NATURAL

Natural

Installation Guide

Version 3.1.6 for Mainframes

software AG

This document applies to Natural Version 3.1.6 for Mainframes and to all subsequent releases. Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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Installation Guide for Mainframes

This document describes step by step how to install Natural with Adabas system files on IBM and compatible systems running under the operating system OS/390, VSE/ESA, VM/CMS or BS2000/OSD.

For the supported versions of the operating systems, refer to Operating/Teleprocessing Systems Required (in the current Natural Release Notes for Mainframes).

Installation instructions for TP monitor interfaces and certain Natural subproducts are also included in this document.

The Natural Installation Guide for Mainframes covers the following topics:

- General Installation Information
- Installing Natural under OS/390
- Installing Natural under VSE/ESA
- Installing Natural under VM/CMS
- Installing Natural under BS2000/OSD
- Installing the Natural Com-plete Interface
- Installing the Natural CICS Interface
- Installing the Natural IMS Interface
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- Installing the Natural UTM Interface
- Installing the Natural TIAM Interface
- Installing NaturalX under OS/390
- NaturalX Trouble Shooting FAQ
- Installing the Natural Web Interface Server Extensions
- Installing the Entire System Server Interface
- Installing Natural Security
- Installing the Software AG Editor
- Installing the Natural Net Data Interface
- Overall Installation Verification

The Natural Installation Guide for Mainframes is supplemented by the following documents:

- Natural Operations for Mainframes
- Natural TP Monitor Interfaces
- System Maintenance Aid

For details of the utility used for loading the Natural system objects, see also the INPL Utility.

For information on the installation of the Natural add-on products, see the following documents:

- Natural Advanced Facilities
- Natural Connection
- Natural for DB2 Database Interface
- Natural Development Server Installation under OS/390
- Natural for DL/I Database Interface

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- Natural for SQL/DS Database Interface
- Natural for VSAM Database Interface
- Natural Optimizer Compiler

General Installation Information

This document contains general installation information concerning the operating systems OS/390, VSE/ESA and BS2000/OSD.

The following topics are covered:

- Prerequisites
- Overview of the Installation Process
- INPL Format
- Installation Options
- Natural System Files
- Using VSAM System Files
- Using Installation Jobs Generated by System Maintenance Aid
- Creating Your Own Installation Jobs

Prerequisites

Before you can install the new version of Natural, the following products must already be installed and the following requirements must be met at your site:

- A supported version of the respective operating system must be installed. For the supported versions of the operating systems, refer to Operating/Teleprocessing Systems Required (in the current Natural Release Notes for Mainframes).
- A supported version of Adabas must be installed. For the supported versions, refer to Natural and Other Software AG Products in the current Natural Release Notes for Mainframes.
- As a rule of thumb, each major Software AG product requires approximately 20 MB space in the Adabas database to store the Natural objects supplied by Software AG.

To use VSAM system files, see Using VSAM System Files.

Overview of the Installation Process

The installation process comprises the following basic parts:

1. Creating an executable module for batch operation.
2. Creating a system file containing the Natural objects (programs, maps, etc.).

   Part 1 and Part 2 are described in the sections:

   Installing Natural under OS/390

   Installing Natural under VSE/ESA

   Installing Natural under VM/CMS

   Installing Natural under BS2000/OSD

3. Creating executable environments under different TP monitors for using Natural in online mode.
   The steps required for Part 3 are described for each TP monitor in the corresponding section of this document:

Installing the Natural/Com-plete Interface

Installing the Natural CICS Interface

Installing the Natural/IMS/TM Interface

Installing the Natural/TSO Interface

Installing the Natural/UTM Interface

Installing the Natural/TIAM Interface

4. Installing the optional Natural add-on products:

   Natural Advanced Facilities *

   Natural Connection *

   Natural for DB2 Database Interface *

   Natural for DL/I Database Interface *

   Natural for SQL/DS Database Interface *

   Natural for VSAM Database Interface *

   Natural Optimizer Compiler *

   Installing the Software AG Editor

   Installing NaturalX

   Installing the Natural Web Interface Server Extensions

   Installing the Entire Systems Server Interface

   Installing Natural Security

   Installing Natural SAF Security *

   Installing the Natural Net Data Interface

   * For installation procedures not included in this document, refer to the relevant add-on product documentation.

INPL Format

The instructions instructions frequently refer to the Natural utility INPL. INPL is used to load the Natural system objects (dataset NAT*nnn*.INPL) into the Natural system files. For details of this utility, refer to the INPL Utility documentation.

Installation Options

Natural offers various installation options which affect the setting up of your Natural system. For example, you can decide whether or not to use a Natural global buffer pool, a Natural shared nucleus, etc.

These options are described in the Natural Operations for Mainframes documentation or in the Natural TP Monitor Interfaces documentation. You are recommended to read this information before you begin with the installation of Natural.

Before you install Natural-based subproducts in a new Natural Version 3.1 environment, refer to the corresponding subproduct-specific installation description regarding INPL procedures.

Natural System Files

- **FNAT**

  A new FNAT system file is required if you wish to upgrade from a previous Natural version. An empty Adabas file is required for this purpose.

- **FUSER**

The FUSER system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural. See the corresponding installation description for the FUSER system file in the section Load the System Files.

- **FDIC**

  The FDIC system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural. See the corresponding installation description for the FDIC system file in the section Load the System Files.

- **FSEC**

  The FSEC system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural. See the corresponding installation description for the FSEC system file in the section Load the System Files.

- **Scratch-Pad File**

  The Scratch-Pad system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural. See the corresponding installation description for the Scratch-Pad File system file in the section Load the System Files.

Using VSAM System Files

If you want to use the Virtual Storage Access Method VSAM for storing your system files, the Natural interface to VSAM is required. For further information on the Natural interface to VSAM, refer to the Natural for VSAM documentation.

It is possible to store the system files of different Software AG products on different data management systems (for example, the Con-nect system file on Adabas and the Natural system file on VSAM). However, if Adabas is available, it is recommended that you use Adabas for **all** system files.

For information about which Software AG products can be used with VSAM system files, please contact Software AG support or your nearest affiliate.

Using Installation Jobs Generated by System Maintenance Aid

Note:
System Maintenance Aid (SMA) is not available for operating system VM/CMS.

The installation of Software AG products is performed by installation *jobs*. These jobs are either created "manually" or generated by System Maintenance Aid (SMA).

For each step of the installation procedures described below, the job number of a job performing the corresponding task is indicated. This job number refers to an installation job generated by SMA.

For information on the concepts and the usage of Software AG’s System Maintenance Aid (SMA), refer to the System Maintenance Aid documentation.

Creating Your Own Installation Jobs

If you are not using System Maintenance Aid, you can use the example installation job of the same job number in the job library on the Natural installation tape. You must adapt this example job to your requirements.

Note that the installation job numbers on the tape are preceded by a product code (see list of job number prefixes below).

Job Number Prefixes

The installation job numbers on the tape are preceded by a product code (for example, **NAT**I060). The relevant product codes are listed in the table below.

Product Code	Component
NAF	Natural Advanced Facilities
NAT	Batch Natural
NCI	Natural under CICS
NCO	Natural under Com-plete
NDB	Natural for DB2
NDL	Natural for DL/I
NII	Natural under IMS/TM
NRT	Natural for TIAM
NSC	Natural Security
NSQ	Natural for SQL/DS
NTC	Natural Connection
NTI	Natural under TSO
NUT	Natural for UTM
NVS	Natural for VSAM
NXX	NaturalX

Installing Natural under OS/390

This document describes step by step how to install Natural under the operating system OS/390 using Adabas system files.

The following topics are covered:

- Prerequisites
- Installation Tape for Natural under OS/390
- Installation Procedure for Natural under OS/390
- Installation Verification for Natural under OS/390

Prerequisites

- A supported version of the OS/390 or z/OS operating system must be installed. For the supported versions of the operating systems, refer to Operating/Teleprocessing Systems Required (in the current Natural Release Notes for Mainframes).
- A supported version of Adabas must be installed. For the supported versions, refer to Natural and Other Software AG Products in the current Natural Release Notes for Mainframes.
- As a rule of thumb, each major Software AG product requires approximately 20 MB space in the Adabas database to store the Natural objects supplied by Software AG.

Installation Tape for Natural under OS/390

The installation tape contains the datasets listed in the table below.

dataset Name	Contents
NAT*nnn*.SYSF	Empty Natural system file
NAT*nnn*.ERRN	Natural error messages
NAT*nnn*.LOAD	Natural load modules
NAT*nnn*.SRCE	Natural source modules and macros
NAT*nnn*.JOBS	Example installation jobs
NAT*nnn*.INPL	Natural system objects
NAT*nnn*.EXPL	Natural example objects

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are using System Maintenance Aid (SMA), refer to the SMA documentation (included on the current edition of the Natural documentation CD).

If you are **not** using SMA, follow the instructions below.

This section explains how to:

- Copy data set COPY.JOB from tape to disk.
- Modify this data set to conform with your local naming conventions.

The JCL in this data set is then used to copy all data sets from tape to disk.

If the datasets for more than one product are delivered on the tape, the dataset COPY.JOB contains the JCL to unload the datasets for all delivered products from the tape to your disk.

After that, you will have to perform the individual install procedure for each component.

Step 1 - Copy data set COPY.JOB from tape to disk

The data set COPY.JOB (label 2) contains the JCL to unload all other existing data sets from tape to disk. To unload COPY.JOB, use the following sample JCL:

```
//SAGTAPE JOB SAG,CLASS=1,MSGCLASS=X
//* --------------------------------
//COPY EXEC PGM=IEBGENER
//SYSUT1 DD DSN=COPY.JOB,
// DISP=(OLD,PASS),
// UNIT=(CASS,,DEFER),
// VOL=(,RETAIN,SER=<Tnnnnn>),
// LABEL=(2,SL)
//SYSUT2 DD DSN=<hilev>.COPY.JOB,
// DISP=(NEW,CATLG,DELETE),
// UNIT=3390,VOL=SER=<vvvvvv>,
// SPACE=(TRK,(1,1),RLSE),
// DCB=*.SYSUT1
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//
```

Where:

<*hilev*>	is a valid high level qualifier
<*Tnnnnn*>	is the tape number
<*vvvvvv*>	is the desired volser

Step 2 - Modify COPY.JOB to conform with your local naming conventions

There are three parameters you have to set before you can submit this job:

- Set HILEV to a valid high level qualifier.
- Set LOCATION to a storage location.
- Set EXPDT to a valid expiration date.

Step 3 - Submit COPY.JOB

Submit COPY.JOB to unload all other data sets from the tape to your disk.

Installation Procedure for Natural under OS/390

Step 1: Copy Natural Modules to an APF Library

(Job I009, Step 0100)

Copy the following Natural modules to an authorized program facility (APF) library:

NATAUMAT	Required if you want to install an Authorized-Service Manager (ASM).
NATAUPGT	
NATAUTRT	
NATBPMGR	Required if you want to install a Natural global buffer pool. An ASM is needed if you want to have Natural global buffer pool propagation.
NATGBPMV	
NATRSCFI	Required if you want to install a Natural roll server.
NATRSDRF	
NATRSMAT	
NATRSRDT	
NATRSSTT	
NATRSTRT	
NATRSWRT	

Step 2: Load the FNAT System File

(Job I050, Step 0100)

If you are installing into an existing Natural 3.1 FNAT file, skip this step.

Load the empty Natural system file (dataset NAT*nnn*.SYSF) using the ADALOD utility.

This file will contain all Natural objects supplied by Software AG. Its size depends on the number of products to be installed later. As a rule of thumb, 20 MB can be assumed for each major Software AG product.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

To avoid Natural errors NAT9988 and NAT7397 after reorganization of the FNAT system file using ADAULD/ADALOD, the parameter USERISN=YES should be left as set by System Maintenance Aid.

The file number *fnat* of the FNAT system file can be chosen as described under Natural profile parameter FNAT (see Profile Parameters in the Parameter Reference documentation).

Step 3: Load the FUSER System File

(Job I050, Step 0101)

You have the following options:

- You can use a new FUSER file for Version 3.1.
- You can use an existing Version 2.3 FUSER file to be shared by Versions 2.3 and 3.1.
- You can use an existing Version 2.2 FUSER file to be used by Version 3.1 only.
- You can use an existing Version 2.2 FUSER file to be shared by Versions 2.2 and 3.1.

Reuse an Existing 3.1 FUSER System File

If you want to use the existing Natural Version 3.1 FUSER system file, skip this step.

Use a New 3.1 FUSER System File - First-Time Installation

If you do **not** want to share the FUSER system file, proceed as follows:

Load the empty Natural user file contained in dataset NATnnn.SYSF using the ADALOD utility.

In this file, all user-written Natural programs are stored.

The following ADALOD parameters **must not** be altered:

```
ISNREUSE=YES
VERSION=6
```

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Parameter Reference in the Natural Reference documentation).
For the use of a new and empty FUSER system file for Natural Version 3.1, no additional system-file-related actions are necessary.

Reuse an Existing 2.3 FUSER System File - Migration from Natural Version 2.3

If you want to use the existing Natural Version 2.3 FUSER system file and you do not want to share the FUSER system file, skip this step.

Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1

If you use an existing Natural Version 2.3 FUSER system file to be shared by Natural Versions 2.3 and 3.1, you must upgrade your Natural Version 2.3 installation to Version 2.3.3 or 2.3.4.

Caution:
Do not use any Natural Version 2.3.2 or 2.3.1 utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File to be shared by Natural Versions 2.2 and 3.1

If you use an existing Version 2.2 FUSER system file to be shared by Natural Versions 2.2 and 3.1, the version of the shared file must be at least 2.2.8.

Note:
If you already performed the steps described below (in the course of your Natural 2.3 installation) to use an existing FUSER file to be shared by Natural Versions 2.2 and 2.3, that file can be considered a Version 2.3 file. For such a file, see the preceding section Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1.

To use a shared 2.2/3.1 FUSER file, before you install Natural Version 3.1, apply the following update INPL datasets to your Natural Version 2.2:

- NA2875 (if INPL Update NA228A2 not yet applied)
- NT2801 (only if Natural Connection is installed)
- NE2841 (only if Natural Security is installed and INPL Update NE22866 not yet applied)

- NA228B4 (only if Natural Security is installed)
- NQ3404 (only if Natural for DB2 is installed)
- NQ3405 (only if Natural for SQL/DS is installed)

Install Natural Version 3.1 as described in the operating-system-specific installation documents.

After you have installed Natural Version 3.1, replace all USR* modules you have copied from library SYSEXT into application libraries located in the Version 2.2 FUSER with the objects from the Version 3.1 library SYSEXT. The objects in the Version 3.1 library SYSEXT are cataloged with Version 2.2.

After you have discarded your Natural Version 2.2 environments, you should keep only modules belonging to your applications in library SYSTEM in FUSER and delete all Software AG objects from that library. If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.

With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

Attention:
Do not use any Version 2.2 Natural utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File for Natural Version 3.1 Only - Migration from Natural Version 2.2

If you use an existing Version 2.2 FUSER system file for Natural Version 3.1, the version of the shared file must be at least 2.2.8.

To use a Version 2.2 FUSER file for Natural Version 3.1 only, that is, without using Natural Version 2.2 in parallel on that file, perform the following steps:

1. With the Version 2.2 SYSMAIN utility, move the entire contents of the Version 2.2 library SYSTEM on the FUSER file to a backup library.
2. Install Natural Version 3.1.
3. With the Version 3.1 SYSMAIN utility, copy all of your own application objects - but no Software AG objects that are part of Natural itself! - from the backup library back to the library SYSTEM of the FUSER file.
   If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

- Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.
- With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Profile Parameters in the Parameter Reference documentation).

Step 3.1: Load the FDIC System File

(Job I050, Step 0103)

Skip this step

- if you want to install Predict (in this case, use the corresponding installation step in the Predict Installation documentation), or
- if you want to use an existing FDIC system file (an existing FDIC system file can be shared by Natural Versions 2.2 and 3.1, or Versions 2.3 and 3.1), or
- if you do not use your own FDIC system file.

If Predict is used, the sharing of the FDIC system file requires that Predict Version 3.4.2 has been installed.

Load the empty FDIC file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

The file number *fdic* of the FDIC system file can be chosen as described under Natural profile parameter FDIC (see Profile Parameters in the Parameter Reference documentation).

Step 3.2: Load the FSEC System File

Skip this step,

- if you do not use Natural Security, or
- if you want to use an existing FSEC system file, or
- if you do not want to use an own FSEC system file.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

An existing Version 2.3.3 or 2.3.4 FSEC system file can be shared by Natural Security Versions 2.3 and 3.1. For details, read the section Using Multiple Versions of Natural Security in the Natural Version 3.1.2 Release Notes for Mainframes. These Release Notes are included in the RN Archive on the Natural Documentation CD.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

Step 4: Load the Scratch-Pad File

(Job I050, Step 0102)

The scratch-pad system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural.

If you do not want to use a scratch-pad file, skip this step.

If you do want to use a scratch-pad file; that is, if you want to use read-only system files (ROSY=ON), see also Natural Scratch-Pad File (in the Natural Operations for Mainframes documentation). Proceed as follows:

Load the empty scratch-pad file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

For the optional scratch-pad file inclusion, the following NATPARM parameters must be added or, if already present, updated with:

```
LFILE=(212,dbid,fnr)
ROSY=ON
```

If you use SMA: To be able to use a read-only system file, you have to set the parameter NAT-SCRF=Y and manually modify skeletons NAT-USER-PARM23-xxxx to include ROSY=ON.

Step 5: Assemble the Natural OS/390 Interface Module

(Job I055, Step 0100 or 0103)

The source program NATOS contains a call to the macro NTOS which generates the Natural OS/390 interface.

- Job I055, Step 0100 does the IEBUPDATE.
- Job I055, Step 0103 assembles and links NATOS.

Set the parameters in the source of the module NATOS to fit your requirements.

For a description of the Natural for OS/390 generation parameters contained in the macro NTOS, refer to NTOS Macro - Generation Parameters for Natural under OS/390 (in the Natural Operations for Mainframes documentation).

Assemble and link the Natural OS/390 interface module "NATOS" contained in the dataset NAT*nnn*.SRCE.

Step 6: Create the Natural Configuration Module

(Job I055, Step 0110)

Assemble and link the Natural Configuration Module (NATCONFG).

For more information on the configuration tables in NATCONFG, refer to Natural Configuration Tables (in the Natural Operations for Mainframes documentation).

Step 7: Create the Parameter Module

(Job I060, Steps 0010, 0015)

Create the Natural batch parameter module.

The following parameters in the parameter module must be modified for the installation:

```
FNAT=(dbid,fnat)
FUSER=(dbid,fuser)
```

For *dbid*, *fnat* and *fuser*, use the values you specified when loading the system files (see Steps 2 and 3).

Global Buffer Pool: If you wish to use a *global* buffer pool, specify the macro NTBPI in all your Natural parameter modules.

For all other parameters: You can generally use the default values. Modify only the values of those parameters whose default values do not suit your requirements.

For a description of the individual parameters contained in the parameter module, refer to the Parameter Reference overview (in the Natural Reference documentation).

Assemble and link the parameter module.

Step 8: Link the Natural Nucleus

When linking the Natural nucleus, you have the following alternatives:

- Link a batch front-end (Job I060, Step 0020) and link a shared nucleus (Job I060, Step 0105) or
- link a non-shared nucleus (Job I060, Step 0020).

Using Alternative 1

1. Link a batch front-end (Job I060, Step 0020)
   If SMALOAD is APF authorized, and you use the OS/390 binder, link the batch nucleus as NORENT.
   With the INCLUDE instruction for the parameter module, specify the name of the Natural parameter module created in Step 7.
   The following modules must be included (include module NATOS first):

Module	Function
NATOS	Batch Natural driver
NATWKFO	Work file support
PR001B	Generated parameter module
ADAUSER	Adabas link module

   To access the shared nucleus, ensure that the NATPARM parameter NUCNAME contains the name of the module linked in Job I060, Step 0105.
   Link the batch front-end.

2. Link a shared nucleus (Job I060, Step 0105)
   For a list of the modules included, see Natural Shared Nucleus under OS/390 and VSE/ESA (in the Natural Operations for Mainframes documentation).
   Link the shared nucleus.

Using Alternative 2

Link a non-shared nucleus (Job I060, Step 0020)

If you use SMA: Ensure that parameter SHARED-NUC is set to 'N'. All the modules are then automatically linked in Step 0020
If you do not use SMA: Merge all INCLUDE statements and corresponding DD cards from Job I060, Step 0105 (shared nucleus) into Job I060, Step 0020 (front-end). Link the executable Natural nucleus.

Step 9: Load the System Programs

(Job I061, Step 0100)

Use the Natural utility INPL to load the Natural system objects (dataset NAT*nnn*.INPL) into the Natural system files.

Step 10: Load the Error Messages

(Job I061, Step 0102)

Load the Natural error messages file (dataset NAT*nnn*.ERRN) using the program ERRLODUS (described in the Natural SYSERR Utility documentation).

Step 11: Load the Examples

(Job I061, Step 0103)

Use the system command INPL to load the Natural example objects (dataset NAT*nnn*.EXPL) into the Natural system file.

Step 12: Load Possible INPL Updates

This step is only required if there are any INPL updates for Natural Version 2.3 on the installation tape. Please refer to the **Report of Tape Creation**.

Use the Natural system command INPL to load any Natural INPL updates.

Step 13: Create and Start the Global Buffer Pool

(Job I200, Step 0100)

This step must only be performed if you wish to use a global buffer pool.

Create and start the job STRTGBP1 before using Natural.

For further information on the global buffer pool, see Natural Global Buffer Pool (in the Natural Operations for Mainframes documentation).

Step 14: Create and Format the Roll File

(Job I200, Step 0101)

This step must only be performed if you wish to use the Natural Roll Server.

Create and start the job FORMRF1 before using Natural.

For further information on different types of roll files, see Natural under CICS and Natural under IMS/TM (in the Natural TP Monitor Interfaces documentation).

Step 15: Create and Start the Roll Server

(Job I200, Step 0102)

This step must only be performed if you wish to use the Natural Roll Server.

Create and start the job ROLLSV1 before using Natural.

For further information on the Natural Roll Server, see Natural Roll Server Operation (in the Natural Operations for Mainframes documentation).

Step 16: Create and Start the Authorized Services Manager

(Job I200, Step 0103)

This step must only be performed if you wish to use the Natural Authorized Services Manager.

Create and start the job AUTHSV1 before using Natural.

For further information, see Authorized-Services Manager (in the Natural Operations for Mainframes documentation).

Installation Verification for Natural under OS/390

For base Natural, there are no specific installation verification procedures.

After the last step of the installation procedure has been successfully performed, check that the following results are available:

- Communication between Adabas and Natural is working.
- The Natural system files have been loaded.
- Batch Natural is operational.

Installing Natural under VSE/ESA

This document describes step by step how to install Natural under the operating system VSE/ESA using Adabas system files.

The following topics are covered:

- Prerequisites
- Installation Tape for Natural under VSE/ESA
- Installation Procedure for Natural under VSE/ESA
- Installation Verification for Natural under VSE/ESA

Prerequisites

- A supported version of the VSE/ESA operating system must be installed. For the supported versions of the operating systems, refer to Operating/Teleprocessing Systems Required (in the current Natural Release Notes for Mainframes).
- A supported version of Adabas must be installed. For the supported versions, refer to Natural and Other Software AG Products in the current Natural Release Notes for Mainframes.
- As a rule of thumb, each major Software AG product requires approximately 20 MB space in the Adabas database to store the Natural objects supplied by Software AG.

Installation Tape for Natural under VSE/ESA

The installation tape contains the datasets listed in the table below. The sequence of the datasets and the number of library blocks needed are shown in the **Report of Tape Creation** which accompanies the installation tape.

dataset Name	Contents
NAT*nnn*.SYSF	Example Natural system file
NAT*nnn*.LIBR	LIBR backup file
NAT*nnn*.INPL	Natural system objects
NAT*nnn*.EXPL	Natural example objects
NAT*nnn*.ERRN	Natural error messages

The notation *nnn* in dataset names represents the version number of the product.

The dataset type and the space each dataset requires on disk is shown in the **Report of Tape Creation**.

Copying the Tape Contents to Disk

The sample JCS supplied on tape for the installation of Natural assumes the existence of one library, which has the following sublibraries:

- installation sublibraries, one for each Software AG product.

In addition to these, you need

- one work sublibrary,
- one sublibrary for sample installation jobs for Natural.

You are recommended to create this library and the work sublibrary before you proceed any further.

Use the following job to create this library.

The size needed for the library depends on the number of products and versions which are to be loaded into this library later on; the following example uses 1200 TRK of a 3380 device as a recommended size:

In the // EXTENT statement, replace *vvvvvv* with the VOLSER of the pack where the dataset is to reside, and *nnnn* with the starting track of the dataset.


```
* $$ JOB JNM=SMADEF,CLASS=0,DISP=D,LDEST=(,...)
* $$ LST CLASS=A,DISP=D
// JOB SMADEF
// DLBL SAGLIB,'INSTALL.SMALIB',99/365,SD
// EXTENT ,vvvvvv,1,0,nnnn,1200
// EXEC LIBR,PARM='MSHP'
DEFINE LIB=SAGLIB
DEFINE SUB=SAGLIB.USRLIB,REUSE=AUTO,R=Y
/*
/&
* $$ EOJ
```

The above sample job assumes that standard label SAGLIB is defined for this library. You can use the following job to add this label to the standard label area:

In the // EXTENT statement, replace *vvvvvv* with the VOLSER of the pack where the dataset is to reside.

```
* $$ JOB JNM=STDLABEL,CLASS=A,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB STDLABEL
// OPTION STDLABEL=DELETE
SAGLIB
/*
// OPTION STDLABEL=ADD
// DLBL SAGLIB,'INSTALL.SMALIB'
// EXTENT ,vvvvvv
/*
/&
* $$ EOJ
```

Copy the sublibrary containing the sample installation jobs from tape using the following JCS:

```
* $$ JOB JNM=NATJOBS,CLASS=0,DISP=D,LDEST=*,SYSID=1
* $$ LST CLASS=A,DISP=D
// JOB NATJOBS
// ASSGN SYS005,IGN
// ASSGN SYS006,cuu,VOL=Tnnnnn
// MTC REW,cuu
// MTC FSF,SYS006,nn
* Tape positioned at file ?, tape mark nn
* *** Now process NATnnn.LIBR - SUBLIBRARY NATnnnJ ***
// EXEC LIBR,PARM='MSHP'
RESTORE SUBLIB=SAGLIB.NATnnnJ:SAGLIB.NATnnnJ -
TAPE=SYS006 -
LIST=YES -
REPLACE=NO
/*
/*
/&
* $$ EOJ
```

Notation:

cuu	represents the physical unit address of the tape drive.
nn	represents the file sequence number as shown in the Report of Tape Creation.
nnn	represents the version number of the product.

If you are not using System Maintenance Aid, adapt and run the job NATTAPE from the job library to restore the Natural sublibrary from tape and make it known to MSHP.

All further datasets will be used direct from tape by the installation jobs.

Installation Procedure for Natural under VSE/ESA

Step 1: Load the FNAT System File

(Job I050, Step 0100)

If you are installing into an existing Natural 3.1 FNAT file, skip this step.

Load the empty Natural system file (dataset NAT*nnn*.SYSF) using the ADALOD utility.

This file will contain all Natural objects supplied by Software AG. Its size depends on the number of products to be installed later. As a rule of thumb, 20 MB can be assumed for each major Software AG product.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

To avoid Natural errors NAT9988 and NAT7397 after reorganization of the FNAT system file using ADAULD/ADALOD, the parameter USERISN=YES should be left as set by System Maintenance Aid.

The file number *fnat* of the FNAT system file can be chosen as described under Natural profile parameter FNAT (see Profile Parameters in the Parameter Reference documentation).

Step 2: Load the FUSER System File

(Job I050, Step 0101)

You have the following options:

- You can use a new FUSER file for Version 3.1.
- You can use an existing Version 2.3 FUSER file to be shared by Versions 2.3 and 3.1.
- You can use an existing Version 2.2 FUSER file to be used by Version 3.1 only.
- You can use an existing Version 2.2 FUSER file to be shared by Versions 2.2 and 3.1.

Reuse an Existing 3.1 FUSER System File

If you want to use the existing Natural Version 3.1 FUSER system file, skip this step.

Use a New 3.1 FUSER System File - First-Time Installation

If you do **not** want to share the FUSER system file, proceed as follows:

Load the empty Natural user file contained in dataset NATnnn.SYSF using the ADALOD utility.

In this file, all user-written Natural programs are stored.

The following ADALOD parameters **must not** be altered:

```
ISNREUSE=YES
VERSION=6
```

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Parameter Reference in the Natural Reference documentation).
For the use of a new and empty FUSER system file for Natural Version 3.1, no additional system-file-related actions are necessary.

Reuse an Existing 2.3 FUSER System File - Migration from Natural Version 2.3

If you want to use the existing Natural Version 2.3 FUSER system file and you do not want to share the FUSER system file, skip this step.

Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1

If you use an existing Natural Version 2.3 FUSER system file to be shared by Natural Versions 2.3 and 3.1, you must upgrade your Natural Version 2.3 installation to Version 2.3.3 or 2.3.4.

