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Natural Business Services

Installation on Mainframes

Version 8.2.1

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Natural Business Services

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About this Documentation

Natural Business Services Installation on Mainframes explains how to install the mainframe components of Natural Business Services V8.2.

This documentation is intended for those who install and set up Natural Business Services on a mainframe platform.

Natural Business Services Installation on Mainframes covers the following topics:

Before You Begin	Contains an overview of Natural Business Services and the product prerequisites. It describes the operating environments, dataset-naming conventions, and the installation tape and jobs. It includes information about System Maintenance Aid (SMA) and sample JCL you can use to copy the datasets from tape to disk.
Setting Up the Environment	Describes how to set up the installation environment. These steps are common to all users.
Installing Natural Construct	Describes how to install Natural Construct without Natural Business Services. It contains information on how to install Natural Construct:

  ■ As a new or current user

  ■ As a catalog and runtime environment

  ■ As a runtime-only environment

  ■ In static (one-language) mode

This section also provides a summary of the installation datasets and the modules supplied with Natural Construct and describes how to:

  ■ Activate Natural Construct

  ■ Verify the success of the installation

  ■ Maintain Natural Construct

Installing the Business Services Repository and Server Components	Describes how to install the repository and server components for Natural Business Services. This section also provides a summary of the installation datasets and modules supplied with Natural Business Services.

Note:

1. When installing both products, you must install Natural Construct before installing Natural Business Services.

2. When installing Natural Construct without Natural Business Services, you do not have to install the Business Service repository and server components.

Installing the Natural Client Describes how to install the runtime component for a generated Natural client.
Service Runtime Component

> **Note:** Refer to *Natural Business Services Release Notes* for the latest information about the installation procedure, system requirements, and new features.

1 Before You Begin

This section contains information you should read before installing Natural Business Services or Natural Construct.

> **Note:** When installing both products, you must install Natural Construct before installing Natural Business Services.

- Prerequisites
- Operating Environments
- Dataset Naming Conventions
- System Maintenance Aid (SMA)
- Description of Installation Tape

Prerequisites

This section describes the software and hardware requirements for Natural Business Services and Natural Construct on mainframe platforms. The following topics are covered:

- Natural Business Services
- Natural Construct

Natural Business Services

This section describes the software prerequisites for installing the Business Service Administration subsystem on the mainframe. This documentation assumes you are installing Natural Business Services for the first time.

To use the online job submission features, the NATRJE module must be installed and operational (see your Natural Installation and Operations documentation).

Before installing Natural Business Services, the following products must be installed on your server:

- Natural V8.2 including Natural RPC Server

- Natural Security V8.2 (optional)

- Natural Construct V8.2.1

- EntireX V8.1 or higher

- Adabas V8.2 or higher

- NaturalONE V8.3.1 or higher

- Natural Development Server (NDV) V8.2 or higher

Natural Construct

Natural Construct V8.2 is compatible with the following Software AG products and versions:

- Natural V8.2
- Natural Business Services V8.2
- Adabas V8.2 or higher
- Predict V8.2 or higher

> **Note:** If you are creating business services from existing Natural subprograms, Predict is not required. Predict, however, allows Natural Construct to use its relationships, views, verification rules, and field attributes (such as column headings, edit masks, and business data types) to generate consistent code.

The Natural Construct installation tape includes sample JCL for the installation (see the CST*nnn*.JOBS dataset).

This guide assumes you are installing Natural Construct for the first time or upgrading from Natural Construct V5.3. If you are upgrading from any other version, read the release notes and installation guides for all versions between your current version and V5.3 and perform the required procedures.

As some components of Natural Construct require access to the Software AG editor, ensure that the editor is fully installed and operational. To use the online job submission features, you must also ensure that the NATRJE module is fully installed and operational. For information about the editor or NATRJE module, see your Natural installation and operations documentation.

Operating Environments

This section describes the operating environments for Natural Business Services and Natural Construct on mainframe platforms. The following topics are covered:

- Operating Systems
- TP Monitors

- Natural Construct Environments

Operating Systems

The Business Service Administration subsystem V8.2 and Natural Construct function in any environment that supports Natural V8.2, including the following operating systems:

- z/OS
- z/VSE

TP Monitors

Like Natural, the Business Service Administration subsystem and Natural Construct run under the following teleprocessing monitors:

- CICS
- Com-plete
- IMS/DC
- TSO

Natural Construct Environments

This section describes the data structures accessed by Natural Construct-generated applications, the compatible Natural software systems, and the use of Natural Security. The following topics are covered:

- Data Access
- Natural Software Systems
- Natural Security

Data Access

Natural Construct generates applications that access the following data structures:

- Adabas
- DB2
- SQL/DS
- VSAM
- DL/1

You can also create your own models to access other data structures.

Natural Software Systems

Natural Construct operates in conjunction with any Natural software system, including:

- Natural Security
- Natural ISPF
- Predict V8.2 or higher
- Entire Connection
- Natural Process
- Natural Business Services V8.2

Natural Security

Access to Natural Construct is protected by Natural Security facilities. Natural Construct-generated modules operate within, and are controlled by, the Natural Security system.

Dataset Naming Conventions

The Business Service Administration subsystem and Natural Business Services installation tapes use a dataset-naming convention that identifies the product, version number, release number, system maintenance level, and dataset type. For example, the Natural Business Services installation tape includes the following dataset:

NBS*nnn*.INPL

This dataset name consists of the following components:

Component	Description
NBS	Product code (NBS for Natural Business Services or CST for Natural Construct)
n	Version number
n	Release number
n	System maintenance level
INPL	Dataset type

System Maintenance Aid (SMA)

To install Software AG products, use the installation jobs. You can either create these jobs manually using JCL or use System Maintenance Aid (SMA).

> **Notes:**

1. If you are not using SMA, the JCL for installing is included in *Copy the Tape Contents to Disk*. Adapt this sample job to your requirements.

2. When not using SMA, you must reference the Natural Construct 227 LFILE in the JCL to invoke the INT* modules.

If you are using SMA, perform the following steps before generating jobs:

1. Load the SMA table data as described in the System Maintenance Aid documentation (if you have not already done so).

2. Set CST82n in the list of available products for your environment to TO BE INSTALLED.

3. If you are performing a first-time installation, adapt the FCST and FCST-DBID parameters in the FILNUM parameter group to the required values.

To use SMA, set the following options in your SMA environment (specified on the **Modify Environment** panel). Verify all options before generating jobs, as they may be set from a previous installation.

CST-FIRST-INSTALL
> To load a new Natural Construct system file, set this option to "Y". To migrate your existing system file to the current version, set this option to "N". The new help text, code frames, and models will be loaded.

CST-FULL-ENV
> To establish an environment in which you can generate, catalog, and run generated modules, set this option to "Y". This will load the CSTnnn.INPL dataset.

> > **Note:** The CSTnnn.INPL dataset contains the Predict modules and will automatically install theses modules in your environment.

CST-CAT-ENV
> To establish an environment in which you can catalog and run (but not generate) generated modules, set this option to "Y". This will load the CSTnnn.INPC dataset (subset of CSTnnn.INPL).

CST-EXE-ENV
> To establish an environment in which you can run (but not generate or catalog) generated modules, set this option to "Y". This will load the CSTnnn.INPE dataset (subset of CSTnnn.INPC).

CST-LOAD-PRD
> To load the Predict definitions for the demo system and system file, set this option to "Y".

CST-LOAD-DB2
> To install the demo system to access DB2 tables, set this option to "Y". (Natural for DB2 must be installed.)

CST-LOAD-VSAM

To install the demo system to access VSAM files, set this option to "Y". (Natural for VSAM must be installed.)

FCST

File number of the Natural Construct system file.

ESIZE-NAT (BS2000/OSD only)

ESIZE for batch environments (minimum is 220).

ESIZE-NRT (BS2000/OSD only)

ESIZE for TIAM environments (minimum is 220).

ESIZE-NUT (BS2000/OSD only)

ESIZE for UTM environments (minimum is 220).

FCST-DBID (z/OS only)

Database ID of the Natural Construct system file.

ESIZE-BATCH (z/OS only)

ESIZE for batch environments (minimum is 120).

ESIZE-ONLINE (z/OS only)

ESIZE for online environments (minimum is 220).

ESIZE (z/VSE only)

ESIZE for z/VSE environments (minimum is 220).

RUNSIZE

Size of the Natural runtime buffer (minimum is 40).

SYNERR

SYNERR option, which must be set to "ON".

Note: The <DATSIZE> buffer is a variable-size buffer. If more storage is required during the session for local data areas, the <DATSIZE> buffer is expanded dynamically. In a thread environment, the <DATSIZE> may be temporarily allocated outside the storage thread if it becomes too large. The size of the <DATSIZE> buffer is reduced back to the minimum size when the application does not need the space any longer.

Description of Installation Tape

This section describes the installation tape for Natural Business Services. The *Report of Tape Creation* lists the volume serial number, media type, dataset names, and dataset sequence numbers. It also indicates the record layouts and disk storage required for each dataset.

Notes:

1. If you are not using SMA, the JCL for installing is included in *Copy the Tape Contents to Disk*. Adapt this sample job to your requirements.

2. When not using SMA, you must reference the Natural Construct 227 LFILE in the JCL to invoke the INT* modules.

This section covers the following topics:

- Contents of the Installation Tape
- Copy the Tape Contents to Disk

Contents of the Installation Tape

The Natural Business Services installation tape contains the datasets described in this section. Dataset names beginning with NBS contain Natural Business Services data, while those beginning with CST contain Natural Construct data:

User	Dataset Name	Description
All	NBS*nnn*.INPL	INPL dataset containing the Business Service Administration subsystem modules.
	CST*nnn*.ADAP	Dataset containing the ADAPT interface modules.
	NBS*nnn*.IUPD	INPL dataset containing updates and fixes to the main INPL dataset. Load this dataset after loading the NBS*nnn*.INPL dataset. **Note:** This dataset is only supplied when there are updates or fixes to the main INPL dataset.
	NBS*nnn*.NCSR	Dataset containing the Natural client service runtime component. To create a runtime environment for generated Natural clients, install this dataset in a non-Natural Business Services environment. For instructions on installing this component, see *Installing the Natural Client Service Runtime Component*.
	NBS*nnn*.SYS1	Dataset containing the Business Service Administration subsystem file. This file contains secured data used as input to the Adabas ADALOD load utility.
	NBS*nnn*.SYS2	Dataset containing the Business Service Administration subsystem data file. This file contains unsecured data used as input to the Adabas ADALOD load utility.
	CST*nnn*.CPRD	Dataset containing all Predict interface modules for users running Natural Construct V8.2 with Predict.
	CST*nnn*.C531	Dataset containing the code frame listings used to compare the code frames in Natural Construct V8.2 with those in V5.3.
	CST*nnn*.DA4	Dataset containing Predict views used in the demo application.
	CST*nnn*.DD4	Dataset containing Predict definitions for the DB2 demo application.
	CST*nnn*.DINP	INPL dataset containing the Natural Construct demo programs to access DB2 data files.

User	Dataset Name	Description
	CST*nnn*.INPC	INPL dataset containing the modules required to catalog and run generated modules. This dataset is a subset of CST*nnn*.INPL. It also contains the messages used by Natural Construct-generated applications.
	CST*nnn*.INPE	INPL dataset containing the modules required to run (but not catalog) generated modules. This dataset is a subset of CST*nnn*.INPC. It also contains the messages used by Natural Construct-generated applications.
	CST*nnn*.INPL	INPL dataset containing all the modules required to generate, catalog, and run Natural Construct-generated modules. It also contains the messages used by Natural Construct-generated applications.
	CST*nnn*.SYSF	Dataset used to unload the Natural Construct SYSF system file. Use this data file as input to the Adabas load utility (ADALOD).
	CST*nnn*.SYSH	Dataset containing help text. This dataset is a subset of CST*nnn*.SYSF.
	CST*nnn*.SYSM	Dataset containing program models. This dataset is a subset of CST*nnn*.SYSF.
	CST*nnn*.SYSR	Dataset containing code frames. This dataset is a subset of CST*nnn*.SYSF.
	CST*nnn*.VD4	Dataset containing Predict definitions for the VSAM demo application.
	CST*nnn*.VINP	INPL dataset containing the Natural Construct demo programs to access VSAM data files.
z/OS and BS2000/OSD	NBS*nnn*.JOBS	Dataset containing sample JCL for all functions required to install the Business Service Administration subsystem.
	CST*nnn*.JOBS	Dataset containing sample JCL for all functions required to install Natural Construct.
z/VSE	NBS*nnn*.LIBJ	Dataset containing sample JCL for all functions required to install the Business Service Administration subsystem.
	CST*nnn*.LIBJ	Dataset containing sample JCL for all functions required to install Natural Construct.

Copy the Tape Contents to Disk

You may want to copy the datasets on the installation tape to disk. The disk storage required for each dataset is given in the Report of Tape Creation, which accompanies the installation tape. The procedure to copy the datasets to disk differs, depending on whether you are using System Maintenance Aid (SMA). If you are using SMA, refer to the System Maintenance Aid (SMA) documentation (included on the current Natural documentation CD).

