

182,987,000

41,400,000

x4.5

2.00E+08

1.50E+08

1.00E+08

5.00E+07

0.00E+00



queue



mutex_queue

```
class realtime_mutex
{
    std::atomic_flag flag = ATOMIC_FLAG_INIT;

public:
    // Non-blocking try_lock for real-time contexts
    bool try_lock() noexcept
    {
        // First test: cheap read-only check
        if (flag.test(std::memory_order_relaxed))
            return false; // Already locked

        // Then test-and-set if the first test passed
        return !flag.test_and_set(std::memory_order_acquire);
    }

    // Blocking lock with test, test-and-set optimization
    void lock() noexcept
    {
        while (true)
        {
            // Optimistically assume the lock is free on the first try
            if (!flag.test_and_set(std::memory_order_acquire))
                break; // Successfully acquired the lock

            // Wait for lock to be released without generating cache misses
            while (flag.test(std::memory_order_relaxed))
                CPU_PAUSE(); // CPU-specific pause instruction
        }
    }

    void unlock() noexcept
    {
        flag.clear(std::memory_order_release);
    }
};
```

<https://rigtorp.se/spinlock/>