

# Miscellaneous Changes and Enhancements

The following topics are covered:

- Profile Parameters
  - NATCONFIG Enhancements
  - Natural Performance Enhancements
  - Source Change Inventory
  - Delivery of Source Changes Enhanced
  - Non-Sliding Year Window (YSLW Parameter)
  - Stack
  - Buffer and Storage Management
  - Natural Global Buffer Pool
  - NATSREX2/3 Example
  - Reduction of Object Code
  - Change/Enhancements Requests
  - Natural Web Interface
-

## Profile Parameters

- New Profile Parameters
- New Parameter Macro
- Enhanced Profile Parameters
- Profile Parameters Dropped
- Retrieving Dynamic Profile Parameters
- Parameter Macro NTFILE
- Profile Parameter PLUGIN

### New Profile Parameters

The following new Natural profile parameters are provided with Natural Version 4.1:

Profile Parameter	Description
BPC64	Specifies the type of storage for the local Natural buffer pool. It corresponds to the C64 subparameter of the BPI profile parameter or the NTBPI macro.
BPCSIZE	Defines the Size of the local Buffer pool cache. It corresponds to the CSIZE subparameter of the BPI profile parameter or the NTBPI macro.
BPMETH	Specifies the search algorithm that is to be used for allocating storage in the Natural buffer pool. It corresponds to the METHOD subparameter of the BPI profile parameter or the NTBPI macro.
DS	Defines the default initial size of various Natural storage buffers (for example, ASIZE, DATSIZE). A corresponding new macro NTDS is also available.
DUE	Allows improvedabend and error handling.
EDBP	Controls the initialization and operation of the Software AG Editor buffer pool and its work file.
EMFM	With this parameter, you can activate/deactivate the Edit Mask Free mode at session startup. This mode allows you to omit literals during input into a field with a numeric edit mask.  Within a running Natural session, you may override this setting with the new terminal command %FM+ or %FM-.
FREEGDA	Determines whether or not the currently used global data area is to be kept when a Natural utility is invoked, that is, whether the global data area is to be still available after the use of the utility or to be newly initialized.
OVSIZE	Defines the maximum total amount of variable storage which can be allocated outside the Natural thread. See Buffer and Storage Management below.
STACKD	Defines the character to be used as the command delimiter for the STACK parameter and for command input under the Natural Development Server (NDV) in a Natural Single Point of Development environment.
TMODEL	Defines the type of terminal model (screen size) being used. This is relevant for environments like IMS/TM, where the TP monitor is not capable of automatically supplying Natural with this information.

### New Parameter Macro

The following new Natural parameter macro is provided with Natural Version 4.1:

Parameter Macro	Description
NTCSTAT	This parameter macro has been introduced to break the limit of 256 bytes for the CSTATIC profile parameter. With the new macro you can define external subprograms to be statically linked to the parameter module.

## Enhanced Profile Parameters

The following Natural profile parameters have been enhanced or changed for Natural Version 4.1:

Profile Parameter	Enhancement
ADAMODE	With Natural Version 3.1, if one of the values 1, 2 or 3 is specified for the ADAMODE parameter, but an Adabas subcomponent is unable to perform an Adabas X48 communication, ADAMODE is set to 0 and the session is continued without an error message. With Natural Version 4.1, an error message is issued before ADAMODE is set to 0. The session is continued if ITERM=OFF has been specified, otherwise the session will be terminated.
BPI	New subparameters: <ul style="list-style-type: none"> <li>● CSIZE=nnnn to set the size of the cache for the local buffer pool.</li> <li>● METHOD= to determine the algorithm for allocating storage in the buffer pool.</li> <li>● C64= to determine the type of storage to be used for the buffer pool cache, either 64-bit memory objects or a data space.</li> <li>● TYPE=SWAP to define a Buffer pool to hold the Natural CICS swap pool.</li> </ul>
CMPO	Same as for COMPOPT system command.
CSIZE	The range of possible values for the Connect buffer area size has been changed from 0 - 128 to 0 - 512 KB.
DATSIZE	As of Version 4.1.2, this parameter is used only to set the minimum size of the local data buffer (DATSIZE). <b>Note:</b> With previous versions of Natural, this parameter could be used to set the minimum <b>and/or the maximum</b> size of the DATSIZE buffer: DATSIZE=(min,max). The maximum setting was dropped for design considerations. The profile parameter OVSIZE can be used instead to limit the memory allocation outside of the thread. A limitation of individual buffer sizes is not provided.
DU	New setting DU=ABEND to produce a memory dump in the case of an abnormal Natural session end and terminate the session with an abend code (same as DU=ON, except that with DU=ON the session is terminated with an error message). This is particularly relevant under IMS/TM.
LT	With Natural Version 3.1, LT=0 disallowed any database access. This made the setting LT=0 useless. With Natural Version 4.1, LT=0 indicates that no limit is to be in effect, so that LT is consistent with other limits, such as MADIO and MAXCL.

