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Building large storage systems with small units: How to make use of disks with integrated network and CPU

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Recent advances in both, hard-disks and system-on-a-chip (SoC) designs enabled the development of a novel form of hard-disk: a disk that includes a network interface and an additional ARM processor, not involved in low level disk operations. This setup allows those disks to run an operating system and to communicate with other nodes autonomously using wired Ethernet. No additional hardware or infrastructure is required.

The HGST laboratory provided us, the dCache team, with early access to those devices. We investigated how such devices might be used in grid and cloud environments. By deploying dCache software and observing the system's behavior we evaluated how a petabyte-sized storage infrastructure, based on these disks, might be build, including possible changes to the dCache software.

We will present two realistic deployment scenarios for those new disks and compare them to existing deployments at the Deutsches Elektronen-Synchrotron (DESY) research centre, where direct attached RAID systems are in use. The results of our initial investigations are presented along with an outline of future work.

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