Subject: MaxAbsLoc and other combined intrinsics
From: Van Snyder
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1 Number

2 TBD

3 Title

4 MaxAbsLoc and other combined intrinsics.

5 Submitted By

6 J3

7 Status

8 For consideration.

9 Basic Functionality

10 In several cases, intrinsic functions ought to be combined. For example, in linear algebra one usually
11 wants to know the location of the element with the maximum absolute value, not the one with the most
12 positive value.

13 Rationale

14 One can get the desired effect by compounding existing intrinsic functions. For example, the lo-
15 cation of the element in a rank-1 array A with maximum absolute value can be determined using
16 MAXLOC(ABS(A)) + LBOUND(A) - 1. This works and is portable, but some processors may compute
17 it less efficiently than the best that could be done — they might compute ABS(A) and put it in an array
18 temp, and then compute MAXLOC of that temp. The stuff about LBOUND(A)-1 is there because the
19 lower bound of an array expression is always 1, no matter what the bounds of the operands are. As a
20 consequence, program authors would be tempted to carry out this computation with a loop instead of
21 the above expression. This increases code bulk, which is the single best predictor of lifetime ownership
22 cost.

23 Estimated Impact

24 Minor — a few new intrinsic function definitions.

25 Detailed Specification

26 Provide a few new compounded intrinsic functions. The most important one from the point of view
27 of linear algebra is a compounding of MAXLOC and ABS, perhaps called MaxAbsLoc. For symmetry,
28 users would expect also to find MaxAbsVal, MinAbsLoc and MinAbsVal. Other combinations might be
29 useful for other disciplines.

30 History