PRINT	<p>New subparameter PADCHRO='y' to define the padding character to be used for output datasets on the print file. The default value is PADCHRO=' ' (blank).</p> <p>New subparameter ROUTE=xxx to determine whether logical print file routing is done according to the OUTPUT clause of the DEFINE PRINTER statement.</p> <p>New subparameter ASA=xxx for all AM=STD routines to determine whether the ASA record format is used.</p> <p>You can now define the hardcopy printer as Printer 0 for all environments.</p>
RPC	The profile parameter RPC and the parameter macro NTRPC have been changed/enhanced, see Changes/Enhancements to Profile Parameter RPC in the Natural RPC section of these Release Notes.
SORT	You can define up to two additional options for the external sort program in EXTOPT. The options are delimited by a slash (/).
TD	<p>New settings:</p> <ul style="list-style-type: none"> <li>● TD=(+/-hh,mm,ss) - In addition to hours and minutes, it is possible to specify seconds for the time differential.</li> <li>● TD=timezone - Name of the time zone to be used. This must be defined as a valid time zone in the NTTZ macro of the NATCONFIG module.</li> </ul>
TS	<p>With Natural Version 3.1, the translation of system library output is performed for the entire contents of the page buffer immediately before being sent to the screen.</p> <p>With Natural Version 4.1, the translation will be performed individually for each field at the time when it is written into the page buffer.</p> <p>For more information, see Translation of System Library Output.</p>
WORK	<p>New subparameter settings:</p> <ul style="list-style-type: none"> <li>● PADCHRI='x' to define the padding character to be used for input datasets on the work file. The default value is: PADCHRI=' ' (blank).</li> <li>● PADCHRO='y' to define the padding character to be used for output datasets on the work file. The default value is: PADCHRO=X'00'</li> </ul>
WPSIZE	New settings for a <i>maximum_below</i> and a <i>maximum_above</i> size to limit the total physical storage in KB which can be allocated below and/or above the 16 MB line.
YSLW	New settings to specify a certain year for the definition of a non-sliding year window.

## Profile Parameters Dropped

The following Natural profile parameters (and parameter macros) have been dropped as of Natural Version 4.1:

- DCOM (NTDCOM) - NaturalX Support
- NTBPI TYPE=DCOM
- IDSIZE - Size of Buffer for Natural/IDMS
- WSIZE - Size of Buffer Area for Screen Images

## Retrieving Dynamic Profile Parameters

A new application programming interface, USR4004, is available which enables you to retrieve the dynamic profile parameter settings of the current Natural session and pass them to another Natural session. This is particularly useful when a Natural session starts another asynchronous Natural session via CMTASK. The user exit will also be useful to ascertain which dynamic profile parameters have been specified for the current session.

## Parameter Macro NTFILE

The parameter macro NTFILE has been replaced by the new parameter macro NTLFILE with different syntax, but equivalent functionality.

Old: NTFILE ID=*logical filenr*,DBID=*dbid*,FNR=*filenumber*

New: NTLFILE *logical filenr,dbid,filenumber*

For compatibility reasons, the old macro NTFILE is still supported.

## Profile Parameter PLUGIN

Because all components of Natural Version 3.1 that could have been enabled using the profile parameter PLUGIN are an integral part of Natural Version 4.1, the only possible setting of the PLUGIN parameter is OFF.

## NATCONFIG Enhancements

- A new macro NTMSG can be used to define a message and a log destination in NATCONFIG for error message logging.
- A new option MIN for the NTBUFID macro can be used to define a minimum start size for a specific variable buffer.

