Documenting Linux MM for fun and for … fun

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Q: How do I map a page into a process
    address space?

A: It should be documented somewhere
        … hmm, read the source

Value

For the reader

- Reading docs is easier than reading the code

- Guides are better than bad code examples

- Looks professional ;-)

More value

For an ~~oldfag~~ experienced writer

- Make sure code matches the intention

- Revisiting after week, month, year

- Help others

Even more value

IBM

For a newbie writer

- Better understanding of the code

- Helps to find the itch to scratch

- Help others

MM documentation a while ago

- Good coverage for MM-related `sysctl`'s and `/proc` bits

- Limited API description

- Hodgepodge of random documents

User visible interfaces

- `sysctl`'s and other bits in `/proc` are documented

  - `Documentation/sysctl/vm.txt`

  - `Documentation/filesystems/proc.txt`

  - Difficult for an unprepared reader

- `/sysfs` is very partially covered

  - `Documentation/ABI/testing/sysfs-kernel-mm-{hugepages,ksm,swap}`

- Additional descriptions buried in `Documentation/vm`

Internal APIs

- ● A section in `Documentation/core-api/kernel-api.rst`
  - ○ First appeared in 2.4.0-test2pre1
  - ○ Handful of updates since then
    - ■ Several additions of documented sources
    - ■ Fixes for file renames
    - ■ ReST conversion
- ● A paragraph in `Documentation/kernel-hacking/hacking.rst`
  - ○ The last update was in 2005
- ● More information buried in `Documentation/vm`

API reference

- Somewhat exists
  - 40% of mm files have kernel-doc comments
  - Roughly 10-15% of functions are documented
  - Some comments just lack the second * in /**
- Comments are not always consistent with the code
- Most of the existing kernel-doc is not linked

- Omnium-Gatherum
  - Random notes
  - User space interface descriptions
  - Design documents
  - Internal API user guides
- User guides are mixed with implementation details
- Hard to identify outdated and irrelevant parts

Start small

- White space
- Spelling, grammar, punctuation
- Comments formatting
- Add several kernel-doc comments
- Make comments and code agree
  - Gets broken again from time to time

Reshuffle

- **ReSTify** `Documentation/vm`

- **Split user space interface descriptions to** `Documentation/admin-guide`

- **Move "Memory Management" API reference to a dedicated file**
  - Link GFP flags documentation

Create

- Brief concepts operview
  - Make life easier for an unaware reader
- Memory allocation guide
  - Allocations in kernel are slightly more complex than malloc(size)
- Description of boot time memory management
  - ~~bootmem, nobootmem,~~ memblock

- Stay focused

- Overwhelming amount of information

- "The best is the enemy of the good"

Current state

- User and admin guides
  - https://www.kernel.org/doc/html/latest/admin-guide/mm/index.html
- API reference
  - https://www.kernel.org/doc/html/latest/core-api/mm-api.html
- Internal documentaion
  - https://www.kernel.org/doc/html/latest/vm/index.html

FIXME: Documentation/vm

- Drop irrelevant content

- Move more parts to `admin-guide` or `core-api`

- Extend implementation descriptions

- Improve structure

  - Design docs

  - Guides

  - Debug aids

  - Notes

ADDME: new documentation

- Elaborate description of design and implementation
- kernel-doc additions
  - prioritize by importance/usage frequency
- "Understanding the Linux Virtual Memory Manager" ReST version?

- Request to verify docs consistency in `submitting-patches.rst`
  - `kernel-doc -none -v`
  - `make W=1`
- Teach `checkpatch.pl` about `kernel-doc`
- Add `make *docs` to LKP and other bots
  - Thank you for the patch! Perhaps something to improve:

    warning: Function parameter or member 'ctx' not described in 'follow_page_mask'
- Pay more attention to docs at review time

Please,
Document!

Thank you!