Natural Engineer
Version 4.4.2
Installation Guide

Manual Order Number: NEE442-010ALL

This document applies to Natural Engineer version 4.4.2 and to all subsequent releases.

Specifications contained herein are subject to change, and these changes will be reported in subsequent revisions or editions.

Readers' comments are welcomed. Comments may be addressed to the Documentation Department at the address on the back cover. Internet users may send comments to the following e-mail address:

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Acknowledgements

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ABOUT THIS MANUAL

Purpose of this manual

This manual contains the Installation details for Natural Engineer.

It describes all aspects of installing Natural Engineer on supported platforms, namely Microsoft Windows, OS/390, BS2000/OSD and VSE/ESA.

This manual should be read carefully before installing and using the product.

Target Audience

The target audience for this manual is intended to be any User of Natural Engineer as well as Systems Administrators responsible for installing and configuring the product.

Typographical Conventions used in this manual

The following conventions are used throughout this manual:

UPPERCASE TIMES	Commands, statements, names of programs and utilities referred to in text paragraphs appear in normal (Times) uppercase.
UPPERCASE BOLD COURIER	In illustrations or examples of commands, items in uppercase bold courier must be typed in as they appear.
< >	Items in angled brackets are placeholders for user-supplied information. For example, if asked to enter <file number>, you must type the number of the required file.
Underlined	Underlined parts of text are hyperlinks to other parts within the online source manual. This manual was written in MS-Word 97 using the "hyperlink" feature.

The following symbols are used for instructions:

⇒	Marks the beginning of an instruction set.
❑	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

How this manual is organized

This manual is organized to reflect the installation requirements for Natural Engineer in the following chapters:

Chapter	Contents
1	Describes how to install and customize Natural Engineer on your PC for the purpose of execution under Natural for the Windows operating system.
2	Describes the installation procedure on the supported mainframe platforms (OS/390, VSE/ESA, BS2000/OSD).
3	Describes the environment considerations for sizing and architecture when using Natural Engineer for the Windows operating system.

Terminology

It is assumed that you are familiar with general Natural and mainframe terminology, as well as the terms and concepts relating to Microsoft Windows operating systems. This section explains some terms that are specific to the Natural Engineer product.

Analysis

The Analysis process of Natural Engineer searches application data within the Natural Engineer Repository, according to specified Search Criteria and generates reports on the search results.

Application

An Application is a library or group of related libraries, which define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

Browser

An Internet Browser such as Microsoft Internet Explorer or Netscape.

Category

Categories in Natural Engineer specify whether and how a Modification is applied to the Natural code. Valid categories are: Automatic change, Manual change, Reject the default Modification, No change to the data item, and the data item is in Generated Code.

A category is further broken down according to type of change (for example: Keyword, Literal, Data Item, Database Access, Definition).

Consistency

An option in the Analysis process that causes Natural Engineer to trace an Impact through the code, using left and right argument resolution to identify further code impacted by the code found.

Environment

The Environment process is the means by which Natural Engineer generates a structured view of the application code in the Natural Engineer Repository. This provides application analysis reports and inventory information on the application and is used as the basis for Impact Analysis.

Exception

An Exception is an Item identified as impacted that does not require a Modification. Where there are a few similar Exception Items, they can be treated as Exceptions, and rejected in the Modification review process. Where there are many similar (therefore not Exceptions), consideration should be given to changing the Search Criteria so they are not identified as impacted in the first place.

Generated Code

This is code which has been generated by a Natural code generator, such as Construct, and which is not normally modified directly in the Natural editor.

Impact

An Impact is an instance of a Natural code Item; e.g., data item or statement (a “hit” scored by the Analysis process) that matches the defined Search Criteria used in the Analysis process.

Iteration

An Iteration is one examination cycle of a field identified according to the specified Search Criteria. For example, one Iteration is reading the field right to left. Multiple Iterations are performed when the option of ‘Consistency’ or Multi Search is requested for Analysis, and Natural Engineer performs as many Iterations as necessary to exhaust all possibilities of expressing and tracing the field, and can be limited by a setting in the NATENG.INI file.

Library

A single library of source code, which exists in the Natural system file.

Modification

A Modification is a change suggested or made to an object or data item resulting in the required compliance of that object or data item. Modifications in Natural Engineer are classified according to Category and Type.

Presentation Split Process

The Presentation Split Process is a sub-function of the Object Builder function that removes screen I/O statements from current application objects and places them in generated subprograms.

Soft Link

A Soft Link is where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

Technical Split Process

The Technical Split Process is a sub-function of the Object Builder function that results in the encapsulation of each database access within the application, into a sub-program so that the application is separated into 'presentation and logic' and 'database access'.

Type

The Type of Modification available, for example: Data Item, Keyword and Literal.

TLM

Text Logic Members are used to contain the code required to support inclusion of common code into the application. An example of this is the code to include into an application before updating a database.

Related Literature

The complete set of Natural Engineer manuals consists of:

1 **Natural Engineer Concepts and Facilities (NEE442-006ALL)**

The Concepts and Facilities manual describes the many application systems problems and solutions offered by Natural Engineer, providing some guidelines and usage that can be applied to Natural applications.

2 **Natural Engineer Release Notes (NEE442-008ALL)**

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to Natural Engineer.

3 **Natural Engineer Installation Guide (NEE442-010ALL)**

The Installation Guide provides information on how to install Natural Engineer on both PC and mainframe platforms.

4 **Natural Engineer Administration Guide (NEE442-040WIN)**
Natural Engineer Administration Guide (NEE442-040MFR)

The Administration Guide provides information on all the various control settings available to control the usage of the different functions within Natural Engineer.

5 **Natural Engineer Application Management (NEE442-020WIN)**
Natural Engineer Application Management (NEE442-020MFR)

The Application Management manual describes all the functions required to add Natural applications into the Repository.

6 **Natural Engineer Application Documentation (NEE442-022WIN)**
Natural Engineer Application Documentation (NEE442-022MFR)

The Application Documentation manual describes all the available functions to document a Natural application within the Repository. These functions will help enhance / supplement any existing systems documentation such as BSD / CSD / Specifications etc.

7 **Natural Engineer Application Analysis and Modification (NEE442-023WIN)**
Natural Engineer Application Analysis and Modification (NEE442-023MFR)

The Application Analysis and Modification manual describes all the available functions to carry out analysis of Natural applications; including basic keyword searches. The modification process is described and detailed to show how it can be applied to modify single selected objects within a Natural application, or the entire Natural application in one single execution.

8 **Natural Engineer Application Restructuring (NEE442-024WIN)**
Natural Engineer Application Restructuring (NEE442-024MFR)

The Application Restructuring manual describes the analysis and modification functionality required to carryout some of the more sophisticated functions such as Object Builder.

9 **Natural Engineer Utilities (NEE442-080WIN)**
Natural Engineer Utilities (NEE442-080MFR)

The Utilities manual describes all the available utilities found within Natural Engineer and, when and how they should be used.

10 **Natural Engineer Reporting (NEE442-025ALL)**

The Reporting manual describes each of the reports available in detail, providing report layouts, how to trigger the report and when the report data becomes available. The various report-producing mediums within Natural Engineer are also described.

11 **Natural Engineer Batch Processing [Mainframes] (NEE442-026MFR)**

The Batch Processing manual describes the various batch jobs (JCL) and their functionality.

12 **Natural Engineer WebStar (NWS442-020ALL)**

The WebStar manual describes the concepts and facilities, installation and configuration options, how to web enable a Natural application and how to create and execute Natural Short Transactions using the Natural Engineer add-on component WebStar.

13 **Natural Engineer WebStar Release Notes (NWS442-008ALL)**

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to the Natural Engineer add-on component WebStar.

14 **Natural Engineer Messages and Codes (NEE442-060ALL)**

The Messages and Codes manual describes the various messages and codes produced by Natural Engineer.

1

INSTALLATION ON THE PC

Chapter Overview

This chapter explains how to install and customize Natural Engineer on your PC for the purpose of execution under Natural.

This information is organized in the following sections:

- Installation Prerequisites.
- Installation Process.
- Natural Parameter Settings.
- Remote Development Environments.

