Opening credits

- Been messing with the Linux kernel since 1993
  - Please blame Stéphane Eranian...

- First patches merged in 1996 (*md* driver)
  - Don’t email me if your disk array gets corrupted...
  - Offloaded maintainership in 1997

- With ARM since 2010
  - Trying to bridge architecture, hardware, and obviously Linux

- Looking after
  - KVM/arm together with Christoffer Dall
  - IRQ subsystem together with Thomas Gleixner
Disclaimer

- This isn’t a maintainer rant!
- This talk is for **EVERYONE**!
- Does not only apply to first time contributors
  - There is something for long time hackers as well!
- Not all maintainers will agree with me
  - If you get flamed for doing any of this, send them my way!
Recurrent themes

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- “But I’m giving you this code for free, why aren’t you just taking it?”
- “I don’t have the time to understand this, just tell me what I should write”
The characters
The Contributor

- Submits a change to the mainline kernel source
- Intends to get it merged eventually
- Can be
  - a new feature
  - a bug fix
  - code cleanup
- Complexity of the changes ranges from trivial to brain-melting
  - The contributor is often the one who understands the problem best
The Reviewer

- Can be distinct from the maintainer
- Often other contributors
- Spreads the load, so that maintainers do scale
- Probably the least recognised, and yet one of the most important characters in this story
The Maintainer

- The maintainers are responsible for some piece of code in the kernel:
  - not to break
  - to be secure
  - readable, understandable
- Ultimately the ones who put their neck on the line
- Spend an awful lot of time reviewing other people’s code
  - Often the target of hundreds of emails a day
Motivations

These characters have quite a few things in common:

- Meeting at a single point of contention: the code
- Trying to solve difficult problems
- Individual responsibility, personal investment
- Very often not their main job
- Quite often a contributor grows into a reviewer, and then a maintainer
The plot
The kernel submission workflow

You have written patches for a wicked idea:

- Post a patch series
- Get it reviewed
- Respond to comments
- Rinse, repeat

Looks simple, but there is a lot behind this.
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- Who do I send it to? How do I get it reviewed?
- I don’t understand these comments and other requests
- ...
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- What is that “patch series” thing?
- Who do I send it to? How do I get it reviewed?
- I don’t understand these comments and other requests
- Can be overwhelming
What is a patch series

- It is an ordered set of patches
- It is conceptually a single change
- Split into multiple patches
- Splitting patches is a hard topic
- Nothing in the kernel breaks at any point in the middle of the series
- We have a limited capacity to process huge changes in one go
What does a patch series look like

- Each patch has a title and a clear commit message
- Each patch is numbered $x/n$ (patch number $x$ out of $n$)
  - Where $x$ is unique, $n$ is constant across the series, and $x \leq n$
- It has a unique version number for the whole series
  - Do not post a series with the same version number twice!
- It has a cover letter, numbered $0/n$
  - Usually only if there is more than a single patch
  - The cover letter describe the goal of the series and contains a change log
  - It contains a diff-stat of the whole series
  - All the patches in the series are in reply to the cover letter
Why these requirements?

From a maintainer or reviewer point of view, these requirements are crucial:

- **Ordered:**
  - Allows the reviewer to see a progression in the design
  - Needed for bisection
- **Logical changes:**
  - Multiple things changing at once make things hard to review
- **Patch numbering:**
  - Am I missing any patch in this series?
  - Helps with the ordering/threading in an email client
- **Version numbering:**
  - Is this something new? Or has it been reviewed already?
  - Don’t reply with a single patch with a new version number
- **Cover letter:**
  - So you know what changed from one revision to another
  - Make sure all the recipients of the series receive the cover letter
  - A chance to having a conversation with the maintainers
Patch series: Don’t do that

- If you’re about to send something that may end up looking like this:

  - (Mon)18:58 [ Anonymous ] RESEND [PATCH v3 1/3] arm64: compat: Split the sigreturn trampolines and kuser helpers (C sources)
  - (Mon)18:58 [ Anonymous ] RESEND [PATCH v3 2/3] arm64: compat: Split the sigreturn trampolines and kuser helpers (assembler ...)
  - (Mon)18:58 [ Anonymous ] RESEND [PATCH] arm64: compat: Expose offset to registers in sigframes
  - (Mon)18:58 [ Anonymous ] RESEND [PATCH v2 6/6] arm64: Wire up and expose the new compat vDSO

- … please don’t.

- Trying to make sense of this series is just too hard

- Probably missing on some very good code

- This is a net loss for the kernel
Use the tools, Luke

- **git is really the only tool you need**
  - and there is no life worth living outside of `git`...
- Although you can use some tool on top of `git` itself
  - But really, you don’t need that
- Do not send patch series by hand. Ever.
- One-off configuration:
  - Configure `git` as an email client
  - Set `sendmail.tocover=1, sendmail.cccover=1` in `~/.gitconfig`
- For each series you want to send:
  - Identify the recipients for this series. Use `scripts/get_maintainers.pl`
  - `git format-patch -o patches/blah -v3 --cover-letter v4.19..HEAD`
  - `Edit patches/blah/v3-0000-cover-letter.patch`, adding the recipients in your cover letter
  - `git send-email --dry-run patches/blah/v3-*patch`
  - If it looks good, drop the `--dry-run` and let it roll
Using email

Please use the canonical email etiquette when posting or responding:

- Plain text email only, no HTML
- Reply inline, not top-posting
- Avoid attachments if at all possible
- No silly disclaimer (this is a public mailing list!)
- Cc people when it matters
- Keep the Cc list short
- Trim the email you’re responding to the essential context
Digression: why email

“Why do you use this silly outdated technology instead of [web-thing-of-the-week]?”

Well, email is:

- Multi-platform
- Archived
- Available offline
- Not interactive
- Distributed
- Easy to integrate with git and CI

Getting rid of email would require a new system to satisfy these properties.

Of course, quite a few organisation cannot do email properly...

- That’s a valid concern
- A lot of people are using their personal email for this
- ELC talk idea for next year: SMTP in a hostile corporate environment
Of reviewers and bandwidth

- You’ve posted a patch series two days ago and quickly received some comments
- You’ve quickly addressed those, collected all the Acks and review tags
- ... and now eager post a new version

Now take a deep breath. Give a chance to other reviewers to catch up with your work.

- Posting too often is usually counter-productive
- Only results in a DoS on the reviewer (you don’t want that)
- Allow about a week between each version, unless asked for an immediate respin
- Remember how long it took you to write these patches
- Reviewing them won’t be any quicker
The maintainer/reviewer workflow

- Is it something I’m interested in or maintain?
- Does the patch series make sense?
- Is there any reported failure?
- Fix or feature?
- Prioritisation
- Each maintainer or reviewer has specific requirements
  - No such thing as *One Size Fits All*
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But there is something that influences the above: **Trust**

- This is how we recognise contributors and reviewers
- Most often people who *go the extra mile*
- When a reviewer or maintainer asks for some extra work on a patch series
  - It is *not* to annoy the contributor
  - It is to *improve* the overall quality of the kernel itself
  - Eventually to build trust between the two parties
Why trust?

This is how the overall patch merging model works. There is trust between:

- Linus and the top-level maintainers
- top level maintainers and their sub-maintainers
- co-maintainers of a single subsystem

In the end, this trust is just as important as the code.

- A software project that doesn’t encourage contributions dies
- One of maintainers’ role is to retain the best contributors
- We always need new reviewers and co-maintainers
- The best contributions benefit the largest part of the community
- This requires involvement of all parties
Building trust

A maintainer or reviewer can ask you to do some additional work:

- Provide a better infrastructure
- Refactor code to limit duplication
- Move bits of a feature to core code

Try to step away from your own code for a while...

- See how this request fits into the overall kernel
- If the request is unclear, ask for clarification!
- If you think this isn’t justified, try to come up with your own proposal
- The maintainer is not always right, give them an alternative perspective
- Become the trusted maintainer of your own code!
Digression: Drive-by patching

- One-off contributions
  - Contributor never to be seen again
- Sometimes the kernel equivalent of “fly-tipping”
  - See the above “Just take it already”
- We do not want to discourage this
  - A number of bug fixes come from those one-offs
  - Some other are just a bunch of unmaintainable changes
- We’d also like to convince these people to stick around...
  - After all, we all started with this first patch...

It is unclear how we can incentivise these contributors to

- Look for another issue to fix
- Have a more continued engagement with the kernel community
Becoming a reviewer

One of best way to improve your kernel-foo is to review patches

- Pick something you’re interested in
- You don’t have to be an expert in the domain
- You just need to be able to follow the code
- If something seems unclear, ask questions!
- If you spot a problem, say so!

If you’re satisfied with the way the code looks:

- Optionally provide a “Reviewed-by”
- Remember that you’re reviewing “to the best of your ability”
- Even if you’re not providing a tag, your input is valuable
Be your first reviewer

Before you’re about to send a patch series:

- **Read your own patches**
  - I mean it!
  - Really!
  - This is the best way to catch basic mistakes

- **Put yourself in the reviewer’s shoes**
  - Does this code make sense?
  - Is it split in a coherent way?
  - Is it commented, documented well enough?
  - Have you taken all the review items into account?
  - Have you collected all the `Acked-by:` and `Reviewed-by:` tags?

- If you’ve answered “yes” to all the above, ship it!
Contributing to the Linux kernel is both tough and rewarding

We are all trying to work together on changing some part of a code-base

Understanding each other’s point of view is key – but can be really hard

Building a level of trust and understanding makes everything easier

We have tools and processes for good reasons – we are not just trying to be difficult. Honestly.

Ask me anything if you’re in doubt. Please trust me to be friendly.
Thank you

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