

# Journaling



## Journaling



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## Chapter 1. Overview

M21 supports bulletproof resilience of the M database system by utilising both before image logging and after image journaling, together with the ability to backup the system whilst it is still being used.

Backup and restore are described in a separate document.

Before image logging records images of database blocks before any modifications are made to them. These images are recorded in the host operating system BIL file and are used by the system to automatically roll the database backwards to the most recent point in time when the structure of the database is known to have been good. Before image logging is automatically set up for a database when it is created using *dbinit* and requires no configuration other than specifying the size of the BIL file, which will depend on the level of modification of the database. During the normal operation of an M21 system the BIL file will automatically be updated with the before images of any blocks which are about to change, no system manager interaction or configuration is required. When the M21 system starts up it will check the BIL file to see if database recovery is necessary and will automatically roll the database back if required, again without system manager intervention being required. If a recovery is required any after-image journal records will then be used to roll the database forward when the system is IPL'ed.

After image journaling records global **SET** and **KILL** operations and changes to M routines in the host operating system journal file. After image journaling is automatically set up for a database when it is created using *dbinit* and requires no configuration other than specifying the size of the two journal files, which will depend on the level of modification of journaled globals in the database. The second journal file is simply a copy of the first and is kept updated automatically by the M21 system. This file should ideally be on a separate disk to prevent the potential loss of both journals if a disk problem occurs. The journal file itself is circular and will automatically wrap around when full. Before this happens, warning messages will be output to the M21 system log file. During the normal operation of an M21 system globals marked for journaling will be output to the journal file automatically with no system manager interaction or configuration being required other than ensuring that journaling is enabled at system IPL time.

The system manager can activate after image journaling of globals for the system, a UCI or an individual global. In addition routines can be marked for journaling on a system wide basis and individual M jobs can be configured to journal or not. The interactions of the various journal flags are described in the following paragraphs.

*Chapter 1. Overview*



## Chapter 2. Configuration File Parameters

System wide journaling of routines or globals can be turned on at IPL time by means of parameters. These are specified in the external configuration file (*xxxxx.cfg*), where *xxxxx* is the database name. This file can be found in the directory where the database files reside and will have been created by the database initialisation program *dbinit*.

### **IPL\_EnableSystemJournal**

Enables system wide journaling of globals at system IPL time if set to **YES**. The default value, if this parameter does not appear in the configuration file is **NO**.

### **IPL\_EnableSystemJournalProg**

Enables system wide journaling of routines at system IPL time if set to **YES**. The default value, if this parameter does not appear in the configuration file is **NO**.



## Chapter 3. SVCjrnl flag

In addition, system wide journaling can be queried or set on and off using a bit flag in the shared system table. In order for any global journaling to occur the system wide flag must be set to on.

The status of system wide journaling of globals can be queried using the following code:

```
w $zinfo(6,"svector","SVCjrnl")
```

This will return a value of 1 if journaling is enabled or 0 if it is not.

The status of system wide journaling of globals can be turned on with the following code:

```
w $zinfo(8,"svector","SVCjrnl",1)
```

and turned off with the following code:

```
w $zinfo(8,"svector","SVCjrnl",0)
```



## Chapter 4. SVCjrnlplog flag

System wide journaling of routines can be queried or set on and off using a bit flag in the shared system table.

The system wide routine journaling flag can be queried using the following code:

```
w $zinfo(6,"svector","SVCjrnlplog")
```

This will return a value of 1 if routine journaling is enabled or 0 if it is not.

The status of system wide journaling of routines can be turned on with the following code:

```
w $zinfo(8,"svector","SVCjrnlplog",1)
```

and turned off with the following code:

```
w $zinfo(8,"svector","SVCjrnlplog",0)
```



## Chapter 5. UCI Journaling

Individual UCIs can be marked to journal using either the M based utility `^UCIMGR` or the external utility `m21uci`.





## Chapter 6. Individual Global Journaling

Individual globals can be marked to journal using the M based utility `^%MuGloM`. The journal characteristic for a global can take three different values as follows:

1. The global will journal only if the UCI that it is in is itself marked for journaling.
2. The global will journal regardless of the setting of journaling for the UCI.
3. The global will never journal regardless of all other settings

*Chapter 6. Individual Global Journaling*

## Chapter 7. Pjrn1 flag

Each job can individually be marked to journal globals. This will override the marking of a global or UCI to not journal, but will not override the setting of an individual global to never journal or the system wide flag being set to off.

The flag to set journaling on for a given partition can be queried using the following code:

```
w $zinfo(6,"pvector","Pjrn1",$JOB)
```

This will return a value of 1 if journaling is enabled for the partition or 0 if it is not.

The partition journal flag can be turned on with the following code:

```
w $zinfo(8,"pvector","Pjrn1",1,$JOB)
```

and turned off with the following code:

```
w $zinfo(8,"pvector","Pjrn1",0,$JOB)
```

**\$JOB** can be omitted and will default to the **\$JOB** of the job issuing the command.



## Chapter 8. Pnjrnl flag

Each job can also be individually marked to not journal globals. This will override the marking of a global or UCI to journal.

The flag to disable journaling for a given partition can be queried using the following code:

```
w $zinfo(6,"pvector","Pnjrnl",$JOB)
```

This will return a value of 1 if journaling is disabled for the partition or 0 if it is not.

The partition no-journal flag can be turned on with the following code:

```
w $zinfo(8,"pvector","Pnjrnl",1,$JOB)
```

and turned off with the following code:

```
w $zinfo(8,"pvector","Pnjrnl",0,$JOB)
```

**\$JOB** can be omitted and will default to the **\$JOB** of the job issuing the command.