Installation Prerequisites

Before installing Natural Engineer, the following must already be installed on your PC:

- Windows 2000 Professional, Windows XP Professional or Windows 2000 Server.
- Natural version 5.1.1 Patch Level 5 or above.
- Adabas version 3.1.1 or above.
- Microsoft Internet Explorer (version 4 or above) or optionally Netscape (version 4 or above).
- Microsoft Visio 2000 (optional).
  If Visio 2000 is to be used, it is essential that the VBA (Visual Basic for Applications) option is included during the install. This option is part of the installation options on the Visio 2000 CD.

Note 1: It is recommended that the minimum screen size should be set to 1024 x 768.

Note 2: To install Natural Engineer the User must have Administrator rights.

Installation Process

The installation process of Natural Engineer on the PC consists of installing the Natural Engineer components and applying manual configurations to your run time environment.

The various installation and configuration requirements are described in the text document README.TXT. This document should be used to help guide you through the installation process.

Note: The README.TXT file can be located in the root folder on the product CD, or after installation, in the X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2 folder, where X: is the drive on which Natural Engineer has been installed.

The installation process of Natural Engineer on the PC consists of three main steps:

1. Natural Engineer components installed from the product CD.

The InstallShield process on the Natural Engineer product CD controls the installation process. This will install the Natural Engineer components on the PC to the following path: X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2 where X: is the drive on which Natural Engineer is to be installed.

2. A series of configurations administered on the target PC to supplement the installation.

The various configurations required to complete the installation include:

- Natural Security issues, if Natural Security is being used.
- Create an Adabas database and Repository file using DBA Workbench.
- Verify the Natural Parameter file NATENG.
- Verify the Natural Engineer Initialization file NATENG.INI.
- Verify the installation of GenTree Natural classes.
- Any migration issues from previous versions of Natural Engineer.

Note: After completing the installation and configuration steps, it is recommended that you reboot the PC.

3. Verify the installation and configuration.

It is recommended that you verify that the installation and configuration is correct before using Natural Engineer. The following steps should be followed:

1. Start Natural Engineer by selecting the Natural Engineer icon on the desktop.
2. Start the Repository database. If you have utilized the NATENG.INI parameter "DBID=" (found within the REPDB group) with the number of your Repository database, then go to step 3. Natural Engineer will automatically start the database for you. Otherwise, start the Repository database following your local site standards.
3. Using the supplied sample application HOSPITAL, test your installation by executing the Application, Environment and Analysis processes.

   Note: The sample application HOSPITAL is located in X:\PROGRAM FILES\ SOFTWARE AG\NATURAL ENGINEER\4.4.2\SYSOBJH\ HOSPITAL.SAG, where X: is the drive on which Natural Engineer has been installed.

4. Check Microsoft Visio connectivity by first confirming that the product works independently of Natural Engineer and then from Natural Engineer using the Structure Flow Diagram option (accessed by using menu options Environment➔ Object Explorer➔Structure Flow Diagram).

   If it is not available, certain DLLs may be missing (the Visio interface requires Visual Basic version 6).

Natural Parameter Settings

The Natural parameter settings are independent of the number of lines of code being processed. In fact, Natural Engineer does not require the settings listed below. However, for optimum performance they are the recommended minimum set for any Natural Engineer session. The following parameters are relevant for Natural on the PC platforms.

Parameter	Setting	Comment
BPSIZE	2000K	Set at least a 2MB Bufferpool.
BPSFI	TRUE	Set BPSFI on.

Other Natural Parameter settings have to be set for Natural Engineer such as LFILE 96. This depends on what Repository (DBID, FNR) has been created.

Note: For more information on the NATPARM settings required during installation refer to the README.TXT file found in the X:\PROGRAM FILES\SOFTWARE AG\NATURAL ENGINEER\4.4.2 folder, where X: is the drive on which Natural Engineer has been installed.

Remote Development Environments

Natural Engineer offers compatible support for remote development environments using Natural's Single Point of Development (SPoD) available with Natural version 5.1.1.

When using Natural Engineer in a SPoD environment, Natural Engineer version 4.3.1.1 or above must be installed in the Windows operating system being used at run time. The same version of Natural Engineer must also be installed in the mainframe environment being used at run time.

2

INSTALLATION ON THE MAINFRAME

Chapter Overview

This chapter describes the installation procedure on the supported mainframe platforms (OS/390, VSE/ESA, BS2000/OSD). This information is organized in the following sections:

Installation Jobs on the Mainframe

The installation of Natural Engineer on mainframe platforms is performed by installation jobs. These jobs are either adapted "manually" or generated by SYSTEM MAINTENANCE AID (SMA).

For each step of the installation procedure described below, the job number of a job performing the respective task is indicated. This job number refers to an installation job generated by SMA. If you are not using SMA, a sample installation job of the same number is provided in the job library on the installation tape; you must adapt this example job to your requirements. Please note that the job numbers on the tape are preceded by a product code (for example, NEEI061 or NEEI050).

Using SYSTEM MAINTENANCE AID

If you are using Software AG's SYSTEM MAINTENANCE AID (SMA) for the installation process, please note the following before generating jobs:

1. Load the SMA table data as described in the SYSTEM MAINTENANCE AID manual (if you have not already done so).
2. Set NEE441 in the list of available products for your environment to "TO BE INSTALLED".
3. Set the following SMA parameters specific to Natural Engineer:

   In group OPTION:
   NEE-FIRST-INSTALL = Y (for first-time installation of Natural Engineer)

   NEE-FIRST-INSTALL = N (for migration installation of Natural Engineer)

   In group FILNUM:
   FNEE1 = <file number of Natural Engineer Repository>
   FNEE1-DBID= <database number of Natural Engineer Repository>

Mainframe Prerequisites

The following products must be installed before you install Natural Engineer:

NATURAL

Natural version 3.1.4 or above.

ADABAS

Adabas version 7.1.2 or above.

The OS/390 Installation Tape

Tape Contents

The installation tape contains the data sets listed in the table below. The sequence of the data sets is shown in the Report of Tape Creation that accompanies the installation tape. The notation vrs in Data Set Name represents the version number, release level and SM level of the product.

Data Set Name	Contents
NEE*vrs*.SRCE	Source library containing member CINI (initialization parameters).
NEE*vrs*.JOBS	Job library with sample JCL for the Natural Engineer process.
NEE*vrs*.LOAD	Load library containing member NATTABLE, required to overcome the restriction of Natural supporting only 32KB parameter data areas.
NEE*vrs*.INPL	Natural modules in INPL format.
NEEvrs.ERRN	SYSERR messages for Natural Engineer.
NEE*vrs*.SYS1	Natural Engineer system file in ADAULD format.
NEE*vrs*.EXPL	Example application library and miscellaneous sample objects library.
NEEvrs.HELP	Natural Engineer Help File.
NEEvrs.IRES	Supplied Impact Search Criteria.

Copying the Tape Contents to Disk

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

This section explains how to:

- Copy data set COPY.JOB from tape to disk.
- Modify this data set to conform to local site standards.

The JCL in data set COPY.JOB is used to copy all data sets from tape to disk.

After all the data sets have been copied, you will need to perform the individual install procedures for each component.

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

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

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

Where:

<hilev> is a valid high level qualifier.

<Tnnnnn> is the tape number.

<vvvvvv> is the desired volser.

Step 2 - Modify COPY.JOB to conform to local site standards.

There are three parameters that must be set before submitting the COPY.JOB:

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

Step 3 - Submit COPY.JOB

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

The VSE/ESA Installation Tape

Tape Contents

The installation tape contains the data sets listed in the table below. The sequence of the data sets is shown in the Report of Tape Creation that accompanies the installation tape. The notation vrs in Data Set Name represents the version number, release level and SM level of the product.

Data Set Name	Contents
NEEvrs.LIBR	Natural Engineer installation libraries.
NEEvrs.INPL	Natural modules in INPL format.
NEEvrs.ERRN	SYSERR messages for Natural Engineer.
NEEvrs.SYS1	Natural Engineer system file in ADAULD format.
NEEvrs.EXPL	Example application library and miscellaneous sample objects library.
NEEvrs.HELP	Natural Engineer Help File.
NEEvrs.IRES	Supplied Impact Search Criteria.

