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Optimising network transfers to and from QMUL, a large WLCG Tier-2 Grid site

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The WLCG, and high energy physics in general, relies on remote Tier-2 sites to analyse the large quantities of data produced. Transferring this data in a timely manner requires significant tuning to make optimum usage of expensive WAN links.

In this paper we describe the techniques we have used at QMUL to optimise network transfers. Use of the FTS with settings and appropriate TCP window sizes allowed us to saturate a 1 Gbit link for 24 hours - whilst still achieving acceptable download speeds. Source based routing and multiple gridftp servers allowed us to use an otherwise unused “resilient” link.

After the WAN link was upgraded to 10Gbit/s, a significant reduction in transfer rates was observed from some sites - due to suboptimal routing resulting in packet loss on congested links. Solving this dramatically improved performance.

The use of jumbo frames (MTU=9000) offers potential improvements in performance, particularly for latency limited links. Whilst much of the Internet backbone is capable of supporting this, most sites are not, and path MTU discovery fails at some sites. We describe our experience with this.

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