Caution:
Do not use any Natural Version 2.3.2 or 2.3.1 utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File to be shared by Natural Versions 2.2 and 3.1

If you use an existing Version 2.2 FUSER system file to be shared by Natural Versions 2.2 and 3.1, the version of the shared file must be at least 2.2.8.

Note:
If you already performed the steps described below (in the course of your Natural 2.3 installation) to use an existing FUSER file to be shared by Natural Versions 2.2 and 2.3, that file can be considered a Version 2.3 file. For such a file, see the preceding section Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1.

To use a shared 2.2/3.1 FUSER file, before you install Natural Version 3.1, apply the following update INPL datasets to your Natural Version 2.2:

- NA2875 (if INPL Update NA228A2 not yet applied)
- NT2801 (only if Natural Connection is installed)
- NE2841 (only if Natural Security is installed and INPL Update NE22866 not yet applied)
- NA228B4 (only if Natural Security is installed)
- NQ3404 (only if Natural for DB2 is installed)
- NQ3405 (only if Natural for SQL/DS is installed)

Install Natural Version 3.1 as described in the operating-system-specific installation documents.

After you have installed Natural Version 3.1, replace all USR* modules you have copied from library SYSEXT into application libraries located in the Version 2.2 FUSER with the objects from the Version 3.1 library SYSEXT. The objects in the Version 3.1 library SYSEXT are cataloged with Version 2.2.

After you have discarded your Natural Version 2.2 environments, you should keep only modules belonging to your applications in library SYSTEM in FUSER and delete all Software AG objects from that library. If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.

With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

Attention:
Do not use any Version 2.2 Natural utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File for Natural Version 3.1 Only - Migration from Natural Version 2.2

If you use an existing Version 2.2 FUSER system file for Natural Version 3.1, the version of the shared file must be at least 2.2.8.

To use a Version 2.2 FUSER file for Natural Version 3.1 only, that is, without using Natural Version 2.2 in parallel on that file, perform the following steps:

1. With the Version 2.2 SYSMAIN utility, move the entire contents of the Version 2.2 library SYSTEM on the FUSER file to a backup library.
2. Install Natural Version 3.1.
3. With the Version 3.1 SYSMAIN utility, copy all of your own application objects - but no Software AG objects that are part of Natural itself! - from the backup library back to the library SYSTEM of the FUSER file.
   If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

- Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.
- With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Profile Parameters in the Parameter Reference documentation).

Step 2.1: Load the FDIC System File

(Job I050, Step 0103)

Skip this step

- if you want to install Predict (in this case, use the corresponding installation step in the Predict Installation documentation), or
- if you want to use an existing FDIC system file (an existing FDIC system file can be shared by Natural Versions 2.2 and 3.1, or Versions 2.3 and 3.1), or
- if you do not use your own FDIC system file.

If Predict is used, the sharing of the FDIC system file requires that Predict Version 3.4.2 has been installed.

Load the empty FDIC file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```


The file number *fdic* of the FDIC system file can be chosen as described under Natural profile parameter FDIC (see Profile Parameters in the Parameter Reference documentation).

Step 2.2: Load the FSEC System File

Skip this step,

- if you do not use Natural Security, or
- if you want to use an existing FSEC system file, or
- if you do not want to use an own FSEC system file.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

An existing Version 2.3.3 or 2.3.4 FSEC system file can be shared by Natural Security Versions 2.3 and 3.1. For details, read the section Using Multiple Versions of Natural Security in the Natural Version 3.1.2 Release Notes for Mainframes. These Release Notes are included in the RN Archive on the Natural Documentation CD.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

Step 3: Load the Scratch-Pad File

(Job I050, Step 0102)

The scratch-pad system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural.

If you do not want to use a scratch-pad file, skip this step.

If you do want to use a scratch-pad file; that is, if you want to use read-only system files (ROSY=ON), see also Natural Scratch-Pad File (in the Natural Operations for Mainframes documentation). Proceed as follows:

Load the empty scratch-pad file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

For the optional scratch-pad file inclusion, the following NATPARM parameters must be added or, if already present, updated with:

```
LFILE=(212,dbid,fnr)
ROSY=ON
```

If you use SMA:
To be able to use read-only system files, set the SMA parameter NAT-SCRF=Y and ROSY=ON.

Step 4: Assemble the Natural Interface Module

(Job I055, Step 0100)

Set the parameters in the source of the module NATVSE contained in the sublibrary SAGLIB.NAT*nnn* to fit your site requirements.

For a description of the NTVSE generation parameters, refer to NTVSE Macro - Generation Parameters for Natural under VSE/ESA (in the Natural Operations for Mainframes documentation).

Assemble and link the Natural VSE/ESA interface module "NATVSE" contained in the dataset NAT*nnn*.LIBR.

Step 5: Create the Parameter Module

(Job I060, Steps 0010, 0015)

Create the Natural batch parameter module (Job I060, Steps 0010).

The following parameters in the parameter module must be modified for the installation:

```
FNAT=(dbid,fnat)
FUSER=(dbid,fuser)
```

For *dbid*, *fnat* and *fuser*, use the values you specified when loading the system files (see Steps 1 and 2).

For all other parameters, you can generally use the default values.

Modify only the values of those parameters whose default values do not suit your requirements. Especially, if you are using a 24-bit external SORT and a shared Natural nucleus linked with RMODE(ANY), you must set RCA=NAT2SORT; see below.

For a detailed description of the individual parameters contained in the parameter module, refer to the Parameter Reference overview (in the Natural Reference documentation).

Assemble and link the parameter module.

Step 6: Link the Natural Nucleus

(Job I060, Step 0020)

The following alternatives exist:

- link a batch front-end (Job I060, Step 0020) and link a shared nucleus (Job I060, Step 0105) or
- link a non-shared nucleus (Job I060, Step 0020).

Using Alternative 1

If you use SMA: Ensure that the SMA parameter SHARED-NUC is set to Y.

1. Link a batch front-end (Job I060, Step 0020).

The following modules must be included (include module NATVSE first):

Module	Function
NATVSE	Batch Natural driver
NATWKFD	Work file support
PRM020BA	Generated parameter module created in Step 5.
ADAUSER	Adabas link module

To access the shared nucleus, ensure that the parameter NUCNAME in the module NATPARM contains the name of the shared module linked in Job I060, Step 0105.

2. Link a shared nucleus (Job I060, Step 0105).

For a list of the modules included, see Natural Shared Nucleus under OS/390 and VSE/ESA (in the Natural Operations for Mainframes documentation).

Using Alternative 2

Link a non-shared nucleus (Job I060, Step 0020).

If you use SMA: Ensure that parameter SHARED-NUC is set to N.
If you do not use SMA: Merge all INCLUDE statements and corresponding DD cards from Job I060, Step 0105 (shared nucleus) into Job I060, Step 0020 (front-end).

Step 7: Link the SORT Nucleus for 24-Bit External SORT

(Job I060, Step 0110)

If you use SMA: Ensure that the SMA parameter 24BIT-SORT is set to Y.

This step is required if you use a shared nucleus linked with RMODE(ANY) **and** if you use a 24-bit external SORT, otherwise omit this step.

Link the module NAT2SORT to a phase with the same name and the attributes AMODE(31), RMODE(24) and entry point NATSRLNK.

To access this phase, ensure that RCA=NAT2SORT has been specified in your NATPARM or as a dynamic profile parameter.

Step 8: Link the Global Buffer Pool Modules

(Job I060, Steps 0120 and 0125)

This step is required if you want to use global buffer pools in VSE/ESA. See Global Buffer Pool under VSE/ESA (in the Natural Operations for Mainframes documentation)

Step 9: Load the System Programs

(Job I061, Step 0100)

Use the Natural system command INPL to load the Natural system objects (dataset NAT*nnn*.INPL) into the Natural system files.

Step 10: Load the Error Messages

(Job I061, Step 0102)

Load the Natural error messages file (dataset NAT*nnn*.ERRN) using the program ERRLODUS (described in the Natural SYSERR Utility documentation).

Step 11: Load the Examples

(Job I061, Step 0103)

Use the system command INPL to load the Natural example objects (dataset NAT*nnn*.EXPL) into the Natural system file.

Step 12: Load Possible INPL Updates

This step is only required if there are any INPL updates for Natural Version 2.3 on the installation tape. Please refer to the **Report of Tape Creation**.

Use the Natural system command INPL to load any Natural INPL updates.

Installation Verification for Natural under VSE/ESA

For base Natural, there are no specific installation verification procedures.

After the last step of the installation procedure has been successfully performed, check that the following results are available:

- Communication between Adabas and Natural is working.
- The Natural system files have been loaded.
- Batch Natural is operational.

Installing Natural under VM/CMS

This document describes how to install Natural under VM/CMS.

The following topics are covered:

- Prerequisites
- Preparing the VM System for Natural
- Preparing the Adabas System for Natural
- Building the Natural/CMS System
- Installation Tape for Natural under CMS
- Installation Procedure for Natural under CMS
- Installation Verification for Natural under CMS

For information on how to run Natural in a CMS environment, refer to Natural under VM/CMS in the Natural Operations documentation.

Notation vrs or vr: If used in the following document, the notation *vrs* or *vr* stands for the relevant **v**ersion, **r**elease, **s**ystem maintenance level numbers.

Prerequisites

The following products must be installed:

- A supported version of the VM/ESA or z/VM operating system must be installed. For the supported versions of the operating systems, refer to Operating/Teleprocessing Systems Required (in the current Natural Release Notes for Mainframes).
- A supported version of Adabas must be installed. For the supported versions, refer to Natural and Other Software AG Products in the current Natural Release Notes for Mainframes.
- As a rule of thumb, each major Software AG product requires approximately 20 MB space in the Adabas database to store the Natural objects supplied by Software AG.

Preparing the VM System for Natural

Natural is completely reentrant under CMS. It is recommended that Natural under CMS be installed as a Discontiguous Shared Segment (DCSS) to avoid unnecessary paging activity by VM.

For better performance, Natural uses a buffer pool in which Natural object programs are stored and executed. If you execute a Natural program, it is fetched from the database and stored in the buffer pool. If you subsequently invoke the same program, it will be executed directly in the buffer pool and thus repeated fetching from the database and accompanying IUCV overhead is avoided.

In a shared buffer pool, one Natural under CMS user can execute Natural programs that have been placed in the buffer pool by another Natural under CMS user. A shared buffer pool is implemented by installing the buffer pool in a writeable saved segment.

You are recommended to install two DCSSs: one for the Natural nucleus and one for the buffer pool. Of course, several buffer pools at different virtual addresses can be defined and several Natural nucleus DCSSs with different functionalities, for example, different static parameter settings (NATPARM) or different Assembler options of the CMS driver (NATCMS).

The buffer pool shared segment is defined as "SN" (see Step 1 of the installation procedure) and the first Natural session automatically initializes the buffer pool. When the last Natural user in VM exits Natural, the use count of the shared segment becomes 0, the buffer pool is purged from CP storage, and the next Natural session has to initialize the buffer pool again.

To avoid repeated initialization, the use count can be artificially held at 1 by including the following statement line in the PROFILE EXEC of a disconnected service machine, *segment* being the name of the Natural buffer pool shared segment:
SEGMENT LOAD *segment*

In this way, the Natural buffer pool is initialized only once and immediately available to a Natural session as long as the disconnected server is running.

Preparing the Adabas System for Natural

The Natural system programs are stored in the Natural system file FNAT. User-written Natural programs are stored in the Natural system file FUSER. These system files reside in Adabas files. Step 2 of the installation procedure describes how these Adabas files can be built in an Adabas system running under CMS.

Building the Natural/CMS System

Building the Natural/CMS system comprises the following steps:

- building the Natural nucleus and
- loading the Natural system file.

The Natural nucleus should be built

- as a module (for testing) and
- as a saved segment (for production use).

The Natural system file is loaded directly from tape using the installation EXEC, NATINPL; see Step 11 of the installation procedure.

The CMS driver NATCMS is included in the Natural module and in the saved segment. NATCMS ASSEMBLE consists of one macro that generates the driver.

Description of the Macro Parameters

For a detailed description of the macro parameters, refer to Step 8 of the installation procedure. The driver NATCMS and the parameter module NATPARM are assembled during the installation process. Optionally, the modules NATTEXT, NATTXT2, NATCONFG and NATPM can be modified and reassembled.

The list of text files to be included in the Natural module or DCSS is contained in REXX program NAT$LOAD EXEC (variable LOADLIST). To customize your Natural system, modify this EXEC with XEDIT by changing the LOADLIST as required.

User ID for Performing the Installation

The user ID used for performing the installation should have a minidisk of 10 cylinders on 3380-type disks or 9000 blocks FB-512. CP privilege class E is needed to issue the CP SAVESYS command. The size of the virtual machine allowed for the user ID must be adequate to accommodate the highest address of the saved segments that you plan to generate.

Installation Tape for Natural under CMS

The installation tape was created under OS/390; it has standard OS/390 labels and headers. It contains the datasets listed in the table below. The sequence of the datasets is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NAT*nnn*.SYSF	Empty Natural system file.
NAT*nnn*.TAPE	CMS installation material. This dataset is in TAPE DUMP format and must be loaded onto the installation minidisk.
NAT*nnn*.ERRN	Natural error messages.
NAT*nnn*.INPL	Natural system objects.
NAT*nnn*.EXPL	Natural example objects.

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

1. To position the tape for the TAPE LOAD command, calculate the number of tape marks as follows:

   If the sequence number of NAT*nnn*.TAPE, as shown by the **Report of Tape Creation**, is *n*, you must position over 3*n* - 2 tape marks (that is, FSF 1 for the first dataset, FSF 4 for the second, etc.).

2. Access the disk that is to contain the Natural installation files as disk "A".

   The size of the disk must be at least 1500 4-KB blocks, for example, 10 cylinders on 3380-type disks or 12000 blocks FB-512.

3. Ask the system operator to attach a tape drive to your virtual machine at address X’181’ and mount the Natural installation tape.
4. Position the tape by issuing the CMS command:
   TAPE FSF *fsfs*
   where *fsfs* is the number of tape marks and is calculated as described above.
5. Load the Natural under CMS installation material by issuing the CMS command:
   TAPE LOAD * * A
6. Keep the tape drive attached to your virtual machine, because the tape is still needed during the installation procedure.

Installation Procedure for Natural under CMS

Step 1: Define the Natural Discontiguous Saved Segments to VM

Execute the DEFSEG class E command for the Natural nucleus and for the Natural buffer pool.

Examples:

```
DEFSEG NAT<vr> 300-4FF SR
DEFSEG NATBP<vr> 500-5FF SN
SAVESEG NATBP<vr>
```

Note:
Segment NATBP*vr* is saved as an empty segment. Segment NAT*vr* will be saved later when the Natural nucleus has been loaded into it.

Step 2: Load the FNAT System File

If you are installing into an existing Natural 3.1 FNAT file, skip this step.

Load the empty Natural system file (dataset NAT*nnn*.SYSF) using the ADALOD utility.

This file will contain all Natural objects supplied by Software AG. Its size depends on the number of products to be installed later. As a rule of thumb, 20 MB can be assumed for each major Software AG product.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

To avoid Natural errors NAT9988 and NAT7397 after reorganization of the FNAT system file using ADAULD/ADALOD, the parameter USERISN=YES should be left as set by System Maintenance Aid.

The file number *fnat* of the FNAT system file can be chosen as described under Natural profile parameter FNAT (see Profile Parameters in the Parameter Reference documentation).

Please also note the following when defining a system file:

On the Natural installation tape, an input file for the ADALOD utility is provided.

It is easiest to perform the ADALOD operation from disk. You are recommended to copy the file NAT*nnn*.SYSF from tape to disk and to make an additional copies for loading the FUSER, FDIC and FSEC system files:

```
FILEDEF IN  TAP1 SL n VOLID nnnnnn (RECFM VB LRECL 9996 BLKSIZE 10000
FILEDEF OUT DISK NATvrSYS LODLIB A
MOVEFILE IN OUT
```

To make additional copies, issue the following commands, for example:

```
COPYFILE NATvrSYS LODLIB A NATvrUSE LODLIB A
COPYFILE NATvrSYS LODLIB A NATvrDIC LODLIB A
COPYFILE NATvrSYS LODLIB A NATvrSCR LODLIB A
```

Modify the member NAT*vr*SYS LODLIB to suit your requirements. In particular replace the question mark (?) specified for the FILE parameter with the file number chosen for your FNAT system file.

You can now invoke the ADALOD EXEC for loading the Natural system file:

```
ADALOD NATvrSYS
```

Step 3: Load the FUSER System File

You have the following options:

- You can use a new FUSER file for Version 3.1.
- You can use an existing Version 2.3 FUSER file to be shared by Versions 2.3 and 3.1.
- You can use an existing Version 2.2 FUSER file to be used by Version 3.1 only.
- You can use an existing Version 2.2 FUSER file to be shared by Versions 2.2 and 3.1.

Reuse an Existing 3.1 FUSER System File

If you want to use the existing Natural Version 3.1 FUSER system file, skip this step.

Use a New 3.1 FUSER System File - First-Time Installation

If you do **not** want to share the FUSER system file, proceed as follows:

Load the empty Natural user file contained in dataset NATnnn.SYSF using the ADALOD utility.

In this file, all user-written Natural programs are stored.

The following ADALOD parameters **must not** be altered:

```
ISNREUSE=YES
VERSION=6
```

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Parameter Reference in the Natural Reference documentation).
For the use of a new and empty FUSER system file for Natural Version 3.1, no additional system-file-related actions are necessary.

Reuse an Existing 2.3 FUSER System File - Migration from Natural Version 2.3

If you want to use the existing Natural Version 2.3 FUSER system file and you do not want to share the FUSER system file, skip this step.

Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1

If you use an existing Natural Version 2.3 FUSER system file to be shared by Natural Versions 2.3 and 3.1, you must upgrade your Natural Version 2.3 installation to Version 2.3.3 or 2.3.4.

Caution:
Do not use any Natural Version 2.3.2 or 2.3.1 utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File to be shared by Natural Versions 2.2 and 3.1

If you use an existing Version 2.2 FUSER system file to be shared by Natural Versions 2.2 and 3.1, the version of the shared file must be at least 2.2.8.

Note:
If you already performed the steps described below (in the course of your Natural 2.3 installation) to use an existing FUSER file to be shared by Natural Versions 2.2 and 2.3, that file can be considered a Version 2.3 file. For such a file, see the preceding section Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3

and 3.1.

To use a shared 2.2/3.1 FUSER file, before you install Natural Version 3.1, apply the following update INPL datasets to your Natural Version 2.2:

- NA2875 (if INPL Update NA228A2 not yet applied)
- NT2801 (only if Natural Connection is installed)
- NE2841 (only if Natural Security is installed and INPL Update NE22866 not yet applied)
- NA228B4 (only if Natural Security is installed)
- NQ3404 (only if Natural for DB2 is installed)
- NQ3405 (only if Natural for SQL/DS is installed)

Install Natural Version 3.1 as described in the operating-system-specific installation documents.

After you have installed Natural Version 3.1, replace all USR* modules you have copied from library SYSEXT into application libraries located in the Version 2.2 FUSER with the objects from the Version 3.1 library SYSEXT. The objects in the Version 3.1 library SYSEXT are cataloged with Version 2.2.

After you have discarded your Natural Version 2.2 environments, you should keep only modules belonging to your applications in library SYSTEM in FUSER and delete all Software AG objects from that library. If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.

With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

Attention:
Do not use any Version 2.2 Natural utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File for Natural Version 3.1 Only - Migration from Natural Version 2.2

If you use an existing Version 2.2 FUSER system file for Natural Version 3.1, the version of the shared file must be at least 2.2.8.

To use a Version 2.2 FUSER file for Natural Version 3.1 only, that is, without using Natural Version 2.2 in parallel on that file, perform the following steps:

1. With the Version 2.2 SYSMAIN utility, move the entire contents of the Version 2.2 library SYSTEM on the FUSER file to a backup library.
2. Install Natural Version 3.1.
3. With the Version 3.1 SYSMAIN utility, copy all of your own application objects - but no Software AG objects that are part of Natural itself! - from the backup library back to the library SYSTEM of the FUSER file.
   If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

- Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.
- With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Profile Parameters in the Parameter Reference documentation).

Modify the member NAT*vr*USE LODLIB to suit your requirements. In particular replace the question mark (?) specified for the FILE parameter with the file number chosen for your FUSER system file.

You can now invoke the ADALOD EXEC for loading the Natural system file:

```
ADALOD NATvrUSE
```

Step 3.1: Load the FDIC System File

Skip this step

- if you want to install Predict (in this case, use the corresponding installation step in the Predict Installation documentation), or
- if you want to use an existing FDIC system file (an existing FDIC system file can be shared by Natural Versions 2.2 and 3.1, or Versions 2.3 and 3.1), or
- if you do not use your own FDIC system file.

If Predict is used, the sharing of the FDIC system file requires that Predict Version 3.4.2 has been installed.

Load the empty FDIC file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

The file number *fdic* of the FDIC system file can be chosen as described under Natural profile parameter FDIC (see Profile Parameters in the Parameter Reference documentation).

Modify the member NAT*vr*DIC LODLIB to suit your requirements. In particular replace the question mark (?) specified for the FILE parameter with the file number chosen for your FDIC system file.

You can now invoke the ADALOD EXEC for loading the Natural system file:

```
ADALOD NATvrDIC
```

Step 3.2: Load the FSEC System File

Skip this step,

- if you do not use Natural Security, or
- if you want to use an existing FSEC system file, or
- if you do not want to use an own FSEC system file.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

An existing Version 2.3.3 or 2.3.4 FSEC system file can be shared by Natural Security Versions 2.3 and 3.1. For details, read the section Using Multiple Versions of Natural Security in the Natural Version 3.1.2 Release Notes for Mainframes. These Release Notes are included in the RN Archive on the Natural Documentation CD.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

Step 4: Load the Scratch-Pad File

The scratch-pad system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural.

If you do not want to use a scratch-pad file, skip this step.

If you do want to use a scratch-pad file; that is, if you want to use read-only system files (ROSY=ON), see also Natural Scratch-Pad File (in the Natural Operations for Mainframes documentation). Proceed as follows:

Load the empty scratch-pad file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

For the optional scratch-pad file inclusion, the following NATPARM parameters must be added or, if already present, updated with:

```
LFILE=(212,dbid,fnr)
ROSY=ON
```

Modify the member NAT*vr*SCR LODLIB to suit your requirements. In particular replace the question mark (?) specified for the FILE parameter with the file number chosen for your scratch-pad file.

You can now invoke the ADALOD EXEC for loading the Natural system file:

```
ADALOD NATvrSCR
```

Step 5: Customize the Natural Parameter Module

The file NATPARM ASSEMBLE contains sample settings of Natural profile parameters.

Use XEDIT to set the parameters FNAT, FUSER, FSEC and FDIC to the correct values for your installation.

Note that these parameters are in effect for the INPL procedure in Step 10.

You must define the Natural buffer pool using the NTBPI macro.

Example:

If you defined a buffer pool shared segment named NATBP*vr*, code:

```
NTBPI TYPE=NAT,NAME=NATBPvr
NTBPI TYPE=NAT,SIZE=1024
```


Natural will be instructed to load the shared segment NATBP*vr* and use it as its buffer pool. If the shared segment cannot be loaded, a buffer pool of 1024KB is allocated from CMS free storage and the initialization error message NAT1074 is displayed.

You can suppress the display of initialization error messages by coding:

```
IMSG=OFF
```

You may wish to include

```
HCAM=CMS
```

to enable the Hardcopy Function (%H) (as described in the Natural Operations documentation). See also Hardcopy Output (in the Natural Reference documentation).

Set other profile parameters as required by your installation.

For a description of these parameters, refer to Profile Parameters (in the Natural Reference documentation).

VM/ESA does not support CPU usage time measurement; as a result, the profile parameter MT reacts to elapsed time instead of CPU usage time. Therefore, set the MT parameter to MT=0.

Step 6: Customize the INCLUDE List for Linking of Natural

The program NAT$LOAD EXEC is used in the following two steps to build Natural for CMS.

You may wish to use XEDIT to customize the contents of variable LOADLIST, for example, to include your own routines that you defined as CSTATIC in NATPARM ASSEMBLE.

Step 7: Linking the Adabas Interface

Before linking Natural, copy the Adabas interface from the Adabas text library.

You can use the following CMS commands to perform this task:

```
FILEDEF IN DISK ADAVnnn TXTLIB fm (MEMBER ADABAS
FILEDEF OUT DISK ADABAS TEXT A
MOVEFILE IN OUT
```

where *ADAVnnn* stands for your current Adabas text library and *fm* for the filemode where you access this text library.

Step 8: Generate a Natural Module

Issue the following CMS command:

```
NATBLDM
```

You are prompted for the name of the Natural module.

Enter a valid CMS file name, for example, "NAT*vrs*".

NATBLDM checks NATCMS TEXT and NATPARM TEXT.

If a TEXT file is not found or if it is older than the corresponding source file, NATBLDM asks you whether you want to assemble (reassemble) the source file. If so, you are given the opportunity to XEDIT the source first, in order to define installation-dependent parameters.

Note that NATCMS TEXT does not exist during an initial installation and an assembly is forced.

Enter "YES" when asked whether you want to edit NATCMS.

Set the parameters that are described in NATCMS ASSEMBLE as required to conform to your site standards.

Parameters in Macro NATCMS

The following parameters can be specified in the NATCMS macro:

Parameter	Description
ATTNKEY=*key*	This parameter specifies the attention key that is used to interrupt a running Natural program, which means that the Natural error message NAT1016 is issued. Valid keys are PA1 to PA3 and PF1 to PF24. Specify NONE if no attention key is to interrupt a Natural program. For compatibility reasons with Natural Version 2.1, all attention keys issue the error message NAT1016 if the ATTNKEY parameter is omitted.
LOADSS=(*name1*,name2**,...)**	This parameter specifies the names of programs that reside in saved segments and are to be loaded dynamically during execution of the Natural CALL statement. If the name of a program differs from the name of the saved segment in which it is contained, specify the two names in parentheses. If, for example, you specify LOADSS=(ALPHA, (BETA, GAMMA)) and a Natural program executes CALL ’ALPHA’, the saved segment named ALPHA is loaded and control is passed to it. When a Natural program executes CALL ’BETA’, the saved segment named GAMMA is loaded and given control. Control is always passed to the start address of the saved segment. If an attempt to load a saved segment fails, normal dynamic load logic is executed, which means that a LOAD macro searches for TEXT files and for TXTLIB and LOADLIB members.
MAXSIZE=*nnn*	This parameter specifies the amount of CMS free storage (in KB) to be obtained for Natural; the default setting is 512. A standard way of calculating the space needed is to add all buffer sizes (ESIZE, etc.) explicitly defined in your NATPARM parameter module, plus 40 KB; see also Using the MAXSIZE Parameter (in the Natural Operations for Mainframes documentation).
OPID=*name*	This parameter specifies the name of the CMS machine to which the operator message is sent after a CALL ’CMWTO’ request has been issued from a Natural program. A value of "*" causes the message to be sent to the current CMS machine; the default value is "OP".

NATBLDM also generates a load map whose file name is the same as the file name of the module, with a file type of "MAP". Keep this map, because it may be helpful in locating errors.

Step 9: Generate a Natural DCSS

Issue the following CMS command:

```
NATBLDS
```

You are prompted for the name of the Natural DCSS (discontiguous shared segment) that you defined in installation Step 1.

Like NATBLDM in Step 8, NATBLDS checks NATCMS TEXT and NATPARM TEXT, and if necessary, allows you to edit and reassemble the respective source before building the saved segment.

NATBLDS also generates a load map whose file name is the same as the name of the DCSS, with a file type of "MAP". Keep this map, because it may be helpful in locating errors.

Natural then offers to build the "bootstrap" for the DCSS which will load and then pass control to the saved segment. If you enter "YES", Natural will ask you for the name you want to use to invoke Natural.

You can also build the bootstrap yourself using the following CMS command:

```
XEDIT NATBOOT ASSEMBLE
```

Set the parameter NSS to the name of the Natural DCSS and file it under the name you want to use, for example "NAT*vr*".

Issue the following CMS commands:

```
GLOBAL MACLIB NATnnn DMSGPI
ASSEMBLE NATvr
LOAD NATvr (ORIGIN TRANS
GENMOD NATvr
```

Step 10: Load the Natural System File and Error Messages

If the tape drive used when copying the contents of the installation tape to disk was detached from your virtual machine, ask the system operator to attach a tape drive to your virtual machine at address X’181’ and mount the Natural installation tape.

Before you can start the Natural INPL, the Adabas environment for your CMS machine must have been set up (as described in the Adabas documentation).

Issue the following CMS command:

```
NATINPL
```

You are prompted for the name of the command to invoke Natural.

Enter one of the following:

- the name of the Natural module built in Step 8, or
- the name of the Natural DCSS bootstrap created in Step 9.

NATINPL then positions the tape and loads the Natural system file and error messages.

This is the most time-consuming step of the installation procedure. The elapsed time varies greatly with machine type and system load and can in some cases exceed an hour.

The Natural system file definitions as coded in the Natural parameter module (which was created in Step 3) apply.

Three reports are produced on your virtual printer.

Check these reports to ensure that no errors have occurred.