Copying the Tape Contents to Disk

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

This section explains how to:

- Copy data set COPYTAPE.JOB from tape to disk.
- Modify this data set to conform to local site standards.

The JCL in data set COPYTAPE.JOB is used to copy all data sets from tape to disk.

After all the data sets have been copied, you will need to perform the individual install procedures for each component.

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

The data set COPYTAPE.JOB (file 5) contains the JCL to unload all other existing data sets from tape to disk. To unload COPYTAPE.JOB use the following sample JCL:

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

Where:

NNN	is the tape address.
lib.sublib	is the catalog library name.

Step 2 - Modify COPYTAPE.JOB to conform to local site standards.

Modify COPYTAPE.JOB to conform to local site standards and complete the disk space parameters before submitting the COPYTAPE.JOB.

Step 3 - Submit COPYTAPE.JOB

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

The BS2000/OSD Installation Tape

Tape Contents

The installation tape contains the data sets listed in the table below. The sequence of the data sets is shown in the *Report of Tape Creation* that accompanies the installation tape. The notation *vrs* in Data Set Name represents the version number, release level and SM level of the product.

Data Set Name	Contents
NEEvrs.SRCE	Source library containing members CINI and PARAMS (initialization parameters, Natural dynamic parameters).
NEEvrs.JOBS	Job library with sample JCL for the Natural Engineer process.
NEEvrs.PAMS	Library containing member NATTABLE, required to overcome the restriction of Natural supporting only 32KB parameter data areas.
NEEvrs.INPL	Natural modules in INPL format.
NEEvrs.ERRN	SYSERR messages for Natural Engineer.
NEEvrs.SYS1	Natural Engineer system file in ADAULD format.
NEEvrs.EXPL	Example application library and miscellaneous sample objects library.
NEEvrs.HELP	Natural Engineer Help File.
NEEvrs.IRES	Supplied Impact Search Criteria.

Copying the Tape Contents to Disk

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

Step 1 - Copy the library SRVnn.LIB from tape to disk.

This step is not necessary if you have already copied the library SRV*nnn*.LIB from another Software AG tape. For more information, refer to the element #READ-ME in this library.

The library SRV*nnn*.LIB is stored on the tape as the sequential file SRV*nnn*.LIBS containing LMS commands. The current version *nnn* can be obtained from the Report of Tape Creation. To convert this sequential file into an LMS-library, execute the following commands:

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

Where:

nnn	is the current version number (see Report of Tape Creation).
<volser>	is the volser of the tape (see Report of Tape Creation).
<tape-device>	is the device type of the tape.

Step 2 - Copy the procedure COPY.PROC from tape to disk.

To copy the procedure COPY.PROC from tape to disk, call the procedure P.COPYTAPE in the library SRVnnn.LIB using the command:

```
/CALL-PROCEDURE   (SRVnnn.LIB, P.COPYTAPE), -
/   (VSNT=<volser>, DEVT=<tape-device>)
```

Where:

nnn	is the current version number (see Report of Tape Creation).
<volser>	is the volser of the tape (see Report of Tape Creation).
<tape-device>	is the device type of the tape.

Note: If you use a TAPE-C4 device, you may omit the parameter DEVT.

Step 3 - Copy all product files from tape to disk.

To copy all the product files from tape to disk, enter the procedure COPY.PROC using the command:

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

Where:

<tape-device>	is the device type of the tape.

Note: If you use a TAPE-C4 device, you may omit the parameter DEVT.

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

Mainframe Installation Steps

Perform the following steps after copying the tape contents to disk.

1. Establish Natural Engineer System File

SMA Reference: Job I050, Step 7000

- Load the Natural Engineer System File contained in data set NEE*vrs*.SYS1.

2. Apply changes to Repository FDT

SMA Reference: Job I051, Step 7010/7015/7020/7030/7040/7050.

The Job I051 contains the necessary Adabas utility JCL required to apply each of the changes to the Repository FDT.

The following Adabas utilities are used to perform the various FDT modifications described below:

UTILITY	DESCRIPTION
ADADBS CHANGE	To change standard length of a field.
ADAINV INVERT	To invert a new super descriptor.
ADADBS NEWFIELD	To add new field.

Any previous Natural Engineer version.

If you are upgrading from any previous Natural Engineer version 4.1, 4.2 or 4.3 and wish to keep your current Repository, then the following amendments need to be applied to the Repository FDT.

1. Add the following fields to the end of the REPOSITORY file.

```
01 , UL, 8, A, NU
```

Note: This was introduced by version 4.2.1 base release. SMA Reference: Job I051 Step 7010.

```
01 , Z0
02 , Z1, 7, P, NU
02 , Z2, 4, B, NU
02 , Z3, 4, B, NU
01 , Z5, 15, A, NU
```

Note: This was introduced by version 4.3.1.3. SMA Reference: Job I051 Step 7015.

2. Change standard length of field.

```
AW - from 32 to 45 bytes
```

Note: This was introduced by version 4.3.1.3 SMA Reference: Job I051 Step 7020.

3. Invert Super descriptors.

```
N9= RT(1,1), UL(1,8), AB(1,8), UT(1,7)
```

Note: This was introduced by version 4.2.1 base release. SMA Reference: Job I051 Step 7030.

```
NA=AA(1,8),AB(1,8),AK(1,32)
NB=AA(1,8),AB(1,8),AC(1,32)
```

Note: This was introduced by version 4.3.1 base release. SMA Reference: Job I051 Step 7040.

```
NC=RT(1,1) ,AA(1,8) ,AB(1,8) ,Z5(1,15)
ND=RT(1,1) ,UL(1,8) ,AB(1,8) ,Z5(1,15)
```

Note: This was introduced by version 4.3.1.3. SMA Reference: Job I051 Step 7050.

3. Modify, Reassemble, and Link the NATPARM Module

SMA Reference: Job I060, Step 0010 (BS2000/OSD, VSE/ESA), Step 0010 + 0015 (OS/390)

1. Modify the NATPARM module used for the Natural Engineer process as described in the table below.

Note: As an alternative to this step, users can use dynamic parameters in their Natural environment. The size parameters are recommendations only. You may have to adapt these values to your particular environment.

Recommended settings:

NTWORK=((1-24),AM=STD,OPEN=ACC,CLOSE=CMD)
NTPRINT=((1-2),OPEN=ACC,AM=STD,CLOSE=FIN)

Parameter	Setting
DELETE=OFF	Natural Engineer uses an Assembler module to overcome the limitation of 32K of space within a PDA. This parameter means that once the Assembler program has been loaded, keep it resident for the session.
DATSIZE=256	This is the maximum value. It is recommended to cover all values that may have been in place when an object was compiled.
LFILE=(095,001,012)	Location of the FDIC file. Logical number is 095 Physical Database is 001. Modify as required for the environment. Physical File Number is 012. Modify as required for the environment.
LFILE=(096,001,010)	Location of the Natural Engineer Repository file. Logical number is 096 Physical Database is 001. Modify as required for the environment. Physical File Number is 010. Modify as required for the environment.
LFILE=(097,001,011)	Location of the FUSER file. Logical number is 097 Physical Database is 001. Modify as required for the environment. Physical File Number is 011. Modify as required for the environment.

Note: Ensure that Printer 19 is present when executing batch modification functions or when starting the online front-end to Modification Categorization

Note: OS/390 and BS2000/OSD can dynamically load the NATTABLE module. Under OS/390, specify the NEEvrs.LOAD as a steplib in the JCL. For BS2000/OSD, NATTABLE can be dynamically linked as BLSLIB&&, such as:

```
/      SET-FILE-LINK FILE-NAME=$SAG.NEE431.MOD,          -
/            LINK-NAME=BLSLIB&&
```

2. For VSE/ESA, in the CSTATIC parameter, add the NATTABLE object i.e., CSTATIC = (NATTABLE).
3. Assemble and link the NATPARM module.

4. Link the Batch NATURAL Nucleus

SMA Reference: Job I060, Step 0020 (OS/390, VSE/ESA) Step 3801 (BS2000/OSD).

