

# Z01BGFP

## 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

Z01BGFP returns MPI information in the grid of processors set up by Z01AAFP.

### 2 Specification

```
SUBROUTINE Z01BGFP(ICNTXT,MYRANK,MYCOORD,NTASKS,IFAIL)
  INTEGER          ICNTXT,MYRANK,MYCOORD(2),NTASKS,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.
$p$	–	the total number of processors in the Library Grid.
$p_r$	–	the row grid coordinate of the calling processor.
$p_c$	–	the column grid coordinate of the calling processor.

#### 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:     NTASKS, 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: MYRANK — INTEGER *Local Output*

*On exit:* a number between 0 and  $p-1$  which identifies the MPI rank in the Library Grid identified by ICNTXT. If ICNTXT is invalid,  $-1$  is returned.

3: MYCOORD(2) — INTEGER array *Local Output*

*On exit:* MYCOORD(1) contains  $p_r$  and MYCOORD(2) contains  $p_c$ . If ICNTXT is invalid,  $-1$  is returned for both MYCOORD(1) and MYCOORD(2).

4: NTASKS — INTEGER *Global Output*

*On exit:* the number of processes in the Library Grid associated with ICNTXT. If ICNTXT is invalid,  $-1$  is returned.

**5: 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.

## 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>
- [2] Gropp W, Lusk E and Skjellum A (1994) *Using MPI: Portable Parallel Programming with the Message-Passing Interface*. Cambridge, MA, MIT Press.

## 8 Example

None.

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