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NICT "Space Weather Cloud" widely distributed storage with Gfarm file system and JGN2plus

Yasuhiro MORIKAWA^{1*}, Ken Sato¹, Kazunori YAMAMOTO², Satoshi Inoue¹,
Ken Tsubouchi¹, Osamu TATEBE³, Chaoyuan Tsui¹, Hisao KATO¹, Shinichi Watari¹,
Ken T. Murata¹

¹NICT, ²Faculty of Engineering, Ehime Univ., ³University of Tsukuba

Improvement of computational performance and observational technique causes expansion of data from numerical simulation and observation in Solar-Terrestrial and Planetary (STP) Science. Cost of maintenance and equipment of existing storage tends to increase dramatically with increase of disk amount, though increase of data grows importance of storage. Then it is expected that maintenance of storage that is large enough to store science data become harder in the future.

At NICT (National Institute of Information and Communications Technology), we are now developing a new research environment named the "Space Weather Cloud". Network distributed cloud storage is being developed as part of the environment. A goal of the storage is that the storage equips peta-byte class amount and scalability with low-cost equipments by grid computing, and is available easily for analysis and visualization as cloud service. The cloud storage is developed with distributed file system "Gfarm v2" developed at AIST and Tsukuba Univ., and NICT Advanced Testbed Network "JGN2plus". The users can access many files on many distributed disk servers without regard for location of the files via virtual directory tree of Gfarm. Moreover, Gfarm replicates a file to multi disk servers for load sharing of I/O and improvement of efficiency of maintenance. In this study, the Gfarm disk servers are planned to be connected with observatories, super computers, and other computational resources for analysis or processing via nationwide high-speed (max 10Gbps) network "JGN2plus". In the result, it is expected that various works (storing, processing, publication, etc.) of STP science data can be performed on the virtual directory tree of the cloud storage.

Until now, selection of hardware organization of disk servers, development of a trial system, distribution of disk servers on remote places (Koganei, Ohtemachi, Okinawa) are done, and 170 TB storage is provided on trial. Now, distribution of disk servers on remote places is continued, and practical utility is verified by test users within and without NICT. In this talk, details of this system, some applications of that, and future works will be introduced.

Keywords: Space Weather Cloud, Gfarm file system, JGN2plus, cloud computing, infomatics, widely distributed storage