## Natural Performance Enhancements

- The Natural Turbo Performance Plug-in of Natural Version 3.1 is an integral part of Natural Version 4.1. With this performance plug-in, loading Natural objects from the Natural System file into the buffer pool requires fewer database calls and searching for Natural objects in the buffer pool causes less CPU load.
- The compression rate of the compression algorithm has been increased; this will reduce the compressed size of a Natural thread, which, in turn, will reduce the time needed for a roll-in/out event required particularly by a terminal I/O.
- The runtime algorithms for assignments, arithmetic operations and comparisons have been enhanced.
- The Adabas Multi-Fetch option is available for database statements (see Programming Language).
- To minimize the swap pool I/Os under CICS and UTM, it is possible to generate an additional Swap Pool ESA Data Space.
- All local buffer pools and Caches can be shared in a batch and TSO environment for multiple users
- The new utility activation without an explicit LOGON preserves the current active steplib chain of the application which reduces the number of buffer pool and/or database calls if the application is continued after return from the utility.

## Source-Change Inventory

In addition to the Zap-inventory modules (e.g. NATAZAP) which exist for Natural and each of its subproducts and list all Zaps applied to the product, Natural Version 4.1 will provide source-change inventory modules in which all source changes applied to a product are logged. This enables support personnel to ascertain the precise state of your product installation, which will facilitate error diagnosis.

## Delivery of Source Changes Enhanced

With Natural Version 4.1, the delivery of single source changes as text files will be discontinued for the following product:

- Natural for CICS

Instead of text files, the affected and all prerequisite sources modules and macros will be delivered as a single package that also includes all previous fixes. This ensures that all prerequisite fixes are applied and that the respective operating system or TP monitor system interface includes all available fixes. In addition, this enhancement prevents typing mistakes that might occur when a source change is incorporated into the respective source module or macro.

## Non-Sliding Year Window (YSLW Parameter)

With Natural 3.1, the YSLW profile parameter allows you to set a so-called "year sliding window" of 100 years to relate a 2-digit year value to a specific century. The value specified with the YSLW parameter determines how many years in the past - that is, before the current year - that 100-year range is to begin. In other words, the window range is always in relation to the current year.

With Natural Version 4.1, it is also possible to set a "non-sliding" year window: You can set the year in which the 100-year range is to begin. For example, if you specify YSLW=1980, the window is from the year 1980 to the year 2079, regardless of what year the current year is.

## Stack

A new application programming interface, USR4003, is available in the library SYSEXT. It enables you to:

- ascertain the number of entries in the stack,
- ascertain the type of a stack entry (command, data),
- read a specific entry from the stack.

Thus it is possible to retrieve information from the stack without having to use an INPUT statement; that is, without the other functions of an INPUT statement being performed, as these may not be desired if merely a stack entry is to be read.

## Buffer and Storage Management

- With Natural Version 4.1, the internal I/O buffers, which are currently fixed-size buffers with a maximum size of 32 KB, are allocated as variable buffers. This avoids situations which lead to errors NAT1114 "internal output buffer overflow" and NAT1150 "attribute buffer overflow".
- Normally, Natural automatically increases the sizes of all its variable buffers (DATSIZE, etc.) as required. Natural Version 4.1 allows you to restrict this automatic increase if you wish: for each variable buffer and work pool, you can define an initialization and/or a maximum size in the NATCONFIG configuration module (macro NTBUFID); the buffer / work pool will then be increased only up to the specified maximum size, but not beyond. If there is no more space in the thread, variable buffers are allocated temporarily outside of the thread. The total amount of storage allocated outside the thread can be limited by profile parameter OVSIZE for variable buffers and/or by profile parameter WPSIZE for work pools.
- At present, the source area, the fast locate table, the PF-key table and the loop table are located in the DATSIZE buffer. With Natural Version 4.1, each of them is located in a buffer of its own.
- With Natural Version 3.1, the Natural thread is located either entirely above or below the 16 MB line. With Natural Version 4.1, a "mixed mode" is possible, that is, some parts of the thread can be above 16 MB, and at the same time other parts can be below it.
- For the handling of large alphanumeric and binary variables, Natural's thread compression has been enhanced.
- Under OS/390 in batch mode and TSO, it is possible for local buffer pools to be shared by multiple sessions.

See also Natural Storage Management in the Natural Operations for Mainframes documentation.

## Natural Global Buffer Pool

The Natural global buffer pool design and operation has changed versus previous Natural versions. To still allow processing of Natural global buffer pools from different Natural versions from one OS/390 APF authorized library, the name of the Natural Version 4.1 global buffer pool manager module is NATGBP41, and all required modules are linked to it, i.e. no other modules are dynamically loaded.

