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Improving the Automated Prompt Calibration at Belle II

The calibration of Belle II data involves two key processes: prompt calibration and reprocessing. Prompt calibration represents the initial step in continuously deriving calibration constants in a timely manner for the data collected over the previous couple of weeks. Currently, this process is managed by b2cal, a Python-based plugin built on Apache Airflow to handle calibration jobs. However, b2cal is a complex system with many interconnected components, introducing usability and maintenance challenges.

To address these limitations, a new prototype system called b2luca (b2LUigi CAlibration) is under development. Built on b2luigi, a helper package for Spotify's Luigi for scheduling large workflows on a batch system, b2luca centralizes all prompt calibration processes at the Belle II calibration center hosted at the Scientific Data and Computing Center of the Brookhaven National Laboratory (BNL). Here, all calibration tasks are executed either in parallel or sequentially, depending on their dependencies, and the results are stored in a centralized database. The system ensures robust validation.

Instead of relying on a custom web interface, b2luca leverages GitLab for managing workflows, collecting expert feedback, and tracking calibration tasks. This integration not only simplifies the workflow but also fosters collaboration through GitLab's version control and issue-tracking features.

By running all calibration tasks directly on one site and incorporating an efficient workflow scheduler, b2luca aims to provide a scalable, user-friendly, and reliable solution for managing calibration pipelines in the Belle II experiment.

Significance

References

Experiment context, if any

Belle II

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