



PREDICT APPLICATION CONTROL

Predict Application Control

Reference

Version 2.3.2

 **SOFTWARE AG**



This document applies to Predict Application Control Version 2.3.2 and to all subsequent releases. Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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PAC Reference

This documentation is intended for all users of Predict Application Control.

It is organized under the following headings:

- **Command Reference** This document describes the available direct commands which can be issued from any screen in the PAC system to bypass menus and access the particular screens directly.
- **Migration Utility** This document describes the PAC Migration utility which may be executed during migration events, using the command MIGLOAD for loading Natural objects into PAC.
- **Compare Utility** This document contains information on the PAC Compare utility. The comparing of Natural, Predict and foreign objects both under the control of PAC, as well as outside of the PAC environment is described.
- **Scan Utilities** This document describes both the scan utility for migration path verification and default update and the scan utility for Natural object versions.
- **User Exits** This document provides detailed information on PAC user exits, whereby control can be passed to user-written Natural programs (user exit routines) to override the change management procedure defaults established by PAC.
- **System Applymods** This document describes the applymods currently used by PAC.
- **Object Type Codes** This document lists and describes the object type codes used in PAC.
- **Application Programming Interface** This document describes PAC's Application Programming Interface (API) facilities, which are Natural subprograms invoked using CALLNAT statements to access PAC directly from within a user-written program without invoking PAC with MENU, ADMIN, or SYSPAC commands.

Command Reference

Instead of using function codes, you can issue direct commands from any screen in the PAC system to bypass menus and access the particular screens directly.

Direct commands are either Natural (N) commands or commands that are specific to PAC (P). The ADMIN and MENU commands are both Natural and PAC commands.

This chapter covers the following topics:

- SYSPAC Commands - N
 - Other SYSPAC Commands
 - Commands to Set SYSPAC Options - P
 - Natural Program Editor Commands
-

SYSPAC Commands - N

The direct commands in this section are used to execute SYSPAC functions. These commands may be issued either when SYSPAC is invoked or from a menu screen.

Direct commands are issued in either interactive or batch mode.

To issue commands in interactive mode

- from any library, enter SYSPAC followed by a direct command string.

After the direct command is issued, you are usually returned to the library from which you issued the command.

Or:

from library SYSPAC, enter MENU followed by a direct command string.

Or:

from a SYSPAC menu screen, enter a direct command string.

To issue commands in batch mode

- from any library, enter SYSPAC followed by a direct command string.

Or:

from library SYSPAC, enter MENU followed by a direct command string.

Note:

All direct commands entered in batch must be entered in delimiter mode when a startup of MENU is specified for the applications SYSPAC and SYSPAA.

This section covers the following topics:

- Command Syntax

- Command Processing
- ADD Command
- ADD EVENT Batch Command
- AUTHORIZE EVENT Batch Command
- BACKOUT EVENT Batch Command
- COPY Command
- DISPLAY Command
- DISPLAY OBJECT Command
- DISPLAY OBJECT LAST Command
- GENLIST EVENT Batch Command
- LINK Command
- MODIFY Command
- PURGE Command
- RELEASE EVENT Command
- RENAME Command
- RESET EVENT Command
- SELECT Command
- SUBMIT EVENT Batch Command
- UNDO EVENT Command

Command Syntax

The generalized syntax for SYSPAC direct commands is as follows:

```
COMMAND ENTITY-TYPE1 entity-name1 [[operator][ ENTITY-TYPE2 ] entity-name2 ]
```

The command and entity-type arguments are always entered in capital letters. A space or a delimiter (the default is a comma) separates the arguments. The delimiter must be used for batch commands.

The arguments enclosed in square brackets in the syntax statement are optional for most commands, but when used, their values are restricted by the first set of arguments.

The characters underlined in each command's syntax statement may be used alone to represent the command and entity-type.

Operators

The operator argument is optional, but if the operator is specified, the correct operator for the selected command must be used.

Entity Types and Entity Names

Only certain entity-types are valid for a particular command. Valid values for each argument are discussed for each command in the following sections. The entity-name must correspond to the associated entity-type designation.

The possible entity-types for PAC commands are as follows:

- APPLICATION
- EVENT
- JOB
- KEYWORD
- OBJECT
- REQUEST
- STATUS

Note:

Direct commands are not currently available for the entity-type keyword.

The format for the entity-names of each of the entity-types is A32 meaning the name is alphanumeric and can consist of up to 32 characters.

Command Processing

Most direct commands can be issued from the command line of any PAC screen by entering the desired command in accordance with the syntax described in this section.

The command bypasses the PAC menus and takes you directly to the desired function screen. For example, if you wish to display an application status link from the Migration Event Menu, enter the following direct command on the command line:

```
DISPLAY STATUS development FOR APPLICATION ord-exam
```

If the entity name is not found, the maintenance menu of the specified entity type (application, event, job, keyword, request, status) is displayed with a message at the bottom of the screen stating that the entity name specified was not found. From this screen, you may request a list of valid entity names by entering one of the following in the relevant entity type field:

- An asterisk (*);
- A range of valid entity names;
- The first one or two characters of an entity name followed immediately by the asterisk notation (for example, "ord*").

Refer to the PAC User's Guide, section Using Range Notation in section Navigating in PAC for more information.

ADD Command

```
ADD ENTITY-TYPE1 entity-name1 [TO][ ENTITY-TYPE2 ] entity-name2 ]
```

Valid entity-types for the ADD command include the following:

entity-type1	entity-type2
APPLICATION	STATUS
EVENT	-
JOB	-
KEYWORD	-
REQUEST	-
STATUS	APPLICATION

The following syntax is used to add (link) an application to a status:

```
ADD APPLICATION application-name [TO][STATUS]status-name
```

The following syntax is used to add (link) a status to an application:

```
ADD STATUS status-name [TO][APPLICATION]application-name
```

The remaining valid values for entity-type1 are not used with a TO-clause.

ADD Command Examples

```
ADD APPLICATION ord-exam
ADD APPLICATION ord-exam TO STATUS user-test
ADD APPLICATION ord-exam STATUS user-test
ADD APPLICATION ord-exam user-test
ADD EVENT ord-dc-01
ADD JOB os-export-jcl
ADD KEYWORD project1
ADD REQUEST fix-01
ADD STATUS user-test
ADD STATUS user-test TO APPLICATION ord-exam
ADD STATUS user-test APPLICATION ord-exam
ADD STATUS user-test ord-exam
```

ADD EVENT Batch Command

The command syntax for adding a migration event in batch is as follows:

```
ADD,EVENT, event-name ,[FOR] application-name ,[FROM] origin-status
      [TO] destination-status
      ,SCHEDULED, yy-mm-dd ,[AT] hh:ii:ss
      ,MREQ, maintenance-request
      ,ARCEVENT, archive-event-name
      ,GENTYPE,C||M|P|R|S]
      ,SET identifiers required for GENTYPE C or S
      ,WITH clause optional for GENTYPE P
```

```
ADD,EVENT,event-name,[FOR] application-name,[FROM] origin-status,
      [TO] destination-status
      [,SCHEDULED,yy-mm-dd,[AT] hh:ii:ss]
      [,MREQ,maintenance-request]
      [,ARCEVENT,archive-event-name]
      [,GENTYPE,C/I/M/P/R/S]
      [SET identifiers required for GENTYPE C or S]
      [WITH clause optional for GENTYPE P]
```

The values for the optional keywords are described in the following table:

Keyword	Value
FOR	name of the application
FROM	name of the origin status
TO	name of the destination status
SCHEDULED	date (yy-mm-dd format) and time (hh:ii:ss format) that the application is to become active in production.
REPLACE	replace existing object(s) with the version being migrated.
MREQ	name of the maintenance request associated with the migration event (if applicable).
ARCEVENT	used if you are restoring archived objects to PAC. ARCEVENT is the name of the archive event that initially archived the objects.
GENTYPE	one-character code (C, I, M, P, R, S) for the type of object list to be generated. Refer to the following GENTYPE Option sections for more information. Note: You must specify a GENTYPE option to generate the object list. Otherwise, you must create the object list manually.

GENTYPE C : Predict Case Generate

The object list is generated from a Predict Case set. The SETUID (user ID of the set; up to eight characters) and SETNAME (name of the set; up to 20 characters) are required when GENTYPE C is specified.

```
,SETUID, pcaset-userID
,SETNAME, pcaset-name
```

The set identified must be defined on the application status link with an origin status of maintenance or development; it must be valid for the current NTFILE definition for Predict Case in the Natural NATPARMS.

GENTYPE Option I : Input

The object list is read from instream input with the GENTYPE I option. The following example shows how this facility may be used.

Work file 1 (CMWKF01) is not used; the data read for creating the object list is contained in the primary input file (CMSYNIN).

The format of the input data must be as follows:

<p>OBJECT-NAME (A32), OBJECT-TYPE (A4) [,VERSION-NUMBER (N4) ,STATUS (A32)]</p>
--

The data fields must be separated with a comma (.). The end of the list must be designated with a period (.). If the version number is omitted, the most recent version of the object will be included on the object list.

For example, CMSYNIN contains the following commands and data:

```
LOGON SYSPAC
MENU
ADD,EVENT,MAY10-01,FOR,ORDERS,FROM,CONTROL,TO,PRODUCTION,%
GENTYPE,I
ORD-COPY,C,2
ORD-CUST,N,1
ORD-GLOB,G,3
ORD-MAP,M,3
ORD-MAIN,P,1
.
FIN
```

The percent sign (%) indicates the end of input for the current line and that the remainder of the command is continued on the next line.

The above example creates a migration event MAY10-01 for the application ORDERS from the status CONTROL to the status PRODUCTION with the resulting object list:

```
ORD-COPY,C,0002
ORD-CUST,N,0001
ORD-END,N,0003
ORD-GLOB,G,0003
ORD-MAP,M,0003
ORD-MAIN,P,0001
```

ADD EVENT Batch Command Example

```
//@USER JOB @ACCOUNT,CLASS=A
//EVENT EXEC PACBATCH
//CMSYNIN DD *
LOGON SYSPAC
MENU
ADD,EVENT,new-event@GEN,FOR,application,%
FROM,development,TO,user-test,%
GENTYPE,I
program1,P
```

```
program2,P  
program3,P  
program4,P  
program5,P
```

GENTYPE Option M : Maintenance Request Generate

The object list will be built from a maintenance request. If MREQ is not specified, the object list will be built from the maintenance request associated with the event name. The object list is built from objects previously checked-out of PAC to a maintenance status. PAC selects checked-out objects with the same maintenance request ID, application, and check-out library (of the From/origin status path) as the event.

For a maintenance request with multiple applications: When adding an event in batch, or generating a list from a maintenance request that was used to check out objects for more than one application, you may add one event for each application in use by the maintenance request using the "@GEN" string for the event name and an asterisk (*) for the application name. If a fixed name is used for the application, then an event for only that application is created. If the "@GEN" string is not used in the event name, then an event is created for the first application only.

Note:

This is valid only if origin status is neither of type Incorporation nor of type Archive.

GENTYPE Option P : PAC Generate

The object list will be built based on the objects currently in the origin status compared with objects in the destination status of the various types of events:

- Development, Maintenance or Incorporation
An object is considered in the list only if the object does not exist for the same application. In the case of Development or Maintenance, objects with sources in the original location are taken into consideration. In the case of Incorporation, objects with sources and/or loadables in the original location are taken into consideration.
- Restoration
Object list is generated only if an archiving event in the Archive Event field is also specified.
- Control
A versioned object will be placed in the list if the object has not already been migrated, overwritten or retired. This is valid for all destination statuses except Archive.
- Archive
If the event is one of archiving, the Natural objects in the compartment whose archiving with removal from the compartment (archiving with finalization) is allowed by the application's Retention Parameters (described in subsection Retention Parameters) are put on the list.
- Retirement
Objects which were never overwritten or retired from a test, maintenance or production environment will be placed on the list.
- De-Archiving
Object list is generated if an archiving event in the Archive Event field is also specified.
- Retirement from CONTROL
If the event is one of retirement from CONTROL, the objects whose retirements are allowed by the application's Retention Parameters (described in subsection Retention Parameters) are put on the list.

- Alignment
Highest numbered Natural object versions are placed on the list.
- False Migration
Objects migrated to the environment defined in the application (origin status link) and have not been overwritten nor retired are placed on the list.

For an origin status of an Archive status type, the Archive event used to archive the objects should be specified.

When you specify P, you may optionally add the following WITH clause to specify selection criteria for the object list:

```
WITH [ ,NAME, object-name
      ,FMDATE, yy-mm-dd
      ,FMTIME, hh:ii:ss
      ,TODATE, yy-mm-dd
      TOTIME, hh:ii:ss
      TYPE, A | L | M | N | P | S... ]
```

NAME includes only the objects in the specified range.

USER includes only the objects saved by a user in the NAME range.

TYPE is a single character designation for any valid Natural object type except error message.

Dates and times must be entered in the formats given. Only objects compiled since the FM (from) date and time and before the TO date and time will be included in the list.

For dates

- yy is the last two digits of the year (e.g., 97 for 1997), mm is the month (e.g., 02 for February), and dd is the day of the month.
- If left blank, the year default is 00; the month default is 01; and the day default is 01.

For times

- hh is the hour of the day using a 24-hour clock; ii is the minutes of an hour (from 01-60); and ss is the seconds of a minute (01-60).
- If left blank, the hour default is 00; the minute default is 01; and the second default is 01.

GENTYPE Option R : Work File 1

You may use the ADD EVENT command in batch to read object lists from external input. For example, objects placed in a work file (Work File 1) may become the object list. The following example shows how this facility may be used.

Work File 1 (label CMWKF01) is required and contains the data from which the object list will be generated.

The format of the data of Work File 1 (CMWKF01) must be as follows:

```
OBJECT-NAME (A32), OBJECT-TYPE (A4) [ ,VERSION-NUMBER (N4)
                                     ,STATUS (A32) ]
```

The data fields must be separated with the specified input delimiter, in this case, the comma (.). If the version number is omitted, the most recent version of the object will be included in the object list. For example:

```
ORD-COPY,C,2
ORD-CUST,N,1
ORD-END,N,3
ORD-GLOB,G,3
ORD-MAP,M,3
ORD-MAIN,P,1
```

The primary input file (label CMSYNIN) contains the following commands:

```
LOGON SYSPAC
MENU
ADD,EVENT,MAY10-01,FOR,ORDERS,FROM,CONTROL,TO,PRODUCTION,%
GENTYPE,R
```

The percent sign (%) tells the user to put the input command to PAC over two lines.

The above example creates a migration event MAY10-01 for the application ORDERS to be migrated from the status CONTROL to the status PRODUCTION with the resulting object list:

```
ORD-COPY,C,0002
ORD-CUST,N,0001
ORD-END,N,0003
ORD-GLOB,G,0003
ORD-MAP,M,0003
ORD-MAIN,P,0001
```

GENTYPE Option S : Predict Set Generate

With GENTYPE S, the object list is built from a Predict set identified by user ID (SETUID), set number (SETNUM), and file number (SETLOC).

