software AG

Natural Engineer

Advanced Services for Unix

Version 9.1

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ADABAS & NATURAL

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Acknowledgements

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ABOUT THIS MANUAL

Purpose of this manual

This manual contains the Advanced Services for Natural Engineer on Unix.

It describes the various Advanced Services options available within Natural Engineer, which include:

- Creation of Test Data via Data Masking on ADABAS.

Target Audience

The target audience for this manual is intended to be any User of Natural Engineer at any level of experience.

Typographical Conventions used in this manual

The following conventions are used throughout this manual:

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

The following symbols are used for instructions:

$\Rightarrow$	Marks the beginning of an instruction set.
□	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

How this manual is organized

This manual is organized to reflect all the Advanced Services options of Natural Engineer in the following chapters:

Chapter	Contents
1	Describes the creation of Test Data via Data Masking on ADABAS.

Terminology

This section offers some of the terms that are specific to the Natural Engineer product.

Note: Familiarity is assumed with the general terminology of Natural, Adabas, Microsoft and Mainframe operating systems.

Analysis

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

Application

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

Browser

An Internet Browser such as Microsoft Internet Explorer or Netscape.

Category

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

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

Cobol

Abbreviation of Common Business Orientated Language. A programming language.

Cobol Link

A Cobol Link is the link between the individual Cobol modules and the executable Cobol program referenced in the JCL object.

Consistency

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

Data Item

A collective term used for any data fields within a programming object. These can be user-defined variables, DDM fields or System Variables. It is inter-changeable with the term 'variable'.

Environment

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

Exception

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

Generated Code

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

Impact

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

Iteration

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

JCL

Job Control Language.

JCL object

A JCL object is a collection of Job Control statements in the order which they are to be executed in a mainframe batch environment. Commonly referred to as JCL.

Library

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

Modification

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

Natural Engineer Advanced Services

Refactoring

Improving a computer program by reorganizing its internal structure without altering its external behavior.

Soft Link

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

TLM

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

Type

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

Variable

A collective term used for any data fields within a programming object. These can be user-defined variables, DDM fields or System Variables. It is inter-changeable with the term 'data item'.

Related Literature

The complete set of Natural Engineer manuals consists of:

1   Natural Engineer Concepts and Facilities (NEE91-006ALL)

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

2   Natural Engineer Release Notes (NEE91-008ALL)

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

3   Natural Engineer Installation Guide for Windows (NEE91-010WIN)
Natural Engineer Installation Guide for Mainframes(NEE91-010MFR)
Natural Engineer Installation Guide for Unix (NEE91-010UNX)

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

4   Natural Engineer Administration Guide (NEE91-040WIN)
Natural Engineer Administration Guide (NEE91-040MFR)
Natural Engineer Administration Guide (NEE91-040UNX)

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

5   Natural Engineer Application Management (NEE91-020WIN)
Natural Engineer Application Management (NEE91-020MFR)
Natural Engineer Application Management (NEE91-020UNX)

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

6   Natural Engineer Application Documentation (NEE91-022WIN)
Natural Engineer Application Documentation (NEE91-022MFR)
Natural Engineer Application Documentation (NEE91-022UNX)

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

Natural Engineer Advanced Services

7   **Natural Engineer Application Analysis and Modification (NEE91-023WIN)**
Natural Engineer Application Analysis and Modification (NEE91-023MFR)
Natural Engineer Application Analysis and Modification (NEE91-023UNX)

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

8   **Natural Engineer Application Restructuring (NEE91-024WIN)**
Natural Engineer Application Restructuring (NEE91-024MFR)
Natural Engineer Application Restructuring (NEE91-024UNX)

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

9   **Natural Engineer Utilities (NEE91-080WIN)**
Natural Engineer Utilities (NEE91-080MFR)
Natural Engineer Utilities (NEE91-080UNX)

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

10   **Natural Engineer Reporting (NEE91-025ALL)**

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

11   **Natural Engineer Batch Processing [Mainframes] (NEE91-026MFR)**
Natural Engineer Batch Processing [Unix] (NEE91-026UNX)

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

12   **Natural Engineer Messages and Codes (NEE91-060ALL)**

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

13   **Natural Engineer Web Interface Installation and Configuration Guide(NEA84-010ALL)**

The Web Interface Installation and Configuration Guide provides information on how to install and configure the Natural Engineer Web Interface.

