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Maple Tree

Monday, 9 September 2019 12:00 (45 minutes)

The Red-Black tree and Radix tree are used in many places in the kernel to store ranges. Both of these trees have drawbacks when used for ranges. The Red-Black tree requires writing your own insertion & search code. It is also designed with the assumption that memory accesses are cheap, which is no longer true. The Radix tree performs acceptably well when ranges are aligned to a power of 2, but has awful worst-case performance.

The Maple tree is a fast, cache efficient tree with a simple API. It supports contiguous ranges efficiently, while suffering only minor penalties for discontiguous ranges. Single entries are also supported as a range of length one.

The Maple tree can optionally track free ranges to allow for more efficient allocation. In order to allow it to be used as the basis for the page cache, it will need support for search marks as well as handling reclamation of shadow entries. Other potential users of the Maple tree want more than the three search marks currently supported by the Radix tree.

We want to discuss requirements with potential users of the Maple tree, and to present development since the last Plumbers conference where the broad outlines of the tree were first presented.

I agree to abide by the anti-harassment policy

Yes

I confirm that I am already registered for LPC 2019

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