

# Natural in Batch under VSE/ESA

This document contains special considerations that refer to Natural in batch under the operating systems VSE/ESA.

The following topics are covered:

- NATVSE - Natural VSE/ESA Batch Interface
- NTVSE - Generation Parameters for Natural under VSE/ESA
- Natural Datasets Used under a VSE/ESA Batch Session
- Debugging Facilities for Natural under VSE/ESA
- NATVSE Attention Interrupts

For considerations that refer to Natural in batch generally, see also:

- Datasets Required for Batch Mode Operation
  - Natural Datasets
  - Adabas Datasets
  - Sort Datasets
  - Subtasking Session Support for Batch Environments
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## NATVSE - Natural VSE/ESA Batch Interface

The Natural VSE/ESA batch interface (NATVSE) consists of a number of service routines interfacing with the VSE/ESA operating system.

NATVSE is supplied as a source module and can be customized to meet your requirements; see also Installing Natural under VSE/ESA (described in the Natural Installation Guide for Mainframes), where you can set the generation parameters). You can either assemble and link it to the Natural nucleus or you can run it separately, connecting with a shared nucleus.

NATVSE must run below the 16 MB line. Multiple sessions can be started in parallel within one batch region; see Subtasking Session Support for Batch Environments.

## NTVSE Macro - Generation Parameters for Natural under VSE/ESA

The NTVSE macro contains several generation parameters (to be set in the NATVSE copy book) to change the NATVSE internal defaults.

These parameters are:

NAME | DSECTS | CANCEL | RJEUSER | FILEID | FILMNGR | FILSCAN | BUFSIZE | LE370 |

### NAME - Name of Relocatable Module

NAME specifies the name of the relocatable module to be created by the given assembly; the default name is NATVSE.

## DSECTS - Listing of Operating System DSECTS

DSECTS specifies whether operating system DSECTS are to be listed; possible values are YES and NO (default).

### CANCEL - Session Termination

CANCEL specifies how the Natural VSE/ESA interface is to proceed at session termination; possible values are YES (default) and NO.

<b>YES</b>	The job is cancelled by CANCEL or JDUMP macros, unless either Natural terminated normally or the session was terminated by the Natural TERMINATE statement.
<b>NO</b>	NATVSE always terminates with RETURN or EOJ macros with a set return code (the same effect is achieved when you set the Session Abend Flag UPSI XXXXX1XX).

### RJEUSER - User ID for Submission via XPCC Macro Requests

RJEUSER defines which user ID is to be set for submission via XPCC macro requests; possible values are NO, YES (default), (YES,VSE) and (YES,NAT).

<b>YES or (YES,VSE)</b>	The system variable *INIT-USER is used as the mandatory submission user ID.
<b>(YES,NAT)</b>	The system variable *USER is used as the mandatory submission user ID.
<b>NO</b>	The user ID "R000" is used.

### FILEID - Check of Label Information

FILEID specifies a string of up to 8 characters which is checked against the start of a DLBL or TLBL file ID. If it matches, this label information is ignored.

This is particularly helpful when DLBL or TLBL statements for CMWKF $n$ \* and/or CMPRT $n$ \* are supplied in the (partition) standard labels, but should not be used.

If, for example, a // DLBL CMPRT01, '...' statement is found, it is not possible to direct a WRITE(1) output to a printer. To do so, use the JCS statement // DLBL CMPRT01, 'IGNORE' and a suitable printer assignment of the relevant SYS $n$ .

Possible values are any character string which must be enclosed in apostrophes if it contains special characters; the default value is 'IGNORE'.

### FILMNGR - Management of Print or Work File in Natural

FILMNGR specifies how a print or a work file is to be managed in Natural; possible values are YES (default) and NO.

<b>YES</b>	The fact that there is label information for a print or a work file and the fact that LABEL=OFF/ON is specified for an unlabelled work file indicates to Natural that this file is available. In particular, this is relevant if the Natural print and work files are to be managed by a file management system.
<b>NO</b>	The logical unit number of the Natural print or work file must be assigned to the appropriate device type.