14   **Natural Engineer Advanced Services (NEE91-017WIN)**
Natural Engineer Advanced Services (NEE91-017MFR)
Natural Engineer Advanced Services (NEE91-017UNX)

The Advanced Services manual describes various advanced options such as the Refactoring of Natural application source code with Natural Engineer, conversion of applications for Natural for Ajax, Business Rule processing and Data Masking.

DATA MASKING

Chapter Overview

This chapter describes the Natural Engineer Data Masking option available from the Advanced Services menu. Data Masking is accessed by selecting option 'D' (Data Masking) from the Advanced Services Menu screen

Data Masking or Data Obfuscation replaces sensitive data with fictitious, but realistic data that can be used for purposes such as software testing and user training.

True Data Masking Techniques via substitution transform confidential information whilst maintaining the integrity of the data. Other techniques such as character scrambling, data redaction ("X-ing" out characters) may render transformed data useless to end users.

The topics covered are:

1. Data Model Maintenance

2. Data Masking Rules Maintenance

3. Data Masking Calendar Maintenance

4. Data Masking Execution

Data Model Maintenance

The Data Model Maintenance option allows for the definition of relationships between Database files.

Data Model Maintenance Selection Screen

The Data Model Maintenance Selection screen is accessed by selecting option '**D**' (Data Model Maintenance) from the Data Masking Menu screen.

This screen presents a list of previously defined Data Models or allows the addition of a new one.

The following Figure 1-1 illustrates the Data Model Maintenance Selection screen.

```
                        - Select Data Model -

   Sel Data Models
     _   EMP-VEH
         Get Vehicles for Employees

















     Reposition -> _____

  Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
        Help        Exit              Add   Prev  Next                     Main
```

Figure 1-1 Data Model Maintenance Selection screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual Data Models can be selected. Valid selections are:
	'S' Select object.
	'E' Will display a pop-up allowing the Data Model Description to be modified..
	'D' Will delete the Data Model and all related Relationships.
Data Models	Provides a list of previously defined Data Models. Selecting a Data Model will display the Data Model Maintenance screen where the Data Model may be modified and relationships added or deleted.
Reposition	Reposition the list of Data Models starting from the new value entered. The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:

Value	Result
*	Will reposition at the start of the Data Model list.
EMP*	Will reposition at the first Data Model name that matches the mask EMP or is greater than the mask input.
EMP-VEH	Will reposition at the first Data Model name that matches the mask exactly or is greater than the object name input.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF4	Will display a pop-up allowing a new Data Model name and description to be added.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Data Model Maintenance Screen

The Data Model Maintenance Selection screen is accessed by selecting a Data Model from the Data Model Maintenance Selection screen.

This screen allows the definition of relationships between files within the Data Model.

Selecting a relationship will display the Data Model Relationship Maintenance screen allowing the relationship to be modified.

The following Figure 1-2 illustrates the Data Model Maintenance screen.

```
                      - Data Model Maintenance -

   EMP-VEH
   Get Vehicles for Employees


   Sel Relationships
    _   Get Vehicles for an Employee

    _   Get Employees from Same Department













 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help        Exit  EPT        Add   Prev  Next  S&T               Main
```

Figure 1-2 Data Model Maintenance screen

SCREEN ITEMS	DESCRIPTION
Data Model Name	The name of the selected Data Model.
Data Model Description	The description of the selected Data Model.
Select	This is the selection column where individual Relationships can be selected. Valid selections are:
	'**S**' Select the Relationship.
	'**E**' Will display a pop-up allowing the Relationship Description to be modified.
	'**D**' Will delete the Relationship.
Relationship	Provides a list of previously defined Relationships. Selecting a Relationship will display the <u>Data Model Relationship Maintenance</u> screen where the Relationship may be modified.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF4	Will display the <u>Entry Point Maintenance</u> screen allowing for the definition of entry points for the relationship.
	This is a mandatory process which has to be performed prior to <u>Data Masking Execution</u>.
PF6	Will display a series of File and Field selection pop-up screens allowing the specification of the From DDM and fields for the Relationship to be selected. The <u>Data Model Relationship Maintenance</u> screen will then be shown allowing a new Relationship to be added.
PF7	Displays previous page.
PF8	Displays next page.
PF9	Will display the <u>Database Sources & Targets</u> screen allowing the definition of database and file ids of the files that are to be modified.
	This is a mandatory process which has to be performed prior to <u>Data Masking Execution.</u>
PF12	Returns to the Natural Engineer Main Menu.

Data Model Entry Point Maintenance Screen

The Data Model Entry Point Maintenance screen is accessed by selecting **'PF4' (EPT)** from the <u>Data Model Maintenance Screen</u>.