Step 11: Make Natural Modules Available to the Users

Copy the Natural module and the DCSS bootstrap to a public disk or have your system programmer copy them to the CMS Y-disk.

Installation Verification for Natural under CMS

To verify your installation perform the following steps:

1. Issue as CMS command the name of the Natural module created in Step 8.
2. Check that the following results are available:
   - Communication between Adabas and Natural is working.
   - The Natural system files have been loaded.
   - Batch Natural is operational.

Installing Natural under BS2000/OSD

This document describes step by step how to install Natural under the operating system BS2000/OSD using Adabas system files.

The following topics are covered:

- Prerequisites
- Installation Tape for Natural under BS2000/OSD
- Installation Procedure for Natural under BS2000/OSD
- Installation Verification for Natural under BS2000/OSD

Prerequisites

- A supported version of the BS2000/OSD operating system must be installed. For the supported versions of the operating systems, refer to Operating/Teleprocessing Systems Required (in the current Natural Release Notes for Mainframes).
- A supported version of Adabas must be installed. For the supported versions, refer to Natural and Other Software AG Products in the current Natural Release Notes for Mainframes.
- As a rule of thumb, each major Software AG product requires approximately 20 MB space in the Adabas database to store the Natural objects supplied by Software AG.

Installation Tape for Natural under BS2000/OSD

The installation tape contains the datasets listed in the table below. The sequence of the datasets, the dataset type, the number of library blocks needed and the space each dataset requires on disk are shown in the **Report of Tape Creation** which accompanies the installation tape.

dataset Name	Contents
NAT*nnn*.SYSF	Empty Natural system file
NAT*nnn*.ERRN	Natural error messages
NAT*nnn*.PAMS	Natural module library
NAT*nnn*.SRCE	Natural source modules
NAT*nnn*.MACS	Natural macros
NAT*nnn*.JOBS	Example installation jobs
NAT*nnn*.INPL	Natural system objects
NAT*nnn*.EXPL	Natural example objects

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are not using SMA, use the procedure described below. In this procedure, the following values must be supplied:

In the dataset names, replace *nnn* with the current version number of the datasets.

Replace all *xxxxxx* with the volume serial number of the tape.

Perform the following steps to copy the datasets from tape to disk:

1. Copy the job dataset NAT*nnn*.JOBS from tape to disk using the BS2000/OSD utility PERCON or EDT.

- If you use PERCON, issue the following commands:

```
/FILE NATnnn.JOBS,VOL=xxxxxx,DEV=T9G -
/    ,FCBTYPE=,RECSIZE=,BLKSIZE=,RECFORM= -
/    ,STATE=FOREIGN,FSEQ=UNK,LINK=PCIN
/FILE P.NATnnn,LINK=PCOUT
/EXEC PERCON
END
```

- If you use EDT, issue the following commands:

```
/FILE NATnnn.JOBS,VOL=xxxxxx,DEV=T9G -
/     ,RECSIZE=,BLKSIZE=,RECFORM= -
/     ,STATE=FOREIGN,FSEQ=UNK,LINK=EDTSAM
/EXEC EDT
@ READ '/'
@ SY '/REL EDTSAM'
@ WRITE 'P.NATnnn'
@ HALT
```

2. Issue the following command:

```
/CALL P.NATnnn,PRODUCT=NATnnn
```

An example job library "LIB.NAT*nnn*" is created from the procedure dataset.

3. Adapt job "E.TAPE" from the example job library.

Then issue the following command to run the job which copies all datasets from tape to disk:

```
/E LIB.NATnnn(E.TAPE)
```


Installation Procedure for Natural under BS2000/OSD

Step 1: Load the FNAT System File

(Job I050, Step 0100)

If you are installing into an existing Natural 3.1 FNAT file, skip this step.

Load the empty Natural system file (dataset NAT*nnn*.SYSF) using the ADALOD utility.

This file will contain all Natural objects supplied by Software AG. Its size depends on the number of products to be installed later. As a rule of thumb, 20 MB can be assumed for each major Software AG product.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

To avoid Natural errors NAT9988 and NAT7397 after reorganization of the FNAT system file using ADAULD/ADALOD, the parameter USERISN=YES should be left as set by System Maintenance Aid.

The file number *fnat* of the FNAT system file can be chosen as described under Natural profile parameter FNAT (see Profile Parameters in the Parameter Reference documentation).

Step 2: Load the FUSER System File

(Job I050, Step 0101)

You have the following options:

- You can use a new FUSER file for Version 3.1.
- You can use an existing Version 2.3 FUSER file to be shared by Versions 2.3 and 3.1.
- You can use an existing Version 2.2 FUSER file to be used by Version 3.1 only.
- You can use an existing Version 2.2 FUSER file to be shared by Versions 2.2 and 3.1.

Reuse an Existing 3.1 FUSER System File

If you want to use the existing Natural Version 3.1 FUSER system file, skip this step.

Use a New 3.1 FUSER System File - First-Time Installation

If you do **not** want to share the FUSER system file, proceed as follows:

Load the empty Natural user file contained in dataset NATnnn.SYSF using the ADALOD utility.

In this file, all user-written Natural programs are stored.

The following ADALOD parameters **must not** be altered:

```
ISNREUSE=YES
VERSION=6
```

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FUSER (see Parameter Reference in the Natural Reference documentation).
For the use of a new and empty FUSER system file for Natural Version 3.1, no additional system-file-related actions are necessary.

Reuse an Existing 2.3 FUSER System File - Migration from Natural Version 2.3

If you want to use the existing Natural Version 2.3 FUSER system file and you do not want to share the FUSER system file, skip this step.

Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1

If you use an existing Natural Version 2.3 FUSER system file to be shared by Natural Versions 2.3 and 3.1, you must upgrade your Natural Version 2.3 installation to Version 2.3.3 or 2.3.4.

Caution:
Do not use any Natural Version 2.3.2 or 2.3.1 utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File to be shared by Natural Versions 2.2 and 3.1

If you use an existing Version 2.2 FUSER system file to be shared by Natural Versions 2.2 and 3.1, the version of the shared file must be at least 2.2.8.

Note:
If you already performed the steps described below (in the course of your Natural 2.3 installation) to use an existing FUSER file to be shared by Natural Versions 2.2 and 2.3, that file can be considered a Version 2.3 file. For such a file, see the preceding section Using a Version 2.3 FUSER File to be shared by Natural Versions 2.3 and 3.1.

To use a shared 2.2/3.1 FUSER file, before you install Natural Version 3.1, apply the following update INPL datasets to your Natural Version 2.2:

- NA2875 (if INPL Update NA228A2 not yet applied)
- NT2801 (only if Natural Connection is installed)
- NE2841 (only if Natural Security is installed and INPL Update NE22866 not yet applied)
- NA228B4 (only if Natural Security is installed)
- NQ3404 (only if Natural for DB2 is installed)
- NQ3405 (only if Natural for SQL/DS is installed)

Install Natural Version 3.1 as described in the operating-system-specific installation documents.

After you have installed Natural Version 3.1, replace all USR* modules you have copied from library SYSEXT into application libraries located in the Version 2.2 FUSER with the objects from the Version 3.1 library SYSEXT. The objects in the Version 3.1 library SYSEXT are cataloged with Version 2.2.

After you have discarded your Natural Version 2.2 environments, you should keep only modules belonging to your applications in library SYSTEM in FUSER and delete all Software AG objects from that library. If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.

With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

Attention:
Do not use any Version 2.2 Natural utilities to manipulate libraries that contain objects of the type "class"! This would cause internal inconsistencies to the effect that Natural 3.1 would then no longer be able to find these objects in the FUSER file.

Using a Version 2.2 FUSER File for Natural Version 3.1 Only - Migration from Natural Version 2.2

If you use an existing Version 2.2 FUSER system file for Natural Version 3.1, the version of the shared file must be at least 2.2.8.

To use a Version 2.2 FUSER file for Natural Version 3.1 only, that is, without using Natural Version 2.2 in parallel on that file, perform the following steps:

1. With the Version 2.2 SYSMAIN utility, move the entire contents of the Version 2.2 library SYSTEM on the FUSER file to a backup library.
2. Install Natural Version 3.1.
3. With the Version 3.1 SYSMAIN utility, copy all of your own application objects - but no Software AG objects that are part of Natural itself! - from the backup library back to the library SYSTEM of the FUSER file.
   If you are not sure which objects are part of your application and which are part of Natural, refer to the information given in SAGSIS Problem No. 176762.

The reasons for the above steps are as follows:

- Under Version 2.2, Natural system programs were loaded with INPL into the library SYSTEM on the FUSER file; these programs are not compatible with Natural Version 3.1. The above update INPL datasets replace these programs with ones that can be executed under Versions 2.2 and 3.1.
- With Version 2.2, Software AG objects to be loaded into the library SYSTEM were loaded into both the system files FNAT and FUSER; as of Version 2.3, they are only loaded into the FNAT file (that is, SYSTEM on FUSER no longer contains Software AG objects). Also, as of Version 2.3, the library SYSTEM on the FNAT file is the default steplib for user applications; with Version 2.2, it is not.

The file number *fuser* of the FUSER system file can be chosen as described under Natural profile parameter FNAT (see Profile Parameters in the Parameter Reference documentation).

Step 2.1: Load the FDIC System File

(Job I050, Step 0103)

Skip this step

- if you want to install Predict (in this case, use the corresponding installation step in the Predict Installation documentation), or
- if you want to use an existing FDIC system file (an existing FDIC system file can be shared by Natural Versions 2.2 and 3.1, or Versions 2.3 and 3.1), or
- if you do not use your own FDIC system file.

If Predict is used, the sharing of the FDIC system file requires that Predict Version 3.4.2 has been installed.

Load the empty FDIC file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```


The file number *fdic* of the FDIC system file can be chosen as described under Natural profile parameter FDIC (see Profile Parameters in the Parameter Reference documentation).

Step 2.2: Load the FSEC System File

Skip this step,

- if you do not use Natural Security, or
- if you want to use an existing FSEC system file, or
- if you do not want to use an own FSEC system file.

If you use Natural Security, refer to Installing Natural Security (in the Natural Installation Guide for Mainframes).

An existing Version 2.3.3 or 2.3.4 FSEC system file can be shared by Natural Security Versions 2.3 and 3.1. For details, read the section Using Multiple Versions of Natural Security in the Natural Version 3.1.2 Release Notes for Mainframes. These Release Notes are included in the RN Archive on the Natural Documentation CD.

If you use Natural Security, refer to Installing Natural Security.

Step 2.3: Load the Scratch-Pad File

The scratch-pad system file can be used exclusively by the new Natural version or it can be shared by different versions of Natural.

If you do not want to use a scratch-pad file, skip this step.

If you do want to use a scratch-pad file; that is, if you want to use read-only system files (ROSY=ON), see also Natural Scratch-Pad File (in the Natural Operations for Mainframes documentation). Proceed as follows:

Load the empty scratch-pad file contained in dataset NAT*nnn*.SYSF using the ADALOD utility, as described below.

The following ADALOD parameters must not be altered:

```
ISNREUSE=YES
VERSION=6
```

For the optional scratch-pad file inclusion, the following NATPARM parameters must be added or, if already present, updated with:

```
LFILE=(212,dbid,fnr)
ROSY=ON
```

Step 3: Assemble the Natural BS2000/OSD Stub Module and Batch Driver

(Job I055, Steps 0216 to 218)

Assemble the following source modules:

- "ABS2STUB" (Natural BS2000/OSD stub module),
- "ANATFRNT" (Natural BS2000/OSD front-end batch driver)
- "ANATRENT" (Natural BS2000/OSD reentrant batch driver).

These source modules are contained in the library *sma-job*.LIB .

Step 4: Create the Parameter Module

(Job I060, Step 0010)

Create the Natural batch parameter module.

The following parameters in the source parameter module "ANATPARM ", which is contained in library *sma-job*.LIB, must be modified for the insta llation:

```
FNAT=(dbid,fnat)
FUSER=(dbid,fuser)
```

For *dbid*, *fnat* and *fuser*, use the values yo u specified when loading the system files (see Steps 1 and 2).

For all other parameters, you can generally use the default values.

Modify only the values of those parameters whose default values do not suit your requirements.

For the individual parameters contained in the parameter module, refer to the Parameter Reference overview in the Natural Reference documentation.

Assemble the parameter module.

Step 5: Link the Natural Nucleus

(Job I060, Steps 3801, 3802)

Link the source modules "LNATFRNT" (front-end part of batch nucleus) and "LNATSHAR" (shared part of batch nucleus).

These source modules are contained in the library *sma-job*.LIB .

With the INCLUDE instruction for the parameter module, specify the nam e of the Natural parameter module created in Step 4.

Using a Sort Program

If you wish to use a sort program (either Natural’s internal one or an external one), include the module NAT2SORT.

It is also possible to place NAT2SORT in a load library from where it can be loaded dynamically at runtime; this requires that "NAT2SORT" is specif ied with the profile parameter RCA.

Step 6: Start All Pools

(Job I119, Step 0090)

Start the job "E.START.ALL" which is contained in the librar y *sma-job*.LIB.

To end all pools, start job "E.END.ALL" which is contained i n the library *sma-job*.LIB.

Step 7: Load the System Programs

(Job I061, Step 0100)

Use the Natural system command INPL to load the Natural system objects (the dataset NAT*nnn*.INPL) into the Natural system files.

Step 8: Load the Error Messages

(Job I061, Step 0102)

Load the Natural error messages file (dataset NAT*nnn*.ERRN) using the program ERRLODUS (described in the Natural SYSERR Utility documentation).

Step 9: Load the Examples

(Job I061, Step 0103)

Use the system command INPL to load the Natural example objects (dataset NAT*nnn*.EXPL) into the Natural system file.

Step 10: Load Possible INPL Updates

This step is only required if there are any INPL updates for Natural V ersion 2.3 on the installation tape. Please refer to the **Report of Tape Creation.**

Use the Natural system command INPL to load any Natural INPL updates.

Installation Verification for Natural under BS2000/OSD

For base Natural, there are no specific installation verification procedures. After the last step of the installation procedure has been successfully performed, check that the following results are available:

- Communication between Adabas and Natural is working.
- The Natural system files have been loaded.
- Batch Natural is operational.

Installing the Natural Com-plete Interface

This document describes step by step how to install the Natural Complete Interface. The following topics are covered:

- Structure and Functionality of the Natural Com-plete Interface
- Prerequisites
- Installation Tape for the Natural Complete Interface
- Installation Procedure for the Natural Complete Interface
- Using a Natural Local Buffer Pool under Com-plete
- Using the Com-plete *ULIB Function
- Installation Verification
- Customizing the Natural Com-plete Environment

For information on how to operate Natural in a Com-plete environment, refer to:

- Natural under Com-plete (in the Natural TP Monitor Interfaces documentation).

Structure and Functionality of the Natural Com-plete Interface

The Natural Com-plete Interface is made up by linking the following modules:

NCFNUC	TP driver interface module.
NCFPARM	Natural Com-plete parameter module.
NCFAM	Natural Com-plete print/work file access method.
TLOPUSER	Interface module for Com-plete functions. This module resides in the Com-plete delivery load library.
NATPARM	Natural parameter module.

The resulting module has to be cataloged as RESIDENT PAGE (see Com-plete System Programmer’s Manual and/or Com-plete Utility Manual).

In addition, it is often quite useful to have small startup programs which pass specific dynamic parameters to Natural. An example of such a startup program is created during installation.

Prerequisites

- Base Natural must be installed under OS/390 or VSE/ESA.
  Version as specified under Operating/Teleprocessing Systems Required in the current Natural Release Notes.
- Com-plete must be installed.
  Version as specified under Natural and Other Software AG Products in the current Natural Release Notes.

Installation Tape for the Natural Complete Interface

Platform:	Requirement:
OS/390 Systems	The modules required to install Natural under Com-plete are part of the standard Natural libraries NAT*nnn*.LOAD and NAT*nnn*.SRCE, which are delivered on the Natural installation tape (see Installation Tape for Natural under OS/390). No additional datasets are required.
VSE/ESA Systems	The modules required to install Natural under Com-plete are part of the standard Natural library NAT*nnn*.LIBR, which is delivered on the Natural installation tape (see Installation Tape for Natural under VSE/ESA). No additional datasets are required.

Installation Procedure for the Natural Complete Interface

Example jobs for installing Natural under Com-plete are contained in the job library with prefix NCO (for example, NCOI070).

Step 1: Create, Assemble and Link NCFPARM - Job I070, Steps 2311, 2312

Customization:
Macro NCMCFPRM contains several parameters, which you can modify if their default values do not suit your requirements; these variables are described in the section Customizing a Natural Com-plete Environment.

Step 2: Create, Assemble and Link Startup Program - Job I070, Steps 2320, 2321

This is an optional step; it should be performed based on site requirements only.

1. Create the source Natural under Com-plete startup program in the source library. Adapt this source to your requirements.
2. Assemble and link the startup program into your Com-plete user program library.

Step 3: Create Parameter Module - Job I080, Steps 2300, 2310

Create the Natural parameter module for Com-plete.

The following parameters in the parameter module must be modified for the installation:

```
FNAT=(dbid,fnat)
FUSER=(dbid,fuser)
```

For *dbid*, *fnat* and *fuser* use the values you specified when loading the system files; see Installing Natural under OS/390 or Installing Natural under VSE/ESA.

Local Buffer Pool:

If you wish to use a Natural *local* buffer pool under Com-plete,
review the TXTSIZE parameter, which determines the text segment size of the buffer pool; if necessary, change the TXTSIZE value in macro NTBPI.

Global Buffer Pool (OS/390 only):

If you wish to use a Natural *global* buffer pool under Com-plete,
specify the same values for the NTPRM parameter SUBSID and the NTBPI parameter NAME as in the Natural installation procedure.

For all other parameters, you can generally use the default values. Modify only the values of those parameters whose default values do not suit your requirements.

For a description of the individual parameters contained in the parameter module, see also the Parameter Reference overview (in the Natural Reference documentation).

Assemble and link the parameter module.

Step 4: Link Com-plete/Natural Nucleus - Job I080, Step 2320

With the INCLUDE instruction for the parameter module, specify the name of the Natural Com-plete parameter module created in Step 3.

1. Include the following modules:
   NCFNUC
   NCFPARM
   NCFAM (previous name: NATCMPL)
   TLOPUSER
   PRM020CO
2. Link the Com-plete/Natural nucleus to your Com-plete user program library.
3. Add the Natural Com-plete nucleus to the list of RESIDENTPAGE programs in your Com-plete SYSPARMs.
4. Adapt the INCLUDE statements for the interface module and the parameter module created in Job I070, Step 2312 and Job I080, Step 2310.

Non-shared nucleus:
If you do not wish to use a shared Natural nucleus under Com-plete, merge all INCLUDE statements and corresponding DD cards from Job I060, Step 0105 (shared nucleus) into Job I080, Step 2320 (front-end).

Step 5: Adapt Com-plete

This step refers to the use of:

- a Natural *local* buffer pool under Com-plete,
- the Com-plete *ULIB function.

These topics are described below under separate headings.

Using a Natural Local Buffer Pool under Com-plete

If you wish to run a Natural *local* buffer pool under Com-plete, link module NCFBPS31 with module TLINNSRV from the Com-plete load library, using the following linkage editor commands (see Job I070, Step 2330):

Platform:	Requirement:
OS/390	MODE RMODE(ANY) INCLUDE *natlib*(NCFBPS31) INCLUDE *comlib*(TLINNSRV) ENTRY NCFBPS31 NAME NCFBPS31(R) where *natlib* is the Natural load library and *comlib* is the Com-plete load library.
VSE/ESA	MODE RMODE(ANY) PHASE NCFBPS31,* INCLUDE NCFBPS31 INCLUDE TLINNSRV ENTRY NCFBPS31

Define the Natural buffer pool server(s) for Natural Version 3.1 in the Com-plete startup:

```
SERVER=(NATBPS31,NCFBPS31,bpdef[,sortdef][,edtdef])

bpdef : 1,size Natural buffer pool
sortdef : 2,size Sort buffer pool
edtdef : 4,size EDITOR buffer pool

size : size is specified in KB; the default value is 100.
```

Buffers will by default be allocated above 16 MB wherever possible.

Example:

```
SERVER=(NATBPS31,NCFBPS31,1,400,2)
```

This example allocates and initializes a Natural buffer pool of 400 KB above 16 MB and a sort buffer pool of 100 KB below 16 MB.

The Natural buffer pool initialization module is loaded dynamically during Com-plete initialization. The linked module must therefore be placed in a load library contained in the COMPINIT concatenation (see also the Com-plete installation documentation).

Using the Com-plete *ULIB Function

If you are running Natural under Com-plete in threads "below" (NCFPARM THABOVE=NO), you must catalog the Natural Com-plete Interface using *ULIB.

The Natural Complete Interface must also be cataloged if Natural work pools below the 16 MB line are desired. The ULIB region size will then depend on the value that was chosen for WPSIZE (section Profile Parameters in the Parameter Reference documentation).

See also Storage Usage (section Natural under Com-plete in the Natural TP Monitor Interfaces documentation).

The region size actually required depends on the buffer sizes specified in the Natural parameter module. To determine the region size actually used, you can use the Natural utility SYSTP as described in the section Debugging and Monitoring.

Installation Verification

Perform the following steps to verify the successful installation of the Natural/ Com-plete interface:

1. Stop and restart Com-plete.
2. Enter the Com-plete user menu, type in the name of the Natural Complete driver. The Natural initial screen should appear.
3. Proceed with the steps described in the section Installation Verification for the TP Monitor Interface.

Customizing the Natural Complete Environment

To customize your Natural Complete environment, you can modify the following parameters in the macro NCMCFPRM.

Parameters in Macro NCMCFPRM

ADDBUF | CRELO | EDITWRK | EXIT | HCDTID | INITID | LC | MSGHDR | NTHSIZE | NUCRELC | SPIEA | THABOVE | TTYxx | U2PRINT |

ADDBUF

Possible values:	any numeric value up to 32767
Default value:	0

ADDBUF specifies the size of the additional I/O buffer, which is calculated by the following algorithm:

```
I/O buffer size = min (8192 + ADDBUF, 32767)
```

CRELO

Possible values:	a list of program names
Default value:	none

CRELO defines the table of resident page programs which are relocatable. If one of the programs specified with this parameter is invoked with a CALL statement, the relocation is *not* disabled.

Example: `CRELO=(PROGA,PROGB)`

EDITWRK

Possible values:	**((***sdname***,** *reclength***,***numrec***),...)**
Default values:	*sdname*: CMEDIT31 *reclength*: 4048 *numrec*: 1000

EDITWRK specifies parameters for editor work files to be able to use the Software AG Editor, where *sdname* is the name of the SD file, *recl* is the record length, *numrec* is the number of records.

The combination *sdname,recl,numrec* may be repeated up to 19 times, which allows you to use up to 20 different editor buffer pools.

Example: `EDITWRK=((WF1,4048,1000),(WF2,4048,2000))`

EXIT

Possible values:	Name of user exit.
Default value:	None

EXIT defines a user exit module name which can be called during a session initialization before Natural is initialized.

HCDTID

Possible values:	YES/NO
Default value:	NO (the hardcopy destination corresponds to the logical terminal name).

HCDTID controls the initialization of the hardcopy destination.

HCDTID=YES	The hardcopy destination is initialized with the terminal ID.
HCDTID=NO	The hardcopy destination corresponds to the logical terminal name.

INITID

Possible values:	CPATCH, TIBNAM, TID
Default value:	TID (Natural terminal ID)

This parameter controls the content of the system variable *INIT-ID.

INITID=TIBNAM	*INIT-ID contains the logical unit name of the user's terminal.
INITID=TID	*INIT-ID contains the string *lbnnnnnn*, where *l* is the stack level on which the session is running, *b* is blank and *nnnnnn* is the TID number, right justified without leading zeroes.
INITID=CPATCH	*INIT-ID contains the same string as with INITID=TID, except that *b* is the Com-plete patch character instead of a blank.

LC

Possible values:	YES/NO
Default value:	YES

This parameter sets the terminal to lower-case mode.

MSGHDR

Possible values:	YES/NO
Default value:	YES

This parameter activates or deactivates a message header for Natural error and termination messages using Com-plete's message switching facility for asynchronous Natural transactions.

NTHSIZE

Possible values:	*nnnn*
Default value:	600

Specifies the size in KB of the storage area used for Natural's buffers, data areas and thread.

This storage area is allocated within the physical Com-plete thread. The remaining area (Com-plete region size RG for the Natural transaction minus NTHSIZE) is available for dynamically loading non-Natural subroutines, or for Natural work pools, for example.

NUCRELC

Possible values:	YES/NO
Default value:	NO

This parameter specifies whether a nucleus relocation check takes place or not.

NUCRELC=YES	When set to YES, this parameter does two things: It checks whether the shared nucleus has been relocated between terminal output and terminal input after the user has pressed ENTER or a PF key. This may happen if the RESIDENTPAGE nucleus is refreshed with the PGM REFRESH or PGM DELETE and PGM LOAD commands. It relocates Natural's internal pointers to the shared nucleus and avoids that a relocated shared nucleus leads to program abends or data corruption. The session can thus continue without interruption.
NUCRELC=NO	No nucleus relocation check.

SPIEA

Possible values:	YES/NO
Default value:	YES (SPIE/ABEXIT exits are activated)

This parameter activates or deactivates the SPIE/ABEXIT exits.

SPIEA=YES	Activates the SPIE/ABEXIT exits.
SPIEA=NO	Deactivates the SPIE/ABEXIT exits. Should be used for test purposes only.

THABOVE

Possible values:	YES/NO
Default value:	YES (use Com-plete thread extension)

This parameter determines the location of the Natural thread (see NTHSIZE parameter).

THABOVE=YES	The Natural thread is allocated in the Com-plete thread extension above the 16-MB line.
THABOVE=NO	The Natural thread is allocated in the physical Com-plete thread below the 16-MB line

TTYxx

This parameter sets teletypewriter (TTY) device control characters. The following hexadecimal values can be set:

Value	Meaning
TTYCR=0D	TTY carriage return
TTYLF=15	TTY line feed
TTYIC=00	TTY idle character
TTYNIC=00	TTY number of idle characters
TTYBS=16	TTY backspace
TTYAL=07	TTY alarm

U2PRINT

Possible values:	YES/NO
Default value:	NO (disable the dynamic hardcopy printer allocation)

This parameter controls Com-plete's dynamic printer allocation feature for hardcopy requests.

U2PRINT=YES	Natural calls for hardcopy requests Com-plete's U2PRINT routine to specify a printer destination.
U2PRINT=NO	Natural use the default value from the HCDEST parameter.

Installing the Natural CICS Interface

This document describes step by step how to install the Natural CICS Interface.

The following topics are covered:

- Prerequisites
- Installation Tape for the Natural CICS Interface
- Naming Conventions for the Natural CICS Interface
- Installation Procedure for the Natural CICS Interface
- Installation Verification

Before starting the installation procedure of Natural under CICS, you should have read the section concerning the system control mechanism, see System Control under CICS (section Natural under CICS in the Natural TP Monitor Interfaces documentation).

References to CICS Tables

Where appropriate, any references to CICS tables (DCT, FCT, PCT, PPT, TCT, etc.) can be considered as references to the corresponding:

- assembly-type resource definitions,
- online resource definitions via CEDA,
- batch resource definitions via DFHCSDUP.

Additional Information

For information on the following topics, refer to Natural under CICS in the Natural TP Monitor Interfaces documentation:

- Macros in Source Module NCISCPCB
- Parameters in Macro NCMPRM
- Customization of VSAM RRDS Roll Files
- NCISCPRI Warnings and Error Messages

Prerequisites

- Base Natural must be installed under OS/390 or VSE/ESA.
- CICS/ESA or CICS/VSE must be installed.
  Version as specified under Operating/Teleprocessing Systems Required in the current Natural Release Notes.
- If you want to install the swap manager module NATSWPMG, you must have included it during installation of Natural under OS/390, where it is optional.

Installation Tape for the Natural CICS Interface

Installation Tape - OS/390 Systems

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NCI*nnn*.LOAD	CICS-dependent load modules
NCI*nnn*.SRCE	CICS-dependent source programs and macros

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are using System Maintenance Aid (SMA), refer to the SMA documentation (included on the current edition of the Natural documentation CD).

If you are **not** using SMA, follow the instructions below.

This section explains how to:

- Copy data set COPY.JOB from tape to disk.
- Modify this data set to conform with your local naming conventions.

The JCL in this data set is then used to copy all data sets from tape to disk.

If the datasets for more than one product are delivered on the tape, the dataset COPY.JOB contains the JCL to unload the datasets for all delivered products from the tape to your disk.

After that, you will have to perform the individual install procedure for each component.

Step 1 - Copy data set COPY.JOB from tape to disk

The data set COPY.JOB (label 2) contains the JCL to unload all other existing data sets from tape to disk. To unload COPY.JOB, use the following sample JCL:

```
//SAGTAPE JOB SAG,CLASS=1,MSGCLASS=X
//* --------------------------------
//COPY EXEC PGM=IEBGENER
//SYSUT1 DD DSN=COPY.JOB,
// DISP=(OLD,PASS),
// UNIT=(CASS,,DEFER),
// VOL=(,RETAIN,SER=<Tnnnnn>),
// LABEL=(2,SL)
//SYSUT2 DD DSN=<hilev>.COPY.JOB,
// DISP=(NEW,CATLG,DELETE),
// UNIT=3390,VOL=SER=<vvvvvv>,
// SPACE=(TRK,(1,1),RLSE),
// DCB=*.SYSUT1
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//
```


Where:

<*hilev*>	is a valid high level qualifier
<*Tnnnnn*>	is the tape number
<*vvvvvv*>	is the desired volser

Step 2 - Modify COPY.JOB to conform with your local naming conventions

There are three parameters you have to set before you can submit this job:

- Set HILEV to a valid high level qualifier.
- Set LOCATION to a storage location.
- Set EXPDT to a valid expiration date.

