Things you need to know to submit a Linux kernel patch
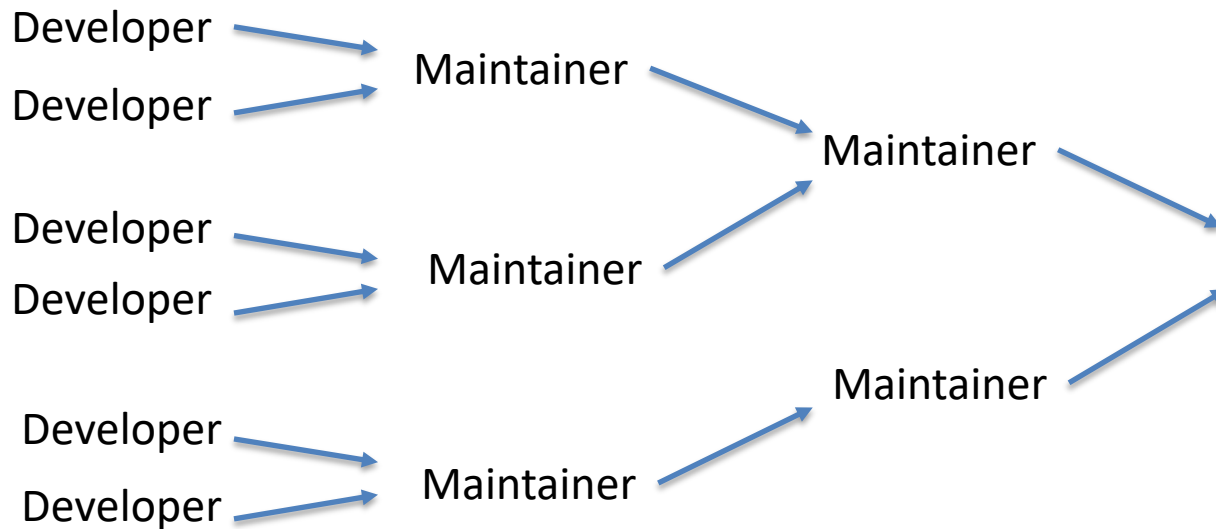
Sayli Karnik

The Linux kernel

- One of the biggest and fastest moving open source project
- 53600 files, >2M Loc

Maintainer Model

15600 coders!

Wouldn't it be great to have a patch merged into the kernel?!

Contributing to the kernel

- Step 1
  - Install Ubuntu/Debian
  - Setup tools:

  Editor (Eg. vim, gedit etc)

  Email client (Eg. Mutt)

  VCS (git)

Contributing to the kernel

- ## Step 2

  Linux kernel code repository

  ```
  git clone -b staging-testing git://git.kernel.org/pub/scm/linux/kernel/git/gregkh/staging.git
  ```

  Copy your current config

  ```
  cp /boot/config-`uname -r`* .config
  ```

  ```
  intern@ubuntu:~/git/kernels/staging$ ls
  COPYING  Documentation  Kconfig       Makefile  arch    certs    drivers   fs        init   kernel  mm    s
  amples   security  tools       virt
  CREDITS  Kbuild                 MAINTAINERS  README    block   crypto   firmware  include  ipc    lib     net   s
  cripts   sound        usr
  ```

Contributing to the kernel

- Step 3

  Build/Install your kernel

  ```
  make -jX
  ```

  ```
  sudo make modules_install install
  ```

Contributing to the kernel

- Step 4
  - Make your branch

    ```
    git checkout -b first-patch
    ```

  - Update your kernel

    ```
    git fetch origin
    ```

    ```
    git rebase origin/staging-testing
    ```

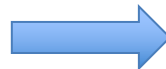 - Make changes //TODO (brb!)
  - Re-Compile

Contributing to the kernel

- Step 5 - Get, set, go! ~> Commit, patch, email

```
git add <file>
```

```
git commit -s -v
```

```
git format-patch -o /tmp/ HEAD^
```


0001-xyz.patch

staging: media: davinci_vpfe: Use BIT macro instead of left shifting 1

```
This patch replaces left shifts on 1 with the BIT(x) macro, as suggested
by checkpatch.pl.
This was done using coccinelle script:
@@
constant c;
@@
- (1 << c)
+ BIT(c)

Signed-off-by: sayli karnik <karniksayli1995@gmail.com>
Signed-off-by: Greg Kroah-Hartman <gregkh@linuxfoundation.org>
```

