

UK position paper on revision of Fortran 2008

The UK vote on the Fortran 2008 CD, written in September 2008, included the following (v. WG5-N1740):

Extent of revision. The current standard has not been fully implemented four years after publication and five years after technical stabilization. The language has proved to be bigger and more complicated than anticipated. Some features of Fortran 2003, for example parameterized derived types and input/output for user-defined derived types, have been found to be difficult to implement and/or to use. The proposed revision does not address these problems but instead adds considerable further complication to the language.

It is not merely disappointing but is becoming a matter of serious concern that no full implementations are available after this period of time. Until it has proved its viability, by having several full implementations and significant vendor and user experience which can influence a revision, no new version that adds significant extra complexity should be published.

The revision should also be seeking to consider the causes of the problems with Fortran 2003, and to address any that are wholly or partially caused by the standard.

Four years, and one revision of the standard, later we are not much further forward. Only two vendors claim full Fortran 2003 conformance and problems in the standards are being discovered during implementation. Some of the recently approved interpretations actually change the language, throwing doubt on the usage of those facilities even in those compilers that have them.

Some vendors, in accordance with user demand, are implementing Fortran 2008 features without providing all of Fortran 2003 first. Indeed some appear to have no plans to implement certain Fortran 2003 features unless specifically required by customers. Since the primary purpose of a language standard is to promote portability we must regretfully conclude that Fortran 2003 has failed as a standard. No programmer interested in running programs on multiple systems can use Fortran 2003 with assurance. The same is true of Fortran 2008, which is essentially Fortran 2003 with added complexity.

The immediate revision task facing WG5 therefore is not to extend but to consolidate. There is little or no user demand for parameterized derived types or for derived type input/output. However these features actually or potentially tax the resources of vendors which would be better applied to implementing the Fortran 2008 facilities for which there is actual demand. WG5 should consider deleting these features or making them optional. There are precedents for removing features from the language and very few, if any, users would be affected. On the other hand optionality would preserve vendors' existing investment. There are already precedents for options within the standard, for example IEEE arithmetic and unicode support. There are also precedents from other languages for making optional those mandatory features which have proved excessively burdensome in implementation.

We think it important therefore that in the next two years or so WG5 should concentrate effort on identifying problems in the existing standard. There should be a review of the restrictions and minor inconveniences which were relevant when introduced but which now may be unnecessary. There should be a review of the relationship with C given the enhanced facilities for intercommunication, in particular whether it should be possible in pure Fortran to provide functionality related to Fortran objects that currently can be done only in C. The aim would be to identify changes that would have a very small impact on implementation while relieving the problems identified.

This work could proceed in parallel with development of the further coarray TS. We continue to believe that coarrays are a minority interest for Fortran users at large. The facilities to be described in the TS should be designed not to be overly burdensome for implementors. To this end the TS should not confine itself to adding facilities. It should be open to consideration of changing or deleting features already in Fortran 2008.

This plan of action would allow a relatively near-term minor revision of the main Fortran standard with a coherent set of updates, rather than with the somewhat uncoordinated set of additions which were put into Fortran 2008. The revision would include corrigenda, editorial fixes, interoperability TS, coarray TS, and some very minor changes arising from the reviews above. This could be followed by a standard revision three years later. We believe that temporarily halting development would be very much welcomed by both vendors and users. At the same time a commitment to future development would allow Fortran to continue to be seen as a modern, evolving language.

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