<pre>.SETUID, prdset-userID .SETNUM, prdset-number .SETLOC,REMOTE/LOCAL</pre>

SETLOC is the location of Predict cross-reference data. For objects from the Control status, the location is always local (that is, the set is stored within PAC). Otherwise, the set location is always remote (that is, the set is stored in the Predict file specified by the application status link).

AUTHORIZE EVENT Batch Command

Note:

The migration event must be in a Pending or Validated state. The authorization request will take a Pending event through the Validated state automatically.

The AUTHORIZE EVENT direct command may be used to authorize migration events in batch.

The syntax for the direct command is as follows:

```
AUTHORIZE, EVENT, event-name [
    ,JOB, job-name
    ,EXPAND, {C | E | R | U | N}
    ,{COPY | MOVE | INCLUDE}
    ,REPLACE, {Y | N}
    ,APPLYMODS, applymod-number(s)
    ,FTT, ftt-name
    ,EXPAND-STATUS, status-name
    ,WORKFILE, {Y | N}
    ,{BATCH | ONLINE}
]
```

AUTHORIZE EVENT Batch Command Example:

```
LOGON SYSPAC
MENU
AUTHORIZE,EVENT,ord dc 02,JOB,natural migrate workfile,EXPAND,C
AUTHORIZE,EVENT,ord dc 03,MOVE,REPLACE,Y,APPLYMODS,4,5
```

BACKOUT EVENT Batch Command

The BACKOUT EVENT direct command may be used to back out a migration event in batch.

The syntax for the direct command is as follows:

```
BACKOUT,EVENT, event-name
```

BACKOUT EVENT Batch Command Example:

```
//@USER JOB @ACCOUNT,CLASS=A,MSGLCASSS=X,REGION=2M
//BACKOUT EXEC PACBATCH
//CMSYNIN DD *
LOGON SYSPAC
MENU
BACKOUT,EVENT,ord_dc_02
FIN
/*
```

COPY Command

```
COPY ENTITY-TYPE1 entity-name1a [TO] entity-name1b
```

Valid entity-types for the COPY command include the following:

entity-type 1

EVENT

JOB

KEYWORD

REQUEST

The COPY command requires a TO-clause, which consists of just an entity-name, with or without the TO operator. The corresponding entity type is always entity-type1.

Examples:

```
COPY EVENT ord-dc-01 TO ord-dc-02
COPY JOB os-export-jc1 new-export-jc1
COPY KEYWORD project1 TO project2
COPY REQUEST fix-01 fix-02
```

DISPLAY Command

Note:

Refer to the following section for information about the DISPLAY OBJECT command.

DISPLAY ENTITY-TYPE1 entity-name1 [[FOR][ENTITY-TYPE2] entity-name2]

Valid entity-types for the DISPLAY command include the following:

entity-type1	entity-type2
APPLICATION	STATUS
EVENT	-
JOB	-
KEYWORD	-
REQUEST	-
STATUS	APPLICATION

The following syntax is used to display an application linked to a status:

```
DISPLAY APPLICATION application-name [FOR][STATUS]status-name
```

The following syntax is used to display a status linked to an application:

```
DISPLAY STATUS status-name [FOR ][APPLICATION]application-name
```

The remaining valid values for entity-type1 are not used with a FOR-clause.

Examples:

```
DISPLAY APPLICATION ord-exam
DISPLAY APPLICATION ord-exam FOR STATUS user-test
DISPLAY APPLICATION ord-exam STATUS user-test
DISPLAY APPLICATION ord-exam user-test

DISPLAY EVENT ord-dc-01
DISPLAY JOB os-export-jc1
DISPLAY KEYWORD project1
DISPLAY REQUEST fix-01

DISPLAY STATUS user-test
DISPLAY STATUS user-test FOR APPLICATION ord-exam
DISPLAY STATUS user-test APPLICATION ord-exam
DISPLAY STATUS user-test ord-exam
```

DISPLAY OBJECT Command

```
DISPLAY OBJECT object-name version  
status [[FOR][APPLICATION] application-name
```

The only valid entity-types for this particular DISPLAY command are as follows:

entity-type1 entity-type2

OBJECT APPLICATION

Note that a specific version of the object may be specified for display. You may also, or alternatively, specify the status for which you want the object version(s) displayed.

Examples:

```
DISPLAY OBJECT ord-exam
DISPLAY OBJECT ord-main 0001
DISPLAY OBJECT ord-main user-test
DISPLAY OBJECT ord-main 0001 user-test

DISPLAY OBJECT ord-main FOR APPLICATION ord-exam
DISPLAY OBJECT ord-main APPLICATION ord-exam
DISPLAY OBJECT ord-main ord-exam

DISPLAY OBJECT ord-main 0001 FOR APPLICATION ord-exam
DISPLAY OBJECT ord-main 0001 APPLICATION ord-exam
DISPLAY OBJECT ord-main 0001 ord-exam

DISPLAY OBJECT ord-main user-test FOR APPLICATION ord-exam
DISPLAY OBJECT ord-main user-test APPLICATION ord-exam
DISPLAY OBJECT ord-main user-test ord-exam
```

DISPLAY OBJECT LAST Command

You may display the most current version of an object, or the next to most current version of a specified object:

```
DISPLAY OBJECT obj-name LAST - n version  
status [[FOR][APPLICATION] application-name
```

where *n* is the most current version minus the number of versions.

Examples:

```
DISPLAY OBJECT ord-main LAST APPLICATION ord-exam
DISPLAY OBJECT ord-main LAST - 1 APPLICATION ord-exam
```

GENLIST EVENT Batch Command

You may use the GENLIST EVENT batch command to create the object list for an existing migration event. If an object list already exists for the event, it will be replaced.

The syntax for the GENLIST EVENT command is as follows:

```

GENLIST, EVENT, event-name GENTYPE, C|I|M|P|R|S|W
                [
                ,MREQ, maintenance-request
                ,ARCEVENT, archive-event-name
                ,SET identifiers required for GENTYPE C or S
                ,WITH clause optional for GENTYPE P
                ]

```

The values for the optional keywords are described in the following table:

Keyword	Description
GENTYPE	one-character code (C, I, M, P, R, S, W) for the type of object list to be generated. Refer to the GENTYPE Option sections associated with the ADD EVENT command. In addition, the GENLIST command provides the GENTYPE "W" (Write to Output File) option. Use this code to write the object list of an existing event to an external output file (Work File 1 is required and must be a minimum length of 72 bytes per record). Note: You must specify a GENTYPE option to generate the object list.
MREQ	name of the maintenance request associated with the migration event (if applicable).
ARCEVENT	used if you are restoring archived objects to PAC. ARCEVENT is the name of the archive event that initially archived the objects.

Example:

```

LOGON SYSPAC
MENU
GENLIST, EVENT, batch-add-d-ut, GENTYPE, R

```

LINK Command

```

LINK ENTITY-TYPE1 entity-name1 [TO] [ ENTITY-TYPE2 ] entity-name2

```

The LINK command is used to link applications and statuses. Valid entity-types for the LINK command include the following:

entity-type1	entity-type2
APPLICATION	STATUS
STATUS	APPLICATION

At least the entity-name argument of the TO-clause is required.

The following syntax is used to link an application to a status:

```

LINK APPLICATION application-name [TO][STATUS]status-name

```

The following syntax is used to link a status to an application:

```
LINK STATUS status-name [TO][APPLICATION]application-name
```

Examples:

```
LINK APPLICATION ord-exam TO STATUS user-test
LINK APPLICATION ord-exam STATUS user-test
LINK APPLICATION ord-exam user-test
```

```
LINK STATUS user-test TO APPLICATION ord-exam
LINK STATUS user-test APPLICATION ord-exam
LINK STATUS user-test ord-exam
```

MODIFY Command

```
MODIFY ENTITY-TYPE1 entity-name1 [[FOR] [ ENTITY-TYPE2 ] entity-name2 ]
```

Valid entity-types for the MODIFY command include the following:

entity-type1	entity-type2
APPLICATION	STATUS
EVENT	-
JOB	-
KEYWORD	-
REQUEST	-
STATUS	APPLICATION

The following syntax is used to modify an application linked to a status:

```
MODIFY APPLICATION application-name [FOR ][STATUS]status-name
```

The following syntax is used to modify a status linked to an application:

```
MODIFY STATUS status-name [FOR ][APPLICATION]application-name
```

The remaining valid values for entity-type1 are not used with a FOR-clause.

Examples:

```
MODIFY APPLICATION ord-exam
MODIFY APPLICATION ord-exam FOR STATUS user-test
MODIFY APPLICATION ord-exam STATUS user-test
MODIFY APPLICATION ord-exam user-test
```

```
MODIFY EVENT ord-dc-01
MODIFY JOB os-export-jcl
MODIFY KEYWORD project1
MODIFY REQUEST fix-01
```

```

MODIFY STATUS user-test
MODIFY STATUS user-test FOR APPLICATION ord-exam
MODIFY STATUS user-test APPLICATION ord-exam
MODIFY STATUS user-test ord-exam

```

PURGE Command

```
PURGE ENTITY-TYPE1 entity-name1 [[FOR] [ ENTITY-TYPE2 ] entity-name2 ]
```

Valid entity-types for the PURGE command include the following:

entity-type1	entity-type2
APPLICATION	STATUS
EVENT	-
JOB	-
KEYWORD	-
REQUEST	-
STATUS	APPLICATION

The following syntax is used to purge an application linked to a status:

```
PURGE APPLICATION application-name [FOR ][STATUS]status-name
```

The following syntax is used to purge a status linked to an application:

```
PURGE STATUS status-name [FOR ][APPLICATION]application-name
```

The remaining valid values for entity-type1 are not used with a FOR-clause.

Examples:

```

PURGE APPLICATION ord-exam
PURGE APPLICATION ord-exam FOR STATUS user-test
PURGE APPLICATION ord-exam STATUS user-test
PURGE APPLICATION ord-exam user-test

PURGE EVENT ord-dc-01
PURGE JOB os-export-jcl
PURGE KEYWORD project1
PURGE REQUEST fix-01

PURGE STATUS user-test
PURGE STATUS user-test FOR APPLICATION ord-exam
PURGE STATUS user-test APPLICATION ord-exam
PURGE STATUS user-test ord-exam

```

RELEASE EVENT Command

The RELEASE EVENT direct command may be used to back out a migration event in batch.

This command performs the same functionality as the BACKOUT command. It is intended to remove the BACKOUT command in a future release of the product.

The syntax for the direct command is as follows:

```
RELEASE,EVENT, event-name
```

RELEASE EVENT Batch Command Example:

```
//@USER   JOB @ACCOUNT,CLASS=A,MSGLCLASS=X,REGION=2M
//RELEASE EXEC PACBATCH
//CMSYNIN DD *
LOGON SYSPAC
MENU
RELEASE,EVENT,ord_dc_02
FIN
/*
```

RENAME Command

```
RENAME ENTITY-TYPE1 entity-name1a [TO] entity-name1b
```

Valid entity-types for the RENAME command include the following:

Valid entity-types for the COPY command include the following:

entity-type1

JOB

KEYWORD

The RENAME command requires a TO-clause, which consists of just an entity-name, with or without the TO operator. The corresponding entity type is always entity-type1.

Examples:

```
RENAME JOB os-export-jc1 new-export-jc1
RENAME KEYWORD project1 TO project2
```

RESET EVENT Command

The RESET EVENT direct command may be used to back out a migration event in batch.

This command does what the online RESET command does. When a migration event is reset, the following occurs:

- The step number of the event is reset to 1.
- The audit report is deleted.

The syntax for the direct command is as follows:

```
RESET,EVENT, event-name
```

RESET EVENT Batch Command Example:

```
//@USER   JOB @ACCOUNT,CLASS=A,MSGLCASSS=X,REGION=2M
//RESET EXEC PACBATCH
//CMSYNIN DD *
LOGON SYSPAC
MENU
RESET,EVENT,ord_dc_02
FIN
/*
```

SELECT Command

```
SELECT ENTITY-TYPE1 entity-name1 [[FOR] [ ENTITY-TYPE2 ] entity-name2 ]
```

Valid entity-types for the SELECT command include the following:

entity-type1	entity-type2
---------------------	---------------------

APPLICATION	STATUS
EVENT	-
JOB	-
KEYWORD	-
REQUEST	-
STATUS	APPLICATION

The following syntax is used to select an application linked to a status:

```
SELECT APPLICATION application-name [FOR ][STATUS ]status-name
```

The following syntax is used to select a status linked to an application:

```
SELECT STATUS status-name [FOR ][APPLICATION ]application-name
```

The remaining valid values for entity-type1 are not used with a FOR-clause.

Examples:

```
SELECT APPLICATION ord-exam
SELECT APPLICATION ord-exam FOR STATUS user-test
SELECT APPLICATION ord-exam STATUS user-test
SELECT APPLICATION ord-exam user-test

SELECT EVENT ord-dc-01
SELECT JOB os-export-jcl
SELECT KEYWORD project1
SELECT REQUEST fix-01
```

```
SELECT STATUS user-test
SELECT STATUS user-test FOR APPLICATION ord-exam
SELECT STATUS user-test APPLICATION ord-exam
SELECT STATUS user-test ord-exam
```

SUBMIT EVENT Batch Command

The SUBMIT EVENT direct command may be used to submit a migration event in batch only in the OS/390 environment. If you are using Natural 2.1, you must copy the module NATRJET from the Natural 2.1 distribution load library into a library in your current steplib concatenation as module NATRJE.

The syntax for the SUBMIT EVENT command is as follows:

```
SUBMIT, EVENT, event-name
```

Note the following when submitting a migration in batch using direct commands:

- You may submit a migration event in batch using direct commands only in the OS/390 environment.
- The migration event must be in an Authorized or Started state.
- If you are using Natural 2.1, you must copy the module NATRJET from the Natural 2.1 distribution load library into a library in your current steplib concatenation as module NATRJE.
- A group event may be resubmitted in order to submit the next member event.

Example

```
//@USER   JOB @ACCOUNT,CLASS=A,MSGLCLASS=X,REGION=2M
//SUBMIT  EXEC PACBATCH
//CMSYNIN DD *
LOGON SYSPAC
MENU
SUBMIT,EVENT,ord_dc_02
FIN
/*
```

UNDO EVENT Command

The UNDO EVENT direct command may be used to back out a migration event in batch.

This command is applicable to emigrations to test or production and to retirements from test or production, provided the events have reached stage 6 and have not been unlocked.

