*2021-MAY-31*

*Julia Initiative for High-Performance Computing*

**Revision History**

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| **Version** | **Date** | **Summary** |
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# 1: Overview: Purpose of this document

Describe Julia’s capabilities for high performance computing

**Target finishing by end of July for steering committee review in August.**

# 2: Scope:

Understand what Julia can bring to the table and describe the proper use cases (e.g. Simulation/MCMC, probabilistic programming, etc…)

# 3: Definitions:

<terminology used in this paper>

# 4: Problem Statement:

Since the 21st Century Cures Act, the need to include RWE with massive amounts of data, both structured and unstructured, within clinical research is desirable but presses technology for faster open-source tools. This is compounded when one wants to run simulations with bigger samples and more iterations. Julia is a mathematical language that has been built by MIT specifically for the purposes of high-performance computing.

What Julia can do, is bridge the gap between the burgeoning needs faster computing and the current open-source technologies available. This working group will explore some use cases as we evaluate Julia as a solution to bridge this gap. Our current thinking is that Julia can be used in this specific manner, which requires high math and high speed, and not for the day-to-day. Julia’s release cycle is starting to stabilize, which gives us the time to evaluate the available packages and will give us a good look these very specific use cases.

# 5: Background:

Parallel computing

# 6: Recommendation:

This is the main part of the paper. This is where we describe the use cases and show the results. Also show how to load/use Julia and the packages available. Show code, describe the differentiators in speed/computing and so forth. Also so where the specific needs are (where other languages can’t compete)

# 7: Disclaimer:

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# 8: Appendices:

# 9: Project Contact Information:

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# 10: Acknowledgments: