NaturalONE

External Objects in Predict

Version 9.3.4

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ADABAS & NATURAL

This document applies to NaturalONE Version 9.3.4 and all subsequent releases.

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Preface

Many Predict functions process Predict documentation data as well as implemented code. This simplifies creation and maintenance of documentation and external objects and guarantees consistency between documentation and implementation. This documentation describes in detail the functions which process both documentation and external objects.

This documentation covers the following topics:

Handling of External and Documentation Objects	An overview of the functions which process documentation and external objects. The information provided in this section is essential for understanding many functions described in later sections of this documentation.
Generation of External Objects	A wide variety of external objects can be generated from documentation objects stored in Predict.
Incorporation	Predict objects can be created by incorporating information from implemented objects which are stored in an external environment.
Administration of External Objects	Implemented objects that are connected to Predict objects can be administered using Predict functions.

1 About this Documentation

- Document Conventions 2
- Online Information and Support 2
- Data Protection 3

Document Conventions

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

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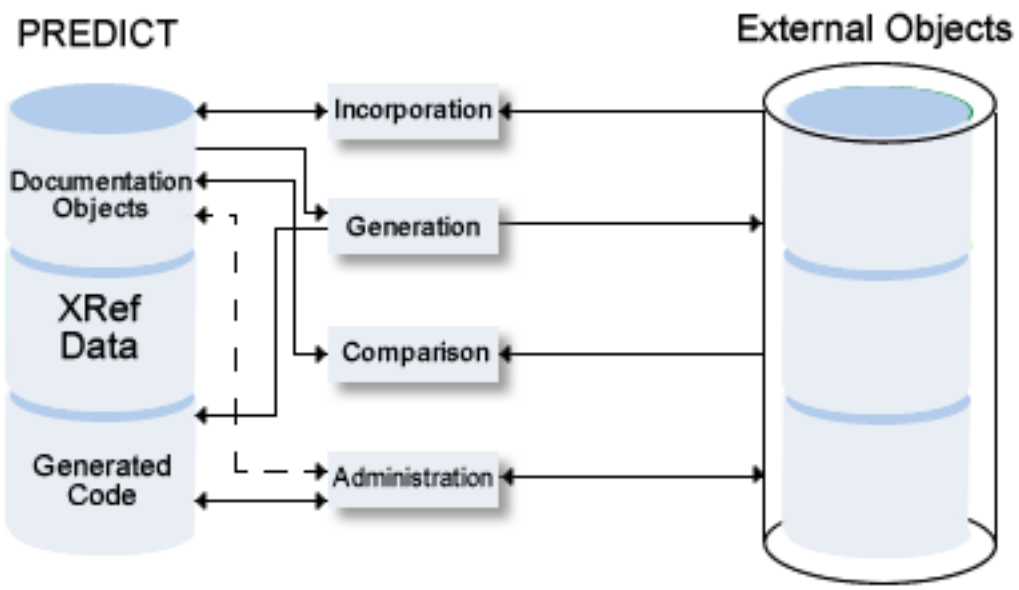
2 Handling of External and Documentation Objects

- What is an External Object 6
- Connection of External and Documentation Objects 7

Information stored in Predict objects can be used to generate external objects, and documentation objects can be incorporated from external objects. The concepts of handling external and documentation objects in Predict are described in this chapter.

Information provided in this chapter is needed to understand many options of generation, incorporation and comparison functions.



This chapter covers the following topics:

What is an External Object

In Predict, data definition objects for use in applications that can be connected to Predict documentation objects are called “external objects”.

The following rules apply.

Administration

- External objects can be generated from Predict documentation or be processed with incorporation functions.
- Each external object can be connected to a documentation object with a generation or incorporation function. For the impact of connecting external and documentation objects, see *Connection of External and Documentation Objects*.

- For external objects implemented with SQL (DB2, Oracle, SQL/DS storagegroups, databases, tablespaces, dbspaces, tables and views) Predict stores the SQL statements that have been generated in a generation protocol. If several generation runs are executed, the protocol is extended for each generation.
- The objects can be administered with utilities of the application environment (for example SYSDDM, SYSAOS, SYSDB2, Natural map editor).

Use

Most of the object types are used at run time. Some of these objects are stored directly in the application environment, others are stored in the Predict system file. For objects that are stored in the Predict system file, Predict data must therefore be accessible at run time of the application which uses the external objects.

Connection of External and Documentation Objects

Predict connects external objects and documentation objects if an external object has been generated from a documentation object or - vice versa - a documentation object has been incorporated from an external object.

Connecting external and documentation objects helps ensure the consistency of the documentation and an application: documentation objects and - to a certain extent - external objects that are connected are protected from being deleted or modified.

Impact of Connecting External and Documentation Objects

The connection of external objects and documentation objects affects the following activities.

- **Administration of External Objects**
  The administration of external objects connected to documentation objects can be restricted with the Predict parameters of the SYSDDM utility, AOS, SYSDB2 utility and Rule in map editor. See *Protection* in the section *General Defaults* in the *Predict Administration* documentation. If these parameters are set to C (connected) the respective utilities cannot be used to administrate external objects that are connected to a Predict object.
- **Modification of Predict Objects**
  Modification of Predict objects is affected as follows:
  - Predict file objects of type Adabas that are connected to an implemented file cannot be unlinked from the Predict database object they belong to.

- **Deleting Predict Objects**
  Deleting Predict objects is affected as follows:
  - Predict File and Verification objects connected to an external object cannot be deleted. To delete a Predict object connected to an external object, the two objects must be disconnected.
  - A generation protocol created by a Generate DB2 ... function can only be purged by purging or disconnecting the implemented DB2 object.
- **Incorporation of External Objects**
  As a general rule, only external objects not yet connected to a documentation object can be processed with incorporation functions.
- **Comparison of External and Documentation Objects**
  To compare an external object and a documentation object, both have to be connected.

Disconnecting Objects

External objects and documentation objects can be disconnected with the Dictionary View commands **Disconnect** and **Delete**. See *Administration of External Objects*.

I Generation of External Objects

This section covers the following topics:

About Generation
Generate for Adabas
Generate for Natural
Generate for DB2

3 About Generation

- Overview of Generation Functions 12
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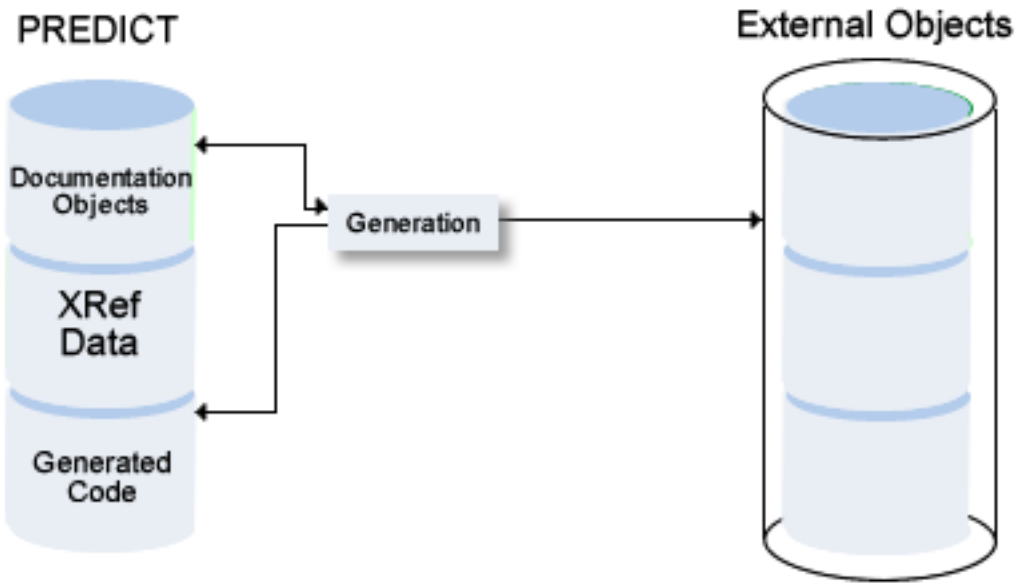
External objects can be generated from Predict objects.



Overview of Generation Functions

Object	Description of External Object
Adabas File	Adabas files are loaded directly into an Adabas database. If the file is already loaded, the differences of the implemented file and the documented file are determined and update commands are generated in order to transform the implemented Adabas file according to the documented file.
Data Definition Module	A collection of field definitions used by Natural for accessing a database.
DB2 database	A DB2 database is implemented directly as a physical DB2 database. Not applicable to SQL/DS.
DB2 procedure/function	This function requires an object of type Program as input, from which then either a procedure or a function is generated.
Verification rule	A rule must already have been generated using the Generate DDM function. Only the code of the rule is changed. The new rule will automatically be used by Natural maps that are cataloged.

Object	Description of External Object			
DB2-Storagegroup	Storagegroups are implemented directly from Predict storagespaces. If a storagegroup has already been implemented from the storagespace, the differences of the implemented DB2 storagegroup and the documented storagespace are determined and update commands are generated to adapt the implementation to the documentation.			
DB2 table/view	DB tables/views are implemented directly from Predict file objects of type D or E. If a table/view has already been implemented from the Predict table/view definition, the differences of the implemented DB2 table/view and the Predict table/view definition are determined and update commands are generated in order to change the implementation according to the documentation.			
DB2 tablespace SQL/DS DBspace	Tablespaces/dbspaces are implemented directly from Predict dataspaces. If a tablespace/dbspace has already been implemented from the dataspace, the differences of the implemented DB2 tablespace/ SQL/DS DBspace and the documented dataspace are determined and update commands are generated to transform the implementation according to the documentation.			
Oracle table/view	Oracle tables/views are implemented directly from Predict file objects of type OT or OV. If a table/view has already been implemented from the Predict table/view definition, the differences of the implemented Oracle table/view and the Predict table/view definition are determined and update commands are generated in order to change the implementation according to the documentation.			

Generation Defaults

Default generation values are set at installation. Most default values are displayed in the input screen of the respective generation function and can then be overwritten for temporary use.

The following rules apply for the use of default values for generation parameters:

- Default values of generation parameters can be changed in Predict: with the function Generation Defaults in the Modify Defaults menu or the command `DEFAULT object-code`.
- Generation defaults can be protected in Predict: by blanking out the "X" preceding the parameter in Modify ... Defaults screens. Protected default values cannot be changed when executing a generation function. The fields of protected parameters are locked in the **Generation Parameters** page of the schema generation wizard. These fields are skipped when positioning the cursor with the TAB key.
- Some default values are not displayed in the **Generation Parameters** page of the schema generation wizard and can therefore only be changed using the Modify Generation Defaults function in Predict. These parameters are described under *Presetting* in the descriptions of individual generation functions later in this section.

Common Parameters

Adabas Version

Note: If a new Adabas version is released that does not have any effect on Schema Generation functions, this new version will not appear in the selection menu. Use the code for the old version.

Code	Version	Remarks
I1	V 5.1 for IBM/Siemens	Applicable to all external object types for which this parameter can be specified. When generating copy/include code, sub/superdescriptors are not included in the record buffer layout.
I3	V 5.3 for IBM/Siemens	As above.
I6	V 6.1 for IBM/Siemens	As above. This Adabas version supports larger database and file numbers.
I7	V 7.1 for IBM/Siemens	As above.
I8	V 8.1 for IBM/Siemens	
I9	V 8.2 for IBM/Siemens	
O4	V 4.1 for IBM/Siemens	
U1	V 1.1 for Linux	
U4	V 2.2 for Linux	
U5	V 3.1 for Linux/Windows	
U6	V 3.2 for Linux/Windows	
U7	V 5.1 for Linux/Windows	
U8	V 6.1 for Linux/Windows	
U9	V 6.2 for Linux/Windows	

4 Generate for Adabas - Adabas File

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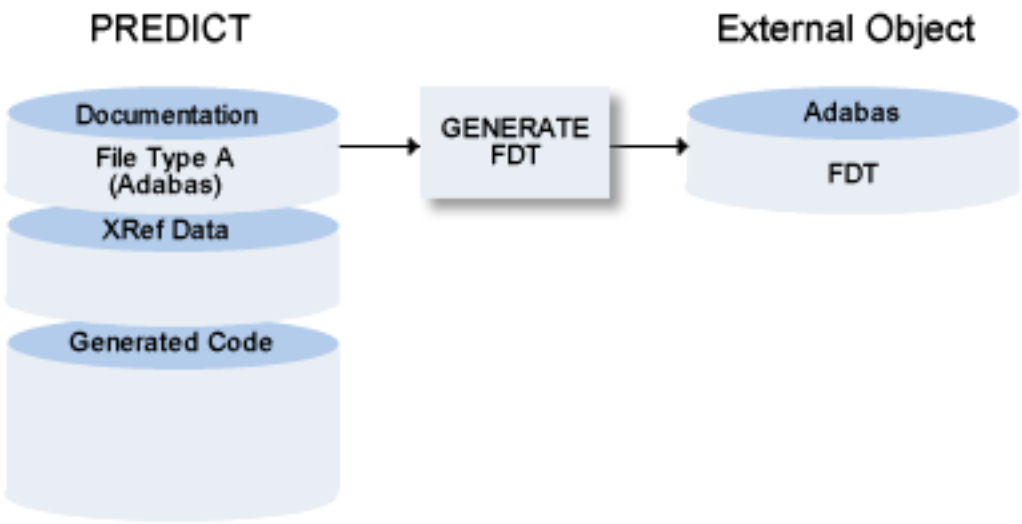
The function generates an Adabas FDT from a Predict file object of type A (Adabas).



Notes:

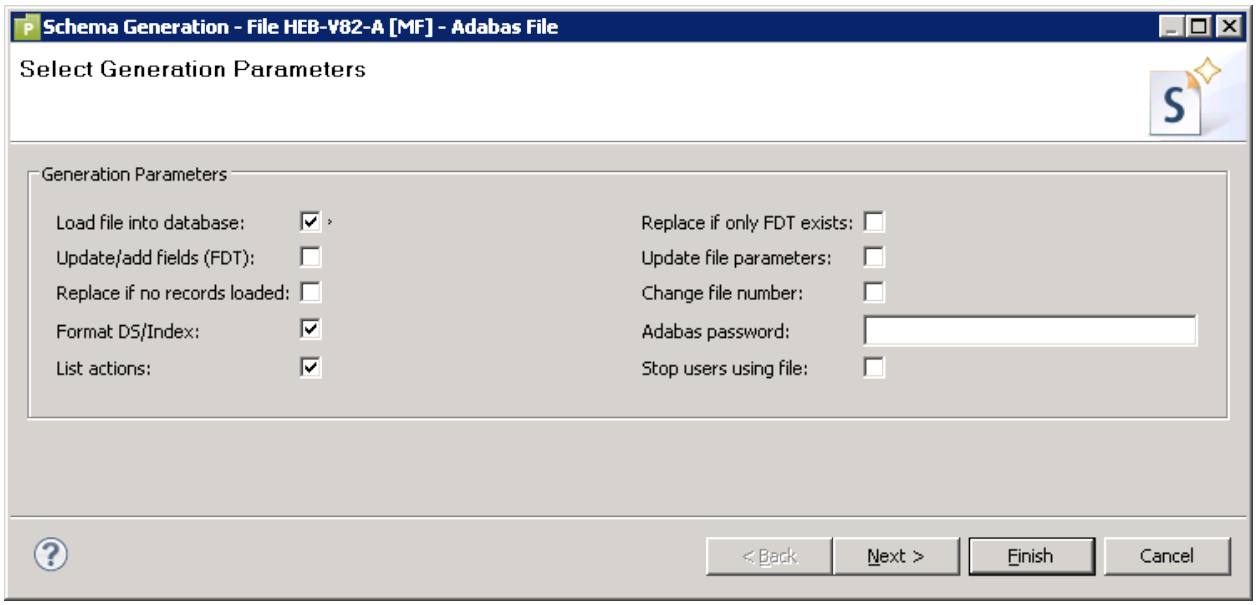
1. If Natural Security and Adabas Online Services are installed and function protection for Predict is activated, permission is required to generate an Adabas file.
2. With this function you can generate input for the ADAFDU utility to create a new file in your Adabas database. For existing files the FDT and the documentation of the file are compared and the input, necessary to adapt the existing FDT for the utilities ADAINV and ADADBM, is generated. The utilities are started immediately. This method automatically creates a connection between external and documentation object. Before you can delete the documentation object, you must either delete the external object (with the administration function Purge) or disconnect the external and documentation object (with function Disconnect). See also section ***Handling of External and Documentation Objects*** in this documentation.
3. When using Adabas Version 6.2 or above, it is possible and recommended to generate Adabas files using the Adabas call interface. This simplifies the generation of Adabas files if the Adabas versions of the source and destination differ from each other. In addition, using the Adabas call interface also offers the generation of Adabas files on remote Adabas databases.
4. An associated LOB file can be specified for a base file containing fields with format LO. A dedicated file object named SAG-ADA-LOB is created during installation. Whenever the number of an associated LOB file is entered in the Adabas attributes of a base file, an own set of Adabas attributes is stored for SAG-ADA-LOB having the specified file number. These settings can be customized. The function Generate Adabas file will automatically create the LOB file in Adabas, when the base file is generated.

5. Before an existing Adabas file will be updated, the file will be locked for general use with the ADAOPR LOCK utility. After generation (or in case of an abnormal end of a action) the file is unlocked.
6. When generating Adabas files, the value created for the MUPEX parameter is taken from the default settings.

A file generated with this method is handled like a file created with Adabas Online Services.

Parameters for Adabas Files

Before the following page is shown, another page may appear in which you have to select a physical file from a drop-down list box.



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

The following parameters can only be set in Predict with the function Defaults > Generation Defaults for object type AF.

Default Parameters		
Delay after stop users	Enter a value of up to 99 seconds. This is the time the system waits before actually performing the generation if parameter Stop users using file is set to Y. See below. Due to Adabas load or too much network traffic, it is possible that not all users have been stopped before the function Generate Adabas file is executed. This delay makes certain that all users really have been stopped before an Adabas file is generated.	
Execute online invert	Y	If set to N, no online invert function is executed.
	Note: This parameter applies only when generating for Adabas databases of version 7 or above.	
Only if TOPISN less than	This function is only available if Execute online invert is set to Y.You can specify a value for TOPISN. The default value is 9999999999. **Note:** This parameter applies only when generating for Adabas databases of version 7 or above.	
Delay after online invert	The online invert function of Adabas version 7 is executed as an asynchronous task. Only one online invert task may be active at a given time. Enter a value of up to 99 seconds. This is the time the system waits after one online invert before performing the next. **Note:** This parameter applies only when generating for Adabas databases of version 7 or above.	
Stop users using file	Y	All current use of the Adabas file is stopped before a generation run is executed. This parameter must be set to Y on a separate terminal if a file currently used by other users is to be regenerated.
	N	The function is terminated if other users are accessing the file.
	Note: If Natural Security and Adabas Online Services are installed and function protection for Predict is activated, permission is required to stop users using an Adabas file.	
Current VM	Adabas files can only be generated from Predict file objects contained in databases accessible from the current virtual machine.	
Parameters		
Load file into database	Y	If no file already exists with given file number, a new file is created in the Adabas database.
Update/add fields (FDT)	Y	Fields documented in Predict and missing in the FDT are added to the Adabas file. The field length in the FDT is adapted to the value in the Predict object, and fields defined as descriptors in the FDT but not in the Predict documentation are released from descriptor status.