### Global Buffer Pool Changes

New commands such as ADDCACHE to add a buffer pool cache to an existing global buffer pool or DELCACHE to delete a global buffer pool's cache without terminating the buffer pool itself.

Also some commands now allow you to process global buffer pools generically by specifying a SUBSID or a BPNAM of '\*'.

## NATSREX2/3 Example

The delivered examples NATEREX2 and NATSREX3 show how you can establish your own collating sequence for a SORT. NATSREX2 translates all bytes of a sort record into the required collating sequence, whereas NATSREX3 - after the records have been sorted - reverses this translation to the original state, see NATSREX2 and NATSREX3 - User Exits for Sort Processing in the Natural Operations for Mainframes documentation.

## Reduction of Object Code

The following measures have been taken to reduce the size of the object code generated for a Natural programming object:

- With Natural Version 3.1, entries are generated in the Variable Description Table (VDT) for every parameter, context variable and application-independent variable (AIV) defined, regardless if this field is used (referenced) in the programming object or not.  
With Natural Version 4.1, a VDT entry is generated only for those parameters, context variables and application-independent variables (AIVs) which are actually referenced in a Natural statement.  
Since Natural Version 3.1, no VDT entry is generated for local variables which are not actually referenced.
- Whenever the compiler detects an assignment of an initial value, it will generate a RESET statement instead, which will require less code. For example, for the statement MOVE 0 TO #NUMERIC, the code generated is the same as for the statement RESET #NUMERIC.
- For constants, even if they are used several times in the same program, only one entry is generated in the constant table (KST).
- The description elements for arrays will be reused for different array fields of the same structure. This reduces the object size, especially when long winded index groups are used.

The reduced object-code size of programming objects will yield several benefits:

- less storage space will be needed for the system files,
- the I/O rate for reading requested objects from the system file will be reduced,
- the Natural buffer pool can be kept smaller, etc.

## Change/Enhancement Requests

The following is an overview of the change/enhancement requests that have been implemented in Natural Version 4.1:

Request Number	Description
CE0512	Natural Advanced Facilities: new scan function for reports. (See Report Display.)
CE3291	Natural Security: allow special link of administrator to unprotected library. (See Linking Administrators to an Unprotected Library.)
CE4787	SYSBPM: the length of the field "Use Count" for the global buffer pool has been increased from 5 to 8 bytes to be able to reflect use counts exceeding 99999.
CE4866	Natural Security: new option to copy a library profile with or without links. (See Copying Libraries.)
CE5064	Natural Security: allow definition of default profiles for libraries. (See Default Profiles.)
CE5084	Natural Security: after occurrence of Adabas Response Code 9 within the current Natural session, OPRB value as determined by Natural Security is used for new database open processing.
CE5098	Support use of Julian date format in MASK option. (See MASK Option in Logical Condition).
CE5107	Natural Advanced Facilities: asterisk notation for report selection criteria. (See Report Display.)
CE5108	Natural Advanced Facilities: new selection options for deleting reports from the spool file. (See New Functions).
CE6270	Natural Advanced Facilities: new report status WAIT to trigger printing of reports not yet printed. (See Report Display.)
CE7138	SYSTP: display Natural user sessions of a specific user/terminal. (See SYSTP Utility.)
CE7808	Make Natural version number available as system variable. (See New System Variables.)
CE7892	SYSBPM: make the direct commands DISPLAY BUFFERPOOL, SELECT BUFFERPOOL and RESET BUFFERPOOL available as functions that can be selected from one of the SYSBPM menus.
CE7959	New ESCAPE statement option for leaving inline subroutine <i>and</i> programming object containing same. (See ESCAPE Statement.)
CE8586	CATALL: provide a user exit to change the default settings of the main CATALL screen. (See CATALL system command).
CE8817	NATLOAD: provide a user exit to be invoked after processing of NATLOAD has finished. (See NATUNLD/NATLOAD Utility.)
CE8886	Natural Security: the number of unsuccessful logon attempts will be passed as parameter to user exit LOGONEX1. (See Logon Procedure.)
CE8906	Roll server: User exit NATRSUX1 has been renamed to NATRSUX14 and provides additional information on each roll file (number of slots defined and in use).
CE8907	Support of IBM's LE (language environment) user-defined error handlers.
CE8944	Suppress error NAT1074 (global buffer pool not found) if an alternative buffer pool is used instead.
CE9048	Natural Security: New function to automatically update/delete the functional security of all command processors whose status is "modified". (See Functional Security.)
CE9063	Natural Security: New function to create and maintain default profiles for libraries. (See Default Profiles.)

