Natural

Installation for z/VSE

Version 9.1.1

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ADABAS & NATURAL

This document applies to Natural Version 9.1.1 and all subsequent releases.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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Preface

This documentation describes the installation of base Natural and Natural add-on products on z/VSE.

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1 About this Documentation

Document Conventions

Convention	Description
Bold	Identifies elements on a screen.
`Monospace font`	Identifies service names and locations in the format *`folder.subfolder.service`*, APIs, Java classes, methods, properties.
`Italic`	Identifies: Variables for which you must supply values specific to your own situation or environment. New terms the first time they occur in the text. References to other documentation sources.
`Monospace font`	Identifies: Text you must type in. Messages displayed by the system. Program code.
{ }	Indicates a set of choices from which you must choose one. Type only the information inside the curly braces. Do not type the { } symbols.
|	Separates two mutually exclusive choices in a syntax line. Type one of these choices. Do not type the | symbol.
[ ]	Indicates one or more options. Type only the information inside the square brackets. Do not type the [ ] symbols.
...	Indicates that you can type multiple options of the same type. Type only the information. Do not type the ellipsis (...).

Online Information and Support

Software AG Documentation Website

You can find documentation on the Software AG Documentation website at **https://documentation.softwareag.com**.

Software AG Empower Product Support Website

If you do not yet have an account for Empower, send an email to empower@softwareag.com with your name, company, and company email address and request an account.

Once you have an account, you can open Support Incidents online via the eService section of Empower at **https://empower.softwareag.com/**.

You can find product information on the Software AG Empower Product Support website at **https://empower.softwareag.com**.

To submit feature/enhancement requests, get information about product availability, and download products, go to **Products**.

To get information about fixes and to read early warnings, technical papers, and knowledge base articles, go to the **Knowledge Center**.

If you have any questions, you can find a local or toll-free number for your country in our Global Support Contact Directory at **https://empower.softwareag.com/public_directory.aspx** and give us a call.

Software AG Tech Community

You can find documentation and other technical information on the Software AG Tech Community website at **https://techcommunity.softwareag.com**. You can:

- Access product documentation, if you have Tech Community credentials. If you do not, you will need to register and specify "Documentation" as an area of interest.
- Access articles, code samples, demos, and tutorials.
- Use the online discussion forums, moderated by Software AG professionals, to ask questions, discuss best practices, and learn how other customers are using Software AG technology.
- Link to external websites that discuss open standards and web technology.

Data Protection

Software AG products provide functionality with respect to processing of personal data according to the EU General Data Protection Regulation (GDPR). Where applicable, appropriate steps are documented in the respective administration documentation.

I Installation Process and Major Natural Features on z/VSE

2 Installation Process and Major Natural Features on z/VSE

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 or file 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.

Note: For information regarding Software AG product compatibility with IBM platforms and any IBM requirements for Software AG products, review the ***Software AG IBM Product Availability*** web page.

Installation Medium

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

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

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

Product Code	Product Name
NAF	Natural Advanced Facilities
NAT	Natural
NCF	Natural Com-plete/SMARTS Interface (corresponds to Natural Com-plete Interface)
NCI	Natural CICS Interface
NCJ	Natural Japanese Language Pack
NDL	Natural for DL/I
NOC	Natural Optimizer Compiler
NSC	Natural Security
NSQ	Natural for SQL/DS
NTC	Natural Connection
NVS	Natural for VSAM
RNM	Natural Review

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 data sets contained on the medium.
- The sequence in which the data sets are located on the medium.
- Attribute descriptions of each data set.

Installation Method

The installation of Software AG products on z/VSE 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 z/VSE* 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` data set 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 data set 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 a PDS library contained on the data set *product-code-vrs*.LIBJ (for example, NAT911.LIBJ) 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, NAT911) 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). The prefix can be specified with the SMA parameter JOB-PREFIX (the default prefix is SMA).

A sample installation job from the PDS 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.

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 z/VSE* 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 data sets (for example, `NAT`*`vrs`*`.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 partitions. The environment-independent nucleus is reentrant.

The environment-independent nucleus can reside in the shared virtual area (SVA) where it can be shared between different partitions.

A module (such as the environment-independent nucleus) loaded into the SVA 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 SVA, multiple batch jobs or TP regions (for example, CICS) 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: `NAT911` for the environment-independent nucleus, NAT911C for the environment-dependent nucleus for a CICS interface, and NAT911B for the batch environment.

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 partition 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 NATCONFG (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 NATCONFG 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 (for example, EXEC CICS LINK under CICS) 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 PROFILE, provided no database information is supplied as subparameter of PROFILE.
Scratch-pad file	Base Natural	Data that is not stored explicitly as a Natural object in another system file. See also *Natural Scratch-Pad File* in the *Operations* documentation.
FDIC	Base Natural	Natural Data Definition Modules (DDMs). If Predict is installed, FDIC also contains data for the Predict dictionary system.

System File	Supplied with	File Contents
		If the Natural Development Server is installed, FDIC also contains application data and holds object locking information.
FREG	Base Natural	Registry data that is not stored explicitly in another system file.
FSEC	Natural Security	Control information required for security definitions.
FSPOOL	Natural Advanced Facilities	Control and spooling information required to output a report on a screen or printer and obtain print statistics.

It is also possible to store Natural system files in a VSAM file system if **Natural for VSAM** is installed. The *Installation for z/VSE* documentation describes the installation steps that apply when using an Adabas database for storage.

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
```

II Installing Natural on z/VSE

3 Installing Natural on z/VSE

This document describes the steps for installing Natural (product code NAT) on z/VSE.

Related Topic:

For information on how to run Natural in a z/VSE 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 data sets required for product installation:

Data Set Name	Contents
ICS*vrs*.LIBR	Source modules, macros, phases and object modules for International Components for Unicode for Software AG (ICS)
MLC*vrs*.LIBJ	Sample installation jobs for Software AG's mainframe license check software The *vrs* 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 *Software AG Mainframe Product Licensing*.
MLC*vrs*.LIBR	Source modules, macros, phases and object modules for Software AG's mainframe license check software including the LICUTIL license utility The *vrs* 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 *Software AG Mainframe Product Licensing*.
NAT*vrs*.LICS	Product license file For information on the license file and product licensing, see *Software AG Mainframe Product Licensing*.
NAT*vrs*.SYSF	Natural system file definitions

Data Set Name	Contents
NAT*vrs*.LIBJ	Sample installation jobs
NAT*vrs*.LIBR	Source modules, macros, phases and object modules
NAT*vrs*.INPL	Natural objects
NAT*vrs*.EXPL	Natural example objects

The data set type and the space each data set requires on disk is shown in the *Software AG Product Delivery Report*.

Copying Data Sets to a z/VSE Disk

Copy the 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 data sets 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 data sets from CD-ROM, refer to the README.TXT file on the CD-ROM.
- If you are not using SMA and want to copy the data sets from tape, follow the instructions in this section.

This section explains how to copy the data sets .LIBJ, .LIBR and .LICS (if supplied) from tape to disk. All other data sets can be installed directly from the tape.

- Step 1: Copy Data Set COPYTAPE.JOB to Disk
- Step 2: Modify COPYTAPE.JOB on Your Disk
- Step 3: Submit COPYTAPE.JOB

Step 1: Copy Data Set COPYTAPE.JOB to Disk

- Modify the following sample job according to your requirements:

```
* $$ JOB JNM=LIBRCAT,CLASS=0,                                          +
* $$ DISP=D,LDEST=(*,UID),SYSID=1
* $$ LST CLASS=A,DISP=D
// JOB LIBRCAT
* *****************************************
*     STORE COPYTAPE.JOB IN LIBRARY
* *****************************************
// ASSGN SYS004,nnn
// MTC REW,SYS004
// MTC FSF,SYS004,4
ASSGN SYSIPT,SYS004
// TLBL IJSYSIN,'COPYTAPE.JOB'
// EXEC LIBR,PARM='MSHP; ACC S=lib.sublib'
/*
// MTC REW,SYS004
ASSGN SYSIPT,FEC
/*
/&
* $$ EOJ
```

where:

`nnn` is the tape address, and
`lib.sublib` is the library and sublibrary in which the data set `COPYTAPE.JOB` is to be stored.

- Execute the job to copy the data set `COPYTAPE.JOB` to disk.

  `COPYTAPE.JOB` contains the JCL required to copy the data sets `.LIBJ`, `.LIBR` and `.LICS` from tape to disk.

Step 2: Modify COPYTAPE.JOB on Your Disk

- Modify `COPYTAPE.JOB` according to your requirements and set the disk space parameters as appropriate.

Step 3: Submit COPYTAPE.JOB

- Execute `COPYTAPE.JOB` to copy the data sets `.LIBJ`, `.LIBR` and `.LICS` to your disk.

Installation Procedure

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

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

(Job I006, Step 0104 and Job I007, Steps 0101, 0102)

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 z/VSE Host Using FTP* in *Software AG Mainframe Product Licensing*.
2. Catalog, check, convert, assemble and link the license file:

Job I006, Step 0104	Catalog license file `NAT`*`vrs`*`.LICS` in the sublibrary.
Job I007, Step 0101	Check license file `NAT`*`vrs`*`.LICS`. This job runs the CHECK function of the LICUTIL license utility (see below).
Job I007, Step 0102	Convert license file into an assembler source. This job runs the MAKE function of the LICUTIL license utility (see below). Assemble and link the assembler source to generate load module `NATLIC`. 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 10: Build the Natural Parameter Module***.
2. Load the `FNAT` system file definition contained in the `NAT`*`vrs`*`.SYSF` data set 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
```

This avoids the Natural errors NAT9988 and NAT7397 after reorganizing the `FNAT` system file using the Adabas utility ADAULD or ADALOD.

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 10: Build the Natural Parameter Module***.

2. Load the `FUSER` system file definition contained in the `NAT`*`vrs`*`.SYSF` data set 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

(Job I050, Step 0102)

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.

Load the new Natural scratch-pad system file definition:

1. Set the System Maintenance Aid (SMA) parameter `NAT-SCRF` to `Y` (Yes).

2. 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 10: Build the Natural Parameter Module***.

3. Load the scratch-pad system file definition contained in the `NAT`*`vrs`*`.SYSF` data set 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.

Load the new Natural `FREG` system file definition:

1. Set the System Maintenance Aid (SMA) parameter `NAT-FREG` to `Y` (Yes).

2. 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 10: Build the Natural Parameter Module***.

3. Load the `FREG` system file definition contained in the `NAT`*`vrs`*`.SYSF` data set 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 10: Build the Natural Parameter Module***.
2. Load the `FDIC` system file definition contained in the `NAT`*`vrs`*`.SYSF` data set 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: Build the Natural Configuration Module

(Job I055, Step 0110)

This step is only required if you need to change the delivered `NATCONFG` module, for example, to adapt the `NTDVCE` macro definition to your requirements.

1. Change and assemble the source contained in the `NAT`*`vrs`* sublibrary.
2. Link the resulting Natural configuration module (`NATCONFG`) to the nucleus when you link the nucleus in ***Step 11: Link the Nucleus***.

   For information on the configuration tables in `NATCONFG`, refer to *Natural Configuration Tables* in the *Operations* documentation.

Step 9: Build the Natural-Specific IBM Language Environment Options

(Job I055, Step 0120)

Build the Natural-specific runtime options for the IBM Language Environment (LE).

This step is only required if you need to adapt the LE options at the `.VSEDEF` label in the delivered `NATLEOPT` module to your requirements.

1. Set the System Maintenance Aid (SMA) parameter `NAT-LEOPT` to `Y` (Yes); the default setting is `N` (No).
2. Change the required LE options in the `NATLEOPT` source module contained in the `NAT`*`vrs`* sublibrary at the `.VSEDEF` label.
3. Assemble the `NATLEOPT` source contained in the `NAT`*`vrs`* sublibrary.
4. Link the resulting `NATLEOPT` module to the environment-dependent nucleus (see ***Step 11: Link the Nucleus***).

Step 10: 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.
   - Configure the z/VSE batch interface: Modify the settings of the parameters supplied with the `NTVSEP` macro to meet your requirements.
   - 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 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.

- If you want to use a Natural global buffer pool, perform the following steps:

  Specify the `NTBPI` macro (see the `BPI` parameter):

  ```
  NTBPI TYPE=NAT,NAME=gbp-name
  ```

  where `gbp-name` is the name of the Natural global buffer pool to be used.

  Supply the following parameter with the `NTPRM` macro:

  ```
  SUBSID=subsystem-name
  ```

  where `subsystem-name` is the name of the Natural subsystem specified when creating the global buffer pool.

  Make sure that the **System Maintenance Aid (SMA)** parameter `NAT-GLOBAL-BP` is set to `Y` (Yes). This is the default setting.

  For detailed information on the Natural global buffer pool, see *Natural Global Buffer Pool under z/VSE* in the *Operations* documentation.

2. Assemble and catalog the Natural parameter module.

Step 11: Link the Nucleus

(Job I060, Steps 0020, 0105)

1. If you want Natural to run in the IBM Language Environment (LE), set the **System Maintenance Aid (SMA)** parameter NAT-LE to Y (Yes). The default setting is N (No).
2. Link the **environment-dependent nucleus** (Step 0020) for batch Natural.

   The list of modules to be linked for the environment-dependent nucleus is supplied with Step 0020.

   Link the environment-dependent nucleus with the linkage editor option RMODE(24).

   If you want Natural to run in the IBM Language Environment (LE), include the object modules NATVSEL, NATLEOPT and NATVSE, and specify ENTRY LESTART instead of ENTRY CMSTART.
3. Link the **environment-independent nucleus** (Step 0105).

   The list of modules to be linked for the environment-independent nucleus is supplied with Step 0105.

   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.

Step 12: Link the Global Buffer Pool and Catalog the Start and Stop Jobs

(Job I060, Steps 0120, 0126, 0127, 0128, 0129)

These steps are only required if you want to use a global buffer pool. For further information on the global buffer pool, see *Global Buffer Pool under z/VSE* in the *Operations* documentation.

- Create and catalog the jobs NGBPSTRT, NGBPSTOP, EGBPSTRT and EGPSTOP:

```
Step 0120 LINK GLOBAL BUFFER POOL MANAGER NATGBP
     0126 SAMPLE JOB TO START NATURAL GLOBAL BUFFER POOL
     0127 SAMPLE JOB TO STOP NATURAL GLOBAL BUFFER POOL
     0128 SAMPLE JOB TO START EDITOR GLOBAL BUFFER POOL
     0129 SAMPLE JOB TO STOP EDITOR GLOBAL BUFFER POOL
```

Step 13: Link the Editor Buffer Pool Program

(Job I060, Step 1900)

Link the NATEDFMV program to initialize the editor buffer pool work file.

Step 14: Load New Natural Objects and Natural Error Messages

(Job I061, Step 0100)

- Load the Natural objects and Natural error messages from the NAT*vrs*.INPL data set 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 15: Load the Japanese Messages

(Job I061, Step 8300, 8302)

This step is optional and only required if you want to replace the English long message texts by their Japanese equivalents or if you want to load the Japanese short message texts. The Japanese message texts are contained in the Natural Japanese Language Pack (product code NCJ), a separate product that can be loaded optionally. If you do not load the Japanese message texts, the English message texts are used instead.

1. Replace the English long message texts (Step 8300) by loading the Japanese long message texts from the NCJ*vrs*.INPL data set into the Natural system file with the Natural INPL utility.
2. Load the Japanese (ULANG=59) short message texts (Step 8302) from the NCJ*vrs*.ERRN data set into the Natural system file by using the ERRLODUS program of the Natural SYSERR utility (described in the *Utilities* documentation).

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

Step 16: Load the Natural Example Objects

(Job I061, Step 0103)

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

Step 17: Link and Start the Optimize Monitor Buffer Pool

(Job I009, Step 1230 and Job I200, Step 0105)

These steps are 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 `NAT04I91` program for the Optimize Monitor Buffer Pool (Job I009).
2. Create and start the job `SAGEOI` (supplied with Job I200) before using Natural. See *Starting the Optimize Monitor Buffer Pool* in the *Operations* documentation.

Installation Verification

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

- Test Batch Natural
- Test Online Natural

Test Batch Natural

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

```
* $$ JOB JNM=JOBNAME,CLASS=A,DISP=D
* $$ LST CLASS=A,DISP=D
// JOB JOBNAME
// LIBDEF PHASE,SEARCH=(SAGLIB.USERLIB,SAGLIB.NATvrs,SAGLIB.ADAvrs),TEMP
// EXEC NATvrsBA,SIZE=NATvrsBA,PARM='SYSRDR'
DC='.',IM=D,MADIO=0,MT=0,OBJIN=R,AUTO=OFF,MAXCL=0,ID=',',INTENS=1
/*
ADARUN DB=001,DE=3390,SVC=045,MODE=MULTI
/*
EDIT
WRITE 'TESTBAT'
END
.E
RUN
SAVE TESTBAT
FIN
```

```
/*
/&
* $$ EOJ
```

This job executes a log on to the Natural library SYSTEM, creates the example program TESTBAT, and executes the program with the system command RUN.

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. Enter the following Natural system command to check the Natural system files:

   ```
   SYSPROF
   ```

2. Enter the following Natural system command:

   ```
   SYSDDM
   ```

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

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

4. 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.

5. Repeat Steps 9 and 10 for the VEHICLES DDM.
6. Check whether the EMPLOYEES and VEHICLES DDMs are now available in your environment:
   - Enter the following Natural system command to logon to the Natural library SYSEXSYN:

     ```
     LOGON SYSEXSYN
     ```

   - Execute an example program that uses EMPLOYEES and VEHICLES, for example, IFEX1S, by entering the following Natural system command:

     ```
     RUN IFEX1S
     ```

III Installing International Components for Unicode for Software AG on z/VSE

4 Installing International Components for Unicode for Software AG on z/VSE

This document describes the steps for installing International Components for Unicode for Software AG (ICS) on z/VSE 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.LIBR` data set 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: Make Phase ICSNTTAB Available for SMARTS
- Step 2: Load the ICS Module at Session Start
- Step 3: Load an ICU Data Library at Session Start

- Step 4: Load ICU Data Items on Request in a Session

Step 1: Make Phase ICSNTTAB Available for SMARTS

Phase `ICSNTTAB` is required under SMARTS for reentrancy reasons.

1. Make sure that the ICS library is available at runtime of a Natural session:

   Specify the ICS library in the job control statement `LIBDEF PHASE` for SMARTS.
2. Define `ICSNTTAB` as `RESIDENTPAGE` to make it available for execution under SMARTS.

Step 2: Load the ICS Module at Session Start

1. Make sure that the ICS library is available at runtime of a Natural session:
   - Specify the ICS library in the job control statement `LIBDEF PHASE` for your Natural batch or SMARTS jobs, or for the TP monitor jobs under which Natural runs.
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.

   Instead of the ICS module `SAGICU`, you can also load the ICS module `SAGICUA9`. In addition to `SAGICU`, this module supports IBM architecture level 9: see alternative ICS modules in the *Unicode and Code Page Support* documentation.

   If you want to load `SAGICUA9`, use the following parameter setting:

   ```
   RCA=SAGICU RCALIAS=(SAGICU,SAGICUA9)
   ```

   The Natural profile parameter `RCALIAS` is described in the *Parameter Reference* documentation.

Step 3: Load an ICU Data Library at Session Start

1. Make sure that the ICS library is available at runtime of a Natural session:
   - Specify the ICS library in the job control statement `LIBDEF PHASE` for your Natural batch or SMARTS jobs, or for the TP monitor jobs under which Natural runs.
2. At the start of a Natural session, set the Natural profile parameters `RCA` and `CFICU` for the ICU data library (`ICSDT60E`) to be used:

```
RCA=ICSDT60E  CFICU=(DATFILE=ICSDT60E)
```

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

Step 4: 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.

1. Make sure that the ICS library is available at runtime of a Natural session:
   - Specify the ICS library in the job control statement LIBDEF PHASE for your Natural batch or SMARTS jobs, or for the TP monitor jobs under which Natural runs.
2. Depending on your TP environment and the setting of the Natural CFICU profile parameter, perform one of the following options:
   - Under CICS, with CFICU=(DATITEM=NONE) set:

     Add one PPT entry for each ICU data item.

     See also the corresponding step in ***Installing Natural CICS Interface***.
   - Under Com-plete and Natural Development Server, with CFICU=(DATITEM=NONE) set:

     Add THREAD-ESQA-SIZE=15K as a keyword parameter to the startup options for your Complete or Natural Development Server.

     Add one RESIDENTPAGE entry for each ICU data item that represents a converter (refer to the ICSCCOMP source member in the ICS*vrs*.LIBR data set).

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.

IV Installation for REQUEST DOCUMENT and PARSE XML Statements on z/VSE

5 Installation for REQUEST DOCUMENT and PARSE XML Statements on z/VSE

This document describes the installation steps for enabling the use of the Natural statements `REQUEST DOCUMENT` and `PARSE XML` on z/VSE.

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 or NATXMLA9 to the Nucleus
- Step 2: Enable the Environment-Dependent Nucleus for LE Execution
- Step 3: Link the Required Modules to the Nucleus

Step 1: Link the Module NATXML or NATXMLA9 to the Nucleus

The module `NATXML` is required to execute the statements `REQUEST DOCUMENT` and `PARSE XML`. If you want the `PARSE XML` statement to support IBM architecture level 9, alternatively, you can use the module `NATXMLA9`. See also *Support for Architecture Levels*.

1. Set the **System Maintenance Aid (SMA)** parameter `NATXML` to `Y` (default is `N`).
2. The `NATXML` module is then linked to the **environment-independent nucleus** by using the following `INCLUDE` statement:

```
 INCLUDE NATXML
```

Or:

For support of IBM architecture level 9:

1. Set the **SMA** parameters `NATXML` and `NAT-ARCHLEVEL9` to `Y` (default is `N`).
2. The alternative `NATXMLA9` module is then linked to the **environment-independent nucleus** by using the following `INCLUDE` statement:

```
INCLUDE NATXMLA9
```

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

The REQUEST DOCUMENT and PARSE XML statements require the IBM Language Environment (LE) for execution. If you want Natural to run in the IBM Language Environment (LE), perform the following steps:

1. Set the **System Maintenance Aid (SMA)** parameter NAT-LE to Y (Yes). The default setting is N (No).
2. Additionally, if you want to modify the LE options in the NATLEOPT source module or if you use non-Natural programs running in 24-bit mode, set the appropriate SMA parameter as described in ***Build the Natural-Specific IBM Language Environment Options*** **in** ***Installing Natural***.
3. Link the environment-dependent nucleus to support LE.

This applies to all batch and TP monitor system environments except Com-plete.

Step 3: Link the Required Modules to the Nucleus

Link the modules indicated in this section to the nucleus depending on the environment to be used.

- Batch and CICS
- Com-plete and SMARTS

Batch and CICS

1. Add the LE library (usually PRD2.SCEEBASE) to the OBJ-SEARCH definition of the link job to resolve the references to LE functions.
2. Link the following LE and TCP/IP access modules to the **environment-dependent nucleus** by using the appropriate INCLUDE statement:

   ```
   INCLUDE NAT2LE
   ```

   Do *not* specify the NOAUTO parameter in the ACTION statement for the link step.
3. If you use the BSI TCP/IP, set the following in the linkage job:

   ```
   INCLUDE NAT2TCP
   ```

   If you use a z/VSE version older than Version 5.2 or an BSI TCP/IP stack older than Version 2.5.5, set the following in the linkage job.

```
INCLUDE NAT2TCP4
```

Com-plete and SMARTS

1. Link the following LE access module to the **environment-dependent nucleus** by using the appropriate INCLUDE statement:

   ```
    INCLUDE NAT2LE
   ```

2. Copy the NCFTCP*vr* phase to the Com-plete/SMARTS load library.
3. For support of the IBM TCP/IP stack, define the CDI (Communication Driver Interface) as described in *Standard CDI Definitions* in the *Com-plete* documentation.
4. Add the POSIX SERVER statement to the Com-plete parameter module SYSPARM.

Support for Architecture Levels

If your Natural system runs on z/OS or z/VSE with an IBM processor with architecture level 9 or higher, you can replace the module NATXML by NATXMLA9. NATXMLA9 is built to use advanced machine instructions introduced with IBM's ESA/390 and z/Architecture. You can use the system command TECH (see the *System Commands* documentation) to find out the architecture level supported on your current machine.

NATXMLA9 improves execution performance, especially for the statements REQUEST DOCUMENT and PARSE XML that use Unicode variables or perform code-page encoding operations. For more information on architecture levels, refer to the related documentation from IBM (z/Architecture, Principles of Operation).

Caution: An operation exception error (abend code S0C1) can occur if the NATXMLA9 module is used, but the underlying machine architecture level is lower than 9.

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`.

V Installing Natural Net Data Interface on z/VSE

6 Installing Natural Net Data Interface on z/VSE

This document describes the steps for installing the Natural Net Data Interface `NATNETTO` on z/VSE.

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 NATCONFG

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

NATCONFG 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
```

VI Installing Entire System Server Interface on z/VSE

7 Installing Entire System Server Interface on z/VSE

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

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

Related Topic:

For information on installing and using the Entire System Server or Natural ISPF, 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

A supported version of either of the following products must be installed before you can install the Entire System Server Interface:

- Entire System Server or Natural ISPF, version as 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 BUFLEN=12288,NUMREQ=5,MAXCBL=3000,MAXEDL=6000,EXTUSER=INIT-USER
```

The parameters are explained below:

BUFLEN	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	Editor session buffer length MAXEDL is used by the NSPF editor and incore database. 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 *Messages and Codes* documentation). In this case, the value of MAXEDL has to be increased.
EXTUSER	External user ID passed to the Entire System Server for security checks See also EXTUSER in the following section.

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 Com-plete 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	Recommended for a multi-user address space. The contents of the Natural system variable *INIT-USER must be identical to the user definition in the external security system (for example, RACF). 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. In this case, the security definition from a CICS or Com-plete 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. (*INIT-USER is described in the *System Variables* documentation.)
EXTUSER=USER	Recommended for a multi-user address space in a Natural Security environment. Processing is similar to EXTUSER=INIT-USER except that the Natural system variable *USER (described in the *System Variables* documentation) is used. (*USER is described in the *System Variables* documentation.)
EXTUSER=ADDRESS-SPACE	Recommended for a batch or server environment. The security description of this address space is inherited for security evaluation.

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, Step 1106)

  Link the parameter module `NATPNIP`. In this case, the module `ESYNODTB` is not required.

Entire System Server

If the Entire System Server is used:

- (Job I055, Steps 1106, 1107)

  Assemble and link the modules `NATPNIP` (Step 1106), and, optionally `ESYNODTB` (Step 1107).

Link the Entire System Server Interface to the Nucleus

(Job I060, Step 3720)

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

`INCLUDE NATPNIP`	Entire System Server Interface parameters
`INCLUDE ESXNUC`	Entire System Server Interface module
`INCLUDE ESYNODTB`	Optional, node table

Installing and Activating the Write-to-Spool Feature

If you want to use the Write-to-Spool feature, either link the access method to your nucleus or load the method dynamically. See also the Natural parameters RCA and RCALIAS.

You can define and assemble the defaults for your nucleus by using the source member NATPWSDF before linking the defaults to the nucleus. You can find the source member NATPWSDF in the source library of Natural.

The default settings of source member NATPWSDF are as follows:

```
NAMPWSPL NODE=148,
PROGRAM=,
CLASS=A,
HOLD=YES,
CNTL=A,
FORM=,
RMT=,
FORMDEF=,
PAGEDEF=
```

The table below shows the modifiable parameters of source member NATPWSDF and a detailed description of these parameters:

Parameter	Description
Node	NPR target node. The node number can consist of up to 5 digits. It addresses the destination started task of the Entire System Server and where the output is written.
Program	JES Writer which can contain up to 8 characters. JES provides control to the Writer program. If JES does not find it, it is ignored. Possible value: *OUTPUT means that the input from the Natural statement DEFINE PRINTER is used to be interpreted as JES Writer.

Parameter	Description
`Class`	`SYSOUT` class within JES where the output has to be written. It can contain only one character or digit. It is a descriptor for further software (for example, Entire Output Management) to detect the output stream for processing.
`Hold = yes/no`	Specifies whether the output stream is to be held within the JES spool in case the task previously started by the Entire System Server terminates.
`CNTL`	Represents the control character for the `SYSOUT` data set. `CNTL` contains one character: `A` ASA control character `M` Machine control character
`Form`*`RMT`*	Describes the form control buffer for JES. This value is transferred to JES which handles the processing. *`RMT`* represents the JES remote user ID if `SYSOUT` has to be routed to a different JES system. You can find the name of the JES system in the destination field within the `DEFINE PRINTER` statement (for example, `DEFINE PRINTER OUTPUT='DAEM'`).
`Formdef` *`Pagedef`*	Can contain up to 6 characters.

After editing the `NATPWSDF` source member with customized values, you can assemble and link it. If you want to use the default settings, you can omit this step.

If you want to use the Write-to-Spool feature with statically linked access method at your site, relink the Natural module as follows:

```
INCLUDE NATPWSPL    The Write-to-Spool access method for Natural
INCLUDE NATPWSDF    The Write-to-Spool defaults (your adapted parameter module)
```

If you want to use dynamic load, you can either use the delivered module `NATPWSAM` with default parameters or you can link your adapted parameter module.

The output is written into the `POWER` spool under a new job number. The name of the printed spool data set will be the name of the original batch job or the user ID of the TP monitor.

For further information, see System Spool Access in the *Operations* documentation.

VII Installing Software AG Editor on z/VSE

8 Installing Software AG Editor on z/VSE

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).

This document describes the steps for installing the Software AG Editor on z/VSE.

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.

The **System Maintenance Aid (SMA)** parameter `SAG-EDITOR` is set to `Y` (Yes) by default to allow installation of the Software AG Editor.

- Step 1: Adapt the Editor Buffer Pool Parameter Macro NTEDBP
- Step 2: Allocate the Editor Work File
- Step 3: Format the Editor Work File
- Step 4: Modify the Startup JCL and Subsystem Definitions
- Step 5: Build the Natural Parameter Module
- Step 6: Define the Global Editor Buffer Pool

- Step 7: Link the Software AG Editor to the Nucleus

Step 1: Adapt the Editor Buffer Pool Parameter Macro NTEDBP

1. Modify the editor buffer pool settings supplied with the `NTEDBP` macro in the Natural parameter module to meet your requirements. For a description of this macro, see the corresponding dynamic profile parameter `EDBP`.
2. Assemble the Natural parameter module and link it to the Software AG Editor work file formatting utility (`NATEDFMV`) contained in the Natural load library. The Software AG Editor work file formatting utility is described in *Editor Work File* in the *Operations* documentation.

   The editor buffer pool parameters contained in the Natural parameter module are stored in the editor buffer pool work file control record during formatting (see ***Step 3: Format the Editor Work File***).

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: Allocate the Editor Work File

(Job I008, Steps 1900, 1901, 1903, 1905)

Under Com-plete, this step is only required if you want to use a global editor buffer pool.

A VSAM RRDS is used as the editor work file. To best exploit the VSAM data set space, the record length should be defined 8 bytes less than the control interval length; see also *Editor Work File* in the *Operations* documentation.

- Depending on your TP monitor environment, execute the following steps to allocate the data set:

```
Step 1900 ALLOCATE EDITOR WORK FILE BATCH
     1901 ALLOCATE EDITOR WORK FILE CICS
     1903 ALLOCATE EDITOR WORK FILE TSO
     1905 ALLOCATE EDITOR WORK FILE GLOBAL
```

Step 3: Format the Editor Work File

(Job I081, Steps 1900, 1901, 1903, 1905)

Under Com-plete, this step is only required if you want to use a global editor buffer pool.

1. Use the Software AG Editor work file formatting utility (`NATEDFMV`) to format and load the control record in the editor work file.
2. Depending on your TP monitor environment, execute the following steps to format the data set:

```
Step 1900 FORMAT EDITOR WORK FILE BATCH
     1901 FORMAT EDITOR WORK FILE CICS
     1903 FORMAT EDITOR WORK FILE TSO
     1905 FORMAT EDITOR WORK FILE GLOBAL
```

Step 4: Modify the Startup JCL and Subsystem Definitions

You can specify the data set to be used for the editor work file by either adding the appropriate DLBL statement or using the keyword subparameter `DDNAME` of the parameter macro `NTEDBP` (see *EDBP - Software AG Editor Buffer Pool Definitions* in the *Parameter Reference* documentation).