## FILSCAN - Scanning of Print or Work Files

FILSCAN specifies whether print or work files are to be scanned; possible values are YES (default) and NO.

<b>YES</b>	The Natural interface for VSE/ESA scans the VSE/ESA label area for all Natural print and work files for which no specific file access method has been defined via Natural session parameters. This may cause overhead.
<b>NO</b>	Access to all Natural print and work files must be specified explicitly via session parameters in order to be "available". This concentrates all file access efforts on the defined files.

## BUFSIZE - Size of Natural I/O Buffer

BUFSIZE specifies the size of the Natural I/O buffer which is used for all input and output operations; the default value is 8192 bytes.

## LE370 - Use of IBM Language Environment

LE370 specifies whether Natural is to run in the IBM Language Environment; possible values are YES and NO (default).

<b>YES</b>	The LE/370 runtime environment is initialized on the initialization of the Natural session. You must specify YES if LE/370 subroutine programs (dynamic or static) are to be called via Natural.
<b>NO</b>	The LE/370 runtime environment is not initialized on the initialization of the Natural session.

## Natural Datasets Used under a VSE/ESA Batch Session

The following optional sequential datasets are used during a Natural under VSE/ESA batch session:

CMPRMIN | CMSYNIN | CMPRINT | CMPLOG | CMTRACE | CMHCOPY | CMPRT / CMWKF |

### CMPRMIN - Dynamic Parameter Dataset

CMPRMIN is a sequential disk or a labelled tape dataset. Supported file formats are:

```
DTFSD/DTFMT RECFORM=FIXUNB,RECSIZE=81
DTFSD/DTFMT RECFORM=FIXUNB/FIXBLK,RECSIZE=80
```

The last eight bytes of each CMPRMIN record are ignored.

### CMSYNIN - Input for Natural INPUT Statements

The two readers (input streams), CMSYNIN and CMOBJIN are assigned to SYSRDR and/or SYSIPT as defined with Natural profile parameters. Alternatively, sequential disk or labelled tape files may be used rather than real/logical (POWER) readers.

Supported file formats are:

```
DTFSD/DTFMT RECFORM=FIXUNB,RECSIZE=81
DTFSD/DTFMT RECFORM=FIXUNB/FIXBLK,RECSIZE=80
```

You must supply appropriate label information; for assignment, you have to use file names CMSYNIN and /or CMOBJIN.

## **CMPRINT - Primary Report Output**

By default, the CMPRINT file is assigned to SYSLST and is processed via the macro DTFPR.

If appropriate label information is supplied for the file name CMPRINT, the print output may also be routed to disk or tape by using the VSE/ESA macro DTFSD or DTFMT respectively, with RECFORM=FIXUNB,BLKSIZE=133.

## **CMPLUG - Optional Report Output for Dynamic Parameters**

By default, the CMPLUG file is assigned to SYSLST and is processed with the macro DTFPR.

If appropriate label information is supplied for the file name CMPLUG, the print output may also be routed to disk or tape by using the VSE/ESA macros DTFSD or DTFMT respectively, with RECFORM=FIXUNB,BLKSIZE=133.

## **CMTRACE - Optional Report Output for Natural Tracing**

By default, the CMTRACE file is assigned to SYSLST and is processed via the macro DTFPR.

If appropriate label information is supplied for the file name CMTRACE, the print output may also be routed to disk or tape by using the VSE/ESA macro DTFSD or DTFMT respectively, with RECFORM=FIXUNB,BLKSIZE=133.

## **CMHCOPY - Optional Report Output for Hardcopy**

By default, the CMHCOPY file is assigned to SYSLST and is processed via the macro DTFPR.

If appropriate label information is supplied for the file name CMHCOPY, the print output may also be routed to disk or tape by using the VSE/ESA macro DTFSD or DTFMT respectively, with RECFORM=FIXUNB,BLKSIZE=133.