This screen allows the definition of an Entry Point for a Data Model. The Entry Point is the starting point of records to be read that builds the required set of data. It is possible to specify a defined Descriptor/Super with single or a range of values.

This is a mandatory process that has to be performed before <u>Data Masking Execution</u> is performed.

Conditions can be specified to determine whether to accept the record read (For instance, only accept if SEX is F (Female).

The following Figure 1-3 illustrates the Data Model Entry Point Maintenance screen.

```
                 - Data Model Entry Point Maintenance -


   Data Model: EMP-VEH

          DDM: EMPLOYEES

        Field: PERSONNEL-ID_____  Operator: THRU

        Value: 11100102_____
               11100107_____










 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help  Del   Exit  Flds  Save                        Cond
```

Figure 1-3 Data Model Entry Point Maintenance screen

SCREEN ITEMS	DESCRIPTION
Data Model	The name of the selected Data Model.
DDM	The name of the DDM.
Field	The name of the field to be used as the Entry Point.
	The field maybe specified as *ISN. If the logic determining the top record is complex, a user defined program may be written to execute beforehand to create a list of ISNs in a work file to be used by the process to extract records.
Operator	The Operator to determine the records to be read.
Value From	The value of the record or the From value of the record if an Operator such as THRU has been selected.
Value To	The To value of the record if an Operator such as THRU has been selected.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Will delete the Entry Point details.
PF3	Exit from the current function and return to previous screen.
PF4	Will display a pop-up Field Selection screen allowing a field to be selected as the Entry Point.
PF5	Will save the Entry Point details and return to the Data Model Maintenance Screen.
PF10	Displays the Conditions screen allowing Bespoke or Simple Conditions to be applied to the Entry Point.

Conditions Screen

The Conditions screen is accessed by selecting '**PF10' (Cond)** from the <u>Data Model Entry Point Maintenance</u> screen or the <u>Data Model Relationship Maintenance</u> screen and allows for the specification of Simple or Bespoke conditions to be applied to the applicable process.

The following Figure 1-4 illustrates the Conditions screen: Simple Condition.

```
+----------------------------Conditions----------------------------+
!                                                                  !
!                                                                  !
!                                                                  !
!                                                                  !
!                                                                  !
 !      +--------------------Simple Condition--------------------+
 !      !                                                         !
 !      !   Field: SEX_____  Operator: EQ__   !
 !      !                                                         !
 !      !   Value: 'F'_____       !
 !      !                                                         !
 !      !                                                         !
 !      !        PF3 - Cancel  PF4 - Flds   PF5 - Confirm         !
 !      !                                                         !
 !      +---------------------------------------------------------+
 !                                                                  !
 !                                                                  !
 !                                                                  !
 !          PF3 - Cancel   PF4 - Simple    PF6 - Bespoke          !
! Please add a Simple or Bespoke Condition                         !
+------------------------------------------------------------------+
```

Figure 1-4 Conditions screen: Simple Condition

SCREEN ITEMS	DESCRIPTION
Simple Condition	
Field	The name of the field to be used as a condition in determining which records are to be read.
Operator	The Operator of the condition.
Value	The value of the condition.
Bespoke Condition	
Bespoke Conditions	Enables complex range of conditions to be defined e.g., ~SEX~ EQ 'F' AND ~SALARY~ GT 30000 would be only accepted if the person was female with a salary greater than 30,000. *Note: Database fields have to be enclosed by a tilda (~).*

PFKEYS	DESCRIPTION
Main Conditions screen	
PF3	Exit from the current function and return to previous screen.
PF4	Displays the Simple Conditions pop-up to allow a Simple Condition to be specified.
PF6	Displays the Bespoke Conditions pop-up to allow a complex Bespoke Condition to be specified.
Simple and Bespoke Conditions screen	
PF3	Exit from the current function and return to previous screen.
PF4	Will display a pop-up Field Selection screen allowing a field to be selected or use in the condition. *Note: This is only available for a Simple Condition.*
PF5	Accepts the Conditions input and returns to the previous screen.

Database Sources and Targets Screen

The Database Sources and Targets screen is accessed by selecting **'PF9' (S&T)** from the Data Model Maintenance Screen.

This is a mandatory process that has to be performed before Data Masking Execution is performed.

This screen allows the definition of database and file ids of the files that are to be modified. If extracting from a production environment to transfer to a test environment then a Source DBID/FNR and Target DBID/FNR needs to be specified.

If the file to be modified is loaded into a database on a test environment, then the 'Update the Database Directly' flag should be selected and only Source DBID/FNR needs to be specified.

