

WLCG networking – from dual-stack to IPv6-only

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The Worldwide Large Hadron Collider Computing Grid (WLCG) community's deployment of dual-stack IPv4/IPv6 on its worldwide storage infrastructure is very successful and has been presented by us at earlier ISGC 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 change 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 will report on our work since the ISGC2024 conference. Firstly, we will report on our campaign to encourage the deployment of IPv6 on CPU services and Worker Nodes. Then, we will present the ongoing work to further identify and correct the use of IPv4 between two dual-stack endpoints. The monitoring and tracking of all data transfers is essential, together with the ability to understand the relative use of IPv6 and IPv4. This paper presents the status of monitoring IPv6 data flows within WLCG. Furthermore, the Research Networking Technical Working Group has identified marking the IPv6 packet header as one approach for understanding complex large data flows. This provides another driver for full transition to the use of IPv6 in WLCG data transfers.

The paper then ends with the working group's proposed plans and timescale for moving WLCG to "IPv6-only", while also defining what we mean by the term "IPv6-only". One component of this plan could be the use of IPv6-only clients configured with a CLAT, customer-side translator, together with a deployment of 464XLAT (IETF RFC6877) using what is often known as "IPv6-mostly" as in IETF RFC8925 to connect to remote IPv4-only services.

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