

Natural

Installation for BS2000

Version 8.2.8

April 2023

Dieses Dokument gilt für Natural ab Version 8.2.8.

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Dokument-ID: NATMF-INSTALL-BS2-828-20230425

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Preface

This documentation describes the installation of base Natural and Natural add-on products on BS2000.

Basic Information:

- | |
|---|
| <ul style="list-style-type: none">■ Installation Process and Major Natural Features |
|---|

Base Natural:

- | |
|--|
| <ul style="list-style-type: none">■ Installing Natural |
|--|

Base Natural - Optional Components:
--

- | |
|--|
| <ul style="list-style-type: none">■ Installing International Components for Unicode for Software AG■ Installation for REQUEST DOCUMENT and PARSE XML Statements■ Installing Natural Net Data Interface■ Installing Entire System Server Interface■ Installing Software AG Editor |
|--|

TP Monitor Interfaces:

- | |
|---|
| <ul style="list-style-type: none">■ Installing Natural TIAM Interface■ Installing Natural <i>open</i>UTM Interface |
|---|

Other Natural Add-On Products:

- | |
|--|
| <ul style="list-style-type: none">■ Installing Natural Security■ Installing Natural Advanced Facilities■ Installing Natural Optimizer Compiler■ Installing Natural Connection |
|--|

1 About this Documentation

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- Online-Informationen und Support 2
- Datenschutz 3

Dokumentationskonventionen

Konvention	Beschreibung
Fettschrift	>Kennzeichnet Elemente auf einem Bildschirm.
Nichtproportionale Schrift	Kennzeichnet Namen und Orte von Diensten im Format <i>Ordner.Unterordner.Dienst</i> , Programmierschnittstellen (APIs), Namen von Klassen, Methoden und Properties in Java.
<i>Kursivschrift</i>	Kennzeichnet: Variablen, für die Sie situations- oder umgebungsspezifische Werte angeben müssen. Neue Begriffe, wenn sie erstmals im Text auftreten. Verweise auf andere Dokumentationsquellen.
Nichtproportionale Schrift	Kennzeichnet: Text, den Sie eingeben müssen. Meldungen, die vom System angezeigt werden. Programmcode.
{ }	Zeigt eine Reihe von Auswahlmöglichkeiten an, von denen Sie eine auswählen müssen. Geben Sie nur die innerhalb der geschweiften Klammern vorhandenen Informationen ein. Geben Sie nicht die Klammersymbole { } ein.
	Trennt zwei sich gegenseitig ausschließende Auswahlmöglichkeiten in einer Syntaxzeile voneinander ab. Geben Sie eine der Auswahlmöglichkeiten ein. Geben Sie nicht das Symbol ein.
[]	Zeigt eine oder mehrere Optionen an. Geben Sie nur die innerhalb der eckigen Klammern vorhandenen Informationen ein. Geben Sie nicht die Klammersymbole [] ein.
...	Zeigt an, dass Sie mehrere Auswahlmöglichkeiten desselben Typs eingeben können. Geben Sie nur die Informationen ein. Geben Sie nicht die drei Auslassungspunkte (...) ein.

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- Das Knowledge Center nach technischen Informationen und Tipps durchsuchen.
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2 Installation Process and Major Natural Features on BS2000

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This document provides general information on the prerequisites and processes required to install base Natural and Natural add-on products. In addition, it describes installation tools and major Natural components required for installation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

General Prerequisites and System Support

Before beginning the installation process, consider the following:

- Be sure to read the current Natural *Release Notes* for Mainframes for information on software and hardware requirements, known issues and changes to the documentation. These *Release Notes* apply to base Natural and Natural add-on products.
- A supported version of the operating system on which Natural is to run must be installed. For the supported operating systems and versions, refer the **Product Version Availability** section of Software AG's Empower web site at <https://empower.softwareag.com/>.
- A supported version of the TP monitor/online interface used with Natural must be installed. For the supported versions, refer to *TP Monitors/Online Interfaces* in the current Natural *Release Notes* for Mainframes.
- A supported version of Adabas must be installed to store the Natural system files. See also [Natural System Files](#).

For the supported versions, refer to *Database Management Systems* in the current Natural *Release Notes* for Mainframes.

- A supported version of each database management system used to store the user data processed with Natural must be installed.

For the supported versions, refer to *Database Management Systems* in the current Natural *Release Notes* for Mainframes.

Installation Medium

The installation medium (for example, tape or CD-ROM) distributed for Software AG mainframe products contains all files required to install base Natural and the Natural add-on products.

The software required for the optional Natural components are contained in the files supplied for base Natural. The software required for the Natural add-on products are contained in separate product files which are listed in the product-specific sections of the *Installation for BS2000* documentation. In addition to the product files, the installation medium can contain the latest fix updates for the supplied products.

The names of the product files begin with a product code that identifies each product, as in the following table:

Product Code	Product Name
ETP	Entire Transaction Propagator
NAF	Natural Advanced Facilities
NAT	Natural
NOC	Natural Optimizer Compiler
NRT	Natural TIAM Interface
NSC	Natural Security
NTC	Natural Connection
NUT	Natural <i>open</i> UTM Interface

Software AG Product Delivery Report

Each installation medium is delivered with a Software AG Product Delivery Report providing the following information:

- A list of all files contained on the medium.
- The sequence in which the files are located on the medium.
- Attribute descriptions of each file.

Installation Method

The installation of Software AG products on BS2000 is performed by installation jobs that contain the JCL required to identify the job to the operating system and run the job.

There are two methods for creating and running the installation jobs:

- using the jobs generated by System Maintenance Aid (SMA), or
- using the jobs created from the sample installation jobs provided.

The *Installation for BS2000* documentation solely describes the installation procedure for the jobs generated by SMA. If you do not use SMA for installation, refer to the example installation jobs supplied on the installation medium.

SMA is supplied with base Natural.

System Maintenance Aid (SMA)

For each step of the installation procedure, System Maintenance Aid (SMA) generates an installation job according to your specifications in SMA. You then submit and run the generated job.

Before you can start generating the jobs, you have to load the `SMT111.TABS` file from the installation medium into the SMA system file. `SMT111.TABS` contains the tables SMA requires to build the jobs.

SMA is supplied with base Natural. For instructions on loading the file and using SMA, refer to the *System Maintenance Aid* documentation.

Readme File

For installation guidance and information on new or changed SMA parameters and Natural features, you can view the product-specific Readme files by using the appropriate SMA function.

➤ To view a product-specific Readme

- From the product list on an SMA **Maintenance** screen, execute the `RM (Show Readme File)` command for the required product(s).

Sample Installation Jobs

The sample installation jobs that can be used as an alternative to SMA are provided in an LMS library contained on the file *product-code-vrs.JOBS* (for example, NAT828.JOBS) shipped on the installation medium. All sample installation jobs provided are listed and described in the README document that accompanies the shipment.

You need to adapt the sample installation jobs to your requirements.

Installation Job Identification

Each installation job indicates the **product code** and version (for example, NAT828) of the corresponding product (for example, Natural).

Each step of the installation procedure is identified by a job name (for example, I050) and one or more steps (for example, Steps 0100 and 0101 for Job I050) that indicate the tasks performed by the job. The job name can have a prefix such as a **product code** (for example, NATI050).

A sample installation job from the LMS library can also have a suffix letter which indicates a variant of the job. For example: Job I060L is a variant of Job I060 and used if support of the IBM Language Environment (LE) is required. In SMA, the same variant is executed with Job I060 and the appropriate SMA parameter setting.

Overall Installation Procedure

The installation process comprises the following:

1. Creating the Natural system files.
2. Creating the Natural parameter module.
3. Creating the Natural nucleus.
4. Loading the Natural objects.
5. Installing the optional Natural components.
6. Installing the Natural add-on products.

Naming Conventions for Installation Procedures

This section describes the naming conventions that apply to the installation procedures of the *Installation for BS2000* documentation:

- [job-library](#)
- [Elements in job-library](#)

job-library

job-library denotes one of the following:

- the sample job library (*product-code-vrs*.JOBS, for example, NAT828.JOBS) if you are *not* using [System Maintenance Aid \(SMA\)](#) or
- the SMA job library if you are using SMA. See the SMA parameter JOBLIB in the SMA Parameter Group BASIC.

Elements in job-library

The following naming conventions are used for the source elements contained in the *job-library* library:

Aproduct-codefunction

for assembler sources and

Lproduct-codefunction

for instructions for BINDER.

Examples:

ANATFRNT, ANATRENT, ANATSTUB and LNATFRNT

Installation Verification

Verify the successful completion of the installation by starting Natural and testing the system functions as described in the relevant sections of the *Installation for BS2000* documentation.



Note: If Natural Security is installed, certain Natural functions and libraries can be restricted to specific users.

INPL Utility

The installation instructions frequently refer to the Natural INPL utility which is used to load the files (for example, `NATvrs.INPL`) contained on the Natural installation medium into the **Natural system files**. The INPL utility is invoked with the Natural system command `INPL`. For detailed information on the INPL utility, refer to the *Utilities* documentation.

Natural Nucleus Components

The Natural nucleus consists of two functional parts: the environment-independent nucleus and the environment-dependent nucleus.



Note: If you maintain different versions of Natural, you must use distinctive names for the nuclei to identify each version.

This section covers the following topics:

- [Environment-Independent Nucleus](#)
- [Environment-Dependent Nucleus](#)
- [Modules for Static Linking](#)
- [Modules for Dynamic Loading](#)
- [Modules Called Dynamically](#)

Environment-Independent Nucleus

The environment-independent nucleus contains components that are independent of the operating system or TP system (online interface) being used. The same instance of the environment-independent nucleus can be used in different online and batch environments in different tasks. The environment-independent nucleus is reentrant.

The environment-independent nucleus can reside in a common memory pool (CMP) or in Class 4 Memory where it can be shared between different tasks.

A module (such as the environment-independent nucleus) loaded into a CMP or Class 4 Memory is protected against modification. Therefore, tests for modifications of the environment-independent nucleus should be performed in a separate environment.

If the environment-independent nucleus resides in the CMP or Class 4 Memory, multiple batch jobs or TP tasks (for example, TIAM) share the same instance of the environment-independent nucleus. This results in a significant reduction of paging activities and virtual storage consumption.

Modules for Linking

The following modules must be linked to the environment-independent nucleus:

- Modules for base Natural
- Environment-independent modules of Natural add-on products
- Environment-independent user-supplied modules

When using System Maintenance Aid (SMA), the required modules are linked to the environment-independent nucleus during the appropriate installation job/step. Modules that can optionally be linked are mentioned in the *Installation Procedure*.

The installation of the environment-independent nucleus is described in *Link the Nucleus* in the *Installation Procedure*.

Specifying the Nucleus Name

The name of the environment-independent nucleus to be used is specified with the Natural profile parameter `NUCNAME` in the Natural parameter module during the installation of the environment-dependent nucleus. You can specify `NUCNAME` as a dynamic parameter in the primary parameter input, but you cannot specify `NUCNAME` in the input strings of the Natural profile parameter `PROFILE` or `SYS`.

The Natural parameter module is described in *Building a Natural Parameter Module* in the *Operations* documentation. `NUCNAME`, `PROFILE` and `SYS` are described in the *Parameter Reference* documentation.

If you maintain different versions of Natural, we recommend that you use distinctive names for the nucleus to clearly identify each version and environment, for example: `NAT828` for the environment-independent nucleus, `NAT828C` for the environment-dependent nucleus for a CICS interface, and `NAT828B` for the batch environment.

Rules for Using an Environment-Independent Nucleus

The rules that apply when using the environment-independent nucleus are described in the following section.

Concerning *openUTM*, see also *Several Applications with one Common Natural* in the *TP Monitor Interfaces* documentation.

1. The environment-independent nucleus is linked *without* the corresponding reentrant parts of the batch, *TIAM* and *openUTM* drivers (these modules must be linked to the **environment-dependent nucleus**).