The data set name specified with `DDNAME` must correspond to the data set definition in your JCL.

- **In Batch Mode:**

  Add a DLBL statement for the editor work file:

  ```
  // DLBL CMEDIT,'data-set-name',,VSAM,CAT=catalog-name
  ```

  where:
  data-set-name is the name of the data set to be used for the work file,
  catalog-name is the name of the VSAM catalog that holds the information about the data set.

  Instead of using an actual VSAM file, you can also define a dummy editor work file by using JCL or standard labels (see the *Example* below). Such a label definition enables you to use the editor and the editor buffer pool. However, any write access to the editor work file will lead to an error, and you cannot use the recovery feature.

Example:

```
// DLBL CMEDIT,'SAG.EDITOR.WORK.FILE',,VSAM,CAT=catalog-name
// EXTENT SYSnnn
// ASSGN SYSnnn,IN
```

where *nnn* is a valid SYS number.

- **Under Com-plete:**
  - If you want to use a global editor buffer pool, add a DLBL statement for the editor work file:

    ```
    // DLBL dlbl-name,'data-set-name',,VSAM,CAT=catalog-name
    ```

    where:
    dlbl-name is the name of the global editor buffer pool,
    data-set-name is the name of the data set to be used for the work file,
    catalog-name is the name of the VSAM catalog that holds the information about the data set.

    In addition, the DLBL name has to be defined to Com-plete by using the UUTIL utility function FM (described in the relevant section of the *Com-plete* documentation).

  - If you want to use a local editor buffer pool, define an SD file as the editor work file. The name of the SD file is indicated in the keyword subparameter DDNAME of the NTEDBP macro.

    The number of work file records is set with the keyword subparameter RECNUM and the work file record length is set with the keyword subparameter LRECL of the NTEDBP macro.

    For a local editor buffer pool, add the definitions of the editor buffer pool to the SERVER parameter of your startup parameters as indicated in ***Define the Natural Com-plete/SMARTS Interface Server*** in the section *Installing Natural Com-plete/SMARTS Interface*.

    For explanations of the keyword subparameters and macros mentioned above, see *EDBP - Software AG Editor Buffer Pool Definitions* in the *Parameter Reference* documentation.

- **Under CICS:**

  Add an entry in the CICS File Control Table (Job I005).

Step 5: Build the Natural Parameter Module

(Job 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 (the default is 64).

2. The Software AG Editor requires either a local or a global editor buffer pool (see also *Natural Buffer Pools* in the *Operations* documentation).

   - If you want to use a local editor buffer pool, specify the NTBPI macro as follows:

     ```
     NTBPI TYPE=EDIT
     ```

     The size of the region must be large enough to allocate the local buffer pool.

     For more information on NTBPI, see *NTBPI Macro Syntax* in the *Parameter Reference* documentation.

   - If you want to use a global editor buffer pool, proceed as follows:

     Specify the NTBPI macro as follows:

     ```
     NTBPI TYPE=EDIT,NAME=gbp-name
     ```

     where *gbp-name* is the name of the global editor buffer pool to be used.

     Supply the following parameter with the NTPRM macro (described in the *Operations* documentation):

     ```
     SUBSID=subsystem-name
     ```

     where *subsystem-name* is the name of the Natural subsystem specified when creating the global buffer pool.

     For detailed information on SUBSID, see *SUBSID - Subsystem ID under z/OS and z/VSE* in the *Parameter Reference* documentation.

3. Assemble and link the Natural parameter module.

Step 6: Define the Global Editor Buffer Pool

The global editor buffer pool can be shared by several regions. It is defined and started using the same procedure as for Natural global buffer pools; see *Natural Global Buffer Pool under z/VSE* in the *Operations* documentation. The parameter setting `TYPE=EDIT` identifies the buffer pool as an editor buffer pool.

All users of the same global editor buffer pool must share the same editor work file; otherwise, an error occurs.

Step 7: Link the Software AG Editor to the Nucleus

(Job I080)

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

  ```
   INCLUDE NATEDT
  ```

- Instead of linking the Software AG Editor module to the nucleus, you can dynamically load it during initialization of a Natural session. In this case, the `NATEDT` editor module must be linked as `EDITOR` object module and the Natural session must be started with the profile parameter setting `RCA=EDITOR` (see also *RCA - Resolve Addresses of Statically Linked Modules* described in the *Parameter Reference* documentation).

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.

VIII Installing Natural CICS Interface on z/VSE

9 Installing Natural CICS Interface on z/VSE

This document describes the steps for installing Natural CICS Interface (product code NCI) on z/VSE.

Related Topics:

For information on how to operate Natural in a CICS environment, see *Using Natural with TP Monitors* and *Natural under CICS* in the *TP Monitor Interfaces* documentation and the following topics:

- *NCISCPCB Generation Parameters*
- *NCMPRM Macro Parameters*
- *Customization of VSAM RRDS Roll Files*
- *NCISCPRI Warnings and Error Messages*

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 CICS Interface:

- Adabas CICS Interface (product code ACI), version as 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*.

Installation Medium

The **installation medium** contains the following data set required for product installation:

Data Set Name	Contents
NCI*vrs*.LIBR	Source modules, macros, phases and object modules

Copy the data set into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Sample Jobs

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

Prefix Used for Natural CICS Interface Components

When used in this document, *`prefix`* denotes a common Natural CICS Interface prefix of 1 to 5 characters, for example, `NCI`*`vr`*. This prefix is determined by the value of the parameter `PREFIX` in the `NTCICSP` macro of the Natural parameter module, for example, in **Step 4** of the *Installation Procedure*. `NTCICSP` and `PREFIX` are described in the *Parameter Reference* documentation.

`prefix` is followed by specific characters to make up the names of the following objects:

`prefix``CB`	Natural CICS Interface system directory, for example, `NCI`*`vr`*`CB`
`prefix``R1` to *`prefix`*`R9`	Natural CICS Interface VSAM RRDS roll files (optional)
`prefix``XFA`	Natural CICS Interface 3270 Bridge `XFAINTU` exit

Installation Procedure

Before you start the installation procedure for the Natural CICS Interface, be sure to read the following:

- *System Control under CICS* in the *TP Monitor Interfaces* documentation
- ***Installation Process and Major Natural Features***

The installation procedure comprises the following:

- Step 1: Customize CICS
- Step 2: Allocate the VSAM RRDS Roll Files for the Natural CICS Interface
- Step 3: Build the Roll-File Initialization Module
- Step 4: Build the Natural CICS Interface Parameter Module
- Step 5: Build the Natural CICS Interface Starter Module NCISTART
- Step 6: Build the Natural CICS Interface Root Module NCIROOT
- Step 7: Build the Natural CICS Interface System Directory Module
- Step 8: Build the Natural CICS Interface External CALLNAT Interface Module
- Step 9: Build the Natural CICS Interface Node Error Program
- Step 10: Build the Natural CICS Interface XFAINTU Exit
- Step 11: Build the Natural CICS Interface Front-End Driver NCISFED
- Step 12: Build the Natural Parameter Module
- Step 13: Link the Environment-Dependent Nucleus

Step 1: Customize CICS

(Job I005, Steps 2211, 2212, 2230)

1. Steps 2211 and 2212:

   Create the CICS tables and RDO entries as described in ***CICS Resource Definitions***.

2. Step 2230 (optional):

   This step is only required if you want to dynamically load an ICU data item without using the SVC instruction on request during a Natural session instead of an entire ICU data library:

   Set `CFICU=(DATITEM=NONE)` and add one PPT entry for each ICU data item.

   See also the **corresponding step** in *Installing International Components for Unicode for Software AG*.

   ICU data items and ICU data libraries are described in the *Unicode and Code Page Support* documentation.

Step 2: Allocate the VSAM RRDS Roll Files for the Natural CICS Interface

(Job I008, Step 2200)

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

- Allocate the VSAM RRDS roll files for the Natural CICS Interface.

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

Step 3: Build the Roll-File Initialization Module

(Job I070, Step 2205)

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

- Assemble and catalog the `NCISCPRI` batch program of the Natural CICS Interface to initialize a roll file.

  This step creates an executable batch module which is used in ***Step 15: Link the VSAM Roll-File Initialization Module***.

Step 4: Build the Natural CICS Interface Parameter Module

(Job I070, Steps 2220, 2225)

- Edit, assemble and catalog the Natural CICS Interface parameter module `NCIPARM`.

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

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

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

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

Step 5: Build the Natural CICS Interface Starter Module NCISTART

(Job I070, Step 2230)

- Make sure that the IBM Language Environment macro library is available in the `SYSLIB` chain in the assembler step.
- Translate, assemble and catalog the Natural CICS Interface starter module `NCISTART`. Repeat these steps after you have installed a new CICS version.

  If you are not using the most recent CICS version, the translate step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step will end with a return code of 0 by using conditional assemblies to bypass potential CICS translator messages.

Step 6: Build the Natural CICS Interface Root Module NCIROOT

(Job I070, Step 2235)

- Translate, assemble and catalog the Natural CICS Interface module `NCIROOT`. Repeat these steps after you have installed a new CICS version.

  If you are not using the most recent CICS version, the translate step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step will end with a return code of 0 by using conditional assemblies to bypass potential CICS translator messages.

Step 7: Build the Natural CICS Interface System Directory Module

(Job I070, Steps 2245, 2250)

- Edit, assemble and catalog the `NCISCPCB` module.

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

  A sample job is provided with the `NCII070(J)` member in the `NAT`*`vrs`*`.LIBJ` library.

  For descriptions of the individual macros and parameters contained in `NCISCPCB`, see *NCISCPCB Generation Parameters* in the *TP Monitor Interfaces* documentation.

Step 8: Build the Natural CICS Interface External CALLNAT Interface Module

(Job I070, Step 2270)

This step must be performed only if you want to use the external `CALLNAT` interface module of the Natural CICS Interface. See also *Environment Dependencies* in *Natural 3GL CALLNAT Interface - Purpose, Prerequisites, Restrictions* in the *Operations* documentation.

- Translate, assemble and catalog the external `CALLNAT` interface module `NCIXCALL`. See also `NCIXCALL` as described for the `CALLNAT` in *Environment Dependencies* in the *Operations* documentation.

  Repeat these steps after you have installed a new CICS version.

  If you have an `NCIXCALL` module from a previous Natural version, specify a new name for this module (for example, `NCIXCIOV`) by using the `SYSPARM` parameter contained in `NCIXCALL`. The `NCIXCALL` module from the previous Natural version must be linked (see ***Step 16: Link the Natural CICS Interface External CALLNAT Interface Module***) to assign it the new name.

If you are not using the most recent CICS version, the translate step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step will end with a return code of 0 by using conditional assemblies to bypass potential CICS translator messages.

Step 9: Build the Natural CICS Interface Node Error Program

(Job I070, Step 2275)

This step must be performed only if you want to use the node error program (NEP) of the Natural CICS Interface.

- Translate, assemble and catalog the Natural CICS Interface module `NCIZNEP`. Repeat these steps after you have installed a new CICS version.

  For information on `NCIZNEP`, see *NCIZNEP Functionality* in the *TP Monitor Interfaces* documentation.

  If you are not using the most recent CICS version, the translate step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step will end with a return code of 0 by using conditional assemblies to bypass potential CICS translator messages.

Step 10: Build the Natural CICS Interface XFAINTU Exit

(Job I070, Step 2280)

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

- Translate, assemble and catalog the Natural CICS Interface module `NCIXFATU`. Repeat these steps after you have installed a new CICS version.

  If you are not using the most recent CICS version, the translate step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step will end with a return code of 0 by using conditional assemblies to bypass potential CICS translator messages.

Step 11: Build the Natural CICS Interface Front-End Driver NCISFED

(Job I070, Step 2290)

This step must be performed only if you want to use the Natural RPC server front-end under CICS.

A sample job is provided with the `NCII070R` member in the `NAT`*`vrs`*`.LIBJ` library.

- Make sure that the IBM Language Environment (LE) macro library is available in the `SYSLIB` chain in the assembler step.
- Translate, assemble and catalog the Natural CICS Interface front-end driver `NCISFED`. Repeat these steps after you have installed a new CICS version.

  If you are not using the most recent CICS version, the translate step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step will end with a return code of 0 by using conditional assemblies to bypass potential CICS translator messages.

Step 12: Build the Natural Parameter Module

(Job I080, Step 2220)

Build the Natural parameter module for the Natural CICS Interface:

1. Modify the settings of the supplied Natural profile parameters as required and in accordance with the settings you specified when building the Natural parameter module for batch mode during the ***Installation Procedure*** for base Natural.

   Make sure that the profile parameters `FNAT` and `FUSER` are set to the same values you specified when loading the system file. The parameters and corresponding macros (if applicable) are described in the *Parameter Reference* documentation.
2. Assemble and catalog the Natural parameter module.

Step 13: Link the Environment-Dependent Nucleus

(Job I080, Step 2230)

- Link the **environment-dependent nucleus** for the Natural CICS Interface with the following modules:

  `NCIPARM` built in **Step 4**,
  `NCISTART` built in **Step 5**,
  `NCIROOT` built in **Step 6**, and
  the Natural parameter module built in **Step 12**.

Include the CICS stub module `DFHELII` (do not use `DFHEAI`).

All components of the environment-dependent nucleus are reentrant. Therefore, you can link it with the shared virtual area (SVA) option to take advantage of the CICS (E)RDSA storage area.

See also *Natural Nucleus under CICS* in the *TP Monitor Interfaces* documentation.

Step 14: Link the Natural CICS Interface System Directory

(Job I080, Step 2250)

- Link the Natural CICS Interface system directory into your CICS user library under the module name *prefix*`CB` (see ***Prefix Used for Natural CICS Interface Components***).

  The Natural CICS Interface system directory is not reentrant. Therefore, it cannot be linked with the shared virtual area (SVA) option.

Step 15: Link the VSAM Roll-File Initialization Module

(Job I080, Step 2265)

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

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

Step 16: Link the Natural CICS Interface External CALLNAT Interface Module

(Job I080, Steps 2270, 2271)

This step must be performed only if you want to use the external `CALLNAT` interface module of the Natural CICS Interface.

For more information, see *Natural 3GL CALLNAT Interface - Purpose, Prerequisites, Restrictions* in the *Operations* documentation.

- Link the external `CALLNAT` interface module `NCIXCALL`.

  See also and *Natural Nucleus under CICS* in the *TP Monitor Interfaces* documentation.

  Step 2270 is needed if the `NCIXCALL` module has been installed in the same CICS partition with a previous Natural version. The previous Natural version `NCIXCALL` module must then be assigned a new name, for example `NCIXCIOV`. Thus, you can preserve the name of the `NCIXCALL` module used in the previous version and need not link it to all your 3GL programs using it.

  Step 2271 links the module `NCIXCALL` for the current Natural version.

The external CALLNAT interface module of the Natural CICS Interface is reentrant. Therefore, you can link it with the shared virtual area (SVA) option to take advantage of the CICS (E)RDSA storage area.

Step 17: Link the Natural CICS Interface Node Error Program

(Job I080, Step 2275)

This step must be performed only if you want to use the node error program (NEP) of the Natural CICS Interface. See also *CICS Node Error Program Considerations for Natural* in the *TP Monitor Interfaces* documentation.

- Link the Natural CICS Interface module NCIZNEP by using the NCIZNEPV module.

  See also and *Natural Nucleus under CICS* in the *TP Monitor Interfaces* documentation.

  The node error program of the Natural CICS Interface is reentrant. Therefore, you can link it with the shared virtual area (SVA) option to take advantage of the CICS (E)RDSA storage area.

Step 18: Link the Natural CICS Interface XFAINTU Exit

(Job I080, Step 2280)

This step must be performed only if you want to use Natural with the CICS 3270 Bridge. See also *CICS 3270 Bridge Support* in the *TP Monitor Interfaces* documentation.

- Link the Natural CICS Interface module NCIXFATU under the name *prefix*XFA (see ***Prefix Used for Natural CICS Interface Components***).

  See also and *Natural Nucleus under CICS* in the *TP Monitor Interfaces* documentation.

  The Natural CICS Interface module NCIXFATU is reentrant. Therefore, you can link it with the shared virtual area (SVA) option to take advantage of the CICS (E)RDSA storage area.

