Data Archiving and Distribution of the Virgo Antenna for Gravitational Wave Detection

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Abstract. The system consists of two sections: an acquisition and storage section (LynxOS based system with the disks directly connected to CPU slave boards) and a data management section (DEC-Unix Alpha Server - Data Server). The performances of these systems can be summarized as: 1- maximum raw data archiving sustained data flow of 10 *Mbyte/s* on DLT tapes (35/70 *Gbyte*); 2- up to 1.2 *Tbyte* disk capacity with a maximum sustained data acquisition flow of 25 *Mbyte/s*; 3- up to 10 *Mbyte/s* retrieval data flow for the on-line data distribution.

INTRODUCTION

The global architecture of VIRGO[1] data acquisition and storage is described in Fig.1. The raw data formatted in frames by the Frame Builder are sent to the Raw Data Archiving (RDA) System, that stores them on DLT tapes (35/70 *Gbyte*). The same frames are processed by the On-line Processing system that provides each frame with the reconstructed [*t, h*] pairs and other auxiliary information, selects the frames likely to contain a gravitational wave event and sends them to the Data Distribution System that archives them both on disks and on DLT tapes (Data Summary Tapes).

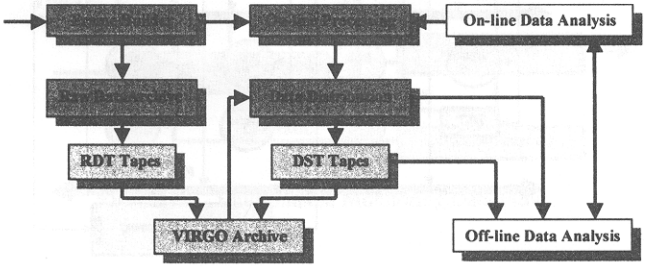

FIGURE 1. Virgo Data Flow.

RAW DATA ARCHIVE

The RDA[2] is organized according to a client/server architecture. In order to match the data flow to the DLT writing speed, we implemented a two stage modular storage

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procedure consisting in the parallel staging of the data on fast disks (writing speed >10 *Mbyte/s - 18 Gbyte* capacity), and the following copy of the data on DLT. The VIRGO RDA system that implements the above outlined structure consists of a 21 slot ELMA VME crate with a master CPU (VMPC4a PowerPC604e from Cetia) running LynxOS v3.0 operating system and linking the system to the Fast Ethernet network, two slave CPUs (VMPC4A) each provided with two 18 *Gbyte* SCSI disks (Cheetah from Seagate) and two 14 cartridge DLT autoloaders (DLTstor7114 from Quantum).

DATA DISTRIBUTION

The Data Distribution System[2] is made of two sections: acquisition and distribution (see Fig.2). This acquisition section is a VME based system made of a master CPU (VMPC4a from Cetia) running LynxOS and slave CPUs (same model) handling each 5 disks (18 *Gbyte* Chetaah from Seagate) connected to fast & wide SCSI interfaces. The master CPU acquires the frames via a Fast Ethernet network and sequentially distributes them to the slave CPUs (via VME bus) for disk storage. The distribution section manages the users requests following a standard networking procedure. The data server is a DECAlpha server 4100, running DEC/Unix and supporting several SCSI buses to connect disks. The link with the VME CPUs is ensured by a Fast Ethernet interface, but both the server and the CPUs may also support FDDI. The data retrieval is done via NFS mounting the disks on the Alpha server.

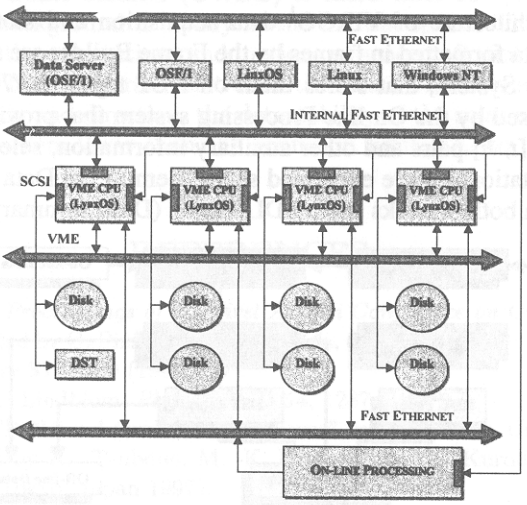

FIGURE 2. Data Distribution Architecture.

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