Update file parameters	Y	File parameters, including the file space allocation, are adapted to the documentation. If the Adabas file is physically coupled to other files and these relationships are not documented, the files are uncoupled.
Change file number	Y	If the Predict file object was renumbered, the Adabas file is renumbered.
Format DS/Index	DATA storage is to be physically formatted.	
Adabas password	Must be provided if the Adabas file (or only an FDT) already exists in the Adabas database and is protected by an Adabas security definition.	
List actions	Y	Actions which are to be performed to adapt the Adabas file to the Predict specification are listed. Some of the actions may not yet be performed by this generation function: they must be run as batch utilities. The list shows all parameters which are used for generation. Parameters which are invalid or currently not able to be implemented are marked accordingly.
Replace if only FDT exists	Y	If a file with this file number once existed in the database and was deleted with the KEEPFDT option, the remaining FDT is overwritten.
	Note: The FDT of the file will not be deleted if the generation terminates abnormally, for example if the field list in Predict contains invalid field definitions.	
Replace if no records loaded	Y	The Adabas file parameters are replaced, because it is not possible to modify all parameters of an existing file. Replacement is only possible if the Adabas file is empty and is not physically coupled to other Adabas files. The current FDT is kept.
Additional Parameters for Linux		
Adabas version	The version of Adabas for which the external object is to be generated (see ***Adabas Version*** for more information).	
Contiguous AC, DS, NI, UI	Setting of space allocations in Adabas utility ADAFDU for Address Converter, Data Storage, Normal Index and Upper Index. See your *Adabas Utilities* documentation for more information.	

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
File ID	FILE-ID
Phys. file number	FNR
Database ID	DB
Phys. database number	DBNR
Load file into database	LOAD
Replace if only FDT exists	REPLACE-FDT
Update/add fields (FDT)	UPD-FDT
Update file parameters	UPD-PARM
Replace if no records loaded	REPLACE-EMPTY
Change file number	RENUMBER
Format DATA storage	DATAFRM
Adabas password	PSW
List actions	LIST
Stop users using file	STOPF

If a parameter is not specified, the default value is taken.

Sample Output for Adabas Files

```
File ID ...... GENERATION-EXAMPLE                                PFnr ...   171
Database ID .. DEMO-DB                                           PDBnr ..   180

Action   Parameter                                  Remark

DEFFDT   FILE=171
         FNDEF='01,AA'
         Field: GROUP-1
         FNDEF='02,AB,14,U,NU'
         Field: ELE-N-9V5
         FNDEF='02,AC'
         Field: GR-IN-GROUP
         FNDEF='03,AD,4,B,DE,FI'
         Field: ELE-B-4
         FNDEF='03,AE,4,P,NU'
         Field: ELE-PS-5V2
         FNDEF='03,AF,4,B,NU,MU'
         Field: MU-B-4
         FNDEF='02,AG,42,A,NU'
         Field: ELE-A-42
         FNDEF='02,AH,8,G,FI'
         Field: ELE-F-8
```

```
         FNDEF='02,AI,3,B,NU'
         Field: ELE-B-3
         FNDEF='01,AL,PE'
         Field: PC-OCC-7
         FNDEF='02,AM,10,U,DE,NU'
         Field: PC-ELE-DE-NS-7V3
         FNDEF='02,AN,4,P,DE,NU,MU'
         Field: PC-MC-PS-6V1
         FNDEF='02,AO'
         Field: PC-GR
         FNDEF='03,AP,2,B,FI'
         Field: PC-ELE-I-2
         FNDEF='03,AQ,14,P,NU'
         Field: PC-PS-20V7
         FNDEF='02,AR,4,G,FI'
         Field: PC-ELE-F-4
         FNDEF='01,AS,4,P,NU'
         Field: ELE-D
         FNDEF='01,AT,7,P,NU'
         Field: ELE-T
         FNDEF='01,AU,1,B,NU'
         Field: ELE-L
         SUBFN='AJ=AG(10,14)'
         Field: SB-ELE-A-5
         SUPDE='S1=AI(1,3),AG(20,36),-'
               'AE(1,4)'
         Field: SP-DE-A-24
         HYPDE='04,S2,4,F,MU,PE=AP,AF'
         Field: HQ-DE-I-4
LOADFILE NOACEXTENSION=NO
         MIXDSDEV=NO
         DATAFRM=YES
         MAXISN=3391
         NAME=GENERATION-EXAMPLE
         MINISN=1
         ASSOPFAC=10
         DATAPFAC=10
         PGMREFRESH=NO
         ISNREUSE=NO
LOADFILE DSREUSE=YES
         MAXDS=0
         MAXNI=0
         MAXUI=0
         CIPHER=NO
         MAXRECL=5060
         UISIZE=41B
         NISIZE=80B
         DSSIZE=233B
         DSDEV=3390
```

5 Generate for Natural

- Replace Verification Rule 24
- Data Definition Module 27

Replace Verification Rule

The Replace Verification Rule function can be applied only to rules of status automatic. A rule is assigned status automatic by applying the function Generate DDM to the file containing the field that the corresponding Verification object is linked to via "Is verified by VE".

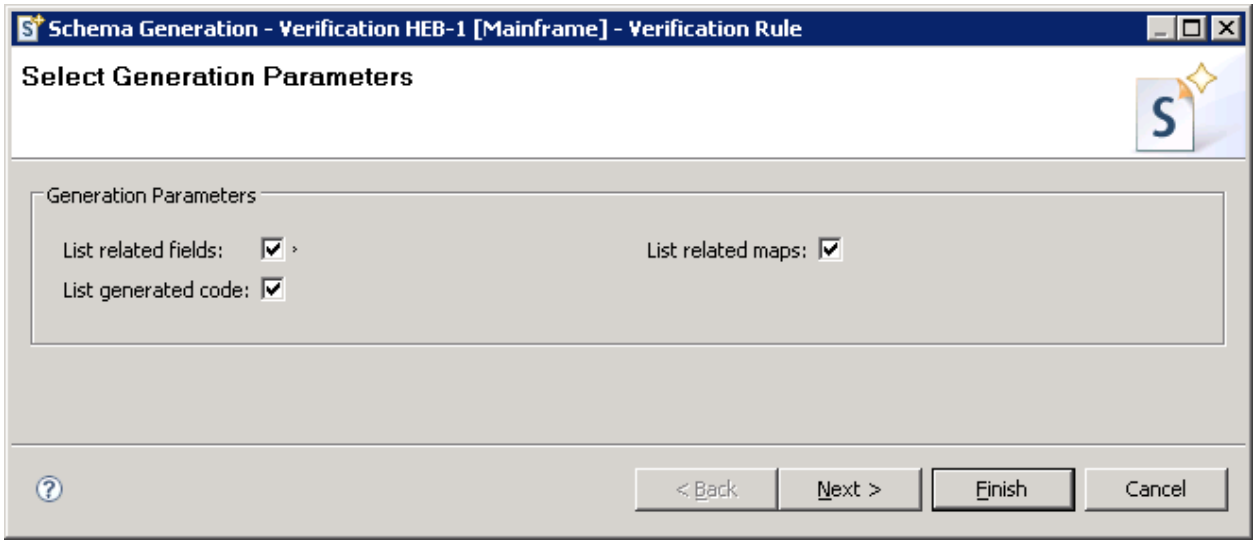
The function Replace Verification Rule replaces the code of the rule; all links to fields remain unchanged.

The following topics are covered below:

- Parameters for Replace Verification Rules
- Keywords

- Sample Output for Replace Verification Rules

Parameters for Replace Verification Rules



Values for fields which have been locked by the data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Parameters		
List related fields	Y	The IDs of all fields connected to this verification rule via "Is verified by VE" are to be listed.
List related maps	Natural maps using replaced verifications are to be recataloged so that they use the new verification rules. List related maps helps to find these maps.	
	Y	The IDs of all maps connected to this verification rule are to be listed.
List generated code	Y	The generated code is to be listed.

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Rule ID	RULE-ID
List related fields	RELATE
List generated code	LIST
List related maps	RELATED-MAPS

If a parameter is not specified, the default value is taken.

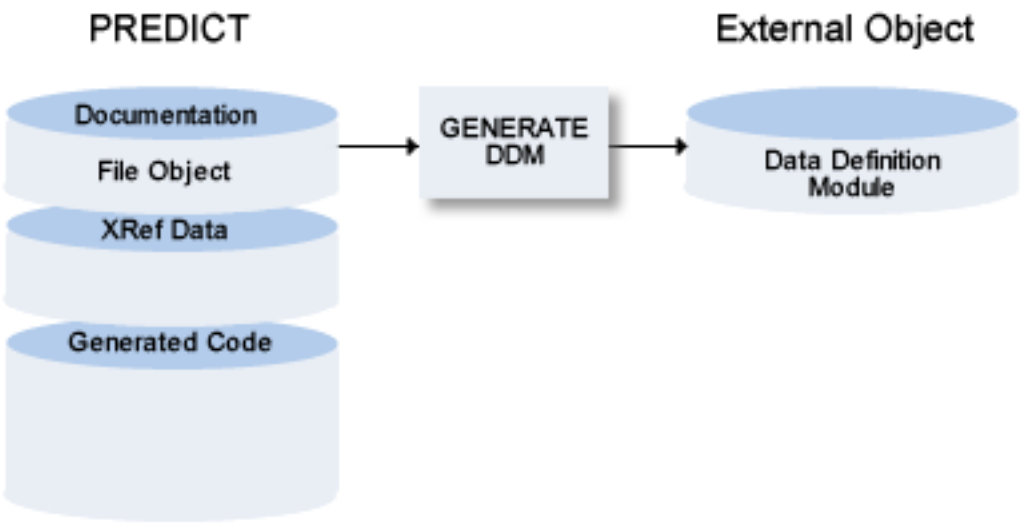
Sample Output for Replace Verification Rules

```
    Link of Verification GEN-CHECK-ZERO to Elementary Fields
           File Name                        Field Name                Remark
-------------------------------- -------------------------------- -------------
GENERATION-EXAMPLE               ELE-N-9V5                        activ
                                 ELE-PS-5V2                       activ
                                 PC-MC-PS-6V1                     activ
Gen-examples                     Ele-N-9V5                        not activ
                                 Ele-PS-5V2                       not activ
                                 PC-MU-PS-6V1                     not activ

Rule: GEN-CHECK-ZERO

0010 * ********************************************************************
0020 * Verification: GEN-CHECK-ZERO generated by Predict                   *
0030 *  with format: Numeric; Type: Not Equal;                              *
0040 *           on: 2007-05-31; at: 13:03:46; from user: SMR;              *
0050 ********************************************************************
0060 IF & = 0
0070 REINPUT 'Invalid value(s): ''0'' .'
0080         MARK *&
```

Data Definition Module



The following topics are covered below:

- Rules Applying to the Generation of DDMs
- Rules Applying to the Generation of DDMs When Using Unicode
- Parameters for Data Definition Modules
- Generating DDMs for Use with IMS
- Generating a DDM for Use with Adabas Vista
- Recommendations when Using Adabas Vista
- Keywords
- Sample Output for Data Definition Modules

Rules Applying to the Generation of DDMs

- If Natural Security is installed and the specified file is defined to Natural Security, the same checks are performed as are performed before a DDM can be regenerated or a file can be added. See description of the parameter DDM Modifier in the section *File Maintenance* of the Natural Security documentation.
- A DDM generated for a physically coupled file contains the ID of the file to which it is coupled and the short names of the fields via which they are coupled as a comment. For example: "Coupled via AA to GA of FINANCE".

- The names of the Predict file and its userviews begin with SYSDIC. When a DDM is generated for a file whose name begins with SYSDIC, the logical database number (255) and logical file number (253) that point to the FDIC are taken.
- If the file (which has a DDM) was renamed, the old DDM is purged in the Generate DDM function and the new DDM is added. If Natural Security objects or Super Natural objects exist for the old DDM, these objects are renamed too.

Note: Rules applying to the generation of DDMs for use with IMS or Adabas Vista are described in the sections *Generating DDMs for Use with IMS* and *Generating a DDM for Use with Adabas Vista*.

When generating DDMs in Windows or Linux environments and the FDIC file is located on the mainframe, the DDM will not be available on the mainframe. It will be stored only in the file system where FDDM is located. When generating DDMs on the mainframe and the FDIC file is also located on mainframe, the DDM will not be available in the Windows or Linux environment. The function must be executed twice.

Rules Applying to the Generation of DDMs When Using Unicode

Database fields containing Unicode data are represented with the format U in the DDM, when running with Natural Version 4.2 for Mainframes or above, Natural Version 6.2 for Linux or above and Natural Version 6.2 for Windows or above.

Whether a field contains Unicode data, is determined in the following way:

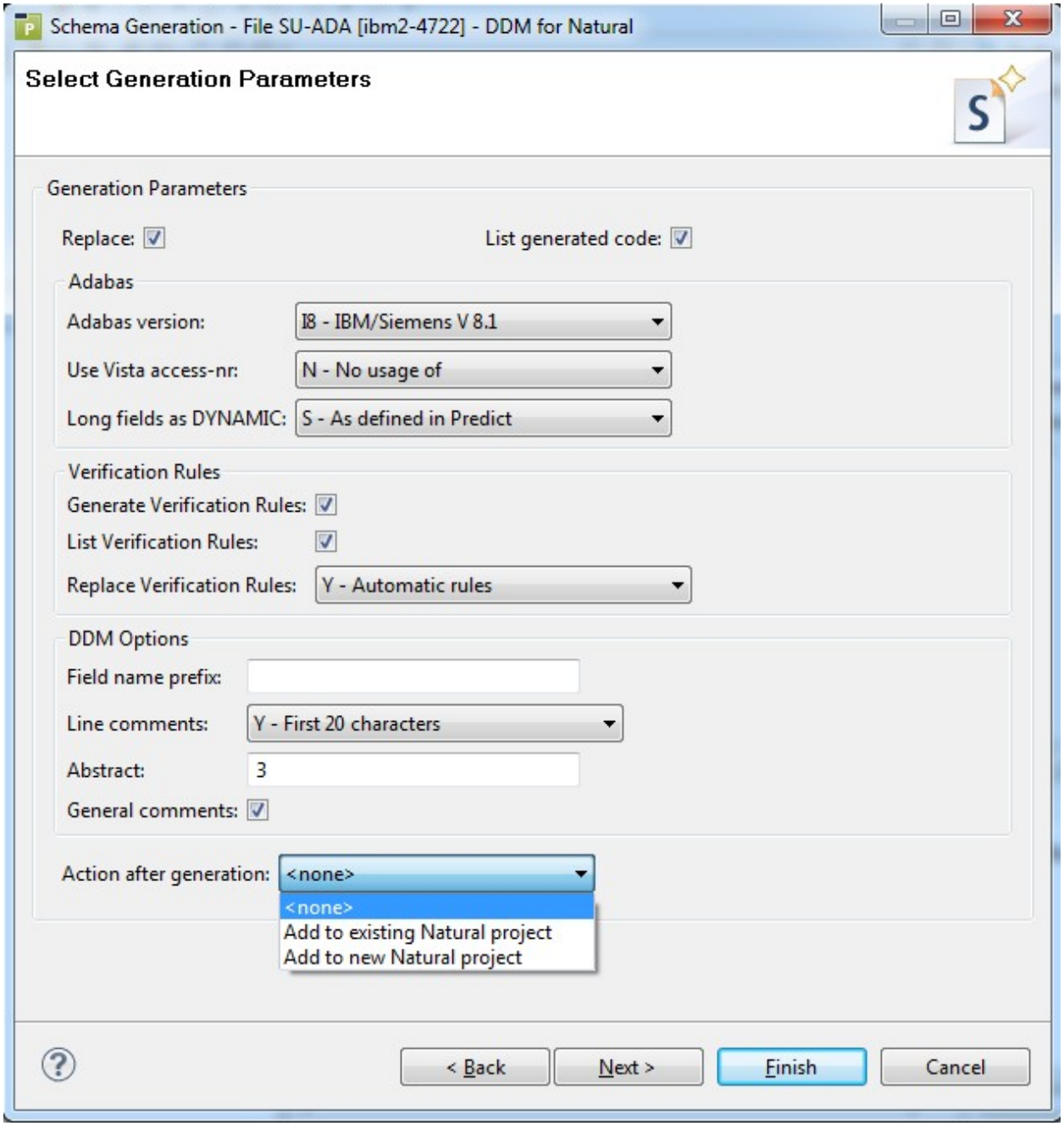
- For DB2 files (file types D, E, MT), the CCSID definition of the table (or of the underlying tables in case of views and materialized query tables) in the SQL Server specified in the DDM Generation defaults is evaluated.

  If it is set to U, the fields with format A, AV, AL or LO, and character set option set to S or to M and fields with format G, GV, or GL are represented with format U in the DDM. If no CCSID value is given, the CCSID definition of the related dataspace in the given SQL Server is checked.
- For Adabas files (file types A, U, AT) each field with format A, AV, AL or LO and character set option M is represented with format U in the DDM.

Parameters for Data Definition Modules

Before the following page is shown, another page may appear in which you have to select a database from a drop-down list box. Its appearence depends on specific defaults defined by the administrator and/or the object that has been selected on the first page of the wizard.