Example: The name of the environment-independent nucleus is `NATSHARE`.

```

/START-PROGRAM $BINDER
START-LLM-CREATION INTERNAL-NAME=NATSHARE,
SLCE-DEFINITION=*BY-ATTRIBUTES(RESIDENCY-MODE=*YES)
INCLUDE-MODULES NATINV,LIB=(NATvrs.MOD)
.
.
INCLUDE-MODULES NATURAL,LIB=(NATvrs.MOD)
.
.
INCLUDE-MODULES NATLAST,LIB=(NATvrs.MOD)
MODIFY-SYMBOL-ATTRIBUTES ADD-MODE=*31,RES-MODE=*ANY,READ-ONLY=*NO
MODIFY-SYMBOL-VISIBILITY
        SYMBOL-NAME = *ALL,
        SYMBOL-TYPE = *DEFINITIONS,
        VISIBLE = *NO(KEEP-RESOLUTION=*YES)
SAVE-LLM LIB=NATURAL.USER.MOD
END
    
```

where *vrs* is the current product version of Natural.

2. Batch, TIAM and *open*UTM application-specific Natural parameter modules are also linked to the environment-dependent nucleus. In addition, the environment-independent nucleus can contain a common Natural parameter module, for example, for *CSTATIC* entries. The name chosen for the linked environment-independent nucleus is also identical with the name of the global common memory pool into which Natural is loaded. This name is to be used as operand for the following keyword parameters:

Name	Used in
NUCNAME	the macros NAMBS2, NAMTIAM and NATUTM
NAME	CMPSTART and ADDON (BS2STUB) described in the <i>Operations</i> documentation

Example:

```

NRTSTART NAMTIAM CODE=FRONT,
        NUCNAME=NATSHARE
        PARMODE=(31, ABOVE),
.
.
NUTFRONT NATUTM APPLNAM=NATUTM,
.
.
        NUCNAME=NATSHARE
        PARMODE=(31, ABOVE)
    
```

3. The environment-independent nucleus is started by the program *CMPSTART*.

Example:

```
/EXEC (CMPSTART,NATURAL.MOD)
NAME=NATSHARE,SIZE=2MB,POSI=ABOVE,ADDR=250,SCOP=GLOBAL
PREFIX=YES,LIBR=NATURAL.USER.MOD
```

4. The link to the environment-independent nucleus is created in the batch, TIAM or *openUTM* applications through the generation of the macro BS2STUB; refer to *CMPSTART Program* described in the *Operations* documentation.

Example:

```
NRTSTUB BS2STUB PARMOD=31,PROGMOD=ANY
        ADDON NAME=NATSHARE,
              STAT=GLOBAL
NUTSTUB BS2STUB PARMOD=31,PROGMOD=ANY
        ADDON NAME=NATSHARE,
              STAT=GLOBAL
```

5. The environment-dependent nucleus must contain the reentrant part of the corresponding driver (NAMBS2 CODE=RENT, NAMTIAM CODE=RENT or NURENT).

Example for TIAM:

```
/START-PROGRAM $BINDER
START-LLM-CREATION INTERNAL-NAME=NRTFRONT, -
SLICE-DEFINITION=*BY-ATTRIBUTES(RESIDENCY-MODE=*YES)
INCLUDE-MODULES NRTFRNT,LIB=(user-lib) /* Non-reentrant part of NAMTIAM ←
INCLUDE-MODULES NRTRENT,LIB=(user-lib) /* Reentrant part of NAMTIAM
INCLUDE-MODULES NRTSTUB,LIB=(user-lib) /* BS2STUB
INCLUDE-MODULES nat-parm-module,LIB=(user-lib) /*
...
END
```

Example for *openUTM*:

```
/START-PROGRAM $BINDER
START-LLM-CREATION INTERNAL-NAME=NUTvrs, -
SLICE-DEFINITION=*BY-ATTRIBUTES(RESIDENCY-MODE=*YES)
INCLUDE-MODULES KDCNUT,LIB=(user-lib) /* openUTM KDCROOT
INCLUDE-MODULES NUSTART,LIB=(user-lib) /* NATUTM
INCLUDE-MODULES NUTRENT,LIB=(user-lib) /* NURENT
INCLUDE-MODULES NUTSTUB,LIB=(user-lib) /* BS2STUB
INCLUDE-MODULES nat-parm-module,LIB=(user-lib)
INCLUDE-MODULES SWPPARM,LIB=(user-lib) /* Swap pool parameter module
...
END
```

where:

vrs is the current product version and

user-lib is the name of the user library,
nat-parm-module is the Natural parameter module.

Environment-Dependent Nucleus

The environment-dependent nucleus contains components that depend on the operating or TP system being used.

In addition to the environment-independent nucleus, every single task in which Natural runs requires an environment-dependent nucleus containing modules that perform actions specific to the operating or TP system. The environment-dependent nucleus assumes control from the operating or TP system at the start of a Natural session, loads the environment-independent nucleus and passes control to it.

Modules for Linking

The following modules must be linked to the environment-dependent nucleus:

- Environment-specific Natural interface modules
- Environment-specific work file and print file modules
- Environment-specific Natural parameter module (see also *Building a Natural Parameter Module* in the *Operations* documentation)
- Environment-dependent modules of Natural add-on products
- Adabas link routine (ADALNK or ADAUSER)
- Environment-dependent user-supplied modules defined as `CSTATIC` in the Natural parameter module. The Natural profile parameter `CSTATIC` is described in the *Parameter Reference* documentation.

When using System Maintenance Aid (SMA), the required modules are linked to the environment-dependent nucleus during the appropriate installation job/step. Modules that can optionally be linked are mentioned in the *Installation Procedure*.

The installation of the environment-dependent nucleus is described in *Link the Nucleus* in the *Installation Procedure*.

Modules for Static Linking

Both the Natural configuration module `NATCONFIG` (described in the *Operations* documentation) and the Natural parameter module contain the Natural-supplied list of additional modules to be statically linked to the nucleus.

The Natural parameter module also contains the user-supplied list of additional modules to be statically linked to the nucleus as specified with the Natural profile parameter `CSTATIC`.

Each entry of these lists consists of a program name and a V-type address constant which must be resolved by linking the corresponding module to the Natural parameter module.

The Natural-supplied list provided with `NATCONFIG` is used if the Natural parameter module is not linked to the environment-independent nucleus. If modules are statically linked to the environment-independent nucleus, a Natural parameter module that defines all these modules must also be linked to the environment-independent nucleus.

Optionally, you can specify an alternative Natural parameter module by using the Natural profile parameter `PARM` (described in the *Parameter Reference* documentation). An alternative parameter module takes precedence over a parameter module that is linked to either the environment-independent or the environment-dependent nucleus.

Merging Module Lists

During initialization of a Natural session, up to three lists of statically-linked modules (specified with the Natural profile parameter `CSTATIC`) are merged:

- Base list for the merge is the list of the Natural parameter module specified with the Natural profile parameter `PARM`;
- V-type address constants not resolved in this list are resolved using the Natural parameter module linked to the environment-dependent nucleus;
- V-type address constants not yet resolved are resolved using the Natural parameter module linked to the environment-independent nucleus.

If a user-supplied module is to be statically linked to the environment-independent nucleus, it must be specified in the Natural parameter module linked to the environment-independent nucleus as well as in the Natural parameter module specified with the Natural profile parameter `PARM`.

Modules for Dynamic Loading

When initializing a Natural session, you can also dynamically load the modules (supplied by Software AG or user-defined) that have been defined for static linking. For information on whether the module of a Natural add-on product is suitable for dynamic loading, read the documentation for your specific Natural add-on product.

For information on defining external names for static non-Natural programs and dynamic linking and controlling these programs, see the Natural profile parameters `RCA` and `RCALIAS` described in the *Parameter Reference* documentation.

Modules Called Dynamically

If a module is not defined for static linking, Natural attempts to load and execute the module using environment-dependent functions when the corresponding Natural `CALL` statement is executed.

Natural System Files

The Natural system files are stored in an Adabas database.

The table below lists and describes the Natural system files that are usually available in a Natural environment. The availability of the system files and the data contained in the files depends on the Software AG products installed in addition to base Natural.

The settings for the system files are defined with Natural profile parameters of the same names (exception: scratch-pad file). You can follow the hyperlinks in the table below to read details about these parameters in the *Parameter Reference* documentation.

System File	Supplied with	File Contents
FNAT	Base Natural	All objects required for Natural system applications.
FUSER	Base Natural	User-specific objects required for user-defined applications.
FPROF	Base Natural	Parameter profiles specified by the profile parameter <code>PROFILE</code> , provided no database information is supplied as subparameter of <code>PROFILE</code> .
Scratch-pad file	Base Natural	Data that is not stored explicitly as a Natural object in another system file. See also <i>Natural Scratch-Pad File</i> in the <i>Operations</i> documentation.
FDIC	Base Natural	Natural Data Definition Modules (DDMs). If Predict is installed, <code>FDIC</code> also contains data for the Predict dictionary system. If the Natural Development Server is installed, <code>FDIC</code> also contains application data and holds object locking information.

System File	Supplied with	File Contents
FREG	Base Natural	Registry data that is not stored explicitly in another system file.
FSEC	Natural Security	Control information required for security definitions.
FSP00L	Natural Advanced Facilities	Control and spooling information required to output a report on a screen or printer and obtain print statistics.

Defining a Scratch-Pad File

Like all other system files of Software AG products, the scratch-pad file is a logical file. The logical file number of the scratch-pad file is 212.

Since there is no mnemonic for the scratch-pad file such as FNAT and FUSER or FDIC, it has to be defined:

- either statically by using the macro NTLFILE in the Natural parameter module or
- dynamically by using the Natural profile parameter LFILE.

Examples of NTLFILE and LFILE Definitions:

LFILE Parameter:

```
LFILE=(212,physical-dbid,physical-fnr,password,cipher-key)
```

NTLFILE Macro:

```
NTLFILE 212,physical-dbid,physical-fnr,password,cipher-key
```


3 Installing Natural on BS2000

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This document describes the steps for installing Natural (product code NAT) on BS2000.

Related Topic:

For information on how to run Natural in a BS2000 environment, see the relevant section in the *Operations* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#).

Installation Medium

The **installation medium** contains the following files required for product installation:

File Name	Contents
ICS <i>vrs</i> .MOD	Load modules and object modules for International Components for Unicode for Software AG (ICS)
MLC <i>vrs</i> .JOBS	Sample installation jobs for Software AG's mainframe license check software The <i>vrs</i> in the library name represents the version of the license check software, which is not necessarily the same as the version of Natural. For detailed information on the license check software, see <i>Software AG Mainframe Product Licensing</i> .
MLC <i>vrs</i> .MOD	Load modules and object modules for Software AG's mainframe license check software including the LICUTIL license utility The <i>vrs</i> in the library name represents the version of the license check software, which is not necessarily the same as the version of Natural. For detailed information on the license check software and the LICUTIL utility, see <i>Software AG Mainframe Product Licensing</i> .
NAT <i>vrs</i> .LICS	Product license file For information on the license file and product licensing, see <i>Software AG Mainframe Product Licensing</i> .
NAT <i>vrs</i> .SRC	Source modules

File Name	Contents
NATvrs.SYSF	Natural system file definitions
NATvrs.MOD	Load modules and object modules
NATvrs.MAC	Macros
NATvrs.JOBS	Sample installation jobs
NATvrs.INPL	Natural objects
NATvrs.EXPL	Natural example objects



Note: The file NATvrs.JOBS will be converted automatically into an LMS library when it is copied from the installation medium to disk.

Copying Files to a BS2000 Disk

Copy the files (data sets) from the supplied installation medium to your disk before you perform the individual installation procedure for each component to be installed.

The way you copy the files depends on the installation method and the medium used:

- If you use System Maintenance Aid (SMA), refer to the copy job instructions provided in the *System Maintenance Aid* documentation.
- If you are not using SMA and want to copy the files from CD-ROM, refer to the README.TXT file on the CD-ROM.
- If you are not using SMA and want to copy the files from tape, follow the instructions in this section.

