MUMPS Development Committee

Extension to the MUMPS Language Standard
Type A Release of the MUMPS Development Committee

$REFERENCE

June 20, 1993

Produced by the MDC Subcommittee #13
Data Management and Manipulation

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The reader is hereby notified that the following language specification has been approved by the MUMPS Development Committee but that it may be a partial specification which relies on information appearing in many parts of the MUMPS specifications. This specification is dynamic in nature, and the changes reflected by this approved change may not correspond with the latest specification available.

Because of the evolutionary nature of MUMPS specifications, the reader is further reminded that changes are likely to occur in the specification released herein prior to a complete republication of MUMPS specifications.

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1. Identification of the proposed change

1.1. MDC proposer and sponsor

This proposal originates from the MUMPS Development Co-ordinating Committee of Europe (MDCC-E) and is sponsored by Ed de Moel.

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1.2. History of MDC actions

At numerous occasions, various members of MDC have expressed their concern that it is difficult to maintain software that makes use of naked references. This new proposal addresses one way of solving this problem.

date	doc#	action
October 1993	This document	Formal write-up.
June 1993	X11/SC13/93-29	Presented for promotion to MDC Type A. Passed 39:0:5.
February 1993	X11/SC13-93-7	Changed specifications of svn and leftrestricted to become additions to lists, rather than explicit replacements of lists. Added phrase suggested by 'Naked Indicator after $QUERY' taskgroup. Presented for promotion to SC#13 Type A, and accepted 17:1:2.
October 1992	X11/SC13/92-39	Addition incorporated as discussed at previous meeting. Presented for promotion to SC#13 Type A.
June 1992	X11/SC13/92-16	Proposal accepted as SC#13 Type B.
February 1992	X11/SC13/91-6	History section put in correct order. Modifications, per guidance in October 1991 meeting, applied. Document discussed by taskgroup; taskgroup was divided over final form of document; equally divided over the various alternatives. Issue of least surprise: @$REFERENCE should never modify the naked indicator.
October 1991	X11/SC1/91-63	Presented for promotion to SC#1 Type A. Voted to allow SET $REFERENCE="", reaffirmed as Type B.
June 1991	X11/SC1/TG22/91-2	Accepted as a SC#1 Type B proposal; no new cons raised.
Oct 6, 1990	X11/SC1/90-62	Presented for acceptance as Type C, referred to taskgroup

Pros and Cons in October 1990

Pro

1. Needed functionality
2. Already implemented
3. $NAME does not fully support functionality

Con

1. Should not refer to "naked indicator"
2. $NAME supplies functionality
3. Encourages use of naked references
4. Should be SETable

A motion to correct spelling, changing $REFRENCE to $REFERENCE passed by voice vote without dissent.

A motion to remove ", *on which the current value of the naked indicator is based*" from the formal

specification in clause 3.3 failed.
A motion to remand this proposal to a taskgroup passed (17:5:2).
A motion to remand document X11/SC1/90-54 ($Reference) to the same task group passed by voice vote.
Task group SC1/22 was created and Ed de Moel was named chair. The scope of work was defined as:
Evaluate the merits of proposals regarding the functionality of saving and restoring the value of the naked indicator. At least Bundy's and De Moel's proposals need to be considered as well as current implementations.
During this meeting a number of other, more or less related proposals was discussed. A number of these were remanded to taskgroups SC1/22 and SC1/24 (chaired by Kate Schell). Later in the meeting, these two taskgroups were combined. These documents were:
- X11/SC1/90-59-6c, Naked reference on Read
- X11/SC1/90-79, Naked indicator after $Query

The charter of the combined taskgroup is understood to be:
Evaluate the processing of naked references in general and the merits of proposals regarding the functionality of saving and restoring the value of the naked indicator. Investigate where in the MUMPS standard explicit text needs to be added regarding the effect that certain language elements will have on the naked indicator. As far as saving and restoring the value of the naked indicator is concerned, at least Bundy's and De Moel's proposals need to be considered as well as current implementations. As far as the addition of explicit text to the MUMPS standard is concerned, at least the function $QUERY and the specification of a naked reference in a READ command need to be addressed.

2. Justification of proposed change

2.1. Needs

When software makes use of naked references, it is difficult to reference a different global variable, and then revert to the main 'stream' of the program. Such use will invalidate the value of the naked indicator, and probably cause execution errors in later phases of the program.

This proposal introduces a new intrinsic special variable that can be used to save and restore the value of the naked indicator.

