

JAliEn: the new ALICE high-performance and high-scalability Grid framework

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The ALICE experiment will undergo an extensive detector and readout upgrade for the LHC Run3 and will collect a 10 times larger data volume than today. This will translate into increase of the required CPU resources worldwide as well as higher data access and transfer rates. JAliEn (Java ALICE Environment) is the new Grid middleware designed to scale-out horizontally and satisfy the ALICE production and analysis requirements after the upgrade.

This paper work presents the architecture of JAliEn, the technologies and methods introduced to achieve high scalability and stability of all services. Performance measurements of key system services are shown and discussed. In addition, we describe the next generation solution that is used to implement and operate one of the main components - the JAliEn File Catalogue. We describe the catalogue design and the database backend used to reach almost unlimited scalability in terms of file descriptors and thus its ability to handle near exascale data volumes. The catalogue is further enhanced with powerful and fast search tools, an important aspect to reach and surpass the required performance for JAliEn. Lastly, we present how JAliEn handles the higher complexity of data processing tasks implemented in the new ALICE software framework ALFA and in multi-core environments.

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