The following Figure 1-5 illustrates the Database Sources & Targets screen.

```
                      - Database Sources & Targets -

 EMP-VEH
 If updating a Test Database directly, enter 'Y' below and enter Source
 DB/FNR. If extracting from a PROD Database to load a TEST Database,
 blank the option below and enter both the Source and Target DB/FNRs.
 Update the database directly?  Y


 Database Sources and Targets

 Sel DDM                             From DBID   FNR  To DBID    FNR
  _    EMPLOYEES                          200    201
  _    VEHICLES                           200    202






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

Figure 1-5 Database Sources & Targets screen

SCREEN ITEMS	DESCRIPTION
Data Model	The name of the selected Data Model.
Select	This is the selection column where individual Database Sources & Targets can be selected.
	Valid selections are:
	'S' Will display a pop-up allowing the Source and Target DBID/FNRs for the DDM to be modified.
	'D' Will delete the Source and Target DBID/FNRs for the DDM.
Update the Database Directly?	Should be set on only if the database to be updated resides in a test environment.
DDM	The name of the DDM.
From DBID	The Database ID of the Source Database.
From FNR	The File Number of the Source File.
To DBID	The Database ID of the Target Database.
	Note: This is not available if the Update the Database Directly flag is selected.
To FNR	The File Number of the Target File.
	Note: This is not available if the Update the Database Directly flag is selected.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.

Data Model Relationship Maintenance Screen

The Data Model Relationship Maintenance screens are accessed by selecting a Data Model Relationship on the <u>Data Model Maintenance Screen</u> or by hitting **'PF6' (Add)** on the same screen.

This first screen displayed shows the details for the From Relationship. The To Relationship details are shown by selecting **'PF11' (Cont.)** on the screen displaying the From details.

Data Model Relationship Maintenance screen – From Details.

This screen allows for the specification of one or more From fields for the relationship.

The following Figure 1-6 illustrates the Data Model Relationship Maintenance screen – From Details.

```
MFDMDM03                    - Relationship Maintenance -
  EMP-VEH                                                      FROM
  Description:  Get Vehicles for an Employee

  From DDM:      EMPLOYEES

  Sel Field                      Format Length  Start   End
   _   PERSONNEL-ID              AA   A   8       1       8

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  DDMs  Exit  Flds            Prev  Next       Cond  Cont. Main
```

Figure 1-6 Data Model Relationship Maintenance screen – From Details

SCREEN ITEMS	DESCRIPTION
Data Model	The name of the selected Data Model.
Description	The description of the Relationship.
Select	This is the selection column where individual From Relationship Fields can be selected.
	Valid selections are:
	'**S**' Will display a pop-up allowing the Start and End Byte positions for the field to be modified.
	'**D**' Will delete the field from the Relationship.
	'**U**' Will move the field up the From Field list.
From DDM	The name of the From DDM.
Name	The name of the From field.
2-Byte ADABAS Mnemonic	The ADABAS short name for the From field.
F	The data format of the From field.
Length	The length of the From field.
Start	The start byte position of the From field.
End	The end byte position of the From field.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Will display a pop-up DDM Selection screen allowing a DDM to be selected as the From DDM for the Relationship.
PF3	Exit from the current function and return to previous screen.
PF4	Will display a pop-up Field Selection screen allowing one or more fields to be selected as From fields for the Relationship.
PF7	Displays previous page.
PF8	Displays next page.
PF10	Displays the Conditions screen allowing Bespoke or Simple Conditions to be applied to the From Relationship.
PF11	Displays the Data Model Relationship screen - To details for the Relationship.
PF12	Returns to the Natural Engineer Main Menu.

Data Model Relationship Maintenance screen – To Details.

This screen allows for the specification of one To field for the relationship.

The following Figure 1-7 illustrates the Data Model Relationship Maintenance screen – To Details.

