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The DIRAC interware: current, upcoming and planned capabilities and technologies

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Efficient access to distributed computing and storage resources is mandatory for the success of current and future High Energy and Nuclear Physics Experiments. DIRAC is an interware to build and operate distributed computing systems. It provides a development framework and a rich set of services for the Workload, Data and Production Management tasks of large scientific communities. A single DIRAC installation provides a complete solution for the distributed computing of one, or more than one collaboration. The DIRAC Workload Management System (WMS) provides a transparent, uniform interface for managing computing resources. The DIRAC Data Management System (DMS) offers all the necessary tools to ensure data handling operations: it supports transparent access to storage resources based on multiple technologies, and is easily expandable. Distributed Data management can be performed, also using third party services, and operations are resilient with respect to failures. DIRAC is highly customizable and can be easily extended. For these reasons, a vast and heterogeneous set of scientific collaborations have adopted DIRAC as the base for their computing models. Users from different experiments can interact with the system in different ways, depending on their specific tasks, expertise level and previous experience using command line tools, python APIs or Web Portals. The requirements of the diverse DIRAC user communities and hosting infrastructures triggered multiple developments to improve the system usability: examples include the adoption of industry standard authorization and authentication infrastructure solutions, the management of diverse computing resources (cloud, HPC, GPGPU, etc.), the handling of high-intensity work and data flows, but also advanced monitoring and accounting using no-SQL based solutions and message queues. This contribution will highlight DIRAC's current, upcoming and planned capabilities and technologies.

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