## **CMPR $T_{nn}$ - Additional Reports**

DCB information is optional. If omitted, it is supplied with the PRINT profile parameter, subparameters RECFM, LRECL and BLKSIZE. If RECFM is not supplied, it is set to value VBA. If no DCB information is supplied, the following rules apply:

When supplying label information with file name CMPR $T_{nn}$ , the print output can be written to a disk or tape. Natural treats this print file like an unblocked fixed-length work file. When "printing" to disk or tape, the same logic as for work files applies (see below).

## **CMWKF $_{nn}$ - Natural Work Files**

DCB information is optional for output files. If omitted, it is supplied in the WORK profile parameter, subparameters RECFM, LRECL and BLKSIZE. If no DCB information is supplied, the following applies:

If the Natural VSE/ESA generation parameter FILMNGR=YES is specified and there is label information for a work file - or if "NO" or "NOTM" is specified for the LABEL subparameter of parameter WORK for an unlabeled work file - Natural knows the file is available. Otherwise, the Natural work-file logical-unit number must be assigned to the correct device type.

If a Natural printer or work file is assigned "IGN", all I/O requests for these files are treated as dummy and no Natural error is generated. However, if there is no assignment or the printer/work file is assigned "UA", any attempt to use this file is treated as an error.

## Debugging Facilities for Natural under VSE/ESA

The Natural VSE/ESA batch interface contains some debugging facilities which can help you to track down problems.

These facilities are controlled by the UPSI settings in the JCL.

Additionally, the UPSI settings may also be specified as a Natural session parameter (UPSI=1XXXXXXXX, for example). This is useful if UPSI settings in JCL have produced side effects in the sense that they have a different meaning for other programs such as for front-end Natural or for programs called by Natural.

There may be the following UPSI settings:

- UPSI 1XXXXXXXX - Dump Flag
- UPSI X1XXXXXXXX - Trace Flag
- UPSI XXX1XXXXX - Storage Freeze Flag
- UPSI XXXXX1XX - Session Abend Flag
- UPSI XXXXXX1X - Abend Exit Flag
- UPSI XXXXXXXX1 - Formatted Dump-Only Flag

These settings are listed below. In addition, a sample job is given to show you how to obtain documentation for debugging.

### UPSI 1XXXXXXXX - Dump Flag

When Natural encounters a problem, the corresponding job usually cancels without a dump, unless an abend actually occurred. When this UPSI flag is set, a dump is always created at the end of the job when an error occurs, that is, when the Natural session termination message is other than NAT9995.

### UPSI X1XXXXXXXX - Trace Flag

When this flag is set, snapshots are taken of the register save area at some strategic points in Natural.

**Note:** Depending on the product sample output, setting this flag can lead to large output.

On entry of all NATVSE service routines, the name of this routine and the general registers 0 to 15 (GRG) are displayed.

**Note:** You can identify the caller from Register 14.

On exit of all NATVSE service routines, the name of this routine, the current general registers (GRG) and Registers 0 to 15 of the currently assigned save area (CSA) are displayed.

**Notes:**

- The contents of the CSA are returned to the caller of the service routine, except the Register 15 return code which is taken from the general registers.
- The contents of the HSA are returned to the caller, which means that this save area contains the return code in Register 15 if a return code was set at all.

Whenever the GRG registers are set, the debugging trace program tries to determine the name of the calling routine and the offset of the call from the beginning of the routine.

The SYS $nnn$  number for the debugging trace print output is SYS040, as long as this SYS $nnn$  number is assigned to a printer device; otherwise SYSLST is used. This is of particular interest if debugging trace output and other Natural print output are to be separated; to do so, assign SYS040 appropriately and supply a POWER \* \$\$ LST statement for this logical print unit.

## UPSI XXX1XXXX - Storage Freeze Flag

On normal or abnormal session termination, Natural, by default, releases all its resources including storage. Despite the setting of UPSI 1, a dump may be useless, because all relevant storage has already been released during Natural termination. When this flag is set, no GETVIS storage acquired earlier is ever released within this job; this applies to all external subroutine programs called by Natural including the Natural nucleus (if not linked to NATVSE) and RCA=ON subproducts.



