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Optimizing High-Latency I/O in CMSSW

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To efficiently read data over high-latency connections, ROOT-based applications must pay careful attention to user-level usage patterns and the configuration of the I/O layer. Starting in 2010, CMSSW began using and improving several ROOT “best practice” techniques such as enabling the TTreeCache object and avoiding reading events out-of-order. Since then, CMS has been deploying additional improvements not part of base ROOT, such as the removal of the TTreeCache startup penalty and significantly reducing the number of network roundtrips for sparse event filtering. CMS has also implemented an algorithm for multi-source reads using Xrootd. This new client layer splits ROOT read requests between active source servers based on recent server performance and issues these requests in parallel.

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