

So you want to be a Linux Kernel Hacker?

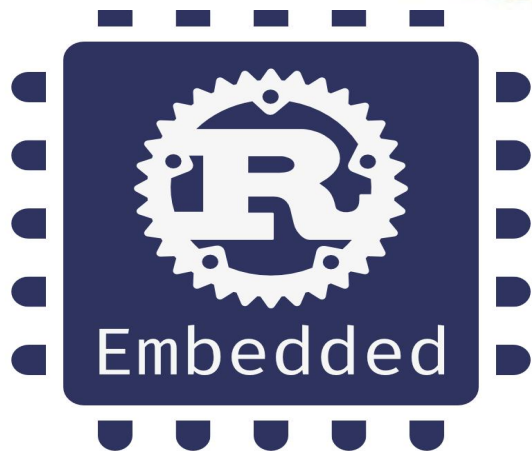
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Vaishali Thakkar

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\$ Hi, I'm Vaishali Thakkar!

Linux™



Rails Girls
Summer of Code



OUTREACHY

Agenda

- Introduction to open source and common open source practices
- The Linux Kernel - Understanding in Layman's terms
- Process of Linux Kernel Development - From source code to community
- Ways to get involved in Linux Kernel

Open source: What?

- A Methodology or philosophy that promotes free distribution and access to a product's design or ideas and implementation details
 - Open as in free use
 - Open as in access
 - Open as in available for everyone
 - Dozens of License types
 - Modifiable and usable for any purpose
 - Often community driven

Open source: Why?

- Give back to community
- Collaborating with the amazing people worldwide
- Education and learning
- Interesting and challenging work
- Fun
- Your portfolio = your CV

Open source: Licences

- Licenses that comply with the Open Source Definition — allows software to be freely used, modified, and shared.
 - MIT:
Short, simple and permissive. Requires preservation of copyright and license notices. Patent permission not granted.
 - Apache:
Requires preservation of copyright and license notices. Provides an express grant of patent rights.
 - GPLv3:
Strong copyleft license. Modified source code must be distributed under the same license.

Open source: How

- Bugs
 - Finding bugs
 - Reporting bugs
 - Fixing bugs

Open source: How

- Bugs
- Testing
 - Using tools
 - Testing of a new feature
 - Performance testing

Open source: How

- Bugs
- Testing
- Documentation
 - Contributing to existing docs
 - Writing blogs
 - Adding new docs

Open source: How

- Bugs
- Testing
- Documentation
- Translation and localization
 - Helping translating docs in local languages
 - Forming local groups and helping to build a local community by knowledge sharing

Open source: How

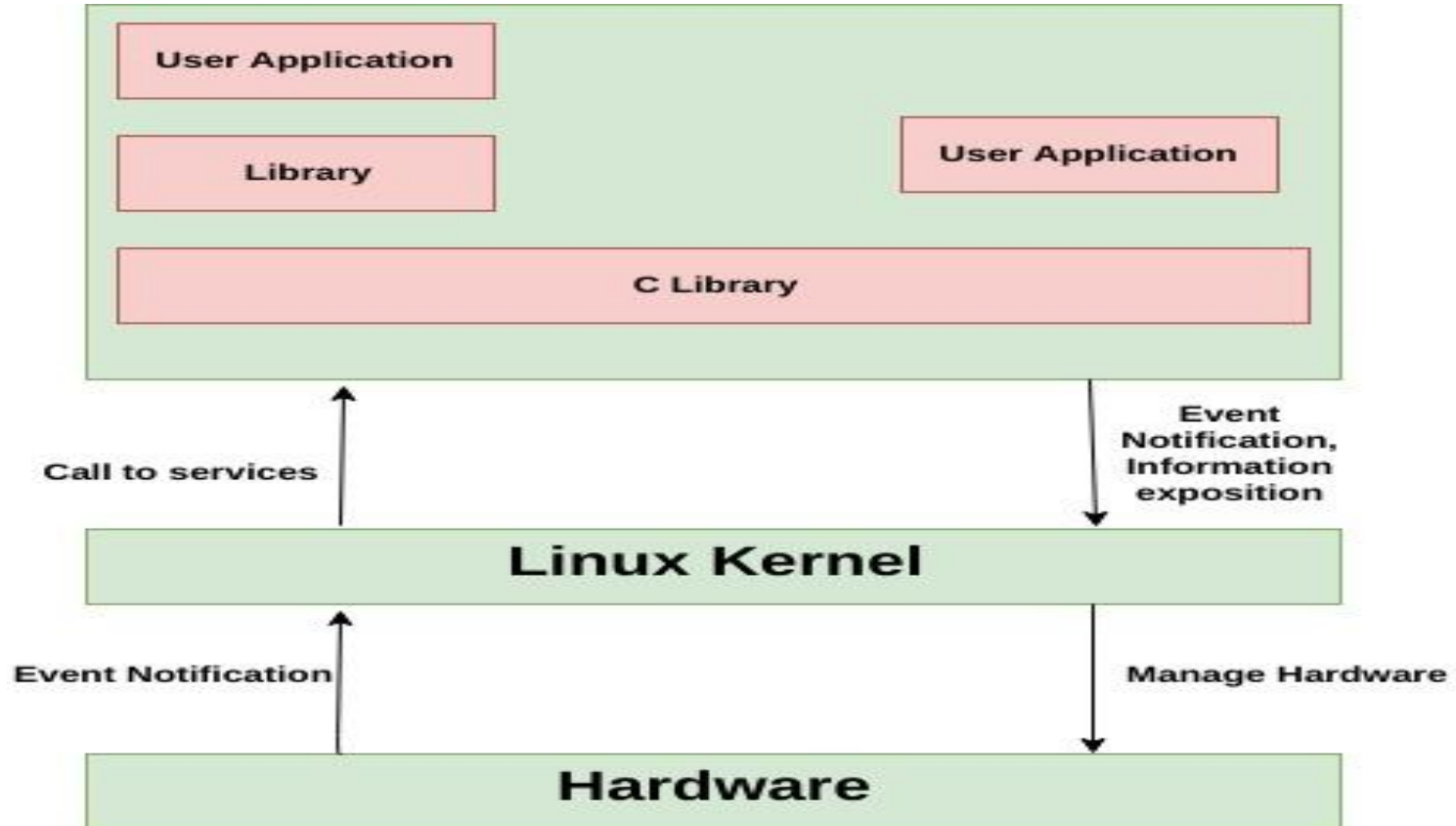
- Bugs
- Testing
- Documentation
- Translation and localization
- Community involvement
 - Helping others
 - IRC and mailing lists involvement

