A SEMI AUTOMATIC FORTRAN TRANSLATOR FOR THE FNAL SECOND GENERATION ACP

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In preparation for building a 250 VUP second generation Fermilab ACP system at Michigan for the CERN L3 experiment, we have developed a semi-automatic pre-compiler to convert event oriented programs into parallel code for the ACP.

The Fermilab second generation ACP system hardware consists of a set of MIPs R3000 processors (15 VUPs/processor) in special boards in VME crates. Each processor runs a full UNIX system and the whole array needs no master. However, it is capable of communicating with a VAX VMS computer which can serve as a front end.

A set of FORTRAN callable routines has been developed by Fermilab to enable the user to use the parallel power of this array. When designing a new program these routines allow convenient and flexible communication between the various processors. However, for existing large programs it is a non-trivial effort to change them into a parallel form for ACP use.

We have helped automate this process by developing a pre-compiler which does at least a large fraction of the modification and in many cases almost all of the modification for event oriented programs. We divide a user program so that the bulk of the program is in one process which is replicated on the different processors. The binary event input to all processes is through a single separate process, as is the binary event output.

There are three parts to the pre-compiler action:
1. Give guidance to the program and add special features. This is done by the use of ACP command lines which are in the form of comment lines mainly in the main program.
2. Intercept all I/O statements and replace them with calls to appropriate I/O routines.
3. Add the general I/O routines, make up the Job Description File needed by the ACP, and add the generally needed ACP routines.

The ACP command lines tag various key points in the program and provide some options.