The syntax for the direct command is as follows:

```
UNDO,EVENT, event-name
```

UNDO EVENT Batch Command Example:

```
//@USER JOB @ACCOUNT,CLASS=A,MSGLCASSS=X,REGION=2M
//UNDO EXEC PACBATCH
//CMSYNIN DD *
LOGON SYSPAC
MENU
UNDO ,EVENT,ord_dc_02
FIN
/*
```

Other SYSPAC Commands

This section covers the following topics:

- ADMIN Command - N and P
- DEACTIVATE Command - P
- MENU Command - N and P
- PACADJST Command - N
- REFRESH Command - P
- SYSPAC Command - N
- SYSPACA Command - N
- UNLOCK Command - P
- Profile Command - N

Note:

In the following paragraphs, N represents a Natural command; P represents a PAC command. ADMIN and MENU are both Natural and PAC commands.

ADMIN Command - N and P

Entered from the SYSPAC library screen. ADMIN provides access to the PAC administrator functions if the user is authorized for those functions.

DEACTIVATE Command - P

The DEACTIVATE command is used when you are displaying a specific object version and you need to deactivate and remove a Natural object from the PCF system file. Only the PAC administrator may use the DEACTIVATE command.

MENU Command - N and P

Entered from the Logon Accepted screen to access the PAC Main Menu.

PACADJST Command - N

The PACADJST command is entered from the SYSPACA library screen to invoke the File Adjust Function used to renumber PAC files without losing the integrity of the PAC system.

REFRESH Command - P

The REFRESH direct command is valid for completed and backed-out events. It refreshes the current event to Pending state. The following information is removed from the refreshed event:

- Audit Report
- Authorization information
- Job information
- Schedule date

A refreshed event can be reused. PAC returns the message "PAC7337: (A) Migration event has been refreshed".

The REFRESH command may be used only on the Display Migration Event screen.

SYSPAC Command - N

Entered at the NEXT prompt on the Natural system library screen to access the PAC system. SYSPAC may alternatively be preceded by LOGON:

`LOGON SYSPAC`

SYSPACA Command - N

Entered at the NEXT prompt on the Natural system library screen. The only object in SYSPACA is the menu object that logs the user on to SYSPAC and executes ADMIN. The SYSPACA object is provided for security reasons. ADMIN monitors whether the user is authorized to use SYSPACA.

UNLOCK Command - P

The UNLOCK command invokes a screen for unlocking PAC data that was locked by a user or by a user's batch user ID. This is a PAC administrator function.

Profile Command - N

The Natural Editor PROFILE command is available from the PAC command line. This enables you to utilize the majority of the editor profile functionality. Please refer to the Natural user documentation for more information.

Commands to Set SYSPAC Options - P

Direct commands may be issued to SYSPAC or to Natural using the character string "/" as a prefix. These commands may be entered on the command line and issued from most PAC screens.

The following table lists and describes the special commands that may be issued to SYSPAC to set ON/OFF SYSPAC options and parameters:

Command	Explanation
FIXES	Lists the fixes that have been applied to PAC; the fixes are distributed in the form of INPL updates.
SET ON TRACK / SET OFF TRACK	Switches PAC tracing utility on / off.

Natural Program Editor Commands

The Natural program editor is used to edit various Natural objects.

This section covers the following topics:

- Positioning Commands
- Edit Commands
- Line Commands

Positioning Commands

Cmd	Position . . .
-----	----------------

+P, -P	forwards or backwards one page.
+, -	forwards or backwards one page.
+H, -H	forwards or backwards half a page.
T, --	to top of program.
B, ++	to bottom of program.
+nnnn	forwards "nnnn" lines (maximum 4 digits).
-nnnn	backward "nnnn" lines (maximum 4 digits).
nnnn	to line "nnnn".
X, Y	to the page containing the line marked with "X" or "Y".

Edit Commands

Command	Description
---------	-------------

ADD [(n)]	Adds "n" empty lines. If "n" is not specified, 9 lines (4 in split screen mode) will be added.
CHANGE	Scans for the value entered as "scandata" and replaces each such value with the value entered as "replacedata". The syntax for this command is: CHANGE 'scandata'replacedata' Any special character which is not valid within a Natural variable name may be used as the delimiter character with the restriction that the same character must be used within any given command.
CLEAR	Clears the edit source work area.
DX	Deletes the X-marked line.
DY	Deletes the Y-marked line.
DX-Y	Deletes the block of lines delimited by X and Y.
EX	Deletes source lines from the top of the source area to, but not including, the X-marked line.
EY	Deletes source lines from the source line following the Y-marked line to the bottom of the source area.
EX-Y	Deletes all source lines in the source area excluding the block of lines delimited by X and Y.

Command	Description
POINT	Causes the line in which the ".N" line command was entered to be positioned to the top of the current screen. See also the line command ".P".
RESET	Deletes the current X and Y line markers and any marker previously set with the line command ".N".
SCAN	Scans for data in the source area. SCAN (without parameter) will cause
['scanvalue']	the SCAN menu to be produced. SCAN 'scanvalue' will result in a scan for scan value. If the scan value is entered without delimiter characters, the entire character string which follows the keyword SCAN will be used as the scan value.
SCAN =	Causes a scan for the next occurrence of the scan value. The direction for a given scan command may also be explicitly specified by entering "SCAN =+" or "SCAN =" prior to command execution. The first line which contains the scanned value is positioned to the top line after each SCAN= or SCAN+ command. Each line in which the scanned value is found will be marked with an "S".
SET ABS	"SET ABS ON" causes the SCAN and CHANGE commands to operate
[ON OFF]	in absolute mode, i.e., the value to be scanned/changed need not be delimited by blanks or special characters. "SET ABS OFF" (default) causes the SCAN and CHANGE commands to operate in non-absolute mode, i.e., the value to be scanned/changed must be delimited by blanks or special characters.
SET NUL	"SET NUL ON" causes the value scanned with a SCAN command to be replaced by a null value. Default is OFF.
[ON OFF]	
SHIFT [- +nn]	Shifts each source line delimited by the X and Y markers to the left or right. "nn" represents the number of characters the source line is to be shifted. Comment lines are not shifted.
SHIFT --	Shifts each source line delimited by the X and Y markers to the leftmost position. Comment lines are not shifted.
SHIFT ++	Shifts each source line delimited by the X and Y markers to the rightmost position (maximum 99 positions). Comment lines are not shifted.
*	Displays the edit command most recently entered.
*=	Causes the last command entered in the command line to be executed.

Line Commands

The notation "(nnnn)" indicates a repetition factor. The default repetition value is 1.

Command	Description
.C(nnnn)	Copies the line in which the command was entered.
.CX(nnnn)	Copies the X-marked line.
.CY(nnnn)	Copies the Y-marked line.
.CX-Y(nnnn)	Copies the block of lines delimited by the X and Y markers.
.D(nnnn)	Delete line(s). The default is 1 line.
.I(n)	Adds "n" empty lines. "n" may be 1-9. If "n" is not specified, 9 lines (4 in split screen mode) will be added.
.J	Joins the current line with the next line. If the resulting line length is greater than the length of the editor screen line, the line will be marked with "L" and then must be separated again using the ".S" command before it can be modified.
.L	Will undo all modifications to the line since the last time was pressed.
.MX	Moves the X-marked line.
MY	Moves the Y-marked line.
.MX-Y	Moves the block of lines delimited by the X and Y markers.
.N	Marks a line as reference for the edit command POINT.
.P	Causes the line marked by this command to be positioned to the top of the screen.
.S	Splits the line at the position marked by the cursor.
.X	Marks the beginning of a block of lines to be processed.
.Y	Marks the end of a block of lines to be processed.

Migration Utility

The PAC Migration utility may be used in conjunction with PAC migration events, using the command MIGLOAD.

MIGLOAD is used to load Natural cataloged objects (including cross-reference data if desired), saved objects, and views into the Natural system files.

Note:

MIGLOAD is used to load objects into PAC that have been previously created in a PAC migration event (using workfile).

This chapter covers the following topics:

- MIGLOAD
 - User Exit for the Migration Utility
 - MIGLOAD
 - User Exit for the Migration Utility
-

MIGLOAD

MIGLOAD is used to load Natural cataloged objects (and associated cross-reference data if available), saved objects, views, and Natural user error messages into the Natural system files.

MIGLOAD loads

- views into the Predict system file (FDIC);
- Natural programming objects and user error messages into the PAC system / Natural system files (FNAT and FUSER).
- Foreign objects.

Objects unloaded with either the NATUNLD or the TRANSFER utility are incompatible with the format supported by MIGLOAD and cannot be used.

The input for MIGLOAD is read from Natural Work File 1.

This section covers the following topics:

- Accessing MIGLOAD
- Attributes of MIGLOAD
- Executing MIGLOAD Using Direct Commands
- Executing MIGLOAD in Batch Mode
- The MIGLOAD Report

Accessing MIGLOAD

To access MIGLOAD, enter the command MIGLOAD at the NEXT prompt in Natural.

The Migrate Load Utility screen appears:

```

08:25:55          ***** PREDICT APPLICATION CONTROL *****          2001-04-25
User DBA          - Migrate Load Utility -          Library SYSPAC

Processing type ..... L      ( 'L' to load or 'S' to scan )
File security exit .. N      ( User exit MIGEX003 must be used ? )

=====
Load file ( NATURAL work file 1 ) must be created by PAC transfer event
=====
                PAC migrate load utility does not support
                load files created by NATUNLD utility
=====

Command ===>

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

The following section describes the functions available on this screen. These may be used individually or in any combination.

Attributes of MIGLOAD

The attributes of MIGLOAD displayed on the Migrate Load Utility screen are discussed in the following sections:

Processing Type

The types of processing to be performed.

- L Load objects for a library / libraries.
- S Scan the MIGLOAD file without performing the load. The exact contents of the load file may be verified through the MIGLOAD report. By default, all objects on the load file are scanned.

File Security Exit

Whether or not the MIGEX003 security exit is to be used.

- Y use MIGEX003 security exit.
- N do not use MIGEX003 security exit.

Executing MIGLOAD Using Direct Commands

Under the control of PAC, MIGLOAD is used specifically for loading Natural objects from a work file into and between statuses within PAC, and for loading objects into the PAA production environment. Outside the control of PAC, MIGLOAD may also be used for general migration.

Normally, objects unloaded from PAC are loaded using the following direct command:

MIGLOAD,LOAD

This section describes the variations of this command that can also be used.

The MIGLOAD direct command may be issued from most PAC screens, from Natural NEXT mode, or from the Natural Main Menu. The direct command syntax for loading Natural objects is as follows:

Syntax 1

MIGLOAD {LOAD | SCAN}

Syntax 2

MIGLOAD LOAD, {Y | N}

Keywords Explanation

LOAD	Instructs PAC to load the contents of the work file depending on the selection criteria.
SCAN	Instructs PAC to scan, but not load, the contents of the work file.

Executing MIGLOAD in Batch Mode

Use a direct command to execute MIGLOAD in batch mode.

Using Parameters

When executing MIGLOAD in batch mode using parameters, individual parameter values must be separated by the delimiter character (the default is ",").

It is recommended that the input-mode parameter (IM) be set to delimiter mode (IM=D).

Using Direct Commands

Using direct commands, MIGLOAD is invoked in batch mode in the same way as online (see above); however, a direct command string must follow the MIGLOAD command.

You may enter direct commands in either of the following ways:

- The direct command string follows the MIGLOAD command on the same input line; each parameter in the command string may be delimited by a blank instead of the delimiter character.
- The direct command string follows the MIGLOAD command on the next input line; each parameter in the command string must be delimited by the delimiter character and not by a blank. If the direct command string is longer than one line, you must place the CF character at the end of the current line to be able to continue on the next line.

Condition Codes in Batch Mode

If an error occurs during MIGLOAD execution, an error message appears and MIGLOAD terminates with a condition code.

The MIGLOAD Report

MIGLOAD provides an audit report, which is a list of the objects that were loaded by MIGLOAD, including where they were loaded to. Additionally, after all MIGLOAD commands have been processed, a summary report is printed (displayed) giving totals for program objects loaded. The following screens are examples of the MIGLOAD report:

The following output (1-3) is an example of loading Natural objects.

Output 1

```

09:25:35          ***** PREDICT APPLICATION CONTROL *****          2001-04-25
User PACBAT              - Migrate Load Utility -              Library SYSPAC
                                   Page 1
Processing load file created on 2001-04-25 at 09:22
System files used for load:  NATURAL ... (00164,00247)
                             PREDICT ... (00164,00235)
    
```

Output 2

```

09:25:35          ***** PREDICT APPLICATION CONTROL *****          2001-04-25
User PACBAT              - Migrate Load Utility -              Library SYSPAC
                                   Page 2
Object      Object  Obj  Action          Date-Time      User          Dest.      NAT.  Xrf
Name.Version  Type  Frm          Save or Cat    ID            Library      Level  Ind
GLOB1.0004   Global Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
GLOB2.0004   Global Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
GLOB3.0004   Global Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
GLOB4.0004   Global Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
GLOB5.0004   Global Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP1.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP10.0004   Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP2.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP3.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP4.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP5.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP6.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP7.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP8.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
MAP9.0004    Map    Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
SUB1.0004    Subpgm Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
SUB2.0004    Subpgm Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
SUB3.0004    Subpgm Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
SUB4.0004    Subpgm Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
SUB5.0004    Subpgm Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
SUB6.0004    Subpgm Cat Replacing  2001-04-04 10:42 DBA      DBA T23    3.1.4  S
    
```

Output 3

```

*** MIGRATE Load has terminated successfully ***
09:25:36          ***** PREDICT APPLICATION CONTROL *****          2001-04-25
User PACBAT          - Migrate Load Utility -          Library SYSPAC
                                          Page 3

          Statistical Report of Objects Processed
                                Saved      Cataloged
                                -----      -----
Global Data Area .....          0          5
Local/Param Data Area ..          0          0
Maps .....          0          10
Help routines .....          0          0
Subroutines .....          0          0
Subprograms .....          0          8
Programs .....          0          24
Copycode .....          0
Text .....          0
Process .....          0          0
Miscellaneous Objects ..          0          0
Views .....          0
Short Errors .....          0
Extended Errors .....          0
Total programming obj ..          0          47
Total objects Read .....          0          47
Total Objects Loaded ...          0          47 ***

NEXT FIN
NAT9995 NATURAL SESSION TERMINATED NORMALLY
    
```

The following output (1-3) is an example of loading foreign objects.

Output 1

```

DATA LOAD
10:49:20          ***** PREDICT APPLICATION CONTROL *****          2001-04-26
User PACBAT          - Migrate Load Utility -          Library SYSPAC
                                          Page 1

          Processing load file created on 2001-04-26 at 10:47
          System files used for load:  NATURAL ... (00164,00247)
                                          PREDICT ... (00164,00235)
    