Step 19: Link the Natural RPC Server Front-End

(Job I080, Step 2290)

This step must be performed only if you want to use the Natural RPC server front-end under CICS.

A sample job is provided with the NCII080R member in the NAT*vrs*.LIBJ library.

- Link the Natural RPC server front-end module NCIRSFE under the defined name by using the NCISFED module.

  The Natural RPC server front-end under CICS is reentrant. Therefore, you can link it with the shared virtual area (SVA) option to take advantage of the CICS (E)RDSA storage area.

Step 20: Initialize the VSAM Roll Files

(Job I081, Step 2200)

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

- Initialize the VSAM roll files.

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

  A VSAM RRDS file is a direct (random) access type file that must be formatted.

  For the Natural CICS Interface VSAM roll files, formatting is done by the `NCISCPRI` batch program. To execute `NCISCPRI`, the Natural roll file to be initialized has to be assigned the file name `ROLL` in the JCL DLBL statement. No other parameter input is required for `NCISCPRI`; all data required for file initialization is obtained by `SHOWCB` VSAM macro calls.

  When running the Natural CICS Interface, supply an end-of-data (`/*`) statement in the JCL for compatibility reasons, although no parameter input is required for `NCISCPRI`.

For descriptions of the messages that can be output during this step, see *NCISCPRI Warnings and Error Messages* in the *TP Monitor Interfaces* documentation.

CICS Resource Definitions

This section describes the resource definitions required or recommended for customizing your CICS system.

Note: We generally recommend that you keep all Natural version-dependent components such as programs, transactions and files in a separate resource group. Such a group is represented by *`natgroup`* in this section.

- Program Definitions
- Transaction Definitions
- File Definitions

Program Definitions

Environment-Dependent Nucleus

- Add a program definition for the environment-dependent nucleus:

```
DEFINE PROGRAM(dep-nuc) GROUP(natgroup) LANGUAGE(ASSEMBLER)         *
        DESCRIPTION(ENVIRONMENT-DEPENDENT NUCLEUS)
```

where *dep-nuc* is the Natural CICS Interface module built in ***Step 13: Link the Environment-Dependent Nucleus***.

We recommend that you set the following parameter value in the CICS program definition under CICS TS:

```
DATALOCATION(ANY)
```

Environment-Independent Nucleus

This definition is optional.

- Add a program definition for the **environment-independent nucleus**:

```
DEFINE PROGRAM(ind-nuc) GROUP(natgroup) LANGUAGE(ASSEMBLER)           *
        DESCRIPTION(NATURAL ENVIRONMENT-INDEPENDENT NUCLEUS)
```

where *ind-nuc* is the name of the **environment-independent nucleus** specified with the Natural profile parameter NUCNAME. The default name is INDNUC*vr*. You need not specify API, CONCURRENCY, DATALOCATION or EXECKEY for the environment-independent nucleus as all attributes of the NCISTART program are inherited since standard linkage conventions (BALR 14,15) are used.

To access the environment-independent nucleus in the SVA, specify USESVACOPY(YES) for this program definition and SVA=YES in the CICS startup parameters.

Natural CICS Interface System Directory

- Add a program definition for the Natural CICS Interface system directory:

```
DEFINE PROGRAM(prefixCB) GROUP(natgroup) LANGUAGE(ASSEMBLER)            *
         DESCRIPTION(NATURAL CICS INTERFACE SYSTEM DIRECTORY)
```

External CALLNAT Interface Module

This definition is optional.

- Add a program definition for the external `CALLNAT` interface module:

```
DEFINE PROGRAM(ncixcall) GROUP(natgroup) LANGUAGE(ASSEMBLER)            *
         DESCRIPTION(NATURAL CICS INTERFACE EXTERNAL CALLNAT MODULE)
```

where *ncixcall* is the name of the `NCIXCALL` module specified in ***Step 16: Link the Natural CICS Interface External CALLNAT Interface Module***.

We recommend that you set the following parameter values in the CICS program definition under CICS TS:

```
DATALOCATION(ANY)
```

Node Error Program

This definition is optional.

- Add a program definition for the node error program (NEP) of the Natural CICS Interface:

```
DEFINE PROGRAM(nciznep) GROUP(natgroup) LANGUAGE(ASSEMBLER)            *
         EXECKEY(CICS)                                                 *
         DESCRIPTION(NATURAL CICS INTERFACE NODE ERROR PROGRAM)
```

where *nciznep* is the NEP name specified in ***Step 9: Build the Natural CICS Interface Node Error Program***.

Global User Exit

This definition is optional.

- Add a program definition for the `XFAINTU` global user exit:

```
DEFINE PROGRAM(prefixXFA) GROUP(natgroup) LANGUAGE(ASSEMBLER)          *
        EXECKEY(CICS)                                                  *
        DESCRIPTION(NATURAL CICS INTERFACE XFAINTU GLUE)
```

Natural RPC Server Front-End

This definition is only required if you want to use the Natural RPC server front-end *ncisfe*.

- Add a program definition for the Natural RPC server front-end:

```
DEFINE PROGRAM(ncirsfe) GROUP(natgroup) LANGUAGE(ASSEMBLER)            *
        DESCRIPTION(NATURAL RPC SERVER FRONT-END)
```

where *ncirsfe* is the name of the `NCIRSFE` module specified for the Natural RPC server front-end in ***Step 19: Link the Natural RPC Server Front-End***.

We recommend that you set the following parameter value in the CICS program definition under CICS TS:

```
DATALOCATION(ANY)
```

Transaction Definitions

We recommend that you define or choose a CICS profile for the Natural transactions similar to the following:

```
DEFINE PROFILE(natprof) GROUP(natgroup)                                *
        DESCRIPTION(CICS PROFILE FOR NATURAL TRANSACTIONS)             *
        SCRNSIZE(ALTERNATE) INBFMH(ALL)
```

where *natprof* is the name of the CICS profile assigned to the Natural transactions.

We also recommend that you define a CICS transaction class for the Natural transactions similar to the following:

```
DEFINE TRANCLASS(natclass) GROUP(natgroup) MAXACTIVE(999)              *
         DESCRIPTION(CLASS FOR NATURAL TRANSACTIONS)
```

where `natclass` is the name of the CICS transaction class assigned to the Natural transactions.

A CICS transaction class dedicated to Natural helps control storage usage by Natural (see also *Controlling Storage Usage* in the *TP Monitor Interfaces* documentation). Assign this transaction class to the definitions of all transactions that directly or indirectly call Natural.

You can define the following:

- Natural Transaction
- Natural Message Switching Transaction
- Node Error Program
- Natural RPC Server Front-End

Natural Transaction

- Add a definition for the Natural transaction:

```
DEFINE TRANSACTION(ncitransact) GROUP(natgroup)                        *
         PROGRAM(dep-nuc) TWASIZE(128) DUMP(NO) SPURGE (YES)           *
         PROFILE(natprof) TRANCLASS(natclass)
```

where:

`ncitransact` is the name of the Natural CICS Interface user transaction ID.
`dep-nuc` is the Natural CICS Interface module built in ***Step 13: Link the Environment-Dependent Nucleus***.

We recommend that you set the following parameter value in the CICS transaction definitions under CICS TS:

```
TASKDATALOC(ANY)
```

`TASKDATALOC(ANY)` can have an impact on non-Natural programs called by Natural; for details, see the relevant IBM literature on CICS.

Natural Message Switching Transaction

- Add a definition for the Natural internal message switching transaction:

```
DEFINE TRANSACTION(nmsg) GROUP(natgroup)                                  *
         PROGRAM(dep-nuc) TWASIZE(128) DUMP(NO) SPURGE (YES)              *
         PROFILE(natprof) TRANCLASS(natclass)
```

where:

dep-nuc is the environment-dependent nucleus linked in ***Step 13: Link the Environment-Dependent Nucleus***.

nmsg is the name of the Natural CICS Interface message switching transaction ID as defined with the MSGTRAN parameter described in *Parameters in Macro NCMPRM* in the *TP Monitor Interfaces* documentation. The default name is NMSG.

We recommend that you set the following parameter value in the CICS transaction definitions under CICS TS:

```
TASKDATALOC(ANY)
```

TASKDATALOC(ANY) can have an impact on non-Natural programs called by Natural; for details, see the relevant IBM literature on CICS.

Node Error Program

This definition is optional and applies to CICS TS only.

- Add a definition for the node error program (NEP) of the Natural CICS Interface:

```
DEFINE TRANSACTION(neptran) GROUP(natgroup)                               *
         PROGRAM(nciznep) DUMP(NO) PRIORITY(255)                          *
         TASKDATAKEY(CICS) TASKDATALOC(ANY)                               *
         PROFILE(natprof)
```

where:

neptran is the NEP transaction code defined with the NEPTRAN generation parameter in the SYSPARM specification in the NCIZNEP module built in ***Step 9: Build the Natural CICS Interface Node Error Program***.

nciznep is the NEP name specified in ***Step 9: Build the Natural CICS Interface Node Error Program***.

Natural RPC Server Front-End

- Add a definition for the Natural RPC server front-end transaction:

  ```
  DEFINE TRANSACTION(ncisfetransact) GROUP(natgroup)                     *
           PROGRAM(ncirsfe) TWASIZE(128) DUMP(NO) SPURGE (YES)           *
           PROFILE(natprof) TRANCLASS(natclass)
  ```

  where:

  `ncisfetransact` is the name of the Natural RPC server front-end transaction ID.
  `ncirsfe` is the name of the `NCIRSFE` module specified for the Natural RPC server front-end in ***Step 19: Link the Natural RPC Server Front-End***.

File Definitions

These definitions are only required if VSAM roll files are to be used.

- Add one entry in the FCT for each Natural CICS Interface VSAM roll file:

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

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

Transient Data Destinations

Error Messages

This definition is optional but highly recommended to log Natural CICS Interface informational messages and Natural abend codes and corresponding error messages.

Add entries in the DCT for the Natural CICS Interface error message logging facility. For Natural error messages, you can use:

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

- An extra partition destination as a synonym for an existing CICS message destination:

  ```
  DFHDCT TYPE=INDIRECT,                                                   *
         DESTID=message-destination,                                      *
         INDDEST=name
  ```

  where:

  `message-destination` is the name of the Natural CICS Interface error message destination as defined with the `MSGDEST` parameter described in *NCMPRM Macro Parameters* in the *TP Monitor Interfaces* documentation. The default name is `NERR`.

  `name` is the name of the corresponding indirect destination.

- An extra file:

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

  DFHDCT TYPE=EXTRA,                                                      *
         DSCNAME=NATMSG,                                                  *
         DESTID=message-destination,                                      *
         OPEN=INITIAL
  ```

  where `message-destination` is the name of the Natural CICS Interface error message destination as defined with the `MSGDEST` parameter described in *NCMPRM Macro Parameters* in the *TP Monitor Interfaces* documentation. The default name is `NERR`.

  You can, for example, change the `RECFORM` format from `VARUNB` (variable unblocked) to `VARBLK` (variable blocked). Natural and the Natural CICS Interface messages have a length of up to 120 bytes. Therefore, the record size (`RECSIZE=nnn`) should be at least 124 bytes for variable record format or 120 bytes for fixed record format.

  When using a disk file:

  Sufficient disk space must be reserved for this data set; a DLBL statement must be added to the CICS startup JCL.

Natural CICS Interface Session Statistics

This definition is optional.

- Add two entries in the DCT for the Natural CICS Interface session statistics:

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

DFHDCT TYPE=EXTRA,                                                     *
       TYPEFLE=OUTPUT,                                                 *
       DSCNAME=NATLOG,                                                 *
       DESTID=log-destination,                                         *
       OPEN=INITIAL
```

Sufficient disk space must be reserved for this data set; a DLBL statement must be added to the CICS startup JCL.

Natural CICS Interface Profile Parameter File

This definition is optional.

- Add two entries in the DCT for the Natural CICS Interface profile parameter file:

```
DFHDCT TYPE=SDSCI,                                                     *
       RECSIZE=80,           card image                                *
       BLKSIZE=nnn,                                                    *
       BUFNO=1,                                                        *
       DSCNAME=cmprmin,                                                *
       RECFORM=FIXBLK,                                                 *
       TYPEFLE=INPUT

DFHDCT TYPE=EXTRA,                                                     *
       DESTID=parameter-destination,                                   *
       DSCNAME=cmprmin,                                                *
       OPEN=DEFERRED
```

where:

`parameter-destination` is the name of the Natural CICS Interface profile parameter input destination as defined with the `PRMDEST` parameter described in *NCMPRM Macro Parameters* in the *TP Monitor Interfaces* documentation. The default name is `NPRM`.

`nnn` is a multiple of 80.

A DLBL statement must be added to the CICS startup JCL.

Installation Verification

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

1. From a CICS session, type in the Natural transaction ID to start a Natural session.
2. Proceed with the steps described in the section ***Test Online Natural***.

IX Installing Natural Com-plete/SMARTS Interface on z/VSE

10 Installing Natural Com-plete/SMARTS Interface on z/VSE

This document describes the steps for installing Natural Com-plete/SMARTS Interface which corresponds to the Natural Com-plete Interface (product code NCF) on z/VSE.

Related Topics:

For information on how to operate Natural in a Com-plete/SMARTS environment, see the following topics:

- *Using Natural with TP Monitors* in the *TP Monitor Interfaces* documentation.
- *Natural under Com-plete/SMARTS* in the *TP Monitor Interfaces* documentation.
- *Natural under Com-plete/SMARTS User Abend Codes* in the *Messages and Codes* documentation.

For information on installing and using Com-plete, see the *Com-plete* 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 Com-plete/SMARTS Interface:

- Com-plete

  See the Com-plete *Installation* documentation.

See also ***General Prerequisites and System Support*** in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following data set required for product installation:

Data Set Name	Contents
NCF*vrs*.LIBR	Source modules, macros, phases and object modules

Copy the data set into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the `NAT`*`vrs`*`.LIBJ` data set and are prefixed with the product code. The data set 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

(Job I080, Step 2300)

The Natural profile parameters and parameter macros mentioned in this section are described in the *Parameter Reference* documentation unless otherwise noted.

1. Modify the Natural parameter module for Com-plete/SMARTS:

   - Configure the Com-plete/SMARTS batch interface: Modify the settings of the parameters supplied with the macro `NTCOMP` to meet your requirements. For descriptions of these parameters, see the corresponding profile parameter `COMP`.

   - Modify the following parameters:

     ```
     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. Define a Natural local buffer pool under Com-plete by modifying the values of the keyword parameters supplied with the parameter macro `NTBPI` (see the Natural profile parameter `BPI`) as required.

   A local buffer pool is allocated during initialization of the first Natural session after Com-plete startup.

   The status of the local buffer pools can be displayed on the operator console by issuing the following Com-plete operator command:

```
SERV,server-name,BPSTAT
```

where *server-name* is the name of the server as specified with the Com-plete SERVER startup option.

Step 2: Link the Nucleus

(Job I080, Step 2320)

Link the **environment-dependent nucleus** for the Natural Com-plete/SMARTS Interface.

- Link the **environment-dependent nucleus** into your Com-plete user program library.

  The list of the modules to be linked for the environment-dependent nucleus is supplied with Step 2320.

  If you want Natural to run in the IBM Language Environment (LE), set the **System Maintenance Aid (SMA)** NAT-LE to Y (Yes). The default setting is N (No).

- Specify the **environment-dependent nucleus** as a Com-plete startup option by setting the following Com-plete keyword parameter:

  ```
  RESIDENTPAGE=name
  ```

  where *name* is the name of the environment-dependent nucleus for the Natural Com-plete/SMARTS Interface.

Step 3: Link the Natural Com-plete/SMARTS Interface Server

(Job I080, Step 2350)

- Link the Natural Com-plete/SMARTS Interface server.

The Natural Com-plete/SMARTS Interface server is used to maintain common storage and tables across Natural sessions, for example, the local buffer pool.

Step 4: Define the Natural Com-plete/SMARTS Interface Server

- Specify the Natural Com-plete/SMARTS Interface server as a Com-plete startup option by setting the following Com-plete keyword parameter:

```
SERVER=(server-name,module-name)
```

where:

server-name is the name of the server as specified with the keyword subparameter `SERVER` in the parameter macro `NTCOMP` (see the *Parameter Reference* documentation).

module-name is the name of the object module linked in ***Step 3: Link the Natural Com-plete/SMARTS Interface Server***.

