Linux 5.7 Features

By Roy Schestowitz
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• FSINFO System Call, Mount Notifications Sent In For Linux 5.7 To Provide Better Storage Details[2]

Red Hat's David Howells has sent in pull requests introducing the new fsinfo() system call and mount/superblock notifications and as part of that a general notification mechanism for the kernel.

This stems from work Howells has been pursuing for the past several months for exposing more file-system information and mount notifications. The fsinfo() system call exposes more file-system / VFS information like file-system UUIDs, capabilities, mount attributes, and other possible bits. With the fsinfo() pull request are also implementations for EXT4 and NFS.

• Linux 5.7 EFI Changes: "The GRUB Project Is Showing Signs Of Life Again" [3]

Ingo Molnar on Monday began sending in his feature pull requests for the Linux 5.7 kernel merge window. Of the pull requests worth noting are the EFI changes.

Molnar characterized the GRUB boot-loader project as "showing signs of life again" following the recent introduction of a generic Linux/UEFI boot protocol rather than "x86 specific hacks". The hope is that over time all new extensions will be introduced via that protocol to avoid these hacks for cleaning up the EFI kernel boot code in due course.

• Linux 5.7 For 64-bit ARM Brings In-Kernel Pointer Authentication, Activity Monitors[4]

The 64-bit ARM architecture code will support several new features with the in-development
Linux 5.7 kernel.

Highlights of the 64-bit ARM (AArch64 / ARM64) code for Linux 5.7 include:

- In-kernel pointer authentication is now supported. Back in 2018 added to the kernel was pointer authentication support but only exposed for user-space usage. As explained back then, "Pointer authentication can be supported by ARMv8.3 hardware and newer to allow for signing and authenticating of pointers against secret keys. The purpose of this pointer authentication is to mitigate ROP attacks and other potential buffer-overrun-style attacks." Now with Linux 5.7 the ARMv8.3+ pointer authentication support also works within the kernel.

- **Linux 5.7 Media Updates Add H.264 / H.265 / VP9 Decode To The Meson Driver** [5]

  The media subsystem updates have landed for the Linux 5.7 kernel merge window.

  The media subsystem updates are predominantly made up by individual media driver updates as usual. Some of the highlights include:

  - The Amlogic Meson VDEC driver now has support for VP9 decoding, H.264 decoding, and HEVC decode.

- **Linux 5.7 Power Management Includes Fixes, Tiny Power Button Driver** [6]

  Intel's Rafael Wysocki who oversees the kernel's power management area has sent in his relevant pull requests for the Linux 5.7 kernel merge window.

  Highlights of the power management updates for Linux 5.7 include:

  - Support for Krait-based SoCs within the Qualcomm driver.

- **Linux 5.7's USB Changes Range From Apple Fast Charging To Reporting USB-C Orientation** [7]

  With the newly-minted Linux 5.6 kernel is initial support for USB4 based on Intel's Thunderbolt code while for Linux 5.7 is a wide variety of other USB changes.

  There aren't any big USB4 changes to note with the Linux 5.7 kernel that is now going through its merge window. But there are plenty of other interesting USB changes for the 5.7 version...
The previously reported work on split lock detection due to its big performance hit is now queued up for Linux 5.7.

Split locks occur when an atomic instruction spans multiple cache lines and requires a global bus lock for ensuring atomicity. These split locks can take at least 1,000 more cycles than an atomic operation within a single cache line.

Last year Intel outlined the Data Streaming Accelerator (DSA) as a feature on future Intel CPUs for high-performance data movement and transformation operations for networking and storage / persistent memory. We are now seeing more of the Intel DSA work beginning to take shape for the Linux kernel.