```

Output 2

10:49:20		***** PREDICT APPLICATION CONTROL *****				2001-04-26		
User PACBAT		- Migrate Load Utility -				Library SYSPAC		
						Page 2		
Object Name.Version	Object Type	Obj Frm	Action	Date-Time Save or Cat	User ID	Dest. Library	NAT. Level	Xrf Ind
BPPURG.0007	Module	Cat	Adding	2098-09-25 12:12	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
BR14.0007	Module	Cat	Replacing	2098-05-24 14:52	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
DEF164.0007	Module	Cat	Replacing	2098-05-25 15:38	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
FRM164.0007	Module	Cat	Replacing	2098-05-25 15:39	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPERR.0007	Module	Cat	Replacing	2099-04-04 20:39	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPL.0007	Module	Cat	Replacing	2098-05-20 16:01	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPLF23.0007	Module	Cat	Adding	2099-03-09 13:01	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPLN22.0007	Module	Cat	Adding	2098-05-20 10:52	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPL22.0007	Module	Cat	Adding	2099-04-08 10:22	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPL23.0007	Module	Cat	Adding	2098-06-17 23:19	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
INPL31.0007	Module	Cat	Adding	2099-03-09 16:54	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
LOADF.0007	Module	Cat	Adding	2099-04-08 10:08	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
NATLOAD.0007	Module	Cat	Adding	2098-08-19 15:17	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				
NATUNLD.0007	Module	Cat	Adding	2098-08-20 09:14	N/A			
			Destination Dataset ...	DBA .PACDEMO.TST.JCL				

Output 3

```

10:49:46          ***** PREDICT APPLICATION CONTROL *****          2001-04-26
User PACBAT          - Migrate Load Utility -                          Library SYSPAC
                                                                Page 3

          Statistical Report of Objects Processed
                                Saved      Cataloged
                                -----      -----
Global Data Area .....          0          0
Local/Param Data Area ..          0          0
Maps .....                      0          0
Help routines .....             0          0
Subroutines .....              0          0
Subprograms .....              0          0
Programs .....                  0          0
Copycode .....                  0
Text .....                      0
Process .....                   0          0
Miscellaneous Objects ..          0          33
Views .....                     0
Short Errors .....              0
Extended Errors .....           0
Total programming obj ..          0          33
Total objects Read .....         0          33
Total Objects Loaded ...         0          33 ***

NEXT FIN
NAT9995 NATURAL SESSION TERMINATED NORMALLY
    
```

The attributes of the MIGLOAD report screens are described in the following table:

Attribute	Indicates . . .
Action	whether an existing object with the indicated name was replaced or not, or whether the object was added or deleted.
Date/Time of Save or Cat	the date and time the loaded object was saved or cataloged.
Destination Dataset	the name of the foreign object dataset to which the objects are being / were loaded.
Dest Library	the name of the library to which the object was loaded.
Object format	whether the loaded object is a saved or a cataloged object, or Xref data.
Object Name / Version	the name and version number of the object that was loaded.
Object Type	the type of the object that was loaded.
User ID	the user who saved or cataloged the loaded object.
Natural Level	the Natural system maintenance level of the loaded object.
Xref Ind	option specified in the load parameters for the disposition and conditions to be honored based on the presence of Xref data.

User Exit for the Migration Utility

PAC provides the MIGEX003 user exit for the migration utility.

The MIGEX003 user exit is an alias for PACEX003 and is invoked whenever PAC needs to access a Natural or Predict file to retrieve or store Natural or Predict objects.

Refer to the section User Exits for detailed information.

Compare Utility

With PAC Version 2.3.2 the Compare utility has been enhanced with a new user interface.

This chapter covers the following topics:

- Introduction
 - Using the Compare Utility
 - Natural Mode
 - PAA Mode
 - PAC Mode
 - Direct Command Mode
 - Extended Compare Utility
-

Introduction

The Compare utility allows you to:

- Compare Natural objects outside of PAC control.
- Compare objects in two Natural libraries, outside of PAC control.
- Compare DDMs in a remote FDIC.
- Compare versioned objects (including Natural, Foreign, Error Messages and DDMs) in the PAC system.
- Compare objects under the control of PAA.
- Compare Natural objects in Production-controlled libraries.
- Manipulate the output from such comparisons for later use.

Depending on the environment from which the Compare utility is invoked, you access the relevant menu in either Natural mode, PAA mode or PAC mode.

If you want to use the Compare Utility in the way you used to do in earlier versions of PAC, you can do so using the Extended Compare Utility option from the Main Compare Menu.

Using the Compare Utility

This section describes the features common to all Compare utility screens in Natural mode, PAC mode and PAA mode.

The following screen is an example of the Compare utility in Natural mode:

```

15:47:37          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Individual Objects -          Library SYSPAC
                                                Mode Natural

ORIGIN LOCATION

                                                Srce or Loadable ... S (S/L)
DBnr ..... 164__ Fnr ... 31__
Library ..... DEMOPAC__

Object ..... _____

DESTINATION LOCATION

DBnr ..... 164__ Fnr ... 31__
Library ..... DEMOPAC__

Object ..... _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp Cmd          Libs ErrM DDMS Clear

```

All Compare utility screens are divided into two sections, "Origin location" and "Destination location". The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Some of the fields are pre-filled for your convenience. They may be overwritten.

The screen header displays the current time and date, the user, the name of the library from which you invoked the utility, and the functional compare mode.

From the main screen, you access the functions you need using the relevant menu codes or PF keys, as described later in this document.

For detailed descriptions relevant for each compare mode, see:

- Natural Mode
- PAA Mode
- PAC Mode

Input Fields

The following input fields are the same in Natural mode, PAC mode and PAA mode:

Object (Name)	Name of the objects to be compared.
Library	Name of the library in which the object is contained.
DBnr and Fnr	Database and file numbers of the objects to be compared.
Srce or Loadable	Source code or object code value.
Additional Criteria	Allows you to filter compared results. The default is N (no additional criteria). To activate the function, enter Y.
Output Options	Allows you to manipulate returned results. The default is N (no output options). To activate the function, enter Y.

PF Key Functions

The following general PF key functions are available:

PF1	Help	Invokes the passive help screens.
PF2	Menu	Invokes the main menu of the Compare utility.
PF3	Exit	Exits the function.
PF4	Crit	Invokes the additional criteria window for data filtering.
PF5	Outp	Invokes the additional output options window for result manipulation.
PF12	Clear	Clears the screen.

PF4 - Additional Criteria

This function is used to further enhance the selection criteria during the initial compare. It must be specified *before* the compare process is carried out.

When you press PF4, the Additional Criteria window offers you the following selections:

Consider directory lines	When comparing, the Natural directory lines of the object will be included.
Ignore tail comments	When comparing, any line tail comments the object may have will be ignored.
Supress comment lines	When comparing, any comment lines will be ignored / suppressed.
Discrepancies only	When the results are returned, only the discrepancies will be displayed.

Enter Y to activate the selection.

PF5 - Additional Output Options

This function is used to further manipulate the results of the compare process.

By default, the results are displayed on your screen. When you press PF5, the Additional Output Options window offers you the following output destinations:

Display (Default=Y)	Displays the results on the screen.
Print	Sends results to a defined Natural printer.
Workfile	Sends results to Natural Workfile1.
Export	<p>Invokes an additional window, that allows you to send the results to a Natural Text member in a Natural library. The data in this window is:</p> <pre> Please select what results you would like to be exported. Equal lines in 1st object Y Equal lines in 2nd object Y Different lines in 1st object ... Y Different lines in 2nd object ... Y No lines in 1st object Y Lines only in 2nd object Y Lines only in 1st object Y No lines in 2nd object Y DBnr 164 Fnr 247 Library Object </pre>
Existing collation	Mark this option (Y), if the existing results are to be used for further manipulation. If not marked (N), the new results will be used. This is flagged as Y as soon as one compare has been carried out.

This function can have effect both before and after the compare is carried out.

Natural Mode

In Natural mode you can compare individual objects and lists of objects outside the control of a PAC environment.

This section covers the following topics:

- Accessing the Compare Utility in Natural Mode
- Comparing Individual Objects
- Comparing Natural Libraries or Lists of Objects
- Comparing Natural Error Messages
- Comparing Natural DDMs

Accessing the Compare Utility in Natural Mode

The Compare utility interface for Natural mode is invoked, if you execute the COMPARE command from any Natural library other than SYSPAC or SYSPAA. You can use the Compare utility for any Natural library or Natural object you have access to.

Comparing Individual Objects

This function allows you to compare a Natural object with any other Natural object.

When you access the Compare utility in Natural mode, the following screen is displayed:

```

15:47:37          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Individual Objects -          Library SYSPAC
                                                Mode Natural

ORIGIN LOCATION

                                                Srce or Loadable ... S (S/L)
DBnr ..... 164__ Fnr ... 31__
Library ..... DEMOPAC__

Object ..... _____

DESTINATION LOCATION

DBnr ..... 164__ Fnr ... 31__
Library ..... DEMOPAC__

Object ..... _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp Cmd          Libs ErrM DDMs Clear
    
```

This is the main screen for the Compare utility in Natural mode.

Fill the required fields Object Name, Library, DBnr / Fnr and Srce or Loadable in both sections with the data to be compared.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

The following Natural mode-specific PF keys are available:

PF6	Cmd	Invokes direct command mode.
PF9	Libs	Invokes the Natural library / list compare function.
PF10	ErrM	Invokes the Natural error message compare function.
PF11	DDMs	Invokes the Natural DDM compare function.

Comparing Natural Libraries or Lists of Objects

This function allows you to compare a Natural library with any other Natural library, or a list of Natural objects with another list of Natural objects.

Enter PF9 to access the "Compare Natural Libraries" screen.

```

15:48:14          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Natural Libraries -          Library SYSPAC
                                                Mode Natural

ORIGIN LOCATION
                                                Srce or Loadable ... S (S/L)
DBnr ..... 164__ Fnr ... 31__
Library ..... DEMOPAC__

Object ..... _____ Object types _____

DESTINATION LOCATION
                                                Srce or Loadable ... S (S/L)
DBnr ..... 164__ Fnr ... 31__
Library ..... _____

Object ..... _____ Object Types _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp Cmd          Nat          ErrM DDMs Clear
    
```

Fill the required fields DBnr / Fnr, Srce or Loadable and Library in both sections with the data to be compared. The other fields are optional.

The Object Types field is a multi-parameter field. It will accept more than one value at once, for example, to retrieve object types program as well as maps as well as local data areas, then you could enter P M L.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

The following Natural mode-specific PF keys are available:

PF6	Cmd	Invokes direct command mode.
PF8	Nat	Invokes the Natural individual compare function.
PF10	ErrM	Invokes the Natural error message compare function.
PF11	DDMs	Invokes the Natural DDM compare function.

Example

The following description serves as an example when comparing one Natural library with another Natural library.

Example: Compare all map and program loadables in library JSYPAC (164,11) with all map and program loadables in library FSYPAC (164,11) and exporting the results to a workfile.

The following screen shows the parameter input:

```

07:40:22          ***** Predict Application Control *****          2002-04-30
User DBA          - Compare Natural Libraries -          Library SYSPAC
                                                Mode Natural

ORIGIN LOCATION
                                                Srce or Loadable ... L (S/L)
DBnr ..... 164__ Fnr ... 11__
Library ..... JSYSPAC__

Object ..... _____ Object types MP_____

DESTINATION LOCATION
                                                Srce or Loadable ... L (S/L)
DBnr ..... 164__ Fnr ... 11__
Library ..... FSYSPAC__

Object ..... _____ Object types MP_____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          Nat          ErrM DDMS Clear
    
```

In the following screen the Output Options window is displayed. Workfile is selected.

```

07:40:22          ***** Predict Application Control *****          2002-04-30
User DBA          - Compare Natural Libraries -          Library SYSPAC
                                                Mode Natural

ORIGIN LOCATION
                                                Srce or Loadable ... L (S/L)
DBnr ..... 164__ Fnr ... 11__
Library ..... JSYSPAC__

Object ..... _____ Object types MP_____

DESTINATION LOCATION
                                                +-----+
!          Output Options          !
! Display          Y          !
! Print          N          !
! Workfile          Y          !
! Export          N          !
! Existing collation N          !
+-----+

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          Nat          ErrM DDMS Clear
    
```

The following screen shows the result of the compare process:

```

There are 1030 semi-match and 157 discrepancy lines in this collation.
07:49:28          ***** PAC COMPARE Utility *****          2002-04-30
Li  1M              N    L      :2M              N    L
    00164 00011 JSYSPAC          :00164 00011 FSYSPAC
>  CFEPRERT P 2001-10-29 14:30
<
>  CNVPAPPL P 2001-10-29 14:04          CNVPAC22 P 2000-03-10 08:25
>  CNVPAUDI P 2001-10-29 14:04
>  CNVPDDM  P 2002-04-17 11:17
>  CNVPDLOC P 2001-10-29 14:04
>  CNVPDLOL P 2001-10-29 14:04
>  CNVPDLOS P 2001-10-29 14:04
>  CNVPDPCF P 2001-10-29 14:04
!  CNVPEVE  P 2001-10-29 14:04          CNVPEVE  P 2000-03-10 08:25
!  CNVPFTT  P 2001-10-29 14:04          CNVPFTT  P 1998-12-08 11:20
>  CNVPF0FF P 2001-10-29 14:04
>  CNVPF000 P 2001-10-29 14:04
!  CNVPISN  P 2001-10-29 14:04          CNVPISN  P 1998-05-28 19:27
>  CNVPNNL  P 2001-10-29 14:04
!  CNVPRED  P 2001-10-29 14:04          CNVPRED  P 1998-05-28 19:27
>  CNVPREDP P 2001-10-29 14:04
>  CNVPVIEW P 2002-04-17 11:17
>  CNVPVK83 P 2001-10-29 14:04
Press ENTER to continue, enter '.' to stop:
    
```

The compare output has a summary line at the top of the page and shows the number of matches, semi-matches and discrepancies.

!	indicates that the object in list 1 has a timestamp different from that of its counterpart in list 2.
<	indicates that the object is present in list 2 but not in list 1.
>	indicates that the object is present in list 1 but not in list 2.
=	indicates that the timestamp of the objects coincide.

In our example above the output was also sent to workfile1 for further manipulation.

Comparing Natural Error Messages

This function allows you to compare a Natural error message with any other Natural error message, or a range of Natural error messages with another range of Natural error messages.

Enter PF10 to access the "Compare Natural Error Messages" screen.

```

15:48:34          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Natural Error Messages -          Library SYSPAC
                                                           Mode Natural

ORIGIN LOCATION

DBnr ..... 164__ Fnr ... 31__
Library ..... DEMOPAC__

Message Number _____ Language Code _

DESTINATION LOCATION

DBnr ..... 164__ Fnr ... 31__
Library ..... _____

Message Number _____ Language Code _

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp Cmd          Nat Libs          DDMS Clear
    
```

Fill the required fields Library and DBnr / Fnr in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

The fields Message Number are relevant to determine whether you are comparing single error messages or lists of error messages. For example:

If you wanted to compare message number 0010 in library XYZ with message number 0010 in library ABC, then both the Message Number fields would have the value 0010 in them. However, if you wanted to compare all error messages in library XYZ beginning with 040 with all Error Messages in library ABC beginning with 040, then both Message Number fields would have the value 040* in them. This would compare a list of all 0400 messages with each other, i.e 0400, 0401, 0402 etc.

The three controlling values that you can use in the Message Number field are:

*	denotes the wildcard function.
<	denotes the less than function.
>	denotes the greater than function.

Valid input examples for the Message Number field would be:

0010> all messages greater than 0010

0100* all messages starting with 100

0050< all messages less than 50

The following Natural mode-specific PF keys are available:

PF6	Cmd	Invokes direct command mode.
PF8	Nat	Invokes the Natural individual compare function.
PF9	Libs	Invokes the Natural library / list compare function.
PF11	DDMs	Invokes the Natural DDM compare function.

Comparing Natural DDMs

This function allows you to compare a Natural DDM with any other Natural DDM.

Enter PF11 to access the "Compare Natural DDMs" screen.

