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Availability Tracking as a Means to Increase LHC Physics Production

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The Large Hadron Collider at the European Organization for Nuclear Research is the world's most powerful particle accelerator, being one of the largest and most complicated machines envisaged to date.
LHC sub-systems must be designed to be sufficiently reliable, with sufficient safety, having an acceptable impact on machine availability. The operation and exploitation of dependable systems needs to take into consideration many aspects, such as maintenance, repair and event recording, in order to ensure system performances meet expectations, and that physics production is optimised.
This paper considers the potential optimisation of physics production by effective use of availability tracking. To facilitate this, a study of LHC availability in 2012 is introduced, this paper outlines first triggers and root causes with their associated impact on the LHC, given from both the operation and system viewpoints.
The paper concludes by outlining concepts for availability tracking proposed for the post-LS1 era, to improve the quality of availability and physics delivery calculations. A unified asset management and event tracking approach could be used to incorporate such information.

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