The Natural Com-plete/SMARTS Interface server module is loaded during Com-plete initialization. The module must therefore be placed in a load library contained in the `COMPINIT` load library concatenation (see also the Com-plete *Installation* documentation).

Step 5: Catalog the Natural Com-plete/SMARTS Interface

This step is required if either of the following is true:

You run Natural under Com-plete/SMARTS and use threads below the line (`THABOVE=NO` setting in the `NTCOMP` macro).

Or:

You want to use Natural work pools below the 16-MB line.

- Catalog the Natural Com-plete/SMARTS Interface by using the Com-plete ULIB utility.
  - For threads below the line:

    The region size to be specified with the ULIB utility parameter `RG` depends on the setting of the keyword subparameter `NTHSIZE` in the parameter macro `NTCOMP` described in the *Parameter Reference* documentation.
  - For work pools below the 16-MB line:

    The region size to be specified with the ULIB utility parameter `RG` depends on the setting of the Natural profile parameter `WPSIZE` (see the *Parameter Reference* documentation) for the parameter macro `NTPRM` (see the *Operations* documentation).

  See also *Storage Usage* in the section *Natural under Com-plete/SMARTS* in the *TP Monitor Interfaces* documentation.

  After installation, you can use the Natural SYSTP utility (see the *Utilities* documentation) to determine the region size actually used.

Installation Verification

You can verify the successful installation of the Natural Com-plete/SMARTS Interface by performing the following steps:

1. Stop and restart Com-plete.
2. Enter the Com-plete user menu and type in the name of the environment-dependent nucleus for the Natural Com-plete/SMARTS Interface.

   The Natural initial screen should appear.
3. Proceed with the steps described in the section *Test Online Natural*.

X Installing Natural for VSAM on z/VSE

This document describes the installation of Natural for VSAM (product code NVS) on an Adabas database or in a VSAM (Virtual Storage Access Method) file system on z/VSE.

Related Topic:

For information on how to operate Natural in a VSAM environment, see *Natural for VSAM* in the *Database Management System 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*).

11 Prerequisites

See ***General Prerequisites and System Support*** in the section *Overview of the Installation Process*.

For the installation of Natural ISPF in a VSAM file system, see the Natural ISPF *Installation* documentation. Be sure that you use the relevant module (`NVSISPV`) provided on the Natural for VSAM installation medium.

12 Installing Natural for VSAM on Adabas System Files on z/VSE

This document describes the steps for installing Natural for VSAM on an Adabas database on z/VSE.

Installation Medium

The **installation medium** contains the following data sets required for product installation:

Data Set Name	Contents
NVS*vrs*.LIBJ	Sample installation jobs
NVS*vrs*.LIBR	Source modules, macros, phases and object modules
NVS*vrs*.EMPL	EMPLOYEES example data
NVS*vrs*.EXPL	Natural example objects

Copy the data sets into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Installation Procedure

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

Step 1: Define the CICS RDO Definitions

(Job I005)

- Define the CICS RDO definitions for the sample VSAM files.

Step 2: Load the Employees Example Data

(Job I008, Steps 1403 - 1407)

1. Define the VSAM cluster and files to contain the Employees example file.
2. Load the `NVS`*`vrs`*`.EMPL` data set into the first of these files (suffix `.EMPL`).
3. Build a secondary index of this into the second file (suffix `.EMPLX`) and define the path for this.

Step 3: Build the Natural for VSAM I/O Module

- Assemble and link the Natural for VSAM I/O module:
  - Under Com-plete:

    (Job I055, Steps 1410, 1411, 1415, 1416)

    Assemble the I/O module `NVSMISC` by using the parameter `SMARTS=YES` (Steps 1415 and 1416). For detailed information, see *NVSMISC Module* and `SMARTS` described in the *Database Management System Interfaces* documentation.
  - Under CICS:

    (Job I070, Step 1400)

    Use the I/O module `NVSCICS`. See *NVSCICS Module* described in the *Database Management System Interfaces* documentation.

    Note: If you are not using the most recent CICS version, the precompile step may result in a non-zero return code (4 - 16, depending on your CICS version) because of CICS commands being used that are unknown to your CICS translator. This return code can be ignored as long as the subsequent assembly step ends with a return code of 0.

  - In any other environment:

    Use the I/O module `NVSMISC`. See *NVSMISC Module* described in the *Database Management System Interfaces* documentation.

Step 4: Build the Natural Parameter Module for VSAM

(Jobs I060, I080)

Build the Natural parameter module:

1. Modify the appropriate jobs according to the batch modules or TP monitor you are relinking: Job I060 for batch, Job I080 for Com-plete and Job I080 for CICS. This applies also to ***Step 5: Link the Nucleus***.

   Add the following parameter and macro calls to your Natural parameter module:

   ```
   VSIZE=72 NTDB VSAM, vsam-dbid NTVSAM
   ```

   The values for `VSIZE` depend on the values specified in `NTVSAM` (see also the *VSIZE Parameter* in the *Database Management System Interfaces* documentation).

2. Assemble and link the Natural parameter module.

Step 5: Link the Nucleus

(Jobs I060, I080)

- Modify the JCL used to link your **environment-independent nucleus** by adding the following `INCLUDE` statement:

  ```
  INCLUDE NVSNUC
  ```

- Modify the JCL used to link your **environment-dependent nucleus** for the Natural CICS Interface by adding the following `INCLUDE` statement:

  ```
  INCLUDE NVSCICS
  ```

- Modify the JCL used to link your **environment-dependent nucleus** for Natural TP monitor interfaces other than the Natural CICS Interface by adding the following `INCLUDE` statement:

  ```
  INCLUDE NVSMISCD
  ```

- Add the corresponding sublibrary for Natural for VSAM to the search chain for the linkage editor.

For information on the components and structure of Natural for VSAM, see also *Components of Natural for VSAM* and *Structure of the Natural Interface to VSAM* in the *Database Management System Interfaces* documentation.

Step 6: Load the Natural Example Objects

(Job I061, Step 1400)

- Load the Natural example objects specific to Natural for VSAM from the `NVS`*`vrs`*`.EXPL` data set into the Natural system file by using the Natural **INPL utility**.

Step 7: Customize your TP Monitor

- Customize your TP monitor environment:

TP Monitor	Instruction
Com-plete	Catalog all VSAM files to Com-plete using the CA function of the Com-plete UFILE utility (described in the *Com-plete* documentation). If you have specified `PATH=CHECK` in `NTVSAM`: 1. Catalog your front program to Com-plete using the CA function of the Com-plete ULIB utility with a region size of 40 KB if you have not changed the first default value of the `WPSIZE` parameter in the Natural parameter module. You must also catalog the front program as privileged. 2. Load the IBM routine `IGG0CLA0` either in the LPA or as a resident program.
CICS	Add the entries for the VSAM-specific example files `EMPLVS` and `EMPLVX` to your RDO definition as described in ***Step 1: Define the CICS RDO Definitions***; you can find the CICS tables on the `NVS`*`vrs`*`.JOBS` data set as `NVSI005`.

Installation Verification

You can verify the successful installation of Natural for VSAM by performing the following:

- Log on to the Natural system library `SYSEXNVS` and run the following programs:
  - `NVSINST1`
  - `NVSINST2`
  - `NVSINST3`
  - `NVSINST4`
  - `NVSINST5`
  - `NVSINST6`

  If all these programs can be executed successfully, the installation of Natural for VSAM is completed and verified.

13 Installing Natural for VSAM on VSAM System Files on z/VSE

This document describes the steps for installing Natural for VSAM in a VSAM file system on z/VSE.

The Natural system files FNAT, FUSER, FDIC, FSEC and FSPOOL can also be located on VSAM files.

The installation of Natural for VSAM in a VSAM file system is basically a combination of the installation descriptions for both base Natural and Natural for VSAM, plus some points specific to VSAM.

For support of source object locking, a separate FLOCK file and related paths are required.

Installation Medium

The **installation medium** contains the following data sets required for product installation:

If you want to install Natural in a VSAM file system, you need the data sets for both base Natural and Natural for VSAM. The required data sets are listed in the table below:

Data Set Name	Contents
NAT*vrs*.LIBR	Source modules, macros, phases and object modules
NAT*vrs*.JOBS	Sample installation jobs
NAT*vrs*.INPL	Natural objects
NAT*vrs*.EXPL	Natural example objects
NVS*vrs*.LIBJ	Sample installation jobs
NVS*vrs*.LIBR	Source modules, macros, phases and object modules
NVS*vrs*.JOBS	Sample installation jobs
NVS*vrs*.VINI	FDIC initialization file for Natural for VSAM
NVS*vrs*.LINI	FLOCK initialization file for Natural for VSAM
NVS*vrs*.EMPL	EMPLOYEES example data
NVS*vrs*.EXPL	Natural example objects

Copy the data sets into your environment as described in ***Copying Data Sets to a z/VSE Disk***.

Installation Procedure

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

The VSAM jobs (for example, VSAMI008) indicated in this section are identical to the jobs generated by **System Maintenance Aid** (for example, I008).

Step 1: Define the CICS RDO Definitions

(Job VSAMI005)

- Define the CICS RDO definitions for the sample VSAM files.

Step 2: Load the Employees Example Data

(Job VSAMI008, Steps 1403 - 1407)

1. Define the VSAM cluster and files to contain the Employees example file.
2. Load the NVS*vrs*.EMPL data set into the first of these files (suffix .EMPL).
3. Build a secondary index of this into the second file (suffix .EMPLX) and define the path for this.

Step 3: Prepare the VSAM Clusters for the Natural System Files

(Job VSAMI008, Steps 1420 - 1446)

- Define three VSAM clusters to be used as system files for Natural (`FNAT`, `FUSER` and `FDIC`) and a path for `FDIC`.

  We strongly recommend that you keep these three system files on separate VSAM clusters.

Step 4: Prepare a VSAM Cluster for the Spool File

(Job VSAMI008, Steps 0300 - 0309)

This step must be performed only if you have Natural Advanced Facilities installed and want your spool file to be a VSAM file, too.

- Define an additional VSAM cluster to be used as the spool file (`FSPOOL`) and five alternate indices.

  Note: Path processing is *not* supported for `FSPOOL`.

Step 5: Prepare a VSAM Cluster for the Security File

(Job VSAMI008, Steps 9900 - 9907)

This step must be performed only if you have Natural Security installed and want your security file to be a VSAM file, too.

- Define an additional VSAM cluster to be used as the security file (`FSEC`) and three alternate indices.

  Note: Path processing is *not* supported for `FSEC`.

Step 6: Prepare a VSAM Cluster for the Scratch-Pad File

(Job VSAMI008, Steps 1450, 1451)

This step must be performed only if you want to use a scratch-pad file; that is, if you want to use read-only Natural system files (`ROSY=ON`); see also the Natural profile parameter `ROSY` and the macro `NTLFILE` described in the *Parameter Reference* documentation.

- Define an additional VSAM cluster to be used as the scratch-pad file (Step 1450).
- Initialize the VSAM scratch-pad file (Step 1451).
- Set the following parameters in the Natural parameter module according to your requirements:

```
NTLFILE 212,dbid,nt-file-number,dlbl-name-scratch-pad-file
ROSY=ON
```

- If you want your Natural system file(s) to be opened for input, adapt your Natural parameter module as follows:

```
FNAT=(dbid,fnr,filename,,RO),
FUSER=(dbid,fnr,filename,,RO),
FSEC=(dbid,fnr,filename,,RO),
```

Step 7: Prepare a VSAM Cluster for the Source Locking File FLOCK

(Job VSAMI008, Steps 1460, 1461)

This step must be performed only if you want to lock source objects in a VSAM file system (`SLOCK=PRE`); see also the parameter `SLOCK` and the macro `NTLFILE` (described in the *Parameter Reference* documentation).

- Define an additional VSAM cluster to be used as the source locking file (Step 1460).
- Load and print the example data record contained in the VSAM source locking file (Step 1461).
- Set the following parameters in the Natural parameter module according to your requirements:

```
NTLFILE 002,dbid,nt-file-number,dlbl-name-source-locking-file,,PATH
SLOCK=PRE
```

The default DLBL name (*`dlbl-name`*) is `FLOCK`, the related default paths are `FLOCKA`, `FLOCKB` and `FLOCKC`.

Step 8: Build the Natural for VSAM I/O Module

(Job VSAMI055, Step 1410)

- Edit, assemble and link the Natural for VSAM I/O module `NVSMISC` with the LSR options:

```
DEFER=YES
COMMIT=NO
READINT=NO
```

For the parameters that can be specified in the `NVSMISC` module, see the relevant section in the *Database Management System Interfaces* documentation.

Step 9: Build the Natural Parameter Module for Batch Mode for VSAM

(Job I060, Step 0010)

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

   - Configure the z/VSE batch interface:
     Modify the settings of the parameters supplied with the `NTVSEP` macro to meet your requirements.

   - In addition to the `VSIZE` and `NTDB` specifications, modify the parameters `FNAT`, `FUSER` and `FDIC` as follows:

     ```
     VSIZE=160,
     FNAT=(vsam-dbid,fnr-fnat,dlbl-name-fnat),
     FUSER=(vsam-dbid,fnr-fuser,dlbl-name-fuser),
     FDIC=(vsam-dbid,fnr-fdic,dlbl-name-fdic),
     NTDB VSAM,vsam-dbid
     NTVSAM
     ```

     The `vsam-dbid` must have the same value in all four entries.

     We recommend that you use different files and different file numbers for `FNAT` and `FUSER`. The `FDIC` file must be a file different from `FNAT` and `FUSER`. Therefore, you may *not* omit the `FDIC` parameter.

     The DLBL names (`dlbl-name`) are the logical names of the Natural system files; each DLBL name can be up to seven characters long. The DLBL name for the `FDIC` path is created by appending an `X` to the DLBL name of the `FDIC` file.

   - If you have Natural Advanced Facilities installed and want your spool file to be a VSAM file, modify the `FSPOOL` parameter accordingly:

     ```
     FSPOOL=(vsam-dbid,fnr-fspool,dlbl-name-fspool)
     ```

   - If you have Natural Security installed and want your security file to be a VSAM file, modify the `FSEC` parameter accordingly:

     ```
     FSEC=(vsam-dbid,fnr-fsec,dlbl-name-fsec)
     ```

     The `FSEC` file must be a file different from `FNAT`.

   - For a quick installation, use the Natural for VSAM LSR feature and specify the following `NTVLSR` definitions in the Natural parameter module (see also *NTVLSR Macro* in the *Parameter Reference* documentation):

```
NTVLSR fnat-dlbl-name,1
NTVLSR fuser-dlbl-name,2
NTVLSR fdic-dlbl-name,3
NTVLSR fdicx-dlbl-name,3
```

If you want to use `FSEC` system files:

```
NTVLSR fsec-dlbl-name,4
NTVLSR fseca-dlbl-name,4
NTVLSR fsecb-dlbl-name,4
NTVLSR fsecc-dlbl-name,4
```

2. Assemble and link the batch parameter module.

Step 10: Link the Nucleus for Batch Natural

(Job I060, Step 0020)

1. Modify the JCL used to link your **environment-dependent nucleus** for batch Natural by adding the following `INCLUDE` statements:

   ```
   INCLUDE NVSNUC
   INCLUDE NVSFNAT
   INCLUDE NVSFSPO
   INCLUDE NVSFSEC
   INCLUDE NVSFLOCK
   INCLUDE NVSMISCD
   ```

   The module `NVSFSPO` is only required if you have Natural Advanced Facilities installed and want your spool file to be installed in a VSAM file system.

   The module `NVSFSEC` is only required if you have Natural Security installed and want your security file to be installed in a VSAM file system.

   The module `NVSFLOCK` is only required if you want to lock source objects contained in an `FUSER` or `FNAT` system file in a VSAM file system.

   If your **environment-dependent nucleus** is not linked to your **environment-independent nucleus**, `NVSMISCD` must be linked to the Natural parameter module instead.

2. Add the corresponding sublibrary for Natural for VSAM to the search chain for the linkage editor.

For information on the components and structure of the Natural interface to VSAM, see also *Components of Natural for VSAM* and *Structure of the Natural Interface to VSAM* in the *Database Management System Interfaces* documentation.

