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Replication and load Balancing strategy of STAR's RDBM

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Database demands resulting from offline analysis and production of data at The STAR experiment at Brookhaven National Laboratory's Relativistic Heavy-Ion Collider has steadily increased over the last 6 years of data taking activities. With each year STAR more than doubles events taken with an anticipation of reaching a billion event capabilities as early as next year. The challenges faced from producing and analyzing this magnitude of events have raised issues with regard to distribution of calibrations and geometry data, via databases, to STAR's growing global collaboration. Rapid distribution, availability, ensured synchronization and load balancing have become paramount considerations. Both conventional technology and novel approaches are used in parallel to realize these goals. This paper discusses how STAR uses distribution methods via MySQL master slave replication to distribute its databases; the synchronization issues that arise from this type of distribution and solutions, mostly homegrown, put forth to overcome these issues. Also discussed is a novel approach toward load balancing between slave nodes that assists in maintaining a high availability rate for a veracious community. This load balancing addresses both, pools of nodes internal to given location, as well as balancing the load for remote users between different available locations. Challenges, trade-offs, rationale for decisions and paths forward will be discussed in all cases, presenting a solid production environment with a vision for scalable growth.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

STAR

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