1. Find the JCL used to link your current batch Natural nucleus.
   This will ensure that all INCLUDE statements specified when you built your current batch Natural nucleus are supplied in this step.
2. In the INCLUDE statement for the NATPARM, specify the name of the NATPARM module that you reassembled in Step 3.
3. For VSE/ESA, in the INCLUDE statement add the location of the NATTABLE object.
4. Link the Natural nucleus.

5. Load Natural Engineer System Programs

SMA Reference: Job I061, Step 7000

- The Natural Engineer system programs are contained in the data set NEE*vrs*.INPL. Load them to your Natural FNAT and FUSER system files using the Natural utility INPL.

6. Load Natural Engineer SYSERR messages

SMA Reference: Job I061, Step 7001

- The Natural Engineer SYSERR messages are contained in the data set NEE*vrs*.ERRN. Load them to your Natural FUSER system files using the Natural utility ERRLODUS.

7. Load Example Application and Miscellaneous Sample Objects

SMA Reference: Job I061, Step 7002

- The Natural Engineer example application (HOSPITAL) and the miscellaneous sample objects (NEEEXPG) are contained in the data set NEE*vrs*.EXPL. Load it to your Natural FUSER system files using the Natural utility INPL.

8. Run Conversion Programs

If you are upgrading from any previous Natural Engineer version 4.1, 4.2 or 4.3 and wish to keep your current Repository, then the following conversion routines need to be applied to the Repository file.

SMA Reference: I082, Step 7000

If you are migrating from any previous Natural Engineer version 4.1, you will need to execute NEE421UP from the NEEvrs.JOBS data set.

This will convert any old audit records to the new CMTS structure and any saved criteria.

Note: This was introduced by version 4.2.1 base release.

SMA Reference: I082, Step 7001

If you are migrating from any previous Natural Engineer version 4.1 or 4.2, you will need to execute NEE431UP from the NEEvrs.JOBS data set.

This will convert any existing internal steplib cross-reference records for improved processing, soft link records and internal record types.

Note: This was introduced by version 4.2.1.1 and 4.3.1.1.

SMA Reference: I082, Step 7002

If you are migrating from any previous Natural Engineer version 4.1, 4.2 or 4.3.1 base release, you will need to execute NEE4311U from the NEEvrs.JOBS data set.

This will convert any existing internal language code cross-reference records.

Note: This was introduced by version 4.3.1.1.

SMA Reference: I082, Step 7003

If you are migrating from any previous Natural Engineer version 4.1, 4.2 or 4.3, you will need to execute NEE4313U from the NEEvrs.JOBS data set.

This will convert any existing internal timestamps.

Note: This was introduced by version 4.3.1.3.

9. Load the Natural Engineer Jobs OS/390

SMA Reference: Job I200, Steps 7001-7011.

7001	NATDELAP	DELAPP
7002	NATEXTMI	EXTMIS
7003	NATEXTRA	EXTRACT
7004	NATIMPAC	IMPACT
7005	NATLOAD	LOAD
7006	NATREPEN	REPORTEN
7007	NATREPGL	REPORTGL
7008	NATREPIM	REPORTIM
7009	NATREPMO	REPORTMO
7010	NATMODIF	MODIFY
7011	NATTASK	TASKSCH

- The Natural Engineer sample jobs are contained in the JOBS or LIBR data set, depending on the operating system. Load the sample jobs to your designated Natural Engineer job library.

  The sample jobs supplied are for running in Batch Mode when not using the Natural Engineer RJE function.

10. Modify Sample Jobs

1. The Job card statement will need to be set up with the correct site standard Job Name convention applicable at your site. The Job Class will also need to be set to a valid class applicable at your site. (It is recommended that you set this to a class that equates to a 'medium' run time as a default for ALL jobs.)
2. Each of the Work File data set names contains a reference to the Application being run through Natural Engineer. This can be identified in the sample jobs by looking for 'AAAAAAAA' within the data set names. It is recommended that you change this for each Application that you are running through Natural Engineer to avoid overwriting any of the data sets.
3. Work File 1 contains the Natural Engineer Initialization parameters (CINI) and is required in ALL the sample Jobs provided. It is set up as a PDS member called 'CINI' (in NEEvrs.SRCE). For each Application you are running you will need to edit CINI to reflect the correct Application Library name. This can be identified within CINI as 'LIBRARY=AAAAAAAA'.

11. Natural Engineer RJE Jobs

- Any batch jobs submitted via the Natural Engineer RJE function utilize JCL text members to build up the jobs. These are loaded as part of the install process.

  The user must modify these jobs and the Natural text members according to their requirements.

  Note: For OS/390, the JCL is supplied within library SYSNEEM. These should be copied to the SYSNEE library.

  For BS2000/OSD, the JCL is supplied within library SYSNEEB. These should be copied to the SYSNEE Library.

  For VSE/ESA, the JCL is supplied within library SYSNEEV. These should be copied to the SYSNEE Library. When running under VSE/ESA, the minimum partition recommended to execute Natural Engineer batch jobs is 8MB.

12. General Adaptions

1. Supplied member name is ###CINIX. If this is a new installation, rename to ###CINI. If this is an existing installation, check parameters in ###CINIX and see if they need transferring to existing ###CINI file.
2. Supplied member name ###DEFnn. If this is a new installation, rename to ###DEF01. This contains the default values for the Multi-Search feature in Impact Analysis, introduced in Natural Engineer version 4.3.1.
3. JCLSTART - this contains the Job Card statement and needs to be amended with the correct site standard Job Name convention applicable at your site. The Job Class will also need to be set to a valid default class applicable at your site. This can be overwritten using the Natural Engineer RJE Job submission screen.
4. The Application name associated with each Work File data set is handled automatically by Natural Engineer RJE function.

13. NATURAL SECURITY Considerations

To run Natural Engineer under Natural Security:

- Define library SYSNEE to Natural Security for all Platforms.
- Define library NEEDB to Natural Security for all Platforms.
- Define library HOSPITAL to Natural Security for all Platforms.
- Define library SYSNEEM to Natural Security for OS/390.
- Define library SYSNEEV to Natural Security for VSE/ESA.
- Define library SYSNEEB to Natural Security for BS2000.

14. Loading Natural Engineer Help System

SMA Reference: JOB I500, Step 7010

To run the load of the Natural Engineer Help System, execute member HELPLOAD from the NEEvrs.JOBS data set. This will delete the existing Natural Engineer help and replace it with the new version of the help from NEEvrs.HELP data set.

15. Loading Natural Engineer Sample Impact Criteria

SMA Reference: JOB I500, Step 7020

To run the load of the sample Natural Engineer impact search criteria, execute member LOADIRES from the NEEvrs.JOBS data set. This will overwrite the existing sample impact search criteria.

16. Natural Engineer RJE User Exit NEEUEX2

- The user exit is named 'NEEUEX2X' on the FNAT SYSNEE library supplied in the NEEvrs. INPL data set. This is to avoid overwriting any existing (modified) versions on the production SYSNEE library during load. If this user exit has not been loaded before, then the NEEUEX2X version needs to be renamed to NEEUEX2 before using Natural Engineer RJE for online job submission.

17. Verify the Installation

- To confirm that the installation was successful, follow the procedure described in the *Natural Engineer Application Management* manual against the supplied example application library.

Mainframe Customization

Setting Initialization Parameters

The member CINI is on the NEEvrs.SRCE data set. This member contains the following parameters:

Section/Parameters	Meaning
(APPLICATION)	Application Section.
LIBRARY=AAAAAAAA	Name of application being processed.
PROGRAM=*	All objects to be processed. Used to limit some reports.
(LOAD)	Load Section.
REPLACE=Y	Load will replace existing data.
(EXTRACT)	Extract Section.
ELETAB=20000	Number of elements within an object.
VARTAB=2000	Number of variables within an object.
DDMCACHE=5	Number of DDMs to hold in memory.
(IMPACT)	**Impact Section.**
IOR=Y	Inter-Object Tracing.
MODE=RE-ENG	Impact Mode of Natural Engineer.
VERSION=nn	Impact Version to be used.
(MODIFY)	**Modify Section.**
COMPONENT_OBJECT_NAME=######*%	Object Builder default name template.
COMMENT-OLD-LINE=Y	During modification, whether or not to comment the original line in the modified object.

