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The future Tier1, sharing a dedicated computing environment

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Resources of large computer centers used in physics computing today. are optimised for the WLCG framework and reflect the typical data access footprint of reconstruction and analysis. A traditional Tier 1 centre like GridKa at KIT hosts thousands of hosts and many PetaBytes of disk and tape storage that is used mostly by a single community. The required size as well as the intrinsic difficulties that came with the deployment of a new infrastructure over the last ten years made it necessary to build a dedicated environment which has been optimised for a small number of middleware stacks. Although computing demands will grow during the lifetime of the LHC, the relative requirements, compared to the growth of hardware capabilities are diminishing. The hardware for computing in high energy physics will soon fit in a few racks, 4 TB disks and 128 core systems are at the horizon as is 100 Gbit networking and the economy of scale is no longer working for LHC computing.

The next generation of dedicated clusters at Tier 1 sites will be of moderate size and could be integrated with environments that are build for fast rising computing consumers such as biology or climatology. This raises the question what characteristics of LHC computing and the attached middleware must be preserved or looked after in these hosted environments. GridKa at KIT, the German Tier1 WLCG centre is actively investigating the possibility to expand the use of its infrastructure beyond physics computing, currently its main task. Alternatively physics jobs may run at different environments at KIT or beyond. This is possible with the use of virtual machines and cloud computing, techniques that allow common environments as well as transparent job migration. Either way is a promising direction and may well lead to more efficient use of ever limited computing, storage and networking resources for example because it allows temporary grow-as-you need expansion of the compute and disk farms which can than be planned with less spare capacity.

The presentation discusses the advantages and disadvantages of a shared computing environment at an LHC Tier 1 in technical as well as organisational sense, the changes to specific hard and software required to enable sharing and the steps to be taken at KIT to enable sharing of or with T1 resources.

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