Deployment of 464XLAT (RFC6877) alongside IPv6-only CPU resources at WLCG sites

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We utilized cutting-edge transition technologies to provide IPv6-only WLCG computing resources with full backwards-compatible connectivity to IPv4-only WLCG resources.

Motivation

1) IPv6 (Internet Protocol version 6) has been production-ready for more than a decade but not all WLCG sites are offering services over IPv6 yet.

2) Mandated requirement for all WLCG sites to be able to support the use of IPv6-only Worker Nodes (WNs) by April 2017 and the Tier-2 site based at QMUL wanted to adopt and support this strategy.

Solution

DNS64 (RFC6147)

How DNS64 Works

IPv6-only Worker Node —> DNS64 Resolver —> WLCG Site DNS Server

DNS Query: Request IPv6 address for server.example.com

DNS Reply: IPv6 address for server.example.com

IPv6 address exists? Yes —> DNS Reply: IPv6 address for server.example.com

No —> DNS Reply: No IPv6 address for server.example.com

Synthesize IPv6 address for server.example.com

IPv4 address for server.example.com

How NAT64 Works

IPv6-only Worker Node —> DNS64 Resolver —> WLCG Site DNS Server

DNS Query: Request IPv4 address for server.example.com

DNS Reply: IPv4 address for server.example.com

IPv4 address exists? Yes —> DNS Reply: IPv4 address for server.example.com

No —> DNS Query: Request IPv6 address for server.example.com

Synthesize IPv6 address for server.example.com

IPv6 address for server.example.com