

LIBRARY IN A WEEK

EDITION 12

Jeff Garland

C++Now 2018

INTRO

WHAT IS THIS SESSION?

- Workshop
 - Learn by doing – work on libraries
 - Different topic every year
 - “Self Organizing”
- Platform for learning from peers
 - About C++, Boost Development, etc
- Community Building
 - Create contributors
 - Create connections

WAYS TO PARTICIPATE

- Please participate!
 - Session(s) are meant to be interactive
 - Shaped/run by the participants
- Things you can do
 - Lead a subgroup
 - Research, Write Code, Present
 - Come to morning sessions and provide input

APPROXIMATE PLAN

- day 1: Get Organized
 - Selection of focus sections to attack
 - Assignments and teaming
- day 2: Initial Presentations
 - Initial solutions
- day 3 & 4: More solution presentations
- day 5: Wrap up – future directions

TOPIC – LIBRARY BUILDING IN C++20 OR AT LEAST C++17

C++ STANDARD IS CHANGING TOO FAST!!!

- C++17 is a standard – implementations are there!
 - Over 100 features in c++17
- C++20 is rapidly developing
 - Several major features already voted in
- Problems
 - Taking advantage of new features in libraries
 - Deprecating things now standardized

C++17 FEATURES

- Language (partial list)
 - Fold expressions
 - Nested namespace definition
 - Deduction guides
 - Structured bindings
 - Make exception specifications part of the type system
 - Aggregate initialization of classes with base classes
 - `constexpr if-statements`
- Library
 - Optional
 - Any
 - Variant
 - Invoke
 - String_view
- https://github.com/tvaneerd/cpp17_in_TTs

C++20 FEATURES VOTED IN

- Language (partial list)
 - Designated Initialization
 - Spaceship operator
 - Concepts
 - Lambdapalooza
 - String literals as template parameters
- Library
 - Date-time based on chrono++/Hinnant date
 - Ranges (TS)

C++20 FEATURES – NOT DONE YET

	Depends on	Current target (estimated)
Coroutines		C++20
Contracts		C++20
Ranges		Core concepts in C++20 Rest in C++20 or 23
Modules		“Core” in C++20 “Rest” in (tbd) focusing on a bridge from header files
Reflection		TS in C++20 timeframe IS in C++23
Executors		TS in C++20 timeframe IS in C++23
Networking	Executors	IS in C++23
future.then, async2	Executors	IS in C++23

- <https://herbsutter.com/2018/04/02/trip-report-winter-iso-c-standards-meeting-jacksonville/>

DAY 1 ACTIVITIES IN DEPTH

- Get a modern compiler!!
- Choose some targets to work with
- Choose some key language features to explore

PROJECT SELECTIONS

- If const_exper – no one is usiing it macro just added
- Update boost config for c++17
- Get rid of auto_ptr
- Tokenizer to support string_view
- Coroutines as monads – replace/augment optional
- Meta point
 - Interface
 - Implementation
 - What do we do with backward compatibility
- Class template argument deduction – deduction guides
 - Std lib needed this in containers...need a templated constructor
- Csv file reading/writing – tokenizer...
- Modules in C++ -- clang modulerize
- Mocking library with minimal macros...
- Algorithms on sets – setDifference, aggregate sets

SUGGESTED POTENTIAL PROJECTS

- Convert boost library for C++11/14/17/20
 - String algorithms (`string_view`, `ranges`)
 - Modules for boost?
 - Date-time
- `constexpr` math functions (R. Powell)
- `notnull_unique_ptr`, `notnull_shared_ptr`:
`unique_ptr/shared_ptr` (R. Powell)
- Other ‘ongoing liaw’ projects
 - Boostache
 - Range by Example

OUTPUTS FROM THE WEEK

- Everyone learns at least a few of the new c++ features
- Draft Library guidelines for boost authors
- A boost or other library utilizing latest features
- Thoughts on what to do with boost in C++20

PLAN OF ACTION

- Form interest groups...
- Meetup in mornings
 - Progress presentations
 - Demonstrations
 - Working time...
- Lunch/Dinner sessions

- Tokenizer/csv – M. Chadwick, Tom Becker

NEXT STEPS

- Meet for lunch
- Presentations for Tue

FINISHING BOOSTSTACHE

- LIAW project from 2014
 - text template processing engine
 - Initial formatting language based on Mustache
 - Michael Caisse has kept it going as side project
- What's needed?
 - Bit of core work
 - Nested contexts not working currently
 - Adding a second grammar
 - Docs and examples
 - More tests
- <https://github.com/cierelabs/booststache>

RANGE BY EXAMPLE

- ranges v3
 - Subset of library is proposed as TS likely C++20
- Problem – how do I use it?
 - No example documentation
 - Not yet documented on C++ reference
 - ‘typical’ boost reference docs – ah, difficult to use
- Needed – more examples!
- Details & Resource
 - <https://github.com/ericniebler/range-v3>
 - https://github.com/JeffGarland/range_by_example