```
                    - Relationship Maintenance -
                                                         TO
   EMP-VEH

   To DDM:  VEHICLES

   Sel Field                          Format Length  Start   End
    _   PERSONNEL-ID                   AC  A  8       1       8

       Fixed Replacements
             Offset Length Value
        Prefix:     1
        Suffix:

        Parent
        Relationship:
        Relationship Type:  1:1    1:many Y  many:many




Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  DDMs  Exit  Flds  Save                    Par   Cond.        Main
```

Figure 1-7 Data Model Relationship Maintenance screen – To Details

SCREEN ITEMS	DESCRIPTION
Data Model	The name of the selected Data Model.
Select	This is the selection column where individual To Relationship Fields can be selected.
	Valid selections are:
	'S' Will display a pop-up allowing the Start and End Byte positions for the field to be modified.
	'P' Will display the Fixed Value Prefix/Suffix screen.
To DDM	The name of the To DDM.
Name	The name of the To field.
2-Byte ADABAS Mnemonic	The ADABAS short name for the To field.
F	The data format of the To field.
Length	The length of the To field.
Start	The start byte position of the To field.
End	The end byte position of the To field.
Fixed Replacements	Contains information regarding any Fixed Value Prefix/Suffix details that have been added.
Parent Relationship	The Parent Relationship (if any).
Relationship Type	The type of the relationship.
	Options are:
	1-1
	1-Many
	Many-Many

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Will display a pop-up DDM Selection screen allowing a DDM to be selected as the To DDM for the Relationship.
PF3	Exit from the current function and return to previous screen.
PF4	Will display a pop-up Field Selection screen allowing a field to be selected as the To Field for the Relationship.
PF5	Saves the Relationship and returns to the Data Model Maintenance screen.
PF9	Will display a pop-up screen allowing a Parent Relationship to be selected if appropriate.
PF10	Displays the Conditions screen allowing Bespoke or Simple Conditions to be applied to the To Relationship.
PF12	Returns to the Natural Engineer Main Menu.

Fixed Value Prefix/Suffix screen

The Fixed Value Prefix/Suffix screen allows a fixed replacement value to be specified for the front and/or the end of the To field.

The following Figure 1-8 illustrates the Fixed Value Prefix/Suffix screen.

```
                      - Relationship Maintenance -
                                                               TO
   EMP- +-------------Edit Prefix/Suffix Replacements---------------+
        !                                                           !
   To D !  Prefix                                                   !
        !                                                           !
   Sel  !  Offset:  1       Length: _____                           !
    p   !  Value:   _____      !
        !                                                           !
        !  Suffix                                                   !
        !                                                           !
        !  Offset: _____    Length: _____                           !
        !  Value: _____          !
        !    thru _____          !
        !                                                           !
        !           PF3 - Cancel    PF5 - Confirm                   !
        !                                                           !
        +-----------------------------------------------------------+



 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help  DDMs  Exit  Flds  Save                    Par  Cond.        Main
```

Figure 1-8 Fixed Value Prefix/Suffix screen

SCREEN ITEMS	DESCRIPTION
Prefix group	
Offset	The position from the front of the field to start applying the fixed value replacement. This is a non-modifiable field set to offset 1.
Length	The length of the fixed value replacement for the prefix.
Value	The value to be replaced for the prefix.
Suffix group	
Offset	The position from the start of the field to start applying the fixed value replacement for the suffix.
Length	The length of the fixed value replacement for the suffix.
Value Start	The start value to be replaced for the suffix.
Value End	The end value to be replaced for the suffix.

PFKEYS	DESCRIPTION
PF3	Exit from the current function and return to previous screen.
PF5	Saves the Fixed Value Replacement details and return to the Data Model Relationship Maintenance screen - To details screen.

Data Masking Rules Maintenance

The Data Masking Rules Maintenance option allows for the definition of masking rules that will be applied against the data within the specified files.

Data Masking Rules Maintenance Selection Screen

The Data Masking Maintenance screen is accessed by selecting option '**R**' (Data Masking Rules Maintenance) from the Data Masking Menu screen.

This screen presents a list of previously defined Data Models.

The following Figure 1-9 illustrates the Data Masking Rules Maintenance Selection screen.

```
                         - Select Data Model -

   Sel Data Models
    _   All Data Models

    _   EMP-VEH
        Get Vehicles for Employees

















     Reposition -> _____

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

Figure 1-9 Data Masking Rules Maintenance Selection screen

SCREEN ITEMS	DESCRIPTION
All Data Models	Selecting this will only show those rules that are applicable to every Data Model. It does not show ALL rules regardless.
Select	This is the selection column where individual Data Models can be selected. Valid selections are: '**S**' Select Data Model.
Data Models	Provides a list of previously defined Data Models. Selecting a Data Model will display a pop-up showing the DDMs that are applicable to the selected Data Model. Selecting a DDM will display the Data Masking Rule Selection screen displaying all the rules defined for the Data Model/DDM combination and allowing for the definition of new rules.
Reposition	Reposition the list of Data Models starting from the new value entered. The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:

Value	Result
*	Will reposition at the start of the Data Model list.
EMP*	Will reposition at the first Data Model name that matches the mask EMP or is greater than the mask input.
EMP-VEH	Will reposition at the first Data Model name that matches the mask exactly or is greater than the object name input.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Data Masking Rule Selection Screen

The Data Masking Rule Selection screen is accessed by selecting a Data Model/DDM combination from the <u>Data Masking Rules Maintenance selection</u> screen.

