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From IPv4 to eternity - the HEPiX IPv6 working group

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The much-heralded exhaustion of the IPv4 networking address space has finally started. While many of the research and education networks have been ready and poised for years to carry IPv6 traffic, there is a well-known lack of academic institutes using the new protocols. One reason for this is an obvious absence of pressure due to the extensive use of NAT or that most currently still have sufficient IPv4 addresses. More importantly though, the fact is that moving your distributed applications to IPv6 involves much more than the routing, naming and addressing solutions provided by your campus and national networks. Application communities need to perform a full analysis of their applications, middleware and tools to confirm how much development work is required to use IPv6 and to plan a smooth transition. A new working group of HEPiX (http://www.hepix.org) was formed in Spring 2011 to address exactly these issues for the High Energy Physics community.

The HEPiX IPv6 Working Group has been investigating the many issues which feed into the decision on the timetable for a transition to the use of IPv6 in HEP Computing, in particular for the Worldwide LHC Computing Grid (http://lcg.web.cern.ch/lcg/). The activities include the analysis and testing of the readiness for IPv6 and performance of many different components, including the applications, middleware, management and monitoring tools essential for HEP computing. A distributed IPv6 testbed has been deployed and used for this purpose and we have been working closely with the HEP experiment collaborations. The working group is also considering other operational issues such as the implications for security arising from a move to IPv6.

This paper describes the work done by the HEPiX IPv6 working group since its inception and presents our current conclusions and recommendations.

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