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Load Balancing in XRootD

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To address the need for high transfer throughput seen for large datacentres using XRootD for projects such as the LHC experiments, it is important to make optimal and sustainable use of our available capacity. Load balancing algorithms play a crucial role in distributing incoming network traffic across multiple servers, ensuring optimal resource utilization, preventing server overload, and enhancing performance and reliability. At the Rutherford Appleton Laboratory (RAL), the UK's Tier-1 centre for the Worldwide LHC Computing Grid (WLCG), we started with a DNS round robin then moved to XRootD's cluster management service component, which has an active load balancing algorithm to distribute traffic across 26 servers, but encountered its limitations when the system as a whole is under heavy load. We describe our tuning of the configuration of the existing algorithm before proposing a new tuneable, dynamic load-balancer based on a weighted random selection algorithm, as well as the observed behaviours of servers under stress conditions

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