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Navigating the Multilingual Landscape of Scientific Computing: Python, Julia, and Awkward Array

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Scientific computing relies heavily on powerful tools like Julia and Python. While Python has long been the preferred choice in High Energy Physics (HEP) data analysis, there's a growing interest in migrating legacy software to Julia. We explore language interoperability, focusing on how Awkward Array data structures can connect Julia and Python. We discuss memory management, data buffer copies, and dependency handling, highlighting performance gains from invoking Julia from Python and vice versa. Particularly, we look into distributed array-oriented calculations involving large-scale HEP data and a unique role of Awkward Array in these workflows. We examine the advantages and challenges of achieving interoperability between Julia and Python in scientific computing.

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