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Towards an IPv6-only WLCG: more successes in reducing IPv4

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The Worldwide Large Hadron Collider Computing Grid (WLCG) community's deployment of dual-stack IPv6/IPv4 on its worldwide storage infrastructure is very successful and has been presented by us at earlier CHEP conferences. Dual-stack is not, however, a viable long-term solution; the HEPiX IPv6 Working Group has focused on studying where and why IPv4 is still being used, and how to flip such traffic to IPv6. The agreed end goal is to turn IPv4 off and run IPv6-only over the wide area network, to simplify both operations and security management.

This paper reports our work since the CHEP2023 conference. Firstly, we present our campaign to encourage the deployment of IPv6 on CPU services and Worker Nodes, with a deadline of end of June 2024. Then, the WLCG Data Challenge (DC24) performed during two weeks of February 2024 was an excellent opportunity to observe the percentage of data transfers which were carried by IPv6. We present our observation of the predominance of IPv6 in data transfers during DC24 and the opportunity we had to understand yet more reasons for the use of IPv4 and to get them removed.

The paper ends with the working group's proposed plans and timescale for moving WLCG to "IPv6-only". We have continued to test IPv6-only clusters as a way of confirming the readiness of the LHC experiments for an IPv6-only environment. Another aspect of the plan is the possible use of IPv6-only clients configured with a customer-side translator, or CLAT, together with a deployment of 464XLAT using what is often known as "IPv6-mostly" as in IETF RFCs 6877/8925. This will enable IPv6-only sites to continue to connect to non-WLCG IPv4-only services.

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