

# LArSoft Build Speed Issues

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## The Issue

- ▶ It was discovered that the LArSoft v04\_29\_00 took 40 minutes to build<sup>1</sup>, while LArSoft v04\_26\_03 had taken 29 minutes to build: 35% increase in build time.
- ▶ This corresponded in moving from art v1\_17\_03 from art v1\_15\_02 (as well as other changes).
- ▶ Longer build times were correlated with increased library sizes.
- ▶ All details are available at [https://cdcvs.fnal.gov/redmine/projects/cet-is/wiki/2016\\_Version\\_Timing](https://cdcvs.fnal.gov/redmine/projects/cet-is/wiki/2016_Version_Timing).

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<sup>1</sup>Non-VM machine, using local disk, 4-way parallel build.

# The Cause

- ▶ Issue was investigated primarily by Patrick Gartung.
- ▶ Found a change in `fhiclcpp` that caused the increased build time.
- ▶ Inline function in `fhiclcpp` that made use of a class template<sup>2</sup>, which template instantiated a large body of code.
- ▶ Every module that called the function contained this code.

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<sup>2</sup>`std::regex`

# The Resolution

1. Move code that used `std::regex` out-of-line.
2. Modify the function template that called this function so that the use of `std::regex` appeared only in the `.cc` file.

*Note the generally-useful tips:*

- ▶ Inline only what is needed (e.g., the function template definition).
- ▶ Judicious hiding of template instantiations can help reduce code size and build times.