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Overcoming obstacles to IPv6 on WLCG

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The transition of WLCG storage services to dual-stack IPv4/IPv6 is nearing completion after more than 5 years, thus enabling the use of IPv6-only CPU resources as agreed by the WLCG Management Board and presented by us at earlier ISGC conferences. Much of the data is transferred by the LHC experiments over IPv6. All Tier-1 storage and over 90% of Tier-2 storage is now IPv6-enabled, yet we still see IPv4 transfers happening when both endpoints have IPv6 available or when remote data is accessed over the network from worker nodes.

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 and the plans to improve the ability to distinguish between IPv6 and IPv4. 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 agreed endpoint of the WLCG transition to IPv6 remains the deployment of IPv6-only services, thereby removing the complexity and security concerns of operating dual stacks. The working group is identifying where IPv4 can be removed and investigating the obstacles to the use of IPv6 in WLCG. Why do transfers between two dual-stack endpoints still use IPv4? This work is presented together with the obstacles defeated, those remaining, and those outside of our control.

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