Open source: How

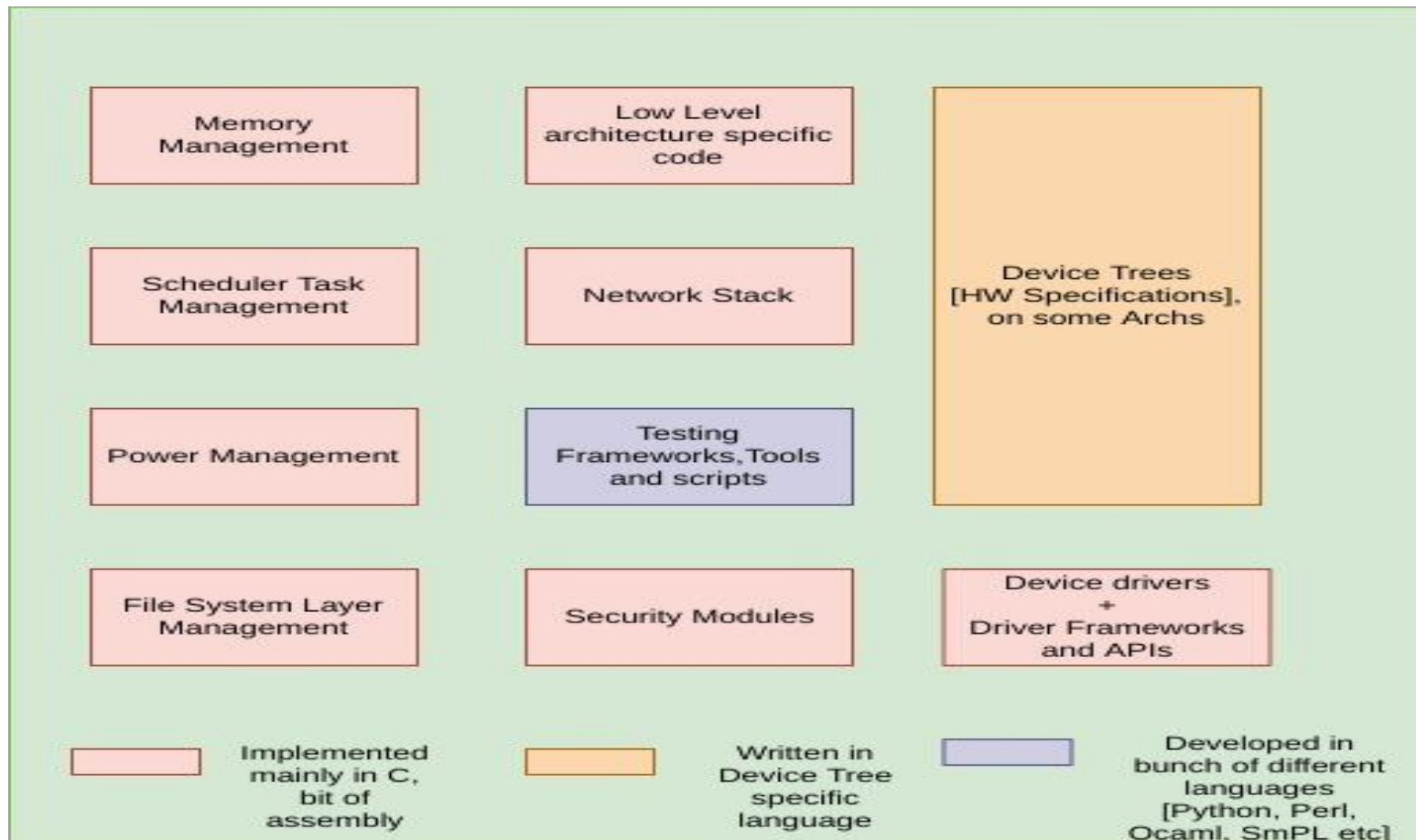
- Bugs
- Testing
- Documentation
- Translation and localization
- Community involvement