This section explains how to copy all files from tape to disk.

- [Step 1: Copy Library SRVvrs.LIB from Tape to Disk](#)
- [Step 2: Copy the Procedure COPY.PROC from Tape to Disk](#)
- [Step 3: Copy all Product Files from Tape to Disk](#)

Step 1: Copy Library SRVvrs.LIB from Tape to Disk

This step is not necessary if you have already copied the library SRVvrs.LIB from another Software AG installation tape. For further information, refer to the element #READ-ME in this library. The library SRVvrs.LIB is stored on the tape as a sequential file named SRVvrs.LIBS containing LMS commands. The current version vrs can be obtained from the *Software AG Product Delivery Report*.

- Execute the following commands to convert SRVvrs.LIBS into an LMS library:

```

/IMPORT-FILE  SUPPORT=*TAPE(FILE-NAME=SRVvrs.LIBS,-
/  VOLUME=volser, DEV-TYPE=tape-device)
/ADD-FILE-LINK  LINK-NAME=EDTSAM, FILE-NAME=SRVvrs.LIBS,-
/  SUPPORT=*TAPE(FILE-SEQ=3), ACC-METH=*BY-CAT,-
/  BUF-LEN=*BY-CAT, REC-FORM=*BY-CAT, REC-SIZE=*BY-CAT
/START-EDT
@READ  '/'
@SYSTEM 'REMOVE-FILE-LINK  EDTSAM'
@SYSTEM 'EXPORT-FILE  FILE-NAME=SRVvrs.LIBS'
@WRITE  'SRVvrs.LIBS'
@HALT
/ASS-SYSDTA  SRVvrs.LIBS
/MOD-JOB-SW  ON=1
/START-PROG  $LMS
/MOD-JOB-SW  OFF=1
/ASS-SYSDTA  *PRIMARY

```

where:

tape-device is the device type of the tape, for example, TAPE-C4, and
volser is the VOLSER of the tape (see the *Software AG Product Delivery Report*).

Step 2: Copy the Procedure COPY.PROC from Tape to Disk

- Call the procedure P.COPYTAPE in the library SRVvrs.LIB to copy the procedure COPY.PROC to disk:

```

/CALL-PROCEDURE  (SRVvrs.LIB,P.COPYTAPE), -
/  (VSNT=volser, DEVT=tape-device)

```

If you use a TAPE-C4 device, you can omit the parameter DEVT.

Step 3: Copy all Product Files from Tape to Disk

- Enter the procedure COPY.PROC to copy all product files to disk:

```

/ENTER-PROCEDURE  COPY.PROC, DEVT=tape-device

```

If you use a TAPE-C4 device, you can omit the parameter DEVT.

The result of this procedure is written to the file L.REPORT.SRV.

Installation Procedure

Be sure to read *Installation Process and Major Natural Features* and *Naming Conventions for Installation Procedures* before you start the installation procedure.

- Step 1: Prepare, Convert, Assemble and Link the License File
- Step 2: Load the FNAT System File Definition
- Step 3: Load the FUSER System File Definition
- Step 4: Load the Scratch-Pad File Definition
- Step 5: Load the FREG System File Definition
- Step 6: Load the FDIC System File Definition
- Step 7: Load the FSEC System File Definition
- Step 8: Assemble the Natural BS2000 Stub Module and Batch Driver
- Step 9: Build the Natural Parameter Module
- Step 10: Link and Start the Optimize Monitor Buffer Pool
- Step 11: Link the Nucleus
- Step 12: Start All Pools
- Step 13: Load New Natural Objects and Natural Error Messages
- Step 14: Load the Natural Example Objects
- Step 15: Allocate and Format the Editor Work File

Step 1: Prepare, Convert, Assemble and Link the License File

(Job I010, Steps 0110, 0111, 0112)

You must install a valid Natural license file.

For detailed information on the license file and product licensing, see *Software AG Mainframe Product Licensing*.

1. Copy the license file from the supplied installation medium to disk or transfer it from the PC as described in *Transferring a License File from PC to a BS2000 Host Using FTP* in *Software AG Mainframe Product Licensing*.
2. Check, convert, assemble and link the license file:

Step 0110	Check license file NAT ν rs.LICS. This job runs the CHECK function of the LICUTIL license utility (see below).
Step 0111	Convert license file into an assembler source. This job runs the MAKE function of the LICUTIL license utility (see below).
Step 0112	Assemble and link the assembler source to generate load module ANATLIC. This module is then linked to the nucleus in Job I060 .

The functions and option settings provided by LICUTIL are described in *Using the License Utility: LICUTIL in Software AG Mainframe Product Licensing*.

Step 2: Load the FNAT System File Definition

(Job I050, Step 0100)

Skip this step if you want to use an existing Natural FNAT system file.

Load the new Natural FNAT system file definition:

1. Specify the database ID and file number of the Adabas file where to load the new FNAT system file definition by using the Adabas ADALOD utility.

In addition, you must specify this database ID and file number in the Natural parameter module as described in [Step 9: Build the Natural Parameter Module](#).

2. Load the FNAT system file definition contained in the NAT vrs .SYSF file by using the Adabas ADALOD utility.

The following ADALOD utility parameter must *not* be changed:

```
ISNREUSE=YES
```

The following ADALOD utility parameter setting is recommended:

```
USERISN=YES
```

If you reorganize an FNAT file or if you unload from or load data to the FNAT file (for example, by using ADAULD/ADALOD), you must specify the parameter USERISN=YES for the ADALOD utility to avoid Natural errors NAT7397 and NAT9988 which require that you re-INPL the Natural FNAT system file.

If you specify the parameter USERISN=YES when you load a new FNAT system file, and you unload data from this FNAT file, the ADALOD utility assumes USERISN=YES as a default setting when re-loading the data into the FNAT file.

Step 3: Load the FUSER System File Definition

(Job I050, Step 0101)

Skip this step if you want to use an existing Natural FUSER system file.

Load the new Natural FUSER system file definition:

1. Specify the database ID and file number of the Adabas file where to load the new FUSER system file definition by using the Adabas ADALOD utility.

In addition, you must specify this database ID and file number in the Natural parameter module as described in [Step 9: Build the Natural Parameter Module](#).

2. Load the FUSER system file definition contained in the NAT_{vrs}.SYSF file by using the Adabas ADALOD utility.

The following ADALOD utility parameter must *not* be changed:

```
ISNREUSE=YES
```

3. If you want to use existing Natural applications, copy all user-written objects to the empty FUSER.
4. If you want to use Natural Application Programming Interfaces (APIs), see *Using a Natural API* in the *SYSEXT Utility* documentation for further guidance.

Step 4: Load the Scratch-Pad File Definition

This step is only required if you want to use read-only system files. See also *Natural Scratch-Pad File* in the *Operations* documentation.

You can skip this step if you want to use an existing Natural scratch-pad file.

This step is not supported by System Maintenance Aid (SMA).

Load the new Natural scratch-pad system file definition:

1. Specify the database ID and file number of the Adabas file where to load the scratch-pad file by using the Adabas ADALOD utility.

In addition, you must specify this database ID and file number in the Natural parameter module as described in [Step 9: Build the Natural Parameter Module](#).

2. Load the scratch-pad system file definition contained in the NAT_{vrs}.SYSF file by using the Adabas ADALOD utility.

The following ADALOD utility parameter must *not* be changed:

```
ISNREUSE=YES
```

Step 5: Load the FREG System File Definition

(Job I050, Step 0104)

This step is only required if registry information must be available to control concurrent user sessions limited with the Natural profile parameter `UCONMAX` (see the *Parameter Reference* documentation).

You can skip this step if you want to use an existing Natural FREG system file.

This step is not supported by System Maintenance Aid (SMA).

Load the new Natural FREG system file definition:

1. Specify the database ID and file number of the Adabas file where to load the FREG system file by using the Adabas ADALOD utility.

In addition, you must specify this database ID and file number in the Natural parameter module as described in [Step 9: Build the Natural Parameter Module](#).

2. Load the FREG system file definition contained in the `NATvrs.SYSF` file by using the Adabas ADALOD utility.

The following ADALOD utility parameter must *not* be changed:

```
ISNREUSE=YES
```

Step 6: Load the FDIC System File Definition

(Job I050, Step 0103)

Skip this step:

- if you want to install Predict. In this case, use the corresponding installation step described in the *Predict Installation* documentation.
- if you want to use an existing Natural FDIC system file.

Load the new Natural FDIC system file definition:

1. Specify the database ID and file number of the Adabas file where to load the new FDIC system file definition by using the Adabas ADALOD utility.

In addition, you must specify this database ID and file number in the Natural parameter module as described in [Step 9: Build the Natural Parameter Module](#).

2. Load the FDIC system file definition contained in the `NATvrs.SYSF` file by using the Adabas ADALOD utility.

The following ADALOD utility parameter must *not* be changed:

```
ISNREUSE=YES
```

Step 7: Load the FSEC System File Definition

(Job I050, Step 9900)

Skip this step, if you do not use Natural Security.

- If you use Natural Security, refer to [Installing Natural Security](#).

Step 8: Assemble the Natural BS2000 Stub Module and Batch Driver

(Job I055, Steps 0216 - 0218)

- Assemble the following source modules:

ANATSTUB	Natural BS2000 stub module
ANATFRNT	Natural BS2000 non-reentrant part of the Natural batch interface
ANATRENT	Natural BS2000 reentrant part of the Natural batch interface

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

Step 9: Build the Natural Parameter Module

(Job I060, Step 0010)

Build the Natural parameter module for batch mode.

1. Modify the settings of the Natural profile parameters supplied with this job, if required. The parameters and corresponding macros (if applicable) are described in the *Parameter Reference* documentation. The most important parameter/macro settings are described below.

- Adapt the following parameters:

```
FNAT=(database-id, file-number)
FUSER=(database-id, file-number)
FDIC=(database-id, file-number)
```

where *database-id* and *file-number* are either the database ID and file number you specified when loading the new FNAT, FUSER and FSEC system files (see [Step 2](#), [Step 3](#) and [Step 6](#), respectively), or the database ID and file number of your existing Natural system files.

These parameters are supplied with the NTPRM macro described in the *Operations* documentation.

- If you want to limit the number of concurrent users with the Natural profile parameter UCONMAX, proceed as follows:

Supply the following parameter with the NTPRM macro:

```
FREG=(database-id,file-number)
```

where *database-id* and *file-number* are either the database ID and file number you specified when loading the new Natural FREG system file (see [Step 5](#)), or the database ID and file number of your existing Natural FREG system file.

- If you want to use read-only system files, proceed as follows:

Supply the following parameter with the NTPRM macro:

```
ROSY=ON
```

Specify the NTLFILE macro (see the parameter LFILE):

```
NTLFILE 212,database-id,file-number
```

where *database-id* and *file-number* are the database ID and file number you specified when loading the new Natural scratch-pad file (see [Step 4](#)), or the database ID and file number of your existing Natural scratch-pad file.

2. Assemble the Natural parameter module.

Step 10: Link and Start the Optimize Monitor Buffer Pool

(Job I060, Step 1230)

This step is only required if you want to use the Optimize Monitor Buffer Pool described in *Optimize Monitor Buffer Pool* in the *Operations* documentation.

1. Link the NAT04182 program for the Optimize Monitor Buffer Pool.
2. Create and start the job E.START.04IBP (supplied with Step 1230) before using Natural. See *Starting the Optimize Monitor Buffer Pool* in the *Operations* documentation.

Step 11: Link the Nucleus

(Job I060, Steps 3801, 3802)

1. Link the **environment-dependent nucleus** LNATFRNT (Step 3801) for batch Natural.

The list of modules to be linked for the environment-dependent nucleus is supplied with Step 3801.