Diffstat

| -rw-r--r-- | drivers/staging/media/davinci_vpfe/davinci_vpfe_user.h | 36 | |

1 files changed, 18 insertions, 18 deletions

```
diff --git a/drivers/staging/media/davinci_vpfe/davinci_vpfe_user.h b/drivers/staging/media/davinci_vpfe/davinci_vpfe_user.h
index f4f35c9..d3f34f9 100644
--- a/drivers/staging/media/davinci_vpfe/davinci_vpfe_user.h
+++ b/drivers/staging/media/davinci_vpfe/davinci_vpfe_user.h
@@ -544,41 +544,41 @@ struct vpfe_isif_raw_config {
 /* IPIPE module configurations */

 /* IPIPE input configuration */
-#define VPFE_IPIPE_INPUT_CONFIG                (1 << 0)
+#define VPFE_IPIPE_INPUT_CONFIG                BIT(0)
 /* LUT based Defect Pixel Correction */
-#define VPFE_IPIPE_LUTDPC                (1 << 1)
+#define VPFE_IPIPE_LUTDPC                BIT(1)
 /* On the fly (OTF) Defect Pixel Correction */
```

Contributing to the kernel

- ## Step 5..

  Shoot the email

```
mutt -H /tmp/0001-<whatever your filename is>
```

```
$ perl scripts/get_maintainer.pl --separator , --nokeywords --nogit --nogit-fallback --noroles
tats --nol -f drivers/staging/most/aim-sound/sound.c
Greg Kroah-Hartman <gregkh@linuxfoundation.org>
```

What can I change in the kernel?

- Starters
  - Code cleanups

```
intern@ubuntu:~/git/kernels/staging$ ls
COPYING  Documentation  Kconfig      Makefile  arch    certs    drivers   fs       init  kernel  mm   s
amples   security  tools   virt
CREDITS  Kbuild        MAINTAINERS  README    block   crypto   firmware  include  ipc   lib     net  s
cripts   sound        usr
```

```
perl scripts/checkpatch.pl -f drivers/staging/android/* | less
```

https://elixir.bootlin.com/linux/latest/source/Documentation/process/coding-style.rst

staging: rtl8192u: ieee80211: Remove typedef to the tx_pending_t structure

Using typedef for a structure type is not suggested in Linux kernel coding
style guidelines. So remove typedef from structure tx_pending_t.
The typedef name is not used anywhere. All variables of this type are declared
using "struct tx_pending_t".
Also change the structure name to tx_pending since it is normally only
typedefs that have names that end in _t.

Signed-off-by: sayli karnik <karniksayli1995@gmail.com>
Signed-off-by: Greg Kroah-Hartman <gregkh@linuxfoundation.org>

Diffstat

-rw-r--r-- drivers/staging/rtl8192u/ieee80211/ieee80211.h 6 ■■

1 files changed, 3 insertions, 3 deletions

```diff
diff --git a/drivers/staging/rtl8192u/ieee80211/ieee80211.h b/drivers/staging/rtl8192u/ieee80211/ieee80211.h
index 0971470..899c77e 100644
--- a/drivers/staging/rtl8192u/ieee80211/ieee80211.h
+++ b/drivers/staging/rtl8192u/ieee80211/ieee80211.h
@@ -1456,10 +1456,10 @@ enum ieee80211_state {



-typedef struct tx_pending_t{
+struct tx_pending {
        int frag;
        struct ieee80211_txb *txb;
-}tx_pending_t;
+};

 typedef struct _bandwidth_autoswitch {
        long threshold_20Mhzto40Mhz;
@@ -1883,7 +1883,7 @@ struct ieee80211_device {
        RT_POWER_SAVE_CONTROL   PowerSaveControl;
 //}
        /* used if IEEE_SOFTMAC_TX_QUEUE is set */
-       struct  tx_pending_t tx_pending;
+       struct  tx_pending tx_pending;
```

staging: lustre: llite: rw26: Remove unused function definition

```
The patch removes unused function definition ll_get_user_pages().
The use of ll_get_user_pages() was replaced with iov_iter_get_pages_alloc()
in commit 91f79c43d1b54d7154b118860d81b39bad07dfff.

Signed-off-by: sayli karnik <karniksayli1995@gmail.com>
Signed-off-by: Greg Kroah-Hartman <gregkh@linuxfoundation.org>
```

