

## ii. System Architecture

The RHIC control system will consist of two physical levels: *Console Level Computers* (CLCs) and *Front-End Computers* (FECs), as indicated schematically in Fig. 9-1.

The Console Level is the upper layer of the control system hierarchy, which comprises operator console and physicist workstations and server processors which provide shared file, database and general computing resources. Console level computers are disked workstation-class nodes running the UNIX operating system.

The CLCs will be connected to the distributed components of the control system by a commercial local area network (LAN). The network implementation will include a high bandwidth FDDI backbone which will provide appropriately scaled access to the distributed equipment locations. Individual connections to front-end computers will be made via Ethernet.

There will be approximately 150 Front End Computers . Several tasks (concurrent threads of execution) will be active in each FEC at any time. These tasks will perform the duties of logging, tolerance and status checking, and data formatting and reporting. Each FEC assembly will consist of a VME crate with a single-board computer of the Motorola 680xx series, network connection, non-volatile memory and I/O modules. I/O to the accelerator is performed either by I/O modules in the front-end crate or by remote controllers connected to the front-end computer by a *field bus*.

A real-time operating system (RTOS) is required so that the operation of the FEC is deterministic, thus providing a predictable response to interrupts from the accelerator devices. Commands sent from the computer services layer are passed on to the I/O modules where they are processed for execution. Requirements for the RTOS in the Front End Computer include the following:

- Compliance with P1003.4 (real-time POSIX)
- Support of TCP/IP and UDP/IP protocols
- Support of standard RPC
- Network File System (NFS) support
- RAM disk support

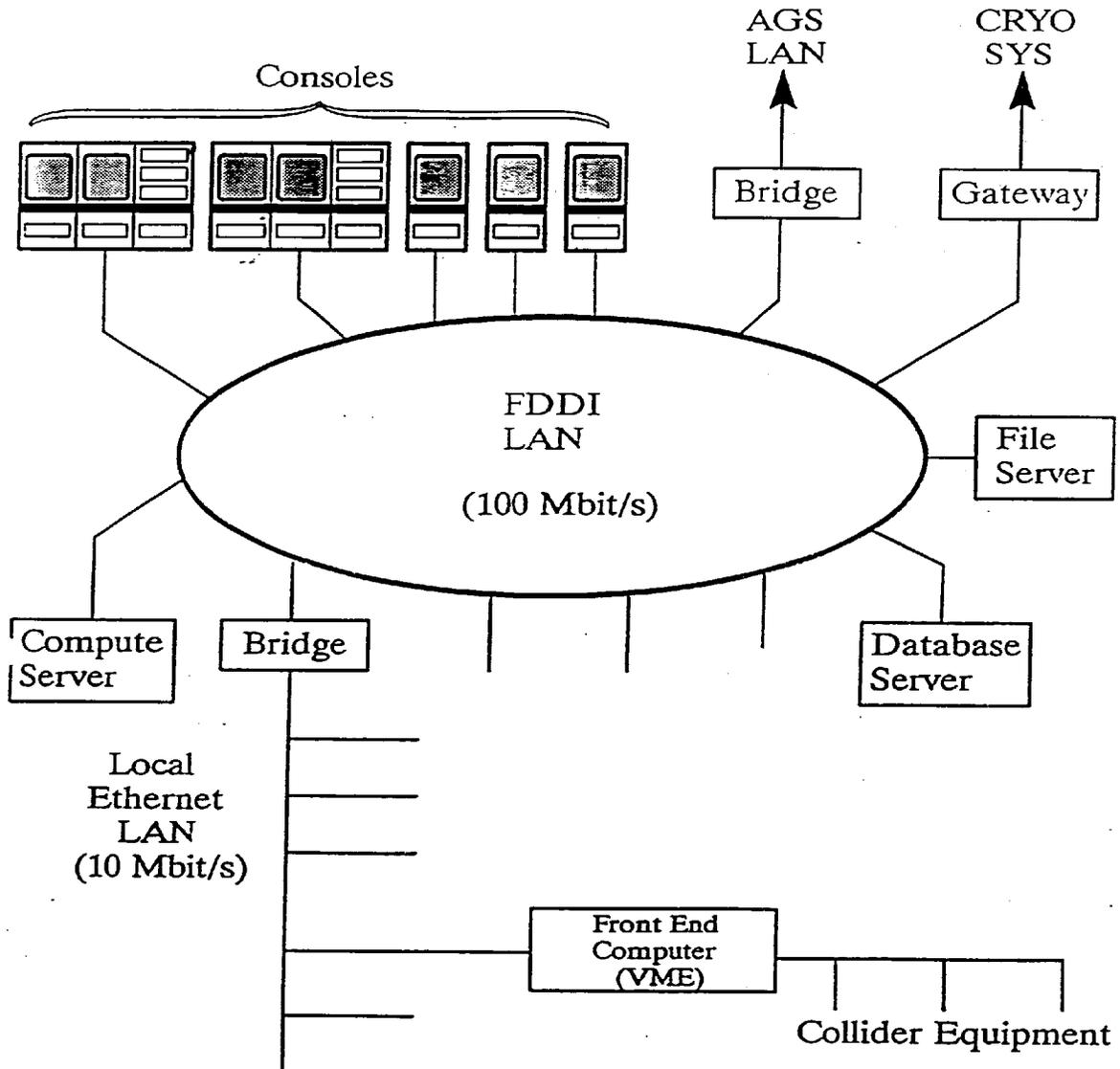


Fig. 9-1. RHIC Network Architecture