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## The IceProd (IceCube Production) Framework

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IceProd is a data processing and management framework developed by IceCube Neutrino Observatory for processing of Monte Carlo simulations and data. IceProd runs as a separate layer on top of middleware and can take advantage of a variety of computing resources including grids and batch systems such as GLite, Condor, NorduGrid, PBS and SGE. This is accomplished by a set of dedicated daemons which process job submission in a coordinated fashion through the use of middleware plug-ins that serve to abstract the details of job submission and job management. IceProd can also manage complex workflow DAGs across distributed computing grids in order to optimize usage of resources. We describe several aspects of IceProd's design including security, data integrity, scalability, throughput as well as the various challenges in each of these topics. We also discuss design aspects of a second generation IceProd, currently being tested in IceCube.

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