

Z01BAFP

NAG Parallel Library Routine Document

Note: before using this routine, please read the Users' Note for your implementation to check for implementation-dependent details. You are advised to enclose any calls to NAG Parallel Library routines between calls to Z01AAFP and Z01ABFP.

1 Description

Z01BAFP returns the row and column coordinates of the root processor within the Library Grid. If the root processor is not part of the Library Grid, then the coordinates $\{-1, -1\}$ are returned.

2 Specification

```
SUBROUTINE Z01BAFP(ICNTXT, NRROOT, NCROOT, IFAIL)
  INTEGER          ICNTXT, NRROOT, NCROOT, IFAIL
```

3 Usage

3.1 Definitions

The following definitions are used in describing the logical processor grid within this document:

m_p – the number of rows in the Library Grid.
 n_p – the number of columns in the Library Grid.

3.2 Global and Local Arguments

The following global **input** arguments must have the same value on entry to the routine on each processor and the global **output** arguments will have the same value on exit from the routine on each processor:

Global input arguments: IFAIL

Global output arguments: NRROOT, NCROOT, IFAIL

The remaining arguments are local.

4 Arguments

1: ICNTXT — INTEGER *Local Input*
On entry: the Library context, usually returned by a call to the Library Grid initialisation routine Z01AAFP.

Note: the value of ICNTXT **must not** be changed.

2: NRROOT — INTEGER *Global Output*
 3: NCROOT — INTEGER *Global Output*

On exit: $\{NRROOT, NCROOT\}$ give the row and column coordinates of the root processor where $0 \leq NRROOT \leq m_p - 1$ and $0 \leq NCROOT \leq n_p - 1$. If the root processor is not part of the Library Grid, then the coordinates $\{-1, -1\}$ are returned.

4: IFAIL — INTEGER *Global Input/Global Output*

The NAG Parallel Library provides a mechanism, via the routine Z02EAFP, to reduce the amount of parameter validation performed by this routine. For a full description refer to the Z02 Chapter Introduction.

On entry: IFAIL must be set to 0, -1 or 1. For users not familiar with this argument (described in the Essential Introduction) the recommended values are:

IFAIL = 0, if multigridding is **not** employed;

IFAIL = -1, if multigridding is employed.

On exit: IFAIL = 0 (or -9999 if reduced error checking is enabled) unless the routine detects an error (see Section 5).

5 Errors and Warnings

If on entry IFAIL = 0 or -1, explanatory error messages are output from the root processor (or processor {0,0} when the root processor is not available) on the current error message unit (as defined by X04AAF).

5.1 Full Error Checking Mode Only

IFAIL = -2000

The routine has been called with an invalid value of ICNTXT on one or more processors.

IFAIL = -1000

The logical processor grid and library mechanism (Library Grid) have not been correctly defined, see Z01AAFP.

IFAIL = -*i*

On entry, the *i*th argument was invalid. This error occurred either because a global argument did not have the same value on all logical processors, or because its value on one or more processors was incorrect. An explanatory message distinguishes between these two cases.

6 Further Comments

None.

7 References

None.

8 Example

The example program illustrates how to obtain the status of the Library Grid.

8.1 Example Text

```
*      Z01BAFP Example Program Text
*      NAG Parallel Library Release 3. NAG Copyright 1999.
*      .. Parameters ..
      INTEGER          NOUT
      PARAMETER        (NOUT=6)
*      .. Local Scalars ..
      INTEGER          ICNTXT, IFAIL, MP, NCROOT, NP, NRROOT
      LOGICAL          ROOT
*      .. External Functions ..
      LOGICAL          Z01ACFP
      EXTERNAL         Z01ACFP
*      .. External Subroutines ..
      EXTERNAL         Z01AAFP, Z01ABFP, Z01BAFP
*      .. Executable Statements ..
      ROOT = Z01ACFP()
      IF (ROOT) THEN
         WRITE (NOUT,*) 'Z01BAFP Example Program Results'
```

```
        WRITE (NOUT,*)
        END IF
*
*   Define a 2x2 Library Grid
*
        MP = 2
        NP = 2
        IFAIL = 0
        CALL Z01AAFP(ICNTXT,MP,NP,IFAIL)
*
*   Get the coordinates of the root processor
*
        IFAIL = 0
        CALL Z01BAFP(ICNTXT, NRROOT, NCROOT, IFAIL)
*
*   Print the coordinates
*
        IF (ROOT) THEN
            WRITE (NOUT,*) 'The coordinates of the root processor:'
            WRITE (NOUT,*)
            WRITE (NOUT, '(1X, '''',I5, ''', ''',I5, ''''')') NRROOT, NCROOT
            WRITE (NOUT,*)
        END IF
*
*   Invalidate the Library Grid
*
        IFAIL = 0
        CALL Z01ABFP(ICNTXT, 'N', IFAIL)
*
        STOP
        END
```

8.2 Example Data

None.

8.3 Example Results

Z01BAFP Example Program Results

The coordinates of the root processor:

0, 0
