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DIRAC Interware for building distributed computing systems for scientific applications

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Modern scientific applications require very large computing and storage capacity to treat steadily increasing data volumes with more and more sophisticated algorithms. In many cases, in particular, for large international scientific collaborations, such capacity cannot be provided by just one even very large computing center. Instead, all the computing and storage resources available for a scientific community must be integrated in a coherent distributed system that can be seen and used by the community members as a single easy to access computer. Therefore, multiple projects were carried out recently to provide distributed computing infrastructures to multiple scientific communities. Among such infrastructures one can mention WLCG Computing Grid for the LHC program or European Open Science Cloud for European research projects. The DIRAC platform provides all the necessary software components for building such distributed computing infrastructures. In the lecture, the example of the DIRAC interware will be used to describe architectures and technologies applied for building complex distributed computing infrastructures involving various types of resources such as computing grids, clouds, supercomputers or volunteer computing platforms based on the BOINC technology. Integration of data stores with different storage technologies will be discussed. Examples of usage of DIRAC based infrastructures for High Energy Physics and other Big Data scientific applications will be presented.

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