This screen presents a list of previously defined Data Models.

The following Figure 1-10 illustrates the Data Masking Rule Selection screen.

```
                    - Select Data Masking Rule -

     EMP-VEH
     EMPLOYEES
 Sel Field                       Rule Type
  _  BIRTH                       Add a nbr of days to a date
     Date Field will be incremented by a random number  of days
  _  BONUS                       Add a %age value
     Field will be incremented by 2%
  _  CITY                        Replace with a random value from a file
     This field will be replaced with a random value from file UK-ADDR
  _  FIRST-NAME                  Replace with a random value from a file
     This field will be replaced with a random value from file UK-FN-F when S
  _  FIRST-NAME                  Replace with a random value from a file
     This field will be replaced with a random value from file UK-FN-M when S
  _  LEAVE-START                 Add a nbr of days to a date
     Date Field will be incremented by a random number  of days



 Reposition -> _____

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
     Help      Exit            Add  Prev Next                      Main
```

Figure 1-10 Data Masking Rule Selection screen

SCREEN ITEMS	DESCRIPTION
Data Model	The name of the Data Model.
DDM	The name of the DDM.
Select	This is the selection column where individual Data Models can be selected. Valid selections are:
	'**S**' Will display the Data Masking Rule Definition screen allowing the existing Rule to be modified.
	'**D**' Will delete the Rule.
Field	The name of the field related to the Rule.
Rule Type	The name of the Rule specified.
Summary	Short description of the type of Rule specified.
Reposition	Reposition the list of Rules starting from the new value entered. The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:

Value	Result
*	Will reposition at the start of the Rule list.
EMP*	Will reposition at the first Rule name that matches the mask EMP or is greater than the mask input.
EMP-VEH	Will reposition at the first Rule name that matches the mask exactly or is greater than the name input.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF6	Will display a series of pop-ups allowing specific Rule Types and associated DDMS to be selected and then displaying the Data Masking Rule Definition screen to allow the rule to be added.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Data Masking Rule Definition Screen

The Data Masking Rule Definition screen is accessed by selecting a Rule from the <u>Data Masking Rule Selection</u> screen or by hitting **'PF6' (Add)** on the same screen.

Different Rule Types will display different screens depending on what type of rule needs to be applied.

The following Figure 1-11 illustrates the Data Masking Rule Definition screen for an Add a nbr of days rule.

```
                    - Data Masking Rule Definition -

  Rule Type:  Add a nbr of days to a date
  Data Model: EMP-VEH
  DDM/Field:  EMPLOYEES/BIRTH


  Mask Ref: _____    Keep Nulls?: Y

  Mask:    YYYYMMDD_____             Move forward/back
  Business Day? Y   Calendar: GBR-GREAT BRITAIN      to a business day  F

  Value 1.: 2_____
  Value 2.: 3_____
  Value 3.: _____
  Value 4.: _____




 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  RTyp  Exit       Save                    Cals  Cond        Main
```

Figure 1-11 Data Masking Rule Definition screen

SCREEN ITEMS	DESCRIPTION

Fields displayed for every Rule Type

Rule Type	The short description of the Rule Type that has been selected. Further information regarding the Rule Type may be obtained by hitting **'PF2' RTyp.**
Data Model	The name of the Data Model.
DDM/Field	The name of the DDM and DDM field.
Mask Reference	The Mask Reference is an identifier to ensure that the same masking values are utilized within a set of data created from an Entry Point Record. This is especially important with key data. It should be set to the same value on each related rule.
Keep Nulls?	If selected this will not modify the contents of the field by the masking value if the value is null.

Individual Rule Type options

Replaced with a FIXED value Rule options

Value 1	Contains the fixed value that will be used to replace the selected field.

Add a FIXED value Rule options

Value 1	Contains the fixed +/- value that will be used to increment the selected field.
Value 3	Contains the lowest value that the field could be if the result should be in certain bounds.
Value 4	Contains the highest value that the field could be if the result should be in certain bounds.

Add a %age value Rule options

Value 1	Contains the fixed +/- percentage value that will be used to increment the selected field.
Value 3	Contains the lowest value that the field could be if the result should be in certain bounds.

SCREEN ITEMS	DESCRIPTION
Value 4	Contains the highest value that the field could be if the result should be in certain bounds.

