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

TBD

Title

MaxAbsLoc and other combined intrinsics.

Submitted By

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Status

For consideration.

Basic Functionality

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

Rationale

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

Estimated Impact

Minor — a few new intrinsic function definitions.

Detailed Specification

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

History