

# Just-in-time matching of workflows for the DUNE experiment

Thursday 21 September 2023 14:10 (20 minutes)

The DUNE experiment is a large international particle physics project which is currently under construction at Fermilab in Illinois and SURF in South Dakota, with prototypes at CERN. The experiment relies on Fermilab's investment in HTCondor and GlideInWMS, and on the LArSoft ecosystem of applications software. Initially data management was done with Fermilab's SAM system but this is gradually being replaced by other components. MetaCat and Rucio are now in use as DUNE's file metadata and replica catalogues, and DUNE has developed a just-in-time workflow management system, justIN, to replace the SAM workflow functionality and provide higher level management of processing requests which are carried out in GlideInWMS/HTCondor jobs. The new system's philosophy of matching tasks to resources as they become available will be described. justIN provides a workflow submission interface and then submits suitable jobs to the DUNE HTCondor pool. Jobs call back to justIN when they eventually start at sites, and a decision is made at that point about what workflows to carry out on that machine and which files to process. These decisions are based on the available memory, processors, maximum local job duration, and the availability of nearby files which are still to be processed as part of the current workflows. This just-in-time approach is able to take unplanned downtimes at sites and storages into account immediately, as well as higher level changes such as fluctuations in the demand from other user communities. This system was validated during the DUNE Data Challenge 4 in late 2022 and has been used in the simulation campaigns of 2023. justIN uses token information obtained from CILogon with users authenticating with the Fermilab Identity Provider service. This in turn allows users to authenticate to the justIN web dashboard or to use the justIN command line tool to launch and manage workflows. To enforce DUNE policies on the use of Rucio-managed storage, justIN jobs carry out data write operations on behalf of user supplied scripts and code, which are isolated from higher level credentials by justIN's use of Singularity/Apptainer containers. Further work to increase the integration of justIN and the new dedicated DUNE HTCondor pool will be described.

## Desired slot length

20

## Speaker release

Yes

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**Session Classification:** HTCondor User Presentations

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