Step 3 - Submit COPY.JOB

Submit COPY.JOB to unload all other data sets from the tape to your disk.

Installation Tape - VSE/ESA Systems

The installation tape contains the dataset listed below. The sequence of the datasets on tape is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NCI*nnn*.LIBR	Natural/CICS installation libraries

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are not using System Maintenance Aid:

Adapt and run job NCITAPE to copy the dataset from tape to disk.

NCITAPE is contained in sublibrary NAT*nnn*J on the Natural installation tape (see Installing Natural Under VSE/ESA).

The dataset type and the space it requires on disk are shown in the **Report of Tape Creation**.

Naming Conventions for the Natural CICS Interface

The following naming conventions apply for Natural under CICS:

ncip	A common system prefix of 1 to 5 characters; for example, NCI31. This prefix is determined by the value of the parameter PREFIX in the Natural/CICS parameter module; see also Step 3 of the Installation Procedure described below. It is followed by specific characters to make up the names of the following objects:
***ncip*CB**	Natural/CICS system directory; for example, NCI31CB.
***ncip*R1 to *ncip*R9**	Natural/CICS VSAM RRDS roll files (optional).
***ncip*XFA**	Natural/CICS 3270 Bridge XFAINTU exit.

Installation Procedure for the Natural CICS Interface

This section describes the actual installation steps.

When link-editing the Natural nucleus or its subcomponents, you may receive IEW2646I or IEW2660W messages, which can be ignored.

Step 1: Allocate the VSAM RRDS Roll Files for Natural

(Job I008, Step 2200)

This step must only be performed if VSAM roll files are used as CICS roll facility.

For optimum performance, which means without CI/CA splits, the Natural CICS Interface uses VSAM RRDS files for roll files.

Sample IDCAMS DEFINE CLUSTER Parameters:

```
DEFINE
  CLUSTER                    -
     (NAME (nci.roll1)       -
     VOLUME (nnnnnn)         -
     NUMBERED                - /* to  indicate VSAM RRDS         */
     CISZ (nnnn)             - /* must not be less than  4096    */
     RECSZ (nnnn nnnn)       - /* optimum  is CISZ minus 7 both  */
     RECORDS (nnnn) )        - /* no  secondary extents for RRDS */
  DATA -
     (NAME (nci.roll1.data) )
```

Step 2: Assemble the Roll-File Initialization Module

(Job I070, Step 2205)

This step must only be performed if VSAM roll files are used as roll facility.

This step creates an executable batch module which is used in Step 12.

Assemble and link/catalog the module NCISCPRI for initializing a roll-file.

Step 3: Create the Natural/CICS Parameter Module

(Job I070, Steps 2220, 2225)

The Natural/CICS parameter module NCIPARM contains a macro NCMPRM, which contains parameters specific to the Natural CICS Interface.

You can generally use the default values for all parameters. Modify only the values of those parameters whose default values do not suit your requirements. The only mandatory parameter without a default value is the common Natural/CICS prefix for roll files and programs.

To simplify the Natural/CICS parameter module installation process, the source module NCIPARM contains the NCMPRM macro request with parameter PREFIX=&SYSPARM. Thus, when generating a Natural/CICS parameter module, assemble the NCIPARM source module with assembler option SYSPARM=*prefix* rather than editing the source module.

The individual parameters are described in the section NCMPRM Macro Parameters (in the Natural TP Monitor Interfaces documentation).

Edit, assemble and link/catalog the Natural/CICS parameter module NCIPARM.

Step 4: Assemble the Natural CICS Interface Module

(Job I070, Step 2230)

Preprocess, assemble and link/catalog the Natural CICS Interface module NCISTART.

Keep in mind that with each installation of a new CICS release, the NCISTART module must be reassembled and linked.

Note:
When linking NCISTART, the following modules receive an IEW0461/IEW2454W error message: NCIPARM, DFHEAI0 and DFHEI1.
This is normal and is resolved in the final link-edit.

Step 5: Create the System Directory

(Job I070, Steps 2245, 2250)

The Natural CICS Interface system directory is generated by assembling and linking the source module NCISCPCB.

For OS/390, you find a basic example source in dataset NAT*nnn*.JOBS and a comprehensive example source in dataset NCI*nnn*.SRCE.

For VSE/ESA, you find a basic example source in sublibrary NAT*nnn*J and a comprehensive example source in sublibrary NCI*nnn*.

For a description of the individual macros and parameters contained in NCISCPCB, refer to NCISCPCB Generation Parameters (in the Natural TP Monitor Interfaces documentation).

Edit, assemble and link/catalog module NCISCPCB.

Step 6: Assemble the Natural/CICS External CALLNAT Interface Module

(Job I070, Step 2270)

This step must only be performed if you want to use the Natural/CICS external CALLNAT interface.

Assemble the Natural/CICS external CALLNAT interface module NCIXCALL.

If you have an NCIXCALL module from Natural Version 2.2, enter a new name for this Version 2.2 NCIXCALL in the SYSPARM parameter, for example NCIXCI22. In Job I080, Step 2270, the Version 2.2 NCIXCALL must be relinked with the name you have specified here.

Keep in mind that with each installation of a new CICS release, the NCIXCALL module must be reassembled and linked.

Note:
When linking NCIXCALL, the following modules receive an IEW0461/IEW2454W error message: DFHEAI0 and DFHEI1.
This is normal and is resolved in the final link-edit.

Step 7: Assemble the Natural/CICS NEP Interface Module

(Job I070, Step 2275)

This step must only be performed if you want to use the Natural/CICS node error program.

Assemble the Natural CICS Interface module NCIZNEP.

Keep in mind that with each installation of a new CICS release, the NCIZNEP module must be reassembled and linked.

Note:
When linking NCIZNEP, the following modules receive an IEW0461/IEW2454W error message: DFHEAI0 and DFHEI1.
This is normal and is resolved in the final link-edit.

Step 8: Assemble the Natural CICS Interface XFAINTU Exit

(Job I070, 2280)

This step must be performed only if you want to use Natural via the CICS 3270 Bridge.

Assemble the Natural CICS Interface module NCIXFATU.

Keep in mind that with each installation of a new CICS release, the NCIXFATU module must be reassembled and linked.

Note:
When linking NCIXFATU, the following modules receive an IEW0461/IEW2454W error message: DFHEAI0 and DFHEI1.
This is normal and is resolved in the final link-edit.

Step 9: Create the Natural Parameter Module

(Job I080, Steps 2210, 2220)

Create the Natural parameter module for CICS.

The following parameters in the parameter module must be modified for the installation:

```
FNAT=(dbid,fnat)
FUSER=(dbid,fuser)
```

For *dbid*, *fnat* and *fuser* use the values you specified when loading the system files; see Installation Procedure for Natural under OS/390 or Installation Procedure for Natural under VSE/ESA.

For all other parameters, you can generally use the default values. Modify only the values of those parameters whose default values do not suit your requirements.

For a description of the individual parameters contained in the parameter module, refer to the Profile Parameters documentation (in the Natural Reference documentation).

Edit, assemble and link/catalog the parameter module.

Step 10: Link the Natural/CICS Nucleus

(Job I080, Step 2230)

Link the executable Natural/CICS nucleus *ncistart* into your CICS user library.

Adapt the INCLUDE instruction for the parameter module to the name of the parameter module created in the previous step.

If you want to install the swap manager module NATSWPMG, you must have included it during installation of Natural under OS/390, where it is optional.

Non-Shared Nucleus:
The following paragraph only applies if you are not using System Maintenance Aid.

If you do not wish to use a shared Natural nucleus under CICS:

Merge all INCLUDE instructions and corresponding DD cards from Job I060, Step 0105 (shared nucleus) into Job I080, Step 2230 (front-end).

Step 11: Link the Natural System Directory

(Job I080, Step 2250)

Link the Natural system directory into your CICS user library with module name *ncip*CB (see Naming Conventions for the Natural CICS Interface).

The Natural system directory must be linked with option NORENT.

Step 12: Link the Roll-File Initialization Module

(Job I080, Step 2265)

This step must only be performed if VSAM roll files are used as CICS roll facility.

Link the VSAM roll file initialization module into your CICS user library.

Platform:	Requirement:
OS/390	This link step has already been performed in Step 2 (job I070, step 2205).

Step 13: Link the Natural/CICS External CALLNAT Interface Module

(Job I080, Steps 2270, 2271)

This step must only be performed if you want to use the Natural/CICS external CALLNAT interface.

Link the Natural/CICS external CALLNAT interface module NCIXCALL.

Step 2270 is needed if NCIXCALL has been installed in the same CICS with Natural Version 2.2.
The Natural Version 2.2 NCIXCALL must then be relinked with a new name, for example NCIXCI22 (see Step 6). This way, you can preserve the old Version 2.2 name "NCIXCALL" for Version 2.3, which avoids that you have to relink all your programs using NCIXCALL.

Step 2271 links the module NCIXCALL for Version 2.3.

Step 14: Link the Natural/CICS NEP Interface Module

(Job I080, Step 2275)

This step must only be performed if you want to use the Natural/CICS node error program.

Link the Natural CICS Interface module NCIZNEP.

Step 15: Link the Natural/CICS XFAINTU Exit

(Job I080, Step 2280)

This step must be performed only if you want to use Natural via the CICS 3270 Bridge.

Link the CICS Interface module NCIXFATU under the name *ncip*XFA (see Naming Conventions for the Natural CICS Interface).

Step 16: Initialize the VSAM Roll Files

(Job I081, Step 2200)

This step must only be performed if VSAM roll files are used as CICS roll facility.

Initialize the VSAM roll files.

This step must be repeated for all roll files used if roll-files are the primary roll-facility.

As a direct (random) access type file, a VSAM RRDS file has to be formatted.

For the Natural/CICS VSAM roll files, formatting is done by the NCISCPRI program. To execute the NCISCPRI program, the Natural roll file to be initialized has to be assigned with file name ROLL in the JCL DD (OS/390) or DLBL (VSE/ESA) statement respectively. No other parameter input is required for NCISCPRI; all data required for file initialization is obtained by SHOWCB VSAM macro calls.

When running Natural/CICS under VSE/ESA-type operating systems:
An end-of-data (/*) statement must be supplied in the JCL stream for compatibility reasons, although no parameter input is required by the NCISCPRI utility.

For a description of the messages that may be output during this step, refer to NCISCPRI Warnings and Error Messages (in the Natural TP Monitor Interfaces documentation).

Step 17: Customize CICS

(Job I005, Steps 2201 - 2205)

Add the following definitions to your CICS system:

- One entry in the PPT for the executable Natural module (*ncistart* being the name of the Natural/CICS nucleus as specified in Step 10):

  ```
  DFHPPT TYPE=ENTRY,PROGRAM=ncistart,RES=YES,PGMLANG=ASSEMBLER
  ```

Platform:	Requirement:
CICS 3.3 or above	The following parameter values can and should be set in the CICS program definition: EXECKEY(USER) DATALOCATION(ANY)

- One entry in the PPT for the Natural/CICS system directory (mandatory):

  ```
  DFHPPT TYPE=ENTRY,PROGRAM=ncipCB,PGMLANG=ASSEMBLER
  ```

Platform:	Requirement:
CICS 3.3 or above	The following parameter values can and should be set in the CICS program definition: EXECKEY(USER) DATALOCATION(ANY)

- One entry in the PPT for the shared Natural nucleus (optional):

  ```
  DFHPPT TYPE=ENTRY,PROGRAM=natshr23,PGMLANG=ASSEMBLER
  ```

Platform:	Requirement:
CICS 3.3 or above	The following parameter values can and should be set in the CICS program definition: EXECKEY(USER) DATALOCATION(ANY)

  (*natshr23* being the name of the environment-independent nucleus part - see also Natural Shared Nucleus (in the Natural Operations for Mainframes documentation) - as specified with the NUCNAME session parameter. The default name is NATSHR23.)

- One entry in the PPT for the 3GL CALLNAT interface (optional):

  ```
  DFHPPT TYPE=ENTRY,PROGRAM=NCIXCALL,PGMLANG=ASSEMBLER
  ```

Platform:	Requirement:
CICS 3.3 or above	The following parameter values can and should be set in the CICS program definition: EXECKEY(USER) DATALOCATION(ANY)

- One entry in the PPT for the node error program (optional):

  ```
  DFHPPT TYPE=ENTRY,PROGRAM=NCIZNEP,PGMLANG=ASSEMBLER
  ```

Platform:	Requirement:
CICS 3.3 or above	The following parameter values can and should be set in the CICS program definition: EXECKEY(CICS) DATALOCATION(ANY)

- One entry in the PPT for the XFAINTU global user exit (optional):

  ```
  DFHPPT TYPE=ENTRY, PROGRAM=ncipXFA, PGMLANG=Assembler
  ```

Platform:	Requirement:
CICS 4.1 or above	The following parameter values can and should be set in the CICS program definition: EXECKEY(CICS) DATALOCATION(ANY)

- One entry in the PCT for the Natural transaction:

```
DFHPCT TYPE=ENTRY,TRANSID=ncitransact,       *
       TWASIZE=128,                           *
       PROGRAM=ncistart,                      *
       SCRNSZE=ALTERNATE
```

(*ncitransact* being the name of the Natural/CICS user transaction code and
ncistart being the name of the Natural/CICS nucleus as specified in Step 10.)

- One entry in the PCT for the Natural internal message switching transaction:

```
DFHPCT TYPE=ENTRY,TRANSID=nmsg,              *
       TWASIZE=128,                          *
       PROGRAM=ncistart
```

(*ncistart* being the name of the Natural/CICS nucleus as specified in Step 10) and
nmsg being the name of the Natural/CICS message switching transaction code as defined in the MSGTRAN parameter, in the section
Parameters in Macro NCMPRM (in the Natural TP Monitor Interfaces documentation). The default name is NMSG.

- The Natural message switching facility requires this transaction to be defined in CICS.

Platform:	**Requirement:**
CICS 3.3 or above	The following parameter values can and should be set in the CICS transaction definition: TASKDATAKEY(USER) TASKDATALOC(ANY) Setting TASKDATAKEY(USER) requires that all modules invoked by Natural via BALR (for example, Adabas) must be able to run in USER key mode. Setting TASKDATALOC(ANY) may have impact on non-Natural programs called by Natural, see the CICS Manual for details.
CICS 4.1 or above	The following parameter value can and should be set in the CICS transaction definition: ISOLATE(YES)

- One entry in the FCT for each Natural CICS Interface VSAM roll file (only if VSAM roll files are to be used):

```
DFHFCT TYPE=FILE,                        *
       FILE=ncipR1,                      *
       ACCMETH=VSAM,                     *
       RECFORM=(FIXED,BLOCKED),          *
       SERVREQ=(UPDATE,DELETE,ADD),      *
       FILSTAT=(ENABLED,OPENED),         *
       BUFND=5,STRNO=3
```

  and correspondingly for all other roll files.
  Local shared resources (LSR) should be used whenever possible. If multiple LSR pools are supported, one pool should be dedicated exclusively to Natural CICS roll files.

- Two or (alternatively) three entries in the DCT for the Natural remote job entry facility NATRJE (OS/390 only):
  When submitting a job to JES with the following *two* entries, the internal reader is started on CLOSE of the destination:

```
DFHDCT TYPE=SDSCI,DSCNAME=NATRJE,TYPEFLE=OUTPUT
DFHDCT TYPE=EXTRA,DSCNAME=NATRJE,DESTID=nrje,OPEN=DEFERRED
```

  (*nrje* being the name of the Natural CICS submit destination as defined in the RJEDEST parameter, see the section NCMPRM Macro Parameters (in the Natural TP Monitor Interfaces documentation). The default name is NRJE.)

- Additionally, the following DD statement is required in the CICS startup JCL:

```
//NATRJE DD SYSOUT=(*,INTRDR),DCB=(RECFM=F,LRECL=80,BLKSIZE=80)
```

  When submitting a job to JES with the following *three* entries, the Natural CICS Interface deals with an indirect destination that will not be closed:

```
DFHDCT TYPE=SDSCI,DSCNAME=NATRJE,TYPEFLE=OUTPUT
DFHDCT TYPE=EXTRA,DSCNAME=NATRJE,DESTID=name,OPEN=INITIAL
DFHDCT TYPE=INDIRECT,DESTID=nrje,INDDEST=name
```

  (*nrje* being the name of the Natural CICS submit destination as defined in the RJEDEST parameter, see the section NCMPRM Macro Parameters (in the Natural TP Monitor Interfaces documentation). The default name is NRJE.
  (*name* being the name of the corresponding indirect destination.)
  It is the user's responsibility to either add an "/*EOF" card as the very last card in the job stream or use the corresponding NATRJE exit. When detecting the "/*EOF" card, JES submits the previous job stream.

- Optionally, you can add entries in the DCT for the Natural CICS error message logging facility. For Natural error messages, you can use:

A destination that is already defined in CICS (for example, CSSL); then no extra DCT entry is required.

An extra partition destination as a synonym for an existing CICS message destination:
DFHDCT TYPE=INDIRECT,DESTID=*nerr*,INDDEST=*name*

- An extra file:

```
DFHDCT TYPE=SDSCI,              *
       DSCNAME=NATMSG,          *
       RECFORM=VARUNB,          *
       RECSIZE=nnn,             *
       TYPEFLE=OUTPUT

DFHDCT TYPE=EXTRA,              *
       DSCNAME=NATMSG,          *
       DESTID=nerr,             *
       OPEN=INITIAL
```

(*nerr* being the name of the Natural CICS error message destination as defined in the MSGDEST parameter, in the section NCMPRM Macro Parameters (in the Natural TP Monitor Interfaces documentation). The default name is NERR.
You can change the RECFORM format from VARUNB (variable unblocked) to VARBLK (variable blocked), for example.
The record size *nnn* must be at least 120 to cover all Natural and CICS termination messages.
When using a disk file:
Sufficient disk space must be reserved for this dataset; under OS/390, a DD statement, or, under VSE/ESA, a DLBL statement must be added to the CICS startup JCL.
When using leading ASA control characters:
See the parameter ASA in macro NCMPRM (in the Natural TP Monitor Interfaces documentation). The file's record size must be increased by 1.

- Optionally, you can add two entries in the DCT for the Natural CICS session statistics:

```
DFHDCT TYPE=SDSCI,              *
       DSCNAME=NATLOG,          *
       RECFORM=VARBLK,          *
       BLKSIZE=4628,            *
       RECSIZE=4624,            *
       DEVICE=DISK

(parameter valid for VSE/ESA only)

DFHDCT TYPE=EXTRA,              *
       TYPEFLE=OUTPUT,          *
       DSCNAME=NATLOG,          *
       DESTID=nlog,             *
       OPEN=INITIAL
```

(*nlog* being the name of the Natural CICS logging destination as defined in the parameter LOGDEST (in the Natural TP Monitor Interfaces documentation). The default name is NLOG.) Sufficient disk space must be reserved for this dataset; under OS/390, a DD statement, or, under VSE/ESA, a DLBL statement must be added to the CICS startup JCL.

- To access a shared Natural nucleus in the LPA/ELPA under OS/390:

  Specify USELPACOPY(YES) for this program definition.

- To access a shared Natural nucleus in the SVA under VSE/ESA with CICS Version 4.1 and above:

  Specify USESVACOPY(YES) for this program definition.

- When using Natural Roll Server as Natural Authorized Services Manager (OS/390 only): add OS/390 system abend code 0D6 into a CICS System Recovery Table (SRT) to protect CICS against failing Roll Server and/or Authorized Services Manager request (via PC instruction) by Natural.

Installation Verification

1. Enter CICS from a user's terminal and type in the Natural transaction code.
2. Proceed with the steps described in the section Installation Verification for TP Monitor Interface.

Installing the Natural IMS Interface

This document describes how to install the Natural IMS Interface (NII)

The following topics are covered:

- Prerequisites
- Installation Tape for the Natural IMS Interface
- Installation Procedure for the Natural IMS Interface
- Customizing the IMS Environment
- Installing the Optional Multi-Session Feature
- Installation Verification

For information on the following topics, refer to Natural under IMS/TM in the Natural TP Monitor Interfaces documentation:

- Environments
- Components
- Special Functions
- User Exits
- Recovery Handling
- Natural IMS/TM Error Codes
  (a list of the error codes and messages that may be issued by the Natural IMS Interface)

Notation *vrs* or *vr*: If used in the following document, the notation *vrs* or *vr* stands for the relevant *version*, *release*, *system maintenance level* numbers.

Prerequisites

The following software must be installed and running before you install the Natural IMS Interface:

- Base Natural under OS/390 (Note that this Natural IMS Interface is applicable to both the Natural Versions 2.3 and 3.1).
- Natural global buffer pool if you are using the MPP environment (strongly recommended).
- Natural roll server if the Natural IMS parameter ROLLSRV is set to YES.
- Authorized Services Manager with the SIP Server function, if the Non-Conversational MPP Interface, Monitoring or Broadcasting is used.
- Authorized Services Manager, if Accounting to SMF is used.
- Adabas/IMS interface.

Installation Tape for the Natural IMS Interface

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NII*nnn*.LOAD	Natural IMS-dependent load modules
NII*nnn*.SRCE	Natural IMS-dependent source programs and macros

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are using System Maintenance Aid (SMA), refer to the SMA documentation (included on the current edition of the Natural documentation CD).

If you are **not** using SMA, follow the instructions below.

This section explains how to:

- Copy data set COPY.JOB from tape to disk.
- Modify this data set to conform with your local naming conventions.

The JCL in this data set is then used to copy all data sets from tape to disk.

If the datasets for more than one product are delivered on the tape, the dataset COPY.JOB contains the JCL to unload the datasets for all delivered products from the tape to your disk.

After that, you will have to perform the individual install procedure for each component.

Step 1 - Copy data set COPY.JOB from tape to disk

The data set COPY.JOB (label 2) contains the JCL to unload all other existing data sets from tape to disk. To unload COPY.JOB, use the following sample JCL:

```
//SAGTAPE JOB SAG,CLASS=1,MSGCLASS=X
//* --------------------------------
//COPY EXEC PGM=IEBGENER
//SYSUT1 DD DSN=COPY.JOB,
// DISP=(OLD,PASS),
// UNIT=(CASS,,DEFER),
// VOL=(,RETAIN,SER=<Tnnnnn>),
// LABEL=(2,SL)
//SYSUT2 DD DSN=<hilev>.COPY.JOB,
// DISP=(NEW,CATLG,DELETE),
// UNIT=3390,VOL=SER=<vvvvvv>,
// SPACE=(TRK,(1,1),RLSE),
// DCB=*.SYSUT1
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//
```

Where:

<*hilev*>	is a valid high level qualifier
<*Tnnnnn*>	is the tape number
<*vvvvvv*>	is the desired volser

Step 2 - Modify COPY.JOB to conform with your local naming conventions

There are three parameters you have to set before you can submit this job:

- Set HILEV to a valid high level qualifier.
- Set LOCATION to a storage location.
- Set EXPDT to a valid expiration date.

Step 3 - Submit COPY.JOB

Submit COPY.JOB to unload all other data sets from the tape to your disk.

Sample Jobs

The sample jobs are contained in the dataset NAT*nnn*.JOBS and are prefixed with "NII".

Installation Procedure for the Natural IMS Interface

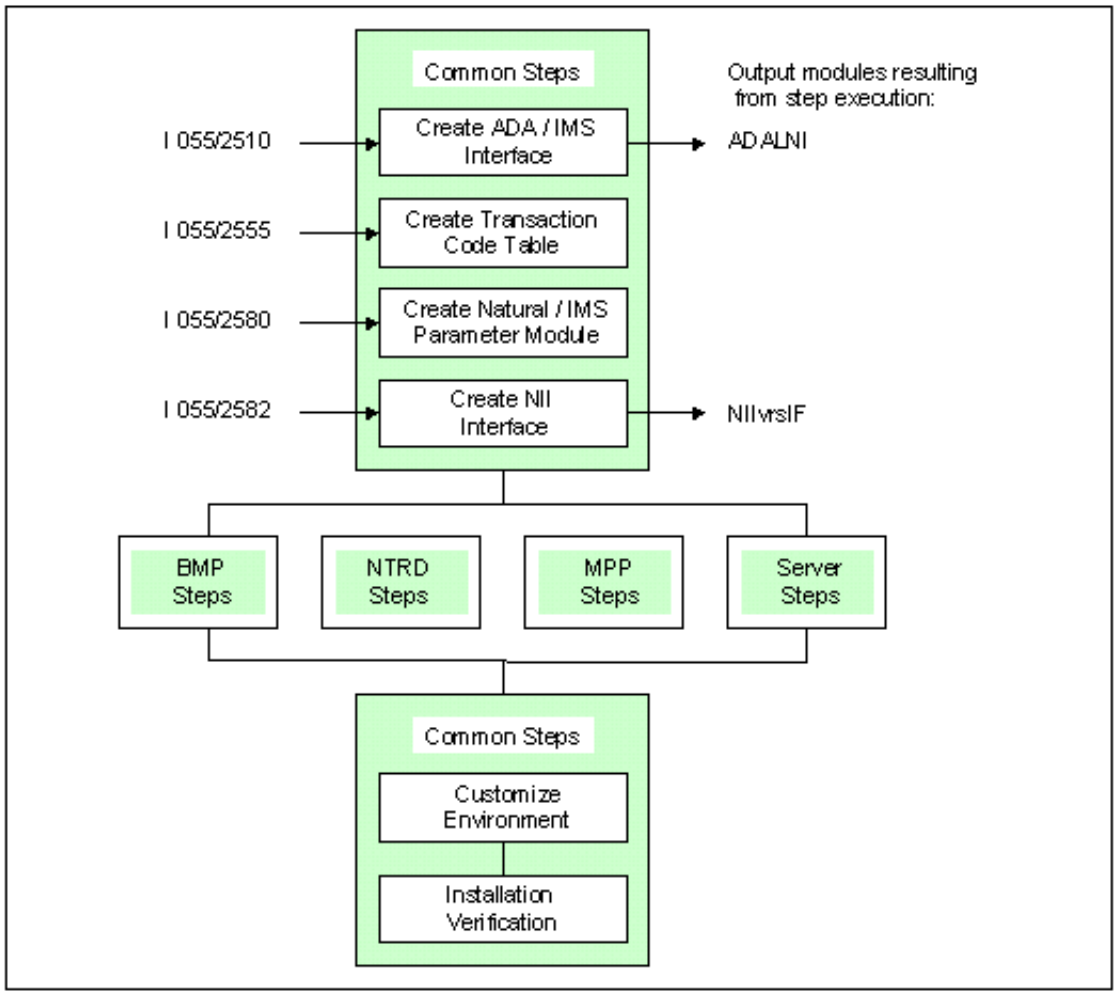
The installation procedure comprises the following:

1. Common Installation Steps
2. Installing the Batch Message Processing BMP Environment
3. Installing the Message-Oriented NTRD Environment
4. Installing the Dialog-Oriented MPP Environment
5. Installing the Natural IMS Server Environment
6. Customizing the IMS Environment

Perform the steps in the sequence indicated above.

Common Installation Steps

The following steps are required to install all environments:



Step 1: Assemble and Link the Adabas/IMS Interface

(Job I055, Step 2510)

1. Modify the member ADALNI from the Adabas/IMS source distribution library to meet your requirements. For further information, see the **Adabas Implementation and Maintenance documentation**.
2. Assemble and link the Adabas/IMS interface.

Step 2: Create and Assemble the Natural IMS Transaction Code Table

(Job I055, Steps 2555 and 2556)

1. Create the Natural IMS transaction code table by including a NIMTRNTG macro for each transaction code used for Natural transactions.

   For further information on the parameters in the NIMTRNTG macro, refer to NIMTRNTG Macro Parameters in the Natural TP Monitor Interfaces documentation.

   If you want to use Natural in non-message-driven BMP or a batch environment, add a NIMTRNTG macro for the PSB used with an arbitrary transaction code.

2. Assemble and link the transaction code table.

Step 3: Create and Assemble the Natural IMS Parameter Module

(Job I055, Steps 2580 and 2581)

1. Create the Natural IMS parameter module by including a NIMPARM macro for each environment needed.

   For information on the parameters for the NIMPARM macro, refer to NIMPARM Macro Parameters (in the Natural TP Monitor Interfaces documentation).