Example for Adabas:



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Presettings	
The parameters below can be changed in the Modify DDM Defaults screen of Predict. See ***Generation Defaults***.	
Specification DB ID	Only applicable to Adabas files and userviews. Y — Database ID *must* be specified. N — Database ID *may* be specified. D — Database ID *may not* be specified. This parameter is set to N at installation.
Money format (for SQL)	N — Unpacked numeric P — Packed numeric
Date/Time representation	A — Alphanumeric / Char D — Date/Time **Note:** A representation as format D or T is only taken into account for DB2 tables and views and when executing the generation with Natural Version 4.1 for mainframes or above.
SQL Server	The server that should be used for data access from Natural. **Note:** It is possible to define an index as clustered in one server and as not clustered in a second server. This influences whether the component fields of the index may be updated or not. Whether a field may be updated or not is indicated by special short names in the DDM for Natural.
Super Natural file DBNR	The database number of the Super Natural system file must be supplied by the DDA if the Super Natural file is not the current FUSER file at generation time. This parameter is set to 0 at installation.
VSAM trailing BLANK char	If a VSAM prefix name contains trailing blanks, these blanks must be represented in Predict with a special character (because trailing blanks cannot be entered in Predict). When generating a DDM for Natural VSAM the special character specified is removed and the correct representation of a blank inserted. A VSAM trailing BLANK char. is not defined at installation. We recommend setting this parameter to $.
Super Natural file FNR	The file number of the Super Natural system file must be supplied by the DDA if the Super Natural file is not the current FUSER file at generation time. This parameter is set to 0 at installation.
Parameters	
Replace	Y — An existing DDM is overwritten.
List generated code	Y — Generated code is listed.
Adabas version	The version of Adabas for which the DDM is to be generated (see ***Adabas Version*** for more information). The Adabas version you specify for DDM generation is independent of your installation platform.

Field name prefix	Prefix to be used for each generated field name. **Note:** This parameter does not apply if you are generating a DDM from an SQL file type.	
Line comments	Y	The first abstract line from each Predict field object is truncated to 20 characters and appended as a line comment to the generated description.
	N	No line comments are generated from Predict object.
	O	Occurrences defined in Predict.
Abstract	The number of Predict abstract lines to be included in the generated code as lines beginning with an asterisk.	
General comments	Y	Comment lines in the Predict file object (marked with ** or */ in field Type) are included. If the field synonym is used, the original field name is displayed. The date and time of the generation and the ID of the user who initiated it are inserted. Source fields of sub/super/hyperdescriptors are also listed.
	N	Comment lines are not included. Source fields of sub/super/hyperdescriptors are not listed.
	D	Derivation only. Similar to Y, but comment lines are only included, where a derivation occurs. Source fields of sub/super/hyperdescriptors are also listed.
Generate verification rules	Y	The status of verification objects connected to fields of this file via "Is verified by VE" is changed to automatic.
Replace verification rules	Y	Verification objects of status automatic connected to fields of this file via "Is verified by VE" are regenerated if they have been modified since generation.
	S	Verification objects of status automatic connected to fields of this file via "Is verified by VE" are regenerated only if they are not connected to any other file.
List verification rules	Y	List the IDs of all verification objects connected to each field.
Action after generation	none	No further action will be taken after a successful generation.
	Add to existing Natural project	The generated DDM will be added to an already existing Natural project after a successful generation.
	Add to new Natural project	The generated DDM will be added to a new Natural project after a successful generation.
For Adabas		
Use Vista access-nr	See table **Meaning of Parameter Use Vista access-nr**. **Note:** This parameter is only applicable to Adabas files and userviews. See also section *Adabas Vista* in the *Predict and Other Systems* documentation.	
Long fields as DYNAMIC	Controls whether fields with format LO or AV in files of type A/U are generated with dynamic or fixed length in the DDM.	

	Y	Yes.
	N	No.
	S	As defined in Predict. This is the default value.
For SQL		
Truncate creator	Y	The name of the generated DDM is the original SQL table/view name *without* the part that identifies the creator.
	Note: Only applicable to SQL file types.	
NAT-l for long fields	Y	Fields longer than 253 and with Natural field length specified are represented as multiple fields (M) in the generated DDM.
	N	The specified field length ist taken.
For IMS		
Generate UDFs	Y	User-defined fields for Natural for DL/I are generated or regenerated.
	Only applicable to files of type I, J, and K.	
Replace UDFs	Y	Any user-defined fields are replaced.
List UDFs	Y	User-defined fields are to be listed.
IMS field suffix	Y	The DDM field name is created using a compressed field name (or Natural synonym), hyphen and IMS segment name.
For Natural subsystems		
Define in security	Only applicable if Natural Security is installed and the user is authorized to create profiles. An authorized user is an administrator who either has no owners or is an owner of himself without countersignatures.	
	Y	An authorized user can create a Natural Security profile for the file whose DDM has just been generated.

Generating DDMs for Use with IMS

When generating a DDM for one of the IMS file types, the following fields are included:

For all file types (I, J, K)

- KEY fields from the higher level IMS segments
- KEY fields from the current IMS segment
- KEY fields from the lower level IMS segment if data is accessed via an AIX index

Additionally for IMS Segments (file type I)

- user-defined fields of all IMS segment layouts (file type J)

- user-defined fields of the related logical child or logical parent segment

IMS Segment (file type J)

- user-defined fields of the named IMS segment layout
- user-defined fields of the related logical child or logical parent segment

IMS userview (file type K)

- user-defined fields of the named IMS User View file
- user-defined fields of the related logical child or logical parent segment

Generating a DDM for Use with Adabas Vista

Prerequisites

If an Vista access number is used for generating a DDM, the virtual machine of the Vista element used for generation must be linked to the current network.

Changing the Current VM and Current Network is described under *Miscellaneous* in the *Predict Administration* documentation.

Recommendations when Using Adabas Vista

If using Dictionary View with Adabas Vista distributed data processing, we recommend the following:

- Always enter Vista access numbers for Adabas files and userviews (Add, Modify file in Predict).
- Set the parameter Specification DB ID in the Modify DDM defaults screen of Predict to D (database ID may not be specified when generating a DDM from an Adabas file/userview) or to N (database ID may be specified but is not mandatory). If this parameter is set to Y, the user is forced to enter a database ID when generating a DDM from an Adabas file/userview.
- Set the parameter Use Vista access-nr in the Modify DDM defaults screen of Predict to T, but do not protect the field.
- Do not enter a database ID when generating a DDM. This ensures the Vista access number is used for generation.

If you do not want to use Adabas Vista: Set the parameter Use Vista access-nr in the Modify DDM defaults screen of Predict to N and deactivate the option by blanking out the preceding X.

The table below illustrates the use of the parameter Use Vista access-nr.

Meaning of Parameter Use Vista access-nr

Specification DB ID	Use Vista Access-Nr	Database ID specified	Result
D,N	N	no	DDM is generated with DB ID=0
D,N	Y	no	If the file does not contain Vista access numbers, an error message is given. If the file contains Vista access numbers, a DDM is generated with the access numbers taken from the file.
D,N	T	no	If the file does not contain Vista access numbers, an error message is given. If the file contains Vista access numbers, the system tests whether a Vista element with the same numbers exists for this file. If so, a DDM is generated with this access numbers.
N,Y	N	yes	[1] If the file is not defined as partitioned in this database and the Adabas attribute Vista access only is not set to Y: the DDM is generated with the physical database number and physical file number (defined with file maintenance function Modify Adabas attributes).
N,Y	N	yes	[2] If the file is defined as partitioned in this database or the Adabas attribute Vista access only=Y: the system checks whether a Vista element for this file and database exists. If exactly one element exists, the DDM is generated with the Vista numbers defined in this Vista element. If more than one Vista element is found, no DDM is generated and an error message is given.
N,Y	T,Y	yes	Same as above, except that if several Vista elements exist for the file and database, the system checks whether the Vista access numbers of the file are identical to the Vista numbers of one of these Vista elements. If identical, the DDM is generated.If not, no DDM is generated and an error message is given.

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
File ID	FILE-ID
Database ID	DATABASE-ID
Replace	REPLACE
Field name prefix	PREFIX
Line comments	LINE-COM
General comments	GENERAL-COM
Abstract	SHORT-COM
List generated code	LIST
Generate verification rules	GENERATE-RULE
Replace verification rules	REPLACE-RULE
List verification rules	LIST-RULE
Generate UDFs	GENERATE-UDF
Replace UDFs	REPLACE-UDF
List UDFs	LIST-UDF
Adabas version	ADA-VER
Truncate creator	TRUNC-CREATOR
IMS field suffix	IMS-SUFFIX
Use Vista access nr.	USE-ACCESS-NR
Define in security	ADD-SECURITY
Status [1)]	STATUS
DDM Modifiers [1)]	MODIFIER1
DDM Modifiers [1)]	MODIFIER1-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER2
DDM Modifiers [1)]	MODIFIER2-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER3
DDM Modifiers [1)]	MODIFIER3-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER4
DDM Modifiers [1)]	MODIFIER4-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER5
DDM Modifiers [1)]	MODIFIER5-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER6
DDM Modifiers [1)]	MODIFIER6-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER7
DDM Modifiers [1)]	MODIFIER7-COUNTER-SIGN
DDM Modifiers [1)]	MODIFIER8
DDM Modifiers [1)]	MODIFIER8-COUNTER-SIGN

Field	Keyword
Owner [1]	OWNER1
Owner [1]	OWNER1-COUNTER-SIGN
Owner [1]	OWNER2
Owner [1]	OWNER2-COUNTER-SIGN
Owner [1]	OWNER3
Owner [1]	OWNER3-COUNTER-SIGN
Owner [1]	OWNER4
Owner [1]	OWNER4-COUNTER-SIGN
Owner [1]	OWNER5
Owner [1]	OWNER5-COUNTER-SIGN
Owner [1]	OWNER6
Owner [1]	OWNER6-COUNTER-SIGN
Owner [1]	OWNER7
Owner [1]	OWNER7-COUNTER-SIGN
Owner [1]	OWNER8
Owner [1]	OWNER8-COUNTER-SIGN
Security Notes [1]	NOTE1
Security Notes [1]	NOTE2
Security Notes [1]	NOTE3
Security Notes [1]	NOTE4
Security Notes [1]	NOTE5
Security Notes [1]	NOTE6
Security Notes [1]	NOTE7
Security Notes [1]	NOTE8
Security Notes [1]	NOTE9
Security Notes [1]	NOTE10
NAT Length	NAT-LENGTH
Long fields as DYNAMIC	LONG-DYNAMIC

If a parameter is not specified, the default value is taken.

[1] Only available in Natural Security. For further details and possible values see the Natural Security documentation.

Sample Output for Data Definition Modules

```
       DBID: 180  FNR: 171  DDM: GENERATION-EXAMPLE              DEF.SEQ:

T L  DB  NAME                              F LENG  S D REMARKS
- -  --  -------------------------------- - ----- - - ------------------------
*    Generation started
*    at 2007-05-31 13:19:05
*    by user MSZ
*
*
*   EXAMPLE FILE FOR THE
*               GENERATION SUBSYSTEM
*
G 1  AA  GROUP-1
  2  AB  ELE-N-9V5                        N 9.5   N
         HD=ELE/HEADER

   VER:  GEN-CHECK-ZERO

G 2  AC  GR-IN-GROUP
  3  AD  ELE-B-4                          B 4.0   F D

   VER:  GEN-VER-EXAM

  3  AE  ELE-PS-5V2                       P 5.2   N

   VER:  GEN-CHECK-ZERO

*   MU field in group redefined two
*   times
M 3  AF  MU-B-4                           B 4.0   N
  2  AG  ELE-A-42                         A 42.0  N

   VER:  GEN-CHECK-BLANK
   VER:  GEN-VER-EXAM

  2  AH  ELE-F-8                          F 8.0   F
  2  AI  ELE-B-3                          B 3.0   N
*   Superfield and superdescriptor
  1  AJ  SB-ELE-A-5                       A 5.0   N
*        -------- SOURCE FIELD(S) -------
*        ELE-A-42(10-14)

  1  S1  SP-DE-A-24                       A 24.0  N S
*        -------- SOURCE FIELD(S) -------
*        ELE-B-3(1-3)
*        ELE-A-42(20-36)
*        ELE-PS-5V2(1-4)
*
```

```
*   PE-group with automatic counter
*
P 1  AL  PC-OCC-7
  2  AM  PC-ELE-DE-NS-7V3                 N 7.3   N D
*   counter for MU-field in PE-group
M 2  AN  PC-MC-PS-6V1                     P 6.1   N D

   VER:  GEN-CHECK-ZERO

*
G 2  AO  PC-GR
  3  AP  PC-ELE-I-2                       B 2.0   F
Format 'INTEGER' changed to 'BINARY'.
  3  AQ  PC-PS-20V7                       P 20.7  N
  2  AR  PC-ELE-F-4                       F 4.0   F
*   Formats: date,time,logical
  1  AS  ELE-D                            D 6.0   N
  1  AT  ELE-T                            T 12.0  N
  1  AU  ELE-L                            L 1.0   N
*   Hyperdescriptor with MU field
*   and source field of a PE-group
M 1  S2  HQ-DE-I-4                       I 4.0     H
*        -------- SOURCE FIELD(S) -------
*        PC-ELE-I-2
*        MU-B-4
***** DDM replaced *****
```

6 Generate for DB2

- Common Parameters for All DB2 Types 40
- DB2 Database 40
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Prerequisites

Generation of DB2 objects is subject to DB2 security mechanisms. See the section *DB2 and SQL/DS* in the *Predict and Other Systems* documentation for more information.

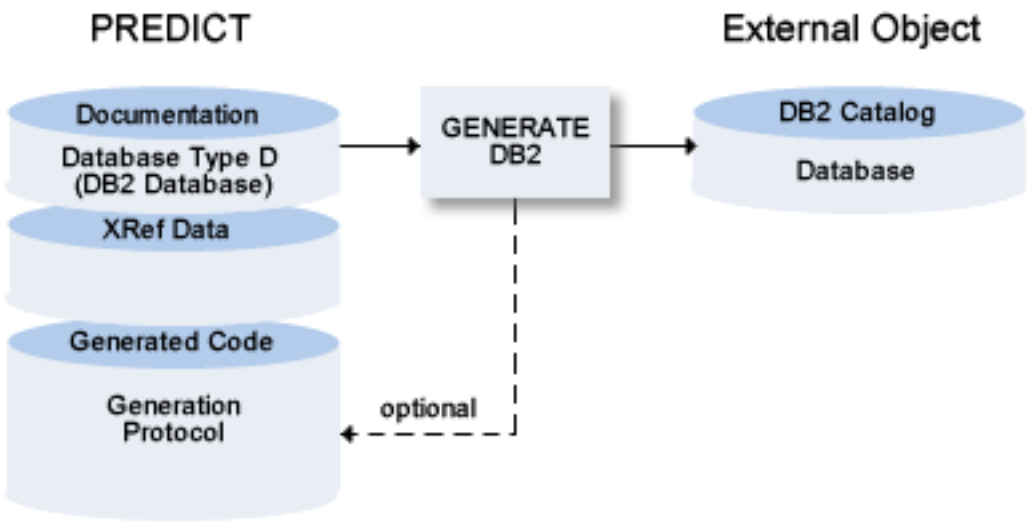
Common Parameters for All DB2 Types

The following parameters can be set in all DB2 object types.

Parameters	
SQL Server	This parameter is defined on page 2 of the schema generation wizard. This page does not appear when only the default server can be used. The SQL server, the object will be implemented in. The value is preset with the value specified in the user or system profile.
Use SQLID	To switch from the logon user ID to a group ID in DB2, you can enter a different SQL ID in this field. The statement `SET CURRENT SQLID` will then be submitted.
List DB2 statement	Y | List the generated DB2 SQL statements.
Protocol saved in member	SQL statements generated for the implementation of the database can be saved in a Natural source member (protocol) on the FDIC file. A member name for the protocol is only required when the DB2 object is generated for the first time. SQL statements generated in subsequent generation runs are concatenated to the protocol. The protocol can be displayed using the Display function of the Administration Implemented *`object-type`* menu of Predict.
Protocol saved in library	Library where the protocol is to be saved.

DB2 Database

A DB2 database can be implemented with Dictionary View by generating the necessary SQL statements. The generated SQL statements can be saved in a generation protocol.



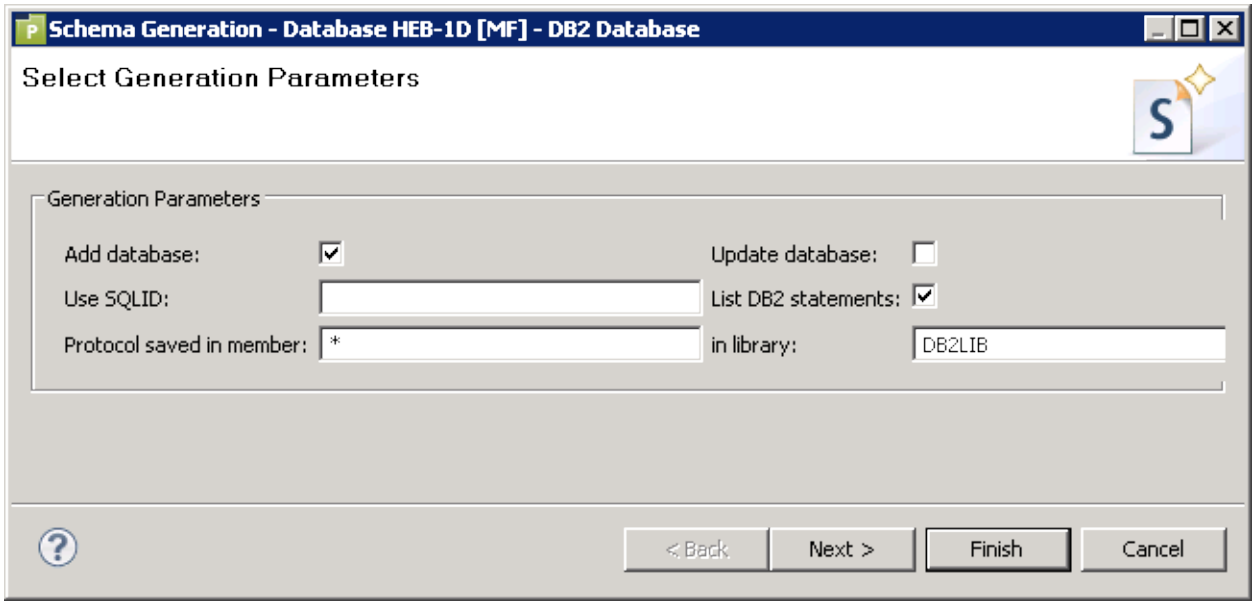
Note: This function is only available if DB2 is installed in your server environment. The function is not applicable to SQL/DS.

The following topics are covered below:

- Parameters for DB2 Databases
- Keywords

- Sample Output for DB2 Databases

Parameters for DB2 Databases



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Presetting		
The parameter below can be changed in the Modify DB2 Database Defaults screen of Predict. See *Generation Defaults*.		
Count of saved actions		Number (0-99) of generation actions which are stored in the protocol specified under Protocol saved in member/library. If 99 is entered, all generation actions are stored. This is the default setting at installation.
Parameters		
Add database	Y	A new DB2 database is created. If the DB2 database already exists, this parameter must be set to N.
Update database	Y	If the database is already implemented, the differences of the implemented database and the Database object in Predict are determined and update commands are generated to modify the implemented database according to the Predict object.

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Database ID	DB
List DB2 statement	LIST
Protocol saved in member	MEM
Protocol saved in library	LIB
Add database	ADD-DB
Update database	UPD-DB
Use SQLID	SQLID
SQL Server	SQL-SERVER

If a parameter is not specified, the default value is taken.

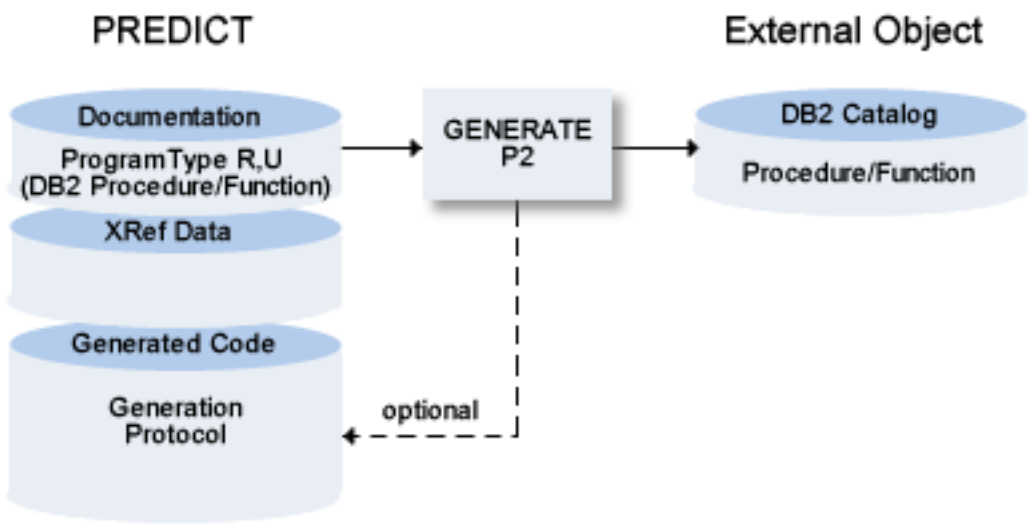
Sample Output for DB2 Databases

```
Database-ID: EXAM-DATABASE

CREATE DATABASE EXAMDB
    STOGROUP EXAM001
    BUFFERPOOL BP1;
```

DB2 Procedure/Function

A DB2 procedure or function requires an object of type Program as input, from which then either a procedure or a function is generated.



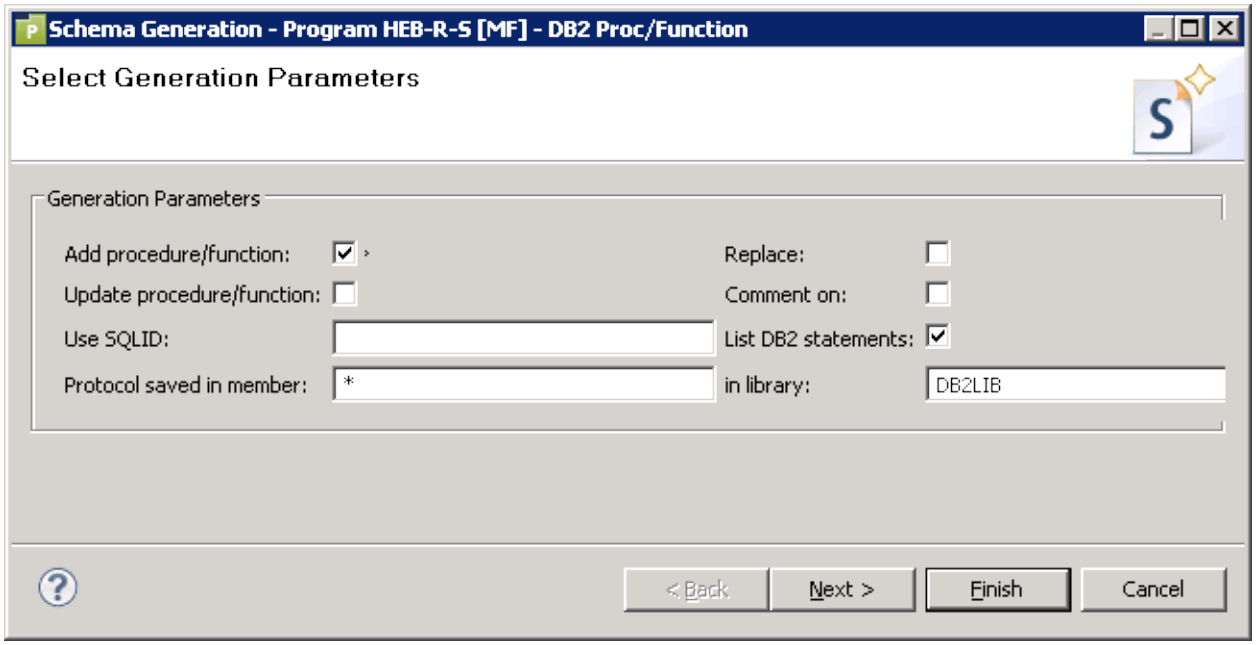
Note: This function is only available if DB2 is installed in your server environment. The function is not applicable to SQL/DS.

The following topics are covered below:

- Parameters for DB2 Procedure/Function

- Keywords

Parameters for DB2 Procedure/Function



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Presetting		
The parameter below can be changed in the Modify DB2 Proc/Function Defaults screen of Predict. See *Generation Defaults*.		
Count of saved actions		Number (0-99) of generation actions which are stored in the protocol specified under Protocol saved in member/library. If 99 is entered, all generation actions are stored. This is the default setting at installation.
Parameters		
Add procedure/function	Y	A new DB2 procedure/function is created. If the DB2 procedure/function already exists, this parameter must be set to N.
Replace	Y	An existing procedure/function in DB2 is dropped and created newly.
Update procedure/function	Y	If the procedure/function is already implemented, the differences of the implemented procedure/function and the program object in Predict are determined and update commands are generated to modify the implemented procedure/function according to the Predict object.

Comment on	Y	The first eight abstract lines of Predict field and file objects are used as DB2 comments for the columns and the table (SQL statement COMMENT ON).

Note: Links concerning the associations IN (Input FI) and RE (Returns FI) define the input and output parameters of the procedure or function.

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Program ID	PROGRAM-ID
Add procedure/function	ADD-PROCEDURE
Update procedure/function	UPD-PROCEDURE
Replace	REPLACE
Comment on	COMMENT
List DB2 statement	LIST
Protocol saved in member	MEM
Protocol saved in library	LIB
Use SQLID	SQLID
SQL Server	SQL-SERVER

If a parameter is not specified, the default value is taken.

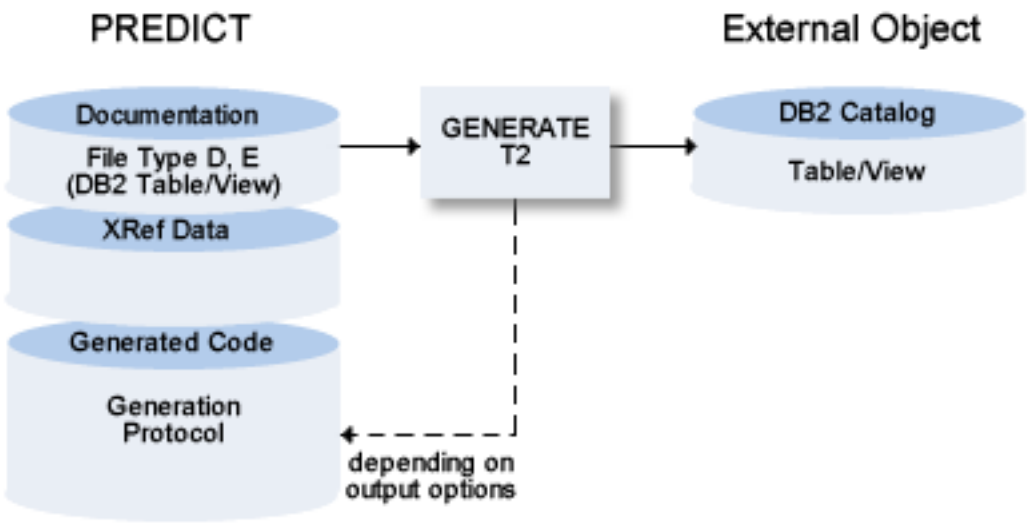
DB2 Table/View

The Generate DB2 Table / View function:

- Generates DB2 and SQL/DS Table/View/Indexes. If a table contains a LOB column, the function generates a `SET CURRENT RULE='STD'` statement which allows DB2 to create the necessary auxiliary tablespaces, tables and indexes for these objects.
- Generates distinct types.
- Generates check expressions. A check expression that differs from the documentation in Predict is dropped and recreated.
- Generates triggers. If a trigger is linked to a DB2 view, an `INSTEAD OF` trigger is generated. A trigger that differs from the documentation in Predict is dropped and recreated.
- Modifies existing DB2 and SQL/DS Table/Indexes, replaces DB2 and SQL/DS Views/Indexes or

- Purges indexes from DB2 or SQL/DS tables if no longer documented with a corresponding Predict file object of file type D (DB2 Table).
- Purges masks or permissions from DB2 tables if no longer documented with a corresponding Predict file object of file type D (DB2 Table).

Note: If an XML column (Field format LO and Character Set X) is added for the first time to a DB2 table, you are recommended to run the function Compare DB2 table after the generation of the DB2 table. The function Compare DB2 table must be executed on the server with the update options Add fields and Field attributes set to Y.

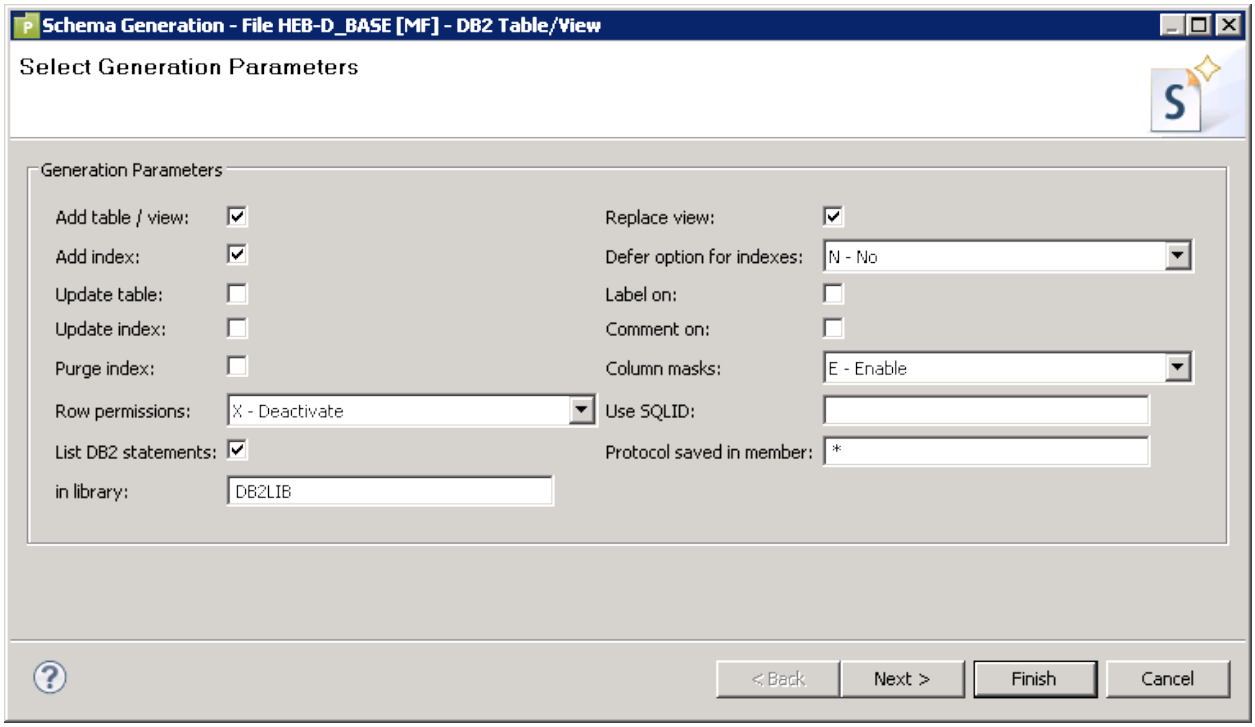


The following topics are covered below:

- Parameters for DB2 Table/View
- Keywords

- Sample Output for DB2 Table/View

Parameters for DB2 Table/View



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Presetting		
The parameter below can be changed in the Modify DB2 Table/View Defaults screen of Predict. See *Generation Defaults*.		
Count of saved actions	Number (0-99) of generation actions which are stored in the protocol specified under Protocol saved in member/library. If 99 is entered, all generation actions are stored. This is the default setting at installation.	
Parameters		
Add table/view	Y	A new DB2 table/view is created. If the DB2 table already exists, this parameter must be N.
Replace view	Y	If the DB2 view already exists, the DB2 statements `DROP VIEW` and `COMMIT` are generated first, followed by the `CREATE VIEW` statement.

Add index	If DB2 indexes are defined for the DB2 table in Predict, set this option to Y to generate the `CREATE INDEX` statements.	
Update table	Y	If the DB2 table/view is already implemented, commands are generated to adapt the DB2 table/view to the documentation (if differences were found). This includes the generation of necessary `ALTER TABLE DROP COLUMN` statements for fields that are no longer documented.
Update index	Y	If the DB2 index is already implemented, update commands are generated to adapt the DB2 index to the documentation (if differences were found). Updating DB2 indexes is only possible for differences of the following attributes: buffer pool, close, freepage, pctfree, VSAM catalog, storage group, primary allocation, secondary allocation, erase, index type, GBPCACHE, piece size. If any other attributes differ, Update index and Purge index must be set to Y. Predict will then update the index by issuing the statements `DROP INDEX`, `COMMIT` and `CREATE INDEX`.
Purge index	Y	A `DROP INDEX` and a `COMMIT` statement are generated if a DB2 index exists and no corresponding index is defined in Predict. **Note:** Partitioned indexes cannot be purged.
Column masks	Options for column masks. Possible values: E – Enable D – Disable A – Activate X – Deactivate EA – Enable & Activate EX – Enable & Deactivate DA – Disable & Activate DX – Disable & Deactivate	
Row permissions	Options for row permissions. Possible values: See Column masks option above.	
Defer option for indexes	Y	The SQL statement `CREATE INDEX` is generated with the option `DEFER YES`.
	N	The SQL statement `CREATE INDEX` is generated without the option `DEFER YES`.
Label on	Y	The string specified in the Predict field attribute Header1 is used as DB2 label for the columns (SQL statement `LABEL ON`). **Note:** If Label on is set to Y, existing labels are generally overwritten even if Header1 is not specified in Predict for each column in the table.

Comment on	Y	The first eight abstract lines of Predict field and file objects are used as DB2 comments for the columns and the table (SQL statement `COMMENT ON`). **Note:** Comment on is set to Y, existing comments are generally overwritten even if no abstract is specified in Predict.

Special Considerations for Temporal Tables and Archive-Enabled Tables

When generating temporal tables, Predict only requires the name of the history or archive table to be used. This history or archive table is then automatically generated and connected to the base table. The history or archive table name can be provided when documenting a temporal table in Predict.

If you want to use a history or archive table with an index of its own then this history or archive table must be documented separately in Predict. Indexes can then be defined manually where required.

Such a separate history or archive table must then also be generated separately. The connection between the base table and the history or archive table, that is normally maintained automatically in Predict, will then be dropped. You will have to manually and individually apply changes made to the base table also in the history or archive table.

After the changes have been applied, you will have to generate both, the base table and the history or archive table, individually in order for the changes to take effect.

A third generation process is then required to reestablish the connection between the base table and the history or archive table.

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
File ID	FILE-ID
Add table/view	ADD-TABLE
Add index	ADD-INDEX
Update table	UPD-TABLE
Update index	UPD-INDEX
Purge index	PURGE-INDEX
Replace view	REPLACE
List DB2 statements	LIST
Protocol saved in member	MEM
Protocol saved in library	LIB

Field	Keyword
Label on	LABEL
Comment on	COMMENT
Defer option for indexes	DEFER
Use SQLID	SQLID
SQL Server	SQL-SERVER
Column masks	MASK
Row permissions	PERMISSION

If a parameter is not specified, the default value is taken.

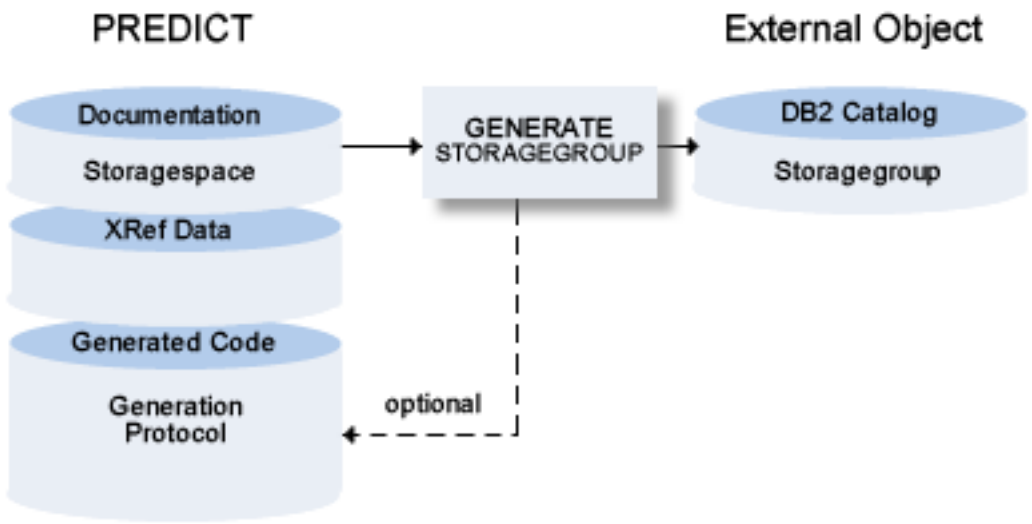
Sample Output for DB2 Table/View

```
File-ID: EXAM-GEN_TABLE
CREATE TABLE EXAM.GEN_TABLE
   (EMPNO                    CHAR(6)          NOT NULL,
    FIRSTNME                 VARCHAR(12)      NOT NULL,
    MIDINIT                  CHAR(1)          NOT NULL,
    LASTNAME                 VARCHAR(15)      NOT NULL,
    WORKDEPT                 CHAR(3)          NOT NULL WITH DEFAULT,
    PHONENO                  CHAR(4)          NOT NULL WITH DEFAULT,
    HIREDATE                 DATE             NOT NULL WITH DEFAULT,
    JOB                      CHAR(8)          NOT NULL WITH DEFAULT,
    EDLEVEL                  SMALLINT         NOT NULL WITH DEFAULT,
    SEX                      CHAR(1)          NOT NULL WITH DEFAULT,
    BIRTHDATE                DATE             NOT NULL WITH DEFAULT,
    SALARY                   DECIMAL(9, 2)    NOT NULL WITH DEFAULT,
    BONUS                    DECIMAL(9, 2)    NOT NULL WITH DEFAULT,
    COMM                     DECIMAL(9, 2)    NOT NULL WITH DEFAULT,
    PRIMARY KEY (EMPNO))
   IN DATABASE EXAMDB
   EDITPROC PROGDB
   AUDIT NONE;
CREATE UNIQUE INDEX PRDDBA.EMPNO
   ON EXAM.GEN_TABLE
      (EMPNO                       ASC)
   SUBPAGES 4
   BUFFERPOOL BP0
   CLOSE YES;
CREATE INDEX DSN8210.XEMP2
   ON EXAM.GEN_TABLE
      (WORKDEPT                    ASC)
   SUBPAGES 4
   BUFFERPOOL BP0
   CLOSE YES;

DIC1880 SUMMARY:     14 FIELD(S) PROCESSED
```

DB2 Storagegroup

A DB2 storagegroup can be implemented with Dictionary View by generating the necessary SQL statements. The generated SQL statements can be saved in a generation protocol.

