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The STAR Trigger Data Pusher

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We describe a new, high-speed trigger network for the STAR detector at RHIC to be used during the upcoming 2006 run and thereafter. The STAR Trigger Data Pusher (STP) replaces the off-the-shelf Myrinet network used in the STAR trigger system during the first five RHIC runs. The STP will lower latencies and increase bandwidth through the trigger system. Custom electronics provide flexibility in implementing flow control, buffering, and debugging. The STP network consists of PCI Mezzanine Cards for each detector, a central data concentrator, a PCI receiver card in the Level-2 processor, and all associated software. The new network connects the 'fast detectors' within STAR using optical fibers allowing faster trigger decisions on greater data volume. Event data from each detector flows through a central concentrator to the Level-2 processor, also over optical fiber. The STP network enables new Level-2 triggers that utilize more data from each collision as well as higher event rates. In this paper we describe the design, implementation and use of the new STP network as well as report latencies, bandwidth, and newly available trigger rates.

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