Step 11: Load the Natural Objects

(Job I061, Step 0100)

- Load the Natural objects from the `NATvrs.INPL` data set into the Natural system file by using the Natural **INPL utility**.

  Ensure that the DLBL names specified in the Natural parameter module (see ***Step 9: Build the Natural Parameter Module for Batch Mode for VSAM***) are also specified for the load function performed with the Natural INPL utility. In addition, a path DLBL name (`dlbl-name-fdicX`) must be specified for `FDIC`.

Note: If you want to install any other Software AG products that require Natural objects to be loaded with the Natural **INPL utility**, ensure that the corresponding installation steps are adapted according to **Job VSAMI061**.

Step 12: Load the Natural Example Objects

(Job I061, Step 0103, and Job VSAMI061, Step 0103)

- Load the Natural example objects from the `NATvrs.EXPL` data set into the Natural system file by using the Natural INPL utility (Job I061, Step 0103).
- Load the Natural example objects specific to Natural for VSAM from the `NVSvrs.EXPL` data set into the Natural system file by using the Natural INPL utility (Job VSAMI061, Step 0103).

Ensure that the DLBL names specified in the Natural parameter module (see ***Step 9: Build the Natural Parameter Module for Batch Mode for VSAM***) are also specified for the load function performed with the Natural INPL utility. In addition, a path DLBL name (`dlbl-name-fdicX`) must be specified for `FDIC`.

Step 13: Reorganize the FNAT System File

- Reorganize the `FNAT` system file by using the VSAM facility AMS REPRO to unload and reload the file.

Step 14: Build the Natural for VSAM I/O Module for CICS

(Job VSAMI070, Step 1400)

This step must be performed only if you want to install Natural for VSAM under CICS.

- Assemble and link the module `NVSCICS`.

Step 15: Link the Nucleus for Natural Under a TP Monitor

(Job VSAMI080)

Proceed with the TP monitor-specific installation steps for base Natural described in the relevant sections in *Installation for z/VSE*, taking into account the following additions:

- Modify your VSAM-specific Natural parameter module according to ***Step 9: Build the Natural Parameter Module for Batch Mode for VSAM***.
- Add the following `INCLUDE` statements to all links of the online nucleus:

  ```
  INCLUDE NVSNUC
  INCLUDE NVSFNAT
  INCLUDE NVSFSPO
  INCLUDE NVSFSEC
  INCLUDE NVSFLOCK
  ```

  The module `NVSFSPO` is only required if you have Natural Advanced Facilities installed and want your spool file to be installed in a VSAM file system. The online environment for Natural Advanced Facilities must be a CICS environment, and the spool files installed in a VSAM file system must be defined in the CICS FCT.

  The module `NVSFSEC` is only required if you have Natural Security installed and want your Natural security system file to be installed in a VSAM file system. The VSAM Natural security system files installed in a VSAM file system must be defined in the CICS FCT.

  The module `NVSFLOCK` is only required if you want to lock source objects contained in an FUSER or FNAT system file in a VSAM file system. The locking files installed in a VSAM file system must be defined in the CICS FCT.
- Modify the JCL used to link your **environment-dependent nucleus** for the Natural CICS Interface by adding the following `INCLUDE` statement:

  ```
  INCLUDE NVSCICS
  ```

- Modify the JCL used to link your **environment-dependent nucleus** for Natural TP monitor interfaces other than the Natural CICS Interface by adding the following `INCLUDE` statement:

  ```
  INCLUDE NVSMISCD
  ```

- Add the corresponding sublibrary for Natural for VSAM to the search chain for the linkage editor. Before starting Natural, ensure that the DLBL names of the Natural system files in the VSAM file system are known in your batch and online environments.

Step 16: Customize your TP Monitor

Customize your TP monitor environment:

<table>
<tr><th>TP Monitor</th><th>Instruction</th></tr>
<tr><td>Com-plete</td><td>

Add the following DLBL statements to your Com-plete startup job:

```
// DLBL FNAT,'DSN=SAGLIB.VSAM.FNAT',,VSAM,CAT=xxxx
// DLBL FUSER,'DSN=SAGLIB.VSAM.FUSER',,VSAM,CAT=xxxx
// DLBL FDIC,'DSN=SAGLIB.VSAM.FDIC',,VSAM,CAT=xxxx
// DLBL FDICX,'DSN=SAGLIB.VSAM.FDIC.PATH',,VSAM,CAT=xxxx
// DLBL EMPLVS,'DSN=SAGLIB.VSAM.EMPLVS',,VSAM,CAT=xxxx
// DLBL EMPLVX,'DSN=SAGLIB.VSAM.EMPLVX.PATH',,VSAM,CAT=xxxx
```

If Natural Security is installed, add the following DLBL statements to your Com-plete startup job:

```
// DLBL FSEC,'DSN=SAGLIB.VSAM.FSEC',,VSAM,CAT=xxxx
// DLBL FSECA,'DSN=SAGLIB.VSAM.FSEC.AIXA',,VSAM,CAT=xxxx
// DLBL FSECB,'DSN=SAGLIB.VSAM.FSEC.AIXB',,VSAM,CAT=xxxx
// DLBL FSECC,'DSN=SAGLIB.VSAM.FSEC.AIXC',,VSAM,CAT=xxxx
```

If you want to lock source objects contained in the `FUSER` or `FNAT` system file in the VSAM file system, add the following DLBL statements to your Com-plete startup job:

```
// DLBL FLOCK,'DSN=SAGLIB.VSAM.FLOCK',,VSAM,CAT=xxxx
// DLBL FLOCKA,'DSN=SAGLIB.VSAM.FLOCK.PATHA',,VSAM,CAT=xxxx
// DLBL FLOCKB,'DSN=SAGLIB.VSAM.FLOCK.PATHB',,VSAM,CAT=xxxx
// DLBL FLOCKC,'DSN=SAGLIB.VSAM.FLOCK.PATHC',,VSAM,CAT=xxxx
```

If you have specified `PATH=CHECK` in `NTVSAM`, catalog your front program to **Com-plete** using the CA function of the Com-plete ULIB utility (described in the *Com-plete* documentation) with a region size of 36 KB if you have not changed the first default value for the `WPSIZE` (described in the *Parameter Reference* documentation) in the Natural parameter module.

</td></tr>
<tr><td>CICS</td><td>

Add the following entries to your FCT:

- the Natural system files `FNAT`, `FUSER`, `FDIC` and `FDICX` required for VSAM;
- the Natural example files `EMPLVS` and `EMPLVX` provided for VSAM;
- the Natural Security files `FSEC`, `FSECA`, `FSECB` and `FSECC` if you have Natural Security installed;
- the VSAM files `FLOCK`, `FLOCKA`, `FLOCKB` and `FLOCKC` if you want to lock source objects contained in the `FUSER` or `FNAT` system file in the VSAM file system.

Refer to Job VSAMI005 for examples. You can add DLBL statements for these data sets to your CICS startup job, too.

</td></tr>
</table>

Installation Verification

You can verify the successful installation of Natural for VSAM by performing the following:

- Log on to the Natural system library `SYSEXNVS` and run the following programs:
  - `NVSINST1`
  - `NVSINST2`
  - `NVSINST3`
  - `NVSINST4`
  - `NVSINST5`
  - `NVSINST6`

  If all these programs can be executed successfully, the installation of Natural in a VSAM file system is completed and verified.

Note for Batch Mode:

For verification in batch mode, you can run Job VSAMI200 which executes the above programs.

Restrictions

The AIX files that relate to the Natural `FSEC` and `FSPOOL` system files provided for a VSAM file system cannot be accessed using a path definition. The reason is that null values are not suppressed during VSAM upgrade handling for AIX keys. The record length of AIX files related to `FSEC` and `FSPOOL` would be exceeded for AIX keys filled with blanks or binary zeros. This would cause problems under CICS, as the record length supported is limited to 32 K only. Natural for VSAM supports null-value suppression for AIX keys and the upgrade handling for AIX files.

XI Installing Natural Security on z/VSE

14 Installing Natural Security on z/VSE

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

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 data sets required for product installation:

Data Set Name	Contents
NSC*vrs*.SYSL	Natural Security log file
NSC*vrs*.INPL	Natural objects
NSC*vrs*.VINI	Natural Security FDIC initialization file for VSAM system files

Copy the data sets into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the NAT*vrs*.LIBJ data set and are prefixed with the product code. The data set 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

(Job I050, Step 9900)

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

Skip this step if you want to load the FSEC system file into a VSAM file system. In this case, refer to ***Installing Natural for VSAM***. See also *Natural for VSAM with Natural Security* in the *Database Management System Interfaces* documentation for restrictions on the use of the FSEC system file in a VSAM environment.

- 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 NAT*vrs*.SYSF data set 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 NSC*vrs*.SYSL data set.

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 NAT*vrs*.SYSF data set.

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 9905)

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 NSC*vrs*.INPL data set 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 9905):

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 NSC*vrs*.INPL data set into the appropriate Natural libraries in your FNAT system file by using the Natural **INPL utility**.

   When you load the contents of the NSC*vrs*.INPL data set 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.

XII Installing Natural Advanced Facilities on z/VSE

This document describes the installation of Natural Advanced Facilities (product code NAF) on z/VSE.

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*).

15 Installing Natural Advanced Facilities under CICS on z/VSE

This document describes the steps for installing Natural Advanced Facilities under CICS on z/VSE.

Prerequisites

Supported versions of the following products must be installed before you can install Natural Advanced Facilities:

- **Natural CICS Interface**
- **Natural for VSAM** if a VSAM file is to be used as a spool file

See also ***General Prerequisites and System Support*** in the section *Overview of the Installation Process*.

Installation Medium

The **installation medium** contains the following data sets required for product installation:

Data Set Name	Contents
`NAF`*`vrs`*`.SYSF`	Natural `FSPOOL` system file definition
`NAF`*`vrs`*`.LIBJ`	Sample installation jobs
`NAF`*`vrs`*`.LIBR`	Source modules, macros, phases and object modules
`NAF`*`vrs`*`.INPL`	Natural objects
`NAF`*`vrs`*`.ERRN`	Natural error messages

Copy the data sets into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Installation Procedure

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

Step 1: Define the CICS RDO Definitions

(Job I005)

This step only applies when using VSAM system files.

- Define the CICS RDO definitions for the sample VSAM files:

  Add the Natural Advanced Facilities spool files (`SPOOL`, `SPOOLA`, `SPOOLB`, `SPOOLC`, `SPOOLD` and `SPOOLE`) to your FCT.

For performance reasons, we strongly recommend you to specify a transaction ID for the spool server, which is different from that of the terminal task. It is then possible to dedicate special threads to the spool server.

If you want to convert an existing VSAM spool file, the FCT must contain the entries for this spool file. The cluster names of the new and the old versions must be different. The VSAM database ID and file number as well as the VSAM DD names must be unique.

Step 2: Prepare a VSAM Cluster for the Spool File

(Job I008, Steps 0300 - 0311)

This step only applies when using VSAM system files.

- Define and initialize a VSAM cluster to be used as the spool file (`FSPOOL`) and five alternate indices.

Step 3: Load the FSPOOL System File Definition for Adabas

(Job I050, Step 0300)

This step only applies when using Adabas system files.

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

Load the new Natural `FSPOOL` system file definition contained in the `NAF`*`vrs`*`.SYSF` data set by using the Adabas ADALOD utility.

Step 4: Build the NAFPARMC Parameter Module

(Job I055, Step 0305)

The use of the `NAFPARMC` parameter module is optional. Alternatively, you can set the server options with Function 30 (see the *Natural Advanced Facilities* documentation) of the `SYSPOOL` application.

- Modify, assemble and link the `NAFPARMC` module.

Step 5: Build the Natural Parameter Module

(Jobs I060, I080)

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

VSAM System Files

The following additional step applies when using VSAM system files:

- Set the `FSPOOL` parameter as follows:

```
FSPOOL=(vsam-dbid,fnr-fspool,dd-name-fspool)
```

  where:
  `vsam-dbid` is the database ID of the VSAM file to be used as the spool file,
  `fnr-fspool` is the file number of the VSAM file to be used as the spool file,
  `dd-name-fspool` is limited to seven characters.

Step 6: Link the Nucleus

(Jobs I060, I080)

- Add the following `INCLUDE` statements to the link steps for Natural and link-edit the executable module:

```
 INCLUDE NAFAF
```

`INCLUDE NAFNUC`
`INCLUDE NAFPARMC` (optional)

The link-edit of the object module containing Natural Advanced Facilities can be done in any of the following ways:

- Include all modules of Natural Advanced Facilities, that is, `NAFNUC`, `NAFAF` and, optionally, `NAFPARMC` in the link-edit of Natural.

  > **Note:** If a shared nucleus is created, the modules can be included in the shared nucleus.

- Link-edit `NAFNUC`, `NAFAF` and, optionally, `NAFPARMC` and an alternative Natural parameter module as a separate module with the mandatory name `CMPRMTB` specified in the `ENTRY` statement. The name of the resulting module is optional.

  > **Note:** This way of link-editing only applies if an alternate parameter module (`PARM=`*`parameter`*) is used. If so, an additional CICS PPT entry with `PROGRAM=`*`name`* is required.

- Link-edit `NAFNUC`, `NAFAF` and, optionally, `NAFPARMC` as a separate module with the mandatory name `NATAM08` specified in the `ENTRY` statement. The name of the resulting module is optional. If it is different from `NATAM08`, however, it must be specified as an alias name in the `NTALIAS` macro of the Natural parameter module.

  > **Note:** This way of link-editing only applies if the `CSTATIC` and `RCA` profile parameters (see the *Parameter Reference* documentation) are used. If so, an additional CICS PPT entry with `PROGRAM=`*`name`* is required.

The following additional step applies when using VSAM system files.

- Add the following `INCLUDE` statement to all links of the nucleus:

```
INCLUDE NVSFSPO
```

Step 7: Load the Natural Objects

(Job I061, Step 0300)

- Load the Natural objects specific to Natural Advanced Facilities from the NAF*vrs*.INPL data set into the Natural system files SYSPOOL 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 8: Load the Natural Error Messages

(Job I061, Step 0304)

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

Step 9: Create a Separate Thread Group for Printer Transaction

(Job I070, Steps 2245, 2250, and Job I080)

We recommend that you establish a separate thread group for the Natural Advanced Facilities printer transaction. To do so, perform these steps:

1. Modify the Natural CICS Interface system directory (Step 2245):

   Include a definition of the Natural Advanced Facilities printer thread group into the Natural CICS Interface system directory.

2. Relink the modified Natural CICS Interface system directory (Step 2250).

   Repeat linking of the Natural CICS Interface system directory.

See also *Build the Natural CICS Interface System Directory Module* in *Installing Natural CICS Interface on z/OS* or *Installing Natural CICS Interface on z/VSE* in the Natural *Installation* documentation.

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 `SYSPOOL` to Natural Security with the startup program `MENU`.

  Note: The physical CICS printers and the application `SYSPRINT` need not be defined to Natural Security. The Natural Security logon processing will identify the `NATSPOOL` spool server and perform a simplified logon to `SYSPRINT`, that is, without any further security checks. In this way, maintenance efforts and the number of Adabas calls at the start of the spool server are considerably reduced. Any logon to `SYSPRINT` attempted by users other than the `NATSPOOL` spool server will be rejected by Natural Security, regardless of whether `SYSPRINT` is defined.

Step 11: Start Natural

- Start Natural and add the user profile, as defined in the `NAFUPF` parameter of the Natural parameter module, to the `SYSPOOL` file by using Function 31.1 (described in 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 `SYSPOOL` file.

Step 12: Create the NATSPOOL Environment

- Initialize a new `NATSPOOL` environment as described in *NATSPOOL Initialization* in the *Natural Advanced Facilities* documentation.

Step 13: Define Natural Advanced Facilities for VTAM/SNA

This step must be performed only if Natural Advanced Facilities is to be used in conjunction with VTAM/SNA printers.

- Define devices in the TCT with a `RELREQ=YES`. This will ensure that VTAM printers are released at the end of printout time when devices are shared with other CICS, TSO or BATCH regions, or with JES.
- Define `TRMSTAT=INTLOG` or `CREATESESS=YES` for the printer to allow `EXEC CICS START` requests to create a session.
- Ensure that the devices have the `SHARE` option generated into the controller VTAM specifications.

