dup_and_fixup_symbol_prop':
drivers/of/overlay.c:220:41: warning: comparison between signed and unsigned integer expre
  if (strnlen(prop->value, prop->length) >= prop->length)
```

Where is warn_check?

Long term:

There is active discussion of whether to provide a location in the Linux kernel source tree for maintainer related tools

I would like to submit warn_check to that location

Where is it?

Short term:

github

warn_check has some rough edges, but it is useful
in it's current form

While it is not in the Linux kernel source tree,
while I am making it suitable for submission,
I will mirror it on github at:
https://github.com/frowand/warn_check

What warnings are reported?

compiler (.c, .s, .dts):

- make W=
- make W=1
- make W=2
- make W=3

sparse (.c, .s):

- make C=2

note: .s untested

Call for help

I have found some of the causes of false detection
of a new warning in a diff report through experience.
I expect more such patterns to exist.

If you encounter other patterns please report them
to me so that I can improve warn_check.

THE END

Thank you for your attention...

Questions?

How to get a copy of the slides

1) leave a business card with me

2) frank.rowand@sony.com

3) https://elinux.org/Japan_Technical_Jamboree_71