

Adopt `source_location` from Library Fundamentals V3 for C++20

Robert Douglas, Corentin Jabot

2019-03-11

Document Number:	P1208R4
Audience:	LWG
Date:	2019-03-11
Project:	Programming Language C++

1 Class `source_location` [`reflection.src_loc`]

1.1 Header `<source_location>` Synopsis [`reflection.src_loc.intro`]

```
namespace std {
    struct source_location {
        constexpr source_location() noexcept;

        constexpr uint_least32_t line() const noexcept;
        constexpr uint_least32_t column() const noexcept;
        constexpr const char* file_name() const noexcept;
        constexpr const char* function_name() const noexcept;

        static consteval source_location current() noexcept;
    };
}
```

[*Note:* The intent of `source_location` is to have a small size and efficient copying.– *end note*]

```
constexpr source_location() noexcept;
```

1 *Effects:* Constructs an object of class `source_location`.

2 *Remark:* The values are implementation-defined.

```
constexpr uint_least32_t line() const noexcept;
```

3 *Returns:* The presumed line number (16.8) represented by this object.

```
constexpr uint_least32_t column() const noexcept;
```

4 *Returns:* An implementation-defined value representing some offset from the start of the line represented by this object.

```
constexpr const char* file_name() const noexcept;
```

5 *Returns:* The presumed name of the current source file (14.2) represented by this object as an NTBS.

```
constexpr const char* function_name() const noexcept;
```

6 *Returns:* If this object represents a position in the body of a function, returns an implementation-defined NTBS that should correspond to the function name. Otherwise, returns an empty string.

```
static consteval source_location current() noexcept;
```

7 *Returns:* When invoked by a function call whose *postfix-expression* is a (possibly parenthesized) *id-expression* naming `current`, returns a `source_location` with an implementation-defined value. The value should be affected by `#line` (14.4) in the same manner as for `__LINE__` and `__FILE__`. If invoked in some other way, the value returned is unspecified.

8 *Remark:* When a *brace-or-equal-initializer* is used to initialize a non-static data member, any calls to `current` should correspond to the location of the constructor or aggregate initialization that initializes the member.

9 [*Note:* When used as a default argument (9.3.6), the value of the `source_location` will be the location of the call to `current` at the call site. – *end note*]

[*Example:*

```
struct s {
    source_location member = source_location::current();
    int other_member;
    s(source_location loc = source_location::current())
        : member(loc) // values of member will be from call-site
    {}
    s(int blather) : // values of member should be hereabouts
        other_member(blather)
    {}
    s(double) // values of member should be hereabouts
    {}
};
void f(source_location a = source_location::current()) {
    source_location b = source_location::current(); // values in b represent
this line
}

void g() {
    f(); // f's first argument corresponds to this line of code

    source_location c = source_location::current();
    f(c); // f's first argument gets the same values as c, above
}
```

– *end example*]

2 Feature macro

We recommend the feature macro `__cpp_lib_source_location` for this feature.