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Design and implementation of Autocaching for CXLSSD

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The emerging CXL interface provides access to storage devices via IO(block) interfaces and character(memory) interfaces. The duality of the interface requires rethinking the current upstream memory and storage subsystem to support these new devices efficiently. Historically, storage devices are considered block devices accessed through a block interface. In this case, the data should be read into host memory, such as the page cache.
To leverage the advantages of both memory and IO interfaces, we propose Autocaching. Autocaching integrates directly accessible storage memory into the virtual file system layer using the device struct page. So that the application or kernel can access page caches or device pages transparently. Autocaching can allocate page cache or device page depending on data or access characteristics. In addition, the access types, indirect access using page cache and direct access using device page, can be dynamically changed with page hotness or memory usage. In this talk, we will detail the kernel changes required for Autocaching as well as share our plans for upstreaming.

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Yes

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