Modifying Natural Engineer Jobs

The jobs which execute the Natural Engineer Process in stand-alone batch mode are contained in the NEEvrs.JOBS data set and for using Natural Remote Job Entry (NATRJE) the JCL is supplied in Natural text members.

The user must modify these jobs and the Natural text members according to their requirements.

Note: For OS/390, the JCL is supplied within library SYSNEEM. These should be copied to the SYSNEE library.

For BS2000/OSD, the JCL is supplied within library SYSNEEB. These should be copied to the SYSNEE library.

For VSE/ESA, the JCL is supplied within library SYSNEEV. These should be copied to the SYSNEE library.

Supplied Natural Engineer Stand-alone Batch Jobs

The following members of NEEvrs.JOBS are supplied.

Extract and Load Members	Description
EXTMIS	Extract Missing Objects.
EXTRACT	Extract Application.
LOAD	Load Repository.

Impact Member	Description
IMPACT	Impact Execution.

Data Modification Member	Description
MODIFY	Execute Modification for all Objects.

Report Members	Description
REPORTGL	Global Reports.
REPORTIM	Impact Reports.
REPORTMO	Modification Reports.
REPORTEN	Application Reports.

Deletion Members	Description
DELAPP	Application Delete.

Natural Engineer Processes and Related Jobs

Global Changes for OS/390

The following global changes should be made to stand-alone batch jobs and NATRJE NATURAL text members for OS/390.

The user should change the following items within the supplied JCL to their site standards:

Value	Description
UNIT=3380	Specify correct UNIT type.
VOL=SER=XXXXXX	Specify correct DASD volume.
PGM=NAT314BA	Specify correct batch Natural program.
DSN=NEE441.LOAD	Specify name of supplied NEEvrs.LOAD.
DSN=NEE441.SRCE	Specify name of supplied NEEvrs.SRCE.
DSN=NAT.LOAD	Specify name of batch Natural steplib.
DSN=ADA.LOAD	Specify name of Adabas Steplib.
DB=025	Specify normal database for ADARUN parameters.
SVC=233	Specify correct SVC number for ADARUN parameters.
DEVICE=3380	Specify correct DEVICE for the database.
AAAAAAAA	Specify name of application to be processed.

Global Changes for BS2000/OSD

The following global changes should be made to stand-alone batch jobs for BS2000/OSD.

The user should change the following items within the supplied JCL to their site standards.

Value	Description
LIB.NEE	Specify name of supplied NEEvrs.JOBS.
NEE441.SRCE	Specify name of supplied NEEvrs.SRCE.
AAAAAAAA	Specify name of application to be processed.

The user should also ensure that the job card and work file names supplied are altered to their site standards.

Extract and Load Processes

Extract Missing Objects

For stand-alone batch job submission, the user should execute member EXTMIS from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of EXTMIS is comprised of the following Natural text members:

```
JCLSTART
JCLEXTM1
JCLEXTM2
JCLEXTR3
JCLLAST
```

Extract Application

For stand-alone batch job submission, the user should execute member EXTRACT from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of EXTRACT is comprised of the following Natural text members:

```
JCLSTART
JCLEXTR1
JCLEXTR3
JCLLAST
```

Load Repository

For stand-alone batch job submission, the user should execute member LOAD from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of LOAD is comprised of the following Natural text members:

```
JCLSTART
JCLLOAD1
JCLLOAD2
JCLLAST
```

Extract and Load

For stand-alone batch job submission, the user should execute member EXTRACT and then member LOAD from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of EXTRACT and LOAD comprises the following Natural text members:

```
JCLSTART
JCLEXTR1
JCLEXTR3
JCLLOAD1
JCLLOAD2
JCLLAST
```

Extract Load and Impact

For stand-alone batch job submission, the user should first execute member EXTRACT and then member LOAD followed by member IMPACT, from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of EXTRACT, LOAD and IMPACT comprises the following Natural text members:

```
JCLSTART
JCLEXTR1
JCLEXTR3
JCLLOAD1
JCLLOAD2
JCLIMPX1
JCLIMPX2
JCLLAST
```

Impact Execution

For stand-alone batch job submission, the user should execute member IMPACT from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of IMPACT is comprised of the following Natural text members:

```
JCLSTART
JCLIMPX1
JCLIMPX2
JCLLAST
```

Execute Modification for all Objects

For stand-alone batch job submission, the user should execute member MODIFY from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of MODIFY is comprised of the following Natural text members:

```
JCLSTART
JCLREMX1
JCLREMX2
JCLLAST
```

Global Reports

For stand-alone batch job submission, the user should execute member REPORTGL from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of REPORTGL is comprised of the following Natural text members:

```
JCLSTART
JCLREPG1
JCLREPG2
JCLREPCT
JCLLAST
```

Impact Reports

For stand-alone batch job submission, the user should execute member REPORTIM from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of REPORTIM is comprised of the following Natural text members:

```
JCLSTART
JCLREPI1
JCLREPI2
JCLREPCT
JCLLAST
```

Modification Reports

For stand-alone batch job submission, the user should execute member REPORTMO from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of REPORTMO is comprised of the following Natural text members:

```
JCLSTART
JCLREPR1
JCLREPR2
JCLREPCT
JCLLAST
```

Application Reports

For stand-alone batch job submission, the user should execute member REPORTEN from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of REPORTEN is comprised of the following Natural text members:

```
JCLSTART
JCLREPA1
JCLREPA2
JCLREPCT
JCLLAST
```

Application Delete

For stand-alone batch job submission, the user should execute member DELAPP from the NEEvrs.JOBS data set.

For NATRJE, the equivalent of DELAPP is comprised of the following Natural text members:

```
JCLSTART
JCLDELE1
JCLDELE2
```

Changes to JCL text members for NATRJE

Natural Engineer version 4.3.1 base release introduced the concept of scheduling tasks. If you are migrating from an earlier version of Natural Engineer, then the following needs to be considered.

Due to the task scheduler using the NATRJE JCL text members when building jobs to carry out the scheduled tasks, several changes have been made to the NATRJE on-line job submission system. Please review the supplied JCL text members for your platform.

Changes relate to the data set names (i.e., no longer contain XXXXXXXX which would have been translated to the user identifier of the submitter), condition codes (OS/390), and changes to the parameter passed to MFRJEP02 (i.e., extra TTTT at the end).

3

OPERATIONAL CONSIDERATIONS

Chapter Overview

This chapter describes some of the operational considerations required for Natural Engineer.

The topics covered are:

1. Architecture

Describes the use of Entire Net-Work to run Natural Engineer with an example of running a project.

2. Environment Sizing

Describes the environment sizing considerations based on one million lines of source code.

3. Natural RPC

Describes the use of Natural RPC (Remote Procedure Call) for Natural Engineer.

Architecture

As Natural Engineer is a Natural application it can take advantage of the Software AG Entire Middleware technology within a client-server environment. The Natural Engineer software can operate with the Adabas Repository existing locally or remotely with the appropriate technology in place.

Entire Net-Work

The following Figure 3-1 illustrates the client server options.

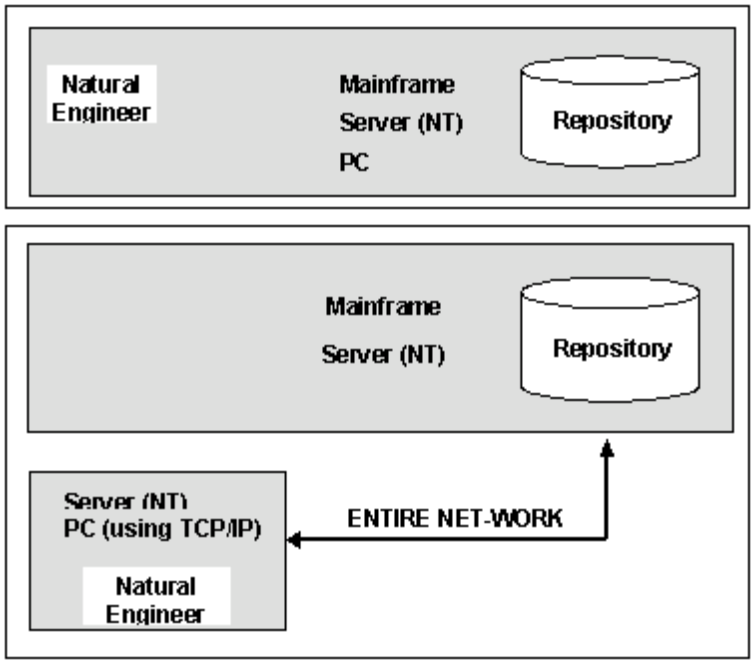

Figure 3-1 Client Server Options

The following Figure 3-2 illustrates the Configuration options.

