dXXXXr0 - Towards std::units

Peter Sommerlad

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Project:	Programming Language C++
Audience:	LWG/LEWG
Target:	C++20

1 Motivation

note: support affine types, e.g. point vs. vector

2 Acknowledgements

— All people who inspired me to work on this, because they created and used units libraries.

— C++now 2017 participants who worked on this during the "library in a week" workshop: Billy Baker, Charles Wilson, Daniel Pfeifer, Dave Jenkins, Manuel Bergler, Morris Hafner, Nicolas Holthaus, Peter Bindels, Steven Watanabe, Tuan Tran.

3 Components and Relationships

Dimension 7 physical base dimensions (length, mass, time, current, temperature, amount of substance, luminous intensity), combined, user-defined, special dimensionless (e.g., angles)

Unit unit of measurement for a given dimension (m,kg,s,A,K,mol,cd) , can be scaled (kilo, micro),

Quantity a measurement in a given unit, convertible to other quantity of same dimension, that is what one computes with, must be as efficient as the underlying numerical type

Units System A set of dimensions and units useful for a domain, e.g., SI units. Combines UDL-suffixes for the units, formatting/IO for quantities, conversions

Conversion A rule/computation to convert a quantity in one unit into a corresponding quantity of the same dimension in another unit, potentially from another unit system.

4 Specification

4.0.1 Bla [bla]

`bla`

1 *Requires:* bla

2 *Effects:* bla