Note:

- If the parameter `ILCS=CRTE` is specified for the assembly of the reentrant part of the BS2000 batch driver, the `BINDER` statements for the masking of symbols have to be specified as follows:

```
INCLUDE-MODULES ELEMENT=(ITOSL#),LIB=$TSOS.SYSLNK.CRTE
RESOLVE-BY-AUTOLINK LIB=($TSOS.SYSLNK.CRTE)
MODIFY-SYMBOL-VISIBILITY -
    SYMBOL-NAME = *ALL, -
    SYMBOL-TYPE = *DEFINITIONS, -
    VISIBLE = *YES
MODIFY-SYMBOL-VISIBILITY -
    SYMBOL-NAME = CMPRMTB, -
    SYMBOL-TYPE = *DEFINITIONS, -
    VISIBLE = *NO(KEEP-RES=*YES)
```

`VISIBLE = *YES`: Necessary to prevent duplicate loading of the CRTE routines.

`VISIBLE = *NO(KEEP-RES=*YES)`: The entry `CMPRMTB` in the Natural parameter module has to be masked if the Natural parameter module is bound to the environment-dependent nucleus.

2. Link the **environment-independent nucleus** LNATSHAR (Step 3802).

The list of modules to be linked for the environment-independent nucleus is supplied with Step 3802.

Ensure that the Natural profile parameter `NUCNAME` (see the *Parameter Reference* documentation) specified in the Natural parameter module contains the name of the module resulting from this link step.

Using a Sort Program

If you want 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 specified with the Natural profile parameter `RCA` (described in the *Parameter Reference* documentation).

Step 12: Start All Pools

(Job I061, Step 0001)

- Start the job `E.START.ALL` which is contained in the library `job-library`.

To end all pools, start the job `E.END.ALL` which is contained in the library `job-library`.

Step 13: Load New Natural Objects and Natural Error Messages

(Job I061, Step 0100)

- Load the Natural objects and Natural error messages from the `NATvrs.INPL` file into the Natural system files by using the Natural **INPL utility**.

The Natural error messages comprise short and long message texts and the German (`ULANG=2`) short message texts. You can use the `ERRUPPER` program of the Natural `SYSERR` utility to convert the message texts to upper case.

For details on the `ULANG` profile parameter and `ERRUPPER`, see the *Parameter Reference* and the *Utilities* documentation, respectively.

Step 14: Load the Natural Example Objects

(Job I061, Step 0103)

- Load the Natural example objects from the `NATvrs.EXPL` file into the Natural system file by using the Natural `INPL` utility.

Step 15: Allocate and Format the Editor Work File

(Job I081, Step 1900)

1. Allocate the editor work file (see also *Editor Work File* in the *Operations* documentation) by issuing the command:

```
/FILE file-name, LINK=CMEDIT, SPACE=...
```

2. Execute the formatting program (`NATEDFM2`, `NATvrs.MOD`) by entering `FORMAT` to format and load the control record in the editor work file.

Installation Verification

This section provides instructions for verifying the successful installation of Natural.

- [Test Batch Natural](#)
- [Start Natural](#)
- [Test Online Natural](#)

Test Batch Natural

You can use the following procedure to invoke Natural in batch mode and check whether the Natural system files are available:

```

/   SET-PROCEDURE-OPTIONS      DATA-ESCAPE-CHAR = *STD
/   ADD-FILE-LINK  DDLIB,      ADALNK.LIB
/   ADD-FILE-LINK  DDLNKPAR,  ADALNK.PARMS
/   ADD-FILE-LINK  CMEDIT,    EDTWORK
/   START-PROGRAM  NATBATCH
EDIT
WRITE 'TESTBAT'
END
.END
SAVE TESTBAT
RUN
FIN
/   EXIT-PROCEDURE

```

This procedure starts Natural (using the Adabas link routine ADALNK), creates the example program TESTBAT, and executes the program with the system command RUN.

Start Natural

Start a Natural session according to the procedure that applies to your TP monitor interface; see also *Installation Verification* described for the [Natural TIAM Interface](#) and the [Natural openUTM Interface](#).

Test Online Natural

You can use the following verification procedure to test Natural system functions in online mode and check whether the Natural system files are available.

1. Log on to the Natural user library SYSTEM:

```
LOGON SYSTEM
```

2. Enter the following Natural system command:

```
MAINMENU
```

3. Select **Development Functions** and enter the following:

C in the **Code** field,
P in the **Type** field, and
TEST in the **Name** field.

4. In the editing area of the program editor, type the following:

```
WRITE 'HELLO'  
END
```

5. Save the source code and exit the program editor.

6. In the **Development Functions** menu, enter the following:

L in the **Code** field and
TES* in the **Name** field.

7. On the **LIST Objects in a Library** screen, enter the RU line command for the TEST program.

8. Enter the following Natural system command:

```
SYSDDM
```

9. In the SYSDDM utility menu, enter the following:

R in the **Code** field and
EMPLOYEES in the **DDM Name** field.

10. After pressing ENTER, enter the following:

C in the **Code** field,
the appropriate Natural system file number in the **FNR** field,
the appropriate database ID in the **DBID** field, and
Y in the **Replace** field.

The specified DDM has been adapted to your environment.

11. Repeat Steps 9 and 10 for the VEHICLES DDM.
- 12 You can check whether the DDMs EMPLOYEES and VEHICLES are now available in your environment by logging on to the Natural system library SYSEXSYN and executing the example programs (for example, AEDEX1R) with the system command RUN.

4 Installing International Components for Unicode for Software

AG on BS2000

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This document describes the steps for installing International Components for Unicode for Software AG (ICS) on BS2000 which allows Natural to convert code pages and support Unicode.

International Components for Unicode for Software AG (ICS) requires the use of an ICS module and an ICU data library. In addition, you can use ICU data items to load ICU components that are not contained in the ICU data library. The ICS module does not have to be linked to the Natural nucleus if neither code page conversion nor Unicode support are required.

The use of ICU functionality increases the required Natural thread size.



Note: For increased flexibility, it is also possible to load the ICS module during initialization of the Natural session. A dynamically loaded ICS module overrides the statically linked ICS module. You can also load an ICU data library during initialization of the Natural session. A dynamically loaded ICU data library overrides any statically linked ICU data library.

The ICS module, the ICU data libraries and the ICU data items are explained in *Enabling Unicode and Code Page Support* in the *Unicode and Code Page Support* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Medium

The ICS module, the ICU data libraries and the ICU data items are contained on the `ICSvrs.MOD` file supplied on the [installation medium](#) for base Natural.

Installation Procedure

Be sure to read [Installation Process and Major Natural Features](#) before you start the installation procedure.

- [Step 1: Link the ICS Module](#)
- [Step 2: Link an ICU Data Library](#)
- [Step 3: Load the ICS Module at Session Start](#)
- [Step 4: Load an ICU Data Library at Session Start](#)

- [Step 5: Load ICU Data Items on Request in a Session](#)

Step 1: Link the ICS Module

1. Add the following `INCLUDE` statement to the link instructions for the **environment-independent nucleus**:

```
INCLUDE-MODULES LIB=ICSvrs.MOD,ELEMENT=(SAGICU),TYPE=(R,L)
```



Note: The ICU data library `ICS60J` is contained in the ICS module `SAGICU` and loaded by default.

2. Link the ICS module to the environment-independent nucleus as described in *Link the Nucleus in Installing Natural*.

Step 2: Link an ICU Data Library

This step is only required if you want to use another data library in addition to `ICS60J`.

1. Add one of the following `INCLUDE` statements to the `BINDER` instructions for the **environment-independent nucleus** depending on the ICU data library to be used:

```
INCLUDE-MODULES LIB=ICSvrs.MOD,ELEMENT=(ICS60E),TYPE=(R,L)
```

2. Link the ICU data library to the **environment-independent nucleus** as described in *Link the Nucleus in Installing Natural*.



Note: Since the size of the resulting module will exceed 16 MB, the environment-independent nucleus has to be linked with the linkage editor `BINDER` if ICU data libraries are to be included.

Step 3: Load the ICS Module at Session Start

1. Make sure that the ICS load library from the `ICSvrs.MOD` file is available to the execution JCL of your Natural or TP monitor interface. Depending on your environment, perform one of the following options:
 - Add `ICSvrs.MOD` with the link name `BLSLIBnn` as an alternative user library to your execution JCL.
2. At the start of a Natural session, set the Natural profile parameter `RCA` as follows:

```
RCA=SAGICU
```

RCA is described in the *Parameter Reference* documentation.

The ICS module SAGICU is described in the *Unicode and Code Page Support* documentation.

Step 4: Load an ICU Data Library at Session Start

1. Make sure that the ICS load library from the `ICSvrs.MOD` file is available to the execution JCL of your Natural or TP monitor interface. Depending on your environment, perform one of the following options:
 - Add `ICSvrs.MOD` with the link name `BLSLIBnn` as an alternative user library to your execution JCL.
2. At the start of a Natural session, set the Natural profile parameters `RCA` and `CFICU` for the ICU data library to be used:

```
RCA=ICSdT60E CFICU=(DATFILE=ICSdT60E)
```

`RCA` and `CFICU` are described in the *Parameter Reference* documentation.

Step 5: Load ICU Data Items on Request in a Session

This step is optional and only required if you want to dynamically load an ICU data item on request during a Natural session instead of an entire ICU data library. For more information, see the *Unicode and Code Page Support* documentation.

- Make sure that the ICS load library from the `ICSvrs.MOD` file is available to the execution JCL of your Natural or TP monitor interface. Depending on your environment, perform one of the following options:
 - Add `ICSvrs.MOD` with the link name `BLSLIBnn` as an alternative user library to your execution JCL.

Installation Verification

After the last step of the installation procedure has been completed, proceed as follows:

1. Configure and activate your Unicode and code page environment by following the instructions in *Configuration and Administration of the Unicode/Code Page Environment* and *Profile Parameters and Macros* in the *Unicode and Code Page Support* documentation.

For information on the code pages and ICU data files available in your current Natural environment, you can use the SYSCP utility (described in the *Utilities* documentation).

2. After successful activation, you can execute the example programs described in the *Unicode and Code Page Support* documentation.

5 Installation for REQUEST DOCUMENT and PARSE XML

Statements on BS2000

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This document describes the installation steps for enabling the use of the Natural statements REQUEST DOCUMENT and PARSE XML on BS2000.

Related Topics:

For information on the functions provided by REQUEST DOCUMENT and PARSE XML, see the following documents:

- *Statements for Internet and XML Access* in the *Programming Guide*
- REQUEST DOCUMENT in the *Statements* documentation
- PARSE XML in the *Statements* documentation

Prerequisites

The following requirements must be met to execute the REQUEST DOCUMENT and PARSE XML statements:

- The ICU library must be installed to convert data from one encoding to another (at least internally). For details, see the relevant section in the *Unicode and Code Page Support* documentation.
- A TCP/IP stack must be available and enabled for the execution environment.
- A DNS (Domain Name System) server or DNS services must be available in the execution environment to resolve internet addresses (`gethostbyname` function).

For Internet Protocol Version 6 (IPv6) support, the following additional prerequisites apply:

- An activated IPv6 stack must be available on the local host.
- The local network must support IPv6.
- An accessible and IPv6-capable DNS server must be available.
- For IPv6 internet communication, an IPv6 connection from the service provider must be available.
- If both IPv4 and IPv6 are used, a dual stack must be supported.
- IPv6 support must be configured with the appropriate keyword subparameters of the Natural profile parameter XML described in the *Parameter Reference* documentation.

See also [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Procedure

Be sure to read *Installation Process and Major Natural Features* before you start the installation procedure.

The installation procedure comprises the following:

- [Step 1: Link the Module NATXML to the Nucleus](#)
- [Step 2: Enable the Environment-Dependent Nucleus for CRTE Execution](#)
- [Step 3: Link the Required Modules to the Nucleus](#)

Step 1: Link the Module NATXML to the Nucleus

The module NATXML is required to execute the statements REQUEST DOCUMENT and PARSE XML.

1. The NATXML module is then linked to the **environment-independent nucleus** by using the following INCLUDE statement:

```
INCLUDE NATLIB(NATXML)
```

Step 2: Enable the Environment-Dependent Nucleus for CRTE Execution

The REQUEST DOCUMENT and PARSE XML statements require CRTE (Common RunTime Environment) functions for execution.