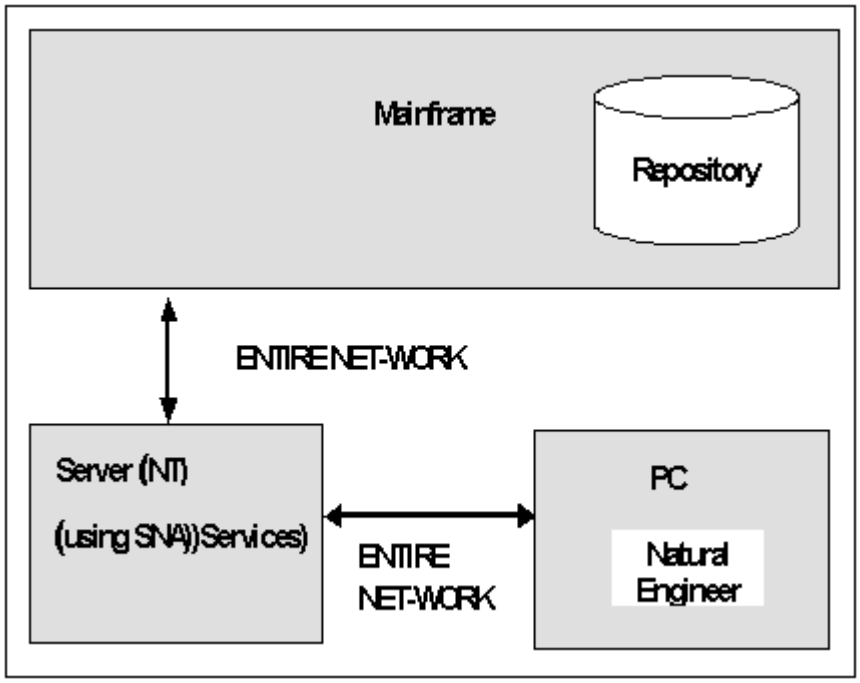

Figure 3-2 Configuration Options

The Natural Engineer application can exist on the same platform as the database as shown above. This can be a mainframe, a Windows server or a PC. The database can exist on a mainframe or a server (Windows) and the application can exist on a PC. Communication between the platforms is provided by Entire Net-Work. This software must exist on each platform that is being used.

Example of using the Entire Net-Work

The following example illustrates the requirements to setup a project using the PC software. If we assume that there are 5 workstations involved in a project, then the following would be required:

- A Server to contain the Natural Engineer Repository Adabas database, this would be Windows running Adabas.

  Note: The Adabas NH parameter should be increased dependent on the number of users.

- 5 PC work stations running Natural Studio, if Modification execution can be controlled onto one PC then runtime versions of Natural could be used on the 4 other PCs.
- ENTIRE Net-Work would be required for the Windows server that contains the Adabas database.
- Each PC would reference that same Natural FUSER file for access to the application code being impacted.
- A server version of the diagramming tool can be referenced for each PC from the Windows server.
- Each PC must have its own copy of the Natural Engineer directory and also the Natural '/PIC' directory so that information is not inadvertently overwritten.

Coordination

Within a project using Natural Engineer there are tasks that must be executed singly and tasks that can be executed in parallel. Listed below are the tasks that fall into each of these categories.

Single Tasks

- Pre-parser execution, this will identify what objects are initially missing from the application library
- Impact Execution (Single PC)
- Modification Execute All

Multiple Tasks

- Extract and Load ranges of objects into the Repository. Using the Load balancing facility of the Pre-Parser, you are provided with the exact application object ranges to utilize all PCs for this process.
- Impact Execution (Impact range on mainframe or multiple PC's against one Repository)
- Modification confirmation of the categories and types for the impacted data items
- Individual Modification Execute if executing development version of Natural Studio

Environment Sizing

This section describes the environment sizing considerations based on one million lines of source code.

Hard Disk Space

Natural Engineer writes an Extract file ("application name".OUT) which contains the neutral records for loading into the Natural Engineer Repository.

- For the PC platforms, 1 million lines of code require 120 Meg of hard disk space.
- For the MVS platform, 1 million lines of code requires 130 cylinders of disk space. This file can also be written to tape.

Adabas Database

Space Requirements

The main consideration when estimating space requirements for Natural Engineer depends upon the complexity of the code, for example how many include routines are present (LDAs, GDAs, PDAs, COPYCODEs etc). The more include routines, the larger the Repository size.

An average record size is 135 bytes.

For 1 million lines of code and more, this would equate to the following:

	Natural Studio	**MVS Mainframe**	
	Adabas 2.2.3 on Windows	**3390**	**3380**
ASSO	220 MB	520 cyls	620 cyls
DATA	250 MB	340 cyls	365 cyls
WORK	50 MB		

Nucleus/ADARUN Parameters

The nucleus/ADARUN parameter settings listed below do not depend on the number of lines of code being processed. However, they reflect the recommended minimum set for any Natural Engineer Repository.

Parameter	Setting	Comment
LQ	30,000	
LP	1,600	
LU	16,000	
LOGGING		Set to blank.
LFP	40,000	
LS	20,000	
TNAA	7200	
TNAE	7200	
TNAX	7200	
NOPLOG		

Natural RPC

Natural Engineer can be used in client-server environments to enable long running processes to run on the server side rather than the client side, improving the run time efficiency.

This is achieved by utilizing the Natural Remote Procedure Call (RPC) techniques provided by Natural.

Prerequisites

Platforms

The following platforms are supported:

- PC: Windows 2000 Professional, Windows XP Professional and Windows 2000 Server.
- Mainframe: OS/390.

Software

The following software must be already installed and available to the run time environment:

- Natural Engineer version 4.3.1.1 or above.

  Note: The same version of Natural Engineer must be installed on both the client and server machines.

- EntireX Communicator version 6.2.2 or above.
- Entire Net-Work version 2.4.1.0 or above.

  Note: Entire Net-Work is only required for Adabas. It is recommended that Adabas is installed on the server when using Natural RPC.

Note: This software is required on both the client and server machines.

Processing Overview

The Natural RPC technique is invoked for long running tasks for the following Natural Engineer functions:

- **Extract**

  The Extract functions are found under the Environment menu and include the options:

  - Extract Source Code.
  - Extract and Load.
  - Extract, Load and Impact.
  - Extract Missing Objects.

- **Load**

  The Load functions are found under the Environment menu and include the options:

  - Load Repository.
  - Extract and Load.
  - Extract, Load and Impact.

- **Impact**

  The Impact functions are found under the Analysis menu and include the options:

  - Impact Execution.

- **Modification**

  The Modification functions are found under the Modification menu and include the options:

  - Execute Modification for All Objects.

The following steps provide a high level overview of the process used by Natural Engineer to utilize Natural RPC for these long running tasks:

1. Start the Broker.
2. Start the server Natural session.
3. Start Natural Engineer on the client.
4. The required function is selected using Natural Engineer running on the client machine.
5. Natural Engineer will recognize that Natural RPC is to be utilized and will invoke NEERPC.EXE. This is used as a message handler between the server and client machines. NEERPC.EXE will register the start of the conversation with Broker and then be placed in a 'wait' status. NEERPC.EXE will display a message window on the client machine. All messages are displayed here.
6. After a 2 second delay (for the NEERPC.EXE registration to complete), Natural Engineer will issue a CALLNAT for the appropriate long running task. This will route across to the server Natural session via Broker. The requested task will now execute on the server machine.
7. As the task executes on the server machine, any processing messages are sent from the server machine via Broker to the client machine. The NEERPC.EXE message window displays these messages.
8. When the task completes on the server machine, any final messages are passed back to the client machine via Broker and displayed on the NEERPC.EXE message window. Then the issuing CALLNAT is terminated and control is passed back to the Natural session on the client machine.
9. Processing now continues on the client machine until another long running task option is selected.