```

15:38:53          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Natural DDMs -          Library SYSPAC
                                                Mode Natural

ORIGIN LOCATION

DBnr ..... 164__ Fnr ... 32__

Object ..... _____

DESTINATION LOCATION

DBnr ..... 164__ Fnr ... 32__

Object ..... _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp Cmd          Nat Libs ErrM          Clear
    
```

Fill the required fields DBnr / Fnr and Object in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Note:

For DDM comparisons the DBnr / Fnr must be a valid FDIC otherwise the following error message is returned: PAC6402: (E) The file is unavailable or unsuitable.

The following Natural mode-specific PF keys are available:

PF6	Cmd	Invokes direct command mode.
PF8	Nat	Invokes the Natural individual compare function.
PF9	Libs	Invokes the Natural library / list compare function.
PF10	ErrM	Invokes the Natural error message compare function.

PAA Mode

In PAA mode you can compare PAA-controlled objects, individual Natural objects and lists of objects outside the control of a PAA environment.

This section covers the following topics:

- Accessing the Compare Utility in PAA Mode
- Comparing Individual PAA Objects
- Comparing Natural Objects

Accessing the Compare Utility in PAA Mode

The Compare utility interface for PAA mode is invoked, if you execute the COMPARE command from the library SYSPAA or choose option C from either the PAA Reporting main menu or the PAA Administration main menu. You can use the Compare utility for PAA-controlled objects which reside on the PAA system file.

When you access the Compare utility in PAA mode, the following screen is displayed:

```

11:53:16          ***** Predict Application Control *****          2002-04-25
User DBA          - PAA Compare Main Menu -                          Library SYSPAA
                                                                Mode PAA

          Code  Function or Mode
          ----  -
          A    Compare PAA Objects
          N    Compare Natural Objects
          X    Direct Command Mode
          ?    Help
          .    Exit

Command ==>

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

```

Choose one of the Codes from the above menu to continue.

- A to compare individual PAA objects
- N to compare individual Natural objects
- X to use direct command mode

Comparing Individual PAA Objects

This function allows you to compare a PAA-controlled object with any other PAA-controlled object.

Choose option A from the PAA Compare Main Menu to access the Compare Individual PAA Objects screen.

```

15:39:18          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Individual PAA Objects -          Library SYSPAC
                                                           Mode PAA

ORIGIN LOCATION
FPAA DBnr .... 164__ Fnr ... 207__          Srce or Loadable ... S (S/L)
Location DBnr 164__ Fnr ... 31__          Library .....
Application .. _____
Status ..... _____
Object ..... _____
PAA version .. _____ State _ Job _____          Current on .. _____

DESTINATION LOCATION
FPAA DBnr .... 164__ Fnr ... 207__
Location DBnr 164__ Fnr ... 31__          Library .....
Application .. _____
Status ..... _____
Object ..... _____
PAA version .. _____ State _ Job _____          Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
          Help Menu Exit Crit Outp          List          Clear
    
```

Fill the required fields FPAA DBnr / Fnr, Srce or Loadable, Location DBnr / Fnr, Library and Object in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Optional fields are available for further selection criteria:

Application	The name of the PAA application.
Status	The name of the PAA status.
PAA Version	The PAA version number of the object. (This differs from the PAC version number).
State	The PAA state the job is in. S = Scheduled C = Current B = Backed up H = Historical R = Removed
Job	The PAA job number.
Current on	The date and time that the PAA object was made current.

The following PAA mode-specific PF key is available:

PF9	List	Invokes the PAA list compare function.
-----	------	--

Comparing Lists of PAA Objects

This function allows you to compare a list of PAA-controlled objects with another list of PAA-controlled objects.

To compare lists of PAA objects, use the PF9 key from the "Compare Individual PAA Objects" menu.

```

15:41:28          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Lists of PAA Objects -          Library SYSPAC
                                     Mode PAA

ORIGIN LOCATION
FPAA DBnr .... 164__ Fnr ... 207__          Srce or Loadable ... S (S/L)
Location DBnr 164__ Fnr ... 31__          Library .....
Application .. _____
Status ..... _____
Object ..... _____          Object types _____

DESTINATION LOCATION
FPAA DBnr .... 164__ Fnr ... 207__          Srce or Loadable ... S (S/L)
Location DBnr 164__ Fnr ... 31__          Library .....
Application .. _____
Status ..... _____
Object ..... _____          Object types _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          PAA          Clear
    
```

Fill the required fields FPAA DBnr / Fnr, Srce or Loadable, Location DBnr / Fnr and Library with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

The following PAA mode-specific PF key is available:

PF8	PAA	Invokes the PAA individual compare function.
-----	-----	--

Example

The following is an example using the Compare utility in PAA mode to compare two Natural objects under the control of PAA.

Example: Compare all subprogram loadables in library LSYSPAC (164,11), application SYSPAC_222 with all subprogram loadables in library JSYSPAC (164,11), application SYSPAC_231 displaying results on the screen.

The following screen shows the parameter input:

```

08:27:12          ***** Predict Application Control *****          2002-04-30
User DBA          - Compare Lists of PAA Objects -          Library SYSPAC
                                                Mode PAA

ORIGIN LOCATION
FPAA DBnr .... 164__ Fnr ... 52__          Srce or Loadable ... L (S/L)
Location DBnr 164__ Fnr ... 11__          Library ..... LSYSYPAC__
Application .. SYSPAC_222_____
Status ..... _____
Object ..... _____          Object types N_____

DESTINATION LOCATION
FPAA DBnr .... 164__ Fnr ... 52__          Srce or Loadable ... L (S/L)
Location DBnr 164__ Fnr ... 11__          Library ..... JSYSYPAC__
Application .. SYSPAC_231_____
Status ..... _____
Object ..... _____          Object types N_____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          PAA          Clear
    
```

The following screen shows the result of the compare process:

```

There are 350 semi-match and 12 discrepancy lines in this collation.
08:30:30          ***** PAC COMPARE Utility *****          2002-04-30
Li  1A          NN  L 00000:2A          NN  L 00000
   00164 00052 LSYSYPAC 00164 00011 :00164 00052 JSYSYPAC 00164 00011
! APINOBJV N 2000-04-13 16:49          APINOBJV N 2001-10-29 14:03
! APINOBLN N 1999-11-22 07:03          APINOBLN N 2001-10-29 14:03
! APINPATH N 1999-11-22 07:03          APINPATH N 2001-10-29 14:03
! APINPRF  N 1999-11-22 07:03          APINPRF  N 2001-10-29 14:03
! APINPRFS N 1999-11-22 07:03          APINPRFS N 2001-10-29 14:03
! APINSEL  N 1999-11-22 07:03          APINSEL  N 2001-10-29 14:03
<
! APINSELO N 1999-11-22 07:03          APINSELO N 2001-10-29 14:03
! APINSRTN N 1999-11-22 07:03          APINSRTN N 2001-10-29 14:03
! APINSTAT N 1999-11-22 07:03          APINSTAT N 2001-10-29 14:03
! APINTEXT N 1999-11-22 07:03          APINTEXT N 2001-10-29 14:03
! AUTNMAPL N 2002-01-15 10:10          AUTNMAPL N 2002-01-09 23:38
! A15NCOPY N 1999-11-25 18:57          A15NCOPY N 2001-10-29 14:03
! A15NGLOB N 1999-11-25 18:57          A15NGLOB N 2001-10-29 14:03
! A15NPOPT N 1999-11-25 18:57          A15NPOPT N 2001-10-29 14:03
! A15NVAL1 N 1999-11-25 18:57          A15NVAL1 N 2001-10-29 14:03
! CFENAUXD N 2000-02-20 14:05          CFENAUXD N 2001-10-29 14:30
! CFENAUXS N 2000-02-20 14:05          CFENAUXS N 2001-10-29 14:30
! CFENCMP  N 2000-02-20 14:05          CFENCMP  N 2001-10-29 14:30
Press ENTER to continue, enter '.' to stop:
    
```

Comparing Natural Objects

This function allows you to compare Natural objects with other Natural objects and Natural libraries with other Natural libraries as described in the following sections:

- Comparing Individual Objects

- Comparing Natural Libraries or Lists of Objects

Starting the comparison from PAA instead of under Natural allows you to compare Natural objects outside of the PAA environment (Production), as these objects / libraries may not be accessible from their development environment.

Choose option N from the PAA Compare Main Menu to access the Compare Individual Objects screen.

PAC Mode

In PAC mode you can compare PAC-controlled objects as well as individual Natural objects and lists of objects outside the control of a PAC environment.

This section covers the following topics:

- Accessing the Compare Utility in PAC Mode
- Comparing Versioned Objects
- Comparing Natural Objects
- Comparing PAA Objects

Accessing the Compare Utility in PAC Mode

The Compare utility interface for PAC mode is invoked, if you execute the COMPARE command from the library SYSPAC or using option C in the PAC Reporting main menu. You can use the Compare utility for PAC-controlled objects which reside on the PAC system file.

When you access the Compare utility in PAC mode, the following screen is displayed:

```

15:42:12          ***** Predict Application Control *****          2002-04-25
User DBA          - PAC Compare Main Menu -                          Library SYSPAC
                                                                Mode PAC

                Code  Function or Mode
                -----
                V    Compare Versioned Objects
                N    Compare Natural Objects
                A    Compare PAA Objects
                X    Direct Command Mode
                E    Extended Compare
                ?    Help
                .    Exit

                Code .. _

Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
                Help  Menu  Exit                                  Canc
    
```

Choose one of the Codes from the above menu to continue.

- V to compare versioned objects
- N to compare individual Natural objects
- A to compare individual PAA objects
- X to use direct command mode
- E to use extended compare

Comparing Versioned Objects

This function allows you to compare a PAC-controlled Natural object with any other PAC-controlled Natural object.

Choose option V from the PAC Compare Main Menu to access the "Compare Versioned Natural Objects" screen.

```

15:42:40          ***** Predict Application Control *****          2002-04-25
User DBA          - PAC Compare Versioned Natural Objects -          Library SYSPAC
                                                           Mode PAC

ORIGIN LOCATION
ACF DBnr ..... 164__ Fnr ... 205__          Srce or Loadable ... S (S/L)

Application .. _____
Status ..... _____
Object ..... _____
Version Nr ... _____          Current on .. _____

DESTINATION LOCATION
ACF DBnr ..... 164__ Fnr ... 205__

Application .. _____
Status ..... _____
Object ..... _____
Version Nr ... _____          Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          Forei          List ErrM DDMS Clear
    
```

Fill the required fields ACF DBnr / Fnr, Srce or Loadable, Application and Object in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Optional fields are available for further selection criteria:

Application	The name of the PAC application.
Status	The name of the PAC status.
Version Nr	The PAC version number of the object.
Current on	The date and time that the PAC object was made current.

The following PAC mode-specific PF keys are available:

PF7	Forei	Invokes the versioned foreign objects compare function.
PF8	Nat	Invokes the Natural versioned objects function
PF9	List	Invokes the lists of versioned objects compare function.
PF10	ErrM	Invokes the versioned error message compare function.
PF11	DDMs	Invokes the versioned DDMs compare function.

Compare Versioned Foreign Objects

This function allows you to compare a PAC-controlled foreign object with any other PAC-controlled foreign object.

To compare versioned foreign objects, use the PF7 key from the "PAC Compare Versioned Natural Objects" menu.

```

15:43:08          ***** Predict Application Control *****          2002-04-25
User DBA          - PAC Compare Versioned Foreign Objects -          Library SYSPAC
                                                Mode PAC

ORIGIN LOCATION
ACF DBnr ..... 164__ Fnr ... 205__          Srce or Loadable ... S (S/L)

Application .. _____
Status ..... _____
Object ..... _____          Object type . ____
Version Nr ... _____          Current on .. _____

DESTINATION LOCATION
ACF DBnr ..... 164__ Fnr ... 205__

Application .. _____
Status ..... _____
Object ..... _____          Object type . ____
Version Nr ... _____          Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          Nat List ErrM DDMs Clear
    
```

Fill the required fields ACF DBnr / Fnr, Srce or Loadable, Application, Object and Object type in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

The Object type field is unique to PAC versioned foreign objects and is a 3 letter user-defined value, for example JCL.

Compare Lists of Versioned Objects

This function allows you to compare a list of PAC-controlled objects with another list of PAC-controlled objects.

To compare lists of versioned objects, use the PF9 key from the "PAC Compare Versioned Natural Objects" menu.

```

15:43:33          ***** Predict Application Control *****          2002-04-25
User DBA          - PAC Compare List of Versioned Objects -          Library SYSPAC
                                                           Mode PAC

ORIGIN LOCATION
ACF DBnr ..... 164__ Fnr ... 205__          Srce or Loadable ... S (S/L)

Application .. _____
Status ..... _____
Object ..... _____          Object types _____
Version Nr ... _____          Current on .. _____

DESTINATION LOCATION
ACF DBnr ..... 164__ Fnr ... 205__          Srce or Loadable ... S (S/L)

Application .. _____
Status ..... _____
Object ..... _____          Object types _____
Version Nr ... _____          Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
          Help Menu Exit Crit Outp          Forei Nat          ErrM DDMS Clear
    
```

Fill the required fields ACF DBnr / Fnr, Srce or Loadable and Application in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Compare Versioned Error Messages

This function allows you to compare one or more PAC-controlled versioned error message with any other PAC-controlled versioned error message(s).

To compare versioned error messages, use the PF10 key from the "PAC Compare Versioned Natural Objects" menu.

```

15:43:57          ***** Predict Application Control *****          2002-04-25
User DBA          - PAC Compare Versioned Error Messages -          Library SYSPAC
                                                           Mode PAC

ORIGIN LOCATION
ACF DBnr ..... 164__ Fnr ... 205__

Application .. _____
Status ..... _____
Message Number _____ Language Code _
Version Nr ... _____ Current on .. _____

DESTINATION LOCATION
ACF DBnr ..... 164__ Fnr ... 205__

Application .. _____
Status ..... _____
Message Number _____ Language Code _
Version Nr ... _____ Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp      Forei Nat List      DDMs Clear
    
```

Fill the required fields ACF DBnr / Fnr and Application in both sections with the data to be compared. The other fields are optional.

The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Compare Versioned DDMs

This function allows you to compare a PAC-controlled versioned DDM with any other PAC-controlled versioned DDM.

To compare versioned DDMs, use the PF11 key from the "PAC Compare Versioned Natural Objects" menu.

