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STM Library Project

Research Manual

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2.1 Concurrent Programming

The concept of concurrency, its problems, and some of its solutions, should be introduced before discussing STM.

“A system is said to be concurrent if it can support two or more actions in progress at the same time.” (Breshears, 2009, p. 3). Concurrency is not the same as parallelism, although parallelism is a subset of concurrency. The key difference is that concurrency only requires two or more actions to be in progress at the same time, whereas parallelism requires two or more actions to occur at the same time. For example, a single-core computer can give the impression that it is performing multiple actions at once by frequently interleaving execution time for different processes/threads. In contrast, a computer with multiple processor cores can literally execute two separate actions at the same time.

Concurrency can be applied to many problems. In this case, concurrent programming will be discussed. This typically involves writing programs that implement multiple threads of execution. Threads of a process can be executed concurrently and share access to the memory of their parent process. Concurrent programs promise performance gains on multicore processor systems. An idealistic expectation of performance gained for a simple application might be that running on a two-core system, you could expect the application to run in half the time (Breshears, 2009, p. 4).

Problems introduced by concurrency

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Breshears, C. (2009). *The art of concurrency*. Sebastopol, CA: O'Reilly.