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Status and trends in networking at LHC Tier1 facilities

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The LHC is entering its fourth year of production operation. Many Tier1 facilities can count up to a decade of existence when development and ramp-up efforts are included. LHC computing has always been heavily dependent on high capacity, high performance network facilities for both the LAN and WAN data movement, particularly within the Tier1 centers. As a result, the Tier1 centers tend to be on the leading edge of data center networking technology. In this paper, we conduct an analysis of past and current developments in Tier1 networking, as well as extrapolating where we anticipate things are heading. A large part of our analysis will be based on the US-CMS Tier1 at Fermilab as a use case. Our analysis will include examination into the following areas:

- Evolution of the US-CMS Tier1 center to its current state...
- The changing environment of data center networking approaches & practices and how they may apply to Tier-1 centers
- Likely impact of emerging network technologies (10GE-connected hosts, 40GE/100GE links, IPv6) on Tier-1 centers
- Trends in WAN data movement and emergence of software-defined WAN network capabilities (end-to-end circuits, OpenFlow, etc)
- PerfSONAR framework's current and potential use within Tier-1 centers for performance measurement and analysis

Summary

Analysis of state and trends in networking at LHC Tier1 facilities. A large part of our analysis will be based on the US-CMS Tier1 facility but we also intend to analyze experience, both LAN and WAN of other Tier1 facilities.

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