If you are not using SMA, refer to one of the following sections:

- BS2000/OSD Users
- z/OS Users

- z/VSE Users

BS2000/OSD Users

The following steps apply to BS2000/OSD users.

1. Copy the SRV*nnn*.LIB library from tape to disk.

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

   The SRV*nnn*.LIB library is stored on the tape as the SRV*nnn*.LIBS sequential file containing LMS commands. The current version *nnn* can be obtained from the *Report of Tape Creation*.

   To convert the SRV*nnn*.LIBS 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:

   - *<tape-device>* is the device type of the tape (for example, TAPE-C4)

   - *<volser>* is the VOLSER of the tape (see the *Report of Tape Creation*)

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

   To copy the COPY.PROC procedure to disk, call the P.COPYTAPE procedure in the SRV*nnn*.LIB library:

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

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

3. Copy all product files from tape to disk.

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

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

> **Note:** If you use a TAPE-C4 device, you can omit the DEVT parameter. The result from this procedure is written to the *'L.REPORT.SRV'* file.

z/OS Users

The following steps apply to z/OS users. If the datasets for more than one product are on the tape, the COPY.JOB dataset contains the JCL to unload the datasets for all products. You must then perform the individual installation procedure for each component.

1. Copy the COPY.JOB dataset from tape to disk.

   The COPY.JOB dataset (label 2) contains the JCL to unload all other datasets from the installation tape to disk. To unload COPY.JOB, use the following sample JCL:

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

   where:

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

2. Modify COPY.JOB to conform with your naming conventions.

   Before submitting this job, set the following parameters:
   - Set HILEV to a valid high-level qualifier
   - Set LOCATION to a storage location
   - Set EXPDT to a valid expiration date

3. Submit the job.

   To unload all other datasets from the tape to your disk, submit COPY.JOB.

z/VSE Users

The following steps apply to z/VSE users. If the datasets for more than one product are on the tape, the COPYTAPE.JOB member contains the JCL to unload the datasets for all delivered products (except datasets you can install directly from tape, such as INPL objects). You must then perform the individual installation procedure for each component.

1. Copy the COPYTAPE.JOB dataset from tape to disk.

   The COPYTAPE.JOB dataset (file 5) contains the JCL to unload all other datasets 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                            <------  tape address
// MTC REW,SYS004
// MTC FSF,SYS004,4
ASSGN SYSIPT,SYS004
// TLBL IJSYSIN,'COPYTAPE.JOB'
// EXEC LIBR,PARM='MSHP; ACC S=lib.sublib'     <------- for catalog
/*
// MTC REW,SYS004                                                    ↵

ASSGN SYSIPT,FEC
/*
/&
* $$ EOJ
```

   where:

   - *NNN* is the tape address

   - *lib.sublib* is the library and sub-library for the catalog

2. Modify COPYTAPE.JOB to conform with your naming conventions.

   Before submitting this job, modify COPYTAPE.JOB to conform to your local naming conventions and set the disk space parameters.

3. Submit the job.

   To unload all other datasets from the tape to your disk, submit COPYTAPE.JOB.

2 Setting Up the Environment

This section describes how to set up the installation environment. These steps are common to all users.

Define the NATPARM

This section describes how to define the NATPARM for Natural Business Services.

Create a New Reentrant Natural Nucleus (Batch)

■ Job I060

To create a reentrant Natural nucleus for batch:

- Update Your Parameter Module
- Make the Nucleus Reentrant

📄 **Notes:**

1. A reentrant nucleus is only required for a full Natural Business Services installation; it is not required for a Natural Construct-only installation.

2. If you intend to use the Trace function, you must install Natural Business Services with printer 2 and 3 assigned to batch.

Update Your Parameter Module

The Business Service Administration subsystem uses special files that must be identified to the Natural transaction used for the subsystem. You can either use the LFILE parameter to dynamically identify the files or you can code the NTLFILE macro in the Natural parameter module to make the files part of the Natural nucleus.

▶ **To update your parameter module (NATPARM):**

1   Set `ADAPRM=ON` in your NATPARM to define a reentrant batch nucleus.

2   Set `LFILE=(227,DBID,FNR)` for the Natural Construct data file (required for Natural Business Services).

📄   **Note:** If you are installing Natural Construct only, steps 3 and 4 are optional.

3   Set `LFILE=(135,DBID,FNR)` for secured data file to invoke Natural.

4   Set `LFILE=(136,DBID,FNR)` for unsecured data file to invoke Natural.

The DBID and FNR values identify the database and file number for the Business Service Administration subsystem file.

5 This step differs, depending on whether you are an z/OS or z/VSE user. For details on how to create the module, refer to your Natural installation and operations documentation.

> **Notes:**

1. The contents of the NATPARM module differ slightly, depending on your operating system.

2. Natural Business Services uses the Software AG editor. To access this editor, you must have an editor work file and buffer pool or you must specify an appropriate EDPSIZE setting (based on the size of the program generated and the number of fields in the file).

The following example shows a NATPARM profile for the Business Service Administration subsystem:

```
ACMPARM  TITLE 'NATURAL 8.2 PARM-MODUL, EXAMPLE'
NTPRM FNR=XX,                  NATURAL SYSTEM FILE NUMBER     -
      DBID=XXX,                NATURAL SYSTEM FILE DB         -
      FUSER=(XXX,X),           NATURAL USER SYSTEM FILE DB    -
      FDIC=(XXX,XXX),          PREDICT SYSTEM FILE            -
      FNAT=(XX,XX),            FNAT FILE                      -
      FSEC=(XXX,XXX),          FSEC FILE                      -
      MENU=OFF,                MENU MODE OFF                  -
      IM=D,                                                   -
      INTENS=1,                                               -
      MT=0,                                                   -
      PD=50,                   SIZE OF COMPLETE PAGE DATA SET -
      ML=B,                    MESSAGE LINE ON BOTTOM         -
      FS=OFF,                                                 -
      LS=132,                  LINE SIZE (0 WOULD TAKE DEVICE)-
      PS=60,                   PAGE SIZE (0 WOULD TAKE DEVICE)-
      PC=OFF,                                                 -
      WH=OFF,                  WAIT IF RECORDS HELD           -
      USIZE=32,                SIZE OF USER AREA              -
      DATSIZE=180,             SIZE OF USER AREA              -
      ESIZE=120,               SIZE OF EXTENDED USER AREA     -
      RUNSIZE=40               SIZE OF NATURAL RUNTIME BUFFER -
      ADAPRM=ON                PASS SESSION DATA IN 7TH PARM  -
      FSIZE=40,                                               -
      SYNERR=ON,                                              -
      MAXCL=0,                                                -
      MADIO=0,                                                -
      DU=OFF,                  DUMP WILL NOT BE PRODUCED      -
      AUTO=ON,
    NTLFILE 227,ddddd,fffff    CONSTRUCT DATA
    NTLFILE 135,ddddd,fffff    BUSINESS SERVICES SECURED DATA
    NTLFILE 136,ddddd,fffff    BUSINESS SERVICES UNSECURED DATA
    END
```

where:

- *ddddd* is the physical database ID

- *fffff* is the physical file number

The recommended Natural parameter settings are:

- `ESIZE=120`

- `RUNSIZE=40`

- `ADAPRM=ON`

- `NTLFILE 227,ddddd,fffff`

- `NTLFILE 135,ddddd,fffff`

- `NTLFILE 136,ddddd,fffff`

> **Note:** We recommend that you use a global buffer pool. If you use a local buffer pool, changes to code are not automatically detected; new or updated modules are not updated. If you are using a local buffer pool, stop and then use the global buffer pool to restart all running services and update the module.

Make the Nucleus Reentrant

▶ **To make the nucleus reentrant:**

■ Link the new batch nucleus with a reentrant version of the Adabas link routine.

Because you cannot make ADAUSER reentrant, you must replace it with one of the following:

- Link the nucleus using the reentrant version of the link routine, ADALNKR, which is supplied with Adabas

  or

- Modify your existing ADALNK to be reentrant and then link the nucleus using the modified ADALNK

In either case, set the default SVCNR value in the ADALNK source to the Adabas SVC number used in your environment. In the multi-tasking batch nucleus, you cannot change ADARUN parameters dynamically because the DDCARD input parameters are no longer available.

> **Note:** For z/OS users, ensure that the RENT link option is specified.

Modify the ADALNK Routine

■ Job I055, Step 1370

▶ **To make the ADALNK routine reentrant:**

1   Set the &RENT macro value to 1.

For example, comment out the default setting for &RENT and remove the comment marker from the reentrant setting:

```
* &RENT     SETB  0           Non-reentrant ADALNK                  .sg62.
  &RENT     SETB  1           Reentrant ADALNK                      .sg62.
```

2   Assemble the modified ADALNK.

3   If running under z/OS, link the modified ADALNK.

Ensure the RENT link option is specified.

Link the Natural Nucleus (batch) with the New NATPARM

Using the Natural link job (I060) that linked the standard Natural nucleus, create an executable Natural nucleus. Include the NATPARM parameter module assembled and linked in *Define the NATPARM*.

> **Note:** Some components of Natural Construct require access to the Software AG editor. Ensure that the editor is installed and operational.

Link the Natural Nucleus (online) with the New NATPARM

Using the Natural link job (I080) that linked the standard Natural nucleus, create an executable Natural nucleus. Include the NATPARM parameter module assembled and linked in *Define the NATPARM*.

> **Notes:**

1. Some components of Natural Construct require access to the Software AG editor. Ensure that the editor is installed and operational.

2. To use the online job submission features of Natural Construct, ensure that the NATRJE module is installed and operational.

Add Natural Security Definitions (Conditional)

If you are using Natural Security, you must add definitions for the following libraries to Natural Security:

Library	Description
SYSBIZ	Stores the executable code for the Business Service Administration subsystem. This library is not required if you are only installing Natural Construct.
SYSCST	Contains the generator maintenance facilities for Natural Construct.
SYSCSTX	Contains sample exit routines.
SYSBIZDE	Contains the Natural Business Services demo application for Adabas. This library is not required if you are only installing Natural Construct.
SYSCSTDE	Contains the Natural Construct demo application for Adabas.
SYSCSTD2	Contains the Natural Construct demo application for DB2.
SYSCSTDV	Contains the Natural Construct demo application for VSAM.

You can restrict access to these libraries to only those users who maintain the definitions that control the generation process. Users who generate modules or maintain help text using Natural Construct do not require access to the libraries.

Adabas Demo Library

The Adabas demo library for Natural Business Services (SYSBIZDE) contains examples of how to use the supplied models. It should be accessible to all developers.

> **Note:** The SYSBIZDE library includes all the modules in the Natural Construct demo library (SYSCSTDE), in addition to the subprogram proxies and new modules that take advantage of the features of Natural Business Services. If you are installing Natural Construct without Natural Business Services, you must define SYSCSTDE to Natural Security.

The modules in this library access the following DDMs:

- NCST-CUSTOMER
- NCST-INS-POLICY
- NCST-ORDER-DISTRIBUTION
- NCST-ORDER-HEADER
- NCST-ORDER-LINES
- NCST-PRODUCT
- NCST-WAREHOUSE

These files should be publicly available.

To allow programs that access the Natural Construct help file to be recataloged, define the following DDMs to Natural Security:

- NCST-HELP
- NCST-HELP-LINES
- NCST-PROFILE

DB2 Demo Library

The DB2 demo library (SYSCSTD2) contains examples of how to use the supplied models. It should be accessible to all developers. The modules in this library access the following DDMs:

- NCSTDB2-CUSTOMER
- NCSTDB2-ORDER_DISTRIBUTION
- NCSTDB2-ORDER_HEADER
- NCSTDB2-ORDER_INSTRUCTIONS
- NCSTDB2-ORDER_LINES
- NCSTDB2-PRODUCT
- NCSTDB2-WAREHOUSE

VSAM Demo Library

The VSAM demo library (SYSCSTDV) contains examples of how to use the supplied models. It should be accessible to all developers. The modules in this library access the following DDMs:

- NCSTVSAM-CUSTOMER
- NCSTVSAM-ORDER-DISTRIBUTION
- NCSTVSAM-ORDER-HEADER
- NCSTVSAM-ORDER-LINES
- NCSTVSAM-PRODUCT
- NCSTVSAM-WAREHOUSE

Create a New Natural Profile

To simplify and automate the launching of the Natural Business Services environment, use the Natural SYSPARM utility to create a new profile.

▶ **To create a new Natural profile:**

1   Log onto the SYSPARM library.

2   Issue the MENU command.

3   Type "A" in conjunction with the SYSBIZ profile name.

4   Add the parameters to start Natural with the required sizes and system files.

> 📄 **Note:** If suitable values are already linked to your Natural nucleus, some of these parameters may not be necessary.

If not defaulted in the Natural transaction, the following parameters are required:

Parameter	Description
ESIZE=120	Extended user area.
EDPSIZE=n	Memory required for the Software AG editor (when not using an editor work file and buffer pool), where n is conditional on the size of the program generated and the number of fields in the file.
RUNSIZE=40	Size of the Natural runtime buffer.
LFILE=(227,DBID,FNR)	Natural Construct system file.
LFILE=(135,DBID,FNR)	Natural Business Services secured file (required for Natural Business Services installation).
LFILE=(136,DBID,FNR)	Natural Business Services unsecured file (required for Natural Business Services installation).

Set Security

▶ **To allow Natural Business Services to communicate with Natural Security:**

1   Access the Natural Security main menu.

2   Access the Administration Services main menu.

3   Access the General Options menu.

4   Set the Free access to functions via interface subprograms property to "Y".

5   Do one of the following:

- If you are installing Natural Business Services, see *Installing the Business Services Repository and Server Components*.

- If you are installing Natural Construct without Natural Business Services, see *Installing Natural Construct*.

3 Installing Natural Construct

This section describes how to install Natural Construct without Natural Business Services. The following topics are covered:

📄 **Note:** By default, Natural Construct is installed during the installation of the Business Service repository and server components. For information, see *Installing the Business Services Repository and Server Components*.

Dataset Summary

- Generation and Maintenance Environment
- Catalog and Runtime Environment
- Runtime-Only Environment
- SMA Tables

Generation and Maintenance Environment

The following table lists the datasets containing modules required to generate and maintain models and help text. It includes the names of the files or libraries in which the dataset contents are stored and the contents of the datasets:

Dataset	Target File/Library	Dataset Contents
CST*nnn*.INPL	FNAT/SYSCST	Code frame and model maintenance modules
	FNAT/SYSLIBS	Generation and help text modules
	FNAT/FUSER	Messages used by Natural Construct-generated applications
CST*nnn*.CPRD	FNAT/SYSCST	CPA*, CPU*, and C.H.* modules for Predict
CST*nnn*.DA4	Predict system	Predict data

The INPL dataset loads the messages used by Natural Construct-generated applications into SYSERR as follows:

- Messages 8000 to 8200 are loaded into the SYSTEM and SYSCST libraries

- Messages 8300 to 8500 are loaded into the CSTAPPL library

- Messages 1 to 9999 (error message text) are loaded into the CSTMSG library

- Messages 1 to 9999 (screen prompt text) are loaded into the CSTLDA library

- Messages 1 to 9999 (text for Actions) are loaded into the CSTACT library

- Messages 1 to 9999 (text for PF-keys) are loaded into the CSTPFK library

- Messages 1 to 9999 are loaded into the SYSBIZ library

> **Note:** If the SYSTEM library is not defined as the highest-level steplib under Natural Security, use the SYSMAIN utility to copy the messages from the SYSTEM library to your alternate steplib.

Catalog and Runtime Environment

The following table lists the datasets containing modules required to catalog and run generated modules. It includes the names of the files or libraries in which the dataset contents are stored and the contents of the datasets:

Dataset	Target File/Library	Dataset Contents
CST*nnn*.INPE or CST*nnn*.INPC	FNAT/SYSTEM	CC* and CD* modules and data areas
CST*nnn*.SYSF	NTLFILE, LFILE, DBID, and FNR	Natural Construct data file

Runtime-Only Environment

The following table lists the datasets containing modules required to run (but not catalog) generated modules. It includes the names of the files or libraries in which the dataset contents are stored and the contents of the datasets:

Dataset	Target File/Library	Dataset Contents
CST*nnn*.INPE	FNAT/SYSTEM	CD* programs, helproutines, subprograms, and maps
CST*nnn*.SYSF	NTLFILE, LFILE, DBID, and FNR	Natural Construct data file

SMA Tables

The following table lists each dataset and the corresponding job and step names:

Dataset Name	Job Name	Step Name
CST*nnn*.SYSF	I050	1300
CST*nnn*.INPL	I061	1300
CST*nnn*.INPC	I061	1301
CST*nnn*.INPE	I061	1302
CST*nnn*.CPRD	I061	1306
CST*nnn*.VINP	I061	1307
CST*nnn*.DINP	I061	1308
CST*nnn*.DA4	I200	1301
CST*nnn*.VD4	I200	1302
CST*nnn*.DD4	I200	1303
CST*nnn*.SYSH	I500	1302

Dataset Name	Job Name	Step Name
CST*nnn*.SYSM	I500	1303
CST*nnn*.SYSR	I500	1304

Modules Supplied with Natural Construct

During installation, modules from the installation tape datasets must be loaded into the target library. You can find the modules in more than one dataset and take the modules from any dataset; you do not have to use all of the datasets.

When you run the NATLOAD utility, the modules are automatically loaded into the target library unless you specify "ALL LIBS" or "STEPLIB" (under Natural Security).

Note: You may have to copy the modules into these libraries in a separate procedure.

The following table lists the prefixes that identify different types of modules supplied with Natural Construct and whether source code is provided for the modules:

Prefix	Source	Type of Module
CC*	Yes	Copycode members used by generated modules. You can modify these members as desired.
CD*	Yes	Default objects (helproutines, subprograms, programs, map layouts, and data areas) used by some generated modules. You can modify these objects as desired.
CG*	Yes	Statement model subprograms. These subprograms collect specification parameters and generate code for the .g models. You can modify these subprograms as desired.
CJ*	Some	Natural objects related to JCL generation.
CNH*	No	Helproutines for user-defined models; these helproutines provide active help for Natural system file information.
CNU*	No	Utility subprograms for user-defined models; they access information in the Natural system files.
CNA*	Yes	Data areas for CNU* subprograms.
CPH*	No	Helproutines for user-defined models; these helproutines provide active help for Predict file information.
CPU*	No	Utility subprograms for user-defined models; these subprograms access Predict file information.
CPA*	Yes	Data areas for CPU* subprograms.
CSU*	No	Utility subprograms for user-defined models; these subprograms provide specialized generation and data manipulation functions.
CSA*	Yes	Data areas for CSU* subprograms.
CS*	No	Natural Construct system programs.
CTE*	Yes	Driver programs.

Prefix	Source	Type of Module
CU*	Yes	Model subprograms; these subprograms collect specification parameters and generate program portions. You can modify the subprograms as desired.
CV*	Some	Conversion utility modules. You may require these modules when you convert to a new version of Natural Construct.
NCST*	No	Startup modules and error routines. These modules must reside in the SYSTEM library (or steplib).

> **Note:** When you modify CU* modules, you must maintain or reapply the modifications with each new release of Natural Construct. You should either rename the modified CU* modules (by changing the "CU" prefix to a "CX" prefix, for example) or modify them in a higher-level steplib.

Install Natural Construct Over an Existing Version

This section describes how to upgrade to Natural Construct V8.2 from a previous version. It is intended for users who want to generate, catalog, and run the generated modules. The CST*nnn*.INPL dataset installs a complete administration, development, generation, and execution environment. The CST*nnn*.JOBS dataset contains sample JCL.

> **Note:** For information on installing catalog and runtime environments, see *Install Natural Construct Catalog and Runtime Environments*.

This section covers the following topics:

- Installation Prerequisites
- Step 1: Create Backup of SYSCST
- Step 2: Load Updated Modules
- Step 3: Install DB2 or VSAM Demo Application (Optional)
- Step 4: Load Updated Predict File Definitions (Optional)
- Step 5: Load Updated Help Text
- Step 6: Load Updated Models
- Step 7: Load Updated Code Frames
- Step 8: Copy Natural Utility Modules
- Step 9: Install in Upper Case Only (Optional)
- Step 10: Translate Error Messages (Optional)
- Step 11: Install in Static (One-Language) Mode (Optional)

■ Step 12: Install the ADAPT Interface Modules (Optional)

Installation Prerequisites

Before beginning the upgrade procedure, ensure the following prerequisites have been met (some prerequisites may have been fulfilled during earlier installations):

■ All code frames supplied as fixes to previous versions of Natural Construct are deleted (code frames with a suffix of "8"). For example, COPA9 is an original code frame installed with the previous version, while COPA8 was delivered later as a fix. To determine which code frames to delete, list the existing code frames in the SYSCST library ("MENU F L") and scan for suffixes of "8".

> ⚠ **Important:** If you used "8" as the suffix in the name of a customized code frame, change the "8" to a "7" (or less) before deleting the code frames.

■ The S8 and S9 superdescriptors are released from the Natural Construct system file.

■ The File Definition Table (FDT) for the Natural Construct system file contains the following fields and values:

Field Name	Format and Length	Option
ED	A8	Null
EG	A8	Null
EH	A8	Null
FE	A8	Null
BX	A253	Null

If these fields or values are not correct, use the Adabas utilities to add missing fields or modify the field values or options. For more information, refer to the Adabas utilities documentation.

> 💡 **Tip:** As the physical placement of the BX field within the FDT can have a small effect on performance, ensure that the BX field is placed after the BM field. Note that the BX field does not have to follow immediately after the BM field (for example, the placement of the field should not interfere with the fields in a PE group).

Step 1: Create Backup of SYSCST

■ Job I051, Step 1300

> **Note:** Before beginning this procedure, ensure all installation prerequisites have been met. For information, see *Installation Prerequisites*.

Before upgrading, use the SYSMAIN utility to move all modules in the SYSCST library to a temporary library. This ensures that no obsolete modules remain in your SYSCST library and that any modules you created or modified using other versions of Natural Construct are not overwritten. You can use this backup copy to restore your custom modules.

Because of the large number of modules in the SYSCST library, we recommend that you create a new application, called CSTTEMP, in Natural Security and move these modules in batch mode. Ensure that CSTTEMP is defined to Natural Security before running the following job:

```
LOGON SYSMAIN
MENU
M,ALL,*,FM,SYSCST,DBID,xxx,FNR,yyy,TO,CSTTEMP,DBID,aaa,%
FNR,bbb,REP
FIN
```

where:

■ *xxx* indicates the DBID value for your FNAT system file

■ *yyy* indicates the FNR value for your FNAT system file

■ *CSTTEMP* indicates the name of the temporary library

■ *aaa* indicates the DBID for your FUSER system file

■ *bbb* indicates the FNR for your FUSER system file

Ensure that the IM=D parameter is set in your NATPARM.

Step 2: Load Updated Modules

▶ **To load the applicable dataset:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to the dataset name.

3   Enter the following:

```
INPL
B
```

This section covers the following topics:

- 2A: Load Updated Natural Construct Modules
- 2B: Load Updated Predict Interface Modules

2A: Load Updated Natural Construct Modules

- Job I061, Step 1300; CST*nnn*.INPL dataset

The CST*nnn*.INPL dataset contains modules that update modules in the demo, SYSTEM, SYSCST, SYSCST00, SYSCSTX, and SYSLIBS libraries. Ensure that the FNAT, FUSER, and FDIC parameter values correctly identify the desired system files.

The INPL utility loads all the data areas, copycode, and external modules used by the generated applications into the FNAT SYSTEM library. Ensure that you load the modules and the DDMs.

2B: Load Updated Predict Interface Modules

- Job I061, Step 1306; CST*nnn*.CPRD

The CST*nnn*.CPRD dataset contains the updated Predict interface modules.

Step 3: Install DB2 or VSAM Demo Application (Optional)

If you are installing in an environment that accesses DB2 or VSAM, you can install the corresponding demo application.

> **Note:** Use the Predict definitions to generate the required physical files. For information, see the Predict documentation.

Install the DB2 Demo Application

- Job I061, Step 1308; CST*nnn*.DINP

The CST*nnn*.DINP dataset contains the demo application to access DB2 tables. The DB2 demo application accesses the following files:

- NCSTDB2-CUSTOMER
- NCSTDB2-ORDER_DISTRIBUTION
- NCSTDB2-ORDER_HEADER
- NCSTDB2-ORDER_INSTRUCTIONS
- NCSTDB2-ORDER_LINES
- NCSTDB2-PRODUCT
- NCSTDB2-WAREHOUSE

▶ **To load the demo application for DB2:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to CST*nnn*.DINP.

3   Enter the following:

```
INPL
B
```

▶ **To copy the data used by the DB2 demo application:**

1   Log onto the SYSCSTD2 library.

2   Catalog and run the CSGMIGA2 program.

Install the VSAM Demo Application

■ Job I061, Step 1307; CST*nnn*.VINP

The CST*nnn*.VINP dataset contains the demo application to access VSAM data files. The VSAM demo application accesses the following files:

■ NCSTVSAM-CUSTOMER

■ NCSTVSAM-ORDER-DISTRIBUTION

■ NCSTVSAM-ORDER-HEADER

■ NCSTVSAM-ORDER-LINES

■ NCSTVSAM-PRODUCT

■ NCSTVSAM-WAREHOUSE

▶ **To load the demo application for VSAM:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to CST*nnn*.VINP.

3   Enter the following:

```
INPL
B
```

▶ **To copy the data used by the VSAM demo application:**

1   Log onto the SYSCSTDV library.

2   Catalog and run the CSGMIGAV program.

Step 4: Load Updated Predict File Definitions (Optional)

Optionally, you can load the updated Predict file definitions for the demo application.

▶ **To load the Natural Construct file layout into Predict:**

1   Invoke Natural in batch mode with work file 1 assigned to the CST*nnn.XXx* dataset, where:

   ▪ *XX* corresponds to the two-letter code for your environment

   ▪ *x* corresponds to your Predict version

2   Specify an FDIC parameter to correspond to the Predict dictionary where you want the Natural Construct file layout to reside.

3   Specify an FNAT parameter to correspond to the Natural system file where Predict is installed.

4   Use the Predict definitions to generate the physical files for DB2 and/or VSAM. For information, see the Generate function in the Predict documentation.

The following input loads the Natural Construct file layouts into Predict:

```
LOGON SYSDICBE
MENU
SET ALF-TYPE=1
LOAD META ALL,REPLACE=YES
LOAD OBJECTTYPE ALL,REPLACE=YES,ADA=N
.
FIN
```

For more information, see the Predict documentation.

Load Definitions for Adabas Demo Application

▪ Job I200, Step 1301; CST*nnn*.DA4 dataset

The CST*nnn*.DA4 dataset contains the unloaded Predict view definitions for the Natural Construct help file and the Adabas demo application.

Load Definitions for VSAM Demo Application

■ Job I200, Step 1302; CST*nnn*.VD4 dataset

The CST*nnn*.VD4 dataset contains the unloaded Predict view definitions for the Natural Construct help file and the VSAM demo application.

Load Definitions for DB2 Demo Application

■ Job I200, Step 1303; CST*nnn*.DD4 dataset

The CST*nnn*.DD4 dataset contains the unloaded Predict view definitions for the Natural Construct help file and the DB2 demo application.

> **Note:** The datasets were created using the V4 Migration utility.

Step 5: Load Updated Help Text

■ Job I500, Step 1302; CST*nnn*.SYSH dataset

Use the CSHLOAD batch utility to load the new help text into the Natural Construct system file (for information, see *Utilities*, *Natural Construct Help Text*).

▶ **To load the updated help text:**

1   Assign the CST*nnn*.SYSH dataset to work file 1.
2   Log onto the SYSCST library.
3   Specify the following input for the CSHLOAD utility:

```
*,,,,,Y
```

Step 6: Load Updated Models

■ Job I500, Step 1303; CST*nnn*.SYSM dataset

Use the CSMLOAD batch utility to load the models into the Natural Construct system file (for information, see *Multiple Model Import Utility*, *Natural Construct Generation*).

▶ **To load the updated models:**

1   Assign the CST*nnn*.SYSM dataset to work file 1.
2   Log onto the SYSCST library.
3   Specify the following input for the CSMLOAD utility:

```
*,Y
```

Step 7: Load Updated Code Frames

■ Job I500, Step 1304, CST*nnn*.SYSR

> **Notes:**

1. Once copied to disk, you can view these datasets online or route them to a printer.

2. The installation tape contains the CST*nnn*.C531 dataset, which compares the new code frames with those in Natural Construct V5.3.

▶ **To load the CST*nnn*.SYSR dataset:**

1   Delete all code frames that use the suffix "8" (i.e., code frames that were supplied as fixes in a previous version of Natural Construct).

> **Note:** For more information, see *Installation Prerequisites*.

2   Assign the CST*nnn*.SYSR dataset to work file 1.

3   Log onto the SYSCST library.

4   Specify the following input for the CSFLOAD utility:

```
*,Y
```

> **Note:** For information about the CSFLOAD utility, see *Multiple Code Frame Import Utility*).

5   Review all code frames that use a suffix lower than "8" (i.e., customized code frames).

Use the Compare Code Frame utility to compare the customized code frames with the newly loaded frames and determine which customizations have been made and may no longer be valid. If extensive changes have been made, you may want to apply the changes manually.

Step 8: Copy Natural Utility Modules

Some generated modules use utility subprograms and routines installed with Natural. The method used to copy these USR routines differs, based on whether you are installing Natural Business Services or installing Natural Construct alone.

> **Note:** To produce a report listing the modules that have been copied, enter "CVUSRCOP Y" when invoking the utility from the client. This report contains an up-to-date listing of which modules were copied and may differ from those documented below.

Natural Business Services

■ Job I200, Step 1371

To configure Natural Business Services, run the CVSPEVR conversion utility in batch mode. This utility:

1. Sets the system file version to NBS82.
2. Invokes the CVUSRCOP utility to copy USR modules from the SYSEXT library to the SYSBIZ library.

When Using Natural Security

> **Note:** Before installing Natural Business Services in a secure environment, ensure that you have applied the latest hot fixes for Natural Security.

If you are using Natural Security, the following errors may occur while running the CVUSRCOP utility:

■ NAT4890 or NAT4891 error

Modify the Natural Security definitions for the affected libraries and adjust the Utilities flag to "N". Run CVUSRCOP again to complete the copy procedure.

■ Error indicating that the CVUSRCOP utility cannot copy the USR1051N routine

This error occurs if Predict is not installed. The USR1051N routine is installed in the SYSEXT library during the Predict installation procedure.

■ NAT4889 error: `SYSMAIN 4889 : Library is not defined to Natural Security`

If you use the Natural Security Administration option to define all Natural system libraries, ensure that the SYSLIBS library is defined as public. (By default, SYSLIBS is protected.)

Natural Construct

■ Job I500, Step 1301

If you are installing Natural Construct without Natural Business Services, run the CVUSRCOP utility to copy the following modules:

Module	From Library	To Library
MAPBOXCA	SYSMAP	SYSLIBS
MAPBOXCT	SYSMAP	SYSLIBS
MAPBOXCV	SYSMAP	SYSLIBS
MAPBOXEX	SYSMAP	SYSLIBS
MAPBOXIN	SYSMAP	SYSLIBS
MAPBOXW1	SYSMAP	SYSLIBS
NATA1003	SYSLIBS	SYSTEM
NATA2000	SYSLIBS	SYSTEM
NATF0205	SYSLIBS	SYSTEM
NAT00008	SYSLIBS	SYSTEM
NAT00009	SYSLIBS	SYSTEM
NAT00020	SYSLIBS	SYSTEM
NAT00027	SYSLIBS	SYSTEM
NAT00028	SYSLIBS	SYSTEM
NAT00034	SYSLIBS	SYSTEM
NAT00047	SYSLIBS	SYSTEM
NAT00063	SYSLIBS	SYSTEM
NAT00082	SYSLIBS	SYSTEM
NAT42002	SYSLIBS	SYSTEM
USR0020N	SYSEXT	SYSTEM
USR0050N	SYSEXT	SYSLIBS SYSTEM
USR0120N	SYSEXT	SYSLIBS SYSTEM
USR0320N	SYSEXT	SYSCST SYSLIBS SYSTEM
USR0360N	SYSEXT	SYSCST SYSLIBS

Module	From Library	To Library
		SYSTEM
USR0622N	SYSEXT	SYSLIBS
USR1002N	SYSEXT	SYSLIBS
		SYSTEM
USR1005N	SYSEXT	SYSLIBS
		SYSTEM
USR1009N	SYSEXT	SYSLIBS
USR1023N	SYSEXT	SYSLIBS
		SYSTEM
USR1025N	SYSEXT	SYSLIBS
USR1031N	SYSEXT	SYSLIBS
USR1038N	SYSEXT	SYSLIBS
USR1051N	SYSEXT	SYSLIBS
		SYSTEM
USR1057N	SYSEXT	SYSLIBS
USR1067N	SYSEXT	SYSTEM
USR2013N	SYSEXT	SYSTEM
USR3013N	SYSEXT	SYSLIBS
USR4011N	SYSEXT	SYSLIBS
		SYSTEM

When Using Natural Security

If you are using Natural Security with Natural Construct, see *When Using Natural Security* for troubleshooting information.

Step 9: Install in Upper Case Only (Optional)

If you are installing in an environment that does not support lower case Latin characters, run the CVUPPERC utility in the SYSCST library to translate the components into upper case. As this is a resource-intensive process, you should run this utility in batch mode. Ensure that the batch job defines the correct Natural Construct logical file number (227) and FUSER system file.

The CVUPPERC utility performs the following functions:

1. Converts all data in the Natural Construct system file to upper case (CVLO2HIA).

2. Converts all messages to upper case (CVLO2HIM).

> **Note:** By default, the CVUPPERC utility converts all English messages to upper case. To translate other languages to upper case, either re-run the CVUPPERC utility using a different language code or use the CVLO2HIM utility and define the language code, error message numbers, and application/library IDs for the desired language. If you use the CVLO2HIM utility, only the messages in the following Natural Construct libraries are converted: SYSTEM, CSTAPPL, CSTACT, CSTPFK, CSTMSG, CSTLDA, SYSCUA, SYSSPEC, SYSLIB, and SYSCST.

3. Converts all supplied source to upper case (CVLO2HIS).

4. Performs a CATALL in the SYSCST library.

When this process is completed, copy all object modules beginning with "CU" and "CG" to the SYSLIBS library in the FNAT system file. You can use the following input:

```
LOGON SYSTEM
SYSMAIN
MENU C,C,CU*,FM,SYSCST,DBID,xxx,FNR,yyy,TO,SYSLIBS,DBID,xxx,%
FNR,yyy,REP
SYSMAIN
MENU C,C,CG*,FM,SYSCST,DBID,xxx,FNR,yyy,TO,SYSLIBS,DBID,xxx,%
FNR,yyy,REP
FIN
```

Ensure that the IM=D parameter is set in your NATPARM and then copy all modules beginning with "CD" and "CC" to the SYSTEM library (or alternate steplib) in your FNAT system file.

Step 10: Translate Error Messages (Optional)

Natural Construct-generated applications use external error messages that are defined in SYSERR in the SYSTEM and SYSCST libraries (message numbers 8000 to 8200). If you want to generate applications in a language for which these messages have not been translated, you can translate the messages using the Translate function in SYSERR. Natural Construct-generated applications also use text defined in the CSTAPPL library in SYSERR.

The Generation subsystem uses messages defined in the CSTMSG and CSTLDA libraries in SYSERR. You can translate this text to another language.

Step 11: Install in Static (One-Language) Mode (Optional)

By default, Natural Construct is installed in dynamic mode (multilingual version that allows users to display Natural Construct in any available language). If desired, you can install in one language only (static mode). For information, see *Static (One-Language) Mode*.

Step 12: Install the ADAPT Interface Modules (Optional)

Optionally, you can install the ADAPT interface modules. These modules are contained in the CST*nnn*.ADAP dataset.

Install Natural Construct for the First Time

This section describes how to install Natural Construct for the first time. It is intended for users who want to generate, catalog, and run generated modules. The CST*nnn*.INPL dataset installs a complete administration, development, generation, and execution environment. The CST*nnn*.JOBS dataset contains sample JCL.

> **Note:** For information on installing catalog and runtime environments, see *Install Natural Construct Catalog and Runtime Environments*.

This section covers the following topics:

- Step 1: Establish Natural Construct Data File
- Step 2: Load Required Modules
- Step 3: Copy Natural Utility Modules
- Step 4: Install DB2 or VSAM Demo Application (Optional)
- Step 5: Load Predict File Definitions (Optional)
- Step 6: Install in Upper Case Only (Optional)
- Step 7: Translate Error Messages (Optional)
- Step 8: Install in Static (One-Language) Mode (Optional)
- Step 9: Install the ADAPT Interface Modules (Optional)

Step 1: Establish Natural Construct Data File

■ Job I050, Step 1300; CST*nnn*.SYSF dataset

The CST*nnn*.SYSF dataset is an unloaded Adabas V7 file and is input to the Adabas ADALOD utility, which loads the Natural Construct data file. The DBID and FNR values used to load the file must be the same as those specified in the NTLFILE macro of the NATPARM module.

The space required by the Natural Construct system file depends on the number of models and help text members defined within Natural Construct. We recommend that you set the following minimum sizes for the ADALOD utility:

ADALOD Parameter	Minimum Size Required
MAXISN	20000
DSSIZE	5
NISIZE	300B
UISIZE	50B

Step 2: Load Required Modules

▶ **To load the required modules and error messages:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to the dataset name.

3   Enter the following:

```
INPL
B
```

This section describes the following procedures:

- 2A: Load Natural Construct Modules
- 2B: Load Predict Interface Modules

2A: Load Natural Construct Modules

■ Job I061, Step 1300; CST*nnn*.INPL dataset

Load the modules from the CST*nnn*.INPL dataset into the appropriate system files. This dataset contains modules for the demo, SYSTEM, SYSCST, SYSCST00, SYSCSTX, and SYSLIBS libraries. Ensure that the FNAT, FUSER, and FDIC parameter values correctly identify the desired system files.

The INPL utility loads all the data areas, copycode, and external modules used by the generated applications into the FNAT SYSTEM library. Ensure that you load the modules and the DDMs.

2B: Load Predict Interface Modules

■ Job I061, Step 1306; CST*nnn*.CPRD

Load the modules from the CST*nnn*.CPRD dataset into the appropriate system files. This dataset contains the Predict interface modules.

Step 3: Copy Natural Utility Modules

Some generated modules use utility subprograms and routines installed with Natural. The method used to copy these USR routines differs, based on whether you are installing Natural Business Services or Natural Construct alone.

> **Note:** To produce a report listing the modules that have been copied, enter "CVUSRCOP Y" when invoking the utility from the client. This report contains an up-to-date list of which modules were copied and may differ from those documented below.

Natural Business Services

■ Job I200, Step 1371

To configure Natural Business Services, run the CVSPEVR conversion utility in batch mode. This utility:

1. Sets the system file version to NBS82.
2. Invokes the CVUSRCOP utility to copy USR modules from the SYSEXT library to the SYSBIZ library.

When Using Natural Security

> **Note:** Before installing Natural Business Services in a secure environment, ensure that you have applied the latest hot fixes for Natural Security.

If you are using Natural Security, the following errors may occur while running the CVUSRCOP utility:

■ NAT4890 or NAT4891 error

Modify the Natural Security definitions for the affected libraries and adjust the Utilities flag to "N". Run CVUSRCOP again to complete the copy procedure.

■ Error indicating that the CVUSRCOP utility cannot copy the USR1051N routine

This error occurs if Predict is not installed. The USR1051N routine is installed in the SYSEXT library during the Predict installation procedure.

■ NAT4889 error: `SYSMAIN 4889 : Library is not defined to Natural Security`

If you use the Natural Security Administration option to define all Natural system libraries, ensure that the SYSLIBS library is defined as public. (By default, SYSLIBS is protected.)

Natural Construct

■ Job I500, Step 1301

If you are installing Natural Construct without Natural Business Services, run the CVUSRCOP utility to copy the following modules:

Module	From Library	To Library
MAPBOXCA	SYSMAP	SYSLIBS
MAPBOXCT	SYSMAP	SYSLIBS
MAPBOXCV	SYSMAP	SYSLIBS
MAPBOXEX	SYSMAP	SYSLIBS
MAPBOXIN	SYSMAP	SYSLIBS
MAPBOXW1	SYSMAP	SYSLIBS
NATA1003	SYSLIBS	SYSTEM
NATA2000	SYSLIBS	SYSTEM
NATF0205	SYSLIBS	SYSTEM
NAT00008	SYSLIBS	SYSTEM
NAT00009	SYSLIBS	SYSTEM
NAT00020	SYSLIBS	SYSTEM
NAT00027	SYSLIBS	SYSTEM
NAT00028	SYSLIBS	SYSTEM
NAT00034	SYSLIBS	SYSTEM
NAT00047	SYSLIBS	SYSTEM
NAT00063	SYSLIBS	SYSTEM
NAT00082	SYSLIBS	SYSTEM
NAT42002	SYSLIBS	SYSTEM
USR0020N	SYSEXT	SYSTEM
USR0050N	SYSEXT	SYSLIBS SYSTEM
USR0120N	SYSEXT	SYSLIBS SYSTEM
USR0320N	SYSEXT	SYSCST SYSLIBS SYSTEM

Module	From Library	To Library
USR0360N	SYSEXT	SYSCST
		SYSLIBS
		SYSTEM
USR0622N	SYSEXT	SYSLIBS
USR1002N	SYSEXT	SYSLIBS
		SYSTEM
USR1005N	SYSEXT	SYSLIBS
		SYSTEM
USR1009N	SYSEXT	SYSLIBS
USR1023N	SYSEXT	SYSLIBS
		SYSTEM
USR1025N	SYSEXT	SYSLIBS
USR1031N	SYSEXT	SYSLIBS
USR1038N	SYSEXT	SYSLIBS
USR1051N	SYSEXT	SYSLIBS
		SYSTEM
USR1057N	SYSEXT	SYSLIBS
USR1067N	SYSEXT	SYSTEM
USR2013N	SYSEXT	SYSTEM
USR3013N	SYSEXT	SYSLIBS
USR4011N	SYSEXT	SYSLIBS
		SYSTEM

When Using Natural Security

If you are using Natural Security with Natural Construct, see *When Using Natural Security* for troubleshooting information.

Step 4: Install DB2 or VSAM Demo Application (Optional)

If you are installing in an environment that accesses DB2 or VSAM, you can install the corresponding demo application. To copy the file definitions into Predict, use the Natural INPL utility to load the applicable dataset.

> **Note:** Use the Predict definitions to generate the required physical files. For information, see the Predict documentation.

This section covers the following topics:

- Install DB2 Demo Application
- Install VSAM Demo Application

Install DB2 Demo Application

- Job I061, Step 1308; CST*nnn*.DINP

The CST*nnn*.DINP dataset contains the demo application to access DB2 tables. The DB2 demo application accesses the following files:

- NCSTDB2-CUSTOMER

- NCSTDB2-ORDER_DISTRIBUTION

- NCSTDB2-ORDER_HEADER

- NCSTDB2-ORDER_INSTRUCTIONS

- NCSTDB2-ORDER_LINES

- NCSTDB2-PRODUCT

- NCSTDB2-WAREHOUSE

▶ **To load the demo application for DB2:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to CST*nnn*.DINP.

3   Enter the following:

```
INPL
B
```

▶ **To copy the data used by the DB2 demo application:**

1   Log onto the SYSCSTD2 library.

2   Catalog and run the CSGMIGA2 program.

Install VSAM Demo Application

■ Job I061, Step 1307; CST*nnn*.VINP

The CST*nnn*.VINP dataset contains the demo application to access VSAM data files. The VSAM demo application accesses the following files:

■ NCSTVSAM-CUSTOMER

■ NCSTVSAM-ORDER-DISTRIBUTION

■ NCSTVSAM-ORDER-HEADER

■ NCSTVSAM-ORDER-LINES

■ NCSTVSAM-PRODUCT

■ NCSTVSAM-WAREHOUSE

▶ **To load the demo application for VSAM:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to CST*nnn*.VINP.

3   Enter the following:

```
INPL
B
```

▶ **To copy the data used by the VSAM demo application:**

1   Log onto the SYSCSTDV library.

2   Catalog and run the CSGMIGAV program.

Step 5: Load Predict File Definitions (Optional)

Optionally, you can load the Predict file definitions for the demo application.

▶ **To load the Natural Construct file layout into Predict:**

1   Invoke Natural in batch mode with work file 1 assigned to the CST*nnn.XXx* dataset, where:

   ■ *XX* corresponds to the two-letter code for your environment

   ■ *x* corresponds to your Predict version

2   Specify an FDIC parameter to correspond to the Predict dictionary where you want the Natural Construct file layout to reside.

3   Specify an FNAT parameter to correspond to the Natural system file where Predict is installed.

4   Use the Predict definitions to generate the physical files for DB2 and/or VSAM.

    For information, see the Generate function in the Predict documentation.

The following input loads the Natural Construct file layouts into Predict:

```
LOGON SYSDICBE
MENU
SET ALF-TYPE=1
LOAD META ALL,REPLACE=YES
LOAD OBJECTTYPE ALL,REPLACE=YES,ADA=N
.
FIN
```

For more information, see the Predict documentation.

Load Definitions for Adabas Demo Application

■ Job I200, Step 1301; CST*nnn*.DA4 dataset

The CST*nnn*.DA4 dataset contains the unloaded Predict view definitions for the Natural Construct help file and the Adabas demo application.

Load Definitions for VSAM Demo Application

■ Job I200, Step 1302; CST*nnn*.VD4 dataset

The CST*nnn*.VD4 dataset contains the unloaded Predict view definitions for the Natural Construct help file and the VSAM demo application.

Load Definitions for DB2 Demo Application

■ Job I200, Step 1303; CST*nnn*.DD4 dataset

The CST*nnn*.DD4 dataset contains the unloaded Predict view definitions for the Natural Construct help file and the DB2 demo application.

> **Note:** The datasets were created using the V4 Migration utility.

Step 6: Install in Upper Case Only (Optional)

If you are installing in an environment that does not support lower case Latin characters, you can run the CVUPPERC utility to translate the product into upper case. To run this utility, you must be in the SYSCST library. As this is a resource-intensive process, we recommend that you run the utility in batch mode. Ensure that the batch job defines the correct Natural Construct logical file number (227) and FUSER system file.

The CVUPPERC utility performs the following functions:

1. Converts all data in the Natural Construct system file to upper case (CVLO2HIA).

2. Converts all messages to upper case (CVLO2HIM).

> **Note:** By default, the CVUPPERC utility converts all English messages to upper case. To translate other languages to upper case, either re-run the CVUPPERC utility using a different language code or use the CVLO2HIM utility and define the language code, error message numbers, and application/library IDs for the desired language. If you use the CVLO2HIM utility, only the messages in the following Natural Construct libraries are converted: SYSTEM, CSTAPPL, CSTACT, CSTPFK, CSTMSG, CSTLDA, SYSCUA, SYSSPEC, SYSLIB, and SYSCST.

3. Converts all supplied source to upper case (CVLO2HIS).

4. Performs a CATALL in the SYSCST library.

When this process is completed, copy all object modules beginning with "CU" and "CG" to the SYSLIBS library in the FNAT system file. You can use the following input:

```
LOGON SYSTEM
SYSMAIN
MENU C,C,CU*,FM,SYSCST,DBID,xxx,FNR,yyy,TO,SYSLIBS,DBID,xxx,%
FNR,yyy,REP
SYSMAIN
MENU C,C,CG*,FM,SYSCST,DBID,xxx,FNR,yyy,TO,SYSLIBS,DBID,xxx,%
FNR,yyy,REP
FIN
```

Ensure that the IM=D parameter is set in your NATPARM and then copy all modules beginning with "CD" and "CC" to the SYSTEM library (or alternate steplib) in your FNAT system file.

Step 7: Translate Error Messages (Optional)

Generated applications use external error messages defined in SYSERR in the SYSTEM and SYSCST libraries (message numbers 8000 to 8200). If you want to generate applications in a language for which these messages have not been translated, you can translate the messages using the Translate function in SYSERR. Generated applications also use text defined in the CSTAPPL library in SYSERR.

The Generation subsystem uses messages defined in the CSTMSG and CSTLDA libraries in SYSERR. You can translate this text to another language.

Step 8: Install in Static (One-Language) Mode (Optional)

By default, Natural Construct is installed in dynamic mode (a multilingual version that allows users to display Natural Construct in any available language). If desired, you can install in one language only (static mode). For information, see *Static (One-Language) Mode*.

Step 9: Install the ADAPT Interface Modules (Optional)

Optionally, you can install the ADAPT interface modules. These modules are contained in the CST*nnn*.ADAP dataset.

Install Natural Construct Catalog and Runtime Environments

This section describes how to set up environments in which you can catalog and run, or run (but not catalog), generated modules without installing Natural Construct in its entirety. In a catalog and runtime environment, you can catalog as well as run generated modules. In a runtime environment, you can run generated modules, but you cannot catalog.

> **Note:** The CST*nnn*.JOBS dataset contains sample JCL.

To install catalog and runtime or runtime-only environments:

- Step 1: Establish Natural Construct Data File
- Step 2: Load Updated Natural Construct Modules

- Step 3: Copy Natural Utility Modules

Step 1: Establish Natural Construct Data File

■ Job I050, Step 1300; CST*nnn*.SYSF dataset

If your applications use help text in the Natural Construct help subsystem, you may have to provide access to the Natural Construct system file to establish a production environment.

> **Note:** If you are an existing user and have application help text in your production environment, use the CSHUNLD utility to unload your help text before loading this dataset; use the CSHLOAD utility to reload your help text after loading this dataset.

For information about loading the help text data file, see *Step 5: Load Updated Help Text*.

Step 2: Load Updated Natural Construct Modules

You can load the updated Natural Construct modules for a catalog and runtime environment or a runtime-only environment.

For a Catalog and Runtime Environment

■ Job I061, Step 1301; CST*nnn*.INPC dataset

The CST*nnn*.INPC dataset is a subset of the CST*nnn*.INPL dataset and contains the modules required for a catalog and runtime environment.

▶ **To load the updated Natural Construct modules:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to CST*nnn*.INPC.

3   Enter the following:

```
INPL
B
```

The INPL utility loads all the data areas, copycode, and external modules used by the generated applications into the FNAT SYSTEM library. Ensure that you load both the modules and the DDMs.

For a Runtime-Only Environment

■ Job I061, Step 1302; CST*nnn*.INPE dataset

The CST*nnn*.INPE dataset is a subset of the CST*nnn*.INPC dataset and contains the modules required for a runtime-only environment. If you want to run generated applications and do not want to install Natural Construct in its entirety (using the CST*nnn*.INPL dataset), load this dataset into the system files for runtime environments.

▶ **To load the updated Natural Construct modules:**

1   Invoke the Natural INPL utility.

2   Set work file 1 to CST*nnn*.INPE.

3   Enter the following:

```
INPL
B
```

The INPL utility loads all external modules used by generated applications into the FNAT SYSTEM library. Ensure that you load the modules and the DDMs.

Step 3: Copy Natural Utility Modules

Some generated modules use utility subprograms and routines installed with Natural. The method used to copy these USR routines differs, based on whether you are installing Natural Business Services or Natural Construct alone.

▢   **Note:** To produce a report listing the modules that have been copied, enter "CVUSRCOP Y" when invoking the utility from the client. This report contains an up-to-date list of which modules were copied and may differ from those documented below.

Natural Business Services

■ Job I200, Step 1371

To configure Natural Business Services, run the CVSPEVR conversion utility in batch mode. This utility:

1. Sets the system file version to NBS82.

2. Invokes the CVUSRCOP utility to copy USR modules from the SYSEXT library to the SYSBIZ library.

When Using Natural Security

> **Note:** Before installing Natural Business Services in a secure environment, ensure that you have applied the latest hot fixes for Natural Security.

If you are using Natural Security, the following errors may occur while running the CVUSRCOP utility:

■ NAT4890 or NAT4891 error

Modify the Natural Security definitions for the affected libraries and adjust the Utilities flag to "N". Run CVUSRCOP again to complete the copy procedure.

■ Error indicating that the CVUSRCOP utility cannot copy the USR1051N routine

This error occurs if Predict is not installed. The USR1051N routine is installed in the SYSEXT library during the Predict installation procedure.

■ NAT4889 error: `SYSMAIN 4889 : Library is not defined to Natural Security`

If you use the Natural Security Administration option to define all Natural system libraries, ensure that the SYSLIBS library is defined as public. (By default, SYSLIBS is protected.)

Natural Construct

■ Job I500, Step 1301

If you are installing Natural Construct without Natural Business Services, run the CVUSRCOP utility to copy the following modules:

Module	From Library	To Library
MAPBOXCA	SYSMAP	SYSLIBS
MAPBOXCT	SYSMAP	SYSLIBS
MAPBOXCV	SYSMAP	SYSLIBS
MAPBOXEX	SYSMAP	SYSLIBS
MAPBOXIN	SYSMAP	SYSLIBS
MAPBOXW1	SYSMAP	SYSLIBS
NATA1003	SYSLIBS	SYSTEM
NATA2000	SYSLIBS	SYSTEM
NATF0205	SYSLIBS	SYSTEM
NAT00008	SYSLIBS	SYSTEM
NAT00009	SYSLIBS	SYSTEM
NAT00020	SYSLIBS	SYSTEM
NAT00027	SYSLIBS	SYSTEM

Module	From Library	To Library
NAT00028	SYSLIBS	SYSTEM
NAT00034	SYSLIBS	SYSTEM
NAT00047	SYSLIBS	SYSTEM
NAT00063	SYSLIBS	SYSTEM
NAT00082	SYSLIBS	SYSTEM
NAT42002	SYSLIBS	SYSTEM
USR0020N	SYSEXT	SYSTEM
USR0050N	SYSEXT	SYSLIBS SYSTEM
USR0120N	SYSEXT	SYSLIBS SYSTEM
USR0320N	SYSEXT	SYSCST SYSLIBS SYSTEM
USR0360N	SYSEXT	SYSCST SYSLIBS SYSTEM
USR0622N	SYSEXT	SYSLIBS
USR1002N	SYSEXT	SYSLIBS SYSTEM
USR1005N	SYSEXT	SYSLIBS SYSTEM
USR1009N	SYSEXT	SYSLIBS
USR1023N	SYSEXT	SYSLIBS SYSTEM
USR1025N	SYSEXT	SYSLIBS
USR1031N	SYSEXT	SYSLIBS
USR1038N	SYSEXT	SYSLIBS
USR1051N	SYSEXT	SYSLIBS SYSTEM
USR1057N	SYSEXT	SYSLIBS
USR1067N	SYSEXT	SYSTEM
USR2013N	SYSEXT	SYSTEM

Module	From Library	To Library
USR3013N	SYSEXT	SYSLIBS
USR4011N	SYSEXT	SYSLIBS
		SYSTEM

When Using Natural Security

If you are using Natural Security with Natural Construct, see *When Using Natural Security* for troubleshooting information.

Install in Static (One-Language) Mode

By default, Natural Construct is installed in dynamic (multilingual) mode, which allows users to display Natural Construct in any available language. If you intend to run the system in one language only, you can install Natural Construct in static (one-language) mode to improve performance and reduce database calls. For information, see *Static (One-Language) Mode*.

> **Note:** Installing in static mode does not limit your ability to generate multilingual applications; static mode applies to the Natural Construct interface only.

Activate Natural Construct

After installing Natural Construct, enter "ncstg" at the Natural Next prompt to activate the program. The Generation main menu is displayed if the installation was successful.

Verify the Installation of Natural Construct

After installing a full version of Natural Construct, there are several procedures you can perform to ensure that the program has been installed correctly. This section describes how to verify that Natural Construct is installed correctly.

> **Note:** These steps apply to a full installation only; they do not apply to runtime or catalog versions.

The following topics are covered:

- Regenerate and Recatalog the Demo System
- Access the Demo System
- Access the Help Text Subsystem

■ Access the Administration and Modeling Subsystem

Regenerate and Recatalog the Demo System

▶ **To regenerate and recatalog the demo system:**

1   Log onto the demo system as follows:

■ "SYSCSTDE" for Adabas

■ "SYSCSTD2" for DB2

■ "SYSCSTDV" for VSAM

2   Enter "ncstbgen" at the Next prompt.

The Multiple Generation panel is displayed:

```
 CSBINOL           ***** Natural Construct *****              CSBMO        ↵

 Mar 09                  Multiple Generation                  1 of 1       ↵

                                                                           ↵

 Module                                                                    ↵

  _____    _____    _____    _____    _____                     ↵

  _____    _____    _____    _____    _____                     ↵

                                                                           ↵

 Model                                                                     ↵

  _____    _____                            ↵

  _____    _____                            ↵

  _____    _____                            ↵

  _____    _____                            ↵

  _____    _____                            ↵

                                                                           ↵

 Catalog regenerated modules .. _                                         ↵

 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--P        ↵

      help  retrn                                                          ↵
```

3   Type "*" in the first Module field.

4   Type "x" in Catalog regenerated modules.

5   Press Enter.

The utility regenerates all modules and produces a report listing the names of the modules
it generated and information about modules that were not generated. For example:

```
Skipped              AWHK     is a PDA. Note: Browse PDAs regenerate by Obj
                     AWHP     is a PDA. Note: Browse PDAs regenerate by Obj
                     BCUSTS20 is a PDA. Note: Browse PDAs regenerate by Obj
                     BORDNS20 is a PDA. Note: Browse PDAs regenerate by Obj
                     CALC     Module CALC was not generated by Construct
                     FLIPSTR  Module FLIPSTR was not generated by Construct
                     FLIPSTRA is a PDA. Note: Browse PDAs regenerate by Obj
                     GCDA     is a PDA. Note: Browse PDAs regenerate by Obj
                     GCDN     Module GCDN was not generated by Construct
                     MODCV    Module MODCV was not generated by Construct
                     MYMAP    is a map; Construct does not re-generate maps
                     NCCFM11  is a map; Construct does not re-generate maps
                     NCCFM21  is a map; Construct does not re-generate maps
                     NCCMAI11 is a map; Construct does not re-generate maps
                     NCCMENUM is a map; Construct does not re-generate maps
                     NCGDA    Module NCGDA was not generated by Construct
                     NCLAYMN1 is a map; Construct does not re-generate maps
                     NCLAYOUT is a map; Construct does not re-generate maps
```

💡 **Tip:** If the modules cannot be regenerated or recataloged, check the Natural parameters.

💡 **Tip:** If a NAT0082 error occurs, one or more modules are not loaded. Check the INPL jobs to determine which modules are missing.

Access the Demo System

▶ **To access the demo system:**

1   Enter "menu" at the Next prompt.

    The Order Entry main menu should be displayed.

2   Select a function from the menu.

    Ensure that the function is available and working.

Access the Help Text Subsystem

▶ **To access the Help Text subsystem:**

1   Enter "ncsth" at the Next prompt.

    The Help Text main menu should be displayed.

2   Enter "L" in the Function field to list the available help members.

    Ensure that the Natural Construct help members are loaded.

Access the Administration and Modeling Subsystem

▶ **To access the Administration and Modeling subsystem:**

1   Logon to the SYSCST library.

2   Enter "menu" at the Next prompt.

    The Administration main menu should be displayed.

3   Enter "M" in the Function field.

    The Maintain Models panel is displayed.

4   Enter "B" in the Action field.

    The Select Model window is displayed. Ensure that the supplied models are loaded.

Maintain Natural Construct

This section describes the operational requirements to maintain and use Natural Construct. The following topics are covered:

- Access the Natural Construct Data File
- Access the Model Maintenance Facilities
- Implement Security Using Sample Exit Subprograms
- Maintain the Natural Construct Generation Environment
- Maintain the Natural Construct Runtime Environment

Access the Natural Construct Data File

To run Natural Construct-generated modules, you must have access to the Natural Construct data file. The supplied models, as well as help text used by Natural Construct and Natural Construct-generated modules, are stored in the Natural Construct data file. Therefore, every Natural transaction that uses Natural Construct facilities must either:

■ Be linked to a NATPARM module that includes the NTLFILE definition for the Natural Construct data file (for more information, see *Step 1: Establish Natural Construct Data File*).

   or

■ Be invoked using the LFILE dynamic parameter to specify the Natural Construct data file, for example:

```
LFILE=(227,DBID,FNR)
```

where:

- *227* identifies Natural Construct
- *DBID* identifies the database ID of the Natural Construct data file
- *FNR* identifies the file number of the Natural Construct data file

▶ **To create an environment that does not require the NTLFILE macro or LFILE dynamic parameter:**

1   Recatalog the following DDMs:

- NCST-HELP
- NCST-HELP-LINES
- NCST-PROFILE

2   Recatalog the following subprograms:

- CD-HELP
- CD-HELPR
- CD-HELPL
- CD-HPRED

These subprograms can then use the Natural Construct data file without requiring the NTLFILE macro or LFILE dynamic parameter.

Access the Model Maintenance Facilities

Access the Natural Construct models, code frames, and control record maintenance facilities from the SYSCST library in the FNAT system file. To use these facilities, the Natural transaction must use a Natural FNAT system file in which Natural Construct is loaded. You can use Natural Security to restrict access to the maintenance facilities.

The Natural Construct definition and model maintenance facilities do not require Predict.

Implement Security Using Sample Exit Subprograms

Natural Construct supplies sample exit subprograms for the Administration and Help Text subsystems. These subprograms allow you to implement security or restrict access to various objects (models, code frames, model subprograms, help text members, etc.).

If the sample exit subprograms are in a library within the Administration or Help Text subsystem, Natural Construct invokes the applicable subprogram to enforce security when an object and action are requested. Depending on the value specified, the subprogram grants or denies access.

The following table lists the supplied sample exit subprograms, the panels they secure, and the libraries they are invoked from:

Subprogram	Panel Secured	Library Invoked From
CSXDUEXT	Administration main menu	SYSCST
CSXMUEXT	Maintain Models	SYSCST
CSXFUEXT	Code Frame menu	SYSCST
CSXSUEXT	Maintain Subprograms	SYSCST
CSXHUEXT	Help Text main menu	SYSLIBS

Note: The CST*nnn*.INPL dataset contains examples of the sample exit subprograms. The sample subprograms are initially loaded into the SYSCSTX library. If you want to activate a subprogram, modify the subprogram and copy it to the library indicated above. Always keep a backup copy of any modified sample exit subprogram.

Maintain the Natural Construct Generation Environment

This section describes the generation environment for Natural Construct. It contains information about the applicable FNAT and FUSER system files, how to control access to the generation environment, the modules required in the environment, and any Predict and steplib considerations.

The following topics are covered:

- FNAT System File
- Control Access to the Generation Environment
- Required Modules
- Predict Support

FNAT System File

The modules you require to use the Generation and Help Text subsystems are stored in the SYSLIBS protected library in the FNAT system file. To use these facilities, the Natural transaction must use the FNAT system file into which Natural Construct is loaded.

Control Access to the Generation Environment

You can use Natural Security to control access to the Generation and Help Text maintenance facilities.

- When you disallow access to NCSTG and NCSTBGEN, users cannot access the generation facilities. (The NCSTBGEN module invokes the Natural Construct batch regeneration facility.)

- When you disallow access to NCSTH, users cannot access the help text facilities.

Required Modules

The supplied code frames and models require certain modules when a Natural Construct-generated module is cataloged, stowed, or run. These modules are necessary because the generated modules contain INCLUDE statements and references to external global, local, and parameter data areas. When Natural Construct is installed, modules that support the INCLUDE statements and external data definitions are loaded into the FNAT SYSTEM library.

Predict Support

To use the generation facilities, Predict must be available in the generation environment and the Natural transaction must use Predict V8.2 or higher.

Maintain the Natural Construct Runtime Environment

This section describes the runtime environment for Natural Construct. It contains information about required modules and steplib considerations.

Required Modules

At runtime, Natural Construct-generated modules must have access to several supplied modules in the current library or a steplib. Generated modules use the Natural subprograms contained in the supplied modules to provide command processing, password checking, and context-sensitive help. These supplied modules must reside in either:

■ the current library at the time the generated module is invoked or run

  or

■ a steplib

Steplib Support

Natural Construct installs the CD* and CC* runtime modules in the FNAT SYSTEM library. If you place modified versions in your FUSER SYSTEM library, these modules can be overridden. The CD* modules include the external data areas, the command-processing and password-checking programs, and the context-sensitive helproutines and subprograms. The CC* modules contain shared copy code members.

4 Installing the Business Services Repository and Server Components

Install Natural Business Services

This section describes how to install Natural Business Services. The following topics are covered:

Dataset Summary

The following table identifies the Natural Business Services dataset, job, and step names:

Dataset Name	Job Name	Step Name
NBS*nnn*.INPL	I061	1370
NBS*nnn*.SYS1	I050	1372
NBS*nnn*.SYS2	I050	1373
NBS*nnn*.NCSR	I061	1371

> **Note:** The NBS*nnn*.NCSR dataset is automatically installed on the server during the installation of Natural Business Services. You must manually install this dataset on any client that does not have Natural Business Services installed. For information, see *Installing the Natural Client Service Runtime Component*.

Step 1: Install Natural Construct

You must install the new version of Natural Construct before installing Natural Business Services. For information, see *Installing Natural Construct*.

Step 2: Create Administration Subsystem Data Files (First-Time Installation Only)

- Job I050, Step 1370

If you are installing Natural Business Services for the first time, you must create the Business Service Administration subsystem data files. To do this, load two files from the installation tape: one contains security-related data (secured data) and the other contains all other data (unsecured data).

Because the data is contained in two files, you can cipher secured data without ciphering all Business Service Administration subsystem data. When loaded, the files are empty. After the

physical files are created, a Natural program populates the files. To dynamically access these files, use the following LFILE values:

- LFILE 135 to access the secured data

- LFILE 136 to access the unsecured data

This section describes how to load secured and unsecured data. The following topics are covered:

- Load Secured Data
- Load Unsecured Data

Load Secured Data

Loading this data differs, depending on whether you cipher the secured data. The following sections describe how to load secured data ciphered and unciphered.

> **Note:** Minimum recommended sizes are: DSSIZE=50B, NISIZE=50B, and UISIZE=20B.

Ciphered

- Job I050, Step 1370 and 1371

To cipher secured data, refer to the sample job in the NBS*nnn*.JOBS (z/OS) or NBS*nnn*.LIBJ (z/VSE) dataset. You may have to modify the job to reflect your environment. To load this file, use the same file number and DBID values used for logical file 135.

> **Note:** SMA (System Maintenance Aid) does not support the loading of secured and ciphered data under BS2000/OSD.

Unciphered

- Job I050, Step 1372; NBS*nnn*.SYS1 dataset

The Adabas ADALOD utility loads the Business Service Administration subsystem data file. The NBS*nnn*.SYS1 dataset is an unloaded Adabas V7 file; use this file as input to the ADALOD utility. To load this file, use the same file number and DBID values used to define NTLFILE 135 (see *Step 3: Load Administration Subsystem Components*).

Set the following minimum sizes for the ADALOD utility:

- MAXISN=20000

- DSSIZE=5

- NISIZE=300B

- UISIZE=50B

Load Unsecured Data

▪ Job I050, Step 1373; NBS*nnn*.SYS2 dataset

The Adabas ADALOD utility loads the Business Service Administration subsystem data file. The NBS*nnn*.SYS2 dataset is an unloaded Adabas V7 file; use this file as input to the ADALOD utility. To load this file, use the same file number and DBID values used to define NTLFILE 136 (see *Step 3: Load Administration Subsystem Components*).

Set the following minimum sizes for the ADALOD utility:

▪ DSSIZE=200B

▪ NISIZE=100B

▪ UISIZE=40B

Step 3: Load Administration Subsystem Components

▪ Job I061, Step 1370; NBS*nnn*.INPL dataset

This dataset contains modules for the Business Service Administration subsystem. The modules are stored in the SYSBIZ, SYSLIBS, and SYSTEM libraries in the FNAT system file. Ensure that the FNAT parameter value correctly identifies the desired system file. Use the following input to the INPL utility:

```
INPL
B
FIN
```

> **Note:** Assign NBS*nnn*.INPL to CMWKF01.

Step 4: Migrate Repository Data (Conditional)

You have three options to migrate repository data from an existing version of Natural Business Services to a new version. If you created a new repository file and have a new FUSER file for your new environment, use one of the options below.

> **Note:** If you created a new repository file, but want to use your existing FUSER file, use option 1.

Option 1: Deploy Services

▶ **To deploy your business services to the new repository:**

■ Use the Deploy option for a Natural Business Services plug-in in your existing environment.

For information, see the applicable plug-in guide.

> **Note:** If you are moving the Natural objects, the SYSMAIN utility must be available in the new environment. If not, you must move the objects manually. In addition, you must manually copy any Natural objects you have coded yourself. Natural Business Services only recognizes modules that are referenced in the code generation specifications.

Option 2: Copy Natural Objects

▶ **To copy the Natural objects:**

1 Re-create your domain and steplib definitions in the new repository file.

2 Copy your business service Natural objects to your new Natural Business Services environment (including the subprogram proxies).

> **Note:** The Natural SYSMAIN utility must be available in the new environment. If not, you must move the objects manually.

3 Use the Natural Construct batch generator to regenerate the service proxies in the appropriate libraries.

This will populate the service repository file.

Option 3: Import/Export Service, Domain, and Steplib Definitions

▶ **To import/export service, domain, and steplib definitions:**

1 Enter the "MENU AA MM DT" direct command from the SYSBIZ library in Natural Business Services V5.3.

The **Transfer Domains** menu is displayed.

2 Enter "XD" in `Function` to export your service, domain, and steplib definitions to a work file.

The **Export Domains** window is displayed.

3 Enter "ID" in `Function` to import your service, domain, and steplib definitions to your new environment.

The **Import Domains** window is displayed.

For more information, see *Data Transfer Utilities*.

Step 5: Migrate Security Group and User Definitions (Conditional)

▶ **To import/export security group and user definitions:**

1   Enter the "MENU SA MM DT" direct command from the SYSBIZ library in Natural Business Services V5.3.

    The **Transfer Groups** menu is displayed.

2   Enter "XG" in `Function` on the **Transfer Groups** menu to export your security group and user definitions to a work file.

    The **Export Groups** window is displayed.

3   Enter "IG" in `Function` on the **Transfer Groups** menu to import your security group and user definitions to your new environment.

    The **Import Groups** window is displayed.

For more information, see *Data Transfer Utilities*.

Activate the Business Service Administration Subsystem

To use the Business Service Administration subsystem, you must first activate the system. This section describes a series of updates and system-related functions you must perform to use the supplied demo application and samples. The following topics are covered:

- Step 1: Verify System File Assignments
- Step 2: Verify Natural Subtask Support
- Step 3: Verify USR* Subprogram Installation
- Step 4: Verify Software AG Editor Installation
- Step 5: Load Default Repository Data
- Step 6: Update Broker Attribute File
- Step 7: Verify Broker Attribute File
- Step 8: Verify Message Queue API
- Step 9: Confirm all Verifications
- Step 10: Define Batch Transaction
- Step 11: Launch the Attach Server

- Step 12: Launch Remaining Servers

Step 1: Verify System File Assignments

This step ensures that the profile was created correctly.

▶ **To verify the system file assignments:**

1   Invoke Natural using the new SYSBIZ profile.

2   Log onto the SYSBIZ library.

3   Issue the VERIFY command.

4   Enter "LF".

The following output is displayed:

```
Construct System File (LFILE 227) checked successfully
NBS Secured File (LFILE 136) checked successfully
NBS Unsecured File (LFILE 135) checked successfully
FNAT System File checked successfully
FUSER System File checked successfully
FDIC System File checked successfully
```

> **Note:** If you are installing Natural Business Services without Natural Construct, you do not require Predict. Therefore, you may encounter an Adabas 3061 error while reading the FDIC system file. If this happens, use the SYSPROF command to verify the system file assignments and, if necessary, override the assignments using the LFILE parameter or relink Natural with a suitable NTLFILE macro.

If any file fails to verify:

1. Correct the SYSBIZ profile.

2. Restart your Natural session.

3. Reissue the VERIFY command.

Step 2: Verify Natural Subtask Support

If your operating system supports multiple Natural batch sessions in one address space (for example, z/OS), use the Multi-Tasking Verification utility to verify that your environment is configured correctly. Then test the servers to ensure they are operating correctly.

Multi-Tasking Verification Utility

The TESTTASK utility verifies that your batch Natural nucleus and ADALNK are reentrant. To run servers in an environment that supports multiple Natural batch sessions in one address space, both conditions are required.

Before using the TESTTASK utility, ensure the following:

- The Natural batch nucleus includes the ADALNKR module or modified ADALNK module. For more information, see *Make the Nucleus Reentrant*.
- The ADALNKR or modified ADALNK module is updated to the correct SVC.
- The batch nucleus specifies `ADAPRM=ON`.
- The INCLUDE statement for ADAUSER is removed.

The Natural batch nucleus and ADALNK reentrant are provided with the following SMA jobs:

- Job I055, Steps 1370–1385
- Job I060, Steps 1370–1372

To start multiple Natural tasks, define the TESTSTSK module as a subtask started by TESTTASK. If your batch nucleus or ADALNK is not reentrant, the job that runs TESTTASK will not end. Otherwise, tracing is written to the job output showing the execution status of the subtasks.

The following JCL excerpt shows the parameters required to call TESTTASK:

```
SYSBIZ,userid,pswd
GLOBALS IM=D ID=/ IA=:
TESTTASK
*/ETID=12301,STACK=(LOGON SYSBIZ,userid,pswd;TESTSTSK 10)
*/ETID=12302,STACK=(LOGON SYSBIZ,userid,pswd;TESTSTSK 10)
*/ETID=12303,STACK=(LOGON SYSBIZ,userid,pswd;TESTSTSK 10)
*/ETID=12304,STACK=(LOGON SYSBIZ,userid,pswd;TESTSTSK 10)
*/ETID=12305,STACK=(LOGON SYSBIZ,userid,pswd;TESTSTSK 10)
.
FIN
/*
```

The job must also define work file 1. This work file can be routed to a printer device.

Step 3: Verify USR* Subprogram Installation

This step verifies that all required USR modules are available from within the current steplib chain.

▶ **To verify that all required USR modules are available:**

1   Log onto the SYSBIZ library.

2   Issue the VERIFY command.

3   Enter "US".

The VERIFY program calls the USR routines to confirm their availability.

Step 4: Verify Software AG Editor Installation

This step verifies the installation of the Software AG editor.

▶ **To verify the installation of the Software AG editor:**

1   Log onto the SYSBIZ library.

2   Invoke the VERIFY program.

3   Enter "SE".

The VERIFY program:

1. Opens a Software AG editor session.

2. Writes lines to the Software AG editor.

3. Reads the lines back from the Software AG editor.

4. Closes the Software AG editor session.

5. Writes out a success/fail message.

Step 5: Load Default Repository Data

Regardless of whether you are installing for the first time or over an existing version, you must perform this step to populate the Natural Business Services files with data required by version 8.2. The CSRLOAD program clears the source area, loads the current repository data, and generates entries required for the Broker attribute file. You must copy the entries manually.

▶ **To load the repository data:**

1   Log onto the SYSBIZ library.

2   Invoke the CSRLOAD program.

The following panel is displayed:

```
This process will load the current Business Files. Make sure your LFILES
are set correctly. This program also clears the source area and generates
entries required for the BROKER Attribute File. These must be copied manually.

Enter default values to be used to establish server records...
  Broker ID ........ BKRnnn_____
  Server qualifiers Prefix: _____ Suffix: _____
  Server Class ..... BUSINESS_____ Unicode (Y/N): N
  JCL Text Member .. BATCHTXT
  Transaction ...... NATBAT__
  Subtask Support .. Y
  Profile FNAT DBID  _13000
  Profile FNAT FNR . __1300
  Profile .......... SYSBIZ__

Natural Security Settings...
  Servers under NSC  _
  User id .......... _____
  Password .........