1. Set the parameter ILCS=CRTE for the **environment-dependent nucleus**.
2. For the assembly step of the reentrant part of the **environment-dependent nucleus**, set the parameter ILCS=CRTE in the following macros:

```
NAMBS2 for batch Natural,  
NAMTIAM for TIAM and  
NURENT for openUTM.
```

This applies to all batch and TP monitor system environments.

Step 3: Link the Required Modules to the Nucleus

Link the modules indicated in this section to the nucleus.

Batch, TIAM and openUTM

1. Add the statement `RESOLVE-BY-AUTOLINK LIB=($TSOS.SYSLNK.CRTE)` to the link step for the **environment-dependent nucleus**.
2. Link the following modules to the environment-dependent nucleus by using the appropriate `INCLUDE` statements:

<code>INCLUDE NAT2LE</code>	CRTE access module
<code>INCLUDE NAT2TCP</code>	TCP/IP access module Since NAT2TCP is delivered in LLM format, the front-end has to be linked with the linkage editor <code>BINDER</code> .
<code>INCLUDE ITOSL#</code>	CRTE initialization module

Natural Development Server/Natural Web I/O Interface

- Copy the LLM and the `NCFIP4vr` to the load libraries of the Natural Development Server and the Natural Web I/O Interface.

Installation Verification

After the last step of the installation procedure has been completed, proceed as follows:

1. Activate the statements in the runtime environment; see *Activation/Deactivation* in the section *Statements for Internet and XML Access* in the *Programming Guide*.

For information on the profile settings that enable the support of the `REQUEST DOCUMENT` and/or `PARSE XML` statement, see the following documents:

- *Profile Settings* in the section *Statements for Internet and XML Access* in the *Programming Guide*
 - Profile parameter `XML` in the *Parameter Reference* documentation
2. Try the example programs contained in the Natural system library `SYSEXV`.

6 Installing Natural Net Data Interface on BS2000

- Prerequisites 46
- Device Configuration in NATCONFIG 46

This document describes the steps for installing the Natural Net Data Interface NATNETTO on BS2000.

Related Topic:

For operational information, see *Natural Net Data Interface NATNETTO* in the *Operations* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Device Configuration in NATCONFIG

Logical net data devices are configured with the IONET flag byte, 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 data delimited option (NEDLM) is set, the delimiter character which separates the fields in the value buffer can be set by using the BEL keyword subparameter of the NTDVCE macro.

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
NEFBOPT	EQU	X'80' 1...	EXTENDED FORMAT BUFF. OPT.

NATCONFIG already has a device entry for NATNETTO.

The TTYPE is NETF. The protocol options are set as follows:

- The value buffer structure is fixed (without delimitation between the fields).
- Format buffer, extended format buffer and attribute buffer options are set.
- The cursor position is in the field number notation.

Message line and PF-key line are suppressed.

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

```


7 Installing Entire System Server Interface on BS2000

- Prerequisites 50
- Default or Customized Installation 50
- Assemble the Parameter Module for the Entire System Server Interface Component 53
- Link the Entire System Server Interface to the Nucleus 54
- Install the Entire System Server in Single-User Mode 54

The Entire System Server Interface is required if the Entire System Server is to be used.

This document describes the steps for installing the Entire System Server Interface on BS2000. You can choose between default installation (recommended) and customized installation.

Related Topic:

For information on installing and using the Entire System Server, refer to the relevant product documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also *Version* in the *Glossary*).

Prerequisites

Before you can use the Entire System Server Interface, you must install a supported version of Entire System Server specified under *Software AG Product Versions Supported by Natural* in the current *Natural Release Notes* for Mainframes.

See also [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Default or Customized Installation

If you want to use the default value settings in the modules `ESYNODTB` and `NATPNIP` (used by the Entire System Server and Natural ISPF), proceed with [Link the Entire System Server Interface to the Nucleus](#).

If you do *not* want to use the default value settings, edit the modules `NATPNIP` and `ESYNODTB` described in this section.

- `NATPNIP`

- [ESYNODTB](#)

NATPNIP

The NATPNIP module contains the following parameters and default values:

```
NAMVIEWP BUFLN=12288,NUMREQ=5,MAXCBL=3000,MAXEDL=6000,EXTUSER=INIT-USER
```

The parameters are explained below:

BUFLN	Length of all Adabas buffers in bytes
NUMREQ	Number of possible nested FIND loops in Natural calling the Entire System Server
MAXCBL	Complex FIND buffer length
MAXEDL	<p>Editor session buffer length</p> <p>MAXEDL is used by the NSPF editor and incore database.</p> <p>The default value is 6000, which should be sufficient for an NSPF editor session and typical incore database applications. However, for large layouts within an incore database file that value might not be large enough and the following message is issued: NAT3077: Not enough space for extent. DB/FNR/Subcode :1://:2://:3:. (see the <i>Messages and Codes</i> documentation).</p> <p>In this case, the value of MAXEDL has to be increased.</p>
EXTUSER	<p>External user ID passed to the Entire System Server for security checks</p> <p>See also EXTUSER in the following section.</p>

EXTUSER

The parameter `EXTUSER` describes how to inherit security definitions from an external security system such as RACF, ACF2 and TOP-SECRET.

The appropriate parameter setting depends on whether a multi-user address space or a single-user address space is used in your environment:

- A multi-user address space provides the option to maintain different user security definitions, for example, one for a CICS and one for a Complete user).
- A single-user address space supports a subsystem, for example, a Natural subtask for Entire Output Management or Entire Operations Management, or a Natural RPC, Natural Web/IO Interface or batch server.

Recommended values for `EXTUSER` are:

EXTUSER=INIT-USER	<p>Recommended for a multi-user address space.</p> <p>The contents of the Natural system variable *INIT-USER must be identical to the user definition in the external security system (for example, RACF).</p> <p>The Entire System Server transfers the value of *INIT-USER to the external security system, and all calls to security restricted resources are handled under this user ID.</p> <p>In this case, the security definition from a CICS or Complete user (for example) is inherited by Entire System Server, and a new logon is not required. If the value of *INIT-USER is not found in RACF (for example), an error occurs indicating that a logon is required.</p> <p>(*INIT-USER is described in the <i>System Variables</i> documentation.)</p>
EXTUSER=USER	<p>Recommended for <i>openUTM</i>. Recommended for a multi-user address space in a Natural Security environment.</p> <p>Processing is similar to EXTUSER=INIT-USER except that the Natural system variable *USER (described in the <i>System Variables</i> documentation) is used.</p> <p>(*USER is described in the <i>System Variables</i> documentation.)</p>
EXTUSER=ADDRESS-SPACE	<p>Recommended for a TIAM, batch or server environment.</p> <p>The security description of this address space is inherited for security evaluation.</p>

ESYNODTB

The ESYNODTB module contains the following parameters and default values:

```
NAMXNOD ID=148,NAME=PRODUCTION-1
NAMXNOD ID=149,NAME=PRODUCTION-2
NAMXNOD ID=1490,NAME=DBID-ABOVE-255, LAST=Y
END
```

The parameters and default values are explained below:

ID	Entire System Server node number (also known as DBID)
NAME	Entire System Server node name
LAST	Indicator for last entry in table

Optional Node Name for Entire System Server Calls

Calls to the Entire System Server from Natural are usually handled with the `NODE` parameter which specifies the node number to be used for the call, for example:

```
FIND ACTIVE-JOBS WITH JOB-NAME = 'ADA*' AND NODE = 148
```

If the node number is defined in the `ESYNODTB` module, alternatively, you can specify the logical name of the required Entire System Server with the `NODE-NAME` parameter, for example:

```
FIND ACTIVE-JOBS WITH JOB-NAME = 'ADA*' AND NODE-NAME = 'PRODUCTION-2'
```

Assemble the Parameter Module for the Entire System Server Interface Component

Natural ISPF

If Natural ISPF is used as the `INCORE` database:

- (Job I055, Steps 1106, 1108)

Link the parameter module `NATPNIU` (Step 1106 for *openUTM*) or `NATPNIT` (Step 1108 for *TIAM* and batch mode). In this case, the module `ESYNODTB` is not required.

Entire System Server

If the Entire System Server is used:

- **openUTM Environments:**

(Job I055, Step 1108)

Assemble and link the module `ANATPNIU`.

`ANATPNIU` must be assembled with `NAMVIEWP EXTUSER=USER` in order to use the Natural Security user ID as user ID for Entire System Server calls (if no `NATPROC-LOGON` is issued).

- **TIAM and Batch Environments:**

(Job I055, Step 1106)

Assemble and link the module `ANATPNIT`.

`NATPNIT` must be assembled with `NAMVIEWP EXTUSER=ADDRESS-SPACE`. The `LOGON` user ID will be used as Entire System Server user ID if no `NATPROC-LOGON` has been issued.

Link the Entire System Server Interface to the Nucleus

(Job I060, Step 3720)

- Link the following Entire System Server Interface modules to the **environment-dependent nucleus** by using the corresponding `INCLUDE` statements:

<code>INCLUDE NATPNIP, NATvrs.MOD</code>	Entire System Server Interface parameters
<code>INCLUDE ESXNUC, NATvrs.MOD</code>	Entire System Server Interface module
<code>INCLUDE NATPRBSU, NATvrs.MOD</code>	BS2000 service module
<code>INCLUDE ESYNODTB, NATvrs.MOD</code>	Optional, node table

Install the Entire System Server in Single-User Mode

(Optional installation for only batch mode or TIAM.)

This section describes the advantages of Entire System Server in single-user mode and the steps required for installation.

- [Advantages of Single-User Mode](#)
- [Installation for Batch Mode and TIAM](#)

Advantages of Single-User Mode

Running the Entire System Server in single-user mode is advantageous, for example, in the following cases:

- Executing long running batch jobs comprising a large number of calls to the Entire System Server.
- Performing test scenarios using a Natural session under TIAM performing many calls to the Entire System Server, without disturbing the production environment.
- Exploring new Entire System Server functionality or versions.

From a Natural point of view, the Entire System Server single-user mode is accessible as Entire System Server node 148, irrespective of whether such a node does already exist on your machine or network.

The following is an example of a Natural program that is running in a single-user environment:

```
FIND ACTIVE-JOBS WITH NODE = 148 AND JOB-NAME = 'XCOM*'
```

This statement calls a single-user Entire System Server that runs within the same address-space. Calling a different Entire System Server node that runs elsewhere in the network is possible by using a different node number, as shown in the following example:

```
FIND ACTIVE-JOBS WITH NODE = 53 AND JOB-NAME = 'NUC*'
```

This statement calls a multi-user Entire System Server with node number 53 out of the same Natural program which called the single-user Entire System Server session.

Installation for Batch Mode and TIAM

1. Link the optional NATPSNGL module to the [environment-dependent nucleus](#):

```
INCLUDE NATPSNGL, NATvrs.MOD
```

This module enables use of single-user mode.

2. Add the mandatory DDLIB2 card to assign the Entire System Server load library and the optional PARMS card to set the parameters for the Entire System Server:

```
/ ADD-FILE-LINK LINK-NAME=DDLIB2,FILE-NAME=$SAG.NPRvrs.MOD
/ ADD-FILE-LINK LINK-NAME=PARMS,FILE-NAME=parameter-file
```

where *parameter-file* is the name of the Entire System Server parameter file.

The Entire System Server parameter file is read during the execution of the first Entire System Server user request. You do not have to issue a LOGON or LOGOFF to the Entire System Server in single-user mode.

3. Modify your Entire System Server parameter file as required. The NODE parameter is ignored since all calls to the Natural node number 148 are routed through the Entire System Server node used for single-user mode.

8

Installing Software AG Editor on BS2000

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■ Installation Procedure	58
■ Installation Verification	61

The Software AG Editor is an optional Natural component that is required by several Natural utilities (for example, SYSRPC and SYSBPM), Natural add-on products (for example, Natural ISPF) and other Software AG products (for example, Predict).

When using SMA, the Software AG editor is automatically installed when installing Natural. If you are not using SMA, install the Software AG editor according to the procedure described in this document.

This document describes the steps for installing the Software AG Editor on BS2000.

Related Topics:

- For operational information, see *Operating the Software AG Editor* in the *Operations* documentation.
- For information on the features and functions of the *Software AG Editor*, see the relevant section in the *Editors* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also *Version* in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Procedure

Be sure to read [Installation Process and Major Natural Features](#) before you start the installation procedure.

- [Step 1: Adapt the Natural Parameter Macro NTEDBP](#)
- [Step 2: Build the Natural Parameter Module](#)
- [Step 3: Allocate and Format the Editor Work File E.FRM.EDITWORK](#)
- [Step 4: Modify the Startup Procedures for the Nucleus](#)
- [Step 5: Start the Global Editor Buffer Pool](#)

- [Step 6: Link the Software AG Editor to the Nucleus](#)

Step 1: Adapt the Natural Parameter Macro NTEDBP

The editor buffer pool parameters contained in Natural parameter module are stored in the editor buffer pool work-file control record during formatting (see [Step 3: Allocate and Format the Editor Work File E.FRM.EDITWORK](#)). The Natural parameter module can be linked to the Software AG Editor work file formatting utility (described in *Editor Work File* in the *Operations* documentation).



Caution: Before adapting the editor parameter macro, first read the documentation of the editor buffer pool parameter EDBP and its corresponding macro NTEDBP in the *Parameter Reference* documentation.

- Assemble and link the Natural parameter module.

For the Initial Installation:

You can leave the defaults. In this case, it is not necessary to assemble and link the Natural parameter module.

Step 2: Build the Natural Parameter Module

(Jobs I060, I080)

1. Add the following parameter to your Natural parameter module to specify the size of the editor area:

```
SSIZE=nn
```

where *nn* must be set to at least 54.

2. Add the following macro to your Natural 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 *Building a Natural Parameter Module* in the *Operations* documentation.

3. Assemble and link the Natural parameter module.

Step 3: Allocate and Format the Editor Work File E.FRM.EDITWORK

(Job I081, Step 1900)

1. Allocate the editor work file (see also *Editor Work File* in the *Operations* documentation) by issuing the command:

```
/FILE file-name, LINK=CMEDIT, SPACE=...
```

2. Execute the Software AG editor work file formatting utility (NATEDFM2, NAT vrs .MOD) by entering `FORMAT` to format and load the control record in the editor work file.

Step 4: Modify the Startup Procedures for the Nucleus

For TIAM and *openUTM*:

- Add a `FILE` command for the editor work file:

```
/FILE file-name, LINK=CMEDIT
```

Step 5: Start the Global Editor Buffer Pool

(Job I061, Step 0001)

Once defined, a global editor buffer pool must be started.

- To start the global editor buffer pool, execute the module `CMSTART`.

Step 6: Link the Software AG Editor to the Nucleus

(Job I080)

- Link the following Software AG Editor modules to either the **environment-independent** or the **environment-dependent nucleus** by using the corresponding `INCLUDE` statements:

<code>INCLUDE NATLIB(NATEDT)</code>	Software AG Editor module
<code>INCLUDE NATLIB(NATEDWA2)</code>	Software AG Editor work file access module

Installation Verification

You can verify the successful installation of the Software AG Editor by performing the following:

- Invoke Natural and enter the following system command:

```
SYSEDT
```

The SYSEDT Utility Main Menu appears, which can be used to display all buffer pool parameters and usage statistics; see *SYSEDT Utility - Editor Buffer Pool Administration* in the *Utilities* documentation.

You can only test the full operation of the Software AG Editor if another Software AG product (for example, Natural ISPF or Predict) that uses Software AG Editor functionality is installed.

9 Installing Natural TIAM Interface on BS2000

- Prerequisites 64
- Installation Medium 64
- Installation Procedure 65
- Installation Verification 67

This document describes the steps for installing the Natural TIAM Interface (product code NRT) on BS2000.

Related Topics:

For information on the following topics, see *Natural under TIAM* in the *TP Monitor Interfaces* documentation:

- *Structure of the Natural TIAM Interface*
- *Parameters in Macro NAMTIAM*
- *Common Memory Pools under TIAM*

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following files required for product installation:

File Name	Contents
NRT vrs .MAC	Driver assembly macros
NRT vrs .JOBS	Sample installation jobs

Copy the files into your environment as described in [Copying Files to a BS2000 Disk](#) in the section *Installing Natural*.

Installation Procedure

Be sure to read *Installation Process and Major Natural Features* and *Naming Conventions for Installation Procedures* before you start the installation procedure.

- Step 1: Build the Natural TIAM Interface Non-Reentrant Part
- Step 2: Build the Natural TIAM Interface Reentrant Part
- Step 3: Build the Natural Parameter Module
- Step 4: Link the Environment-Dependent Nucleus

Step 1: Build the Natural TIAM Interface Non-Reentrant Part

(Job I070, Step 0102)

Build the non-reentrant part of the Natural TIAM Interface.

1. Modify the parameters settings in the macro `NAMTIAM` if required. You can generally use the default values of the parameters. Modify only the values that do not suit your requirements.

For descriptions of the individual parameters, see *Parameters in Macro NAMTIAM* in the *Natural TP Monitor Interfaces* documentation.

2. Assemble the source module `ANRTFRNT` in the library *job-library* to generate the macro `NAMTIAM` for the non-reentrant part.

Step 2: Build the Natural TIAM Interface Reentrant Part

(Job I070, Step 0103)

Build the reentrant part for the Natural TIAM Interface.

1. Modify the parameter settings in the macro `NAMTIAM` if required. You can generally use the default values of the parameters. Modify only the values that do not suit your requirements.

For descriptions of the individual parameters, see *Parameters in Macro NAMTIAM* in the *Natural TP Monitor Interfaces* documentation.

2. Assemble the source module `ANRTRENT` in the library *job-library* to generate the macro `NAMTIAM`.

Step 3: Build the Natural Parameter Module

(Job I080, Step 0109)

Build the Natural parameter module for the Natural TIAM Interface.

1. Set the FNAT and FUSER profile parameters (see the *Parameter Reference* documentation) in the source module ANRTPARM of the Natural parameter module:

```
FNAT=(database-id,file-number)
FUSER=(database-id,file-number)
```

where *database-id* and *file-number* are the values you specified when loading the system files during the *Installation Procedure* for base Natural.

2. Assemble the source module ANRTPARM in the library *job-library*.

Step 4: Link the Environment-Dependent Nucleus

(Job I080, Step 0110)

- Use the INCLUDE statements for BINDER contained in LNRTFRNT in the library *job-library*.

Notes:

1. The source module ANATSTUB has been assembled during the installation of base Natural.
2. If the parameter ILCS=CRTE is specified for the assembly of the reentrant part of the TIAM driver, the BINDER statements for the masking of symbols have to be specified as follows:

```
INCLUDE-MODULES ELEMENT=(ITOSL#),LIB=$TSOS.SYSLNK.CRTE
RESOLVE-BY-AUTOLINK LIB=($TSOS.SYSLNK.CRTE)
MODIFY-SYMBOL-VISIBILITY -
    SYMBOL-NAME = *ALL, -
    SYMBOL-TYPE = *DEFINITIONS, -
    VISIBLE = *YES
MODIFY-SYMBOL-VISIBILITY -
    SYMBOL-NAME = CMPRMTB, -
    SYMBOL-TYPE = *DEFINITIONS, -
    VISIBLE = *NO(KEEP-RES=*YES)
```

VISIBLE = *YES: Necessary to prevent duplicate loading of the CRTE routines.

VISIBLE = *NO(KEEP-RES=*YES): The entry CMPRMTB in the Natural parameter module has to be masked if the Natural parameter module is bound to the environment-dependent nucleus.

Installation Verification

You can verify the successful installation of the Natural TIAM Interface by performing the following steps:

1. Call the procedure `P.START.NRT` in the library *job-library* to start Natural under TIAM.
2. Proceed with the steps described in the section *Test Online Natural*.

10

Installing Natural openUTM Interface on BS2000

■ Prerequisites	70
■ Installation Medium	70
■ Installation Procedure	71
■ Installation Verification	73

This document describes the steps for installing the Natural *openUTM* Interface (product code NUT) on BS2000.

Related Topic:

For information on how to operate the Natural *openUTM* Interface, see *Natural under openUTM* in the *TP Monitor Interfaces* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also *Version* in the *Glossary*).

Prerequisites

A supported version of the following product must be installed before you can install the Natural *openUTM* Interface:

- Adabas UTM Interface (product code AUT)

See also [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following files required for product installation:

File Name	Contents
NUT vrs .SRC	Source modules
NUT vrs .MAC	Macros
NUT vrs .JOBS	Sample installation jobs

Copy the files into your environment as described in [Copying Files to a BS2000 Disk](#) in the section *Installing Natural*.

Installation Procedure

Be sure to read *Installation Process and Major Natural Features* and *Naming Conventions for Installation Procedures* before you start the installation procedure.

- Step 1: Generate the KDCROOT Source
- Step 2: Assemble the BS2STUB Module for the Natural openUTM Interface
- Step 3: Assemble the Non-Reentrant Part for the Natural openUTM Interface
- Step 4: Assemble the Reentrant Part for the Natural openUTM Interface
- Step 5: Generate the Swap Pool Parameter Module NTSWPRM
- Step 6: Assemble KDCROOT
- Step 7: Generate KDCFILE
- Step 8: Build the Natural Parameter Module
- Step 9: Link the Environment-Dependent Nucleus

Step 1: Generate the KDCROOT Source

(Job I070, Step 0110)

- Prepare the sample KDCDEF instruction source `NUT.KDCDEF` (LMS element type = D) in the library *job-library* so that it suits your environment.

Therefore, refer to *Defining the openUTM Resources (KDCDEF)* in the *TP Monitor Interfaces* documentation.

Step 2: Assemble the BS2STUB Module for the Natural openUTM Interface

(Job I070, Step 0111)

- Assemble the source module `ANUTSTUB` in the library *job-library*.

See also *Local Common Memory Pools* in the *Operations* documentation.

Step 3: Assemble the Non-Reentrant Part for the Natural openUTM Interface

(Job I070, Step 0112)

- Assemble the source module `ANUTFRNT` in the library *job-library*.

See also *Keyword Parameters of Macro NATUTM* in the *TP Monitor Interfaces* documentation.

Step 4: Assemble the Reentrant Part for the Natural openUTM Interface

(Job I070, Step 0113)

- Assemble the source module ANUTRENT in the library *job-library*.

See also *Keyword Parameters of Macro NURENT* in the *TP Monitor Interfaces* documentation.

Step 5: Generate the Swap Pool Parameter Module NTSWPRM

(Job I070, Step 0114)

- Assemble and link the module ANUTSWP in the library *job-library*.

See also *Keyword Parameters of Macro NTSWPRM* in the section *Defining the Swap Pool* in the *Operations* documentation.

Step 6: Assemble KDCROOT

(Job I070, Step 0120)

- Assemble the sample source ANUTKDCR (generated in [Step 1](#)) in the library *job-library* for the KDCROOT module.

See also *Generating KDCROOT* in the *TP Monitor Interfaces* documentation.

Step 7: Generate KDCFILE

(Job I075, Step 0100)

- Use the sample KDCDEF instruction source NUT.KDCDEF prepared in [Step 1](#).

Step 8: Build the Natural Parameter Module

(Job I080, Step 0200)

Build the Natural parameter module for the Natural openUTM Interface.

1. Set the FNAT and FUSER profile parameters (see the *Parameter Reference* documentation) in the source module ANUTPARM of the Natural parameter module:

```
FNAT=(database-id,file-number)
FUSER=(database-id,file-number)
```

where *database-id* and *file-number* are the values you specified when loading the system files during the *Installation Procedure* for base Natural.

2. Assemble the source module ANUTPARM in the library *job-library*.

Step 9: Link the Environment-Dependent Nucleus

(Job I080, Step 0210)

- Use the INCLUDE statements for BINDER contained in LNUFRNT in the library *job-library*.

If the parameter ILCS=CRTE is specified for the assembly of NURENT, the BINDER statements for the masking of symbols have to be specified as follows:

```
INCLUDE-MODULES ELEMENT=(ITOSL#),LIB=$TSOS.SYSLNK.CRTE
RESOLVE-BY-AUTOLINK LIB=($TSOS.SYSLNK.CRTE)
MODIFY-SYMBOL-VISIBILITY -
    SYMBOL-NAME = *ALL, -
    SYMBOL-TYPE = *DEFINITIONS, -
    VISIBLE = *YES
MODIFY-SYMBOL-VISIBILITY -
    SYMBOL-NAME = (CMPRMTB,NU8*), -
    SYMBOL-TYPE = *DEFINITIONS, -
    VISIBLE = *NO(KEEP-RES=*YES)
```

VISIBLE = *YES: Necessary to prevent duplicate loading of the CRTE routines.

VISIBLE = *NO(KEEP-RES=*YES): The entry CMPRMTB in the Natural parameter module has to be masked if the Natural parameter module is bound to the environment-dependent nucleus.

Installation Verification

You can verify the successful installation of the Natural *openUTM* Interface by performing the following steps:

1. Submit the job E.START.SWP in the library *job-library* to start the Natural swap pool.
2. Submit the job E.START.NUT in the library *job-library*, which is a sample job for starting Natural under *openUTM*.
3. Enter the Natural transaction code.
4. Proceed with the steps described in the section *Test Online Natural*.

11 Installing Natural Security on BS2000

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■ Installation Procedure	77
■ Installation Verification	79

This document describes the steps for installing Natural Security (product code NSC) on BS2000.

Related Topic:

For information on the features and functions provided by Natural Security, see the *Natural Security* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Additional Prerequisites for Natural Security in a Heterogeneous Environment

In addition to the prerequisites referred to above, the following software must be installed to use Natural Security in a heterogeneous environment:

- Entire Net-Work
- Natural Security for Mainframes

The following software must be installed as required:

- Natural Security for UNIX
- Natural Security for Windows
- Natural Security for OpenVMS

For further information, see *Using Natural Security on Multiple Platforms* in the *Natural Security* documentation.

Installation Medium

The [installation medium](#) contains the following files required for product installation:

File Name	Contents
NSCvrs.SYSL	Natural Security log file
NSCvrs.INPL	Natural objects

Copy the files into your environment as described in [Copying Files to a BS2000 Disk](#) in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the NATvrs.JOBS file and are prefixed with the product code. The file is provided on the installation medium supplied for base Natural.

Installation Procedure

Be sure to read [Installation Process and Major Natural Features](#) before you start the installation procedure.

Note for the Reinstallation:

- When you repeat a Natural Security installation, only the Natural objects are replaced; the Natural Security data defined for SYSSEC and DBA is *not* reset to the values defined after the initial installation. You can use the **Natural Security Recover** function of the Natural **INPL utility** to reset the data.

This section describes the actual installation steps:

- [Step 1: Load the FSEC System File Definition](#)
- [Step 2: Load the Log File](#)
- [Step 3: Load the Logon and Error Log File](#)
- [Step 4: Build the Natural Parameter Module](#)
- [Step 5: Load New Natural Objects](#)

Step 1: Load the FSEC System File Definition

(Job I050, Step 9900)

Skip this step if you want to use an existing Natural FSEC system file.

- Load the new Natural FSEC system file definition:
 1. Set the System Maintenance Aid (SMA) parameter NSC-FIRST-INSTALL to Y (Yes). This is the default setting.
 2. Specify the database ID and file number of the Adabas file where to load the FSEC system file by using the Adabas ADALOD utility.

In addition, you must specify this database ID and file number in the Natural parameter module as described in [Step 4: Build the Natural Parameter Module](#).

3. Load the FSEC system file definition contained in the `NATvrs.SYSF` file by using the Adabas ADALOD utility.

The following ADALOD utility parameter must *not* be changed:

```
ISNREUSE=YES
```

Step 2: Load the Log File

(Job I050, Step 9901)

This step only applies if Adabas is installed and if the Natural Security function **Logging of maintenance functions** (see the *Natural Security* documentation) is to be used. It creates the log file to be used by the function.

- Load the log file by using the Adabas ADALOD utility. Input for ADALOD is the `NSCvrs.SYSL` file.

Step 3: Load the Logon and Error Log File

(Job I050, Step 9902)

This step only applies if Adabas is installed and if the Natural Security function **Store Logon and Error Data on Separate System Files** (see the *Natural Security* documentation) is to be used. It creates the logon and error log file to be used by the function.

- Load the logon and error log file by using the Adabas ADALOD utility. Input for ADALOD is the `NATvrs.SYSF` file.

Step 4: Build the Natural Parameter Module

(Jobs I060, I080)

1. Specify the following profile parameter in your Natural parameter module:

```
FSEC=(database-id,file-number)
```

where *database-id* and *file-number* are the database ID and file number of either the new FSEC system file loaded in [Step 1](#) or your existing FSEC system file.

The FSEC profile parameter is described in the *Parameter Reference* documentation.

Repeat Job I080 for all your TP monitors.

2. Assemble and link your Natural parameter module.

Step 5: Load New Natural Objects

(Job I061, Step 0102 or Step 9900)

For the migration installation (Step 0102):

1. Set the System Maintenance Aid (SMA) parameter `NSC-FIRST-INSTALL` to N (No). The default setting is Y (Yes).
2. Load the Natural objects specific to Natural Security from the `NSCvrs.INPL` file into the appropriate Natural libraries in your `FNAT` system file by using the Natural [INPL utility](#).

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, you would have to delete the entire contents of the system file and reinstall all Natural components again.

For the initial installation (Step 9900):

1. Set the System Maintenance Aid (SMA) parameter `NSC-FIRST-INSTALL` to Y (Yes).
2. Load the Natural objects specific to Natural Security from the `NSCvrs.INPL` file into the appropriate Natural libraries in your `FNAT` system file by using the Natural [INPL utility](#).

When you load the contents of the `NSCvrs.INPL` file for the first time, this step creates the following security profiles and relationships:

- A library security profile with the library ID `SYSSEC`. The library is people-protected (**People-protected** set to Y and **Terminal-protected** set to N).
- A user security profile with the user ID `DBA`, the user type Administrator, and the password set to `DBA`.

The user `DBA` is linked to the library `SYSSEC` (ordinary link, no special link).

Installation Verification

Natural Security is operational after [Step 5: Load New Natural Objects](#) of the *Installation Procedure* has been completed successfully.

For the initial installation, proceed as described in the section *First Steps After the Installation* in the *Natural Security* documentation. If you upgrade from a previous Natural Security version, you can skip the steps described in this section.

12

Installing Natural Advanced Facilities on BS2000

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This document describes the steps for installing Natural Advanced Facilities (product code NAF) on BS2000.

Related Topic:

For information on the features and functions provided by Natural Advanced Facilities, see the *Natural Advanced Facilities* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following files required for product installation:

File Name	Contents
NAF <i>vrs</i> .SYSF	Natural FSP00L system file definition
NAF <i>vrs</i> .MOD	Load modules and object modules
NAF <i>vrs</i> .MAC	Macros
NAF <i>vrs</i> .JOBS	Sample installation jobs
NAF <i>vrs</i> .INPL	Natural objects
NAF <i>vrs</i> .ERRN	Natural error messages

Copy the files into your environment as described in [Copying Files to a BS2000 Disk](#) in the section *Installing Natural*.

Installation Procedure

Be sure to read *Installation Process and Major Natural Features* and *Naming Conventions for Installation Procedures* before you start the installation procedure.

- Step 1: Load the FSPPOOL System File Definition
- Step 2: Build the NAFB2P Parameter Module
- Step 3: Assemble the Environment-Dependent Nucleus and the Natural Parameter Module
- Step 4: Build the Natural Parameter Module
- Step 5: Link the Environment-Independent Nucleus
- Step 6: Load the Natural Objects
- Step 7: Load the Natural Error Messages
- Step 8: Link the Spool Server
- Step 9: Link the Environment-Dependent Nucleus
- Step 10: Define Natural Advanced Facilities for Natural Security
- Step 11: Start Natural

Step 1: Load the FSPPOOL System File Definition

(Job I050, Step 0300)

Skip this step if you want to use an existing spool file of Natural Advanced Facilities.

Load the new Natural FSPPOOL system file definition contained in the `NAFvrs.SYSF` file by using the Adabas ADALOD utility.

Step 2: Build the NAFB2P Parameter Module

(Job I055, Step 0300)

1. If required, modify the settings of the parameters in the source module `ANAFB2P`, which is contained in the file `NAFvrs.JOBS`.

The following examples illustrate how the parameters can be set:

Example 1 - Installation with Natural Security and Two Spool Servers:

```
DC01    = NAFDCAM1
DC02    = NAFDCAM2
DC03    = NO
.
.
.
.
DC30    = NO
```

```
NAFERK1 = NAFP1
NAFERK2 = NAFP2
PA01    = 'STACK=(LOGON SYSPRINT,userid1,password;SVPBS201) '
PA02    = 'STACK=(LOGON SYSPRINT,userid2,password;SVPBS201) '
PA03    = 'NO '
.
.
.
.
.
PA30    = 'NO '
```

Example 2 - Installation without Natural Security and One Spool Server:

```
DC01    = NAFDCAM1
DC02    = NO
.
.
.
.
.
DC30    = NO
NAFERK1 = NAFP1
NAFERK2 = NAFP2
PA01    = 'STACK=(LOGON SYSPRINT;SVPBS201) '
PA02    = 'NO '
.
.
.
.
.
PA30    = 'NO '
```



Note: If Natural Security is installed, link the library `SYSPRINT` to a user which is normally not active in the Natural Security environment. Moreover, link `SYSPRINT` to as many users as there are spool servers (1-9).

The parameters for DCAM connection (DC01 - D30) and for P1-EVENTING (NAFERK1, NAFERK2) must be different from those used for the same function in any other application for the same CPU.

Described below are the parameters that can be specified in the macro `NAFB2P`:

Parameter	Explanation
DC01 - DC30	7 bytes indicating the name of the corresponding DCAM application Unused entries should be set to NO.
NAFERK1	8 bytes indicating the event ID for the communication between the online Natural and the spool server(s) and defining the name of the used common memory pool
NAFERK2	8 bytes indicating the event ID for the automatic startup for spool server(s) using an <i>openUTM</i> TP monitor and the corresponding parameter <i>SPOOL=(name, number)</i>
PA01 - PA30	Stack data for the initialization of Natural by specifying the following: <pre>STACK=(LOGON library,userid; program-name)</pre> If Natural Security is installed, specify the following: <pre>STACK=(LOGON library,userid,password; program-name)</pre> Unused parameters must be set to NO.
MONEVT	Name of the event ID for the BS2000 monitor task (8 bytes maximum)
PAMO	LOGON command for the monitor task. The start program must always be set to <i>SVPMON01</i> . If Natural Security is installed, specify the following: <pre>STACK=(LOGON library,userid,password; program-name)</pre>
CMPSIZE	Size of the Natural Advanced Facilities common memory pool (in units of 1 KB) The value is rounded up to the next higher multiple of 64 KB (64 KB = segment size = allocation unit for the common memory pools).
RSOFORM	Name of a form to be used by the spool server when output is sent to an RSO printer The information in the report is ignored. If value ' ' is used, the information from the report is used.
BS2FORM	Name of a form to be used by the spool server when output is sent to a system printer The information in the report is ignored. If value ' ' is used, the information from the report is used.
PASEC	Determines whether at logon the spool server uses the FSEC value applicable to the invoking online application (YES/NO).
PANAT	Determines whether at logon the spool server uses the FNAT value applicable to the invoking online application (YES/NO).
ISO	Determines whether the spool server(s) use a DCAM ISO application in addition to the DCAM NEA application (YES/NO).

Parameter	Explanation
RSOPROT	Determines whether the RSO messages resulting from the PRINT invocation are to be written to a log if logical printers with RSO support are used. ON: log is written to SYSLST02. OFF: no log is written to SYSLST02.
MAXERR	Maximum number of acceptable Natural spool server abends (abnormal termination of Natural). 0: no limit. 1 - 255: limit. If the specified limit is exceeded, the spool server terminates itself.

2. Assemble the source module ANAFB2P to create the parameter module NAFB2P. If Natural Security is installed, check the LOGON command to application SYSPRINT.

Step 3: Assemble the Environment-Dependent Nucleus and the Natural Parameter Module

(Job I055, Steps 0301, 0302, 0303)

Assemble the environment-dependent nucleus for batch mode and the Natural parameter module for the Natural Advanced Facilities server task and the Natural monitor task.

- Assemble the following source modules:

ANAFRNT	Natural BS2000 front-end for environment-dependent nucleus for batch
ANAFRENT	Natural BS2000 reentrant, environment-dependent nucleus for batch
ANAFPARM	Natural BS2000 parameter module for batch

Step 4: Build the Natural Parameter Module

(Job I060, Step 0010, and Job I080, Step 0109)

1. Modify the parameters FSPPOOL, NTPRINT, NAFUPF and NAFSIZE in the Natural parameter module according to your site requirements. For more information on these parameters, see *Natural Profile Parameters for NATSPOOL* in the *Natural Advanced Facilities* documentation.
2. Assemble and link the Natural parameter module.

Step 5: Link the Environment-Independent Nucleus

(Job I060, Step 3802)

- Add the following `INCLUDE` statements to the sources `LNATSHAR` in the library `NAFvrs.JOBS`:

```
INCLUDE  NAFNUC      ,NAFvrs.MOD
INCLUDE  NAFREENT   ,NAFvrs.MOD
INCLUDE  NAFB2RSO   ,NAFvrs.MOD
INCLUDE  NAFSERVR   ,NAFvrs.MOD
```

Step 6: Load the Natural Objects

(Job I061, Step 0300)

- Load the Natural objects specific to Natural Advanced Facilities from the `NAFvrs.INPL` file into the Natural system files `SYSP00L` and `SYSPRINT` by using the Natural **INPL utility**.

Ensure that the INPL load function finishes with the message:

```
Natural Advanced Facilities initialized by INPL
```

If this initialization fails, various problems will be encountered at execution time.

The maps contained on the data set are provided in source form so that you can modify them according to your requirements (for example, translate the maps from English into another language). If you modify these maps, ensure that all fields have the same format/length/relative position in the map. Failure to abide by this restriction will result in an invalid system.

Step 7: Load the Natural Error Messages

(Job I061, Step 0304)

- Load the Natural error messages specific to Natural Advanced Facilities from the `NAFvrs.ERRN` file into the Natural `FDIC` system file by using the `ERRLODUS` program of the Natural `SYSERR` utility (described in the *Utilities* documentation).

Step 8: Link the Spool Server

(Job I065, Steps 0300, 0301, 0302, 0303)

- Link the source members LNAFSERV, LNAFSEND, LNAFMON and LNAFMEND in the library `NAF vrs . JOBS`.

Source	Function
LNAFSERV	Links the program that starts the Natural Advanced Facilities server task
LNAFSEND	Links the program that terminates the Natural Advanced Facilities server task
LNAFMON	Links the program that starts the Natural Advanced Facilities monitor task See also <i>BS2000 Monitor</i> in the <i>Natural Advanced Facilities</i> documentation.
LNAFMEND	Links the program that terminates the Natural Advanced Facilities monitor task

Step 9: Link the Environment-Dependent Nucleus

(Job I080, Steps 0110, 0200)

- Add the following `INCLUDE` statements to the sources LNUTFRNT, LNRTFRNT and/or LNATFRNT (Job I060, Step 3801) in the library `job-library`:

```
INCLUDE NAFB2P ,job-library
INCLUDE NAFFRONT ,NAF vrs .MOD
```

Step 10: Define Natural Advanced Facilities for Natural Security

This step must be performed only if Natural Advanced Facilities is being installed in a Natural Security environment.

- Define `SYSP00L` to Natural Security with the startup program `MENU`.

Step 11: Start Natural

1. Start Natural and add the user profile, as defined in the `NAFUPF` parameter (see the *Parameter Reference* documentation) of the Natural parameter module, to the `SYSP00L` file by using Function 31.1 (see the *Natural Advanced Facilities* documentation).



Note: A NAT7201 message is issued at the start of the session indicating that the profile has not yet been added to the `SYSP00L` file.

2. Configure the spool file by following the instructions in *NATSP00L Initialization* in the *Natural Advanced Facilities* documentation.

Installation Verification

You can verify the successful installation of Natural Advanced Facilities by following the instructions provided in this section.

- [System Testing](#)
- [NATSPPOOL System Errors](#)

System Testing

You can perform the following steps to determine whether Natural Advanced Facilities functions correctly.

➤ To print a test report

- 1 In the appropriate logical printer, set the `Disposition` to `K` for testing.
- 2 Log on to the Natural system library `SYSPPOOL` and execute the programs `NTEST` and `SPPTTEST`. These programs contain `WRITE (1)` statements.

You can also create test reports with Function 42 (described in the *Natural Advanced Facilities* documentation).

➤ To proceed if a test report cannot be printed

- 1 Check whether the report is contained in the spool file. If the report is not in the spool file, it is possible that a `FILE` command for a print file has been active and that the report has been written to the print file and not to the spool file. This would occur because the `FILE` command has a higher priority.

If the report is in the spool file but still is not printed, take the following steps.

- 2 Check whether the printer is in `FREE` status. If the printer is in status `BUSY`, `INOP`, `DEAC` or `HUNG`, reset it to `FREE`.
- 3 Check whether there is an error message on the console beginning with Natural Advanced Facilities. Normally, an error message will be sent to the console whenever a report is not printed. This allows the console operator to perform a more detailed analysis of the cause of the error.
- 4 Check whether the information in the printer definition (see Function 31.4 in the *Natural Advanced Facilities* documentation) and `PDN` are consistent with one another.

In addition, verify that the correct physical printer name and processor name have been specified.

- 5 Check whether the printer is reserved by another spool system and, although it is not currently in use, has been deactivated by the other spool system. In this case, it is best if the printer is reset via a direct operator command.
- 6 Check whether the printer is defined in an *openUTM* application (KDCDEF) and activated from that application. Deactivate the printer via an *openUTM* administration command.

If the printer prints only 80 characters per line and 24 lines per page, take the following step.

- 7 Check the PDN for the printer to see that the appropriate `LINELEN` and `MAXLINE` parameters have been included in the `XOPCH` macro.

For example, to cause the printer to print 132 characters per line and 80 lines per page, provide the following parameter values:

```
XOPCH LINELEN=132
MAXLINE=80
```

- 8 If a `WRITE (rep)` statement with attribute definition `AD=I` (intensified display) is used, the Natural profile parameter `INTENS` (see the *Parameter Reference* documentation) must be specified to enable intensified display.

The following must be true:

$$LS * INTENS \leq \text{printer buffer size}$$

where `LS` is the line size as defined in the `FORMAT (rep)` statement, and the printer buffer size as specified in the printer definition (see Function 31.4 in the *Natural Advanced Facilities* documentation).

NATSPPOOL System Errors

A system error may be issued upon initialization of *openUTM* if the `SPOOL` parameter has been included in the `NATUTM` macro and the spool server cannot be started during initialization.

Possible causes of this error are:

- The batch limit has been exceeded, and the spool server cannot be started.
- The entry job name specified in the `SPOOL` parameter either does not exist, or the entry job exists under a different name than the one specified in the `SPOOL` parameter.

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Installing Natural Optimizer Compiler on BS2000

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This document describes the steps for installing the Natural Optimizer Compiler (product code NOC) on BS2000.

Related Topic:

For information on the features and functions provided by the Natural Optimizer Compiler, see the *Natural Optimizer Compiler* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

See [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following file required for product installation:

File Name	Contents
NOC <i>vrs</i> .MOD	Load modules and object modules

Copy the file into your environment as described in [Copying Files to a BS2000 Disk](#) in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the NAT*vrs*.JOBS file and are prefixed with the product code. The file is provided on the installation medium supplied for base Natural.

Installation Procedure

Be sure to read [Installation Process and Major Natural Features](#) before you start the installation procedure.

- [Step 1: Build the Natural Parameter Module](#)

- [Step 2: Relink the Nucleus](#)

Step 1: Build the Natural Parameter Module

(Jobs I060 and I080)

1. Activate the Natural Optimizer Compiler by adding the following macro to your Natural parameter module:

```
NTOPT 'INDX,OVFLW,ZD=OFF'
```

See also *Macro NTOPT* in the *Natural Optimizer Compiler* documentation.

2. Assemble and link the Natural parameter module.

Step 2: Relink the Nucleus

(Job I060)

Adapt the link steps for Natural:

1. Add the following `INCLUDE` statement to the link of the environment-independent nucleus to include the Natural Optimizer Compiler modules:

```
INCLUDE NOCNUC,NOCvrs.MOD
```

2. Relink your nucleus as described in [Link the Nucleus](#) in *Installing Natural*.

Installation Verification

You can verify the successful installation of the Natural Optimizer Compiler by performing the following steps:

1. Recatalog an existing program or write a new program and then catalog it.
2. Check the directory information for the program you have just cataloged, by using the following `LIST` system command:

```
LIST DIR object-name
```

The directory information for the specified object will be displayed, showing the size of the machine code at the bottom of the screen.

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Installing Natural Connection on BS2000

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This document describes the steps for installing Natural Connection (product code NTC) on BS2000.

Related Topic:

For information on the features and functions provided by Natural Connection, see the *Natural Connection* documentation.

Notation *vrs* or *vr*:

When used in this document, the notation *vrs* or *vr* represents the relevant product version (see also Version in the *Glossary*).

Prerequisites

A supported version of the following product must be installed before you can install Natural Connection:

- Entire Connection

See the *Installation* section in the *Entire Connection* documentation.

See also [General Prerequisites and System Support](#) in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following file required for product installation:

File Name	Contents
NTC <i>vrs</i> .MOD	Load modules and object modules

Copy the file into your environment as described in [Copying Files to a BS2000 Disk](#) in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the NAT*vrs*.JOBS file and are prefixed with the product code. The file is provided on the installation medium supplied for base Natural.

Installation Procedure

Be sure to read *Installation Process and Major Natural Features* before you start the installation procedure.

- [Step 1: Build the Natural Parameter Module](#)
- [Step 2: Adapt the Link Steps](#)

Step 1: Build the Natural Parameter Module

(Jobs I060, I080)

1. Adapt the Natural parameter module:

- Specify the keyword subparameter `AM=PC` in the `NTPRINT` macro for all printer files and work files to be used for data transfer between the host and the PC. For example:

```
NTPRINT (7),AM=PC
NETWORK (7),AM=PC
```

- Specify the profile parameter `PC=ON`.

The parameters and the macro are described in the *Parameter Reference* documentation.

2. Assemble and link the Natural parameter module.

Step 2: Adapt the Link Steps

(Job I080)

Adapt the link steps for online Natural:

1. Add the following `INCLUDE` statement to the element `LNATSHAR` in the library *job-library*:

```
INCLUDE NTPCAM3,NTCvrs.MOD
```

2. Relink your Natural shared nucleus as described in *Link the Nucleus* in *Installing Natural*.

Installation Verification

You can verify the successful installation of Natural Connection by following the instructions below:

1. Invoke Entire Connection on the PC and start the terminal emulation.
2. Use the terminal emulation to invoke Natural on the mainframe.
3. Enter the terminal command %+ to activate the PC connection.
4. Use the Natural Object Handler (described in the *Utilities* documentation) to download Natural objects to the PC. For information on transferring Natural objects, see also *Data Transfer* in the section *Terminal Emulation* in the *Entire Connection* documentation.
5. Verify that the downloaded objects are now on your PC.