Linux Kernel

Linux Kernel in the system



Inside the Linux Kernel

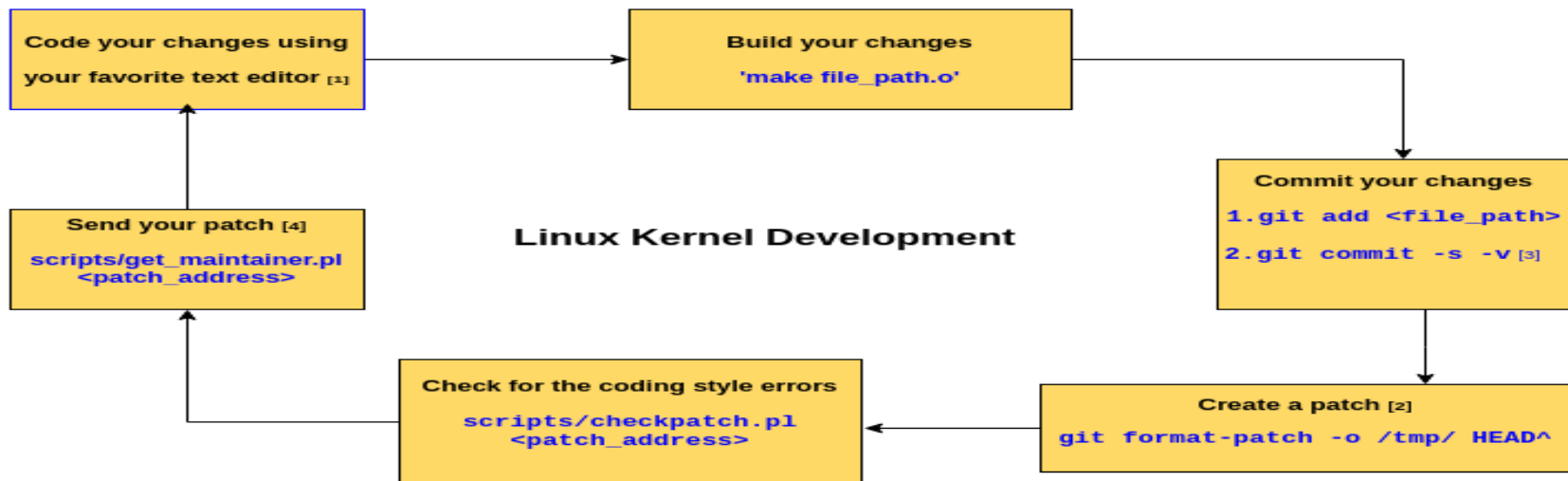


Process of the kernel development

- Code your changes
 - Find a contribution to make
 - Read mailing list archives
 - Gain experience and ask questions

Process of the kernel development

- Code your changes
- Create and send in your patch



[1] Do the changes in your local branch: <https://kernelnewbies.org/FirstKernelPatch#head-4fc0349738a61ed254bcbef7a980321c77495014>

[2] You should see the command output with a filename in /tmp/

[3] **Philosophy of Linux kernel patches:** <https://kernelnewbies.org/PatchPhilosophy>

[4] **Using mutt to send patches:** <https://kernelnewbies.org/FirstKernelPatch#head-dc6a8aa0be0d0e8ed9dc03726d0b5a1fb0f65e1f>
Using git-send-email to send patches: <https://burzalodowa.wordpress.com/2013/10/05/how-to-send-patches-with-git-send-email/>