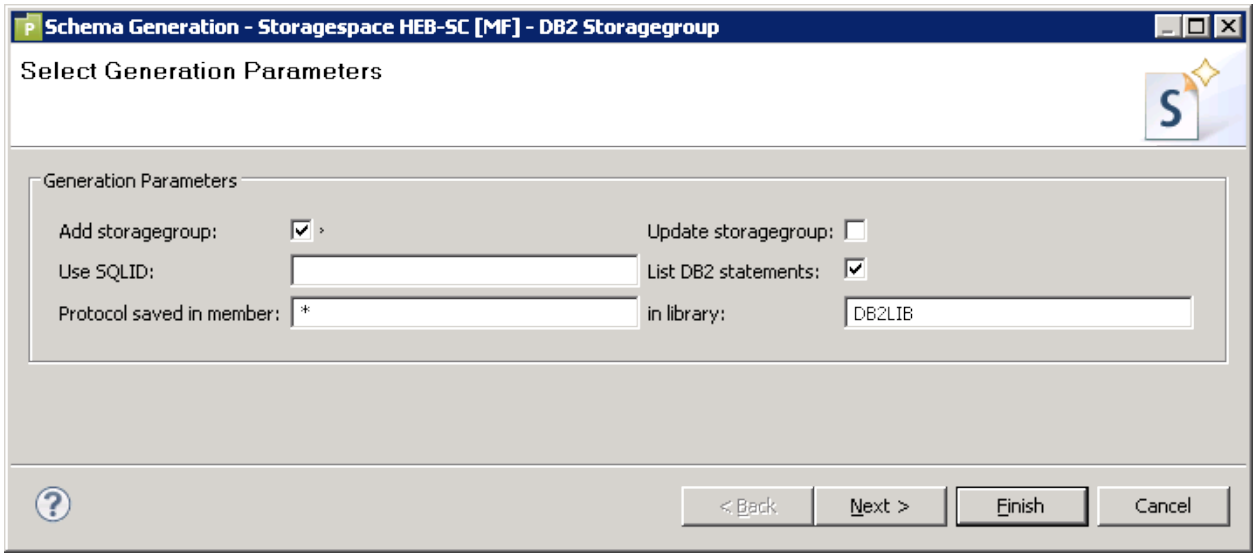


The following topics are covered below:

- Parameters for DB2 Storagegroup
- Keywords

- Sample Output for DB2 Storagegroup

Parameters for DB2 Storagegroup



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Presetting		
The parameter below can be changed in the Modify DB2 Storagegroup Defaults screen of Predict. See *Generation Defaults*.		
Count of saved actions		Number (0-99) of generation actions which are stored in the protocol specified under Protocol saved in member/library. If 99 is entered, all generation actions are stored. This is the default setting at installation.
Parameters		
Add storagegroup	Y	A new DB2 storagegroup is created. If the DB2 storagegroup already exists, this parameter must be set to N.
Update storagegroup	Y	If the DB2 storagegroup is already implemented, commands are generated to adapt the DB2 storagegroup to the documentation (if differences were found).

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Storagespace ID	STORAGESPACE-ID
Add Storagegroup	ADD-STORAGEGROUP
Update Storagegroup	UPD-STORAGEGROUP
List DB2 statements	LIST
Protocol saved in member	MEM
Protocol saved in library	LIB
Use SQLID	SQLID
SQL Server	SQL-SERVER

If a parameter is not specified, the default value is taken.

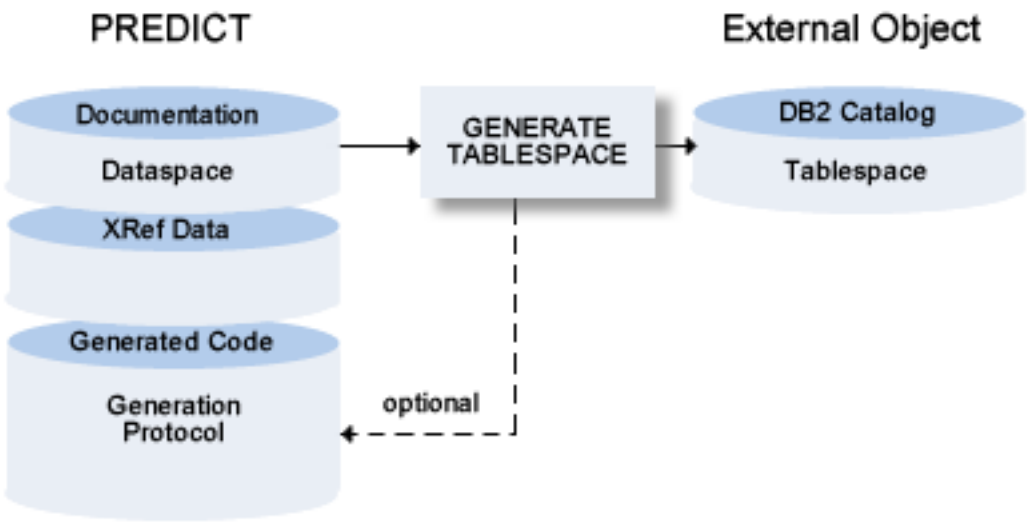
Sample Output for DB2 Storagegroup

```
Storagespace-ID: EXAM-STORAGEGROUP

CREATE STOGROUP EXAM001
       VOLUMES (VOL05 )
       VCAT DB2;
```

DB2 Tablespace

A DB2 tablespace can be implemented with Dictionary View by generating the necessary SQL statements. The generated SQL statements can be saved in a generation protocol.

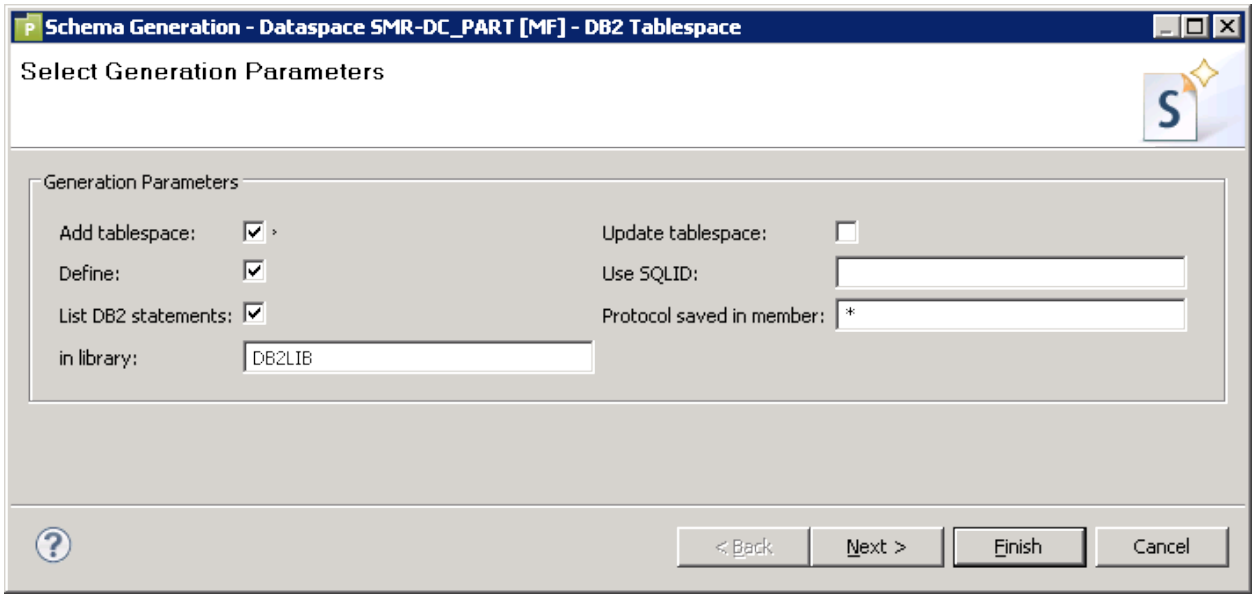


The following topics are covered below:

- Parameters for DB2 Tablespace
- Keywords

- Sample Output for DB2 Tablespace

Parameters for DB2 Tablespace



Values for fields which have been locked by your data dictionary administrator cannot be overwritten. These fields are skipped when positioning the cursor with the TAB key. See *Generation Defaults*.

Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Presetting		
The parameter below can be changed in the Modify DB2 Tablespace Defaults screen of Predict. See *Generation Defaults*.		
Count of saved actions	Number (0-99) of generation actions which are stored in the protocol specified under Protocol saved in member/library. If 99 is entered, all generation actions are stored. This is the default setting at installation.	
Parameters		
Add tablespace	Y	A new DB2 tablespace is created. If the DB2 tablespace already exists, this parameter must be set to N.
Update tablespace	Y	If the tablespace is already implemented, the differences of the implemented tablespace and the documented dataspace are determined and update commands are generated to modify the implemented tablespace according to the documented dataspace.

Presetting	
	Note: Certain parameters may be modified with the `ALTER TABLESPACE` statement only when the database is active, other parameters only when the database is stopped. For this reason it may be necessary to submit the generation job twice.
Define	N | A `DEFINE NO` clause is generated
Partitions initialized	Only for tablespaces with type G (Partition by growth). Specifies the number of partitions to be initialized (corresponds to the `NUMPARTS` option in DB2) and must not exceed the total number of partitions defined for that tablespace.

Keywords

The schema generation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Dataspace ID	DATASPACE-ID
Add tablespace	ADD-TABLESPACE
Update tablespace	UPD-TABLESPACE
List DB2 statements	LIST
Protocol saved in member	MEM
Protocol saved in library	LIB
Define	DEFINE
Use SQLID	SQLID
SQL Server	SQL-SERVER
Partitions initialized	NUMPARTS

If a parameter is not specified, the default value is taken.

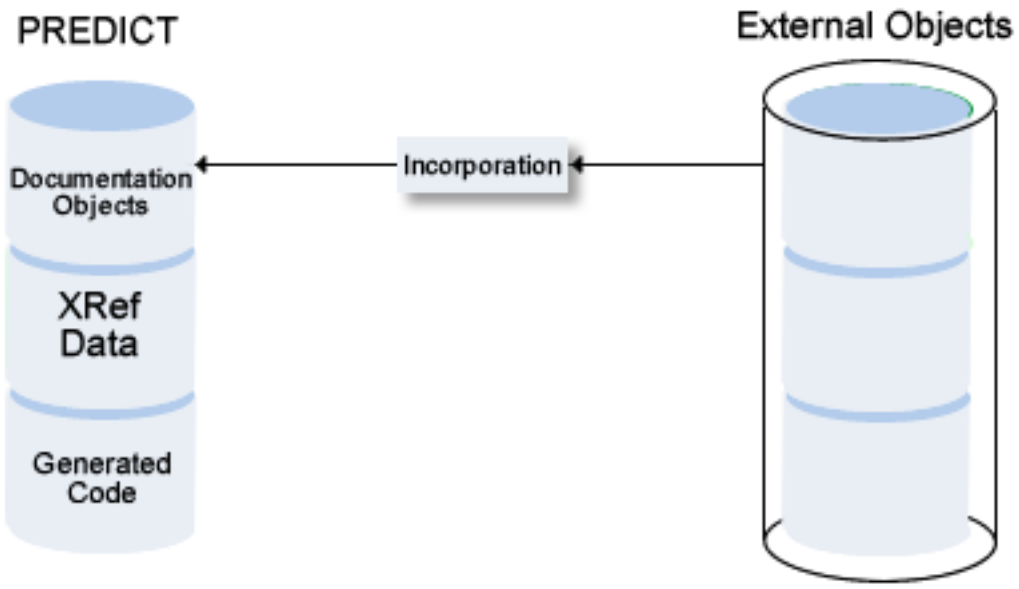
Sample Output for DB2 Tablespace

```
Dataspace-ID: EXAM-TABLESPACE

CREATE TABLESPACE EXAMTS IN EXAMDB
       NUMPARTS 4
       BUFFERPOOL BP0
       LOCKSIZE ANY
       CLOSE NO;
```

II Incorporation

Predict objects can be created or updated by incorporating information from external objects.



This section covers the following topics:

Concepts of Incorporation
Incorporating Adabas Databases
Incorporating Adabas Files
Common Parameters for All DB2 Types
Incorporating DB2 Storagegroups
Incorporating DB2 Databases
Incorporating DB2 Tablespaces and SQL/DS DBspaces
Incorporating DB2 and SQL/DS Tables/Views

7 Concepts of Incorporation

- Overview of Incorporation Options 62
- Connecting External and Predict Objects 62
- Calling Incorporation Functions 64

Incorporation functions are used

- to find external objects that are not yet documented/connected to a documentation object,
- to document applications that are not yet documented in Predict,
- to redocument applications that are not completely documented in Predict.

Overview of Incorporation Options

Incorporation functions perform the following tasks:

- **Test**
  Compare external and documentation objects. The function finds implemented objects already documented with Predict objects, where the implemented object and the Predict object are not connected.

  Note: In Predict, this incorporation function is called Compare.

- **Connect**
  Connect external and documentation objects. The function connects documentation and implementation objects and - if appropriate - the documentation object is partially updated. For example: physical file attributes are updated, but file lists are not.
- **Display Masters**
  Display IDs of objects that must be documented in Predict before objects can be incorporated.
  - Display DB2 databases, tablespaces and storagegroups that must be documented in Predict before tables/views or tablespaces can be incorporated.
- **Incorporate**
  Incorporate external objects. A Predict object is created, its attributes are taken from the implemented object. The implemented object and the new documentation object are connected.

Connecting External and Predict Objects

The incorporation functions Test, Connect and Incorporate can be used to connect Predict objects and external objects.

See the section ***Handling of External and Documentation Objects*** in this documentation for a description of the basic principles of connecting external and Predict objects.

Identifying Corresponding External and Documentation Objects

Incorporation functions read information from Predict and from external sources to try and find objects that correspond. Corresponding objects are identified as follows:

Predict Object	Corresponding Object Identified with
Adabas Database	Physical database number (P-DBnr)
Adabas File	Physical database and file number (P-DBnr/P-Fnr); see also note below.
DB2 Database	DB2 database name
DB2,SQL/DS Tables/Views	DB2,SQL/DS table/view name - Predict file ID
DB2 Storagegroup	DB2 storagegroup name
DB2 Tablespace	DB2 tablespace name

Note: With partitioned files, a Predict file object can be implemented with several physical files: In this case the database/file number of implemented files and corresponding Predict file objects need not be identical. Predict evaluates the Vista translation table to determine implemented files documented with Predict file object when the database/file numbers are not identical.

Sources of Information on External Objects

Predict reads the following external sources of information:

Documentation Object	External Source of Information
Adabas Database	Adabas GCB
Adabas file	Adabas FCB and FDT
DB2 Database	DB2 catalog
DB2,SQL/DS Tables/Views	DB2 catalog
DB2 Storagegroup	DB2 catalog
DB2 Tablespace	DB2 catalog

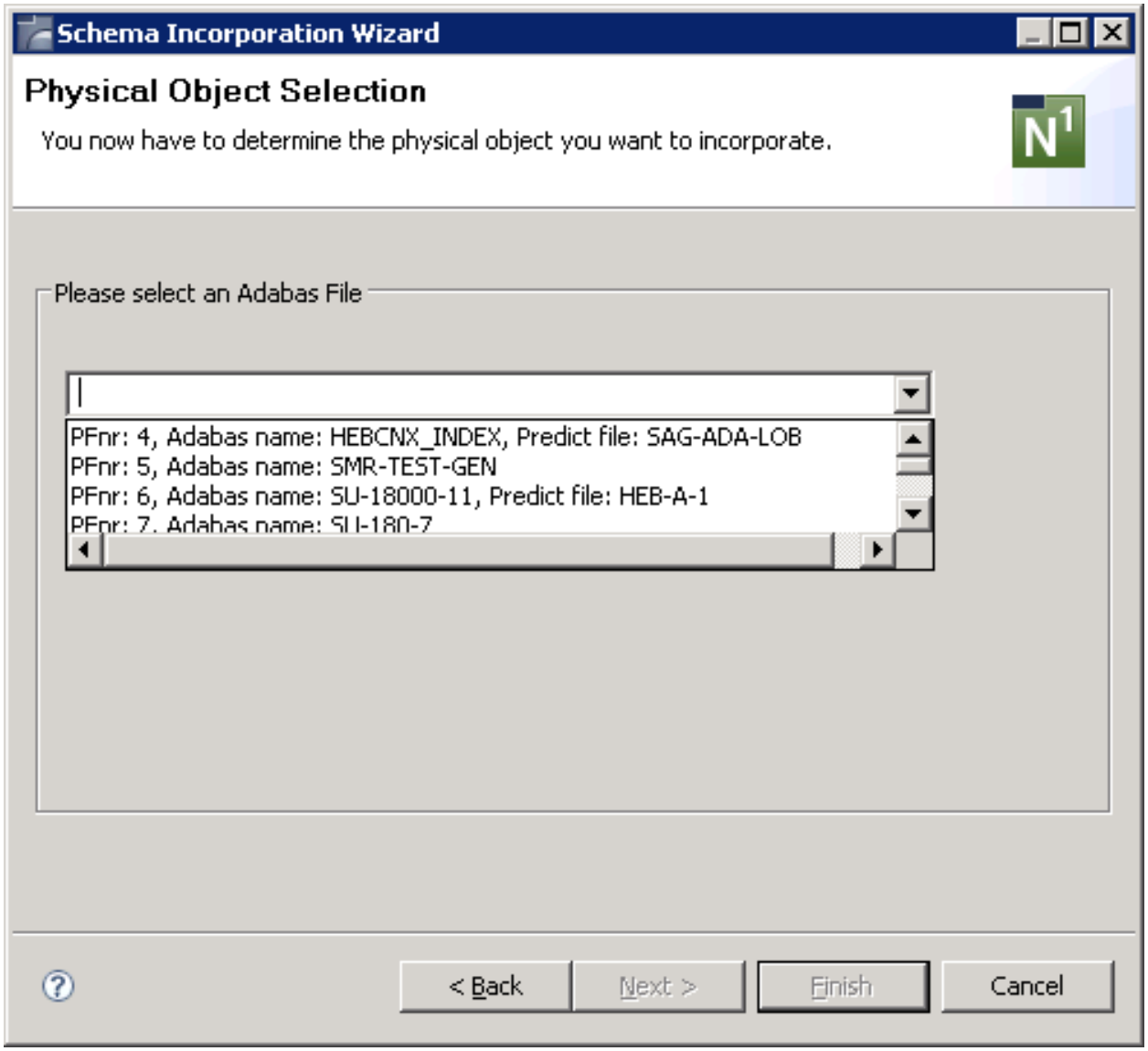
Calling Incorporation Functions

Incorporation Functions are Executed in Two Steps

- Create a list of external objects not yet connected to any Predict documentation object by specifying selection criteria.
- Process the selected objects with incorporation functions.