```

15:44:19          ***** Predict Application Control *****          2002-04-25
User DBA          - PAC Compare Versioned DDMs -          Library SYSPAC
                                                           Mode PAC

ORIGIN LOCATION
ACF DBnr ..... 164__ Fnr ... 205__

Application .. _____
Status ..... _____
Object ..... _____
Version Nr ... _____ Current on .. _____

DESTINATION LOCATION
ACF DBnr ..... 164__ Fnr ... 205__

Application .. _____
Status ..... _____
Object ..... _____
Version Nr ... _____ Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp      Forei Nat List ErrM      Clear
    
```

Fill the required fields ACF DBnr / Fnr, Application (Predict applications only) and Object in both sections with the data to be compared. The other fields are optional. The values you enter will be compared and the resultant data will be returned for viewing and, if necessary, further manipulation.

Example

The following is an example using the Compare utility in PAC mode to compare two versioned DDMs.

Example: Compare a versioned DDM named load-module version 1 in application Predict with that of the same named DDM version 1 in application DDMS_FOR_231.

The following screen shows the parameter input:

```

08:59:01          ***** Predict Application Control *****          2002-04-30
User DBA          - PAC Compare Versioned DDMs -          Library SYSPAC
                                                Mode PAC

ORIGIN LOCATION
ACF DBnr ..... 164__ Fnr ... 50__

Application .. PREDICT_____
Status ..... _____
Object ..... LOAD-MODULE_____
Version Nr ... 1_____          Current on .. _____

DESTINATION LOCATION
ACF DBnr ..... 164__ Fnr ... 50__

Application .. DDMS_FOR_231_____
Status ..... _____
Object ..... LOAD-MODULE_____
Version Nr ... 1_____          Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          Forei Nat List ErrM          Clear
    
```

The following screen shows the result of the compare process:

For detailed description, see the section Natural Mode.

Comparing PAA Objects

This function allows you to compare single PAA-controlled objects with other PAA-controlled objects and lists of PAA-controlled objects with other lists of PAA-controlled objects.

Choose option A from the PAC Compare Main Menu to access the "Compare Individual PAA Objects" screen.

Starting the comparison from PAC instead of under PAA allows you to have the full functions of the utility available in a central place.

Please note that in order to use this function, you need access to your FPAA file from your PAC environment.

```

15:45:39          ***** Predict Application Control *****          2002-04-25
User DBA          - Compare Individual PAA Objects -          Library SYSPAC
                                                           Mode PAA

ORIGIN LOCATION
FPAA DBnr .... 164__ Fnr ... 207__          Srce or Loadable ... S (S/L)
Location DBnr 164__ Fnr ... 31__          Library .....
Application .. _____
Status ..... _____
Object ..... _____
PAA version .. _____ State _ Job _____ Current on .. _____

DESTINATION LOCATION
FPAA DBnr .... 164__ Fnr ... 207__
Location DBnr 164__ Fnr ... 31__          Library .....
Application .. _____
Status ..... _____
Object ..... _____
PAA version .. _____ State _ Job _____ Current on .. _____

Add. Criteria N          Output Options ..... N
Command =====> _____
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Menu Exit Crit Outp          List          Clear
    
```

Direct Command Mode

When you invoke the PAC compare direct command mode, the following screen is displayed:

```
09:48:58          ***** Predict Application Control *****          2002-05-13
User DBA          - PAC Compare Direct Command Mode -          Library SYSPAC

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

You can invoke the direct command mode online by either using menu option "X" or, when in PAC mode, with the PF6 key (Cmd). A blank screen is displayed in which you enter your direct commands. If the length of the command exceeds the screen size, you can use the continuation character (%), see the COMPARE command examples COMPARE Command Examples. However, in order to obtain the best possible results from the Compare Utility, it is recommended that you use the direct command mode option in batch.

The following points are important and worth noting when using the direct command mode.

- the first command must always be COMPARE;
- commas are required to separate syntax elements (see examples later in this section);
- APPLICATION can no longer be abbreviated as APPL;
- LIB or LIBRARY is a mandatory entry;
- all commands need a WHERE-clause indicating DBnr's and Fnr's. (Previously if this was not specified, the Compare utility assumed the current settings of the ACF / FUSER).

Keywords	Explanation
ALL	Selects only saved components for processing.
CAT	Selects only cataloged components for processing. (Any corresponding saved components will not be processed.)
SAVED	Selects all saved components for processing. (Any corresponding cataloged object will not be processed.)
STOWED	Selects all saved components for processing. (Any corresponding cataloged object will not be processed.)
IN/FM	Introduces the specification of the first list or object to be compared.
TO	Introduces the specification of the second list or object to be compared.
APPLICATION	Name of a PAC application that contains the object.
LIBRARY	Name of the library where the object exists. Mandatory.

- COMPARE, object-type, and object-name1 must normally be the first three parameters of the command string.
- A period mark indicates the end of command. If a "." is detected anywhere within a command string, all data after the "." will be ignored.
- The library-name must be specified immediately after the IN, FM, and TO keywords.
- The application-name must follow the APPLICATION keyword, which must be specified immediately after the IN, FM, and TO keywords.
- The where-clause1 must always follow the IN or FM keyword and library-name1 or application-name1; however, the keywords and values within the clause may be specified in any order.
- The where-clause2 must always follow the TO keyword and library-name2 or application-name2; however, the keywords and values within the clause may be specified in any order.
- The keywords and values of the with-clause may be specified in any order; and the with-clause may be placed anywhere within the direct command string, except in the first three positions.

WHERE-Clause

The where-clause is mandatory. It specifies the location of the library specified in the IN/FM (from) or TO clauses.

Note that the keywords and values within the clause may be specified in any order.

Keywords	Explanation
WHERE	Indicates the start of a where-clause.
CIPHER	Cipher code of the file. (Ignored).
DBID	Database number of the specified library.
FNR	File number of the specified library.
NAME	VSAM name (FCT) of the file (VSAM only). (Ignored).
PASSWORD	Password of the file. (Ignored).
SEC	DBnr, fnr, password, cipher of the Natural security file against which security validation must be performed. (Ignored).
STATUS	Name of the status.
VERSION	Version number of an/the object(s) to be compared.

WITH-Clause

The with-clause is optional. It specifies attributes of the objects to be selected.

Note that the keywords and values of the with-clause may be specified in any order; and the with-clause may be placed in any location within the direct command string, except in the first three positions.

Keywords	Explanation
WITH	(Optional) Indicates the start of a with-clause.
DIFFER	Selects for processing all programming objects with different saved and cataloged dates. (Ignored).
EXPAND	Expands the compare report to show a comparison of both directories and source code; a short compare list is not displayed. The source comparison is written to CMPRT01.
FMDATE	Limits the selection by the save/catalog date.
FMTIME	Limits the selection by the save/catalog time.
MON	Activates online trace facility (not valid in batch). (Ignored).
SHORT	Selects for processing all programming objects found in the origin library. If SHORT is not specified, all objects in both libraries will be processed. (Ignored).
TID	Identifies the terminal ID where the saved/cataloged objects must have been processed to be selected.
TODATE	Identifies the save/catalog date after which no objects are selected.
TOTIME	Identifies the save/catalog time after which no objects are selected.
TYPE	Identifies the type(s) of objects to be selected.
USER	Identifies the ID of the user who saved/cataloged the objects to be selected for processing.

COMPARE Command Examples

To compare the saved components of a particular object in two different Natural libraries.:

```
COMPARE
COMPARE, ALL, , TRNSTOWP, FM, LIB, ASYSPAC, WHERE, DBID, 164, FNR, 11, %
TO, LIB, PAC14CSC, WHERE, DBID, 164, FNR, 11
```

.

To compare the cataloged component of a particular object in two different Natural libraries:

```
COMPARE
COMPARE, CATALOGED, , TRNSTOWP, FM, LIB, ASYSPAC, WHERE, DBID, 164, FNR, 11, %
TO, LIB, PAC14CSC, WHERE, DBID, 164, FNR, 11
```

.

To compare the saved component of a particular object in two different Natural libraries:

```
COMPARE
COMPARE, SAVED, , TRNSTOWP, FM, LIB, ASYSPAC, WHERE, DBID, 164, FNR, 11, %
TO, LIB, PAC14CSC, WHERE, DBID, 164, FNR, 11
```

.

To compare the saved component of a particular object in two different Natural libraries:

```
COMPARE
COMPARE, STOWED, , TRNSTOWP, FM, LIB, ASYSPAC, WHERE, DBID, 164, FNR, 11, %
TO, LIB, PAC14CSC, WHERE, DBID, 164, FNR, 11
```

.

To compare a range of components in two different Natural libraries:

```
COMPARE
COMPARE, ALL, , TRN*, FM, LIB, ASYSPAC, WHERE, DBID, 164, FNR, 11, %
TO, LIB, PAC14CSC, WHERE, DBID, 164, FNR, 11
```

.

To compare a component of an application in two different PAC statuses with different saved and cataloged dates:

```
COMPARE
COMPARE, ALL, , TRNSTOWP, IN, APPLICATION, SYSPAC_214, STATUS, CONTROL, %
WHERE, DBID, 164, FNR, 50, %
TO, APPLICATION, SYSPAC_214, WHERE, STATUS, PRODUCTION, %
WHERE, DBID, 164, FNR, 50, WITH, DIFF
```

.

To compare a range of components of an application in two different PAC statuses:

```
COMPARE
COMPARE, ALL, , TRN*, IN, APPLICATION, SYSPAC_214, STATUS, CONTROL, %
WHERE, DBID, 164, FNR, 50, %
TO, APPLICATION, SYSPAC_214, WHERE, STATUS, PRODUCTION, %
WHERE, DBID, 164, FNR, 50, WITH, DIFF
```

.

To compare a component of an application with two different versions:

```
COMPARE
COMPARE, ALL, , TRNSTOWP, IN, APPLICATION, SYSPAC_214, VERSION, 2, %
WHERE, DBID, 164, FNR, 50, %
TO, APPLICATION, SYSPAC_214, WHERE, VERSION, 3, %
WHERE, DBID, 164, FNR, 50
```

.

To compare a range of components of an application with two different versions:

```
COMPARE
COMPARE,ALL,,TRN*,IN,APPLICATION,SYSPAC_214,VERSION,2,%
WHERE,DBID,164,FNR,50,%
TO,APPLICATION,SYSPAC_214,WHERE,VERSION,3,%
WHERE,DBID,164,FNR,50
.
```

To compare a component of an application with two different versions, using the parameter expand:

```
COMPARE
COMPARE,ALL,,MENU,IN,APPLICATION,SYSPAC_214,VERSION,1,%
WHERE,DBID,164,FNR,50,%
TO,APPLICATION,SYSPAC_222,WHERE,VERSION,1,%
WHERE,DBID,164,FNR,50,WITH,EXPAND
.
```

Extended Compare Utility

The Extended Compare Utility is the old Compare utility, that was delivered with PAC Version 2.2. It was thought necessary to leave this functionality in the product for those users who have already mastered the more complex functions that this has provided.

This section covers the following topics:

- Redefine Scratch Pad
- Define List or Sequence
- Operate on Lists
- Operate on Sequences
- Operate on Collations
- Compare Adhoc
- Extended Direct Command Mode

Choose option E from the PAC Compare Main Menu to access the "Compare Utility Extended Menu" screen.

```

14:07:06          ***** PREDICT APPLICATION CONTROL *****          2002-04-22
User DBA          - COMPARE Utility Extended Menu -          Library SYSPAC

Code  Function or Mode
-----
P    Redefine Scratch Pad
D    Define List or Sequence
L    Operate on Lists
S    Operate on Sequences
C    Operate on Collations
A    Compare Ad Hoc
M    Direct Command Mode
?    Help
.    Exit
-----
Code ..

Pad 164      206   Lists           Seqs           Colls           Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Exit                                               Canc
    
```

PF Keys available from this panel are PF3 (Exit or Return) and PF12 (Cancel).

The short code indicators in the panel at the bottom are:

Pad	Current DBnr and Fnr for scratch pad settings. Default: PCF settings.
Lists	Number of each list defined for this session. Blank spaces are displayed for lists which were not defined as shown in the screen in section Operate on Lists. A maximum of 8 lists can be defined.
Seqs	Number of each sequence defined for this session. Blank spaces are displayed for sequences which were not defined as shown in the screen in section Operate on Lists. A maximum of 8 sequences can be defined.
Colls	Number of each collation defined for this session. Blank spaces are displayed for collations which were not defined as shown in the screen in section Operate on Lists. A maximum of 8 collations can be defined.
Reps	Number of each report defined for this session. Blank spaces are displayed for reports which were not defined. A maximum of 8 reports can be defined.

Redefine Scratch Pad

Enter function code P in the Compare Utility Main Menu to define / modify the default values set for the scratch pad. If the file definition is omitted, PCF is assumed.

The scratch pad is used to temporarily store lists and definitions of sequences used during your session. The current value of this parameter is displayed on the Main Menu panel on the left side.

Define List or Sequence

Enter function code D in the Compare Utility Main Menu to either define a list (of common, PAC or PAA objects) for mass compare, or a sequence (individual compare) for later use in the Compare utility.

Before starting the actual compare process, you need to define lists or sequences using various selection criteria.

The Compare Utility Entity Definition screen appears:

```

15:38:26          ***** PREDICT APPLICATION CONTROL *****          2000-02-29
User DBA          - COMPARE Utility Entity Definition -          Library SYSPAC

Entity..... _ (L,S)      Kind..... _ (coMmon,paC,paA,Event)
Number..... _ (1..8)     Object Group..... _ (N,E,D,F,M)

Pad 164      135   Lists          Seqs          Colls          Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
          Retr                                          Canc
    
```

The following parameters are available:

Parameter	Description
Entity	List or Sequence
Kind	"M" Common Objects outside of PAC control "C" PAC objects under the control of PAC "A" PAA objects under the control of PAA "E" PAC events
Number	The number assigned to the defined list or sequence (1 to 8)
Object Group	"N" Natural objects "E" Error Messages "D" Data Definition Modules "F" Foreign Objects "M" Migration lists

Enter the five values and press ENTER to continue. Depending on your input various screens are displayed in which you can specify the attributes for defining lists or sequences.

