

C++ coroutines: Getting rid of our atomic variant discriminator

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We continue [the refinement of our coroutine implementation](#) by removing the atomic variable used as the discriminator of our result holder variant.

The discriminator needed to be atomic because we used it in `await_ready` to peek at whether the coroutine had completed. But we've switched over to using the atomic `m_waiting` member to track the coroutine state, which means that the use of the discriminator is now protected by the memory ordering requirements of `m_waiting`. The discriminator itself can now be a regular variable.

```

template<typename T>
struct simple_promise_holder
{
    ...
    // std::atomic<result_status>
    result_status status
        { result_status::empty };

    template<typename...Args>
    void set_value(Args&&... args)
    {
        new (std::addressof(result.wrap))
            wrapper<T>{ std::forward<Args>(args)... };
        status = result_status::value;
    }

    void unhandled_exception() noexcept
    {
        new (std::addressof(result.error))
            std::exception_ptr(std::current_exception());
        status = result_status::error;
    }

    // bool is_empty() const noexcept
    // {
    //     return status.load(std::memory_order_relaxed) ==
    //         result_status::empty;
    // }

    T get_value()
    {
        switch (status) {
        case result_status::value:
            return result.wrap.get_value();
        case result_status::error:
            std::rethrow_exception(
                std::exchange(result.error, {}));
        }
        assert(false);
        std::terminate();
    }

    ~simple_promise_result_holder()
    {
        switch (status) {
        case result_status::value:
            result.wrap.~wrapper();
            break;
        case result_status::error:
            if (result.error)
                std::rethrow_exception(result.error);
            result.error.~exception_ptr();
        }
    }
};

```

```
    }  
  }  
};
```

What used to be `status.store` is now just an assignment, and what used to be `status.load` now just a read.

We can also get rid of the `is_empty` method, since it was used only by our previous version of `client_wait_ready`, which we abandoned when we switched to using `m_waiting`.

Next time, we'll add support for cold-start coroutines.

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