Step 1: Selecting the Objects to be Processed

A drop-down list box containing external objects is provided. Selection criteria determine which objects are contained in the list. The content of the list depends on the external object type.



Remarks which apply to all Object Types

Note: Type-specific remarks are described with the respective external object types.

Remark	Function	Description
Equal	Test	No significant differences between external and documentation object. Connection between the two can be established.
Different		Significant differences between external and documentation object. No connection between the two possible.
Connected	After execution of incorporation function Connect	Connection between external and documentation object was established.

Remark	Function	Description
Not connected		No connection established due to significant differences between external and documentation object.
Incorporated	After execution of function Incorporate	New Predict object created with information from external object.
Not incorporated		No new Predict object created.

Step 2: Processing Objects with Incorporation Functions

Test

Compares the external objects with Predict objects and reports differences between attributes and lists of children (if applicable). Requires that both an implemented object and a corresponding Predict object exist.

Connect

Connects the external object to an existing Predict object and

- copies current information from external object to the Predict object;
- writes to the generation log of the object that a corresponding implemented database existed when the connection was established;
- connects child objects to the corresponding external objects.

Display Masters

When incorporating tables/views/tablespaces, higher-level objects (databases, storagegroups, tablespaces) must be documented in Predict. This function finds higher-level objects that are not documented.

Incorporate

Creates Predict objects from information of external objects and connects the Predict objects to the external objects. Applicable to all external object types.

- When incorporating files/tables/views, Predict objects for the files in the database and links from files to fields are also created.

Type-specific parameters determine how the different incorporation functions work.

8 Incorporating Adabas Databases

- Prerequisites for Adabas Databases 68
- Restrictions for Adabas Databases 68
- Selecting Adabas Databases 69
- Incorporation Functions for Adabas Databases 70
- Keywords 72

Prerequisites for Adabas Databases

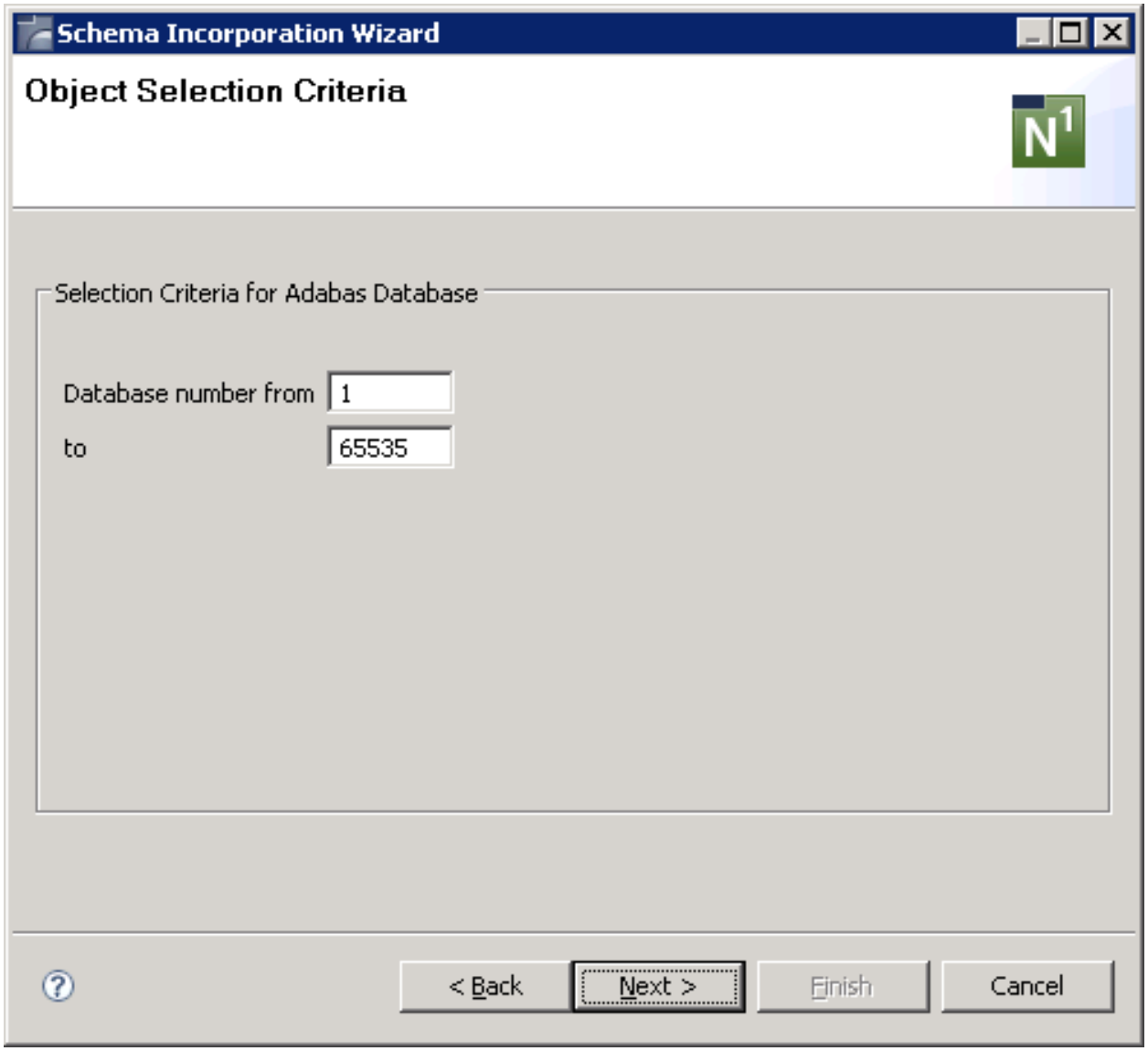
- Adabas Online Services must be active.
- Databases must be Adabas Version 6 databases or above.
- If Natural Security is installed and function protection for Predict is activated, access rights must be given.

Restrictions for Adabas Databases

Only databases accessible from the current virtual machine can be processed

Note: See *Concepts of Incorporation* for basic information on how to use incorporation functions.

Selecting Adabas Databases



Parameters	
Database number from/to	The physical numbers of the Adabas databases to be incorporated. A range of up to 23 databases can be specified.
Update DB attributes (connect option)	Provided on a later page of the schema incorporation wizard (after the physical object has been selected from the drop-down list box). Y - The attributes of the Predict database object are to be updated.

Databases which meet the given selection criteria and are not already connected to a Predict database are then provided in the drop-down list box on the next page of the schema incorporation wizard.

Information in the drop-down list box		
DBnr	Number of the database.	
Adabas name	The Adabas name of the database (the name specified with the ADADEF or the ADAREF utility).	
Predict database ID	The IDs of Predict database object.	
Remark	Any of the following type-specific remarks or blank. For type-independent remarks see *Remarks which apply to all Object Types*. **Note:** If any of the following remarks is given, no incorporation function is possible.	
	DB error: nnnn	Where nnnn is an Adabas response code between 3001 and 3255. The database is not defined in NTDB as type Adabas.
	Vista element exists	Incorporating the database would destroy the consistency of the Predict documentation.
	Database with different type exists	A Predict database object with a different database type exists. Incorporating the database would destroy the consistency of the Predict documentation.
	Exists in other Network	Unique database number is required and the database already is exists in another network. Incorporating the database would destroy the consistency of the Predict documentation.
	Access via Vista	The database to be incorporated is only accessible using Vista, but Vista support is not activated in Predict.

Incorporation Functions for Adabas Databases

Valid functions:

- Test
- Connect

- Incorporate

Test

Compares (tests) the database and the Predict database object and reports differences between attributes and file lists.

Connect

Connects the database to the existing Predict database object, and

- copies current information from Adabas to Predict object
- writes to the generation log of the object that a corresponding implemented database existed when the connection was established
- connects the checkpoint and security file (if any) of the Adabas database to Predict file objects in the file list of the database with the same file number.

Specify the following parameters in an additional page of the schema incorporation wizard.

Connect Options	
Update DB attributes	See the parameter table in ***Selecting Adabas Databases*** for a description of this parameter.

Incorporate

Scope of the Incorporation

- A Predict database object of type A is created and connected to the external object.
- Vista elements for the database are created
  - if Vista is installed and
  - the Vista translation table contains translation elements with this database specified as target.
- The new database object is linked to the current virtual machine.
- If this database has a checkpoint or security file, the following files are added to the file list of the database: *SAG-ADA-CHECKPOINT* and *SAG-ADA-SECURITY*.

Specify the following parameters in an additional page of the schema incorporation wizard.

Incorporation Options	
Database ID	The ID of the new database object in Predict (mandatory). The Adabas name of the database is displayed and can be accepted or overwritten. The Adabas name is specified in the ADADEF or the ADAREF utility when creating the database.
List incorporated code	Y The values of all attributes incorporated for the database are listed (optional).

Keywords

The schema incorporation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Database number from	DBNR-FROM
Database number to	DBNR-TO
Function	SUB-FUNCTION
Database ID	DATABASE-ID
List incorporated code	LIST
Update DB attributes	UPD-DB

9 Incorporating Adabas Files

- Prerequisites and Restrictions for Adabas Files 74
- Selecting Adabas Files 75
- Incorporation Functions for Adabas Files 77
- Keywords 78

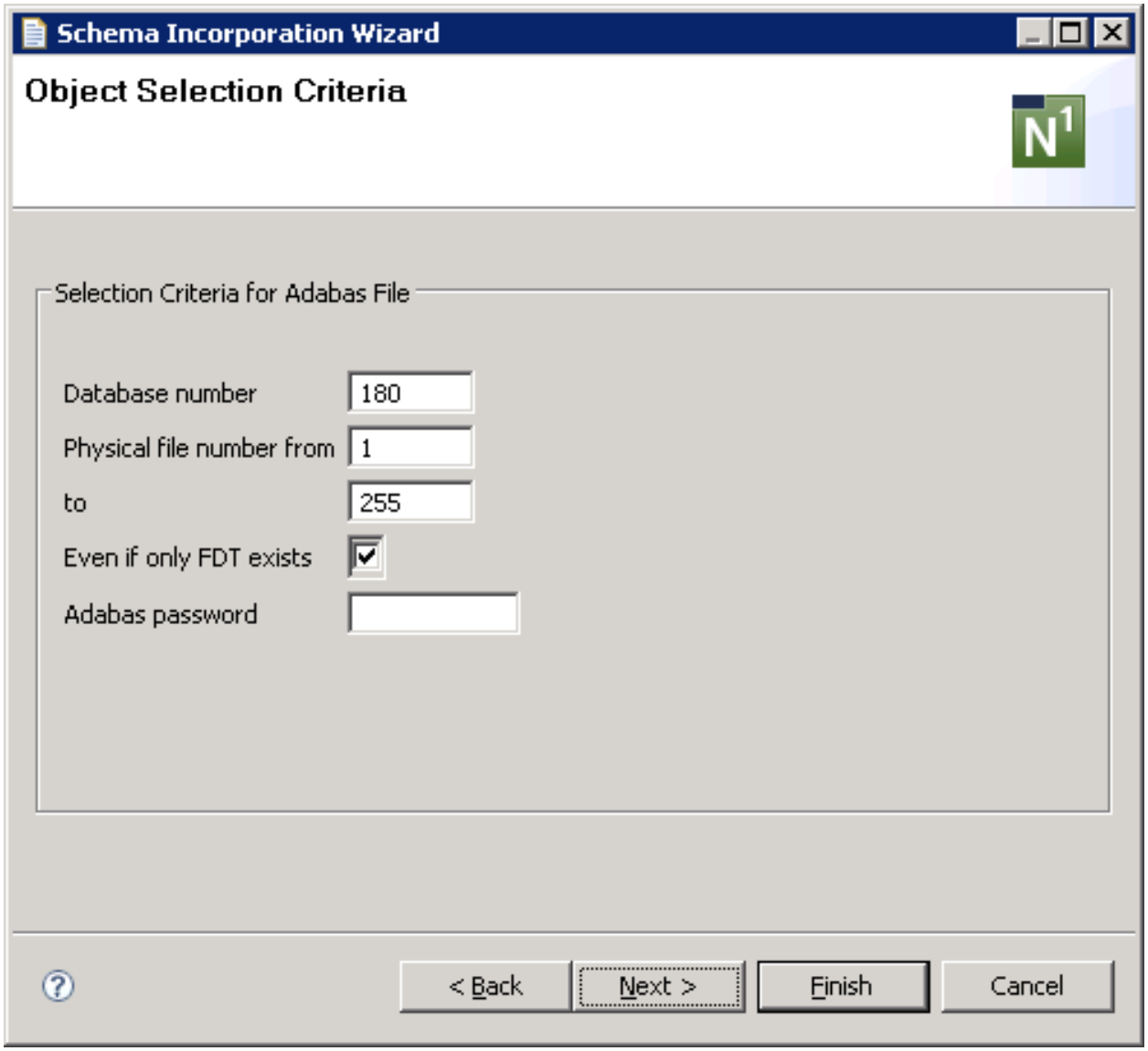
Prerequisites and Restrictions for Adabas Files

- A Predict database object for the Adabas database of the file must exist.
- If Natural Security is installed and function protection for Predict is activated, access rights must be given.
- Certain features of the Connect and Incorporate functions require Adabas Online Services to be active and Adabas Version 6 or above (see descriptions below).

Note: See *Concepts of Incorporation* for basic information on how to use incorporation functions.

With partitioned or replicated files, a Predict file object can be implemented as several physical files. In this case, the database/file number of implemented files and corresponding Predict file objects need not be identical. Predict evaluates the Vista translation table to determine if an implemented file is documented with a Predict file object, even if the database/file numbers are not identical. Therefore, when incorporating partitioned files, only one implemented Adabas file can be incorporated using the Incorporate function. Other components of that file can then be connected with the incorporation function Connect. Both the functions Incorporate and Connect update the Vista translation table of the file.

Selecting Adabas Files



Parameters	
Database number	The physical number of the Adabas database in which the Adabas files to be incorporated reside.
Physical file number from/to	Range of physical file numbers of the Adabas files to be incorporated.
Even if only FDT exists	Y A file is to be incorporated even if it has been deleted with the Keep FDT option.

	N	Only valid if the following conditions are met: ■ Adabas Online Services must be available; ■ The file to be incorporated must reside in a database of Adabas Version 6 or above; ■ The file to be incorporated must not have been deleted with the Keep FDT option, since it must have implementation data.
Update file attributes (connect option) / File attributes (incorporation option)	Provided on a later page of the schema incorporation wizard (after the physical object has been selected from the drop-down list box). Determines which attributes of the data dictionary file object are to be updated. Provided that Adabas Online Services are available and the file to be connected or incorporated resides in a database of Adabas Version 6 or above, the following values can be specified:	
	R	File attributes required when loading a file and any other file attributes specified in the data dictionary object.
	O	All file attributes including optional attributes not specified in the data dictionary object.
	N	No file attributes are to be updated.
Adabas password	The password required to access the file if the file is protected by Adabas security. The password is not converted to upper case.	

Files which meet the given selection criteria and are not already connected to a Predict file object are then provided in the drop-down list box on the next page of the schema incorporation wizard.

Information in the drop-down list box		
PFnr	Physical number of the file in the database.	
Adabas name	The name that was specified, either to the ADALOD utility or to Adabas Online Services, when the file was loaded into the database.	
Predict File ID	The ID of Predict file object of type A that may correspond to the Adabas files.	
Remark	Any of the following type-specific remarks or blank. In any of the following messages is displayed, the connect function cannot be executed. For type-independent remarks see *Remarks which apply to all Object Types*.	
	Partitioned master missing	Documentation of Vista elements and entries in Vista translation table are different.
	ISN range overlapping	Predict file object with physical distribution type expanded is different.
	Different components	Predict file object with physical distribution type expanded is different. Vista elements and entries in Vista translation table are different.
	Different Vista type	Documentation of Vista elements and entries in Vista translation are different.

Information in the drop-down list box		
	Different local definition	Documentation of Vista elements and entries in Vista translation are different.

Incorporation Functions for Adabas Files

Valid functions:

- Test
- Connect
- Incorporate

Test

Compares Adabas files and corresponding Predict file objects.

Connect

Connects Adabas file to the corresponding Predict file object and

- copies information from the Adabas FCB to the Predict file object,
- writes to the generation log of the object that a corresponding Adabas file existed when the connection was established.
- adds or updates Vista elements according to Vista translation table (if applicable).

Specify the following parameters in an additional page of the schema incorporation wizard.

Connect Options	
Update file attributes	See the parameter table in *Selecting Adabas Files* for a description of this parameter.

Incorporate

Scope of the Incorporation

- One Predict file object is created for each Adabas file. The Predict file objects are connected to the Adabas files.
- The new file object is linked to the database object via association "Contains FI".
- One field object is created for each field in the file. The ID assigned to each field object is created from the name of the field followed by either -GROUP for a group or -FIELD for a single field. A prefix and/or suffix specified with the parameters Field name prefix/suffix is/are added.
- If the file is physically coupled, a relationship object is created for each coupling definition.

- One Vista element (if applicable). If the file is accessible via several entries in the Vista translation table, the Vista element is created for the lowest logical file number.
- If Adabas Online Services are active and the file is implemented in a database of Adabas Version 6 or above, information on the implementation of the file (space allocation, for example) is incorporated.

Specify the following parameters in an additional page of the schema incorporation wizard. Parameter File ID is mandatory, all other parameters are optional.