The following Figure 3-3 illustrates the Natural RPC process using PC server and client installation.

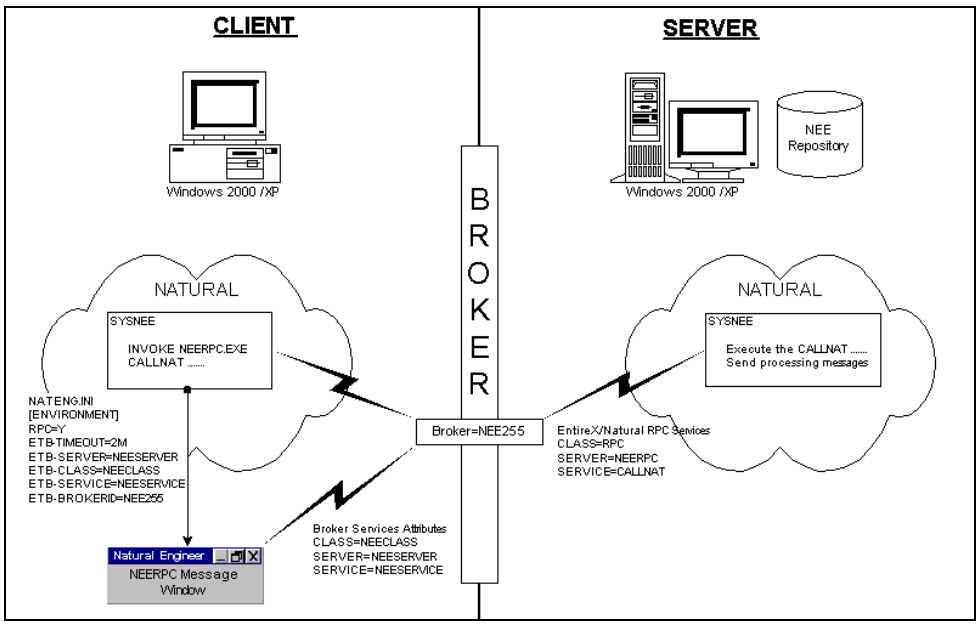

Figure 3-3 Natural RPC using PC server and client installation

Configuration Requirements under Windows

Natural Engineer Initialization File Settings

Client

For each client machine, the Natural Engineer initialization file NATENG.INI needs to be modified to add the following parameters under the ENVIRONMENT group:

Group Header / Parameter	Description
RPC=	Default value = N Controls the Natural RPC functionality. Possible values are: **Y** Natural RPC functionality will be invoked. **N** Use standard processing.
ETB-TIMEOUT=	Default value = 2M Controls the timeout period between NEERPC.EXE and Broker. The values are input using the EntireX Broker conventions. Possible values are: **N** Value is in seconds, for example 60 is 60 seconds. **Ns** Value is in seconds, for example 60s is 60 seconds. **Nm** Value is in minutes, for example 60m is 60 minutes. **Nh** Value is in hours, for example 60h is 60 hours.
ETB-SERVER=	Default value = NEESERVER This is the SERVER name specified in the EntireX Broker Attributes file under the EntireX Broker Services section.
ETB-CLASS=	Default value = NEECLASS This is the CLASS name specified in the EntireX Broker Attributes file under the EntireX Broker Services section.
ETB-SERVICE=	Default value = NEESERVICE This is the SERVICE name specified in the EntireX Broker Attributes file under the EntireX Broker Services section.
ETB-BROKERID=	Default value = NEE255 This is the Broker identity to be used.

Server

No additional parameters are required.

EntireX Broker

Client

Access to the EntireX Broker needs to be available on each client machine in order for the Natural RPC processing used by Natural Engineer to be able to send the processing messages from the server machine to the client machine. The messages will be displayed using the NEERPC message window.

The minimum requirement on the client is to install a mini runtime installation of EntireX. This will install the relevant Broker stubs required.

To install, insert the EntireX Communicator CD into the client machine and switch to the following directory: X:\WINDOWS\EXX\PROGRAM FILES\SOFTWARE AG\ ENTIREX\ETC folder, where X: is the location of the CD drive. Then invoke the executable file EntireXMiniRuntime.EXE.

The following administrative tasks need to be applied on each client machine.

1. Define Broker Host and Services

The Broker host needs to be defined so that the client knows where the Broker resides. This is done using the Windows HOSTS file, which contains the mappings of IP addresses to host names. This file needs to be amended to map the IP address of the Broker.

The HOSTS file is typically located in the X:\WINNT\SYSTEM32\DRIVERS\ETC folder where X: is the directory where the Windows operating system is installed.

Example mapping for Broker NEE255:

```
127.0.0.1 NEE255
```

If the Broker utilizes a non-standard port (the standard Broker port is 1971), then the Windows SERVICES file needs to have a Broker service and port added.

The SERVICES file is typically located in the X:\WINNT\SYSTEM32\DRIVERS\ETC folder where X: is the directory where the Windows operating system is installed.

Example service entry for Broker NEE255:

NEE255 1900/tcp

Note: If the client machine has the mini runtime EntireX installed, then the SERVICES file will need to have an entry added to identify the correct port number for the Broker to be used. For example:

NEE255 1971/tcp

Server

The server machine must have the full version of EntireX Communicator installed.

The EntireX Broker on the server machine needs to be administered to add a Broker Instance for use with Natural Engineer and Natural RPC.

1. Create a Broker Instance

A new Broker Service can be administered by using the ExtireX Broker Administration screen and selecting the 'Add New Broker' option. A Broker name and Port number need to be specified, for example:

Broker NEE255 and Port number 1971.

2. Broker Attribute File

The Broker Attribute File contains the parameters that control the availability and characteristics of the clients and servers. It is divided into two sections, the Broker-specific and server-specific. For Natural Engineer and Natural RPC, modifications need to be applied to the server-specific section only.

The server-specific attribute section can be located by looking for the DEFAULTS=SERVICE parameter. Two service identities consisting of the attributes CLASS, SERVER and SERVICE need to be added:

1. Natural Engineer service

```
CLASS = NEECLASS, SERVER = NEESERVER, SERVICE = NEESERVICE
```

This entry can be added after the sample definitions found in the Broker Attribute file, for example:

```
CLASS = ACLASS, SERVER = ASERVER, SERVICE = ASERVICE
CLASS = BCLASS, SERVER = BSERVER, SERVICE = BSERVICE
CLASS = CCLASS, SERVER = CSERVER, SERVICE = CSERVICE
CLASS = NEECLASS, SERVER = NEESERVER, SERVICE = NEESERVICE
```

Note: Additional services can be added, each time changing the SERVICE= value.

2. Natural RPC service

```
CLASS = RPC, SERVER = NEERPC, SERVICE = CALLNAT
```

This entry can be added after the sample definitions found in the Broker Attribute file, for example:

```
CLASS = RPC, SERVER = SRV1, SERVICE = CALLNAT
CLASS = RPC, SERVER = NEERPC, SERVICE = CALLNAT
```

3. Define Broker Host and Services

The Broker host needs to be defined so that the server knows where the Broker resides. This is done using the Windows HOSTS file, which contains the mappings of IP addresses to host names. This file needs to be amended to map the IP address of the Broker.

The HOSTS file is typically located in the X:\WINNT\SYSTEM32\DRIVERS\ETC folder where X: is the directory where the Windows operating system is installed.

Example mapping for Broker NEE255:

127.0.0.1 NEE255

If the Broker utilizes a non-standard port (the standard Broker port is 1971), then the Windows SERVICES file needs to have a Broker service and port added.

The SERVICES file is typically located in the X:\WINNT\SYSTEM32\DRIVERS\ETC folder where X: is the directory where the Windows operating system is installed.