Step 14: Define Natural Advanced Facilities for VTAM/non-SNA

This step must be performed only if Natural Advanced Facilities is to be used in conjunction with VTAM/non-SNA printers.

1. Include `TRMSTAT=TRANSCEIVE` in the TCT definition for the device.
2. Set the VTAM definition for the device parameter `ISTATUS` to `ACTIVE`.

16 Installation Verification for Natural Advanced Facilities under CICS on z/VSE

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

System Testing

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

To print a test report

- In the appropriate logical printer, set the `Disposition` to `K` for testing.

  Log on to the Natural system library `SYSPOOL` and execute the programs `NTEST` and `SPPTEST`. These programs contain `WRITE (1)` statements.

  Or:

  Create test reports with Function 42 described in the *Natural Advanced Facilities* documentation.

To proceed if a test report cannot be printed

1. Check that the CICS printer status is `IN SERVICE`.
2. Use the CICS message switching transaction `CMSG` to route a message to the specified printer:

   ```
   CMSG 'message',ROUTE=term-id,SEND
   ```

   where *`term-id`* is the terminal identification of the CICS printer as specified in the TCT.
3. If Natural Security is installed, check whether logon error records (of the `NATSPOOL` spool server `NATP`) have been written to the Natural Security system file. The maintenance system for these error records can be invoked by entering `ERROR` in the command line of Natural Security.
4. Check that the standard Natural `LOGON` object has *not* been replaced. The `NATSPOOL` spool server `NATP` must be able to execute the `SVPCIC01` module in the `SYSPRINT` library.

   Also check whether the `LOGON` user exit causes the `LOGON` of the spool server to `SYSPRINT` to terminate.
5. Check that the catalog dates of the objects in `SYSPRINT` and `SYSPOOL` are identical to one another.
6. Check that the parameters for the spool server match the Natural Advanced Facilities environment. To do so, invoke `MENU` in the `SYSPOOL` library and check the **CICS Options** defined with Function 30.5 (see the *Natural Advanced Facilities* documentation).

7 Check that neither the external security (`EXTSEC` operand of CICS PCT) nor the security levels (`TRANSEC` operand of CICS PCT) are defined for the spool server `NATP`. This ensures that `NATP` can be initiated without security violations.

8 Check the TCT and VTAM definitions (see ***Step 10: Define Natural Advanced Facilities for Natural Security***, ***Step 13: Define Natural Advanced Facilities for VTAM/SNA*** and ***Step 14: Define Natural Advanced Facilities for VTAM/non-SNA*** in the section *Installing Natural Advanced Facilities under CICS*).

9 Allocate a screen device instead of a printer device to the `Destination/Form` pairing of the first logical printer, execute `NTEST` in the `SYSPOOL` library, and check for error messages on the screen.

On certain devices, the CICS abend ATNI may occur.

Since the Natural Security logon processing checks whether the device is a printer, this test is only possible if Natural Security is *not* installed.

10 Start the transaction `CEDF` for your terminal device and check whether the command `EXEC CICS START` (to start the spool server) is executed.

11 Start the transaction `CEDF` for your printer device (`CEDF` terminal ID of printer) and check which commands are executed.

12 Check the Natural Advanced Facilities messages on the system operator console and/or in the log file (the destination of messages is defined with Function 30.5 (see the *Natural Advanced Facilities* documentation).

Console messages sent by the spool server start with:

```
NAF SP-SERV:
```

Console messages sent by the terminal task start with:

```
NAF-
```

13 Obtain a `NATSPOOL` trace and check which Natural Advanced Facilities modules are called, which Adabas commands are executed, and which return codes are encountered.

NATSPOOL Trace using SYSRDC

To obtain an online `NATSPOOL` trace by using the Natural SYSRDC utility

1 Start a Natural session with the following dynamic parameters:

```
RDCSIZE=100, TRACE=(NATAM08), ITRACE=ON
```

2. Log on to the SYSRDC library.
3. Execute the following command to select the internal trace type:

   ```
   RDCSET N
   ```

4. Execute the following command to start the trace:

   ```
   RDCSTART
   ```

5. Execute a program which creates a report, for example, NTEST in the SYSPOOL library.
6. Log on to the SYSRDC library.
7. Execute the following command to display the trace entries:

   ```
   RDCDISP
   ```

   You will now see when a NATSPOOL module begins (marked as BEG) and ends (marked as END) as well as its return code in decimal representation.

   After the execution of an Adabas call (marked as ADA), you will see the command code, the first byte of the command ID and the return code in decimal representation.

For detailed information on the SYSRDC utility, see the *Utilities* documentation.

NATSPOOL Reason Codes

Errors that may occur during the check for printer availability:

Error	Description
INV REQU	Invalid request
INV ID	Invalid ID
INV ADDR	Invalid address
INV DEVC	Invalid logical device code for page status
ATI REQU	ATI required on NON-ATI terminal
RESO PRO	Resource problem for inter-partition session
INV PROG	Invalid program name
UNAB PER	Unable to perform request
INV TYPE	Type is not LUC
RESO QUI	Resource quiesced by TMP
LOCATERR	Any error different from those listed above

Errors that may occur during the start of the spool server:

Error	Description
TERMIDER	Terminal ID error
TRANIDER	Transaction ID error
SYSIDERR	SYSID error
INVREQ	Invalid request
IOERR	I/O error
LENGERR	Length error
ISCINVRE	ISC invalid request
NOTAUTH	Not authorized
STARTERR	Any error different from those listed above

NATSPOOL Initialization Console Messages

Messages that may occur during the initialization of NATSPOOL:

Message	Text
NAF-01C	ADABAS RC*xxx*, DBID*xxx*, FNR*xxx*, AT OPEN
NAF-02C	Not used
NAF-03C	ADABAS RC*xxx*, DBID*xxx*, FNR*xxx*, AT READ REPORT
NAF-04C	ADABAS RC*xxx*, DBID*xxx*, FNR*xxx*, AT READ PRINTER
NAF-05C	ADABAS RC*xxx*, DBID*xxx*, FNR*xxx*, AT CLOSE
NAF-06C	ADABAS RC*xxx*, DBID*xxx*, FNR*xxx*, AT UPDATE REPORT
NAF-07C	ADABAS RC*xxx*, DBID*xxx*, FNR*xxx*, AT UPDATE PRINTER
NAF-08I	REPORT *xxxxxxxxx*, JOB*xx*.*xxx*, SET -TO BE PRINTED-
NAF-09I	PRINTER *xxxx* SET -FREE-
NAF-10I	PRINTER *xxxx* RESTARTS IN 20 SECONDS, DEST=*xxxxxxxx*, FORM=*x*
NAF-11C	RESTART ERROR NAT *xxxx* ON PRINTER *xxxx*

NATSPOOL Print Server Messages

See the online help for descriptions of the NATSPOOL print server messages.

To invoke online help for print server messages

1 In the **Natural Spool Administration Menu**, press PF1.

2 Enter function code 99 (miscellaneous information).

3 Enter function code 4 (Natural Advanced Facilities SP-SERV messages from spool server).

NATSPOOL Abend Codes

Abend Code	Reason	Action
NAF1 - INVALID LENGTH	The length of the data to be printed is not positive.	Obtain the dump and contact Software AG technical support.
NAF2 - INVALID LENGTH	The length of the data to be printed is greater than the maximum length of the terminal I/O buffer (TIOBM).	Obtain the dump and contact Software AG technical support.
NAF3 - INVALID RETURN CODE	The return code of the task-end routine CMTSKND is not zero.	Obtain the dump and contact Software AG technical support.
NAF4 - INVALID RETURN CODE	The return code of the print routine CMWTERM is not zero.	Obtain the dump and contact Software AG technical support.

XIII Installing Natural Optimizer Compiler on z/VSE

17 Installing Natural Optimizer Compiler on z/VSE

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

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 data set required for product installation:

Data Set Name	Contents
NOC*vrs*.LIBR	Source modules, macros, phases and object modules

Copy the data set into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the NAT*vrs*.LIBJ data set and are prefixed with the product code. The data set 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 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 or Load Modules Dynamically

You can either statically link the Natural Optimizer Compiler modules to the nucleus or dynamically load them when initializing a Natural session.

Relink the Nucleus:

(Jobs I060, I080)

Adapt the link steps for Natural:

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

   ```
    INCLUDE NOCNUC
   ```

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

Load Phases Dynamically

1. Add the library containing the phases statement:

   ```
   // LIBDEF PHASE,SEARCH=(,,,,,SAGLIB.NOCvrs,...),TEMP
   ```

2. At the start of a Natural session, set the Natural profile parameter `RCA` as follows:

```
RCA=NOCGW,RCALIAS(NOCGW,NOCNUC)
```

`RCA` is described in the *Parameter Reference* documentation.

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.

XIV Installing Natural Connection on z/VSE

18 Installing Natural Connection on z/VSE

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

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 data set required for product installation:

Data Set Name	Contents
`NTCvrs.LIBR`	Source modules, macros, phases and object modules

Copy the data set into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the `NATvrs.LIBJ` data set and are prefixed with the product code. The data set 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
     NTWORK  (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 Natural Connection sublibrary into the LIBDEF OBJ search:

   ```
   // LIBDEF OBJ,SEARCH=(.....,SAGLIB.NTCvrs,....),TEMP
   ```

2. Add the following `INCLUDE` statement in the SYSIPT to the Natural link job for the linkage editor:

   ```
   INCLUDE NTCPCAM3
   ```

3. Relink your 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.

XV Installing Natural Review on z/VSE

19 Installing Natural Review on z/VSE

This document describes the steps for installing Natural Review (product code RNM) on z/VSE.

Related Topic:

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

Storage Requirements

The Natural Review monitoring system requires CICS shared storage for collecting its monitoring data. For each Natural session, a user account area of 656 bytes is allocated plus space for a Natural call table (NCT). This table is used to track the Natural programs and database calls issued within a transaction. The number of NCT entries is determined by the `NCTSIZE` parameter in the source member `RNMSCB3.A` (see ***Step 7: Build the Natural Review System Control Block***). Each table entry is 48 bytes long and the table contains 32 entries (default). This yields a total amount of 656+32*48=2192 bytes per running session. The storage is reused when the session terminates.

Each active response time report requires a basic control block that is 400 bytes long. Each detail record is 128 bytes long. The maximum number of detail records per report is controlled by the `Number of Records` in the report definition. If the `Transaction Summary` option is set in the report definition, a 64 bytes transaction summary area is allocated for each transaction ID.

After a report has been written to the Natural Review repository file by the history session, all report-depending storage is released.

Installation Medium

The **installation medium** contains the following data sets required for product installation:

Data Set Name	Contents
RNM*vrs*.SYSF	ADALOD loadable RNM system file
RNM*vrs*.LIBR	Source modules, macros, phases and object modules
RNM*vrs*.INPL	Natural objects

In the RNM*vrs*.LIBR, the following sublibrary object types are used:

.A	Assembler source code, examples, and so on
.J	Installation jobs
.OBJ	Object modules

Copy the data sets into your environment as described in ***Copying Data Sets to a z/VSE Disk*** in the section *Installing Natural*.

Sample Jobs

Sample installation jobs are contained in the NAT*vrs*.LIBJ data set and are prefixed with the product code. The data set 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: Add CICS Control Table Entries for Natural Review
- Step 2: Load the Natural Review Repository File
- Step 3: Build the Natural Parameter Module
- Step 4: Link the Nucleus
- Step 5: Load New Natural Objects
- Step 6: Define the SYSRNM Library in Natural Security
- Step 7: Build the Natural Review System Control Block
- Step 8: Link the Natural Review History Session Startup Module
- Step 9: Activate the Natural Review Modules

- Step 10: Initialize the Natural Review Repository File

Step 1: Add CICS Control Table Entries for Natural Review

(Job I005, Step 2211)

Define the following CICS table entries with RDO. You may have to include additional parameters according to your requirements. Natural Review supports transaction isolation (that is, it can run in user key).

- Program Control Table (PCT)
- Processing Program Table (PPT)
- Program List Tables CICS Startup and Shutdown (PLTPI and PLTSD)

Program Control Table (PCT)

1. Define the Natural Review history session start/stop transaction:

```
CEDA DEFINE TRANSACTION(RVH1) PROGRAM(RNMHIST3)
     GROUP(RNMvr)
```

2. Define the Natural Review asynchronous Natural history session transaction:

```
CEDA COPY TRANSACTION(xxxx) GROUP(yyyy) AS(RVH2)
     TO(RNMvr)
```

   This copies your existing Natural transaction ID *xxxx* from your Natural definition group *yyyy* as an alias transaction for Natural Review. This definition is optional and you may use the online Natural transaction code *xxxx* as well, but it helps the administrator identify the Natural Review asynchronous history session.

   The transaction codes RVH1 and RVH2 can be chosen freely (that is, you may change them if required). The Natural session transaction code must be the same as defined with the parameter NATTRAN (in this example, NATTRAN=RVH2). See ***Step 7: Build the Natural Review System Control Block*** and *Installation Verification* (**Step 3**).

Processing Program Table (PPT)

1. Define the Natural Review history session start/stop program:

```
CEDA DEFINE PROGRAM(RNMHIST3) LANGUAGE(ASSEMBLER)
     GROUP(RNMvr)
```

2. Define the Natural Review system control block:

   ```
   CEDA DEFINE PROGRAM(RNMSCB3) LANGUAGE(ASSEMBLER)
        RESIDENT(YES) GROUP(RNMvr)
   ```

3. After entering the online definitions, activate them by using `CEDA INSTALL GROUP(RNMvr)`. The new `GROUP` should be added to the `GRPLIST` defined for CICS cold start.

Program List Tables CICS Startup and Shutdown (PLTPI and PLTSD)

This table entry is optional. You can use it for automatic start and termination of the Natural Review history session during CICS startup and shutdown.

1. Define the Natural Review history session start/stop program:

   ```
   DFHPLT TYPE=ENTRY,PROGRAM=RNMHIST3
   ```

2. Insert the table entry in your assembled PLTPI and/or PLTSD CICS table. This avoids manual starting and stopping of the Natural Review history session (see ***Step 7: Build the Natural Review System Control Block***).

Step 2: Load the Natural Review Repository File

(Job I050, Step 2620)

You can skip this step if you have already installed a Natural Review repository file and want to continue using it. The format of the repository file is compatible with previous versions.

The repository file is an Adabas file used for storing response time reports and history data. It is possible to share the repository file across several CICS regions. Any Adabas file can be used to contain the Natural Review repository file. The corresponding file number must be defined to Natural as a logical system file (see ***Step 3: Build the Natural Parameter Module***). The repository file has to be initialized via Natural (see ***Step 10: Initialize the Natural Review Repository File***).

- Modify the job as follows before submitting it:
  - Change the data set definitions according to your requirements.
  - Change `DB=dbid` in the Adabas `ADARUN` statements to the correct database ID.
  - Change `SVC=nnn` to the correct Adabas SVC number.
  - Change the Adabas `ADALOD` statement to the file number `fnr` of the Adabas file that will contain the Natural Review repository file, and the Natural Review version `vrs` you are running:

```
ADALOD LOAD FILE=fnr,NAME='REPOS-RNMvrs'
```

Step 3: Build the Natural Parameter Module

(Job I060, Steps 0010, 0015)

1. Modify the settings of the parameters supplied with the Natural parameter module as follows:

   ```
   RDCSIZE=2
   MADIO=5000
   MAXCL=0
   RCA=NATGWREV
   NTLFILE 180,dbid,fnr
   ```

   where:

   `RDCSIZE` is the Natural profile parameter that determines whether a session is monitored by Natural Review. If you set `RDCSIZE=0` (this is the default) for a session, it is *not* monitored by Natural Review.

   `RCA` is the Natural profile parameter required if you want to link the Natural Review monitor interface module separate from the nucleus (see ***Step 7: Build the Natural Review System Control Block***) by means of the RCA technique.

   `NTLFILE` (or dynamic `LFILE` parameter) is the macro that determines the Natural Review repository file used by the `SYSRNM` application for retrieving and maintaining report definitions and storing history report data for the history session. The currently accessed repository file can be changed using the `LFILE` command within Natural Review (see the *Natural Review* documentation).

   `dbid` is the database ID and *`fnr`* the file number specified in ***Step 2: Load the Natural Review Repository File***.

