

Subject: Internal subprograms as actual arguments and procedure pointer targets
From: Van Snyder
Reference: 03-258r1, section 1.7, 04-148

1 **1 Number**

2 TBD

3 **2 Title**

4 Internal subprograms as actual arguments and procedure pointer targets.

5 **3 Submitted By**

6 J3

7 **4 Status**

8 For consideration.

9 **5 Basic Functionality**

10 Allow internal subprograms as actual arguments and procedure pointer targets.

11 **6 Rationale**

12 In many cases where one uses a subprogram as an actual argument, it needs access to entities of which
13 the procedure to which it is passed is unaware. If the actual argument were an internal subprogram, it
14 could access these extra entities by host association.

15 Since the 2003 standard does not require the TARGET attribute for a nonpointer dummy procedure
16 that is a procedure pointer target, we cannot simultaneously allow internal procedures to be actual
17 arguments and prohibit them to be procedure pointer targets.

18 **7 Estimated Impact**

19 Small. Minor changes necessary in Sections 7, 12 and 16, and maybe Annex C. Estimated at J3 meeting
20 169 to be at 4 on the JKR scale.

21 **8 Detailed Specification**

22 **8.1 Allow an internal subprogram to be an actual argument**

23 There are two possibilities concerning the host of the internal subprogram:

- 24 • Allow the host of the internal subprogram to be recursive. Make it clear that accesses by host
25 association from the internal subprogram to entities of its host are accesses to entities in the
26 instance of its host as of the instant the internal subprogram was used as an actual argument, not
27 to entities in the instance of its host as of the instant the internal subprogram is invoked.
- 28 • Require that the host of the internal subprogram is not recursive. In this case, there can only
29 be one instance of the procedure defined by the host subprogram. This restriction could later be
30 relaxed. Many processors may relax it as an extension.

1 **8.2 Allow an internal subprogram to be a procedure pointer target**

2 Similar considerations regarding recursive hosts apply. It is unavoidable that the same restriction applies
3 to internal subprograms used as procedure pointer targets and used as actual arguments.

4 If internal subprograms of recursive hosts are allowed to be procedure pointers, make it clear that the
5 instance of the host to which accesses from the internal subprogram to that host by host association refer,
6 when it is invoked by way of the pointer, is the instance as of the instant the procedure was associated
7 with the pointer, which is not necessarily the instance as of the instant the internal subprogram is
8 invoked via the pointer.

9 Make sure that a procedure pointer associated with an internal subprogram becomes undefined when
10 the instance of the procedure defined by its host subprogram that was in existence at the instant the
11 pointer association was established ceases to exist.

12 **8.3 Suggested edits**

13 These suggested edits are intended to illustrate the magnitude of the proposed project. They assume that
14 internal procedures within recursive hosts are prohibited to be actual arguments or procedure pointer
15 targets. If recursive hosts are allowed, somewhat different but simpler and fewer edits would be needed.

16 [Editor: After “external” insert “, internal”. At the end of the constraint, add a sentence “If *procedure-* 144:5-6
17 *name* is the name of an internal procedure, the host of the subprogram that defines that procedure shall
18 not be recursive.”]

19 [Editor: After “external” insert “, internal”. At the end of the constraint, add a sentence “If *procedure-* 267:15,17
20 *name* is the name of an internal procedure, the host of the subprogram that defines that procedure shall
21 not be recursive.” Better yet, replace C1229 with exactly the same text as C727, as modified by the edit
22 for 144:5-6 above.]

23 [Editor: After “procedures” insert “whose hosts are recursive”; after “arguments” insert “or procedure 267:17+2
24 pointers”.]

25 [Editor: After “procedures” insert “whose hosts are recursive”; after “arguments” insert “or procedure 267:17+4-5
26 pointers”.]

27 [Editor: After the first “argument” insert “or associated as a procedure pointer target”; after the second 267:17+6
28 “argument” insert “or target”.]

29 [Editor: After “external” insert “, internal”.] 271:16

30 [Editor: At the end of the paragraph, add a sentence within the paragraph “If the actual argument is 271:19
31 the name of an internal procedure, the host of the subprogram that defines that procedure shall not be
32 recursive.”]

33 (5 $\frac{1}{2}$) Execution of a procedure is completed and the subprogram that defines that procedure is 415:17+
34 the host of an internal procedure that is the target of the pointer, even if the pointer has
35 the SAVE attribute.