The following screen shows an example of the definition of a list (number 3) of common Natural modules in library KSYSPAC.

```

15:40:52          ***** PREDICT APPLICATION CONTROL *****          2000-02-29
User DBA          - COMPARE Utility Entity Definition -          Library SYSPAC

Entity..... 1 (L,S)      Kind..... m (coMmon,paC,paA,Event)
Number..... 3 (1..8)    Object Group..... n (N,E,D,F,M)

Definition of list 3
Database number... 164__  Src/Loadable..... 1 (S/L)
File number..... 11__   Object types..... p_____

Library..... ksyspac_

Object..... _____

Time from..... YYYY-MM-DD HH:II
Time to..... YYYY-MM-DD HH:II
User..... _____

Pad 164      135      Lists      3      Seqs          Colls          Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
          Retr                                          Canc
    
```

Attributes for Defining Lists and Sequences

Database number	Database number of the origin environment where the object / objects exist.
File number	File number of the origin environment where the object/objects exist. For Common objects the Fnr must be a valid FUSER/FNAT/FDIC file. For PAC objects the Fnr must be a valid ACF file. For PAA objects the Fnr must be a valid PAA file.
Src/Loadable	Type of objects; either source code or loadable code.
Object type	The type(s) of objects to be compared. For Common objects please see valid types in the PAC User's Guide. For foreign objects this type value is user defined.
Library	The name of the library where the objects reside.
Object	The name of the object to be compared.
Time from	The time stamp from of the object selected. Format is YYYY-MM-DD HH:II
Time to	The time stamp to of the object selected. Format is YYYY-MM-DD HH:II
User	The valid user ID of the user that saved / stowed / compiled the object.

The following attributes are available depending on the combination of the attributes Kind and Object Group you specified:

Ebyte	Used for object group (E) (error messages) only. If this field is left blank then all short error messages will be returned. If this field is populated with a valid Natural language code, then the long error messages for that language code will be returned.
Application	The PAC application of the object(s) to be defined. This field is mandatory for definition of kind PAC.
Status	The PAC status of the object(s) to be defined.
Event	If status is either blank or Control it refers to an immigration event. Anything else refers to an emigration event.
PAC version	The object version number assigned by PAC.
Current on	For a PAC definition this will return the most recent objects on the value specified. For PAA definitions then it will return objects that will be equal to the PAA field 'current on'.
	The following six location attributes are used only when Kind=A (PAA).
Database number	PAA location database number.
File number	PAA location file number (FUSER/FNAT/FDIC)
Library	PAA location library (valid FUSER/FNAT library)
Node	PAA location ESY node for foreign objects.
Volume or BS2 type	PAA location Volume or BS2 type for foreign objects.
Data set	PAA location dataset name.
PAA version	The object version number assigned by PAA.
State	The PAA value of 'state'. This can be Backed out, Current, Historical, Removed, and Scheduled.
Job	The number of the PAA job that was used to migrate the object into PAA.

The result of this list definition is returned to the Compare Utility Main Menu displaying a short text on top of the screen of the number of objects that the definition obtained, as seen in the following screen.

```

There are 354 entries in list 3 .
15:41:58          ***** PREDICT APPLICATION CONTROL *****                2000-02-29
User DBA          - COMPARE Utility Main Menu -                            Library SYSPAC

Code  Function or Mode
-----
P    Redefine Scratch Pad
D    Define List or Sequence
L    Operate on Lists
S    Operate on Sequences
C    Operate on Collations
A    Compare Ad Hoc
M    Direct Command Mode
?    Help
.    Exit
-----
Code ..

Pad 164      135  Lists   3      Seqs          Colls          Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Canc                                               Canc
    
```

The list definition has returned a list of 354 entries, and you will note that the list field at the foot of the screen now contains the number 3. This indicates that list number 3 is now defined and temporarily stored.

Operate on Lists

Enter function code L in the Compare Utility Main Menu to manipulate the defined lists.

```

15:24:04          ***** PREDICT APPLICATION CONTROL *****                2000-02-29
User DBA          - COMPARE Utility List Headers -                            Library SYSPAC

List  1 Common 00164 00011      Library KSYSPAA
                                Type NP   L
List  2 Common 00164 00010      Library SYSPAA
                                Type NP   L
List  3 PAC    00164 00050      Compartment SYSPAC_214          00017
                                Type N    S

List  5 PAA    00164 00052      Location GSYSPAA 00164 00011
                                Type N    L

List  7 Common 00164 00040
                                Type D

Pad 164      135  Lists 123 5 7  Seqs 123456  Colls 1 3 5  Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Canc                                               Canc
    
```

The Compare Utility List Headers screen shows list headers with some identification data. The list number, the kind value (Common, PAC or PAA), the type value (Natural, error messages, DDMs or foreign), as well as the library or application name, DBnr and Fnr is also part of the header record. This allows you to identify the list

you have previously defined at a glance.

In order to compare list 1 with list 2, enter 1 in the input field underneath the first list and 2 underneath the second list to be compared. If you would prefer to compare list 2 with list 1, simply swap the numbers.

In the input field underneath each List line you can enter the following:

- 1 or the first list to be compared
- 2 or the second list to be compared
- D To display the list
- P Print the list
- W Write the list to Natural workfile 1
- T Save the list to a Natural text module
- ? for Help

The following screen shows an example of the Display list function D. In our example we displayed list 1, which was a defined Common Natural list from DBnr=164, Fnr=11 and from library KSYSPAA for loadable program type objects.

```

15:46:39          ***** PAC COMPARE Utility *****          2000-02-29
List  1 Common 00164 00011      Library KSYSPAA
                                Type NP   L
0001 ADJUST                NP   L 2000-11-22 07:46:08 00001 00001
0002 ADMIN                  NP   L 2000-01-04 11:15:35 00002 00002
0003 CNVPAA22              NP   L 2000-01-04 11:15:36 00002 00002
0004 CNVPFTA                NP   L 2000-01-04 11:15:36 00002 00002
0005 CNVPLCR                NP   L 2000-11-22 07:46:09 00001 00001
0006 CNVPXREF              NP   L 2000-11-22 07:46:10 00001 00001
0007 CONVERT                NP   L 2000-01-04 11:15:36 00002 00002
0008 INTPAA                 NP   L 2000-11-22 07:46:11 00001 00001
0009 MENU                   NP   L 2000-11-22 07:46:12 00001 00001
000A PAAPIBEG              NP   L 2000-12-01 15:38:34 00001 00001
000B PA2PAACR              NP   L 2000-02-08 09:55:06 00003 00000
000C PA2PAAPL              NP   L 2000-11-22 07:46:13 00001 00001
000D PA2PADJ                NP   L 2000-11-22 07:46:14 00001 00001
000E PA2PAERR              NP   L 2000-01-18 09:02:58 00002 00002
000F PA2PAJOB              NP   L 2000-11-22 07:46:15 00001 00001
0010 PA2PALOC              NP   L 2000-11-22 07:46:15 00001 00001
0011 PA2PAMOD              NP   L 2000-11-22 07:46:15 00001 00001
0012 PA2PAMSC              NP   L 2000-11-22 07:46:16 00001 00001
0013 PA2PAOBJ              NP   L 2000-11-22 07:46:16 00001 00001
Press ENTER to continue, enter '.' to stop:

```

The displayed list shows details including object name, object type, date and time and PAC and PAA version.

The following screen shows an example of the results of a comparison between list 1 and list 2. The results show by means of single character indicators the differences between the contents of list 1 versus list 2.

The second line displays the elements Li - List; 1M - list 1, common; NP - object group Natural Program; L - loadable; :2M - list 2, common; NP - object group Natural Program; L - loadable.

The third line displays the database ID, the file number and the library for both lists.

```

15:49:44          ***** PAC COMPARE Utility *****          2000-02-29
Li  LM              NP  L      :2M              NP  L
   00164 00011 KSYSPAA          :00164 00010 SYSPAA
! ADJUST  P 2000-11-22 07:46    00001 ADJUST  P 1999-05-28 22:15    00001
! ADMIN   P 2000-01-04 11:15    00002 ADMIN   P 1999-12-10 11:28    00001
! CNVPAA22 P 2000-01-04 11:15    00002 CNVPAA22 P 1999-07-03 23:27    00001
! CNVPFTA P 2000-01-04 11:15    00002 CNVPFTA P 1999-12-08 11:17    00001
! CNVPLCR P 2000-11-22 07:46    00001 CNVPLCR P 1999-11-23 13:18    00001
! CNVPXREF P 2000-11-22 07:46    00001 CNVPXREF P 1999-05-28 22:15    00001
! CONVERT P 2000-01-04 11:15    00002 CONVERT P 2000-01-19 11:48    00004
<          CONVRT13 P 1999-06-21 13:24    00001
<          CONVRT21 P 1999-06-21 13:24    00001
> INTPAA  P 2000-11-22 07:46    00001
! MENU    P 2000-11-22 07:46    00001 MENU    P 1999-12-10 11:28    00001
<          PAADC001 P 1999-01-16 12:59    00000
<          PAADC012 P 1998-10-01 16:27    00000
<          PAADC015 P 1998-09-30 18:44    00000
> PAAPIBEG P 2000-12-01 15:38    00001
! PA2PAACR P 2000-02-08 09:55    00003 PA2PAACR P 2000-04-02 01:31    00001
! PA2PAAPL P 2000-11-22 07:46    00001 PA2PAAPL P 1999-12-10 11:28    00001
! PA2PADJ  P 2000-11-22 07:46    00001 PA2PADJ  P 2000-04-02 00:48    00001
! PA2PAERR P 2000-01-18 09:02    00002 PA2PAERR P 2000-01-19 11:48    00002
Press ENTER to continue, enter '.' to stop:

```

The (!) indicates that the object in list 1 has a timestamp different from that of its counterpart in list 2.

The (<) indicates that the object is present in list 2 but not in list 1.

The (>) indicates that the object is present in list 1 but not in list 2.

The (=) indicates that the timestamp of the objects coincide.

Operate on Sequences

Enter function code S in the Compare Utility Main Menu to manipulate defined sequences.

An example of defined sequences is shown below:

```

15:51:59          ***** PREDICT APPLICATION CONTROL *****          2000-02-29
User DBA          - COMPARE Utility Sequence Headers -          Library SYSPAC

Object 1 Common 00164 00011      Library KSYSPAA
      ADJUST                                Type NP   L
Object 2 Common 00164 00010      Library SYSPAA
      ADJUST                                Type NP   L
Object 3 PAC     00164 00050      Compartment SYSPAA_214          00018
      CONVERT                              Type NP   S Version 00004
Object 4 PAC     00164 00050      Compartment SYSPAA_221          00028
      CONVERT                              Type NP   S Version 00002
Object 5 PAC     00164 00050      Compartment SYSPAA_214          00018
      ADJUST                                Type NP   S Version 00001
Object 6 PAC     00164 00050      Compartment SYSPAA_221          00028
      ADJUST                                Type NP   S Version 00001

Pad 164      135   Lists 123 5 7   Seqs 123456   Colls 1 3 5 7   Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
          Canc                                          Canc

```

The panel shows sequence headers with some identification data. The sequence number, the Kind value (Common, PAC or PAA), the Type value (Natural, error messages, DDMs or foreign), as well as the library or application name, object name, DBnr and Fnr is also part of the header. This allows you to identify the sequence you have previously defined at a glance.

In order to compare sequence 1 with sequence 3, enter 1 in the input field underneath the first sequence and 2 underneath the sequence 3. If you would prefer to compare list 3 with list 1, simply swap the numbers.

In the input field underneath each List line you can enter the following:

- 1 for the first sequence to be compared
- 2 for the second sequence to be compared
- D Display the sequence
- P Print the sequence
- W Write the sequence to Natural workfile 1
- E Display the directory information for the sequence
- Q Print directory information for the sequence
- X Write directory information to Natural workfile 1
- ? for Help

Operate on Collations

Enter function code C in the Compare Utility Main Menu to manipulate collations.

An example of created collations is shown below:

```

15:52:58          ***** PREDICT APPLICATION CONTROL *****          2000-02-29
User DBA          - COMPARE Utility Collation Headers -          Library SYSPAC

Li  1M           NP  L           :2M           NP  L
    00164 00011 KSYSPAA          :00164 00010 SYSPAA

Ob  3C CONVERT   NP  S 00004:4C CONVERT   NP  S 00002
    00164 00050 SYSPAA_214       :00164 00050 SYSPAA_221

Ob  5C ADJUST    NP  S 00001:6C ADJUST    NP  S 00001
    00164 00050 SYSPAA_214       :00164 00050 SYSPAA_221

Li  1M           NP  L           :2M           NP  L
    00164 00011 KSYSPAA          :00164 00010 SYSPAA

The headers of collations with both arguments extant are highlighted.
Pad 164      135  Lists 123 5 7  Seqs 123456  Colls 1 3 5 7  Reqs
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
          Canc                                          Canc

```

Collations are a result of the comparison of lists and sequences. When list 1 is compared with list 2 then the result of this is written to a collation, again using a number from 1 to 8.

These collation numbers can be seen in the Colls field at the bottom of the screen at all times. Once the collations have been created then it is possible to again manipulate the results of these stored collations.

The panel shows collation headers with some identification data. The source of the collation, the kind value (Common, PAC or PAA), the type value (Natural, error messages, DDMs or foreign), as well as the library or application name, Object name, DBnr and Fnr is also part of the header. This allows you to identify the collation you have previously created at a glance.

In the input field underneath each entry you can enter the following commands:

- D Display the sequence
- P Print the sequence
- W Write the sequence to Natural workfile 1
- E Display the directory information for the sequence
- Q Print directory information for the sequence
- X Write directory information to Natural workfile 1
- R Create a report from the collation information
- T Save the collation details to a Natural Text module
- B Print bulk collations from collation
- C Write bulk collations to Natural workfile 1
- ? for Help

Compare Adhoc

The Compare Adhoc function is very similar in its functionality to the Define List/Sequence function, except that with the adhoc function it is possible to define two lists or sequences from within the same panel. Enter function code A in the Compare Utility Main Menu.

The following screen illustrates the initial entry panel:

15:53:39	***** PREDICT APPLICATION CONTROL *****	2000-02-29
User DBA	- COMPARE Utility Entity Definition -	Library SYSPAC
Entity (L,S)... _	Object Group (N,E,D,F,M) _	
Number (1..8) _	Kind (coMmon,paC,paA,Event) _	
Number (1..8) _	Kind (coMmon,paC,paA,Event) _	
Pad 164	135 Lists 123 5 7 Seqs 123456 Colls 1 3 5 7 Reps	
Enter-PF1---	PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---	
	Retr OK Canc	

The parameters of Entity, Number, Object Group and Kind are the same as previously defined. Once the above parameters have been filled, as the screen below shows, then the PF5 key becomes useable, as a confirmation key. Once this key is used then the completed screen's values are accepted as input and the utility then does an automatic comparison of the two defined entities and asks for a collation number to write away the results.