2. Assemble and link the Natural IMS parameter module.

Step 4: Link the Natural IMS Interface Module

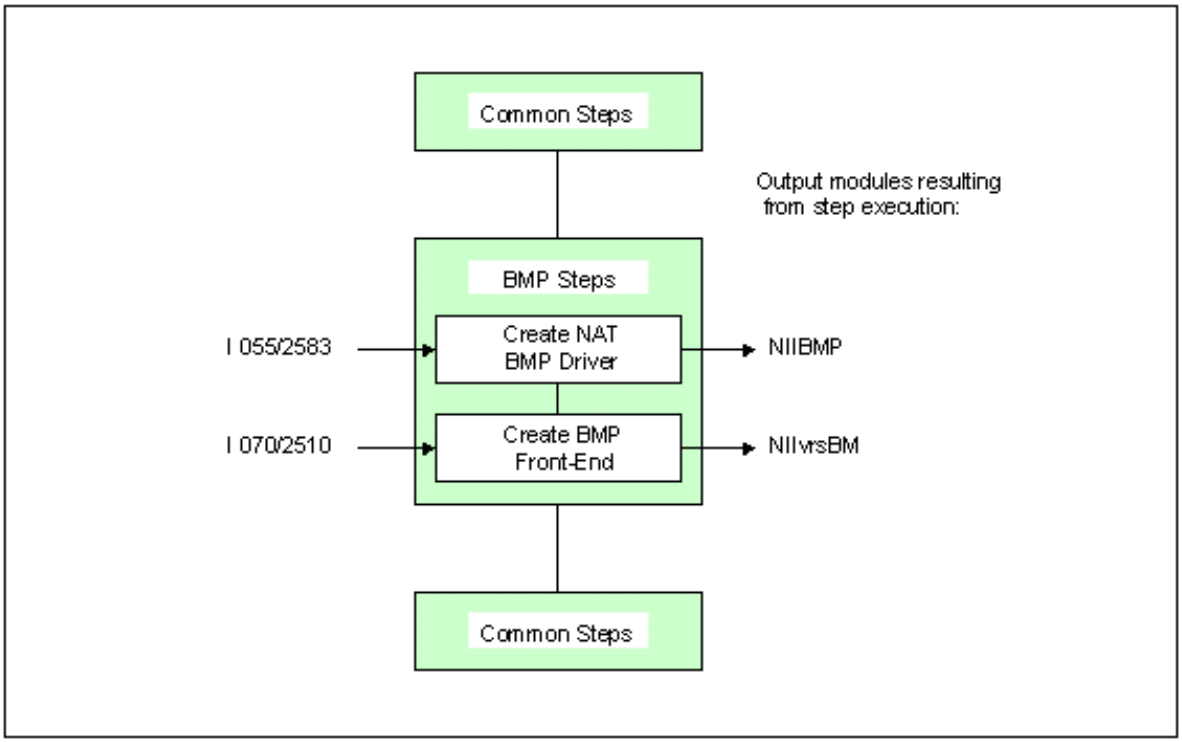
(Job I055, Step 2582)

Link the Natural IMS Interface module.

This module is applicable to all environments.

Installing the Batch Message Processing BMP Environment

The following steps are required to install the Natural IMS BMP environment:



Step 1: Create the Natural IMS BMP Interface

(Job I055, Steps 2583 and 2584)

1. Create the source NIIBMP which contains a call to macro NIMDRIV with the parameter TYPE set to "BMP".

   For further information on the macro NIMDRIV, refer to the NIMDRIV Macro Parameters (in the Natural TP Monitor Interfaces documentation).

2. Assemble and link the Natural IMS BMP interface.
   For CMPRMTB you receive the warning IEW0461. You can ignore this.
   If LE370 is set to YES, you receive the warning IEW0461 for modules starting with CEE. You can ignore this.

Step 2: Link the Natural IMS BMP Front-End

(Job I070, Step 2510)

The front-end consists of the BMP interface created in the previous step and your batch Natural parameter module NATPARM.

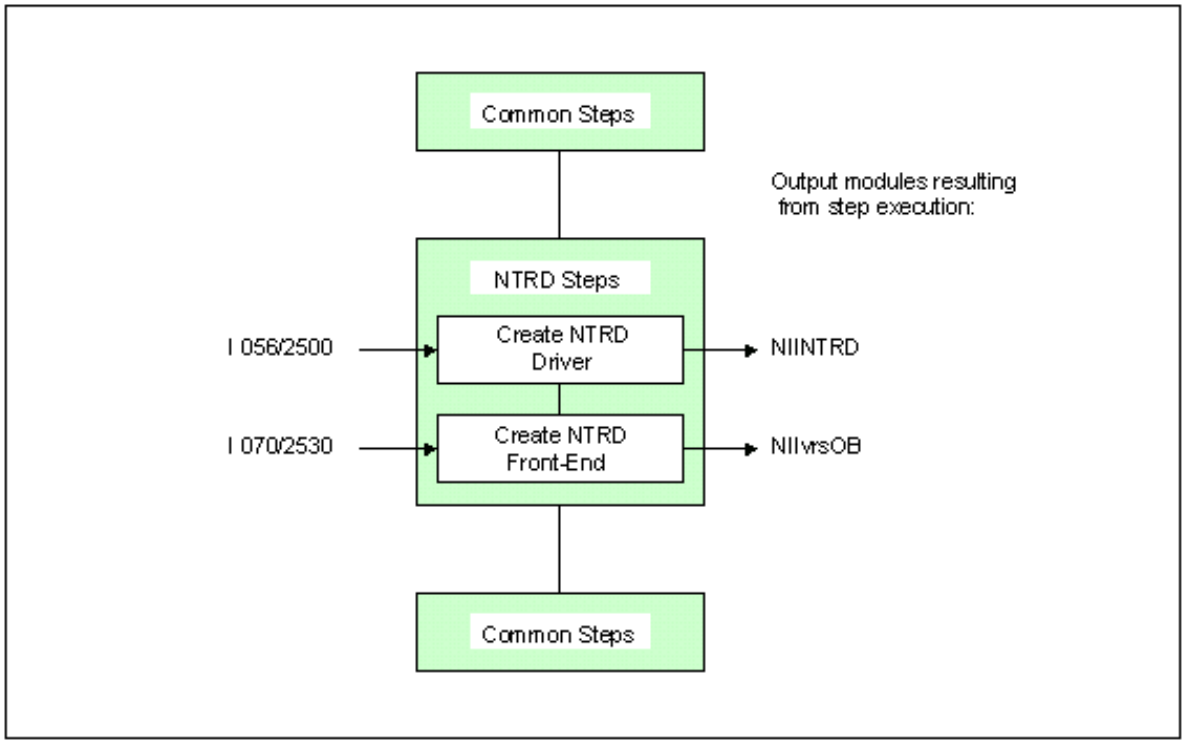
1. Specify the name of the Natural batch parameter module with the INCLUDE instruction in the parameter module (Job I060, Steps 0610, 0015).
2. Specify the name of the front-end module used for this link.

This name must also be specified in your BMP region job as application program name (parameter MBR).

3. Link the front-end for the Natural IMS BMP environment.

Installing the Message-Oriented NTRD Environment

The following steps are required to install the Natural IMS NTRD environment:



Step 1: Create the Natural IMS NTRD Interface

(Job I056, Steps 2500, 2501)

1. Create the source NIINTRD which contains a call to macro NIMDRIV with the parameter TYPE set to "NTRD".
   For further information on the macro NIMDRIV, refer to the NIMDRIV Macro Parameters (in the Natural TP Monitor Interfaces documentation).
2. Assemble and link the Natural IMS NTRD interface.
   For CMPRMTB you receive the warning IEW0461. You can ignore this.
   If LE370 is set to YES, you receive the warning IEW0461 for modules starting with CEE. You can ignore this.

Step 2: Link the Natural IMS NTRD Front-End

(Job I070, Step 2530)

The front-end consists of the NTRD interface created in the previous step and of your batch Natural parameter module NATPARM.

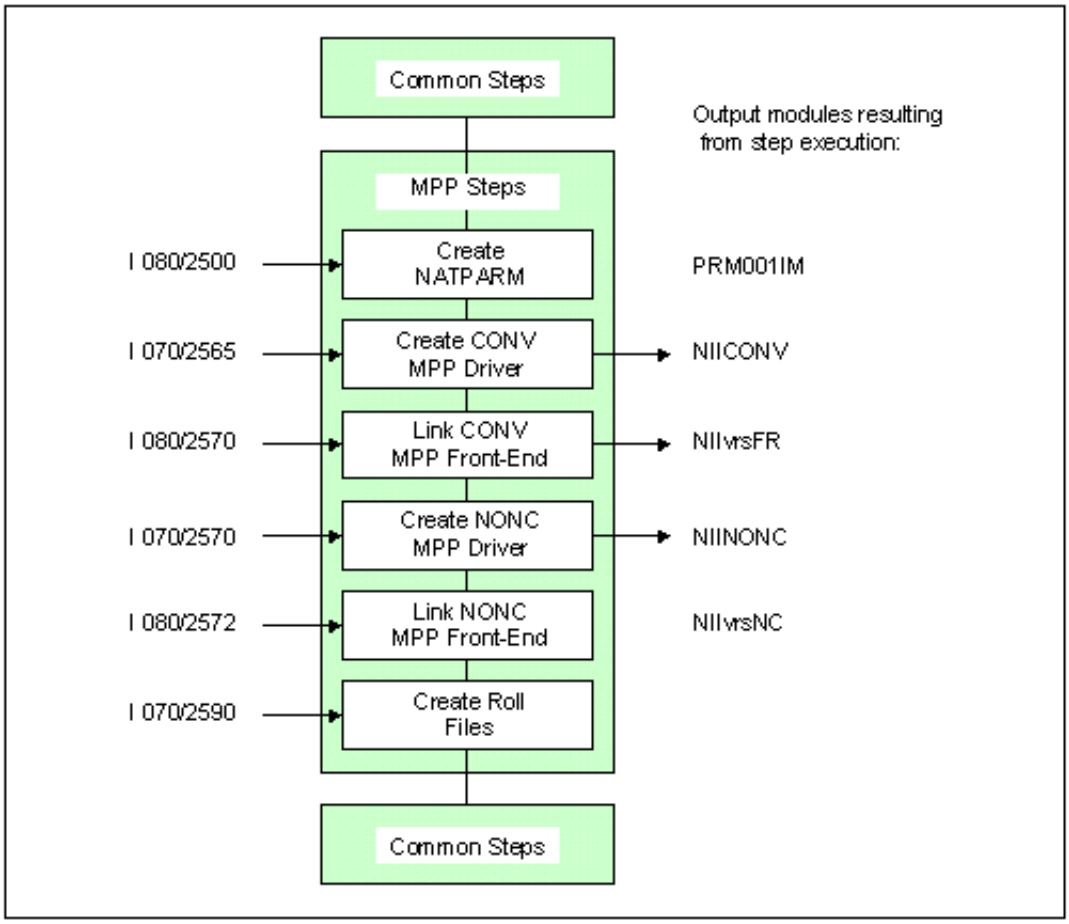
1. Specify the name of the Natural batch parameter module with the INCLUDE instruction in the parameter module (Job I060, Steps 0610, 0015).
2. Specify the name of the front-end module used for this link.

This name must also be specified in the APPLCNT macro as application program name (parameter PSB), if the NTRD front end is invoked direct by transaction code and not by bootstrap module.

3. Link the front-end for the Natural IMS NTRD environment.

Installing the Dialog-Oriented MPP Environment

The following steps are required to install the Natural IMS MPP environment:



Step 1: Create the Online Natural Parameter Module

(Job I080, Steps 2500, 2510)

1. Set the values of the following parameters in the parameter module:

   ```
   FNAT=(dbid,fnat)
     FUSER=(dbid,fuser)
   ```

   where *dbid*, *fnat*, and *fuser* are the values you specified when loading the system files in your base Natural installation.
   For further information, see Installing Natural Under OS/390.

2. To use a global buffer pool, specify the macro NTBPI in the parameter module and set the parameter SUBSID in the profile parameter module.

   It is strongly recommended that you use a global buffer pool.

3. Modify any other parameters in the parameter module whose default values do not meet your requirements. For further information on the parameters contained in the parameter module, refer to Parameter Modules (in the Natural Reference documentation).
4. Assemble and link the Natural parameter module for the dialog-oriented environments.

Step 2: Create the Natural IMS Conversational MPP Interface

(Job I070, Steps 2565,2566)

1. Create the source NIICONV which contains a call to macro NIMDRIV with the parameter TYPE set to "CONV".

   For further information on the macro NIMDRIV, refer to the NIMDRIV Macro Parameters (in the Natural TP Monitor Interfaces documentation).

2. Assemble and link the Natural IMS Conversational MPP interface.

Step 3: Link the Natural IMS Conversational MPP Front-End

(Job I080, Step 2570)

The front-end consists of the Natural IMS Conversational MPP interface created in Step 2 and the online Natural parameter module NATPARM created in Step 1.

1. Specify the name of the online Natural parameter module in the INCLUDE instruction for the parameter module.
2. Specify the name of the front-end module used for this link.

   This name must also be specified in the APPLCNT macro as application program name (parameter PSB).

3. Link the front-end for the Natural IMS Conversational MPP environment.

Step 4: Create the Natural IMS Non-Conversational MPP Interface

(Job I070, Steps 2570, 2571)

1. Create the source NIINONC which contains a call to macro NIMDRIV with the parameter TYPE set to "NONC".
   For further information on the macro NIMDRIV, refer to the NIMDRIV Macro Parameters (in the Natural TP Monitor Interfaces documentation).
2. Assemble and link the Natural IMS Non-Conversational MPP interface.

Step 5: Link the Natural IMS Non-Conversational MPP Front-End

(Job I080, Step 2572)

The front-end consists of the Natural IMS Non-Conversational MPP interface created in the previous step and the online Natural parameter module NATPARM created in Step 1.

1. Specify the name of the online Natural parameter module in the INCLUDE instruction for the parameter module.
2. Specify the name of the front-end module used for this link.

   This name must also be specified in the APPLCNT macro as application program name (parameter PSB).

3. Link the front-end for the Natural IMS Non-Conversational MPP environment.

Step 6: Allocate and Format the Natural IMS Roll Files

(Job I070, Step 2590)

This step is only required if you do not use the roll server.

If you do not want to use the Natural roll file server, you have to allocate and format the roll files to be used by Natural under IMS.

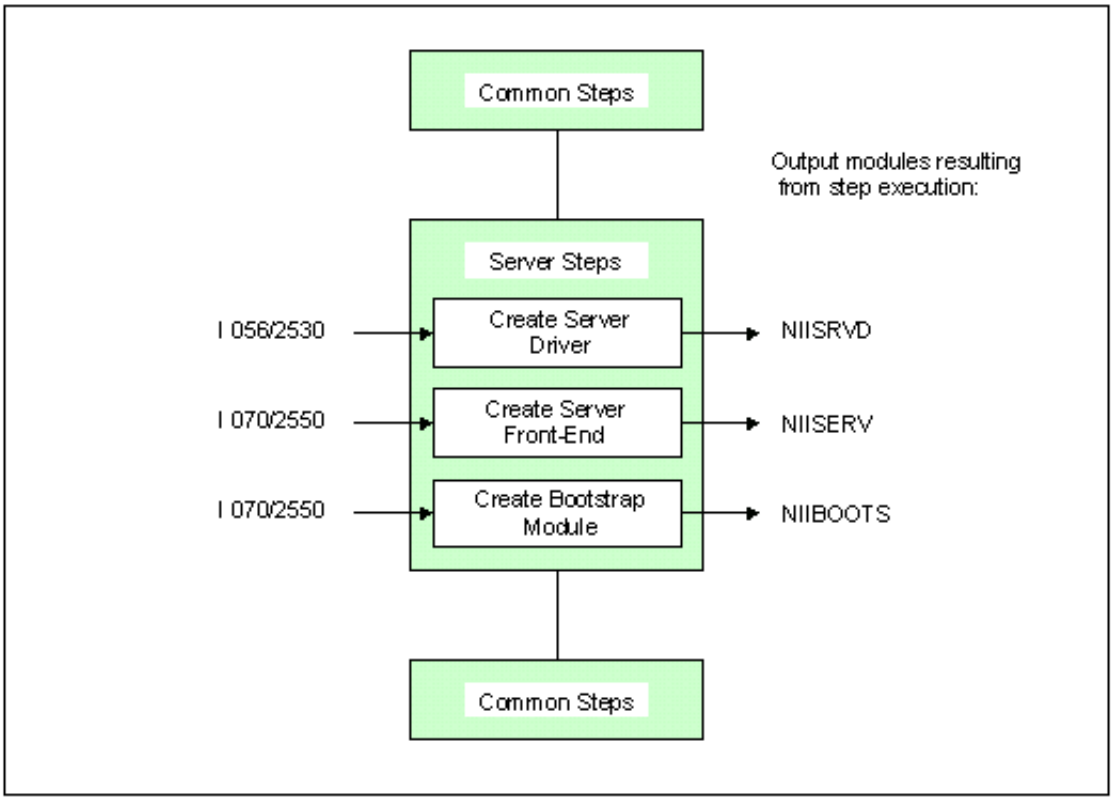
You can allocate up to 5 sequential datasets with a fixed-record format for use as roll files.

1. Allocate the roll files.
2. Format the roll files using the module NATRSRFI.
   Note:
   If you want to share roll files between Natural Version 2.3 and Natural Version 3.1 environments, you have to format the roll files using the Natural Version 2.3 module NATRSFI. Apart from the different version of module NATRSFI, the procedure is identical for Natural Version 2.3 and Natural Version 3.1 roll files.

The roll file initialization program produces a WTO message indicating the number of concurrent users which can be serviced by the roll file.
For information on the roll file facility, refer to Roll Server (in the Natural Operations for Mainframes documentation).

Installing the Natural IMS Server Environment

The following steps are required to install the Natural IMS server environment:



Step 1: Create the Natural IMS Server Interface

(Job I056, Steps 2530, 2531)

1. Create the source NIISRVD which contains a call to macro NIMDRIV with the parameter TYPE set to "SRVD".
   For further information on the macro NIMDRIV, refer to the NIMDRIV Macro Parameters (in the Natural TP Monitor Interfaces documentation).
2. Assemble and link the Natural IMS server interface.
   For CMPRMTB you receive the warning IEW0461. You can ignore this.
   If the Natural installation option LE370 is set to YES, you receive the warning IEW0461 for modules starting with CEE. You can ignore this.

Step 2: Link the Natural IMS Server Front-End

(Job I070, Step 2550)

The front-end consists of the server interface created in the previous step and of your batch Natural parameter module NATPARM.

1. Specify the name of the Natural batch parameter module with the INCLUDE instruction in the parameter module (Job I060, Steps 0610, 0015).
2. Specify the name of the front-end module used for this link.

   This name must also be specified in the NIMBOOT macro as diver name (parameter DRIVERN).

3. Link the front-end for the Natural IMS server environment.

Step 3: Create the Bootstrap Module NIIBOOTS

(Job I056, Steps 2540, 2541)

1. Create the source NIIBOOTS which contains a call to macro NIMBOOT with the parameter SERVER set to "YES". For the DRIVERN parameter, specify the name of the SRV front-end module created in step 2.
2. Assemble and link the Natural IMS bootstrap module.

Customizing the IMS Environment

The following steps require system modifications to your IMS environment.

Step 1: Create the APPLCTN Table Definitions for MPP, BMP and NTRD

MPP Define Sample:

```
APPLCTN PSB=NIIvrsFR,PGMTYPE=TP
      TRANSACT  CODE=NATvrs,MODE=SNGL,SPA=512,
          MSGTYPE=(SNLGSEG,RESPONSE,9)
```

The size of the SPA must be set to at least 157 bytes plus the NRASTART value.

BMP Define Sample (Message-Driven or NAF-specific BMP):

```
APPLCTN PSB=NIIvrsBM,PGMTYPE=BATCH
      TRANSACT  CODE=NATBMP,MODE=SNGL,
          MSGTYPE=(SNLGSEG,RESPONSE,9)
```

This APPLCTN definition is required if you use the CMGETMSG feature.

BMP Define Sample (without Message Queue Processing):

```
APPLCTN PSB=NIIvrsBM,PGMTYPE=BATCH
```

NTRD Define Sample:

```
APPLCTN PSP=NIIvrsOB,PGMTYPE=TP
      TRANSACT  CODE=NATOBMP,MODE=SNGL,
          MSGTYPE=(MULTSEG,NONRESPONSE,10)
```

Step 2: Create the PSB/ACB for both the MPP and BMP

Example for MPP:

PSB for conversational Natural:

```
  PCB TYPE=TP,MODIFY=YES
  PCB TYPE=TP,MODIFY=YES
  PCB TYPE=TP,MODIFY=YES
  PCB TYPE=DB,DBNAME=dliddm,PROCOPT=A,KEYLEN=16 sample for NDL
  SENSEG NAME=EMPLOY,PROCOPT=A sample for NDL
  SENSEG NAME=VEHICL,PROCOPT=A,PARENT=EMPLOY sample for NDL

  PSBGEN PSBNAME=NIIvrsFR,LANG=ASSEM,MAXQ=3,IOASIZE=132
```

At least one modifiable TP-PCB must be defined for default use of hardcopy, sending messages and transaction switching. To avoid a Natural initialization error, the value of the WRKPCBS parameter in the current environment table must be less than or equal to the number of PCBs minus 1.

Example for BMP:

```
  PCB TYPE=TP,MODIFY=YES
  PCB TYPE=TP,MODIFY=YES
  PCB TYPE=DB,DBNAME=dliddm,PROCOPT=A,KEYLEN=16 sample for NDL
  SENSEG NAME=EMPLOY,PROCOPT=A sample for NDL
  SENSEG NAME=VEHICL,PROCOPT=A,PARENT=EMPLOY sample for NDL
    PSBGEN PSBNAME=NIIvrsBM,LANG=ASSEM,MAXQ=3,IOASIZE=132
```

At least one modifiable TP-PCB must be defined for default use of hardcopy and sending messages. To avoid a Natural initialization error, the value of the WRKPCBS parameter in the current environment table must be less than or equal to the number of PCBs minus 1.

After creating the required APPLCTNs for the BMP and MPP environments, you must generate the PSB, DBD and ACB.

After the ACB generation, the following commands activate the new definitions:

```
MODIFY PREP ACBLIB
  MODIFY COMMIT
```

Step 3: Create the BMP and MPP Regions

Use the sample members as guidelines when creating the specific regions for your installation.

```
BMPJOB
  MPPJOB
```

Step 4: Create the PRELOAD List

Update the PRELOAD list using a PRELOAD member DFSMPL*xx* with the following module names:

- the Natural nucleus name,
- the name of the NII interface,
- the front-end name,
- the Adabas link module name

Example for MPP:

```
NATURvr,NIIvrsIF,NIIvrsFR,ADALNI
```

Example for BMP:

```
NATURvr,NIIvrsIF,NIIvrsBM,ADALNK
```

If ALIAS names are used for any members in the PRELOAD list, these names should be added to the PRELOAD list as well. Failure to do so leads to performance degradation.

Special Considerations

- Set the REGION parameter to at least 2 MB.
- Include LOAD libraries used to create the Natural IMS environment.
- Include the DD statement for the roll file created in job I070M, step 2590:

  ```
  //ROLLFn   DD  DSN=....DISP=SHR
  ```

  where *n* is a value from 1 - 5.

- Include the DD statement for NATRJE:

  ```
  //NIIRJEDD   DD  SYSOUT=(X,INTRDR)
  ```


Installing the Optional Multi-Session Feature

The Multi-Session Feature is an optional feature. For further information, see Multi-Session Feature (in the Natural TP Monitor Interfaces documentation).

Step 1: Create the Multi-Session Database

The following steps have no corresponding example jobs in NAT*nnn*.JOBS.

1. Create the DBD using the member NIIMSDBD in NII*vrs*.SRCE.
2. Create the PSB for the initial load.
3. Add the DBD to all PSBs intended for use with the multi-session feature.
4. Define and load the database using the JCL INITDM in NAT*vrs*.JOBS.

Step 2: Adapt the NII Parameter Module - Environment Table

Parameter	Description
MSACTV=YES	Activates the session manager
MSDBD=*dbdname*	Where *dbdname* is the name used in MSDBD
MSCRKEY	The key to create a new session
MSRSKEY	The key to switch to a resumed session
MSMAX=*nn*	Where *nn* is the number of active sessions (max. 8)

For further information, see the sections Installing the Batch Message Processing (BMP) Environment and Installing the Dialog-Oriented (MPP) Environment.

Step 3: Adapt the Transaction Code Table

Set the following parameter:

Parameter	Description
MSPCB	Number of the multi-session PCB

Installation Verification

1. From an IMS session, start the BMP with the following command:

   ```
   /STA REG BMPJOB
   ```

2. Check output.
   The output results from the Natural system command TECH. Verify the output with your environment.
3. Issue the following IMS commands from the IMS session:

   ```
   /STA REG MPPJOB
     /STA TRAN NATvrs
     /STA PROG NIIvrsFR
   ```

4. Type in transaction name NAT*vrs*.
5. Proceed with the steps described in the section Installation Verification for TP Monitor Interface.

Installing the Natural TSO Interface

The Natural TSO Interface (NATTSO) consists of a number of service routines interfacing with the OS/390 operating system. NATTSO is supplied as a source module and can be customized to meet your requirements (see also Step 3 of the NATTSO installation).

You have two options:

- assemble and link it to the Natural nucleus
- or run it separately, connecting with a shared nucleus.

NATTSO is fully reentrant and can run above the 16 MB line.

This document describes step by step how to install Natural in a TSO environment. It covers the following topics:

- Prerequisites
- Installation Tape for the Natural TSO Interface
- Installation Procedure for the Natural TSO Interface
- Installation Verification

For information on the following topics, refer to Natural under TSO (in the Natural TP Monitor Interfaces documentation):

- General Information about the Natural TSO Interface
- Natural TSO Datasets

Notation *vrs* or *vr:* If used in the following document, the notation *vrs* or *vr* stands for the relevant ***v***ersion, ***r***elease, ***s***ystem maintenance level numbers.

Prerequisites

Base Natural must be installed under OS/390.

See Installing Natural under OS/390.

Installation Tape for the Natural TSO Interface

The installation tape contains the dataset listed in the table below. The position of the dataset is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NTI*nnn*.SRCE	TSO-dependent source programs

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are using System Maintenance Aid (SMA), refer to the SMA documentation (included on the current edition of the Natural documentation CD).

If you are **not** using SMA, follow the instructions below.

This section explains how to:

- Copy data set COPY.JOB from tape to disk.
- Modify this data set to conform with your local naming conventions.

The JCL in this data set is then used to copy all data sets from tape to disk.

If the datasets for more than one product are delivered on the tape, the dataset COPY.JOB contains the JCL to unload the datasets for all delivered products from the tape to your disk.

After that, you will have to perform the individual install procedure for each component.

Step 1 - Copy data set COPY.JOB from tape to disk

The data set COPY.JOB (label 2) contains the JCL to unload all other existing data sets from tape to disk. To unload COPY.JOB, use the following sample JCL:

```
//SAGTAPE JOB SAG,CLASS=1,MSGCLASS=X
//* --------------------------------
//COPY EXEC PGM=IEBGENER
//SYSUT1 DD DSN=COPY.JOB,
// DISP=(OLD,PASS),
// UNIT=(CASS,,DEFER),
// VOL=(,RETAIN,SER=<Tnnnnn>),
// LABEL=(2,SL)
//SYSUT2 DD DSN=<hilev>.COPY.JOB,
// DISP=(NEW,CATLG,DELETE),
// UNIT=3390,VOL=SER=<vvvvvv>,
// SPACE=(TRK,(1,1),RLSE),
// DCB=*.SYSUT1
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//
```


Where:

<*hilev*>	is a valid high level qualifier
<*Tnnnnn*>	is the tape number
<*vvvvvv*>	is the desired volser

Step 2 - Modify COPY.JOB to conform with your local naming conventions

There are three parameters you have to set before you can submit this job:

- Set HILEV to a valid high level qualifier.
- Set LOCATION to a storage location.
- Set EXPDT to a valid expiration date.

Step 3 - Submit COPY.JOB

Submit COPY.JOB to unload all other data sets from the tape to your disk.

Installation Procedure for the Natural TSO Interface

Step 1: Create CLIST

(Job I070, Step 2400)

Create a source Natural TSO CLIST.

This CLIST is used later to invoke Natural under TSO. Please note that this is only a basic example which you can adapt to your requirements and to your TSO environment.

Step 2: Create ADARUN Cards

(Job I070, Step 2410)

Create source ADARUN cards.

This source member is required by the CLIST created in Step 1.

Step 3: Create and Assemble Module NATTSO

(Job I070, Step 2415,Step 2420)

The source program NATTSO contains a call to macro NTTSO, which generates the Natural TSO Interface.

