Chapter 1

Introduction

CM/AVS adapts and extends the Application Visualization System (AVS) to the realm of the CM-5. AVS provides a graphic programming environment in which a user builds a distributed visualization application. An application may involve diverse operations such as filtering, graphing, volume rendering, polygon rendering, image processing, and animation. CM/AVS enables an application to operate on data that is distributed on CM-5 processing nodes and to interoperate with data from other sources. CM/AVS also facilitates the incorporation of CM-5 code into a CM/AVS application.

CM/AVS is not run separately from AVS. A user runs AVS normally, using CM/AVS modules and functions to handle data on the CM-5.

1.1 Overview of CM/AVS

The building blocks of an AVS application program are small, packaged units of code, called *modules*. Most modules process typed data input(s) into typed data output(s). Each module performs a given function. The function may be as simple as adding two arrays, or as complicated as extracting isosurfaces of a volume. When a CM/AVS module is used, the function is performed on a CM-5.

Modules are connected to form larger applications, called *networks*. In a network, information is passed between the modules as various data types. Only the *field* data type, which represents an array of data, is relevant to CM/AVS. CM/AVS supports a *parallel field* that accommodates the distribution of data across the CM-5 processing nodes. CM/AVS includes routines to allocate the parallel arrays, and to access the data and coordinates as CM Fortran arrays or C* parallel variables.

When CM/AVS modules that operate on parallel data are connected with AVS modules that operate on serial data, CM/AVS routines convert the data between parallel and serial fields as required. The conversion is transparent to the user and to the module writer.

The AVS Network Editor visual interface makes it easy to build application networks graphically. Alternatively, the Network Editor may be driven by the AVS Command Language Interpreter.

1.2 The CM/AVS Package

The CM/AVS software package includes:

- A set of modules that handle data on a CM-5. The modules are described in Appendix B.
- A set of routines that provide general operations for parallel fields. The routines are used by the CM/AVS modules and users may incorporate them in their own C* or CM Fortran modules. The concepts that differentiate serial and parallel fields are discussed in Chapter 3. The routines are described in Appendix A.
- On-line code examples, help files, and release notes.

CM/AVS is installed on the CM-5 compile server as follows:

CM/AVS libraries	**/usr/lib**
CM/AVS include files	**/usr/include**
Combined module binary, list-dir file, and library description file	**/usr/lib/cmavs_library**
Examples	**/usr/examples/cmavs**
Module help files	**/usr/doc/cmavs/modules**

Release notes	**/usr/doc/cmavs-1.0.releasenotes**
Source (by license only)	**/usr/src/cmavs**

The directory **/usr/examples/cmavs/unsupported** contains items that are supplied without guarantee or support. The **README** file in this directory contains information about its contents. Appendix C contains additional information about unsupported programs and modules.