Incorporation Options	
File ID	ID of the new file object (mandatory). The Adabas name of the file is displayed and can be accepted or overwritten.
File attributes	See the parameter table in *Selecting Adabas Files* for a description of this parameter.
Field name prefix	Prefix of each field ID.
Field name suffix	Suffix of each field ID.
List incorporated code	Y | The values of all attributes incorporated for the file are to be listed.

Keywords

The schema incorporation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Database number	DBNR
Physical file number from	FROM-FNR
Physical file number to	TO-FNR
Even if only FDT exists	EVEN-ONLY-FDT
Update file attributes (connect option) / File attributes (incorporation option)	FILE-ATTR
Adabas password	PSW
Function	SUB-FUNCTION
File ID	FILE-ID
Field name prefix	PREFIX
Field name suffix	SUFFIX
List incorporated code	LIST

10 Common Parameters for All DB2 Types

The following parameters can be set in all DB2 object types.

Parameters	
SQL Server	The SQL server from which the object will be incorporated from.

11 Incorporating DB2 Storagegroups

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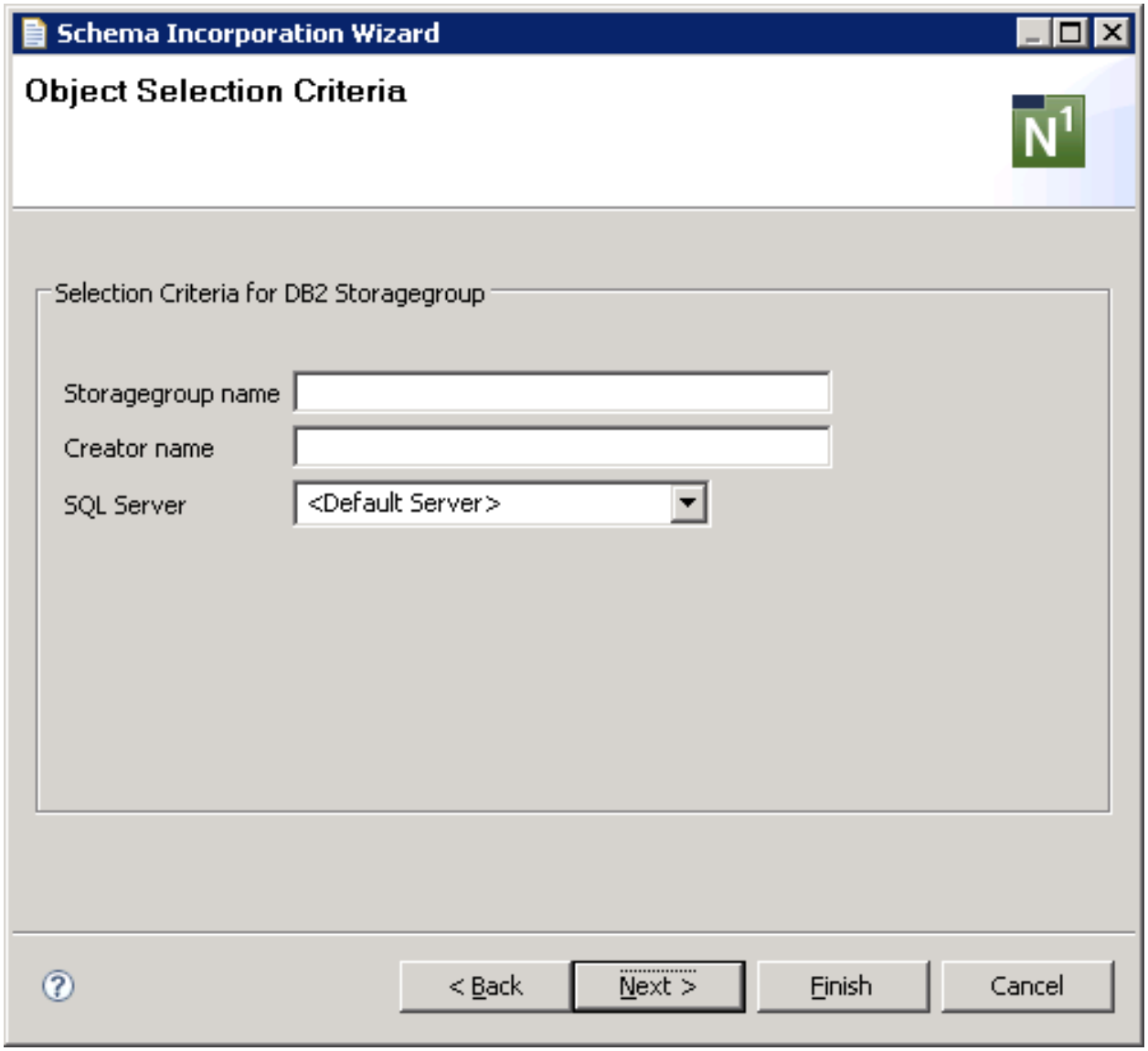
- Selecting DB2 Storagegroups 83
- Incorporation Functions for DB2 Storagegroups 84
- Keywords 85

Prerequisites for DB2 Storagegroups

Incorporation of DB2 objects is subject to DB2 security mechanisms. See the section *DB2 and SQL/DS* in the *Predict and Other Systems* documentation.

Note: See ***Concepts of Incorporation*** for basic information on how to use incorporation functions.

Selecting DB2 Storagegroups



Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Parameters	
Storagegroup name	DB2 storagegroup name. Asterisk notation is allowed.
Creator name	DB2 creator name. Asterisk notation is allowed.
Update storagespace attributes (connect option)	Provided on a later page of the schema incorporation wizard (after the physical object has been selected from the drop-down list box). Y - Attributes of the Predict storagespace that differ from the DB2 storagegroup are updated.

Information in the drop-down list box	
Storagegroup name	Name of the storagegroup.
Predict storagespace ID	ID of a Predict storagespace documenting the storagegroup.
Remark	A type-independent remark (see *Remarks which apply to all Object Types* or blank.

Incorporation Functions for DB2 Storagegroups

Valid functions:

- Test
- Connect
- Incorporate

Note: Corresponding DB2 storagegroups and Predict objects of type storagespace are identified by the DB2 storagegroup name.

Test

Compares the storagegroup and the Predict storagespace and reports differences between attributes.

Connect

Connects the storagegroup to the existing Predict storagespace, and

- updates the Predict storagespace;
- writes to the generation log of the Predict object that a corresponding implemented storagegroup existed when the connection was established.

Specify the following parameters in an additional page of the schema incorporation wizard.

Connect Options	
Update storagespace attributes	See the parameter table in *Selecting DB2 Storagegroups* for a description of this parameter.

Incorporate

Scope of the Incorporation

- Creates a Predict storagespace with attributes documenting the storagegroup.
- Connects the storagegroup and the Predict storagespace.

Specify the following parameters in an additional page of the schema incorporation wizard. Storagespace ID is mandatory, List incorporated code is optional

Incorporation Options		
Storagespace ID	ID to be assigned to the new Predict storagespace.	
List incorporated code	Y	The values of all attributes incorporated for the table or view are to be listed.

Keywords

The schema incorporation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Storagegroup name	STOGROUP
Creator name	CREATOR
Function	SUB-FUNCTION
Storagespace ID	STOSPACE-ID
List incorporated code	LIST
Update storagespace attributes	UPD-ST
SQL Server	SQL-SERVER

12 Incorporating DB2 Databases

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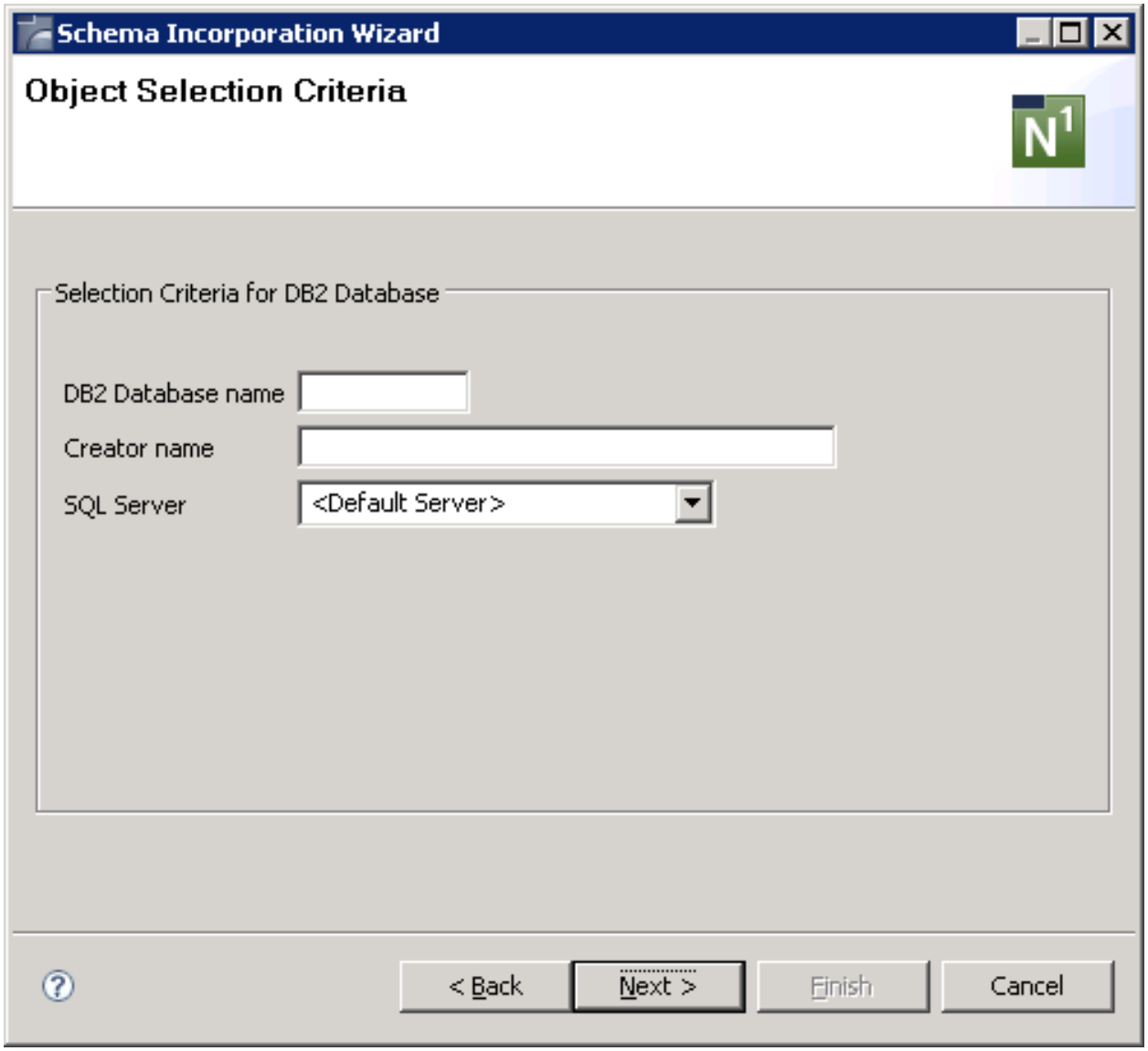
- Selecting DB2 Databases 89
- Incorporation Functions for DB2 Databases 90
- Keywords 91

Prerequisites for DB2 Databases

Incorporation of DB2 objects is subject to DB2 security mechanisms. See the section *DB2 and SQL/DS* in the *Predict and Other Systems* documentation.

Note: See ***Concepts of Incorporation*** for basic information on how to use incorporation functions.

Selecting DB2 Databases



Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Parameters	
DB2 database name	DB2 database name. Asterisk notation is allowed.
Creator name	Creator name. Asterisk notation is allowed.
Update DB attributes (connect option)	Provided on a later page of the schema incorporation wizard (after the physical object has been selected from the drop-down list box). Y - Attributes of the Predict database object are to be updated.

Databases which meet the selection criteria and are not already connected to a Predict database object are then provided in the drop-down list box on the next page of the schema incorporation wizard.

Information in the drop-down list box		
Creator	Creator of the database.	
Database name	Name of the database	
Predict database ID	ID of Predict database object for a DB2 database with this DB2 name.	
Remark	Either the following type-specific remark or blank. For type-independent remarks see *Remarks which apply to all Object Types*.	
	SC missing	Default storagegroup is not documented. Incorporation is not possible.

Incorporation Functions for DB2 Databases

Valid functions:

- Test
- Connect
- Incorporate

Test

Compares the database and the Predict database object and reports differences between attributes and file lists.

Connect

Connects the DB2 database to the corresponding Predict database object and

- copies current information from the DB2 catalog into the dictionary object;
- writes to the generation log of the Predict database object that a corresponding implemented database existed when the connection was established.

Specify the following parameters in an additional page of the schema incorporation wizard.

Connect Options	
Update DB attributes	See the parameter table in *Selecting DB2 Databases* for a description of this parameter.

Incorporate

Scope of the Incorporation

- Creates a database object of type D with attributes documenting the database.
- The new database object is linked to the Predict object documenting the current virtual machine via association "Contains DA".
- Connects the database and the Predict database object.

Specify the following parameters in an additional page of the schema incorporation wizard. The parameter Database ID is mandatory, the other parameter is optional

Incorporation Options		
Database ID	ID of the new Predict database object. The creator and DB2 name of the database joined by a hyphen is displayed and can be accepted or overwritten.	
List incorporated code	Y	The values of all attributes incorporated for the database are to be listed.

Keywords

The schema incorporation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword	
DB2 database name	DB2NAME	
Creator name	CREATOR	
Function	SUB-FUNCTION	
Database ID	DATABASE-ID	
List incorporated code	LIST	
Update DB attributes	UPD-DB	
SQL Server	SQL-SERVER	

13 Incorporating DB2 Tablespaces and SQL/DS DBspaces

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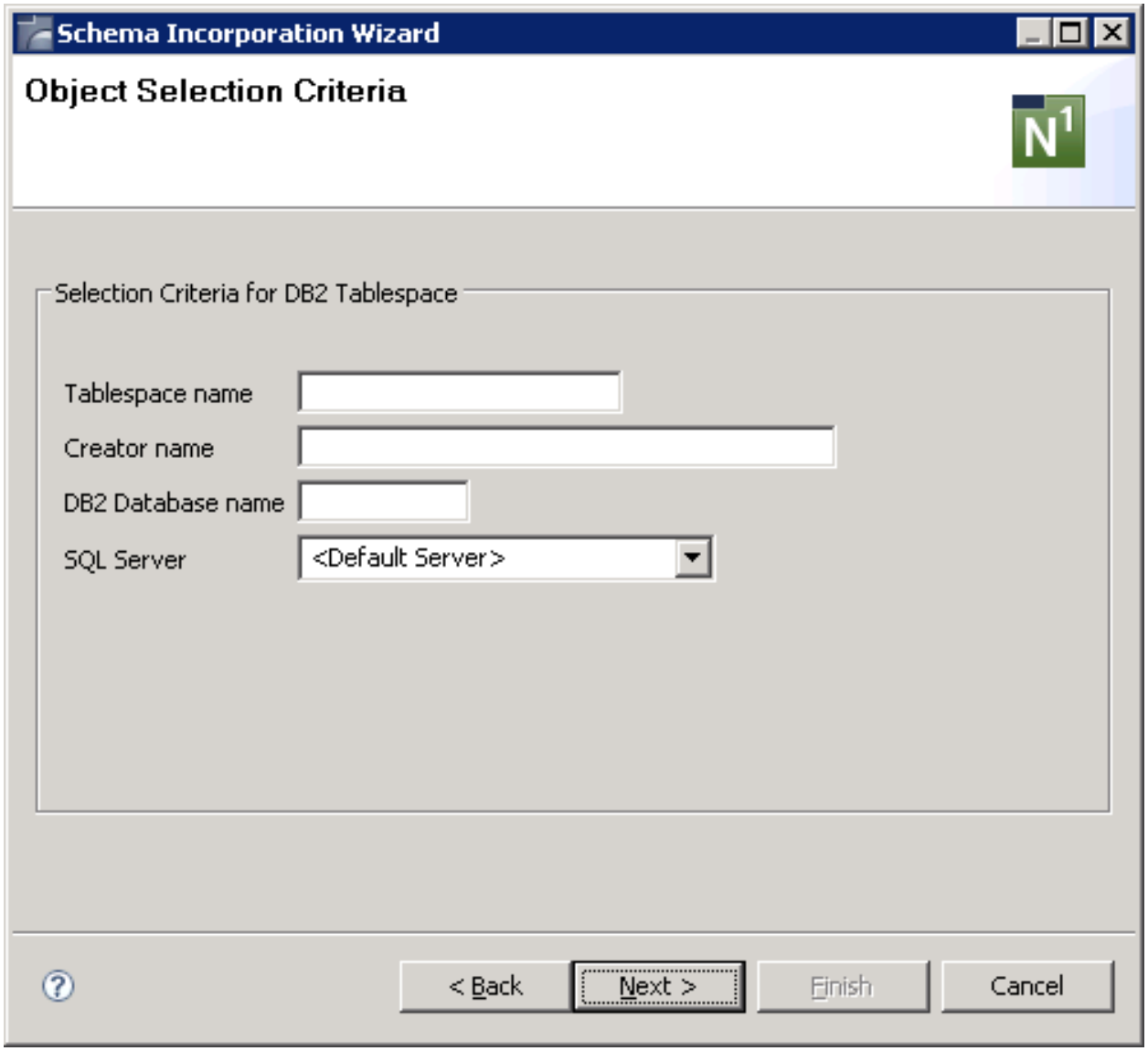
Prerequisites for DB2 Tablespaces

Incorporation of DB2 objects is subject to DB2 security mechanisms. See the section *DB2 and SQL/DS* in the *Predict and Other Systems* documentation.

Note: See ***Concepts of Incorporation*** for basic information on how to use incorporation functions.

Selecting Tablespaces



Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Parameters	
Tablespace name	Name of DB2 tablespace. Asterisk notation is allowed.
Creator name	Name of tablespace creator. Asterisk notation is allowed.
DB2 database name	Name of DB2 database. Protected when processing SQL/DS DBspaces. Asterisk notation is allowed.
Update dataspace attributes (connect option)	Provided on a later page of the schema incorporation wizard (after the physical object has been selected from the drop-down list box). Y - Attributes of the Predict dataspace that differ from the DB2 tablespace are changed.

Information in the drop-down list box		
DB2 database	Name of the database containing the tablespace.	
Tablespace name	Name of the tablespace.	
Predict dataspace ID	ID of the Predict dataspace object documenting the DB2 tablespace.	
Remark	Any of the following type-specific remarks or blank. For type-independent remarks see ***Remarks which apply to all Object Types***.	
	SC missing	Default storagegroup is not documented. Incorporation is not possible.
	DA missing	The DB2 database or storagegroup is not documented in Predict. Incorporation is not possible.
	ST missing	

Incorporation Functions for Tablespaces

Valid functions:

- Test
- Connect
- Display Masters
- Incorporate

Test

Compares DB2 tablespaces and corresponding Predict dataspace objects. Differences between file lists and tablespace/dataspaces attributes are reported.