2.2. Existing practice in the area of the proposed change

Currently, one way of getting at the value of the naked indicator is through the special function $NAME, and then still rather cumbersome. At least one implementation allows a svn to be referenced and set to a value, thus obtaining and redefining the value of the naked indicator.

3. Description of the proposed change

3.1. General description of the proposed change

This proposal introduces the new intrinsic special variable $REFERENCE that returns the namevalue of the most recently referenced gvn. This svn may also be SET to a new value, thus creating the possibility to redefine the value of the naked indicator without referencing a global variable.

3.2. Annotated examples of use

Consider the following piece of MUMPS code:

```
            ...
            DO SAVNAK
            ...
            DO RESTNAK
            ...
            QUIT
            ;
SAVNAK      SET OLD=$REFERENCE QUIT
RESTNAK     SET $REFERENCE=OLD QUIT
```

The code at label SAVNAK saves the value of the gvn that was most recently referenced. Note that a reference to a name does not automatically mean that the associated variable exists or has a value.
The code at label RESTNAK restores the naked indicator to its previous variable. Note that setting $REFERENCE does not imply that the global variable that it points to is actually referenced, only that the naked indicator is (re)set.

```
            ...
            SET ^X=1 WRITE !,$REFERENCE
            SET ^X(1)=2 WRITE !,$REFERENCE
            SET $REFERENCE="" WRITE !,"Naked indicator is undefined."
```

should produce:

```
^X
^X(1)
```

Note that a reference to ^X makes the naked indicator undefined, but does not make $REFERENCE empty.
The final command, SET $REFERENCE="" makes $REFERENCE empty and also makes the naked indicator undefined.

3.3. Formalization

In **Section I, clause 4.1.3.10**, make the following additions:

Add to the table that itemizes the **names** of the **svns**:

R[EFERENCE]

Add to the clause that describes the various **svns**:

$R[EFERENCE] — $REFERENCE returns the namevalue of the most recently referenced gvn, on which the current value of the naked indicator is based; for the behavior after a reference to the function $QUERY see 4.1.4.13.
The initial value of $REFERENCE is the empty string.
The value of $REFERENCE may be set to either the empty string, or to a namevalue, indicating a gvn. A side-effect of setting $REFERENCE equal to the empty string is that the naked indicator will become undefined. A side-effect of setting $REFERENCE to a namevalue is that the naked indicator will change as if the indicated gvn had been referenced.

In **Section I, clause 5.2.17**, add to the list that defines the leftrestricted:

4. Implementation impacts

4.1. Impact on existing user practices and investments

The addition of this intrinsic special variable will greatly enhance the possibility to maintain software that makes use of naked references. Its greatest impact is the fact that it offers a simple facility to save and restore the namevalue that caused the **current** value of the naked indicator to be established.
Note: $REFERENCE returns the full namevalue, not the truncated naked indicator, so that the value of $REFERENCE can later be used in another reference, without the artificial addition of a 'final' subscript to make syntactically correct code.

4.2. Impact on existing vendor practices and investments

Minor, many implementors already offer this functionality.

4.3. Techniques and costs for compliance verification

Create a file containing the following text:

```
SET X=$DATA(^A(3)),^(3)="data ^A 3 (must be retrieved later)"
SET V1=$REFERENCE
WRITE !,"$REFERENCE should be equal to '^A(3)': ",V1
SET X=$DATA(^(3,4))
SET V2=$REFERENCE
WRITE !,"$REFERENCE should be equal to '^A(3,4)': ",V2
LOCK ^P(27)
SET V3=$REFERENCE
WRITE !,"$REFERENCE should still be equal to '^A(3,4)': ",V3
SET $REFERENCE=V1
WRITE !,"Naked reference should work: ",^(3)
WRITE !
QUIT
```

4.4. Legal considerations

None.

5. Closely related standards activities

5.1. Other X11 proposals (Type A or Type B) under consideration

$NAME intrinsic function.

5.2. Other related standards efforts
None.

5.3. Recommendations for co-ordinating liaison
Subcommittee #12. Possibility to create standard extrinsic functions to save and restore the naked indicator.

6. List of associated documents

X11/SC1/90-46: $REFERENCE, similar proposal by different author, withdrawn.
X11/SC1/90-54: $REFERENCE, similar proposal by different author, remanded to taskgroup SC1/22.
X11/SC1/90-59-6c: Naked reference on Read
X11/SC1/90-79: Naked indicator after $Query
X11/89-27: $NAME, MDC Type A extension.
X11/SC1/90-62: $REFRENCE, older version, remanded to taskgroup SC1/22.