Example service entry for Broker NEE255:

NEE255 1900/tcp

NATURAL Parameter Files

Natural Parameter files for running Natural Engineer need to exist on both the client and server machines. These are based on the supplied Natural Parameter file NATENG and will need to be modified for Natural RPC parameters as described below.

Client

The following parameters need to be modified:

Parameter	Description	
AUTORPC	Value = ON This is used to enable Natural RPC to automatically run any subprograms on the server if not found on the client.	
DFS	This is the default server parameter and requires the following settings:	
	Server name	The name of the RPC server, for example NEERPC.
	Server node	The node name of the RPC server, for example NEE255.
	Transport protocol	The transport protocol to be used, for example ACI,TCP.
MAXBUFF	Value = 30 Kb Used to determine the size of the buffer provided for the automatic execution of Natural RPC calls.	
RPCSIZE	Value = 30 Kb Used to determine the size of the buffer used by Natural RPC.	
TIMEOUT	Value = 32400 sec Specifies the number of seconds the client is to wait for an RPC server response. If this time is exceeded, the remote procedure call will be terminated with a corresponding error message.	

Server

The following parameters need to be modified:

Parameter	Description
AUTORPC	Value = OFF This is used to enable Natural RPC to automatically run any subprograms on the server if not found on the client.
ETID	Value = $ This is used as an identifier for Adabas related information.
MAXBUFF	Value = 30 Kb Used to determine the size of the buffer provided by the server to receive the client request including data and to send back the result.
RPCSIZE	Value = 30 Kb Used to determine the size of the buffer used by Natural RPC.
SERVER	Value = Y Used to start the session as RPC server.
SRVNAME	The name of the RPC server, for example NEERPC.
SRVNODE	The name of the node for the RPC server, for example NEE255.
STARTUP	Remove the program name NATENG.
STEPLIB	Add library SYSNRPC. *Note: This is only required when the server machine is a PC.*
TRANSP	The transport protocol to be used, for example ACI,TCP.

SYSRPC Utility

The SYSRPC utility provides functions used to maintain service directories in order to connect the client's calling program to a subprogram on a server. The service information is stored in the subprogram NATCLTGS and the XML-formatted file SERVDIRX (Natural text member).

The items of the service directory are Node, Server, Library and Subprogram.

A dummy NATCLGS entry needs to be created using the SYSRPC utility.

Client

If the client run time environment is using the same FNAT libraries as the server, then no SYSRPC configuration is required. If separate FNAT libraries are being used, then the following needs to be configured for each client.

Natural version 4

1. Logon to library SYSRPC.
2. Run SYSRPC from the command line. This will invoke the SYSRPC utility screen.
3. Select the menu option Tools➔Local Service Directory Maintenance.
4. Create a default service directory entry containing Node, Server, Library and Subprogram details. For example

```
Node       = NEE255
Server     = NEERPC
Library    = SYSNEE
Subprogram = DUMMY
```

5. Save the entry by using the '**OK**' button.
6. Exit the utility.

Natural version 5

1. Logon to library SYSRPC.
2. Run SYSRPC from the command line. This will invoke the SYSRPC utility screen.
3. Select the menu option Edit➔New item➔Node. Type in the node name, for example NEE255.
4. Select the menu option Edit➔New item➔Natural RPC Server. Type in the server name, for example NEERPC.
5. Select the menu option Edit➔New item➔Library. Type in the library name, for example SYSNEE.
6. Select the menu option Edit➔New item➔Service [subprogram]. Type in the subprogram name, for example DUMMY.
7. Save the entry by using the menu option Object➔Save.
8. Exit the utility.

Server

Natural version 4

1. Logon to library SYSRPC.
2. Run SYSRPC from the command line. This will invoke the SYSRPC utility screen.
3. Select the menu option Tools➔Local Service Directory Maintenance.
4. Create a default service directory entry containing Node, Server, Library and Subprogram details. For example

```
Node       = NEE255
Server     = NEERPC
Library    = SYSNEE
Subprogram = DUMMY
```

5. Save the entry by using the '**OK**' button.
6. Exit the utility.

Natural version 5

1. Logon to library SYSRPC.
2. Run SYSRPC from the command line. This will invoke the SYSRPC utility screen.
3. Select the menu option Edit➔New item➔Node. Type in the node name, for example NEE255.
4. Select the menu option Edit➔New item➔Natural RPC Server. Type in the server name, for example NEERPC.
5. Select the menu option Edit➔New item➔Library. Type in the library name, for example SYSNEE.
6. Select the menu option Edit➔New item➔Service [subprogram]. Type in the subprogram name, for example DUMMY.
7. Save the entry by using the menu option Object➔Save.
8. Exit the utility.

Configuration Requirements under OS/390

When running Natural Engineer utilizing Natural RPC under the OS/390 operating system requires the execution of a batch job, which will invoke a server Natural session.

Natural Engineer Initialization File

The Natural Engineer initialization file is held as a PDS member named 'CINI' and is located in the NEEvrs.SRCE data set.

This data set contains a set of parameters under the RPC group, which will dynamically allocate data sets for the Natural Engineer functions that utilize Natural RPC at run time.

Example:

```
(RPC)
WKF03=NATENG.AAAAAAAA.OUT.RPC
WKF03-VOLUME=XXXXXX
WKF03-UNIT=DISK
WKF03-RECFM=VB
WKF03-LRECL=254
WKF03-BLKSIZE=0

WKF04=NATENG.AAAAAAAA.XXX.RPC
WKF04-VOLUME= XXXXXX
WKF04-UNIT=DISK
WKF04-RECFM=FB
WKF04-LRECL=120
WKF04-BLKSIZE=0

WKF05=NATENG.AAAAAAAA.IN.RPC
WKF05-VOLUME= XXXXXX
WKF05-UNIT=DISK
WKF05-RECFM=FB
WKF05-LRECL=80
WKF05-BLKSIZE=0

WKF06=NATENG.AAAAAAAA.TEMP.RPC
WKF06-VOLUME= XXXXXX
WKF06-UNIT=DISK
WKF06-RECFM=FB
WKF06-LRECL=171
WKF06-BLKSIZE=0
```

The following parameters need to be modified:

Parameter	Description
WKF03= **WKF04=** **WKF05=** **WKF06=**	The data set names to be generated may need the high level qualifier (HLQ) modified to meet local site standards. *Note: The data set secondary level names 'AAAAAAAA' should not be changed. These are dynamically generated at run time and will be replaced with the application name.* *Equally the secondary name 'XXX' for work file 4 should also not be changed as this will be replaced by the Natural Engineer function using that file. For example: Extract errors will be written to work file 4 and the name will contain 'EEX'.*
WKF03-VOLUME= **WKF04-VOLUME=** **WKF05-VOLUME=** **WKF06-VOLUME=**	Specify the correct DASD volume required.

NATURAL Parameter Files

The Natural Parameter file being used for the server Natural session needs to have the following parameter added:

```
RPC=(SERVER=ON,SIZE=10,MAXBUFF=6,SRVNAME=NEERPC,
NTASKS=1,SRVNODE=BKR034,TIMEOUT=10,TRACE=0)
```

The following parameters need to be modified:

Parameter	Description
SRVNAME	The name of the RPC server, for example NEERPC.
SRVNODE	The name of the node for the RPC server, for example BKR034.

Batch Job: NEERPC

The batch job used to invoke the server Natural session is called 'NEERPC' and is located in the NEEvrs.JOBS data set.

The user should change the following items within the supplied JCL to their site standards:

Value	Description
PGM=NAT314BA	Specify correct batch Natural program.
DSN=NEE441.LOAD	Specify name of supplied NEEvrs.LOAD.
DSN=NEE441.SRCE	Specify name of supplied NEEvrs.SRCE.
DSN=NAT.LOAD	Specify name of batch Natural steplib.
DSN=ADA.LOAD	Specify name of Adabas Steplib.
DB=025	Specify normal database for ADARUN parameters.
SVC=233	Specify correct SVC number for ADARUN parameters.
DEVICE=3380	Specify correct DEVICE for the database.

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