svn UPDATE
by Steven Kreuzer

Since the topic of this issue is FreeBSD vs. Linux, I thought it would be interesting to take a closer look at some of the changes made to the LinuxKBI subsystem over the past few months. The project was originally announced in May 2016 as a way to no longer have to port changes from the Linux KMS and DRM drivers over to FreeBSD. The idea is to add a set of shims that can act as a compatibility layer to allow for these drivers to work with minimal changes, making it easier to follow upstream development and greatly reducing the diff between FreeBSD code and the original code from Linux. In addition, it also speeds up the integration of new changes in FreeBSD, which I am sure is a welcome addition to anyone running FreeBSD on bleeding-edge hardware.

Properly implement `poll_wait()` in the LinuxKPI. This prevents direct use of the `linux_poll_wakeup()` function from unsafe contexts, which can lead to use-after-free issues.
https://svnweb.freebsd.org/changeset/base/323349

Resolve IPv6 scope ID issues when using `ip6_find_dev()` in the LinuxKPI.
https://svnweb.freebsd.org/changeset/base/323351

Add more sanity checks to `linux_fget()` in the LinuxKPI. This prevents returning pointers to file descriptors that were not created by the LinuxKPI. https://svnweb.freebsd.org/changeset/base/323347

Remove unsafe access to the LinuxKPI file structure from ibcore. `selwakeup()` is now done by the `wake_up()` family of functions. https://svnweb.freebsd.org/changeset/base/323350

Add some miscellaneous definitions to support the DRM drivers.
https://svnweb.freebsd.org/changeset/base/322795

Fix for deadlock situation in the LinuxKPI's RCU synchronize API.
https://svnweb.freebsd.org/changeset/base/322746

Use integer type to pass around jiffies and/or ticks values in the LinuxKPI because in FreeBSD ticks are 32-bit.
https://svnweb.freebsd.org/changeset/base/322357

Implement parts of the `hrtimer` API in the LinuxKPI. https://svnweb.freebsd.org/changeset/base/320364

Add `u64_to_user_ptr()` to the LinuxKPI. https://svnweb.freebsd.org/changeset/base/320337

Add `ns_to_ktime()` to the LinuxKPI. https://svnweb.freebsd.org/changeset/base/320336

Add `noop_lseek()` to the LinuxKPI. https://svnweb.freebsd.org/changeset/base/320333

Allow the VM fault handler to be `NULL` in the LinuxKPI when handling a memory map request. When the VM fault handler is `NULL`, a return code of `VM_PAGER_BAD` is returned from the character device's pager populate handler. https://svnweb.freebsd.org/changeset/base/320189

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- Add `kthread` parking support to the LinuxKPI. https://svnweb.freebsd.org/changeset/base/320078

- Add generic `kqueue()` and `kevent()` support to the LinuxKPI character devices. The implementation allows read and write filters to be created and piggybacks on the `poll()` file operation to determine when a filter should trigger. The piggyback mechanism is simply to check for the `EWOULDBLOCK` or `EAGAIN` return code from `read()`, `write()`, or `ioctl()` system calls and then update the `kqueue()` polling state bits. https://svnweb.freebsd.org/changeset/base/319409

- Improve `kqueue()` support in the LinuxKPI. Some applications using `kqueue()` do not set non-blocking I/O mode for event-driven read of file descriptors. This results in the LinuxKPI internal `kqueue` read and write event flags having to be updated before the next read `and/or` write system call, otherwise the read `and/or` write system call may block. https://svnweb.freebsd.org/changeset/base/319501

- Implement 64-bit atomic operations for the LinuxKPI. https://svnweb.freebsd.org/changeset/base/294521

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