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Aware Computing in ATLAS: Estimating Carbon Footprint for Workloads with PanDA

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The ATLAS experiment relies on the PanDA workload management system to handle its analysis and production tasks across the Worldwide LHC Computing Grid (WLCG). In response to a request from the ATLAS Sustainability Forum, we've introduced a new feature: simple, informative estimates of the carbon emissions generated by each job.

To achieve this, we calculate CO_2 emissions by retrieving time-dependent, regional electricity grid emission intensities and using estimated core power consumption values. Emission totals are calculated in grams of CO_2, differentiated by region or a global average, and presented to users upon task completion. These estimates are also available in monitoring tools, distinguishing emissions by successful and failed jobs.

This feature is not meant to deter essential work but to raise awareness of the environmental impact of computational tasks, encouraging users to consider optimizing their workloads for a greener future.

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