The following parameters can be set in this macro call:

Parameter	Explanation

ABEXIT=ESTAE/SPIE/NONE	Specifies the mode of abend processing within Natural. With ABEXIT=ESTAE, Natural intercepts all abends and issues the appropriate error messages. With ABEXIT=SPIE, only program checks are intercepted as they used to be with Natural Version 2.1. With ABEXIT=NONE, Natural does not intercept any abends or program checks at all. The default value is "ESTAE".
ALTSCRN=YES/NO	Specifies the screen mode in which a session is to run. By default, a session runs in alternate screen mode ("YES"). If ALTSCRN is set to "NO", the session runs in default screen mode .
FACOM=NO/YES	Specifies whether the FACOM operating system is to be used. With FACOM=NO, FACOM is not used. With FACOM=YES, FACOM is to be used. The default value is "NO".
LBPNAME=*name*	This parameter controls the sharing of the local buffer pools. It defines the *name* of the shared buffer pool environment. (1-8 characters) and is used to locate and synchronize the local buffer pools. The default value is none, that is, local buffer pools are not shared. When running multiple Natural sessions under OS/390 in a batch or TSO environment concurrently, for example, using a Natural RPC, each session allocates storage for separate local buffer pools. Except for the Natural OS/390 batch server, the local buffer pools are not shared, that is, if the different sessions use the same Natural objects, these have to be loaded once for each session. The buffer pool specified by *name* will be shared by the different Natural sessions.
LE370=NO/YES/POSIX	Specifies whether Natural is to run in the IBM language environment. With LE370=YES, you can call external subprograms according to the LE/370 calling conventions. With LE370=NO, you can only call main programs of the language environment. With LE370=POSIX, you can call external subprograms according to the LE/370 calling conventions with POSIX semantics, i.e. LE/370 is initialized with runtime option POSIX(ON). The default value is "NO".
NDBFSRV=NO/YES	Specifies whether the Natural for DB2 file server is to be used. With NDBFSRV=YES, this file server is invoked at each terminal I/O. With NDBFSRV=NO, this file server will not be used. The default value is "NO".
SUBPOOL=*nnn*	Defines the storage subpool for GETMAIN requests. Possible values are "0" to "127". The default value is "0".

SWAPKEY=*key*	Defines the TSO/ISPF split screen swap key for Natural, which is assigned to PF9 on most of the ISPF panels. Valid keys are PF1 to PF24 and PA1 to PA3. Split screen support requires TSO/ISPF interface module ISPLINK from the ISPF load library to be included in the link step for Natural/TSO. By default, no split screen support is generated.
TTYTYPE=*type*	Defines the default device type for TTY terminals. The specified type must be defined in the NATCONFG (Natural configuration) module. It can be overwritten by the TTYPE profile parameter or by the "%T" terminal command. The default value is "TTY".

Assemble and link the Natural TSO Interface module NATTSO.

Step 4: Create and Assemble Parameter Module

(Job I080, Step 0010, Step 0015)

Create the Natural parameter module for TSO.

The following parameters in the parameter module must be modified for the installation:

```
FNAT=(dbid,fnat)
  FUSER=(dbid,fuser)
```

For *dbid*, *fnat* and *fuser* use the values you specified when loading the system files; see Installation Procedure for Natural under OS/390

Global Buffer Pool: If you wish to use a Natural *global* buffer pool under TSO, specify macro NTBPI as in Step 7 of the Natural installation procedure under OS/390.

For all other parameters: You can generally use the default values.

Modify only the values of those parameters whose default values do not suit your requirements.

For a description of the individual parameters contained in the parameter module, refer to Parameter Reference (in the Natural Reference documentation).

For dynamic assignment of profile parameters, see also the CMPRMIN dataset described in the section Natural in Batch Mode (in the Natural Operations for Mainframes documentation).

Assemble and link the parameter module.

Step 5: Link Natural TSO Nucleus

(Job I080, Step 0020)

With the INCLUDE instruction for the parameter module, specify the name of the Natural TSO parameter module created in Step 4.

Non-Shared Nucleus:
If you do not wish to use a shared Natural nucleus under TSO:
merge all INCLUDE statements and corresponding DD cards from Job I060, Step 0105 (shared nucleus) into Job I080, Step 0020 (front-end).

Link the executable Natural TSO nucleus.

Step 6: Make Adabas Interface Available

You have two options:

- Include the Adabas load library in the steplib of your TSO user procedures.
- Or copy the modules listed in the section referring to installation with TSO of the appropriate Adabas installation manual to a library of your TSO user steplib.

Installation Verification

Perform the following steps to verify the successful installation of the Natural TSO Interface:

1. Enter TSO, "READY" mode.
2. Invoke the CLIST you created in Step 1 of this Installation Procedure.
   Example:

   ```
   EX 'SAGLIB.SMA.SRCE(NATvr)'
   ```

3. Proceed with the steps described in the section Installation Verification for TP Monitor Interface.

Installing the Natural UTM Interface

This document describes step by step how to install the Natural UTM Interface.

The following topics are covered:

- Prerequisites
- Installation Tape for the Natural UTM Interface
- Installation Procedure for the Natural UTM Interface

For information on how to operate the Natural UTM Interface, refer to Natural under UTM (in the Natural TP Monitor Interfaces documentation).

Prerequisites

Base Natural must be installed under BS2000/OSD.

See Installing Natural Under BS2000/OSD.

Installation Tape for the Natural UTM Interface

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NUT*nnn*.MACS	Macros necessary for Natural/UTM
NUT*nnn*.SRCE	Sources necessary for Natural/UTM

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are not using System Maintenance Aid: Adapt and run job E.NUTTAPE to copy the datasets from tape to disk.

E.NUTTAPE is contained in job dataset NAT*nnn*.JOBS on the Natural installation tape (see Installation Tape for Natural under BS2000/OSD). The sample jobs directly use the sequential datasets from tape.

The dataset type and the space each dataset requires on disk are shown in the **Report of Tape Creation**.

Installation Procedure for the Natural UTM Interface

Step 1: Assemble the Natural UTM BS2Stub Module

(Job I055, Step 0220)

Assemble source module ABS2STUU in library *sma-job*.LIB.

See also Local Common Memory Pools (in the Natural Operations for Mainframes documentation).

Step 2: Generate the Swap Pool Parameter Module NTSWPRM

(Job I055, Step 0221)

Assemble and link module ANATSWP in library *sma-job*.LIB.

Step 3: Assemble the Natural UTM Non-Reentrant Front-End Part

(Job I070, Step 0112)

Assemble source module ANUTFRNT in library *sma-job*.LIB.

See also Keyword Parameters of Macro NATUTM (in the Natural TP Monitor Interfaces documentation).

Step 4: Assemble the Natural UTM Reentrant Part

(Job I070, Step 0113)

Assemble source module ANUTRENT in library *sma-job*.LIB.

See also Keyword Parameters of Macro NURENT (in the Natural TP Monitor Interfaces documentation).

Step 5: Prepare KDCDEF

(Jobs I070, Step 0119)

Prepare the sample source NUT.KDCDEF in *sma-job*.LIB for the KDCDEF module.

See also Defining the UTM Resources (KDCDEF) (in the Natural TP Monitor Interfaces documentation).

Step 6: Assemble KDCROOT

(Jobs I070, Step 0120)

Assemble the sample source AKDCROOT in *sma-job*.LIB for the KDCROOT module.

See also Generating KDCROOT (in the Natural TP Monitor Interfaces documentation).

Step 7: Generate the KDCDEF File

(Job I075, Step 0100)

Job E.I075 is a sample job to run KDCDEF.

Modify it to suit your environment.

Step 8: Assemble the Natural UTM Parameter Module -

(Job I080, Step 0200)

1. Modify the following parameters:
   FNAT=(*dbid*,*fnat*)
   FUSER=(*dbid*,*fuser*)
2. Assemble and link source module ANUTPARM in library *sma-job*.LIB.

Step 9: Link the Natural UTM Non-Reentrant Front-End Part

(Job I080, Step 0210)

Use the INCLUDE statements for TSOSLNK contained in LNUTFRNT in library *sma-job*.LIB.

Step 10: Start the Natural Swap Pool - Job I105, Step 0100

Start the Natural swap pool.

Installation Verification

1. Submit job E.START.NUT in library *sma-job*.LIB, which is a sample job for starting Natural under UTM.
2. Proceed with the steps described in the section Installation Verification for TP Monitor Interface.

Installing the Natural TIAM Interface

This document describes step by step how to install the Natural TIAM Interface.

The following topics are covered:

- Prerequisites
- Installation Tape for the Natural TIAM Interface
- Installation Procedure for the Natural TIAM Interface
- Parameters in Macro NAMTIAM
- Installation Verification

For detailed information on the following topics, refer to Natural under TIAM (in the Natural TP Monitor Interfaces documentation).

- Structure of the Natural TIAM Interface
- Common Memory Pools under TIAM

Notation *vrs* or *vr*: If used in the following document, the notation *vrs* or *vr* stands for the relevant **v**ersion, **r**elease, **s**ystem maintenance level numbers.

Prerequisites

Base Natural must be installed under BS2000/OSD.

See Installing Natural under BS2000/OSD.

Installation Tape for the Natural TIAM Interface

The installation tape contains the dataset listed below. The sequence of the datasets on tape is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NRT*nnn*.MACS	Macros necessary for Natural/TIAM

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are not using System Maintenance Aid: Adapt and run job E.NATTAPE to copy the dataset from tape to disk.

E.NATTAPE is contained in job dataset NAT*nnn*.JOBS on the Natural installation tape; see Installation Procedure for Natural under BS2000/OSD.

The dataset type and the space it requires on disk are shown in the **Report of Tape Creation**.

Installation Procedure for the Natural TIAM Interface

Step 1: Assemble the Natural/TIAM Non-Reentrant Front-End Part

(Job I070, Step 0102)

The front-end part of Natural/TIAM is assembled by generating the macro NAMTIAM. You can generally use the default values of the parameters in macro NAMTIAM.

Modify only the values of those parameters whose default values do not suit your requirements.

The individual parameters are described in the section Parameters in Macro NAMTIAM.

Assemble source module ANRTFRNT in library LIB.NAT*nnn*. to generate macro NAMTIAM for the front-end part.

Assemble source module BS2STUB in library LIB.NAT*nnn*.

Step 2: Assemble the Natural/TIAM Reentrant Part

(Job I070, Step 0103)

The reentrant part of Natural/TIAM is assembled by generating the macro NAMTIAM. You can generally use the default values of the parameters in macro NAMTIAM.

Modify only the values of those parameters whose default values do not suit your requirements.

The individual parameters are described in the section Parameters in Macro NAMTIAM.

Assemble source module ANRTRENT in library LIB.NAT*nnn* to generate macro NAMTIAM.

Step 3: Assemble the Natural/TIAM Parameter Module

(Job I080, Step 0109)

Assemble source module ANRTPARM in library LIB.NAT*nnn*.

Step 4: Link the Natural/TIAM Front-End Part

(Job I080, Step 0110)

Use the INCLUDE statements for TSOSLNK contained in LNRTFRNT in library LIB.NAT*nnn*.

Parameters in Macro NAMTIAM

The macro NAMTIAM has to be generated twice: for the front-end part of the Natural TIAM Interface and for the reentrant part. For which part it is generated is determined by the parameter CODE in the NAMTIAM macro.

For the generation of the front-end part and the reentrant part, a label can be provided in the macro call to NAMTIAM. This label defines the CSECT name, under which the module is stored in the module library. If no label is specified, the name for the front-end part is "NATFRONT" and the name for the reentrant part is "NATRENT".

Example of NAMTIAM Macro for Front-End Part:

```
NATTESTF NAMTIAM CODE=FRONT,
  NUCNAME=NB2RENT,
  PARMOD=31
```

In this example, the CSECT name of the front-end part is defined as NATTESTF.

Example of NAMTIAM Macro for Reentrant Part:

```
NATTESTR NAMTIAM CODE=RENT,
  CLRKEY=K4,
  PARMOD=31
```

In this example, the CSECT name of the reentrant part is defined as NATTESTR.

Parameters:

The individual parameters which can be specified in macro NAMTIAM are explained below:

ADACOM | ADDBUFF | AFPNAME | APPLNAM | ATTKEY | CLRKEY | CODE | CURPRO | DELETE | DYNPAR | HCASK | ILCS | LF | LINK | LINK2/LINK3/LINK4 | NUCNAME | PARMOD | PFK | REFRKEY | REQMLOC | SWPPSW | TRACE | TTYLS | TTYPS | T975X | UMODE | USERID |

ADACOM

Possible values:	ADAUSER/ADALNN/ADABAS/ADALNK
Default value:	ADALNK

This parameter applies for the generation of the front-end part. It determines which Adabas link module is to be used.

ADACOM=ADAUSER	The module ADAUSER is linked to the front-end part (Adabas versions lower than 7.1).
ADACOM=ADALNN	The module ADALNN is linked to the front-end part if Multi-Pass is in use (Adabas versions lower than 7.1).
ADACOM=ADABAS	The modules ADAUSER + SSFB2C are linked to the front-end part (Adabas Version 7.1 and higher).
ADACOM=ADALNK	The module ADALNK is linked to the front-end part (Adabas versions lower than 7.1) or the modules ADALNK, ADAL2P + SSFB2C are linked to the front-end part (Adabas Version 7.1 and higher).

ADDBUFF

Possible values:	1 *to* 8/*no operand*
Default value:	*No operand*

This parameter applies for the generation of the front-end part.

It determines the additional number of pages (4-KB units) for the terminal I/O buffer.

AFPNAME

Possible values:	*name/no operand*
Default value:	*No operand*

This parameter applies for the generation of the front-end part.

name is the name (maximum 16 characters) of the common memory pool of Adabas Fast Path. This name must be used for the common memory pool definition in macro ADDON (this macro is used for assembling BS2STUB).

APPLNAM

Possible values:	*name*
Default value:	NATTIAM

This parameter applies for the generation of the front-end part.

name is the name (maximum 8 characters) of the Natural TIAM application. This name is part of the serialization ID when the Natural TIAM task is initialized.

ATTKEY

Possible values:	ON/OFF
Default value:	OFF

This parameter applies for the generation of the reentrant part.

ATTKEY=ON	Pressing the K2 key on your terminal is intercepted by an STXIT routine. Natural creates an ATTENTION INTERRUPT and returns a NAT1016 error message.
ATTKEY=OFF	Pressing the K2 key leads to a normal BS2000/OSD interrupt.

CLRKEY

Possible values:	K1 to K4, F1 to F4, DUE2
Default value:	K4

This parameter applies for the generation of the reentrant part.

This parameter can be used to define an alternate CLEARKEY in addition to LSP and DUE1.

CODE

Possible values:	FRONT/RENT
Default value:	FRONT

This parameter applies for the generation of both the front-end and reentrant parts.

It determines which part of the Natural TIAM Interface is to be generated.

CODE=FRONT	Indicates the generation/assembly of the front-end part.
CODE=RENT	Indicates the generation/assembly of the reentrant part.

CURPRO

Possible values:	ON/OFF
Default value:	ON

This parameter applies for the generation of the front-end part.

It controls whether the cursor can be positioned to a protected field.

CURPRO=ON	The cursor *cannot* be positioned to a protected field.
CURPRO=OFF	The cursor can also be placed in a protected field (for example, for field-specific help functions).

DELETE

Possible values:	ON/OFF
Default value:	ON

This parameter applies for the generation of the reentrant part.

DELETE=ON	The setting of the profile parameter DELETE (see DELETE - Deletion of Dynamically Loaded Programs in the section Profile Parameters in the Parameter Reference documentation) in the Natural parameter module determines whether dynamically loaded non-Natural programs are unloaded at the end of the Natural program in which they are loaded or whether they are unloaded when command mode is entered.
DELETE=OFF	A dynamically loaded non-Natural program once loaded is kept for the duration of the whole Natural session.

DYNPAR

Possible values:	NO/YES/DIALOG/SYSDTA/SYSIPT/FILE
Default value:	NO

This parameter applies for the generation of the front-end part.

DYNPAR=DIALOG	The dynamic parameters are read from terminal input.
DYNPAR=YES	The dynamic parameters are read from terminal input. YES has the same effect as DIALOG; it is kept for compatibility reasons.
DYNPAR=SYSDTA	The dynamic parameters are read from SYSDTA.
DYNPAR=SYSIPT	The dynamic parameters are read from SYSIPT. This operand is only allowed with an operating system lower than BS2000/OSD Version 2.0.
DYNPAR=FILE	The dynamic parameters are read from a sequential file. The input of this SAM file is interpreted as one single text string, which means that the individual entries must be separated from each other by a comma, even at the end of a line. Such a parameter file must be defined with a FILE command by using the LINK parameter CMPRMIN. See also the example given below.
DYNPAR=NO	No dynamic parameters are read from terminal input.

Example for DYNPAR=FILE:

```
/FILE NAT.PARAMS,LINK=CMPRMIN
```

HCASK

Possible values:	ON/OFF
Default value:	ON

This parameter applies for the generation of the reentrant part.

It determines whether a user is asked to specify an output device each time he or she produces a hardcopy (with terminal command %H).

HCASK=ON	The user is asked to specify a device for each hardcopy.
HCASK=OFF	The device used for the previous hardcopy is used again.

ILCS

Possible values:	CRTE/YES/NO
Default value:	NO

This parameter applies for the generation of the reentrant part.

ILCS=CRTE	3GL subprograms are invoked with common runtime environment convention. To be able to do so, the ILCS initialization routine IT0SL# must be linked to the Natural front-end, as shown below:
	
	`INCLUDE IT0SL#,SYSLNK.CRTE.010`
	`  RESOLVE,SYSLNK.CRTE.010`

ILCS=YES	3GL subprograms are invoked with enhanced ILCS linkage convention. To be able to do so, the ILCS initialization routine IT0INITS must be linked to the Natural front-end, as shown below:
	
	`INCLUDE IT0INITS,SYSLNK.ILCS`
	`  RESOLVE,SYSLNK.ILCS`

ILCS=NO	Standard processing applies.

LF

Possible values:	X’*zz*’
Default value:	X’25’

This parameter applies for the generation of the front-end part.

With this parameter you specify the control character to be used for line advance when printing on the local printer.

LINK

Possible values:	*name* (*name*,*name*,...)
Default value:	none

This parameter applies for the generation of the front-end part.

The *name(s)* of programs and modules that are called from Natural programs and linked with the non-reentrant part must be specified with this parameter. Conversely, the programs and modules whose names are specified must be linked with the non-reentrant part, otherwise the application is put into status SYSTEMERROR and all users are rejected with an error message.

A "TABLE" macro call is performed for the specified programs and modules, which enters their load addresses into the dynamic loader’s link table. It is therefore not necessary to dynamically load these programs when they are called by Natural programs.

Example:

```
LINK=PROG1
  LINK=(PROG1,PROG2,MODUL111)
```

LINK2/LINK3/LINK4

Possible values:	*name* (*name*,*name*,...)
Default value:	none

These parameters apply for the generation of the front-end part.

The parameters LINK2, LINK3 and LINK4 are an extension of the LINK parameter. Since an operand definition cannot be longer than 127 characters (including parentheses), these parameters are provided for cases where the operand of parameter LINK would be too long. The syntax is analogous to that of LINK.

Examples:

```
NAMTIAM LINK=(PROG1,PROG2,...),
        LINK2=(PROG54,...) NAMTIAM LINK=(PROG1,PROG2,PROG3,PROG4)
```

NUCNAME

Possible values:	*name*
Default value:	NB2RENT

This parameter applies to the generation of the front-end part.

With this parameter you specify the name of the bounded, reentrant Natural module. You must use this name for the Natural pool and load information in macro ADDON (BS2STUB assembles macro ADDON).

PARMOD

Possible values:	(*nn*,*loc*)
nn:	24/31
loc:	BELOW/ABOVE
Default value:	(24,BELOW)

This parameter applies to the generation of both the front-end and reentrant parts.

- The first part of this parameter (*nn*) is used to define an addressing mode (24-bit or 31-bit mode) for the Natural TIAM application.
- The second part of this parameter (*loc*) is used to define the front part location of the Natural TIAM application. If you load the front part of the application above 16 MB, this must be defined in the front part's link procedure as follows:
  LOADPT=*XS or
  LOADPT=X'*address*'

Example:

```
/EXEC TSOLINK

  PROG NATvrs,FILENAM=NATvrs,LOADPT=*XS,...

  TRAITS RMODE=ANY,AMODE=31

  INCLUDE....

  /* PARMOD=(nn,loc) MUST BE IDENTICAL IN THE FRONT-END AND REENTRANT
  PARTS
```

PFK

Possible values:	(KN,*y*) (KO,*y*) (KS,*y*) OFF
Default value:	(KS,L)

This parameter applies for the generation of the front-end part.
It is used to set one of the following function-key modes:

KN	Either literals "%K1" to "%K20" and send-key code "DÜ1" or send-key codes "F1" to "F20" are loaded to the function keys; this depends on the device type.
KO	The literals "01" to "20" and send-key code "F5" are loaded to the function keys.
KS	The literals "A" to "T" and send-key code "F5" are loaded to the function keys; in addition, with every output message a dummy field is generated at the last two positions of the screen. This dummy field is used to receive and pass the key value.
OFF	No function key mode is generated.
y	This can be either "L" or "N": - "L" means that the function keys are loaded; - "N" means that the corresponding mode is activated, but function keys will not be loaded.

REFRKEY

Possible values:	K1 to K14 / NO
Default value:	K14 (keys ESC + ":")

This parameter applies for the generation of the reentrant part.

It can be used to define a function key. If this function key is pressed, the last full Natural screen is refreshed. Thus it is possible to continue the dialogue with Natural after the screen has been overwritten by messages from the operator or the operating system.

The send-key code is not passed to the Natural application. The interface sets the Natural key code to "ENTER". The key defined with the REFRKEY parameter must be different from the one defined with the CLRKEY parameter.

REQMLOC

Possible values:	RES/BELOW/ABOVE
Default value:	RES

This parameter applies for the generation of the reentrant part in 31-bit mode (PARMOD=31).

It determines where the requested Natural work areas are to be allocated via request memory by the system.

REQMLOC= BELOW	All areas are requested below 16 MB.
REQMLOC= ABOVE	All areas are requested above 16 MB.
REQMLOC=RES	All areas are requested depending on the location of the reentrant part.

The REQMLOC parameter corresponds to the LOC parameter of the BS2000/OSD system macro REQM.

SWPPSW

Possible values:	*xxxx*
Default value:	ADMI

This parameter applies for the generation of the front-end part. It is only applicable in conjunction with MULTI-PASS.

The operand of this parameter defines the password to read or modify other users’ records in the Natural dynamic parameter file.

TRACE

Possible values:	*(nn,ll)*
nn:	01...99
ll:	71...132
Default value:	(99,71)

This parameter applies to the generation of the reentrant part.

With this parameter, you specify the number of a trace file and the maximal length of a trace print record. *nn* is the number for the SYSLST*nn* trace file and *ll* is the maximal length in characters of a trace print record.

If any external Natural trace function is active, the trace records will be written to SYSLST*nn*. In this case, the Natural TIAM driver creates the following trace file:

Example:

```
NATURAL.TRACE.TIAM.TTTT,SPACE=(30,3)
  SYSFILE SYSLSTnn=NATURAL.TRACE.TIAM.TTTT

  /* TTTT is the task sequence number
```

Before the Natural TIAM session is terminated, the trace file will be closed as follows:

```
SYSFILE SYSLSTnn=(PRIMARY)
```

TTYLS

Possible values:	*nn*
Default value:	80

This parameter applies for the generation of the front-end part.

With this parameter you can adjust Natural’s physical line length to different paper formats used with a telex machine.
nn specifies the physical line size for TTY devices.

TTYPS

Possible values:	*nn*
Default value:	24

This parameter applies for the generation of the front-end part.

With this parameter you can adjust Natural's physical page size to different paper formats used with a telex machine.
nn specifies the physical page size (number of lines) for TTY devices.

T975X

Possible values:	9750/9755/9756/9763
Default value:	9750

This parameter applies for the generation of the front-end part.

It is used to determine for which device types messages are to be optimized when using data stations which were generated in PDN as 9750.

UMODE

Possible values:	(S,*y*)
Default value:	(S,E)

This parameter applies for the generation of the front-end part.

Operands:

S	Mode of operation = single; that is, one Natural session can be started from a terminal.
y	Language indicator for the logoff message. D=Danish E=English F=French G=German I=Italian N=Dutch S=Spanish

USERID

Possible values:	YES/SYSTEM/NO/USER
Default value:	USER

This parameter applies for the generation of the front-end part.

USERID=SYSTEM or USERID=YES	The Natural user ID is created by using the BS2000/OSD user ID.
USERID=USER or USERID=NO	The Natural user ID is created by using the job name; that is, the "/.JOBNAME" of the LOGON command. If no BS2000/OSD job name has been specified with the LOGON command, the Natural user ID is created as with USERID=SYSTEM or YES.

Installation Verification

1. Call procedure P.STARTNRT in library LIB.NAT*nnn* to start Natural under TIAM.
2. Proceed with the steps described in the section Installation Verification for TP Monitor Interface.

Installing NaturalX under OS/390

This document describes step by step how to install NaturalX under OS/390.

The following topics are covered:

- Prerequisites
- Installation Tape for NaturalX under OS/390
- Installation Procedure for NaturalX under OS/390

For further information on NaturalX, see the NaturalX documentation.

Prerequisites

Software

- OS/390 Operating System
  Version as specified under under Operating/Teleprocessing Systems Required in the current Natural Release Notes.
- EntireX DCOM
  Version as specified under Natural and Other Software AG Products in the current Natural Release Notes.
- OS/390 UNIX Services with access to the OS/390 HFS (hierarchical file system)

Knowledge

Before you start installing NaturalX under OS/390, it is important that you have a clear picture of the NaturalX system architecture under this operating system; see NaturalX System Architecture under OS/390 (in the NaturalX documentation).

Installation Tape for NaturalX under OS/390

The installation tape contains the datasets listed in the table below. The sequence of the datasets is shown in the **Report of Tape Creation** which accompanies the installation tape.

Dataset Name	Contents
NXX*nnn*.LOAD	Natural load modules
NXX*nnn*.JOBS	Sample installation jobs and sample configuration files

The notation *nnn* in dataset names represents the version number of the product.

Copying the Tape Contents to Disk

If you are not using SMA:

Copy the job dataset NXX*nnn*.JOBS from tape to disk using the sample JCL below.

The following values must be supplied in the JCL:

1. In the dataset names, replace *nnn* with the current version number of the datasets.
2. With the SER parameter, replace *XXXXXX* with the volume serial number of the tape .
3. With the LABEL parameter, replace *x* with the sequential number of the tape dataset (see the **Report of Tape Creation**).
4. With the VOL=SER parameter, replace *YYYYYY* with the volume serial number of the disk pack.

```
// JOB CARD
//V2COPY EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=A
//IN1 DD DSN=NXXnnn.JOBS,DISP=OLD,UNIT=TAPE,
// VOL=(,RETAIN,SER=XXXXXX),LABEL=(x,SL)
//OUT1 DD DSN=SAGLIB.NXXnnn.JOBS,DISP=(NEW,CATLG,DELETE),
// UNIT=SYSDA,VOL=SER=YYYYYY,SPACE=(CYL,(1,1,10))
//SYSIN DD *
C I=IN1,O=OUT1 /*
```

Adapt and run job NXXTAPE from the job dataset to copy the load and source libraries from tape to disk.

The sample jobs directly use the sequential datasets from tape.

The dataset type and the space each dataset requires on disk are shown in the **Report of Tape Creation**.

Installation Procedure for NaturalX under OS/390

The NaturalX distribution tape contains the following load modules:

- NATCOMST
- NATCOM
- NATURALX
- NATXMON

Step 1: Create directory file structure in the HFS.

(Job I009, Step 8500)

Create the following directories in your OS/390 HFS (hierarchical file system):

- $SAG/$NATDIR/$NATVERS/etc
- $SAG/$NATDIR/$NATVERS/bin
- $SAG/$NATDIR/$NATVERS/trace/client
- $SAG/$NATDIR/$NATVERS/trace/server

The following is an example of how to do this:

```
cd $sag
mkdir nat
cd nat
mkdir vnnn
cd vnnn
mkdir etc
mkdir bin
mkdir trace
mkdir trace/client
mkdir trace/server
```

The directory names must be in lower case.

Step 2: LinkEdit files into the HFS.

(Job I009, Steps 8502, 8503)

LinkEdit the files NATURALX and NATXMON into the $SAG/$NATDIR/$NATVERS/bin directory in your HFS system as shown in the following example:

```
//************ JOB/STEP NXX311 I009 8502
  //*
  //*
  //* LINK MODULE NATURALX INTO HFS STRUCTURE
  //* LINK-INPUT FROM SYSLIN
  //*
  //LKD8502 EXEC PGM=IEWL,
  // PARM=('RENT,REUS,XREF,LET,LIST,NCAL,CASE=MIXED',
  // 'SIZE=(1024K,128K)')
  //SYSLMOD DD PATH='/u/sag/nat/vnnn/bin',
  // PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
  // PATHMODE=(SIRWXG,SIRWXU)
  //NATLOAD DD DISP=SHR,DSN=PQR.NXXnnn.LOAD
  //SYSUT1 DD UNIT=3380,SPACE=(1700,(500,100))
  //SYSPRINT DD SYSOUT=*,
  // DCB=(RECFM=FB,LRECL=121,BLKSIZE=1210)
  //SYSLIN DD *
  INCLUDE NATLOAD(NATURALX)
  NAME naturalx
  /*
  //* LINK MODULE NATURALX INTO HFS STRUCTURE
  //* LINK-INPUT FROM SYSLIN
  //*
  //LKD8502 EXEC PGM=IEWL,
  // PARM=('RENT,REUS,XREF,LET,LIST,NCAL,CASE=MIXED',
  // 'SIZE=(1024K,128K)')
  //SYSLMOD DD PATH='/u/sag/nat/vnnn/bin',
  // PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
  // PATHMODE=(SIRWXG,SIRWXU)
  //NATLOAD DD DISP=SHR,DSN=PQR.NXX311.LOAD
  //SYSUT1 DD UNIT=3380,SPACE=(1700,(500,100))
  //SYSPRINT DD SYSOUT=*,
  // DCB=(RECFM=FB,LRECL=121,BLKSIZE=1210)
  //SYSLIN DD *
  INCLUDE NATLOAD(NATXMON)
  NAME natxmon
  /*
  //*
```

Step 3: Define environment variables.