   For details about the parameters mentioned above, see the *Parameter Reference* documentation.

2. Assemble and link the Natural parameter module.

Step 4: Link the Nucleus

(Job I060, Step 0020)

- Link the nucleus for Natural Review by including the following module from the Natural Review library:

```
INCLUDE RNMNUC3
```

Natural Review uses the Natural Data Collector exit interface to get data from Natural. For more information on the `SYSRDC` Data Collector, see the Natural `SYSRDC` utility described in the *Utilities* documentation.

The Natural Review module `RNMNUC3` supports all different ways of statically linked Natural subprograms. For more information about linking the nucleus, see *Linking Natural Objects to the Natural Nucleus* in the Natural *Operations* documentation.

If you run an **environment-independent nucleus** for multiple environments (for example, CICS and batch), link `RNMNUC3` to the environment-dependent nucleus, because Natural Review monitoring runs under CICS only. This prevents unnecessary overload in your non-CICS systems.

- If `RNMNUC3` is not linked to the **environment-dependent nucleus**, the following CICS assembler command level stub from the CICS library must be linked to `RNMNUC3`:

```
INCLUDE DFHEAI
```

- Instead of linking `RNMNUC3` to the nucleus, you can link it as a separate module defined with the Natural profile parameter `RCA` (described in the *Parameter Reference* documentation). The following linkage editor statements are then required:

```
 PHASE NATGWREV,*
 MODE RMODE(ANY)
 INCLUDE DFHEAI
 INCLUDE RNMNUC3
 ENTRY NATGWREV
```

The `MODE` statement is optional. A CICS PPT entry is required for the module `NATGWREV`. It must be specified with the profile parameter `RCA` (see ***Step 3: Build the Natural Parameter Module***). The module can be shared between multiple Natural nuclei.

Step 5: Load New Natural Objects

(Job I061, Step 2661)

1. If you want to continue using a profile text object `DEFAULT` you modified according to your requirements, rename your `DEFAULT` object in the `SYSRNM` library before you start loading the new Natural objects.
2. Load the Natural objects specific to Natural Review from the `RNM`*`vrs`*`.INPL` data set into your `FNAT` system file by using the Natural INPL utility.

   It is sufficient to load the Natural objects only into one `FNAT` system file even if you want to monitor other `FNAT` system files as well.

The Natural Review User Profile Subsystem is initialized when the profile text object `DEFAULT` is copied to the `SYSRNM` library.

3. If you renamed the profile text object `DEFAULT` in the first step, replace the newly loaded `DEFAULT` by this object.

Step 6: Define the SYSRNM Library in Natural Security

This step only applies if Natural Security is installed.

- Define the Natural Review library `SYSRNM` in Natural Security.

  You can define a startup menu for the `SYSRNM` library. If the library is `People-protected`, each user of this library must be linked to it.

- Define `REVHIST` as a user of type `PERSON` with a default application of `SYSRNM`. `REVHIST` is used as the user ID by the Natural Review history session.

Step 7: Build the Natural Review System Control Block

(Job I070, Steps 2622, 2623)

The Natural Review System Control Block `RNMSCB3` is defined as a program in CICS. `RNMSCB3` is not an executable program. Its storage is used by Natural Review as the common anchor and control point for all monitored Natural sessions and reports within one CICS address space. There are some installation-specific generation parameters you can specify in object `RNMSCB3` in the Natural Review source library.

- Set the following parameters in `RNMSCB3` according to your requirements:

<table>
<tr><th>Parameter</th><th>Explanation</th></tr>
<tr><td>NATTRAN=</td><td>This is the Natural/CICS transaction code for the Natural Review history session. You must specify this parameter to set the correct Natural transaction code (see <i>Step 1: Add CICS Control Table Entries for Natural Review</i>).</td></tr>
<tr><td>NPARMS=</td><td>Additional dynamic Natural parameters for the Natural Review history session. This parameter is optional.</td></tr>
<tr><td>CLOSE=</td><td>This parameter determines whether any started Natural Review reports are closed automatically during the termination of the Natural Review history session. There are two possible values:
<table>
<tr><td>CLOSE=YES</td><td>All started reports are closed. This is the default setting.</td></tr>
<tr><td>CLOSE=NO</td><td>Started reports are not closed.</td></tr>
</table></td></tr>
<tr><td>DATE=</td><td>The date format used in the records stored in the Natural Review repository file. There are two possible values:</td></tr>
</table>

Parameter	Explanation	
	DATE=OLD	The date format is *YY/MM/DD*. This is the default setting.
	DATE=NEW	The date format is *YYYYMMDD*.
EMPTY=	This parameter determines whether empty history records are stored in the Natural Review repository file. A record is considered empty if no transactions occurred within the report time interval. There are two possible values:	
	EMPTY=YES	Empty history records are stored.
	EMPTY=NO	Empty history records are not stored. This is the default setting.
NCTSIZE=	This parameter determines the number of entries in the Natural Call Table (NCT) of Natural Review. The NCT is allocated in CICS shared storage and is used to track the usage of the Natural programs per session. Possible values: 0 - 128. The default setting is NCTSIZE=32.	

- Modify and run the job RNMI070 to generate the Natural Review System Control Block. The module must be linked with the NORENT option. The target link library can be any library defined to CICS.

Step 8: Link the Natural Review History Session Startup Module

(Job I070, Step 2625)

Natural Review history data is written to the Natural Review repository file by an asynchronous (that is, not terminal-bound) Natural session.

- Modify and run job RNMLINK in the Natural Review source library.

  It links the CICS-dependent history session startup module RNMHIST3. The target link library can be any library defined to CICS.

  There can be only one history session within one CICS address space. The Natural objects specific to Natural Review (see ***Step 5: Load New Natural Objects***) must be loaded to the FNAT system file running with the history session.

Step 9: Activate the Natural Review Modules

- Use the following CEMT transaction to activate the nucleus module to which RNMNUC3 and the modified Natural parameter module are linked:

  ```
  CEMT SET PROGRAM(. . . .) NEWCOPY
  ```

- Restart CICS if you cannot activate the nucleus module.

Step 10: Initialize the Natural Review Repository File

Skip this step if your Natural Review repository file is already initialized.

- Initialize the repository file after loading it in ***Step 2: Load the Natural Review Repository File***:

  Logon to the SYSRNM library and enter the following at the NEXT prompt:

  ```
  INSTALL NM
  ```

  The following messages will then appear:

  ```
  Now creating sample report system response time
  Now creating sample report highest response
  Natural Review repository initialization complete.
  Press <ENTER> to continue
  ```

  During the initialization process, two default (sample) response time reports are added as shown above.

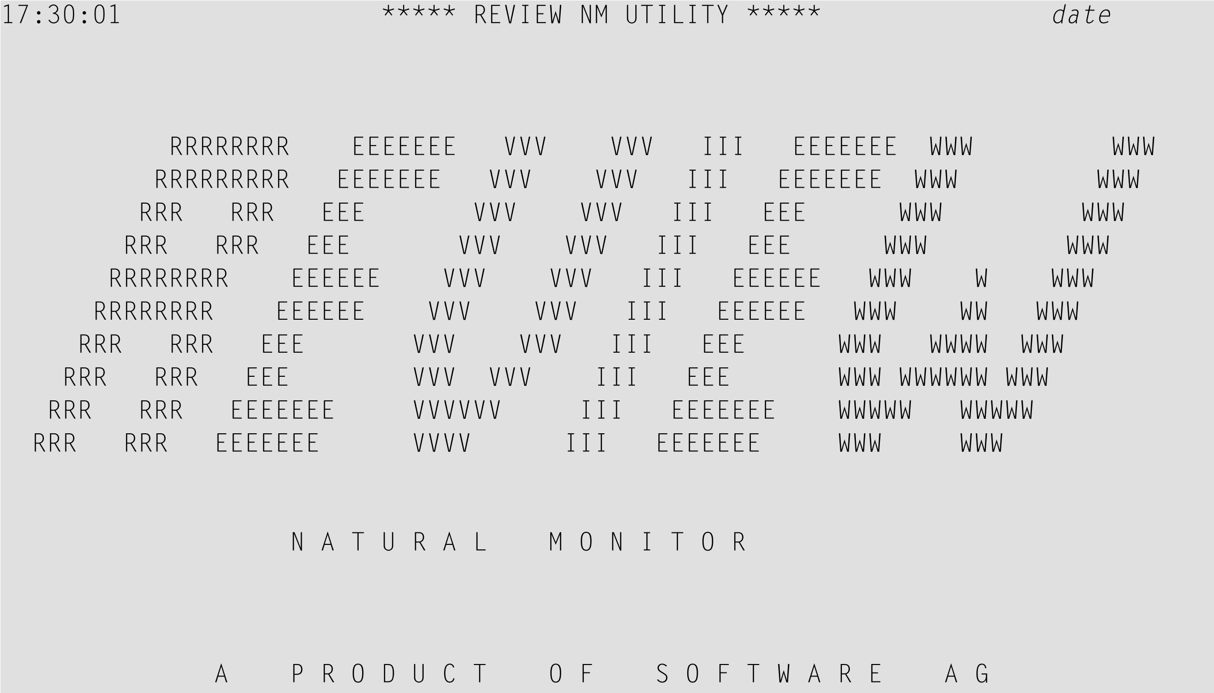
Installation Verification

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

1. At any Natural command prompt, enter the following:

   ```
   SYSRNM
   ```

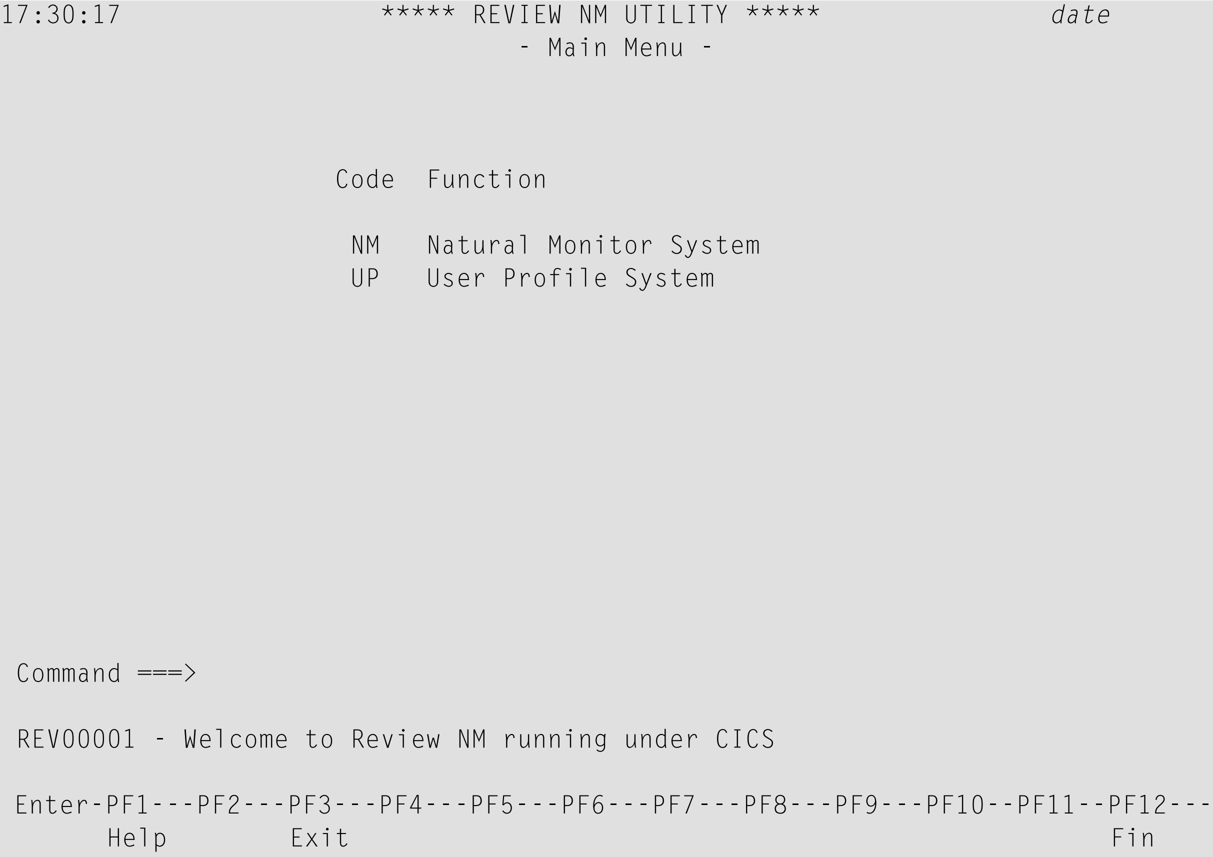
   Natural Review is started and a Natural Review logo screen similar to the example below appears:



```
17:30:01                 ***** REVIEW NM UTILITY *****               date



           RRRRRRRR    EEEEEEE   VVV    VVV   III   EEEEEEE  WWW         WWW
          RRRRRRRRR   EEEEEEE   VVV    VVV   III   EEEEEEE  WWW         WWW
         RRR   RRR   EEE       VVV    VVV   III   EEE      WWW         WWW
        RRR   RRR   EEE       VVV    VVV   III   EEE      WWW         WWW
       RRRRRRRR    EEEEEE    VVV    VVV   III   EEEEEE   WWW    W    WWW
      RRRRRRRR    EEEEEE    VVV    VVV   III   EEEEEE   WWW   WW   WWW
     RRR   RRR   EEE       VVV    VVV   III   EEE      WWW   WWWW  WWW
    RRR   RRR   EEE        VVV  VVV    III   EEE       WWW WWWWWW WWW
   RRR   RRR   EEEEEEE     VVVVVV     III   EEEEEEE    WWWWW   WWWWW
  RRR   RRR   EEEEEEE      VVVV      III   EEEEEEE     WWW     WWW


                   N A T U R A L    M O N I T O R



              A    P R O D U C T    O F    S O F T W A R E    A G
```

(You can suppress this screen by specifying BANNER=N in the text object CONFIG in the library SYSRNM.)

2. Press ENTER to invoke the Natural Review **Main Menu** screen:



```
17:30:17                 ***** REVIEW NM UTILITY *****               date
                                  - Main Menu -



                      Code  Function

                       NM   Natural Monitor System
                       UP   User Profile System














 Command ===>

 REV00001 - Welcome to Review NM running under CICS

 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help        Exit                                                 Fin
```

Alternatively, you can invoke this menu by logging on to the Natural library `SYSRNM` and then entering the following command:

```
MENU
```

3. In the command line of the Natural Review **Main Menu** screen, enter either of the following commands:

   ```
   NM
   ```

   (for **Natural Monitor System**)

   or

   ```
   UP
   ```

   (for **User Profile System**)

   Depending on the command entered, the main screen of the requested subsystem appears. You can then check your installation parameters and the status of the history session. For detailed information on the functions provided by the subsystems, see the *Natural Review* documentation.

4. If you want to run history reports, start the history session. It runs as an asynchronous (non-terminal) Natural session and writes the collected report data to the repository file each time a report time interval has expired.

You can start and stop the history session either automatically by using the CICS PLTPI/PLTSD (see ***Step 1: Add CICS Control Table Entries for Natural Review***), or manually outside Natural by using the `RVH1` transaction (see ***Step 1: Add CICS Control Table Entries for Natural Review***) in the following ways:

`RVH1`	Start the Natural Review history session with the transaction code `RVH2` as defined with `NATTRAN` in ***Step 8: Build the Natural Review System Control Block***. The history session can also be started with the `START` command of Natural Review (see the *Natural Review* documentation).
`RVH1 STOP`	Terminate the Natural Review history session. The history session can also be terminated with the `STOP` command of Natural Review (*Natural Review* documentation).
`RVH1 TEST`	Start the Natural Review history session on the current terminal. This option can be used for debugging purposes, for example, to debug the history session with CEDF (the CICS debugging facility). Note that no Natural terminal I/O operations are supported during the normal processing of the history session. Therefore, you have to terminate the history session from another terminal.

5. Check the Natural Review initialization messages on the console log of your CICS system to find out whether the history session has started successfully. The following message should appear: `REV20200 - REVIEW NM HISTORY SESSION STARTED`.

   For more detailed explanations of the messages in Natural Review, enter `MSG` followed by the message number (for example, `MSG 1`) in the command line of Natural Review.