Connect

Connects DB2 tablespaces to Predict dataspace object and

- copies current information from the DB2/SQL/DS catalog to the dictionary object
- writes to the generation log of the Predict dataspace object that a corresponding implemented database existed when the connection was established.

Specify the following parameters in an additional page of the schema incorporation wizard.

Connect Options	
Update dataspace attributes	See the parameter table in *Selecting Tablespaces* for a description of this parameter.

Display Masters

The DB2 databases and storagegroups a tablespace is related to must be documented in Predict before the tablespace can be incorporated. The incorporation function M can be used to identify all objects that are missing. These can then be incorporated before the tablespace is incorporated.

Incorporate

Scope of the Incorporation

- A Predict dataspace object is created for each tablespace and connected to the tablespace.
- The dataspace object is linked to the corresponding database in Predict via association "Contains DC".

Specify the following parameters in an additional page of the schema incorporation wizard. Dataspace ID is mandatory, List incorporated code is optional.

Incorporation Options		
Dataspace ID	ID of the Predict dataspace object. The DB2 tablespace name is displayed and can be accepted or overwritten.	
List incorporated code	Y	Display what has been incorporated as attributes of the dataspace object.

Keywords

The schema incorporation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Tablespace name	TBSPACE
Creator name	CREATOR
DB2 database name	DB2NAME
Function	SUB-FUNCTION
Dataspace ID	DSSPACE-ID
List incorporated code	LIST
Update dataspace attributes	UPD-DS
SQL Server	SQL-SERVER

14 Incorporating DB2 and SQL/DS Tables/Views

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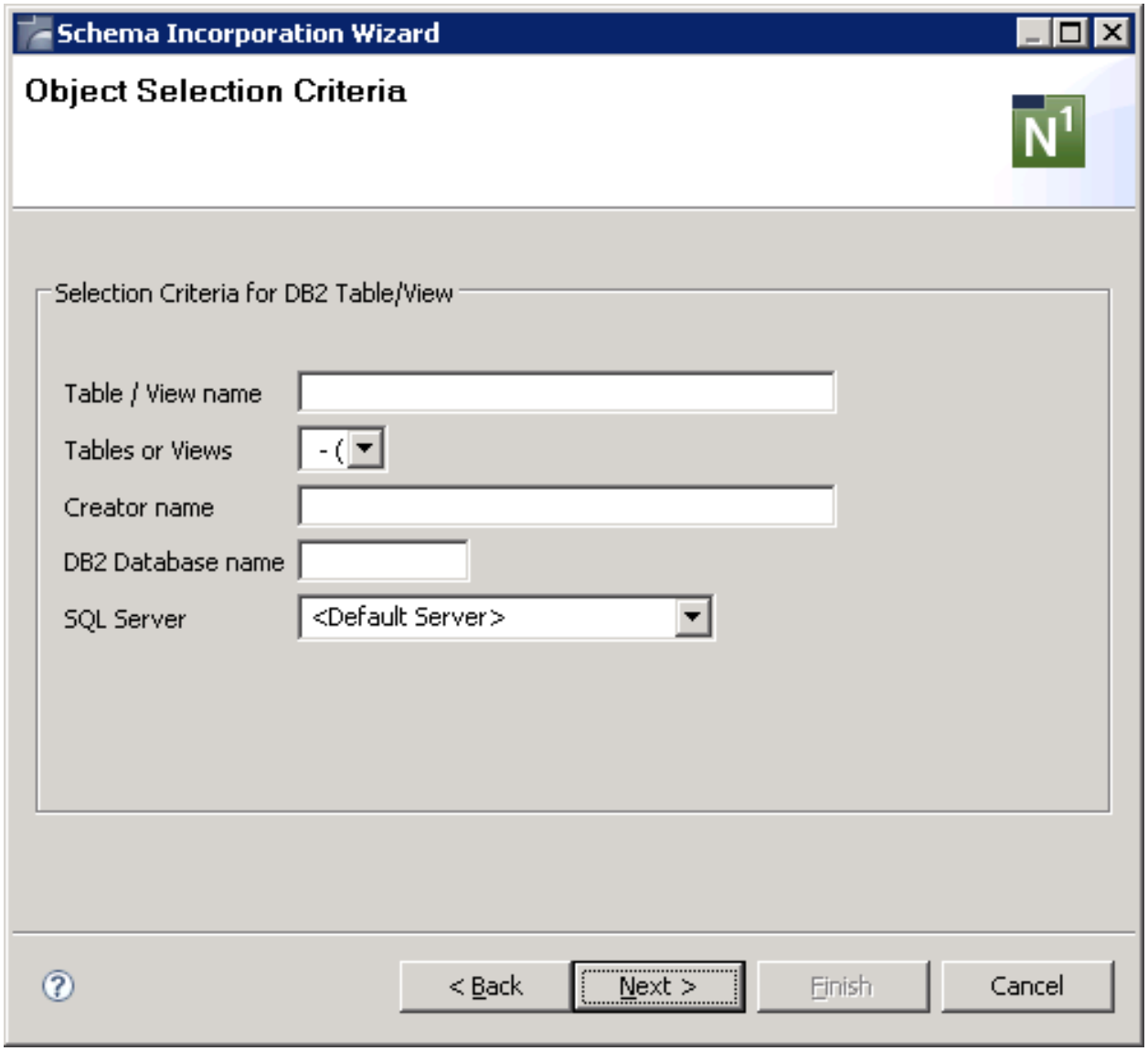
- Selecting DB2 and SQL/DS Tables/Views 101
- Incorporation Functions for DB2 and SQL/DS Tables/Views 103
- Keywords 105

Prerequisites for DB2 and SQL/DS Tables/Views

- For DB2 tables and views, a Predict object documenting the DB2 database containing the tables/views must exist.
- For SQL/DS tables and views, a corresponding database object in Predict is not required. See the section *DB2 and SQL/DS* in the *Predict and Other Systems* documentation.

Note: See ***Concepts of Incorporation*** for basic information on how to use incorporation functions.

Selecting DB2 and SQL/DS Tables/Views



Common parameters which are not included in the table below are described under *Common Parameters for All DB2 Types*.

Parameters	
Table / view name	The name in DB2 of the tables and views from which the data dictionary objects are to be created. Asterisk notation is allowed.
Tables or views	Limit the function to files of one type. Valid values: T — DB2 tables V — DB2 views blank — All types
Creator name	The DB2 "creator" of the tables and views from which the data dictionary objects are to be created. Asterisk notation is allowed.
DB2 database name	The name in DB2 of the database or databases in which the specified tables and views reside. Asterisk notation is allowed. When incorporating Tables/Views from SQL/DS, this parameter is protected.
Update file attributes (connect option)	Provided on a later page of the schema incorporation wizard (after the physical object has been selected from the drop-down list box). Y - Attributes of the Predict file object and, for files of type E, the subselect specification of the SQL create statement are to be updated. The triggers linked to the file via association "Has TR" are also updated.

Files which meet the given selection criteria and are not already connected to a Predict file object are then provided in the drop-down list box on the next page of the schema incorporation wizard.

Information in the drop-down list box	
Creator	Creator in DB2.
Table/view name	Name of the table/view.
Database	Name of DB2 database(s) where the table/view is implemented.
T	Type of the DB2 file: T — DB2 table V — DB2 view M — DB2 query table
Predict file ID	The ID of Predict file object for a DB2 table or view with this DB2 name.
Remark	Any of the following type-specific remarks or blank. For type-independent remarks see *Remarks which apply to all Object Types*. DA missing / ST missing / DS missing — The DB2 database, storagegroup or tablespace the table/view belongs to are not documented in Predict. Incorporation is not possible. Master missing — The specified DB2 view cannot be incorporated as a data dictionary object until a dictionary object for a related DB2 table or view has been created.

Information in the drop-down list box		
	Invalid file-type	The type of the specified DB2 table or view does not match the type of the corresponding Predict object: the file type of the data dictionary object is either not D (DB2 table) or not E (DB2 view).

Incorporation Functions for DB2 and SQL/DS Tables/Views

Valid functions:

- Test
- Connect
- Display Masters
- Incorporate

Note: Corresponding DB2 tables/views and Predict file objects of type D and E are identified by DB2 table/view name.

Test

Compares DB2 table/views and corresponding Predict file object. Differences between field lists and attributes of the tables/views are reported.

Connect

Connects DB2 tables/views to Predict file object and

- copies current information from the DB2 catalog to the dictionary object;
- writes to the generation log of the Predict file object that a corresponding implemented table/view existed when the connection was established.

Specify the following parameters in an additional page of the schema incorporation wizard.

Connect Options	
Update file attributes	See the parameter table in *Selecting DB2 and SQL/DS Tables/Views* for a description of this parameter.

Display Masters

DB2 databases, storagegroups and tablespace and tables/views a table/view is related to must be documented in Predict before the table/view can be incorporated. This function finds all objects that are not documented. These can then be incorporated before the table/view is incorporated.

Incorporate

Scope of the Incorporation

- One Predict file object is created for each table or view. The ID of the new file object consists of the creator name and DB2 name of the table or view joined by a hyphen.
- One field object is created for each field in the table or view. The ID assigned to each new field object will be the name of the field in DB2. For each view that is incorporated, the appropriate parts of the subselect specification in the SQL statement CREATE will be copied to the file and field objects created.
- One field object is added to file *SAG-DISTINCT-TYPE* for each distinct type that is not already documented. The ID assigned to each new field object consists of the schema name and the type name concatenated by a hyphen. The connection between the standard fields of *SAG-DISTINCT-TYPE* and the table field is established if the field in DB2 is distinct type.
- One Predict file object with file type IV (Intermediate view) is created for each subselect clause in the from clause of a view definition. For each column in the select list of subselect a Predict field object is created. For each intermediate view that is created, the appropriate parts of the subselect specification in the SQL statement CREATE will be copied to the file and field objects created.
- One Predict field object (type SP) for each composite index is created.
- One Predict field object (type SP) for each composite foreign key is created if there is not already a Predict field object for a composite index built from the same columns.
- One Predict relationship object is created for each foreign key.
- Labels defined for columns are documented as field headers.
- A trigger object is added for each trigger defined for a table or view. A link is established either to the file object via association "Has TR" or to the corresponding field objects in case of an update trigger.
- A verification is added and linked to the corresponding field for each check constraint that is defined for one column.
- Attributes of the corresponding file object are updated for each table check constraint (check expression for more than one column).

Specify the following parameters in an additional page of the schema incorporation wizard.

Incorporation Options		
Comments as abstract	Y	String constants assigned with COMMENT ON are to be incorporated as the abstract of the corresponding Predict object: ■ Comments assigned to the table or view are to be copied to the file object. ■ Comments assigned to a field of the table or view are to be copied to the field object.
List incorporated code	Y	The values of all attributes incorporated for the table or view are to be listed.
Document as table	Y	For views and materialized-query tables only. This incorporation option can be used if you are not interested in the derivation of a view from the underlying base table or if the used query involves the usage of compiled SQL scalar or table functions.

Keywords

The schema incorporation wizard uses the following keywords when showing the command that is to be processed:

Field	Keyword
Table/View name	TABLE
Tables or Views	TYPE
Creator name	CREATOR
DB2 Database name	DB2NAME
Function	SUB-FUNCTION
Incorporate comments	COMMENT
List incorporated code	LIST
Incorporate comments	ABSTRACT
Update file attributes	UPD-FILE
SQL Server	SQL-SERVER
Document as table	AS-TABLE

III Administration of External Objects

15 Administration of External Objects

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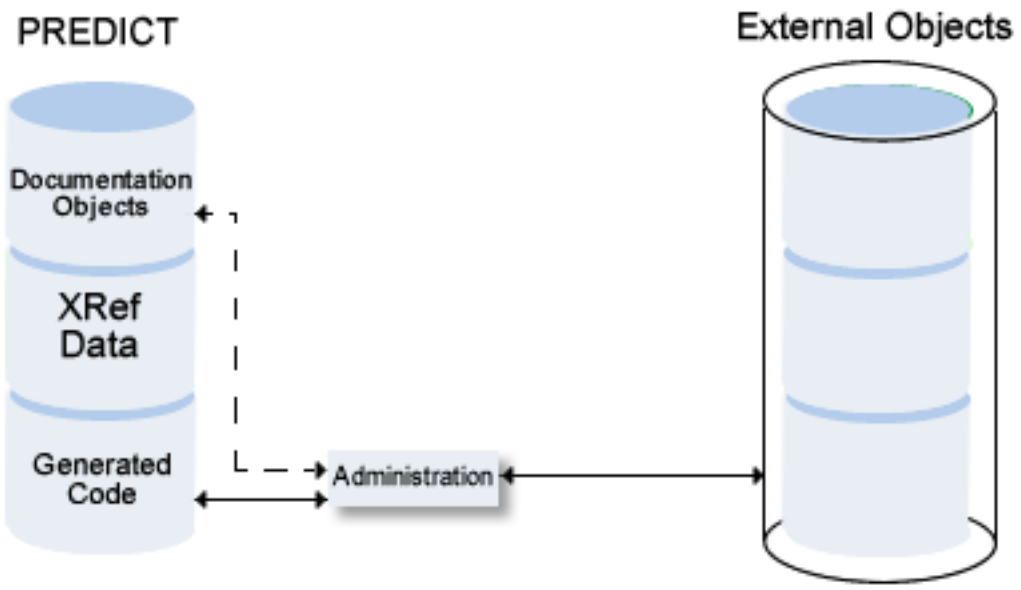
Information stored in Predict objects can be used to generate external objects, and documentation objects can be incorporated from external objects. External objects generated from documentation objects and documentation objects incorporated from external objects are connected. Predict provides functions to administrate external objects connected to documentation objects. These functions are described in this section.

See the section ***Handling of External and Documentation Objects*** in this documentation for a more detailed description of how external and Predict objects are handled.



Overview of Options

The following topics are covered below:

- Overview of Administration Functions

- General Rules

Overview of Administration Functions

Administration functions are used to perform the following tasks.

- **Disconnect implementation - Disconnect command**
  Disconnects external objects from their corresponding Predict objects. The implementation pointer from the documentation object to the external object is deleted, but the objects themselves remain intact.
- **Display implementation - Report command**
  Displays external objects.

  The following information is displayed:

  - Generated code.
- **Purge implementation - Deletecommand**
  Purges external objects. Any dependent objects are physically deleted. It is sometimes necessary to delete an external object before the connected Predict object can be deleted.
- **Refresh file - Refresh External command**
  Deletes all records stored in Adabas files, DB2 tables/views or Oracle tables/views.

General Rules

- External objects to be processed are identified by the Predict documentation object to which they are connected.
- If the Predict object was incorporated or connected with an Incorporation function, no generation protocol is stored in Predict.

Administrating External Databases

Functions

Disconnect implementation - Disconnect command

Disconnects implemented databases connected to the Predict database object by deleting the implementation pointer of the documentation object.

Display implementation - Report command

For DB2 databases: displays the generation log. For Adabas and IMS databases: only the implementation pointer is displayed.

Purge implementation - Delete command

For DB2 databases: Deletes the database and all dependent tablespaces, tables and views. The database ID must be entered again to confirm deletion. If a table holds the last reference to a distinct type, the distinct type is also deleted.

The function is not available for Adabas and IMS databases.

Caution: Database and all dependent tablespaces, tables and views are *physically deleted* in DB2. Recovery from this action is not possible.

Administrating External Dataspaces

Functions

Disconnect implementation - Disconnect command

Disconnects tablespaces and Predict dataspaces by deleting the implementation pointer of the Predict dataspace object.

Display implementation - Report command

Displays the generation log.

Purge implementation - Delete command

Deletes the tablespace and all dependent tables and views. The dataspace ID must be entered again to confirm deletion. If a table holds the last reference to a distinct type, the distinct type is also deleted.

If dependent tables and views exist, they are listed. The deletion of these dependent objects has to be confirmed.

Caution: Tablespace and dependent tables and views are *physically deleted* in DB2. Recovery from this action is not possible.

Administrating External Files

Functions

Disconnect implementation - Disconnect command

Disconnects implemented external object(s) from the Predict file object by deleting the implementation pointer of the file object.

Display implementation - Report command

Displays generated code.

Purge implementation - Delete command

Deletes generated code. If a DB2 table holds the last reference to a distinct type, the distinct type is also deleted.

Caution: File is physically deleted in Adabas, DB2, Oracle or Adabas SQL Server directory. All dependent objects are deleted, too.

Special rules apply when deleting Adabas files or DDMs:

Adabas files

The following rules apply:

- If the file to be deleted is in use, the Adabas option Stop user using file is used.
- If Predict/AOS Security is active, access rights are required to delete an Adabas file or to stop users using the file. See *Protecting Adabas Databases and Files* in the section *Protecting External Objects in Predict with Natural Security* in the *Predict Security* documentation.

DDMs

For DDMs defined in Natural Security, access rights to maintain the security definition of the file in Natural Security are required. See *Protecting DDMs* in the section *Protecting External Objects in Predict with Natural Security* in the *Predict Security* documentation.

Refresh file - Refresh External command

Deletes all records stored in Adabas files, DB2 tables or Oracle tables. Data structure remains intact. Refresh operation must be confirmed.

Special rules apply when refreshing Adabas files:

- If the file to be refreshed is in use, the Adabas option Stop user using file can be used.

Note: If Predict/AOS Security is active, access rights are required to delete an Adabas file or to stop users using the file. See *Protecting Adabas Databases and Files* in the section *Protecting External Objects in Predict with Natural Security* in the *Predict Security* documentation.

Caution: This function deletes the entire contents of an Adabas file, DB2 table/view or Oracle table/view. Recovery from this action is not possible.

Administrating External Programs

Functions

Disconnect implementation - Disconnect command

Disconnects implemented external object(s) from the Predict program. The implementation pointer from the documentation object to the external object(s) is deleted, but the objects themselves remain intact.

Display implementation - Report command

Displays generated code.

Purge implementation - Delete command

Deletes the procedure/function in DB2.

Administrating External Storagespaces

Functions

Disconnect implementation - Disconnect command

Disconnects implemented external object(s) from the Predict storagespace by deleting the implementation pointer of the documentation object.

Display implementation - Report command

Displays generated code.

Purge implementation - Delete command

Deletes generated code.

A storagespace which is used by any tablespace or index space cannot be deleted. In this case, a list of all the tablespaces, tables and views used by the storagespace is displayed.

Caution: Storagegroup is physically deleted in DB2.