

Z01BBFP

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

Z01BBFP identifies the logical processors which are on a Library Grid created by a call to Z01AAFP.

2 Specification

```
SUBROUTINE Z01BBFP(ICNTXT, ZGRID, IFAIL)
  INTEGER          ICNTXT, IFAIL
  LOGICAL          ZGRID
```

3 Usage

3.1 Definitions

None.

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: 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: ZGRID — LOGICAL *Local Output*

On exit: if the calling processor is one of the logical processors associated with ICNTXT then ZGRID = .TRUE., otherwise ZGRID = .FALSE..

3: 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

- [1] Blackford L S, Choi J, Cleary A, D'Azevedo E, Demmel J, Dhillon I, Dongarra J, Hammarling S, Henry G, Petitet A, Stanley K, Walker D and Whaley R C (1997) ScaLAPACK Users' Guide *SIAM* 3600 University City Science Center, Philadelphia, PA 19104-2688, USA. URL: http://www.netlib.org/scalapack/slug/scalapack_slug.html

8 Example

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

8.1 Example Text

```
*      Z01BBFP Example Program Text
*      NAG Parallel Library Release 3. NAG Copyright 1999.
*      .. Parameters ..
      INTEGER          NOUT
      PARAMETER        (NOUT=6)
*      .. Local Scalars ..
      DOUBLE PRECISION X
      INTEGER          I, ICNTXT1, ICNTXT2, ICOFF, IFAIL, MP, MQ, MR,
+                   NP, NQ, NR
      LOGICAL          ROOT, ZGRID1, ZGRID2
      CHARACTER        CNUMOP, TITOP
      CHARACTER*2      FORMT
*      .. Local Arrays ..
      INTEGER          IS(1), IWORK(1)
*      .. External Functions ..
      DOUBLE PRECISION G05AAFP
      LOGICAL          Z01ACFP
      EXTERNAL         G05AAFP, Z01ACFP
*      .. External Subroutines ..
      EXTERNAL         X04BMFP, Z01AAFP, Z01ABFP, Z01BAFP, Z01BBFP
```

```

*      .. Executable Statements ..
ROOT = Z01ACFP()
IF (ROOT) THEN
    WRITE (NOUT,*) 'Z01BBFP Example Program Results'
    WRITE (NOUT,*)
END IF

*
*      Define a 2x2 Library Grid
*
MP = 2
NP = 2
IFAIL = 0
CALL Z01AAFP(ICNTXT1,MP,NP,IFAIL)

*
*      Print the status of the processors
*
IF (ROOT) THEN
    WRITE (NOUT,*) 'The 2x2 Library Grid'
    WRITE (NOUT,*)
    WRITE (NOUT,*) '1 indicates in CONTEXT'
    WRITE (NOUT,*) '0 indicates not in CONTEXT'
    WRITE (NOUT,*)
END IF

*
*      Check whether the new Library Grid exists
*
IFAIL = 0
CALL Z01BBFP(ICNTXT1,ZGRID1,IFAIL)

*
*      Print the status of the processors
*
FORMAT = 'I1'
TITOP = 'Y'
CNUMOP = 'X'
ICOFF = 0
IFAIL = 0
IF (ZGRID1) THEN
    IS(1) = 1
ELSE
    IS(1) = 0
END IF
CALL X04BMFP(ICNTXT1,NOUT,1,1,IS,1,FORMAT,TITOP,CNUMOP,ICOFF,IWORK,
+           1,IFAIL)

*
*      Invalidate the 2x2 Library Grid
*
IFAIL = 0
CALL Z01ABFP(ICNTXT1,'Y',IFAIL)

*
*      Redefine a 2x1 Library Grid
*
MQ = 2
NQ = 1
IFAIL = 0
CALL Z01AAFP(ICNTXT2,MQ,NQ,IFAIL)
IFAIL = 1
CALL Z01BAFP(ICNTXT2,MR,NR,IFAIL)

*

```

```

*      Check whether the new Library Grid exists
*
      IFAIL = 0
      CALL Z01BBFP(ICNTXT2,ZGRID2,IFAIL)
*
*      Print the status of the processors
*
      IF (ROOT) THEN
        WRITE (NOUT,*)
        WRITE (NOUT,*) 'The 2x1 Library Grid'
        WRITE (NOUT,*)
      END IF
      IFAIL = 0
      IF (ZGRID2) THEN
        IS(1) = 1
      ELSE
        IS(1) = 0
      END IF
      CALL X04BMFP(ICNTXT2,NOUT,1,1,IS,1,FORMAT,TITOP,CNUMOP,ICOFF,IWORK,
+                1,IFAIL)

*      10 random numbers are generated and summed on logical
*      processors where ZGRID=.TRUE.

      IF (ZGRID2) THEN
        X = 0.0D0
        DO 20 I = 1, 10
          X = X + G05AAFP()
20      CONTINUE
      END IF

*
*      Invalidate the 2x1 Library Grid
*
      IFAIL = 0
      CALL Z01ABFP(ICNTXT2,'N',IFAIL)
*
      STOP
      END

```

8.2 Example Data

None.

8.3 Example Results

Z01BBFP Example Program Results

The 2x2 Library Grid

1 indicates in CONTEXT

0 indicates not in CONTEXT

Array from logical processor 0, 0

1

Array from logical processor 0, 1

1

Array from logical processor 1, 0

1

Array from logical processor 1, 1

1

The 2x1 Library Grid

Array from logical processor 0, 0

1

Array from logical processor 1, 0

1
