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Enabling PCIe TPH in Linux for Smart Data Cache Injection

PCIe standard TLP processing hints (TPH) allow steering tags (STs) to be attached to PCIe TLP headers to facilitate optimized processing of DMA write requests that target memory space. New AMD hardware, by leveraging TPH, will support smart data cache injection where DMA data will be prefetched into L2 cache of target CCXs rather than DRAM. These new technologies can potentially improve DMA by reducing latency, increasing performance, and/or saving the memory bandwidth.

This talk will review our design to enable the TPH support for PCIe devices in the Linux kernel. We also present kernel support for a new ACPI _DSM, available in the root complex, to provide STs for I/O devices. As a practical demonstration, we will show a real-world use case utilizing a Linux open-source network driver.

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