Diffstat

-rw-r--r-- drivers/staging/lustre/lustre/llite/rw26.c 26 ████████████████

1 files changed, 0 insertions, 26 deletions

```
diff --git a/drivers/staging/lustre/lustre/llite/rw26.c b/drivers/staging/lustre/lustre/llite/rw26.c
index d89e795..420f296 100644
--- a/drivers/staging/lustre/lustre/llite/rw26.c
+++ b/drivers/staging/lustre/lustre/llite/rw26.c
@@ -156,32 +156,6 @@ static int ll_releasepage(struct page *vmpage, gfp_t gfp_mask)

 #define MAX_DIRECTIO_SIZE (2 * 1024 * 1024 * 1024UL)

-static inline int ll_get_user_pages(int rw, unsigned long user_addr,
-                                     size_t size, struct page ***pages,
-                                     int *max_pages)
-{
-        int result = -ENOMEM;
-
-        /* set an arbitrary limit to prevent arithmetic overflow */
-        if (size > MAX_DIRECTIO_SIZE) {
-                *pages = NULL;
-                return -EFBIG;
```

What can I change in the kernel?

- Some other coding style rules:

- Meaningful names: cntusr() $\implies$ count_users()
- Not more than 80 columns
- Indentations/spaces/braces
- Avoid typedefs
- Standard commenting style
- Use existing macros

What can I change in the kernel?

- Coccinelle can help!

(pattern matching and transformation tool)

Example:

```
@depends on i@
type T; T[] E;
@@
- (sizeof(E)/sizeof(*E))
+ ARRAY_SIZE(E)
```

What can I change in the kernel?...

@ disable isnt_zero @

expression *E;

@@

E !=

- 0

+ NULL

- TODOs

```
find drivers/staging —name TODO
```

What can I change in the kernel?...

- ## Read kernel mailing archives
  linux-kernel@vger.kernel.org

- ## Go through the git log to see commits

```
$ git log --pretty=oneline --abbrev-commit
fc17fe387718 Staging: tidspbridge: Fix split strings in drivers/staging/tidspbridge/core/tiomap3430.c
152cb4232c4f Staging: tidspbridge: Fix split strings in drivers/staging/tidspbridge/core/io_sm.c
4096ec993f10 staging: rts5139: Fix quoted string split across lines
```

Revising your patch

- **Do not top-post to ask questions!**

Mark,

Lunch tomorrow sounds great! Let's keep it simple and get a pepperoni pizza. } answer

> *On Fri, Apr 26, 2013 at 9:25 AM, Mark wrote:*

> *Hey John, I had some questions I wanted to ask you:*

> *1. Do you want to go out to lunch with me tomorrow?*
> *2. What's your favorite type of pizza?*
> *3. You're paying this time, right?* } questions

Mark,

See my answers below…

> *On Fri, Apr 26, 2013 at 9:25 AM, Mark wrote:*

> *Hey John, I had some questions I wanted to ask you:*

> *1. Do you want to go out to lunch with me tomorrow?*

Lunch tomorrow sounds great!

> *2. What's your favorite type of pizza?*

Let's keep it simple and get a pepperoni pizza.

> *3. You're paying this time, right?*

You bet! You paid last time so it's my turn.

} Inline replies

Revising your patch

```
Subject: [PATCH v2 1/2] USB: at91: fix the number of endpoint parameter

In sama5d3 SoC, there are 16 endpoints, which is different with
earlier SoCs (only have 7 endpoints). The USBA_NR_ENDPOINTS micro
is not suitable for sama5d3. So, get the endpoints number through
the udc->num_ep, which get from platform data for non-dt kernel,
or parse from dt node.

Signed-off-by: Bo Shen <voice.shen@atmel.com>
---
Changes in v2:
  - Make the commit message more clearer.

 drivers/usb/gadget/atmel_usba_udc.c | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)

diff --git a/drivers/usb/gadget/atmel_usba_udc.c b/drivers/usb/gadget/atmel_usba_udc.c
```

May the source be with you ☺

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