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## Research on Wide Area Network Performance Anomaly Detection Technology Based on Machine Learning

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As a WLCG prototype T1 site, IHEP's network performance directly impacts the site's reliability. The current primary method for measuring network performance is implemented through Perfsonar, which actively measures performance metrics such as bandwidth, connection status, one-way and two-way latency, packet loss rate, and jitter between IHEP and other sites. However, there is a lack of relatively efficient network performance issue detection capabilities, posing significant challenges for network operations personnel when addressing network performance problems. This paper proposes a machine learning-based network anomaly detection algorithm, utilizing performance metric data obtained from both Perfsonar and third-party network monitoring tools. By integrating network protocol analysis and network traffic analysis techniques, the algorithm achieves network communication anomaly detection and alerting. Ultimately, this enhances the ability to detect network performance issues, helping network operations personnel to provide a more efficient network environment more effectively and quickly.

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