Process of the kernel development

- Code your changes
- Create and send in your patch
- Gather feedback
 - Testing results and the patch
 - Mentoring and guidance
 - Discussion of strategies and suggestions

Process of the kernel development

- Code your changes
- Create and send in your patch
- Gather feedback
- Repeat

Communication style - Linux kernel

- Mailing lists - `scripts/get_maintainer.pl`

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- Responding to emails
 - Consistent communication style

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 - Consistent communication style
 - Respond inline - Say NO to top-posting

Example:

```
From: Kludge Crufty <example@email.com>  
Subject: Design decisions for next release  
On Fri, Sep 12, 2014 at 03:00:56PM -0700, Baaz Quux wrote:  
> On Fri, 12 September 2014 at 02:30:17PM -0700, Foo Bar wrote:  
>  
> I think we should do X.
```

```
I think we should do Y.  
Kludge
```

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 - Do not use Outlook - mangles patches

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 - Don't include quotes in your signature

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 - Likely to be missed

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 - Sending email in related mailing list opens door for more perspectives on the same problem

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 - Looks like multi way messaging

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 - Connect to a network

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 - Connect to a network
 - Once on a network, join a channel

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Communication style - Linux kernel

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- Responding to emails
- Avoid sending personal emails
- Follow IRC Etiquettes
- Remember, anything you post on the internet is there FOREVER.

Coding style - Linux kernel

- Documentation/codingstyle

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- We love tabs

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Coding style - Linux kernel

- Documentation/codingstyle
- We love tabs
- 80 characters line limit
- We are picky - checkpatch.pl

Git

- Open source
- Created by Linus Torvalds in 2005 to work on the Linux kernel
- Fastest version control system
- Set up `.gitconfig` to send patches in the Linux kernel:

Git patch

- Example:

```
clk: sunxi: Use resource_size
```

Use the function `resource_size` instead of explicit computation.
Problem found using Coccinelle.

Signed-off-by: Vaishali Thakkar <vaishali.thakkar@oracle.com>

Acked-by: Chen-Yu Tsai <wens@csie.org>

Signed-off-by: Maxime Ripard <maxime.ripard@free-electrons.com>

```
diff --git a/drivers/clk/sunxi/clk-sun9i-mmc.c b/drivers/clk/...
```

```
index a9b1761..0c2dd02 100644
```

```
--- a/drivers/clk/sunxi/clk-sun9i-mmc.c
```

```
+++ b/drivers/clk/sunxi/clk-sun9i-mmc.c
```

```
@@ -106,7 +106,7 @@ static int sun9i_a80_mmc_config_clk_probe  
    (struct platform_device *pdev)
```

```
...
```

```
- count = DIV_ROUND_UP((r->end - r->start + 1), SUN9I_MMC_WIDTH);  
+ count = DIV_ROUND_UP(resource_size(r), SUN9I_MMC_WIDTH);
```


Different tags

- Signed-off-by: Indicates that the signer was involved in the development of the patch, or that he/she was in the patch's delivery path.
- Acked-by: Often used by maintainers or core developers of the file. It is a record that the acker has at least reviewed the patch and has indicated acceptance.
- Reported-by: Gives credit to people who find bugs and report them.

Different tags

- Tested-by: Indicates that the patch has been successfully tested (in some environment)
- Reviewed-by: Indicates that the patch has been reviewed and found acceptable according to the Reviewer's Statement
- Suggested-by: Indicates that the patch idea is suggested by the person named and ensures credit to the person for the idea.

Developer's certificate of origin

- By making a contribution to this project, I certify that:
 - The contribution was created in whole or in part by me and I have the right to submit it under the open source license indicated in the file; or
 - The contribution is based upon previous work that, to the best of my knowledge, is covered under an appropriate open source license and I have the right under that license to submit that work with modifications, whether created in whole or in part by me, under the same open source license (unless I am permitted to submit under a different license), as indicated in the file; or

Developer's certificate of origin

- By making a contribution to this project, I certify that:
 - The contribution was provided directly to me by some other person who certified above 2 points or and I have not modified it.
 - I understand and agree that this project and the contribution are public and that a record of the contribution (including all personal information I submit with it, including my sign-off) is maintained indefinitely and may be redistributed consistent with this project or the open source license(s) involved.

Useful Links

- First patch tutorial: <https://kernelnewbies.org/FirstKernelPatch>
- Task ideas: <https://github.com/nerdyvaishali/kernelbridge>
- Latest kernel development articles: [LWN.net](https://lwn.net)