This flag should be handled carefully, because more partition GETVIS storage is used, but jobs may still cancel due to failed GETVIS requests if the operating system storage requests cannot be satisfied.

## UPSI XXXXX1XX - Session Abend Flag

By default, a Natural session is cancelled if crucial errors have occurred (NAT9 $nnn$  termination messages except NAT9995 and NAT9987). When this flag is set, Natural does *not* cancel, but terminates "normally" just passing the Natural return code to the job control.

## UPSI XXXXXX1X - Abend Exit Flag

This flag may be helpful in the case of recurrent abends.

In batch mode, Natural usually has a check abend exit for active programs (STXIT PC) to recover from program checks (NAT095 $n$  error messages). When DU=ON is specified, this exit creates a snap dump and passes control to Natural for a clean session termination.

When this flag is set, the Natural session runs without any abend exit for active programs, which means that all program checks are handled directly by the operating system.

If this flag is set, the dump flag, the storage freeze flag, the session abend flag and the formatted dump-only flag are ignored.

## UPSI XXXXXXXX1 - Formatted Dump-Only Flag

With DU=ON, the NATVSE abend exit routine creates a snap dump of the Natural session when a program check abend occurs (and the UPSI XXXXXX1X flag is not set).

- The failed instruction, the program check code (SOC $n$ ), the general registers, the currently active routine, the offset of the failed instruction within this routine and the absolute (PSW) address are displayed together with Registers 0 to 15 of the currently assigned save area (CSA).
- In addition, the non-reentrant Natural VSE/ESA driver, all areas GETMAINED by Natural and all Natural programs in the buffer pool are dumped.
- Then control is passed to Natural for a clean session termination.
- Finally the job terminates via a VSE JDUMP macro resulting in a dump containing the whole partition.

Since in many cases the dynamic Natural session areas are relevant for debugging only, the dump of the static session areas can be suppressed by setting this UPSI flag.

## Obtaining Documentation for Debugging

If a problem has to be analyzed, any information which might be relevant is important, in particular, the executed JCS and the corresponding console log.

The following sample job is intended to show you how to obtain comprehensive documentation:

```
// JOB sampljob
// OPTION LOG,PARTDUMP to see JCL on printer
/* Library Definitions: labels and LIBDEFs
...
/* ADARUN Parameter Input Definition
// ASSGN SYS000,SYSRDR
/* Natural Work File Definitions
// DLBL CMWKFnn,'...',... disk work file
// EXTENT SYSnnn,volser,,,nn,mm
// ASSGN SYSnnn,DISK,VOL=volser,SHR
// TLBL CMWKFnn,'...',... labelled tape work file
// ASSGN SYSnnn,cuu assignment to tape unit
/* Natural Print File Definitions
// ASSGN SYSnnn,cuu assignment to print UR unit
// DLBL CMPRTnn,'...',... print file on disk
// EXTENT SYSnnn,volser,,,nn,mm
// ASSGN SYSnnn,DISK,VOL=volser,SHR
// TLBL CMPRTnn,'...',... print file on labelled tape
// ASSGN SYSnnn,cuu assignment to tape unit
/* Debugging Options
// ASSGN SYS040,SYSLST debugging trace unit
// UPSI 1xxx00xx flags as discussed above
// EXEC Natural,SIZE=...
... dynamic parameters
/* end of dynamic parameters
... ADARUN parameters
/* end of ADARUN parameters
... Natural input
/* end of Natural input
// EXEC LISTLOG print console messages
/& end of job
```

## NATVSE Attention Interrupts

The Natural VSE/ESA batch interface (NATVSE) supports attention interrupts via the console command `MSG xx`, where `xx` is the VSE partition ID a console operator can force on a NAT1016 attention interrupt event.

This special functionality is controlled by the Natural profile parameter `ATTN`.