Replaced with a random value from a file Rule options

File	Contains the file name which a random value will be chosen from to replace the selected field.

Execute a user defined subprogram Rule options

File	Contains the text member name if a data source is required.
Executable	The name of the user defined subprogram which will generate the value to replace the field.

Add a nbr of days to a date Rule options

Mask	If the selected field format is other than D (Date), the Mask input field will be visible.
	Enter the data mask as stored in the database in the field marked Mask e.g. for a date stored as 31122017 in an N08 field then enter the Mask as DDMMYYYY
Business Day	If the resulting date is to be a business day then this should be checked.
Calendar	The Calendar to use to check if the date is a business day. This would have been set up by the Data Masking Calendar Maintenance function. It is only available if Business Day is selected.
Move forward/back to a business day	Set this to **'B'** to ensure that the result is a business day the result should be moved back to a business day as defined by the calendar.
	Set this to **'F'** to ensure that the result is a business day the result should be moved forward to a business day as defined by the calendar.
Value 1	Contains the lowest random number of days that the date field will be incremented by.
Value 2	Contains the highest random number of days that the date field will be incremented by.
Value 3	Contains the lowest value that the field could be if the result should be in certain bounds. The date should be in the format YYYYMMDD.

SCREEN ITEMS	DESCRIPTION
Value 4	Contains the highest value that the field could be if the result should be in certain bounds. The date should be in the format YYYYMMDD.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Displays information regarding the Rule Type selected *Note: The text for this field is provided by DM* Text members in the SYSNEE library.*
PF3	Exit from the current function and return to previous screen.
PF5	Saves the Rule details and returns to the Data Masking Rule Selection screen.
PF9	Displays a pop-up allowing a Calendar to be selected. *Note: This is only available if Business Day is selected.*
PF10	Displays the Conditions screen allowing Bespoke or Simple Conditions to be applied to the Entry Point.
PF12	Returns to the Natural Engineer Main Menu.

Data Masking Calendar Maintenance

The Data Masking Calendar Maintenance option allows for the definition of Calendars to assist in determining whether a date is a business day or not. It is used by Calendar Rules such as "Add a nbr of days to a date". These would be defined and maintained by the Data Masking Rule Definition screen.

Data Masking Calendar Maintenance Selection Screen

The Data Masking Maintenance screen is accessed by selecting option '**C**' (Data Masking Calendar Maintenance) from the Data Masking Menu screen.

This screen presents a list of previously Calendars.

The following Figure 1-12 illustrates the Data Masking Calendar Maintenance Selection screen.

```
                    - Data Masking Calendar Maintenance-

                Sel  Calendars
                  _    DE - GERMANY
                  _    GBR - GREAT BRITAIN
                  _    SWE - SWEDEN

















           Reposition->
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help       Exit            Add   Prev  Next                      Main
```

Figure 1-12 Data Masking Calendar Maintenance Selection screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual Calendars can be selected. Valid selections are: '**S**' Select Calendar. '**D**' Delete Calendar.
Calendars	Provides a list of previously defined Calendar. Selecting a Calendar will display the Data Masking Calendar Maintenance screen where the Calendar may be modified..
Reposition	Reposition the list of Calendars starting from the new value entered. The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:

Value	Result
*	Will reposition at the start of the Calendar list.
GBR*	Will reposition at the first Calendar name that matches the mask GBR or is greater than the mask input.
UK	Will reposition at the first Calendar name that matches the mask exactly or is greater than the object name input.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF6	Displays the Data Masking Calendar Maintenance screen where new Calendars may be added.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Data Masking Calendar Maintenance Screen

The Data Masking Calendar Maintenance screen is accessed by selecting **'PF6' (Add)** from the Data Masking Calendar Maintenance Screen.

It allows for the specification of new Calendar details or the modification of an already existing Calendar.