Request Number	Description
CE9159	SYSTP: Simultaneous cancellation of multiple Natural user sessions depending on their last-activity date. (See SYSTP Utility).
CE9266	Retrieve information from the stack without using an INPUT statement (See Stack).
CE9292	Natural Security: new option to adjust the physical content of a library on the FUSER system file accordingly when a Natural Security library profile is renamed, copied or deleted. (See Copying, Renaming and Deleting Libraries).
CE9344	Natural Security: control the display of mailboxes in batch mode by a general option in Administrator Services. (See Mailboxes in Batch Mode.)
CE9451	READ statement: evaluation of ENDING AT values not done by Natural, but by the database system. (See READ Statement).
CE9452	Enhanced possibilities for usage of notation "&n&" for dynamic insertion of values in copycodes.
CE9687	Natural Security: a warning message "your password will expire in <i>nmn</i> days" will be issued to the user. (See Logon Procedure.)
P225029	Natural Advanced Facilities: enhanced PSPPATPR parameter.
P225950	INPUT statement: modifiable fields with edit masks. (See INPUT statement).
P228451	LT=0 and infinite loop needed. (See Enhanced Profile Parameters, LT).
P230559	Parameter format/length conflict not detected with PCHECK=ON. (See COMPOPT system command).
P225919	Update SYSPARM in Batch. (See Direct Commands and Batch Processing in SYSPARM Utility).

## Natural Web Interface

The following changes/enhancements to the Natural Web Interface are provided with Natural Version 4.1:

- Internal Usage of Dynamic Variables and New Natural Features
- W3\* Programs for Dynamic Variables and Dynamic Arrays of Dynamic Variables
- Use #HTTP\_NEWLINE together with W3HTML
- Samples Library SYSWEB

### Internal Usage of Dynamic Variables and New Natural Features

- Internal usage of dynamic variables instead of (A1/1:v arrays).
- Existing programs need not be recataloged.
- Use new Translate commands internally.
- The predefined maximum return page is now set to 100000 (can be changed more easily).
- To change the maximum size of the return page, only the PDA W3LIMITS needs to be changed. It is no longer necessary to change w3context, too. There is no need to change the definition of the (A1/1:v) array and its redefinition up to the maximum size that might be needed even if the majority of pages is smaller.
- Using dynamic variables decreases the data consumption of the application.
- Easier handling of environment variables greater then (A250). These variables need not be read in parts using redefined long alpha with (A1/1:v) array.
- Use of long constant values. A complete HTML page now can be defined within an init clause of the program, or an simple assign statement.

### W3\* Programs for Dynamic Variables and Dynamic Arrays of Dynamic Variables

- All interfaces of programs that had been defined as (A250) By Value have been changed to (A) Dynamic By Value. User programs need not be changed or recataloged to work with the changed interface.
- New W3\*DYNAMIC calls have been introduced. The existing calls look for trailing blanks (because of static length strings) and remove trailing blanks. The new calls take the compile dynamic variable up to \*length(), without additional checking.
- Use of constant values greater the (A253).

## Use #HTTP\_NEWLINE together with W3HTML

If more than one line should be produced and converted to HTML, it had been necessary to call W3HTMLLINE for every page. The changed Web Interface now can handle lines that had been compressed with ##HTTP\_NEWLINE.

**old:**

```
perform w3text "<pre>"
perform w3htmlline "if a > b then"
perform w3htmlline " write 'result is > then old' "
perform w3htmlline "else"
perform w3htmlline " write 'result is < then old' "
perform w3htmlline "end-if"
perform w3text "</pre>"
```

**new:**

```
perform w3text "<pre>"
COMPRESS "if a > b then" ##HTTP_NEWLINE
" write 'result is > then old' " ##HTTP_NEWLINE
"else" ##HTTP_NEWLINE
" write 'result is < then old' " ##HTTP_NEWLINE
"end-if" ##HTTP_NEWLINE
into W3DYN LEAVING NO
perform w3html w3dyn
perform w3text "</pre>"
```

## Samples Library SYSWEB

The contents of the samples directory SYSWEB have been moved to the following directory:

FNAT/SYSWEB/RES