Mark default records to be loaded...
  X Users            X Groups           X Domains           X Steplibs
  X Servers          X Business Services X Security Links
```

> 💡 **Tip:** If you make any errors specifying this data, you can manually change the repository data in the Business Service Administration subsystem (enter "MENU SA MM SE" on the command line).

3   Specify default settings for the records to be generated.

You can use the default values for most settings. Specify the following fields:

Field	Description
Broker ID	Name of the broker to use in this environment.
Server qualifiers	Prefix and suffix values added to the names of the server records being created. The combination of prefix and suffix characters must be less than or equal to 10.
Unicode	If you want NBS servers to invoke Natural subprograms that contain Unicode parameters, enter "Y" in this field. For more information, see *Use Unicode Parameters for Your Business Service*. **Note:** 1. The Broker attribute file definition generated by CSRLOAD will be different for a Unicode dispatcher, since the generated entry for SERVER=DISPATCH, SERVICE=MAIN will require CONVERSION=SAGTCHA.

Field	Description
	2. The servers must run in a Unicode-enabled Natural environment.
Transaction	Name of the Natural nucleus under which the service will run. The default transaction name is NATBAT, but you can change the name if desired.
Subtask support	Verification of Natural subtask support. If the TESTTASK program completed successfully, "Y" is displayed. If not, "N" is displayed. For more information, see *Step 2: Verify Natural Subtask Support*.
Profile FNAT DBID and FNR	Database ID and file number for the Natural FNAT system file in which the SYSBIZ profile is located.
Profile	Name of the profile used. By default, SYSBIZ is displayed.
Natural Security Settings	If your servers run under Natural Security, mark Servers under NSC and specify a user ID and password; use the specified user ID and password to start all servers.

4   Press Enter.

The CSRLOAD program displays all records that are being loaded.

> **Note:** If any records currently exist in your Natural Business Services files, they will not be replaced. The output report indicates which records were not replaced. Rename or delete the existing records and rerun the CSRLOAD program, specifying only the objects you want to load.

Load Servers Only

When using the CSRLOAD program, you can optionally load the servers only (security, dispatch, security, etc.). When loading servers, determine whether the servers will use Natural Security and whether they will use batch jobs as Natural subtasks. Although the servers can use any combination of these options, problems may arise if you load a server that uses one option (for example, without assigning Natural Security) and then change the option (for example, specify Natural Security later). To eliminate this problem, you can load different sets of servers that have different options and specify a prefix or suffix to identify each set. For example, you can specify an "NSC-" prefix, select `Servers under NSC`, and enter a user ID and password. This allows the same set of servers to start up with and without Natural Security.

> **Notes:**

1. To allow the secure and non-secure servers to run at the same time, define the settings for both sets of servers in Broker.

2. The JCL templates must be different for both sets of servers, based on how the LOGON is issued. For more information, see *Step 10: Define Batch Transaction*.

You can also specify batch or subtask servers. Subtask servers are ideal as they use the least re-sources. The dispatch and security servers can run as Natural subtasks called from the Natural session that is running the attach server. The downside to this option is that it is more difficult to debug the servers. If the dispatch or security servers are not responding, run them as batch jobs first to determine the problem. To automatically load the batch job server definitions, change the Subtask Support option to "N" and change the prefix (for example, to BTCH-).

> **Tip:** Once the servers are running correctly, convert the security batch job into a started task. For information, see *Step 5: Define and Start an Attach Server*.

▶ **To load the servers only:**

1   Log onto the SYSBIZ library.

2   Invoke the CSRLOAD program.

3   Select one or more server options.

4   De-select all options except `Servers` in the Default Records to be Loaded section.

For example:

```
This process will load the current Business Files. Make sure your LFILES
are set correctly. This program also clears the source area and generates
entries required for the BROKER Attribute File. These must be copied manually.

Enter default values to be used to establish server records...
  Broker ID ........ BKRnnn_____
  Server qualifiers Prefix: _____  Suffix: _____
  Server Class ..... BUSINESS_____ Unicode (Y/N): N
  JCL Text Member .. BATCHTXT
  Transaction ...... NATBAT__
  Subtask Support .. Y
  Profile FNAT DBID  _13000
  Profile FNAT FNR . __1300
  Profile .......... SYSBIZ__

Natural Security Settings...
  Servers under NSC  _
  User id .......... _____
  Password .........

Mark default records to be loaded...
  _ Users            _ Groups           _ Domains            _ Steplibs
  X Servers          _ Business Services _ Security Links
```

5   Press Enter.

The selected servers are loaded.

Create Servers for Other Environments

You can also run the CSRLOAD utility again to create servers for other environments. To create servers for other environments, add a prefix or suffix as server qualifiers (for example, "NSC-" or "-NSC" to identify secure servers) and specify an alternate server class.

Step 6: Update Broker Attribute File

When the CSRLOAD program ends, the Natural source area contains the definitions required for the Broker attribute file. Copy these definitions from the source area to your Broker attribute file and confirm the following global settings:

```
*------------------------------------------------------------------*
* Broker specific Attributes / Definition of global resources     *
*------------------------------------------------------------------*
 DEFAULTS = BROKER
   NUM-CLIENT        = 250
   NUM-CONVERSATION  = 1000
   NUM-SERVER        = 50
   NUM-SERVICE       = 500
   NUM-LONG-BUFFER   = 500
   NUM-SHORT-BUFFER  = 2000
```

Step 7: Verify Broker Attribute File

This step verifies the additions to the Broker attribute file.

▶ **To verify the Broker attribute file additions:**

1   Log onto the SYSBIZ library.

2   Issue the VERIFY command.

3   Enter "AF".

A confirmation message is displayed:

```
Business service                       Broker service
----------------------- --------------------------------------------------
ATTACH                  BKR057/BUSINESSSERVICES-QA/ATTACH/MAIN
                        MAIN and CMD services registered successfully
CFACTORY                BKR057/BUSINESSSERVICES-QA/CFACTORY/MAIN
                        MAIN and CMD services registered successfully
DISPATCH                BKR057/BUSINESSSERVICES-QA/DISPATCH/MAIN
                        MAIN and CMD services registered successfully
SECURITY                BKR057/BUSINESSSERVICES-QA/Security/MAIN
                        MAIN and CMD services registered successfully
TIMESTAMP               BKR057/BUSINESSSERVICES-QA/TIMESTAMP/MAIN
                        MAIN and CMD services registered successfully
```

If any errors appear in the output, correct either the records in your Natural Business Services file or the definitions in your Broker attribute file and rerun the test.

Step 8: Verify Message Queue API

This step verifies the message queue API.

▶ **To verify the message queue API:**

1   Log onto the SYSBIZ library.

2   Invoke the VERIFY program.

3   Enter "MQ".

The VERIFY program:

1. Calls the message queue (conversation factory) APIs to pass data (as a multi-part message). This confirms that no limits are specified on Broker message lengths that will cause SQUSEND/SQURECV to fail.

2. Sends the binary values from H'00' to H'FF'. This confirms that no translation routine was added to the Broker attribute file.

3. Confirms that the data it receives matches the data it sent.

Step 9: Confirm all Verifications

This step confirms that all verifications have been successful.

▶ **To confirm all verifications:**

1   Log onto the SYSBIZ library.

2   Invoke the VERIFY program.

3   Enter "*".

The program performs all verifications and confirms that:

- the required Adabas files are available
- the required class/server/service combinations for NBS have been defined in the Broker attribute file
- the required Natural user exit routines are available
- the program editor is available
- the middleware connection is working

■ the steplib chain settings are correct

Step 10: Define Batch Transaction

In this step, create a new JCL template (BATCHTXT) you can use to launch your servers. Sample templates are supplied in the SYSBIZ library. Edit the following member for your server environment:

■ BATCHJCL (z/OS)

■ BATCHDCL (z/VSE)

■ BATCHBCL (BS2000/OSD)

■ For other environments, create the BATCHTXT member starting with a valid Natural batch job applicable to your operating system.

To define the batch transaction:

10A: Specify a Job Name

The job name can either be a specific value or a combination of the &JOB-PREFIX&JOB-NR substitution parameters (derives a unique job name). When the JCL is generated, the &JOB-PREFIX value is assigned a two-character value associated with the server it is invoking.

10B: Define Logon Parameters

If your servers run under Natural Security, supply a user ID and password as part of the LOGON SYSBIZ command. You cannot use the job name to define the user ID because the value is normally generated dynamically. Include `AUTO=OFF` in your NATPARM.

Under Natural Security, the LOGON command should appear as follows:

```
SYSBIZ user-ID,password
```

where *user ID* is a valid user linked to the SYSBIZ library.

> **Note:** Under z/OS, you can also specify the `USERID=YES` parameter in the NATOS module and supply a `USERID` parameter on your job card. In that case, the `USERID` parameter on the job card defines the Natural Security user, not the job name.

Example of Natural Input Parameters

Following the LOGON, the Natural input statements should appear as follows:

```
SPSSTART
&BUSINESS-SERVICE,%
&USER-ID,%
&PASSWORD,%
&TRACE-OPTION,%
&TRACE-LOCATION,%
&Q-BROKER-ID,%
&Q-USER-ID,%
&Q-TOKEN,%
&Q-Security-TOKEN,%
&Q-CONV-ID
&PROGPARM
FIN
```

10C: Define Work File 7

The JCL member should define work file 7 (CMWKF07).

■ If you are using the Natural subtasking feature, define work file 7 as a temporary file.

■ If you are invoking all servers as separate batch jobs, define work file 7 as a permanent file.

Save your modified JCL member as BATCHTXT.

10D: Test the Submitted Job

▶ **To test the submitted job:**

1   Invoke the BATCHTST program to test the generated JCL.

2   Override any values to reflect your environment.

3   Press Enter to generate the JCL into the source area.

4   Review the JCL for validity.

The Natural input statements should now contain the following:

```
VERIFY
*
.
SPSWKF07
```

If necessary, modify the original BATCHTXT member and repeat the test. Once valid JCL is generated, rerun BATCHTST and mark the Submit option. This submits a job to run the verify steps in batch. Monitor and review the submitted job using normal operating system commands.

Step 11: Launch the Attach Server

Launch the attach server. This server allows you to issue commands to the server.

▶ **To launch the attach server:**

1   Log onto the SYSBIZ library.

2   Enter "MENU SA MS" on the command line.

    The Manage Servers panel is displayed:

```
SPCMS      ***** Business Service Administration Subsystem *****        SPCMSO
Feb 14                        - Manage Servers -                        8:58 PM
                                                                             ↵

Action  Server                            Type     Attach Manager              ↵

------  --------------------------------  -------  ------------------------------
  ___      ATTACH-82-EXX                   Attach                                ↵

  ___      ATTACH-82-EXX-SECURE            Attach                                ↵

  ___      DISPATCH-82-EXX                 Server                                ↵

  ___      DISPATCH-82-EXX-BATCH           Server   ATTACH-82-EXX                ↵

  ___      DISPATCH-82-EXX-SECURE          Server   ATTACH-82-EXX-SECURE         ↵

  ___      DISPATCH-82-EXXTEST             Server                                ↵

  ___      SECURITY-82-EXX                 Server                                ↵

  ___      SECURITY-82-EXX-BATCH           Server   ATTACH-82-EXX                ↵

  ___      SECURITY-82-EXX-SECURE          Server   ATTACH-82-EXX-SECURE         ↵

Server .....: _____  Server type ..: _                  ↵

Replica ID .: _____  Repeat command: _                  ↵

Last command:                                                                  ↵

Respondent .:                                                                  ↵

                                                                               ↵

                                                                               ↵

Direct Command: _____   ↵

Debug     EndJob     EndService EnVironmnt Initiate   Ping      Refresh       ↵

SHutdown  STeplibs   SYsprof    (PF4=CLog) (PF5=flip)                          ↵
```

3   Type "I" beside the attach server.

4   Press Enter to initiate the attach server.

Note the name of the batch job submitted. In a few seconds, you should be able to issue other commands, such as Ping (P) or Environment (EV). If the ETB Error 7/7 (Service not registered) message is displayed, review the job, resolve any errors in BATCHTXT, and repeat the process.

Step 12: Launch Remaining Servers

With an attach server running, use the INITIATE command to launch the Timestamp service. In a few seconds, you should be able to ping this service. If not, perform one of the following steps:

■ If you are not using the Natural subtasking feature, review the JCL that was submitted and correct BATCHTXT.

■ If you are using the Natural subtasking feature, enter "D" (Debug command) beside the Timestamp server. A report is displayed, indicating the outcome. For example:

```
====================================ATTACH==============================
BKR057/BUSINESSSERVICE-QA/ATTACH/MAIN/B0FC1B6797BFAD01B0FC2313E9356601
Response: 1              Response code: 0000        Message ID:
Natural startup parameters ...
FNAT=(1000,1000),PROFILE=SYSBIZ, STACK=(LOGON SYSBIZ;SPSSTART USING_CMPARM
;SPSDATA) ETID=E1834186
Response: 2              Response code: 0000        Message ID:
Data passed via CMUPARM ...
Service=TIMESTAMP,Init User=,Parent Rid=B0FC1B6797BFAD01B0FC2313E9356601
Response: 3              Response code: 0000        Message ID:
Natural startup results ...
SPSSTART started in debug mode, for service TIMESTAMP
Checking system files ...
System files validated
Logon performed
Register performed
Server program: SPSTIMS    *DATA:   -1
Program SPSDATA invoked.    *DATA =    0
Stopping test due to debug mode
```

Review this report and try to diagnose the startup problem. Modify the Timestamp service records (enter "MENU SA MM SE" on the command line), as well as the records for all other services that use the SUBTASKB server start routine. Repeat the procedure until you are able to initiate and ping all servers.

For more information, see *Natural Business Services Administration*.

5 Installing the Natural Client Service Runtime Component

Dataset Summary

The following table describes the dataset required for the Natural client service runtime component:

Dataset Name	Job Name	Step Name
NBS*nnn*.NCSR	I061	1371

Install the Natural Client Service Runtime Component

To create a runtime environment for generated Natural clients, install this dataset in a non-Natural Business Services environment.

▶ **To install the Natural client service runtime component:**

1   Load the NBS*nnn*.NCSR dataset as follows:

- Invoke the Natural INPL utility.

- Set work file 1 to the dataset name.

- Enter the following:

```
INPL
B
```

2   Run the CVCLICOP utility.

This utility copies the USR and Natural routines required by the Natural client service runtime component. The following table describes which libraries the applicable routines are copied from and to:

Routines	From	To
USR	SYSEXT library	SYSTEM library
NAT	SYSLIBS library	SYSTEM library