The following Figure 1-13 illustrates the Data Masking Calendar Maintenance screen.

```
                  - Data Masking Calendar Maintenance-

         +-----------------Calender Maintenance------------------+
         !                                                       !
         !    Country Code:  GBR  Name: GREAT BRITAIN_____     !
         !                                                       !
         !    Working Days:        Sel Public Holidays           !
         !          Monday  Y       _  Sunday  1 January 2017     !
         !          Tuesday Y       _  Monday 25 December 2017    !
         !          Wednesday Y     _  Saturday  3 March 2018     !
         !          Thursday  Y     _  Monday  5 March 2018       !
         !           Friday  Y      _  Tuesday  6 March 2018      !
         !          Saturday _      _  Wednesday  7 March 2018    !
         !            Sunday _      _  Thursday  8 March 2018      !
         !                          _  Friday  9 March 2018       !
         !                          _  Saturday 10 March 2018     !
         !                          _  Tuesday 25 December 2018   !
         !                                                       !
         !      PF3-Canc PF5-Save PF6-Hols PF7-Prev PF8-Next     !
         !                                                       !
Enter-P  +-------------------------------------------------------+ 11--PF12-
     Help         Exit               Add    Prev  Next                 Main
```

Figure 1-13 Data Masking Calendar Maintenance screen

SCREEN ITEMS	DESCRIPTION
Country Code	A unique identifier for the Calendar.
Name	The name of the Calendar.
Working Days	Select which days are to be working days for this Calendar.
Public Holidays	The list of Public Holidays defined for this particular Calendar.
Public Holidays Sel	This is the selection column where individual Public Holidays can be deleted. Valid selections are: '**D**' Delete Public Holiday.

PFKEYS	DESCRIPTION
PF3	Exit from the current function and return to previous screen.
PF5	Will save the Calendar details and return to the Data Masking Calendar Maintenance Selection Screen.
PF6	Displays a pop-up where Public Holidays may be added in format DD MM YYYY.
PF7	Displays previous page.
PF8	Displays next page.

Data Masking Execution

The Data Masking Execution allows for the execution of the previously defined rules against the required data.

There are two main methods of execution:

1. Extract from a Production Database for loading to a Test Database.

    Will utilize a Work File to migrate data from Production LPAR to Test.

    The Extraction Process will read data based on the Entry Point (EPT) that has been defined by the Data Model Entry Point Maintenance process. For each EPT Record returned, it will process all Relationships with Parent = 0. As it processes a Relationship, it will recursively call any Relationship with Parent = this.Relationship (nested Relationships).

    Once it has finished processing an EPT record (the whole set of data linked to that EPT Record), it will then process the next EPT Record.

    Records have any Data Masking rules applied & are then written to a Work File.

    As the Data Masking is applied as the records are processed before being written to the intermediate work file the original data is never seen.

    Data is written as compressed records (Format Buffer = C.). This file may then be transferred to the Test environment for loading into the Test Database.

2. Execute directly against a Test Database

    Will execute directly against files loaded in a Test Database.

    Processing is the same as Execution from a Production Database, except that instead of writing to the Work File it will directly issue the updates to the Test Database to apply the masking.

Data Masking Execution Screen

The Data Masking Execution screen is accessed by selecting option '**E**' (Data Masking Execution) from the Data Masking Menu screen.

To enable the execution to run each Data Model has to have an Entry Point and Database Sources & Targets defined.

The following Figure 1-13 illustrates the Data Masking Execution screen.

```
                      - Data Masking Execution -

  Sel Data Models
   _   EMP-VEH
       Get Vehicles for Employees













   Reposition -> _____

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
     Help      Exit                    Prev  Next                      Main
 'E' to Extract Data Model, 'M' to Mask files or 'L' to Load masked files
```

Figure 1-13 Data Masking Execution screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual Data Models can be selected.

Valid selections are:

'**E**' Extract Data Model.

Will invoke the Extract Data Model batch job via the NATRJE Job Submission screen.

The Extract Model will create a file of the Data Model and associated masking rules. This file could then be transferred to a different machine if required and would be used as an input to a Data Masking Batch job.

'**M**' Mask Files.

Will invoke the Mask Files batch job via the NATRJE Job Submission screen.

This will execute the Data Masking rules for the Data Model against the Source Database as specified in the Database Sources and Targets based on the Entry Point specified.

If executing directly against a Database it will directly issue the updates to that Database to apply the masking. If not, a work file will be created that may be loaded into an alternate Database using the Load function.

'**L**' Load Masked Files.

Will invoke the Load Masked Files batch job via the NATRJE Job Submission screen.

This will load a previously executed masked work file as created by the Execute process into the Target Database as specified in the Database Sources and Targets.

Data Models	Provides a list of previously defined Data Models.

Reposition	Reposition the list of Data Models starting from the new value entered. The reposition value can be input using either a complete name or part name using an '*' (asterisk) wildcard. For example:

Value	Result
*	Will reposition at the start of the Data Model list.
EMP*	Will reposition at the first Data Model name that matches the mask EMP or is greater than the mask input.
EMP-VEH	Will reposition at the first Data Model name that matches the mask exactly or is greater than the object name input.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

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