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The ATLAS Data Acquisition and High Level Trigger Systems: Experience and Upgrade Plans

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The ATLAS DAQ/HLT system reduces the Level 1 rate of 75 kHz to a few kHz event build rate after Level 2 and a few hundred Hz out output rate to disk. It has operated with an average data taking efficiency of about 94% during the recent years. The performance has far exceeded the initial requirements, with about 5 kHz event building rate and 500 Hz of output rate in 2012, driven mostly by physics requirements.

Several improvements and upgrades are foreseen in the upcoming long shutdowns, both to simplify the existing architecture and improve the performance. On the network side new core switches will be deployed and possible use of 10GBit Ethernet links for critical areas is foreseen. An improved read-out system to replace the existing solution based on PCI is under development. A major evolution of the high level trigger system foresees a merging of the Level 2 and Event Filter functionality on a single node, including the event building. This will represent a big simplification of the existing system, while still maintaining the flexibility of the Region of Interest based approach.
It will furthermore open up new optimizations and simplifications in the existing HLT code.

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