

- (2) No next occurrence if target level is less than or equal to current controlling source level object, i.e., higher in hierarchy and occurrences do not match. In this case value is repeated for all loop occurrences till next loop iteration.
- (3) Related loops in source and target must have equal occurrences, otherwise in error.
- (4) If two controlling objects at the same level in source control two objects at different levels in target, must merge all like valued occurrences (if denoted as unique).
- (5) If source object is lower in hierarchy than its receiving target object and is controlling object and only one occurrence of higher levels, higher level objects must repeat in same frequency as lower level.

The output of the target side mapping is a linear array of values occurring in the sequence that they were generated within. This output is called a value stack array. When sorting is specified, a parallel array or structure is maintained and the structure is adapted to track the iteration occurrences of the output data. The target object that is sorted contains a pointer to a sort control structure. The structure tracks beginning and ending sort element structures and memory areas used to store sorted values. Each sort element structure tracks beginning and ending pointers into the value stack array of the occurrences they track. Also contained are pointers to other multi-level sorting occurrences. In this manner, it should be apparent to one of ordinary skill in the art that these data occurrences may be efficiently and accurately translated and communicated to computer system 14.

Referring now to FIG. 16, there is shown a typical data screen 122, associated with a terminal 76 of the preferred embodiment of this invention. As shown, system 10, and more particularly user interface portion 72, allows access and data models, of the source and target systems, to be graphically displayed to a user and to be easily modified. These models 124, 126, as shown, may be concurrently displayed to a user in order for a user to understand the complete or entire transformation process. Moreover, the computeraided modeling portion 30 allows for single-stepped operation of a translation session, by executing a translation component that has been previously defined and stored within portion 30. In this manner, a user may run or execute a translation with the ability to set break points at which the operator may step the translation component through its operation, a single step at a time. The operator, according to the preferred embodiment of this invention, may also set various "watch points" to allow the user to

modify the values given to a various object. These operations allow for a very efficient and accurate fault detection of system 10.

It should be apparent to one of ordinary skill in the art, that system 10 allows for the efficient translation of a first message having a first data format, to a second message having a second data format.

It is to be understood that the invention is not limited to the exact construction or method illustrated and described above, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the following claims.

I claim:

1. A method to transform data from a first format to a second format comprising the steps of:

- creating a quoted character value;
- creating a numerical byte value;
- creating a data value;
- receiving said data;
- reviewing said data for occurrences of said quoted character, numerical byte value, and data value;
- counting said occurrences of said quoted characters, numerical byte values, and data value within said data;
- assigning a priority value to each occurrence of said quoted characters, numerical byte values, and data values;
- assigning each of said occurrences of quoted characters, numerical byte values, and data values to an array of variables; and,
- creating said second format by arranging said variables, within said linear array, into a format arrangement according to said assigned priority values.

2. A data interchange system adapted to transform a message having a plurality of data objects arranged in a first format into a second and a third format, said system comprising:

- means for receiving said message and for recognizing, extracting, and arranging said plurality of data objects in only a single structure;
- second means for providing said second and third formats;
- third means for selecting said plurality of said data objects in said single structure and for arranging said selected data objects into said second and third format.

* * * * *