(Job I009, Steps 8510, 8511)

- With Sytem Maintenane Aid (SMA):
  Job I009 with Steps 8510 and 8511 is generated to create NATENV and NATXENV source members in the SMA library.
- Without SMA:
  Define the required environment variables by modifying the following PDS members inNXX *nnn*.JOBS:

Member	Description
NATENV	Shell startup profile
NATXENV	NaturalX environment file

For information on System Maintenance Aid (SMA), see also Using Installation Jobs Generated by System Maintenance Aid in the section General Installation Information.

For information on environment variables, see the section NaturalX System Architecture under OS/390 and the subsection Environment Variables (in the NaturalX documentation).

Step 4: Copy the configuration files into HFS.

(Job I009, Steps 8530)

The following is a sample job for copying the configuration files into HFS:

```
//************ JOB/STEP NXXnnn I009 8530
  //*
  //*
  //* PASS SHELL COMMANDS TO OE
  //*
  //PASS8530 EXEC PGM=IKJEFT01
  //SYSTSPRT DD SYSOUT=*
  //SYSTSIN DD *
  OPUT 'SAG.NXXnnn.JOBS(NATENV)'
  '/u/sag/nat/vnnn/natenv'
  TEXT
  OPUT 'SAG.NXXnnn.JOBS(NATXENV)'
  '/u/sag/nat/vnnn/natxenv'
  TEXT
  OPUT 'SAG.NXXnnn.JOBS(RMB)'
  '/u/sag/nat/vnnn/rmb'
  TEXT
  /*
  //*
  //* **** END OF SMA-JOB D009I009 *******
```

Step 5: Set permissions for the RMB script.

(Job I009, Step 8538)

This step performs the shell command 'chmod 777 on script RMB'.

Step 6: Remove blank characters from the members NATENV and NATXENV.

(Job I009, Steps 8540, 8542)

The RMB (ReMove Blanks) script is executed to remove the blanks at the end of each line in NATENV and NATXENV.

Step 7: Add environment variables.

Append the required environment variables from 'natenv' to your shell startup profile '.profile' using the following command:


```
cat  $NATDIR/$NATVERS/natenv  >>  <path>/.profile
```

Step 8 : Assemble the Natural OS/390 interface module with the option LE370=POSIX.

(Job I055, Steps 8510, 8520)

Job I055, Step 8510 starts the batch program IEBUPDATE.

Job I055, Step 8520 assembles and links NATOS.

Step 9: Define an NTBPI entry for your DCOM buffer pool in NATPARM and assemble.

(Job I060, Steps 8510, 8520)

Create the Natural batch parameter module with the necessary parameters for NaturalX (NTBP entry).

Job I055, Step 8510 starts the batch program IEBUPDATE.

Job I055, Step 8520 assembles and links NATPARM.

Step 10: Adapt the SVC number and the 'rent' flag in the source of ADALNK in your Adabas source library.

You do this by setting the 'rent' flag in the ADALNC source to '1'.

Step 11: Assemble and link ADALNK Job/Step NXX*nnn*.

(Job I055, Step 8501)

Link ADALNK using the RENT option.

Step 12: Relink your Front-end with the new NATPARM and driver.

(Job I060, Step 8530)

Link the Natural nucleus using the re-entrant ADALNK created in Step 11.

Step 13 - optional: Create a CLIST for your sample Natural TSO client.

(Job I070, Step 8500)

Create the CLIST to call your sample NAT /TSO client which will be created with the following steps.

Step 14 - optional: Assemble and link NAT/TSO interface.

(Job I070, Steps 8515, 8520)

Assemble and link the NAT/TSO interface with option LE370=POSIX.

Step 15 - optional: Link Natural TSO nucleus.

(Job I080, Steps 8510, 8515, 8520)

Assemble and link NATPARM. Link your NAT/TSO nucleus using the re-entrant ADALNK created in Step 11.

NaturalX Trouble Shooting FAQs

This document contains a number of frequently asked questions (FAQs) referring to NaturalX. Where applicable, reference is made to relevant problem descriptions/solutions that are maintained in Software AG's Support Information System SAGSIS.

How can I check whether an object runs locally or remotely ?

Return the system variable *INIT-ID from a method or property. For remote objects, *INIT-ID contains a unique session identifier. With *INIT-ID, it is also possible to check whether two objects are running in different Natural sessions (ExternalSingle) or in the same session (ExternalMultiple).

How can I check if my Natural TSO session is connected to COM ?

At session initialization, you should get the message:

```
NaturalX COMLIB initializing
  NaturalX API version nnnn
  COMLIB API version nnnn
```

Or invoke DCOMPARM utility, enter any Server ID and press ENTER. You get the message Com not available if you are not connected to COM.

Or check for initialization error NAT0750 NATGWCOM, initialization of COM failed, reason nn.

My Natural TSO session is not connected to COM

- Check whether the NXX load library is concatenated to your load libraries. Usually you get a NAT0920 Program NATCOMST cannot be loaded if this is not the case.
- Specify RCA=(NATCOMST) either in natparm or as dynamic session parameter.
- Your NATTSO must be assembled with LE370=POSIX
- Check allocation of DD name NATXENV. Does this file exist with the appropriate permissions for read access ? The TSO clist CONTROL statement must contain the keyword ASIS if the path name of the NATXENV file contains lower case.
- Check the content of the file allocated to NATXENV. It must define at least the environment variables EXXDIR, EXXVERS, PATH, LIBPATH, DCOLIB, NATDIR and NATVERS.
  It is not possible to refer to the content of variables, e.g.
  EXXDIR=/sag/exx
  EXXVERS=v521
  PATH=$EXXDIR/$EXXVERS/bin
  is not possible, you have to specify
  PATH=/sag/exx/v521/bin
- You must have execute permissions for the files in the EXX lib directory.

I get "1 mapping of failed, errno=132" at Natural initialization

Increase your region size at TSO logon.

I get "1 Error: NTD is not running "

- The EntireX DCOM environment is not active.
- The environment variable COOL_RPC_ENDPOINT, COOL_NTD_TVTUNER or COOL_TMP_DIR is not set properly in the NATXENV file. If these variables are not set in NATXENV file, the default defined by dcomconfig file in $EXXDIR/$EXXVERS/etc. is used.
- No access permissions to the COOL_TMP_DIR directory.

NAT0711 The object could not be created - DCOM code 80080005" occurs at CREATE OBJECT immediately.

EntireX DCOM cannot start the server. This can have various reasons:

- If no "launching user" is defined for the server ID, DCOM launches the server under the client user ID. Determine the launching user ID according the RunAs definition in "dcomcnfg".
- Please check "ntpasswd" entry for the launching user if you use local DCOM security.
- Check password definition for the RunAs setting.
- Check execute permissions for "naturalx" in Natural bin directory for the launching user.
- Check write permissions in Natural trace/server directory for the launching user.
- "ntdstarter" on EXX bin directory must be "Program Controlled" (shell command *extattr*) and must be owned by user *root* .
- The user who started the DCOM environment must be defined in the RACF resource "BPX.DEAMON".

NAT0711 The object could not be created - DCOM code 80080005" occurs at CREATE OBJECT after a few seconds.

EntireX DCOM launched the server, but the server did not initialize correctly. This can have various reasons. Examine the server trace output.

The server .ste file contains the error "Cannot load COM API NATCOM" or "Cannot load NATURAL Front End "

Check the definition of environment variable STEPLIB. It should refer to the load data set containing the NaturalX modules NATCOMST/NATCOM and the load data set containing your batch front specified by NATX_NUCNAME.
Both data sets must be defined in the OS/390 sanction list.

NAT0711 The object could not be created - DCOM code 8000FFFF" occurs at CREATE OBJECT.

A Natural error occurred at the server site during create object. Examine the server trace output for the primary Natural error code.

NAT0711 The object could not be created - DCOM code 80041004" occurs at CREATE OBJECT.

Error during Natural session initialization at the server site. Examine the server trace output for the primary Natural error code. If the trace output contains a "NAT9987 NATURAL SESSION TERMINATED ABNORMALLY", examine the server CMPRINT output for additional error information. One reason for this situation could be an database response code at session initialization. Specify ETID=' ' for the NaturalX server.

DCOM code 80041002 Rollout of the Natural session failed. Probably roll file overflow.

The standard roll server dispatch algorithm does not allow you to use multiple roll files for NaturalX sessions.

NAT0711 occurs at CREATE OBJECT. A successive CREATE OBJECT of the same class works.

This may happen if many classes are registered for the desired server and your CREATE OBJECT causes DCOM to initialize the server. Increase the NATX_INITTOUT value.

NAT0736 at CREATE OBJECT even if the class is registered and a server is launched.

The class is registered but the launched server can not load the class object. Examine the trace file. At server initialization, NaturalX traces all available classnames. Probably the Natural class object is deleted or the server runs with an invalid FUSER.

I have modified my shell environment, e.g. modified the NATX_TRACE variable, but the server is launched with the old value.

A server launched by DCOM will inherit the environment from the DCOM process, and to change the DCOM environment it is required to restart DCOM with the appropriate environment modifications.

A bypass to avoid the DCOM restart is to start the server manually from a shell session which contains the appropriate environment modifications.

A more comfortable way is to "insert" a shellscript between DCOM and NaturalX which is explained in the following topic.

Is it possible to modify the NaturalX environment depending on the SERVID or the launching user ?

Yes, just rename the naturalx binary (on NAT bin directory) to e.g. natural_x. Replace the naturalx by an executable shell script with the desired functionality.

You may examine the $* parameters for parameter DCOM=(SERVID=...) to get the server ID. And with "test $(whoami) = ..." you may find out the user ID of the launching user. At the end of the script, just call "natural_x $*"

DCOM launches a new server process for each client. How can I share one server process for all clients?

The EntireX DCOM default is to start a server exclusively for each client. To share a NaturalX server with multiple clients, you are required to assign a "launching user" to the SERVID. This can be done with the EntireX "dcomcnfg" utility.

For example, *dcomcnfg {the_servid_guid} RunAs=SAG* causes the server to be launched under the userid SAG, independent of the client userid. And all clients requesting this serverid are connected to this single process.

the_servid_guid can be retrieved with the "dcomcnfg" utility as well. Just enter dcomcnfg without parameters and you get a list of all registered SERVIDs and their *the_servid_guid*.

I modified a class method but the server still executes the old method code.

Does the server use the same Natural Buffer Pool and the same FUSER?

How can I pass DD definitions (e.g. SYSUDUMP) to a NaturalX server ?

With Natural for Mainframes Version 3.1.2, this is only possible if you prestart the server manually in batch. With Version 3.1.3, DD names can be specified with the environment variable NATX_DYNALLOC.

Is it possible to view the CMPRINT output of a NaturalX server?

Yes, using the environment variable NATX_FEPRM, the CMPRINT output can be assigned to any JES output class. The output is routed to the JES output queue under the launching userid suffixed by a numeric value.

Special characters are not transferred correctly to ASCII platforms.

The following session parameters are required for the NaturalX server:

```
PM=C
  TAB1=(4F,5A,7C,B5,75,C0,80,D0,41,AD,42,BD,BA,E0,48,7C,78,4F)
  TAB1=(4A,63,E0,EC,5A,FC,C0,43,6A,CC,D0,DC,7D,7F)
  TAB2=(5A,4F,B5,7C,C0,75,D0,80,AD,41,BD,42,E0,BA,7C,48,4F,78)
  TAB2=(63,4A,EC,E0,FC,5A,43,C0,CC,6A,DC,D0,7F,7D)
```

See SAGSIS P188229.

Which Natural Security definitions are required if my server runs under control of NSC ?

In general the same as if you had use the classes locally. Each client user ID must be defined in Natural Security (NSC) and must have access to the library where the class resides.

Additionally, the user ID of the "launching user" defined in the DCOM RunAs value must be defined in NSC. NaturalX Version 3.1.3 requires the *Transition Period Logon = Y*.

Installing the Natural Web Interface Server Extensions

This document describes how to install the Natural Web Interface Server Extensions for CGI Interface under the OS/390 Unix System Services.

The following topics are covered:

- Prerequisites
- Installation Tape
- Installation Procedure
- Further Steps

Prerequisites

Software

- OS/390 Operating System
  Version as specified under Operating/Teleprocessing Systems Required in the current Natural Release Notes.
- EntireX
  Version as specified under Natural and Other Software AG Products in the current Natural Release Notes.
- OS/390 Unix System Services with access to the OS/390 HFS (hierarchical file system).

Knowledge

Before you start installing Natural Web Interface Server Extensions under OS/390, it is important that you have a clear picture of the Natural Web Interface system architecture; see the Natural Web Interface documentation.

Installation Tape

The installation tape contains the datasets listed in the table below.

Dataset Name	Contents
NWW*nnn*.CPIO	Compressed NWW modules.

The notation *nnn* in dataset name represents the version number of the product.

Installation Procedure

Step 1: Copy the tape contents to disk

(Job I008, Step 0155)

Copying the Tape Contents to Disk

If you are using System Maintenance Aid (SMA), refer to the SMA documentation (included on the current edition of the Natural documentation CD).

If you are **not** using SMA, follow the instructions below.

This section explains how to:

- Copy data set COPY.JOB from tape to disk.
- Modify this data set to conform with your local naming conventions.

The JCL in this data set is then used to copy all data sets from tape to disk.

If the datasets for more than one product are delivered on the tape, the dataset COPY.JOB contains the JCL to unload the datasets for all delivered products from the tape to your disk.

After that, you will have to perform the individual install procedure for each component.

Step 1 - Copy data set COPY.JOB from tape to disk

The data set COPY.JOB (label 2) contains the JCL to unload all other existing data sets from tape to disk. To unload COPY.JOB, use the following sample JCL:

```
//SAGTAPE JOB SAG,CLASS=1,MSGCLASS=X
//* --------------------------------
//COPY EXEC PGM=IEBGENER
//SYSUT1 DD DSN=COPY.JOB,
// DISP=(OLD,PASS),
// UNIT=(CASS,,DEFER),
// VOL=(,RETAIN,SER=<Tnnnnn>),
// LABEL=(2,SL)
//SYSUT2 DD DSN=<hilev>.COPY.JOB,
// DISP=(NEW,CATLG,DELETE),
// UNIT=3390,VOL=SER=<vvvvvv>,
// SPACE=(TRK,(1,1),RLSE),
// DCB=*.SYSUT1
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//
```

Where:

<*hilev*>	is a valid high level qualifier
<*Tnnnnn*>	is the tape number
<*vvvvvv*>	is the desired volser

Step 2 - Modify COPY.JOB to conform with your local naming conventions

There are three parameters you have to set before you can submit this job:

- Set HILEV to a valid high level qualifier.
- Set LOCATION to a storage location.
- Set EXPDT to a valid expiration date.

Step 3 - Submit COPY.JOB

Submit COPY.JOB to unload all other data sets from the tape to your disk.

Step 2: Create Directory File Structure in HFS

(Job I009, Step 0150)

Create the following directories in your OS/390 HFS (hierarchy file system):

```
$SAG/nat
  $SAG/nat/vnnn
```

The following is an example of how to do this:

```
  cd $sag
  mkdir nat
  cd nat
  mkdir vnnn
```

The directory names must be in lower case.

nnn = Current version of natural

Step 3: Copy the dataset into your OS/390 HFS

(Job I009, Step 0155)

If you are not using SMA:

Copy the job dataset NWW*nnn*.CPIO from disk to HFS using the sample JCL below.

```
//PASS0155 EXEC PGM=IKJEFT01
  //SYSTSPRT DD DUMMY
  //JES  DD  SYSOUT=*,DCB=(RECFM=V,LRECL=256)
  //STDOUT  DD PATH='/tmp/out',
  //   PATHOPTS=(OCREAT,OTRUNC,OWRONLY),PATHMODE=SIRWXU
  //STDERR  DD PATH='/tmp/err',
  //   PATHOPTS=(OCREAT,OTRUNC,OWRONLY),PATHMODE=SIRWXU
  //SYSTSIN  DD *
    OPUT 'SAGLIB.NWWnnn.MVSCPIO' +
    '/u/nat/aze/products/sag/nat/vnnn/NWWvnnn.cpio.z' +
    BIN
  /*
```

Step 4: Uncompress the file on your OS/390 HFS

(Job I009, Step 0157)

If you are not using SMA:

Logon to your HFS and enter the following commands:

```
cd $sag/nat/vnnn
  uncompress NWWvnnn.cpio.z
  cpio -icvBd > NWWvnnn.cpio
```


Note:
If the message "EDC5139I Operation not permitted" occurs, it can be ignored.

Further Steps

For further information, refer to the Natural Web Interface documentation and proceed as described in the section Configuring the Natural Web Interface, paying particular attention to the notes given under the heading "In an OS/390 Unix System Services Environment".

Installing the Entire Systems Server Interface

Installing the Entire Systems Server Interface (ESX) is required if the product Entire System Server or Natural ISPF is to be used.

This document covers the following topics:

- Standard Installation (Recommended)

  If you want to use the recommend standard value settings in the modules ESYNODTB and NATPNIP (used by the products Entire System Server and Natural ISPF, then you can proceed with Linking the ESXNUC Module.

- Customized Installation

  If you do **not** want to use the recommend standard value settings, you may first edit module NATPNIP in the Natural source library and then relink the ESXNUC module.

Customized Installation

For a customized installation, you may edit the module NATPNIP in the Natural source library.

The content of module NATPNIP is:

```
NAMVIEWP BUFLEN=8192,NUMREQ=5,MAXCBL=3000,MAXEDL=3000,EXTUSER=INIT-USER
```

The default values are included. The NATPNIP parameters are explained below:

BUFLEN	Length of all Adabas buffers in bytes.
NUMREQ	Number of possible nested FIND loops in Natural calling Entire System Server.
MAXCBL	Complex FIND buffer length.
MAXEDL	Editor session buffer length.
EXTUSER	External USER-ID which will be passed to Entire System Server for security checks.

Possible values for EXTUSER are:

EXTUSER=INIT-USER	(recommended for OS/390 platforms) The value of the Natural variable *INIT-USER is transferred via Entire System Server to an external security system like RACF, ACF2, TOP-SECRET and all calls to security restricted resources are handled under this user ID.
EXTUSER=USER	(recommended for UTM on BS2000/OSD) Similar processing using Natural variable *USER.
EXTUSER=ADDRESS-SPACE	(recommended for TIAM and Batch on BS2000/OSD) The security description of this Address-Space is used for security evaluation.

You may also edit module ESYNODTB in the Natural source library which contains the following default values:

```
NAMXNOD ID=148,NAME=PRODUCTION-1
  NAMXNOD ID=149,NAME=PRODUCTION-2,LAST=Y
  END
```

When do I need to change these values?

Normally, calls to Entire System Server from NATURAL are handled via a NODE parameter like:

```
FIND ACTIVE-JOBS WITH JOB-NAME = 'ADA*' AND NODE = 148
```

where NODE contains a numeric value, but no character-oriented values.

Programmers need to know a numeric value pointing to a real Entire System Server. Using the value NODE-NAME, they may code:

```
FIND ACTIVE-JOBS WITH JOB-NAME = 'ADA*' AND NODE-NAME = 'DAEF'
```

where *DAEF* is the logical name of the production Entire System Server.

The table ESYNODTB defines these mappings and contains the following parameters:

ID	Entire System Server Node number (also known as DBID).
NAME	Entire System Server Node Name.
LAST	Indicator for last entry in table.

Assembling the Parameter Modules for the ESX Component

The jobs mentioned below can be found in the library NAT*nnn*.JOBS.

Without Entire System Server

If the Entire System Server is not installed, this means that Natural ISPF is used as INCORE database only.

Under OS/390 and VSE

Link the parameter module NATPNIP, using Job I055, Step 1106.
In this case, the module ESYNODTB is not required.

Under BS2000/OSD

Link the parameter module NATPNIU (for UTM) or NATPNIT (for TIAM/Batch), using Job I055, Steps 1106 and 1108.
In this case, the module ESYNODTB is not required.

With Entire System Server

Under OS/390 and VSE

Assemble and link the modules using Job I055, Step 1106 (NATPNIP) and, optionally,1107 (ESYNODTB).

Under BS2000/OSD - UTM Environments

Assemble and link the modules using Job I055, Step 1108 (ANATPNIU) and, optionally, 1107 (AESYNDTB).

ANATPNIU must be assembled with "NAMVIEWP EXTUSER=USER" in order to use the Natural Security user ID as user ID for ESY calls (if no NATPROC-LOGON is issued).

Under BS2000/OSD - TIAM and Batch Environments

Assemble and link the modules using Job I055, Step 1106 (ANATPNIT) and, optionally, 1107 (AESYNDTB).

NATPNIT must be assembled with "NAMVIEWP EXTUSER=ADDRESS-SPACE". The LOGON user ID will be used as ESY user ID if no NATPROC-LOGON has been issued.

Proceed with Linking the ESXNUC Module.

Linking the ESXNUC Module

Under OS/390

You can either link all modules to the shared nucleus or link them all to the front-end.

Include the following instructions in your link job:

INCLUDE NATLIB(NATPNIP)	Entire System Server Interface parameters
INCLUDE NATLIB(ESXNUC)	ESX nucleus
INCLUDE NATLIB(NATPSNGL)	Optional, allow use of Entire System Server in single-user mode
INCLUDE NATLIB(ESYNODTB)	Optional, node table

Under VSE

You can either link all modules to the shared nucleus or link them all to the front-end.

Include the following instructions in your link job:

INCLUDE NATPNIP	Entire System Server Interface parameters.
INCLUDE ESXNUC	ESX nucleus.
INCLUDE NATPSNGL	Optional, allow use of Entire System Server in single-user mode.
INCLUDE ESYNODTB	Optional, node table.

Under BS2000/OSD

All modules have to be linked to the front-end part of Natural to handle different configuration settings.

Include the following instructions in your link job:

INCLUDE NATPNIP, NATnnn.MOD	Entire System Server Interface parameters.
INCLUDE ESXNUC, NATnnn.MOD	ESX nucleus.
INCLUDE NATPRBSU, NATnnn.MOD	BS2000/OSD service module.
INCLUDE NATPSNGL, NATnnn.MOD	Optional, allow use of Entire System Server in single-user mode (only possible under TIAM or in batch mode).
INCLUDE ESYNODTB, NATnnn.MOD	Optional, node table.

Under VM/CMS

Modify the variable LOADLIST in NAT$LOAD EXEC to include the following modules:

Library	Module	Explanation
ISPLIB	ISPURT1	Utility.

Modules required from Entire System Server Interface:

Library	Module	Explanation
NATLIB	NATPNIP	Entire System Server Interface parameters.
NATLIB	ESXNUC	ESX nucleus.
NATLIB	ESYNODTB	Optional, node table.

Proceed as described in the VM/CMS installation procedure under the heading "Generate a Natural Module".

Installing Natural Security

This document describes how to install Natural Security on a mainframe computer under all mainframe operating systems and TP monitors supported by Natural using an Adabas database.

The following topics are covered:

- Prerequisites
- Installation Tape for Natural Security
- Installation Procedure
- Installation Verification
- Natural Security in a Heterogeneous Environment
- Setting Up Natural Security in a Heterogeneous Environment

Prerequisites

The following software must be installed and running before you can install Natural Security:

- Natural for batch
- TP monitor(s)

You are recommended to install Natural Security **after** all other subproducts of Natural, as this makes defining the subproducts' system libraries to Natural Security easier.

If Natural Security Versions 2.2 and 3.1 or Versions 2.3 and 3.1 are to be used in parallel using the same Version 2.2 or 2.3 FUSER system file (containing the Natural Security interface subprograms), and if you are using the Natural Security Interface subprogram, the following are prerequisites:

For Natural Security Versions 2.2 and 3.1 in parallel:

- Update tape NE2866 for Version 2.2
- The interface subprograms on the FUSER system file must be replaced by those from the library SYSSEC from the Version 2.2 FNAT system file.

For Natural Security Versions 2.3 and 3.1 in parallel:

- Natural Security Version 2.3.4
- The interface subprograms on the FUSER system file must be replaced by those from the library SYSSEC from the Version 2.3 FNAT system file.

With Natural Security versions 2.2 and above, you can always use the same FSEC file.

If you are using parallel versions of Natural Security it is **strongly recommended** that you always use the highest version to perform data maintenance.

For more information, see Interface Subprograms in the Natural Security documentation.

Additional Prerequisites for Natural Security in a Heterogeneous Environment

In addition to the prerequisites described above, the following software must be installed and running in order to use Natural Security in a heterogeneous environment:

- Entire Network version *
- Natural Security for Mainframes (IBM, BS2000, AS400) *

* Version specified under Natural and Other Software AG Products in the current Natural Release Notes for Mainframes.

The following software must be installed as required:

- Natural Security for UNIX Version 3.1 and above
- Natural Security for Windows NT (Intel/Alpha) Version 3.1 and above
- Natural Security for Open VMS Version 3.1 and above
- Natural Security for Windows 98 and Windows 2000 Version 5.1 and above

For further information, see Setting Up Natural Security in a Heterogeneous Environment.

Prerequisite for the Natural Development Server Part

The following is required:

- INPL of Natural Security Version 3.1.5 or above
- Enable SYSSEC to maintain Natural Development Server specific profiles.
- Add basic application profiles to the FSEC system file which are prerequisites for maintaining Natural Development Server specific profiles.

See also Application Protection, Prerequisites (in the Natural Security documentation).

Installation Tape for Natural Security

The installation tape contains the dataset NSC*nnn*.INPL (where *nnn* represents the version number of the product). This dataset contains the Natural Security modules in a format loadable with the Natural system command INPL.

For a detailed description of the installation tape refer to the **Report of Tape Creation** which accompanies the tape.

Installation Procedure

It is recommended that you install Natural Security **after** all other subproducts of Natural, as this makes defining the subproducts' system libraries to Natural Security easier.

Step 1: Create System File - Job I050, Step 9900

Only perform this step if you wish to use a new FSEC system file for Natural Security Version 3.1. If you wish to use an existing Version 2.2 or 2.3 FSEC system file, omit this step.

If you wish to have the FSEC as VSAM system file, please refer to the Natural for VSAM Interface documentation for information on how to install the FSEC system file and details concerning restrictions on the use of the FSEC VSAM system file.

Load the Natural Security system file (FSEC) using the Adabas utility ADALOD (ADALOD is described in the **Adabas Utilities Manual**). Input for ADALOD is the dataset NAT*nnn*.SYSF. The file number you specify for the FSEC system file must be as yet unused.

This step creates an empty system file for Natural Security.

Step 2: Create Log File

(Job I050, Step 9901)

This step must only be performed if the Natural Security function "Logging of Maintenance Functions" is to be used. Otherwise, omit this step.

Load the log file using the Adabas utility ADALOD (ADALOD is described in the **Adabas Utilities Manual**). Input for ADALOD is the dataset NSC*nnn*.SYSL.

This step creates a log file to be used by the above-mentioned function.

Step 3: Adjust Natural Parameter Modules

(Jobs I060, I080)

- Add the following profile parameter to all your Natural parameter modules:
  `FSEC=(,file-number)`
  where *file-number* represents the number of the Natural Security system file - either the new one loaded in Step 1 or the existing Version 2.2 or 2.3 one.
  (If required, you can also specify a database ID, password and cipher code with the FSEC profile parameter; refer to FSEC - Natural Security System File in the Natural Reference documentation.)

- In all your Natural parameter modules, set the profile parameter DATSIZE to a value of at least 64.

Repeat jobs I060 and I080 for all your TP monitors.

Step 4: Load Natural Security Modules

(Job I061, Step 9900)

Once this step has been performed, it is not possible to remove Natural Security from the Natural system file; to remove Natural Security from the system file again, you would have to delete the entire contents of the system file and re-install all Natural components again.

Load the Natural Security modules using the Natural system command INPL (described in the in the Natural Reference documentation).

This step loads the Natural Security modules into your Natural system file (FNAT) under the library ID "SYSSEC" and the logon-processing programs under the library ID "SYSLIB".

This step also results in the creation of the following security profiles and relationships:

- A library security profile with library ID **"SYSSEC"**. The library is people-protected ("People-protected" set to "Y" and "Terminal-protected" set to "N").
- A user security profile with user ID **"DBA"**, user type ADMINISTRATOR, and password set to "DBA".
- User "DBA" is linked to library "SYSSEC" (ordinary link, no special link).

If INPL is executed again for Natural Security, the Natural Security modules will be newly loaded without affecting any objects and relationships already defined after the initial execution of INPL.

If you execute INPL with the option "RECOVER", the user "DBA", the library "SYSSEC", and the link between the two will be redefined as after the initial installation, while all other links to "SYSSEC" will be cancelled.

Step 5: Change Password of User "DBA"

Invoke Natural.

On the Natural Security logon screen, type in library ID "SYSSEC", user ID "DBA", password "DBA", and a new password, and press ENTER.

Type in the new password again and press ENTER to confirm the password change.

