

System upgrade of the KEK central computing system

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The KEK central computer system (KEKCC) supports various activities in KEK, such as the Belle / Belle II, J-PARC experiments, etc. The system is now under replacement and will be put into production in September 2016. The computing resources, CPU and storage, in the next system are much enhanced as recent increase of computing resource demand. We will have 10,000 CPU cores, 13 PB disk storage, and 70 PB maximum capacity of tape system.

Grid computing can help distribute large amount of data in geographically dispersed sites and share data in an efficient way for world wide collaborations. But the data centers of host institutes of large HEP experiments have to take into serious consideration for managing huge amount of data. For example, the Belle II experiment expects that several hundred PB storage has to be stored in the KEK site even if Grid computing is taken as an analysis model. The challenge is not only for storage capacity. I/O scalability, usability and power efficiency and so on should be considered for the system design of storage system. Our storage system is designed to meet requirements for managing 100 PB-order data. We introduce IBM Elastic Storage Server (ESS) and DDN SFA12K as storage hardware, and adopts GPFS parallel file system to realize high I/O performance. The GPFS file system can take several tiers for recalling data from local SSD cache in computing nodes to HDD and tape storage. We take full advantage of this hierarchical storage management in the next system. Actually we have long history of using HPSS system as HSM of tape system. Since the current system, we introduced GHI (GPFS HPSS Interface) as the layer of disk and tape system, which enables high I/O performance and good usability as GPFS disk file system for tape data.

In this talk, we mainly focus on the design and performance of our new storage system. In addition, issues on workload management, system monitoring, data migration and so on are described. Our knowledge, experience and challenges can be usefully shared among HEP data centers as a data-intensive computing facility for the next generation of HEP experiments.

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Primary author: MURAKAMI, Koichi

Co-authors: IWAI, Go (KEK); SASAKI, Takashi (High Energy Accelerator Research Organization (JP)); NAKAMURA, Tomoaki (High Energy Accelerator Research Organization (JP)); TAKASE, Wataru (KEK)

Presenter: MURAKAMI, Koichi

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