Step 6: Define Administrators

This step must only be performed if Version 3.1 is your first version of Natural Security; that is, if you have not used any previous version of Natural Security. Otherwise, omit this step.

Create a user security profile for each person who is to be a Natural Security administrator; and then link each Natural Security administrator to the library SYSSEC. The following is an *example* of how to do this.

- On the logon screen, type in library ID "SYSSEC", user ID "DBA" and the password as established in Step 4.
- The Natural Security Main Menu will be displayed. On this, enter code "M".
- A window will be displayed. In this window, mark object type "User" with a character or with the cursor.
- The User Maintenance selection list will be displayed. In the command line of the User Maintenance selection list, enter the command "ADD".
- A window will be displayed. Choose a user ID for your Natural Security administrator (for example, if the administrator’s name were Arthur Dent, you may choose "AD" as his user ID; the following steps will take this as an example). In the window, type in user ID "AD" and user type "A".
- The Add User screen will be displayed.
  Enter the user name "Arthur Dent" and set Private Library to "N" (and press ENTER).
- Press PF3. User Arthur Dent is now defined to Natural Security under the user ID "AD".
- The User Maintenance selection list will be displayed again. In the "Co" column of the selection list, mark user "AD" with function code "LL".
- A window will be displayed. In the window, enter library ID "SYSSEC".
- The Link User To Libraries selection list will be displayed. In the "Co" column of the selection list, mark library "SYSSEC" with function code "LK". User Arthur Dent is now linked to library SYSSEC.
- In the command line, enter the direct command "LOGOFF". The Natural Security logon screen will be displayed.

Now you can log on to SYSSEC with user ID "AD" and password "AD". When you log on with the new user ID for the first time, you must change the password (by typing in a new password in addition to the user ID and password).

Once you have successfully defined administrators, it may be advisable to delete user DBA to make sure that the user ID "DBA" cannot be used by unauthorized users to gain access to SYSSEC.

To delete user DBA:

- Log on to SYSSEC with user ID "AD".
- Go to the User Maintenance selection list as described above.
- On the list, mark user "DBA" with function code "DE".
  A window will be displayed, in which you enter and confirm user ID "DBA".
  The user DBA is now deleted.

Step 7: Define System Libraries

Only perform this step if Version 3.1 is your first version of Natural Security; that is, if you have not used any previous version of Natural Security. Otherwise, omit this step.

Create security profiles for all system libraries of Natural and Natural subproducts installed at your site; see also Adding a New Library (in the Natural Security documentation).
Refer to the installation instructions for other Software AG products for the corresponding security definitions to be performed.

To automatically create security profiles for system libraries (that is, all libraries whose IDs begin with "SYS"), proceed as follows:

- Use the function "Definition of System Libraries".
- Log on to library "SYSSEC".
- On the Natural Security Main Menu, select "Administrator Services".
- On the Administrator Services Menu, select the function "Definition of System Libraries".

When you invoke the function, a list of the system libraries of Natural and all Natural subproducts installed at your site will be displayed. For each system library, a library-specific security profile is provided in which all the necessary components are already defined appropriately.

On the list, you can either mark with "AD" individual libraries to which you wish their pre-defined profiles to be applied one by one,
or you can choose to have the pre-defined profiles applied to all product system libraries simultaneously by marking the corresponding product with "AD".

Note:
This step should not be performed for SYS libraries containing Natural utilities, as it is recommended that these utilities be protected as described in the section "Controlling the Use of Natural Utilities" (in the Natural Security documentation); see also Protecting Natural Utilities.

If you use the function "Definition of System Libraries" in an initial installation, you have to set the Natural profile parameter MADIO to a value of at least "2000".

Installation Verification

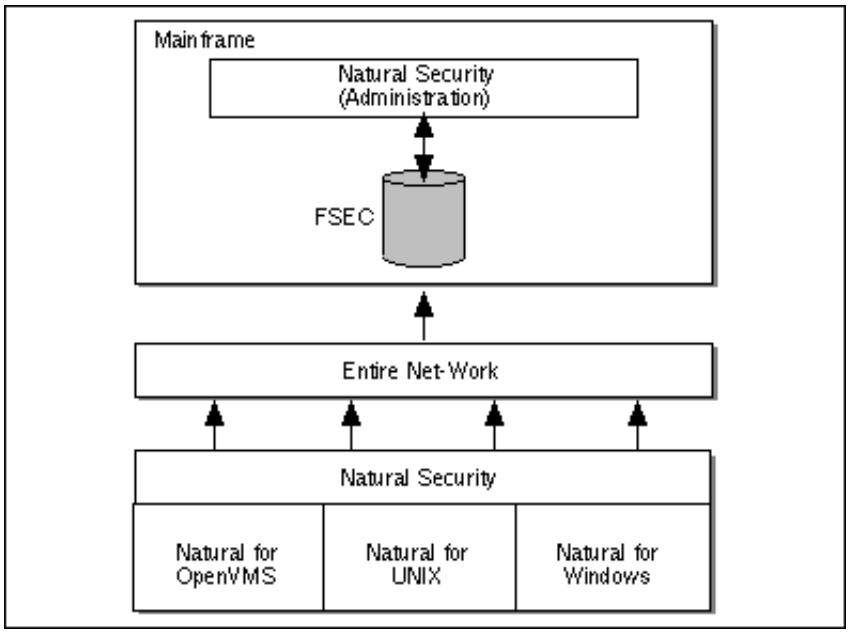
After Step 5 of the installation procedure has been completed successfully, Natural Security is operational.

Repeat the "Installation Verification" procedure for all Natural subproducts installed at your site.

Natural Security in a Heterogeneous Environment

With Natural Security Version 3.1 and above for mainframes, all enterprise security profile data can be stored and administrated centrally in a mainframe system file, which is accessible to a heterogeneous environment, thus simplifying and standardizing security maintenance on a company-wide basis. The security data in the mainframe Natural Security system file (FSEC) can be retrieved via remote database calls, managed by Entire Net-Work, from the following Natural Security installations:

- Natural for OpenVMS
- Natural for UNIX
- Natural for Windows 98, NT or 2000 (Intel/Alpha)



All maintenance and administration of security data is done on the mainframe installation. In the non-mainframe Natural Security installations, the security data maintenance application SYSSEC is disabled, as are the following Natural Security interface subprograms for modifying security profiles:

- NSCLI
- NSCOB
- NSCUS

If these interface subprograms are invoked, error NAT0828 is returned.

For further information on setting up Natural Security in a heterogeneous environment, see below.

Setting Up Natural Security in a Heterogeneous Environment

This section covers the following topics:

- Configuring Entire Network
- Customizing the Natural I/O Conversion Table on Non-Mainframe Platforms
- Setting Up Module Access
- Setting Up Natural DDM Security

Configuring Entire Network

Entire Net-work's translation process is centered around the format and length of each field specified in the search and format buffers that are passed with each Adabas call, along with special translation definition parameters. When a request goes through the network conversion routines, each individual field is translated according to the format and length defined for it in the associated search or format buffer.

To avoid the errors NAT0824 and NAT0825, add translation definitions for the following fields for the DBID and FNR of the mainframe system file FSEC with format "X":

- LW
- LC
- LQ
- LV
- LS

This prevents values being either translated or swapped.

For further information, see the section **Special Handling of Field Format "X"** in the section **Heterogeneous Platform Considerations** in the **Entire Net-Work Installation and Operations for Mainframes** documentation.

Customizing the Natural I/O Conversion Table on Non-Mainframe Platforms

If you want to use special characters not contained in the default Natural character set (ISO08859), for example in passwords, you must customize the Natural I/O conversion table in the following sections of the file NATCONV.INI:

```
ISO8859_1->EBCDIC

EBCDIC->ISO8859_1
```

You can use the call CMCNV provided in the module SULCONV in the library SYSTRANS to check the settings.

For further information on the file NATCONV.INI, see the Installation documentation for the relevant platform.

Setting Up Module Access

When you are using Natural Security cross-platform, security profiles held in the mainframe FSEC will usually apply to data held in libraries on another platform.

If you use the Allow/Disallow Modules definition, it is recommended that you use the "Module names held in the user buffer" fields of the library maintenance function Disallow/Allow Modules screen. For modules which are not on the mainframe FUSER, use the Free List.

For further information, see the section Disallow/Allow Modules (in the Natural Security documentation, section Library Maintenance).

Setting Up Natural DDM Security

If you want to use a non-mainframe platform as your Natural development environment, you must move any DDMs required by Natural modules to the library SYSTEM (FUSER). This is necessary because Natural Security runtime only checks DDMs located in the library SYSTEM.

Installing the Software AG Editor

The Software AG Editor is an optional feature that represents basic functionality within Natural, exclusively used by several Natural subproducts and other Software AG products.

The information contained herein supersedes the instructions given in the **Software AG Editor Installation Manual** which now is obsolete and no longer valid.

These installation instructions cover the following topics:

- Prerequisites
- Support of an OS/390 Sysplex Environment
- Migrating from Previous Versions
- Installation Procedure under OS/390 and VSE/ESA
- Installation Procedure under BS2000/OSD
- Installation Procedure under CMS
- Installation Verification

For details on the following topics, see also the documentation listed below:

- Operating the Software AG Editor in the Natural Operations for Mainframes documentation
- SYSEDT Utility in the section Debugging and Monitoring
- Software AG Editor Functionality and Usage, refer to the Software AG Editor reference documentation.

Notation *vrs* or *vr*: If used in the following document, the notation *vrs* or *vr* stands for the relevant **v**ersion, **r**elease, **s**ystem maintenance level numbers.

Prerequisites

Installation Modules

As the Software AG Editor is an integrated part of Natural, it can only be installed together with the current Natural version; that is, the version it is supplied with. The installation modules are provided as part of the Natural installation datasets.

Software AG Editor as an Alternative to the Natural Program Editor

If you want to use the Software AG Editor as an alternative to the Natural program editor, you still need to have Natural ISPF installed and to set your editor profile appropriately. For detailed information, see Editor Profile (in the Natural User's Guide for Mainframes).

Using SMA

If you install the Software AG Editor by using SMA, you must set a flag to "Y" (for YES). This flag is called:

Platform:	**Requirement:**
OS/390 or VSE/ESA	"SAG-EDITOR"
BS2000/OSD	"NAT-OPT-EDITOR"

Support of an OS/390 Sysplex Environment

To support an OS/390 Sysplex environment, that is, to be able to switch the OS/390 host during a Natural session, the Software AG Editor must run without a buffer pool.

For this purpose, the profile parameter EDPSIZE (described in the Natural Reference documentation) is supplied where you can specify the size of an auxiliary editor buffer pool. All editor data are kept in the user storage thread. The total editor work space per user is limited by the EDPSIZE parameter. No editor work file is required. The RECOVER mechanism of the Software AG Editor is not supported.

Migrating from Previous Versions

Since the RECOVER mechanism from Software AG Editor Versions 2.2.6 or above is upward compatible, you can continue using a buffer pool work file from Version 2.2. However, the format of the editor buffer pool is incompatible between Versions 2.2 and 3.1. Therefore, you cannot share buffer pools and their work files between Versions 2.2 and 3.1.

- If you want to use **Version 2.2 and Version 3.1** editor work files concurrently in the same region, you have to use different logical database names.
  To define the dataset names, use the parameter DDNAME in the editor buffer pool parameter module (described in the Natural Operations for Mainframes documentation).
- If you want to use **Version 2.3 and Version 3.1** concurrently in the same region, you can either use different buffer pools and work files (see above) or you can share it. In the latter case, you must link the NATEDT module of Natural 3.1 to your Natural 2.3 nucleus.
  It would be also possible to link the NATEDT module of Natural 2.3 to your Natural 3.1 nucleus. In either case, it must be the same NATEDT for all Natural nuclei. This also applies if you want to share a global EDITOR buffer pool between Natural 2.3 and 3.1.

Installation Procedure under OS/390 and VSE/ESA

The installation procedure for the integrated Software AG Editor under OS/390 and VSE/ESA consists of the following steps:

Step 1: Adapt the Editor Buffer Pool Parameter Module NATEDPRM

The buffer pool parameters contained in NATEDPRM are stored in the work-file control record during formatting (see Step 3). NATEDTPRM can be linked to the run-time module NATEDT and to the EDITOR work-file batch formatting utility.

Before adapting NATEDPRM, first refer to the Editor Buffer Pool Parameter Macro (in the Natural Operations for Mainframes documentation).

Assemble the buffer pool parameter module and link it together with the Editor Work File Batch Format utility (NATEDFM) contained in the Natural load library.

For first-time installations: You can leave the defaults. In this case, it is not necessary to assemble the buffer pool parameter module.

Step 2: Allocate the Editor Work File

(Job I008, Step 190*x*)

Skip this step for Com-plete.

A VSAM RRDS is used as the editor work file. To best exploit the VSAM dataset space, the record length should be defined 8 bytes less than the control interval length; see also Editor Work File (in the Natural Operations for Mainframes documentation).

Depending on your TP-monitor environment, run Step 190*x* of Job *nnn*I008 to allocate the dataset

where *nnn* represents the product code of the corresponding Natural interface (for example, NCI or NII).

Step 3: Format the Editor Work File

(Job I081, Step 190*x*)

Skip this step for Com-plete.

Use the Editor Work File Batch Format program (NATEDFM) to format and load the control record in the editor work file.

Depending on your TP-monitor environment, run Step 190*x* of Job *nnn*I081 to format the dataset
where *nnn* represents the product code of the corresponding Natural interface (for example, NCI or NII).

Platform:	Requirement:
VSE/ESA	To be able to use the batch format utility, the phase NATEDFMV must be created by linking the following modules: NATEDFMV NATEDPRM Link the modules (job I060, step 1900).

Step 4: Modify the Start-Up JCL and Subsystem Definitions

You can change the DD name in the editor buffer pool's parameter module NATEDPRM. If you use another DD name than CMEDIT, you must specify it in your JCL.

Platform:	Requirement:
OS/390 and TSO	Add a DD card for the editor work file: //CMEDIT DD DSN=*dataset-name*,DISP=SHR If you have specified the correct dataset name in the editor buffer pool's parameter module, this step can be omitted, as Natural will allocate the file dynamically.
VSE/ESA	Add a DLBL card for the editor work file: // DLBL CMEDIT,'*dataset-name*',,VSAM,CAT=*catalog-name* Since an editor work file cannot be shared by several VSE/ESA partitions, each partition requires its own editor work file. In VSE/ESA batch mode, however, instead of using an actual VSAM file, a dummy editor work file can be defined by using JCL or standard labels, see example for VSE/ESA Batch Mode below. Such a label definition enables you to use the editor and the editor buffer pool, but any write access to the editor work file will lead to an error, and recovering will not be possible.

Example for VSE/ESA Batch Mode:

```
// DLBL CMEDIT,'SAG.EDITOR.WORK.FILE',,VSAM,CAT=catalog-name
  // EXTENT SYSnnn */ nnn being any valid SYS number
  // ASSGN SYSnnn,IGN
```


Platform:	Requirement:
Com-plete	The Software AG Editor uses an SD file as its work file under Com-plete, therefore no separate VSAM file is required. Therefore, a global buffer pool cannot be shared between Com-plete and other environments. The name of the SD file is indicated in the DDNAME parameter of the NATEDPRM macro. The DSNAME subparameter of the NATEDPRM parameter has therefore no significance. The SD file is allocated automatically at initialization of the editor buffer pool. By default, an SD file with 1000 records and a length of 4048 bytes is allocated. These default values may be overwritten by the EDITWRK parameter in the NCMCFPRM module (see Customizing a Natural/Com-plete Environment). If you want to use a local editor buffer pool, add the definitions of the editor buffer pool to the SERVER parameter of your startup parameters as indicated in the section Using a Natural Local Buffer Pool under Com-plete.

CICS	Add an entry in the CICS File Control Table as follows:
	
	`CMEDIT DFHFCT`
	`  TYPE=DATASET,`
	`  ACCMETH=VSAM,`
	`  DATASET=CMEDIT,`
	`  FILSTAT=(ENABLED,OPENED),`
	`  SERVREQ=(ADD,UPDATE,DELETE),`
	`  RECFORM=(FIXED,UNBLOCKED),`
	`  STRNO=4,`
	`  RSL=PUBLIC,`
	`  LOG=NO`
	
	Local shared resources (LSR) can be used if possible.
	
	If you use the DSNAME parameter, the JCL definition for the editor work file is obsolete.

Step 5: Adapt all Natural Parameter Modules

(Job I080)

Add the following parameter to your parameter module to specify the size of the editor area:

`SSIZE=`*nn*

where "*nn*" must be set to at least 54.

The following buffer-pool type-dependent steps must be made:

`NTBPI TYPE=EDIT,SIZE=`*size*

The region size must be defined large enough to be able to allocate the buffer pool.

Using a Global Buffer Pool - OS/390 only

If you want to use a global buffer pool, you must specify the NTBPI macro (see Assembling a Natural Parameter Module in the Natural Operations for Mainframes documentation) in a different way so that you are able to specify the global editor buffer pool ID.

Specify the NTBPI macro as follows:

```
NTBPI TYPE=EDIT,NAME=name
```

Reassemble and link the parameter module.

If you want to use a global buffer pool, the Natural subsystem interface must be installed. For more information, see Natural Global Buffer Pool (in the Natural Operations for Mainframes documentation).

Step 6: Define a Global Editor Buffer Pool - OS/390 only

Optionally, the editor buffer pool can be defined as a global buffer pool.

Similarly to the global Natural buffer pool, the global editor buffer pool can be shared by several regions. It is defined and started with the same procedure as a global Natural buffer pool; see Natural Global Buffer Pool (in the Natural Operations for Mainframes documentation), only that parameter TYPE=EDIT has to be added. However, it must be kept separate from the global Natural buffer pool.

Make sure that all users of a global editor buffer pool have access to the same shared editor work file.

This will be checked by the editor buffer pool manager and can lead to abends if the current work file is different from the work file used during initialization.

Under IMS/TM, the use of a global buffer pool is mandatory.

Step 7: Relink Natural with the Software AG Editor

(Job I080)

Natural must be relinked with the editor module NATEDT.

Assuming your Natural load library is referenced by NATLIB, add the following line to your linkage-editor input:

```
INCLUDE NATLIB(NATEDT)
```

The editor module can be linked to a shared nucleus or to an environment-dependent nucleus. You can link it to an alternate parameter module, or as a separate module named editor if you are running with profile parameter RCA (in the Natural Reference documentation).

In this case, the editor module NATEDT must be linked as load module EDITOR and RCA=EDITOR.

If you have specified the parameters DDNAME or DSNAME in the module NATEDPRM, it must be linked together with NATEDT. Then add the following line to your linkage-editor input:

```
INCLUDE NATLIB(NATEDPRM)
```


Installation Procedure under BS2000/OSD

The installation procedure for the integrated Software AG Editor under BS2000/OSD consists of the following steps:

Step 1: Adapt the Editor Buffer Pool Parameter Module NATEDPRM

The buffer pool parameters contained in NATEDPRM are stored in the work-file control record during formatting (see Step 3). NATEDTPRM can be linked to the run-time module NATEDT and to the EDITOR work-file batch formatting utility.

Before adapting NATEDPRM, first read the section Editor Buffer Pool Parameter Macro (in the Natural Operations for Mainframes documentation).

Assemble and link the buffer pool parameter module (see the source member NATEDPRM in your source library).

For first-time installations: You can leave the defaults. In this case, it is not necessary to assemble the buffer pool parameter module.

Step 2: Adapt all Natural Parameter Modules

(Jobs I080 and I060)

Add the following parameter to your parameter module to specify the size of the editor area:

`SSIZE=`*`nn`*

where "*nn*" must be set to at least 54.

Add the following macro to your parameter module to specify the size of the editor buffer pool:

```
NTBPI TYPE=EDIT
```

The region size must be defined large enough to be able to allocate the buffer pool. For a detailed description of the NTBPI macro, refer to Assembling a Natural Parameter Module (in the Natural Operations for Mainframes documentation).

Reassemble and link the parameter module.

Step 3: Allocate and Format the Editor Work File E.FRM.EDITWORK

(Job I081, Step 1900)

Allocate the editor work file (see also Editor Work File in the Natural Operations for Mainframes documentation) by issuing the command:

`/FILE` *`dataset-name`*`,LINK=CMEDIT,SPACE=...`

Then execute the formatting program (NATEDFM2, NAT*vrs*.MOD) by entering FORMAT to format and load the control record in the editor work file.

Step 4: Modify the Start-Up Procedures for your Natural Nuclei

For TIAM and/or UTM:

Add a FILE command for the editor work file:

```
/FILE D.EDITWORK.dbid,LINK=CMEDIT
```

Step 5: Define a Local Editor Buffer Pool

(Job I070, Step 1900)

To define a local editor buffer pool, proceed as follows:

Assemble the source member containing the ADDON macro definition for the common memory pool of the Software AG Editor (ABS2STUU for UTM and ABS2STUB for TIAM and batch) in your job library.

Include the resulting module (BS2STUB) in the linkage-editor input for your UTM, TIAM or batch front-end part.

For the macros and parameters contained in macros BS2STUB and ADDON, see Local Common Memory Pools (in the Natural Operations for Mainframes documentation).

Step 6: Define a Global Editor Buffer Pool

(Job I070, Step 1900)

Optionally, the editor buffer pool can be defined as a global buffer pool.

Similar to the global Natural buffer pool, the global editor buffer pool can be shared by several regions. However, it must be kept separate from the global Natural buffer pool.

To define a global editor buffer pool, proceed as follows:

Assemble the source member containing the ADDON macro definition for the common memory pool of the Software AG Editor (ABS2STUU for UTM and ABS2STUB for TIAM and batch) in your job library.

Include the resulting module (BS2STUB) in the linkage-editor input for your UTM, TIAM or batch front-end part.

Ensure that all users of a global editor buffer pool have access to the same shared editor work file.

This will be checked by the editor buffer pool manager and can lead to abends if the current work file is different from the work file used during initialization.

For the macros and parameters contained in macros BS2STUB and ADDON, see Local Common Memory Pools (in the Natural Operations for Mainframes documentation).

Step 7: Start the Global Editor Buffer Pool

(Job I106, Step 0100)

Once defined, a global editor buffer pool must be started.

To start the global editor buffer pool, execute the module CMPSTART.

Step 8: Relink Natural with the Software AG Editor

(Job I080)

Natural must be relinked with the editor module NATEDT and the work file access module NATEDWA2 (see the source member LNATSHAR in your job library).

Assuming your Natural load library is referenced by NATLIB, add the following lines to the linkage-editor input:

```
INCLUDE NATLIB(NATEDT)
INCLUDE NATLIB(NATEDWA2)
```

Installation Procedure under CMS

The installation procedure for the integrated Software AG Editor under CMS consists of the following steps:

Step 1: Adapt the Editor Buffer Pool Parameter Module NATEDPRM

The buffer pool parameters contained in NATEDPRM are stored in the work file control record during the first initialization. Before adapting NATEDPRM, first read Editor Buffer Pool Parameter Macro (in the Natural Operations for Mainframes documentation).

Assemble the buffer pool parameter module.

For first-time installations: You can leave the defaults. In this case, it is not necessary to assemble the buffer pool parameter module.

Step 2: Adapt all Natural Parameter Modules

Add the following parameter to your NATPARM module to specify the size of the editor area:

```
SSIZE=nn
```

where "*nn*" must be set to at least 54.

Add the following macro to your NATPARM module to specify the size of the local editor buffer pool:

```
NTBPI TYPE=EDIT,SIZE=size
```

For a detailed description of the NTBPI macro, refer to Assembling a Natural Parameter Module (in the Natural Operations for Mainframes documentation).

Reassemble and link the NATPARM module.

The CMS machine must be defined large enough to allocate the editor buffer pool.

Step 3: Relink Natural with the Software AG Editor

Natural must be relinked with the editor modules NATEDT and NATEDPRM.

Modify LOADLIST in NAT$LOAD EXEC to include:

```
NATEDT NATEDPRM
```

Run NATBLDM EXEC to rebuild Natural for CMS.

Check for the following line in NAT$LOAD EXEC and make sure that the value 50 is set:

```
SET LDRTBLS 50
```

Installation Verification for the Software AG Editor

Once you have installed the editor, you can verify the installation.

Invoke Natural and enter SYSEDT on the command line.

The Editor Buffer Pool Services utility SYSEDT displays all buffer pool parameters and usage statistics (see the section Debugging and Monitoring).

To be able to test the full operation of the Software AG Editor, a subproduct (for example, Natural ISPF) must be installed which uses its functionality.

Installing the Natural Net Data Interface

The Natural Net Data Interface NATNETTO supports the EntireX CICS 3270 Bridge and similar client/server solutions in message-oriented server environments, i.e. TP monitors.

The following topics are covered:

- Device Configuration in NATCONFG
- Installation Procedure under OS/390
- Installation Procedure under VSE
- Installation Procedure under BS2000/OSD

Device Configuration in NATCONFG

Logical net data devices are configured with the flag byte IONET, all other flag and value settings must be made as in the sample definition given below. The module entry is VCNETTO, additional device entries must be specified with WXTRN=OFF. The settings of FLAG1, FLAG2 and RTAL must be according to the example below.

If the delimited mode is set, the delimiter character which separates the fields in the value buffer can be set via cmbel.

IONET Settings

IONET	DS	XL1	NETDATA CONTROL FLAG
NECUFNR	EQU	X'01' 1	CURSOR POSITION = FIELDNR
NEMSG	EQU	X'02' .... ..1.	SEND MESSAGE LINE (if not set, message line will be skipped)
NEABO	EQU	X'04' .... .1..	ATTRIBUTE BUFFER OPTION
NEFBO	EQU	X'08' .... 1...	FORMAT BUFFER OPTION
NEFLG	EQU	X'10' ...1	FIELD LENGTH OPTION
NEDLM	EQU	X'20' ..1.	DATA DELIMITED OPTION
NEFIX	EQU	X'40' .1..	FIXED FORMAT OPTION
NEFBOPTE	EQU	X'80' 1...	EXTENDED FORMAT BUFF. OPT.

NATCONFG, as delivered with Natural Version 3.1.3, already has a device entry for NATNETTO. The TTYPE is "NETF". The potocol options are set as follows:

- Value buffer structure is fixed (without delimitation between the fields).
- Format buffer exetended format buffer and attribute buffer options are set.
- The cursor position is in field number notation.

Message line and pf-key line are supressed

Example:

```
NTDVCE TYP=NETF,NAME=NETTF,ENTRY=VCNETTO,MSG=BOT,          HS06-
       FLAG1=CMNIXD,FLAG2=CMTNOPT,RTAL=255,                HS07-
       FLAGS=(IONET,-,CO,IONET,+,NEFIX+NEFBO+NEABO+NECUFNR+NEFB-
       OPTE,WINDTITI,+,PFKNDISP)                           HS06
```


Installation Procedure under OS/390

To install the Natural Net Data Interface under OS/390, adapt the following link step for Natural.

- Add the following INCLUDE instruction and the corresponding DD-statements in the link instructions for the linkage editor:

```
INCLUDE NATLIB(NATNETTO)
```

Installation Procedure under VSE

To install the Natural Net Data Interface under VSE, adapt the following link step for Natural.

- Add the following INCLUDE instruction in the search chain for the linkage-editor:

```
INCLUDE NATNETTO
```

Installation Procedure under BS2000/OSD

To install the Natural Net Data Interface under BS2000/OSD, adapt the following link steps for Natural.

- Add the following INCLUDE instruction to the element LNATSHAR in LIB.NAT*nnn*:

```
INCLUDE NATNETTO,NATnnn.MOD
```

- Relink your Natural shared nucleus with procedure P.LINKMOD in LIB.NAT*nnn*

Overall Installation Verification

This document describes how to verify the successful completion of the preceding installation procedures. It covers the following topics:

- Installation Verification for Base Natural
- Installation Verification for the TP-Monitor Interface

Installation Verification for Base Natural

For base Natural, there are no specific installation verification procedures. After the last step of the installation procedure has been successfully performed, check that the following results are available:

- Communication between Adabas and Natural is working.
- The Natural system files have been loaded.
- Batch Natural is operational.

Installation Verification for the TP-Monitor Interface

Once you have installed a Natural/TP-monitor interface (Part 3 of the Overall View of the Installation Process as outlined at the beginning of this documentation), as described for each TP monitor in the corresponding section of this documentation, you should verify the successful installation of the TP-monitor interface.

Before you start the verification procedure, ensure that you have already created the EMPLOYEES sample file; if not, refer to the appropriate Adabas documentation for information on how to create it.

To verify the successful installation of the TP-monitor interface, proceed as follows:

1. Invoke the Natural utility SYSDDM by entering the following command in the Natural command line:
   SYSDDM
   On the SYSDDM menu, enter Code "E" (Edit DDM) and DDM Name "EMPLOYEES".
   Press PF3 to quit.
   Enter Code "C" (Catalog DDM), the file number and the database ID of your EMPLOYEES demo file and Replace "Y".
   After these functions have been performed, exit from SYSDDM.
2. Log on to library SYSEXRM:
   LOGON SYSEXRM
   EDIT, CHECK, STOW, RUN, EXECUTE the example programs "FNDSOR" and "REAEX1S" in this library.
3. Log on to library SYSEXV23:
   LOGON SYSEXV23
   MENU
   Try the programs in this library; they demonstrate the new features provided by Natural Version 3.1.