The following screen shows this:

```

15:53:39          ***** PREDICT APPLICATION CONTROL *****          2000-02-29
User DBA          - COMPARE Utility Entity Definition -          Library SYSPAC

Entity (L,S)... L          Object Group (N,E,D,F,M) N
Definition of list 6      (PAC)
Database number __164   File number __50          Src/Loadable L
Application.... SYSPAA_214_____
Status..... _____
Event..... _____
Object..... _____ Object types _____
PAC version.... _____ Current on.. YYYY-MM-DD HH:II

Definition of list 4      (Common)
Database number 164___ File number 11___          Src/Loadable l
Library..... gsyspaa_          +-----+
Object..... _____ Ob ! Placing of Result!
Time-fm..... YYYY-MM-DD HH:II          Ti ! collation 2      !
User..... _____          +-----+

Pad 164      135      Lists 123 5 7 Seqs 123456 Colls 1 3 5 7 Reps
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Retr          OK          Canc
    
```

The results of the above comparison are then displayed in collation 2 immediately below:

```

16:02:55          ***** PAC COMPARE Utility *****          2000-02-29
Li 6C          N      L 0000:4M          N      L
   00164 00050 SYSPAA_214          :00164 00011 GSYSPAA
= ADJUST  P 1999-05-28 22:15      00001 ADJUST  P 1999-05-28 22:15      00001
= ADMIN   P 1999-12-10 11:28      00001 ADMIN   P 1999-12-10 11:28      00001
> APIAADP A 2000-01-29 10:21      00001
> APIAADPS A 1999-05-28 22:13      00001
> APIAAJOD A 1999-05-28 22:13      00001
> APIAAJOS A 1999-05-28 22:13      00001
> APIAALOD A 1999-05-28 22:13      00001
> APIAALOS A 1999-05-28 22:13      00001
> APIAAOBD A 1999-05-28 22:13      00001
> APIAAOBS A 1999-05-28 22:13      00001
> APIAPARM A 1999-05-28 22:13      00001
= APINADPD N 2000-01-29 10:21      00001 APINADPD N 2000-01-29 10:21      00001
= APINADPS N 1999-05-28 22:13      00001 APINADPS N 1999-05-28 22:13      00001
= APINAJOD N 1999-05-28 22:13      00001 APINAJOD N 1999-05-28 22:13      00001
= APINAJOS N 1999-05-28 22:13      00001 APINAJOS N 1999-05-28 22:13      00001
= APINALOD N 1999-05-28 22:14      00001 APINALOD N 1999-05-28 22:14      00001
= APINALOS N 1999-05-28 22:14      00001 APINALOS N 1999-05-28 22:14      00001
= APINAOBD N 1999-05-28 22:14      00001 APINAOBD N 1999-05-28 22:14      00001
= APINAOBS N 1999-05-28 22:14      00001 APINAOBS N 1999-05-28 22:14      00001
Press ENTER to continue, enter '.' to stop:
    
```

The use of the Compare Adhoc is a quick method of achieving the desired results, from one central function. All of the defined entities are still temporarily stored as with the previous functions, and can then be manipulated as before.

Extended Direct Command Mode

The Extended Compare utility may be executed using direct commands. To enter that mode, choose option (M) from the Extended Compare Utility main menu, at which point a blank screen is presented.

It may also be executed in batch at which point the direct command syntax is used. When using the COMPARE direct commands in batch the following Natural parameters must be used:

```
CF= OFF
ID= any character distinct from a ','
```

The former compare syntax is still valid with this version of the Compare Utility and the direct commands remain the same as documented later in this section. All former commands have to be preceded by the command 'COMPARE'

A combination of both the former and new syntax is possible in a single session, however the new syntax must follow the former syntax because as soon as the new syntax is used then it is no longer possible to revert back to the former syntax. This is only valid for a single session.

The direct command syntax complies with the functionality that we have dealt with in the above menu functions. Define sequences, Define lists, Display lists, Display Collation, Display Object, Display Report and so on.

This section covers the following topics:

Explanation of Some of the Terms Used in the Direct Syntax:

T1 or TYPE1	this always has to be specified and indicates what type of objects is being dealt with. Possible values: F Foreign N Natural E Error Messages D DDMs
T2 or TYPE2	this value has to be specified for T1=Foreign and is optional for all other types of T1. Possible values: any user-defined Foreign object type.
T3 or TYPE3	this value is optional depending on the value of T1. Possible values: L Loadable S Source

Extended Compare Command Syntax

The Compare utility offers 14 new direct commands and "." for end. The direct commands consist of a combination of two letters, the first letter representing the compare entity, the second letter the function, for example PD: Pad Definition. The parameters valid for each command are described with each command type below.

- P Pad
- L List
- S Sequence
- R Report
- D Define
- T Natural Text
- C Collate / Compare
- P Print

In the following description these signs are used:

<text> further details about the parameter are given later in the section

{text} one of the parameter options listed must be entered

[text] the element is optional

| or

italic the variable value must be entered

* you can use the item as often as you like or not at all

Define Commands

The Define commands are used to create a sequence of objects for later comparisons. Choose one of the following commands using the syntax as described.

PD,<file definition>

LD,<number of list>,<kind>,{T1 | TYPE1},<type1>{,<selection criterion>}*

SD,<number of sequence>,<kind>,{T1 | TYPE1},<type1>{,<selection criterion>}*

RD,<number of collation>{,<type of line of report>}*

Examples:

- Define a scratch pad file for use with the session on database 164, file 31.

```
pd,db,164,fnr,31
```

- Define list 1; create in it entries for all modules in (SYSPAC,164, 240) whose names begin with 'CF'.

```
ld,1,m,t1,n,t3,l,db,164,fnr,240,lib,syspac,obj,cf*
```

- Define list 2; create in it entries for all the latest sources of application SYSPAC_213 in ACF (164,50) whose names begin with 'MG'.

```
ld,2,c,t1,n,t3,s,db,164,fnr,50,appl,syspac_213,obj,mg*
```

- Define list 3; create in it entries for all the latest sources of application SYSPAC_214 in ACF (164,50) whose names begin with 'MG'.

```
ld,3,c,t1,n,t3,s,db,164,fnr,50,appl,syspac_214,obj,mg*
```

- Define sequence 1: Natural source named 'MGCNSVER' in application SYSPAC_213 in ACF (164,50), it shall be the highest numbered version if there are several.

```
sd,1,c,t1,n,t3,s,db,164,fnr,50,appl,syspac_213,obj,mgcnsver
```

- Define sequence 2: Natural source named 'MGCNSVER' in application SYSPAC_214 in ACF (164,50), it shall be the highest numbered version if there are several.

```
sd,2,c,t1,n,t3,s,db,164,fnr,50,appl,syspac_214,obj,mgcnsver
```

- Make a report of collation 2; omit matches, put into the report the non-matching lines of both the first and the second objects and the lines of either object that have no counterparts in the other object.

```
rd,2,!1,!2,>1,<2
```

Parameter	Valid Values
File definition	{, {<DBNR phrase> <FNR phrase>}}* For an explanation of the above elements, see next page. If the file definition is omitted, PCF is assumed.
Number of list	1 to 8
Number of sequence	1 to 8
Number of collation	1 to 8
Kind	M Common Objects known to Natural C PAC objects under the control of PAC A PAA objects under the control of PAA.
Type 1	N Natural objects E Error Messages D Data Definition Modules F Foreign Objects See table of selection criteria below.
Type of line of report	=1, =2, !1, !2, <1, <2, >1, >2
Selection criterion	{APPL APPLICATION}, <application name> AVNO, <Paa Version Number> {CURR CURRENT}, <time> CVNO, <PAC version number> <DBNR phrase> DSN, <PDS name> EBYTE, {<blank>, <LANGUAGE CODE>} EVENT, <PAC event name> <FNR phrase> JOB, <PAA job number> {LDB, LDBNR}, <database number of a PAA location> LFNR, <file number of a PAA location> <LIB phrase> {LT LTYPE VOL}, <volume name or BS2000/OSD LMS type> NODE, <node number> {OBJ OBJECT}, <range of object names> STATE, <state of a PAA object> STATUS, <PAC status name> TIMEFM, <time> TIMETO, <time> {T2 TYPE2}, {<Natural types> <foreign type>} {T3 TYPE3}, {L S} USER, <user ID> For an explanation some of these elements, see below.

Explanation of some of the above elements:

Phrase	Syntax / Values
<DBNR phrase>	{DB DBNR},<database number>
<FNR phrase>	FNR,<file number>
<state of PAA object>	B (backed out), C (current), H (historical), R (removed) or S (scheduled).
<Natural types>	{<Natural type>}*
<time>	must fit mask: YYYYMMDDHHII.

Comments:

- A DBNR or FNR phrase refers to an FPAA if <kind> is 'A', to an ACF if <kind> is 'C', to a Natural system file or an FDIC if <kind> is 'M'.
- Error messages should be specified with sequences of four digits.
- An EBYTE phrase is never a must. If none is present and error messages are being selected then they are short error messages.
- An EVENT phrase refers to an event that has brought objects into CONTROL if there is no STATUS phrase in the command or <PAC status name> is 'CONTROL'; otherwise it refers to an event that has taken objects to the deployment.
- A CURR phrase refers to a PAA object's currency in the location or to a PAC object's assumed currency in a deployment. A CURR phrase does not affect the selection of PAC objects if no status other than CONTROL is specified.

The following table shows which selection criteria are mandatory or optional when using the combination of the parameters <kind> and <type1>.

* optional

+ mandatory

B mandatory for BS2000/OSD, optional for all other operating systems.

	AD	AE	AF	AN	CD	CE	CF	CN	MD	ME	MN
APPL	*	*	*	*	+	+	+	+			
AVNO	*	*	*	*							
CURR	*	*	*	*	*	*	*	*			
CUNO					*	*	*	*			
DBNR	+	+	+	+	+	+	+	+	+	+	+
DSN			+								
EBYTE		*				*				*	
EVENT					*	*	*	*			
FNR	+	+	+	+	+	+	+	+	+	+	+
JOB	*	*	*	*							
LDBNR	+	+		+							
LFNR	+	+		+							
LIB		+		+						+	+
LT			B								
NODE			+								
OBJ	*	*	*	*	*	*	*	*	*	*	*
STATE	*	*	*	*							
STATUS	*	*	*	*	*	*	*	*			
TIMEFM										*	*
TIMETO										*	*
TYPE2			+	*			+	*			*
TYPE3			+	+			+	+			+
USER											*

Collate / Compare Commands

The Collate / Compare commands are used to perform the actual comparison of the previously defined sequences. The result of the comparison is written into a collation. Choose one of the following commands using the syntax as described.

```
LC,<number of list>,<number of list>,<number of collation>
SC,<number of sequence>,<number of sequence>,<number of collation>
{,<comparison directive>}*

```

Examples:

- Collate lists 2 and 3; put the result in collation 1.
`lc,2,3,1`
- Compare sequences 1 and 2; put the result in collation 2.

`sc,1,2,2`

Note:

A PAA object can be compared only if the object is backed up, current or scheduled.

Parameter	Valid Values
Number of list	1 to 8
Number of sequence	1 to 8
Number of collation	1 to 8
Comparison directive	DIR DIRECTORY DISREGC DISREGCL DIR(ECTORY): work on directory lines too DISREGC: disregard tail comments DISREGCL: disregard comment lines.

Print Commands

The Print commands are used to manipulate the results obtained from a previously performed comparison. Choose one of the following commands using the syntax as described.

```
LP,<number of list>{,<print destination>}*
SP,<number of sequence>{,<print destination>}*
DP,<number of sequence>{,<print destination>}*
CP,<number of collation>{,{<print destination> | DISCR}}*
BP,<number of collation>{,{<print destination> | DISCR | <comparison directive>}}*
RP,<number of collation>{,<print destination>}*
```

Comments:

- RP will work only for a collation for which a report has been defined.
A PAA object or its directory can be printed only if the object is backed up, current or scheduled.
- DISCR in a CP command: the "matches" need not be printed;
DISCR in a BP command: the "matching" couples of objects need not be compared (BP will anyway print only the "discrepancies" of each comparison of sequences it does.).

Examples:

- Display list 1.
`lp,1,disp`
- Display list 2.
`lp,2,disp`
- Display list 3.
`lp,3,disp`
- Display collation 1.
`cp,1,disp`
- Display sequence 1.

`sp,1,disp`

- Display sequence 2.

`sp,2,disp`

- Display collation 2.

`cp,2,disp`

- Display collation 2 showing only discrepancies.

`cp,2,disp,discr`

- Display report 2.

`rp,2,disp`

- Display the directory information of sequence 1.

`dp,1,disp`

- Display sequence 3.

`sp,3,disp`

Parameter	Valid Values
Number of list	1 to 8
Number of sequence	1 to 8
Number of collation	1 to 8
Comparison directive	DIR DIRECTORY DISREGC DISREGCL
Print destination	DISP DISPLAY PRINT WORK WORKFILE

Natural Text Commands

The Text commands are used to write the results of a comparison to a Natural text object in the Natural library you specified. Choose one of the following commands using the syntax as described.

`LT,<number of list><NATURAL destination>`
`RT,<number of collation><NATURAL destination>`

Examples:

- Write list 1 (see the very beginning of this scenario) to a Natural text named 'LIST1' in (ES-X-0, 164, 31).

`lt,1,db,164,fnr,31,lib,es-x-0,obj,list1`

- Write report 2 to a Natural text named 'LIST2' in (ES-X-0, 164, 31).

`rt,2,db,164,fnr,31,lib,es-x-0,obj,list2`

Note:

RT will work only for a collation for which a report has been defined.

Parameter	Valid Values
Number of list	1 to 8
Number of sequence	1 to 8
Number of collation	1 to 8
NATURAL destination	{, {<DBNR phrase> <FNR phrase> <LIB phrase> {OBJ OBJECT}, <object name> } }*

Explanation of some of the above elements:

Phrase	Syntax / Values
<DBNR phrase>	{DB DBNR}, <database number>
<FNR phrase>	FNR, <file number>
<LIB phrase>	{LIB LIBRARY}, <library name>

Scan Utilities

Two scan utilities are available to the PAC user:

- Scan Migration Paths
the scan utility for migration path verification and default update;
- Scan Natural Object Versions
the scan utility for Natural object versions.

This chapter covers the following topics:

- Scan Migration Paths Utility - SCANPATH
 - Scan Natural Object Version Utility - SCANOBJ
-

Scan Migration Paths Utility - SCANPATH

This section covers the following topics:

- Accessing the SCANPATH Utility
- Modifying Migration Path Defaults
- Scanning/Replacing Migration Path Defaults

The SCANPATH utility may be used to modify (update) the migration path defaults of several migration paths at a time. PAC administration functions also include a subset of the SCANPATH utility.

For example, the jobs used to process migration events can be updated for all migration paths that use a particular job.

The following options are available for modifying (updating) migration paths that satisfy your selection criteria:

- Modifying the default values for the migration paths that meet the specified selection criteria.
- Scan for migration paths that use a particular job and (optionally) replace that job, as well as other migration path defaults as follows:
 - Execution mode (batch/online)
 - Work file usage
 - Copy/move/include objects

Accessing the SCANPATH Utility

To access the SCANPATH utility, logon to library SYSPAC, then enter the command SCANPATH at the NEXT prompt and press ENTER.

The Scan Migration Paths screen is displayed as shown in the following example:

```

15:20:59          ***** PREDICT APPLICATION CONTROL *****          2000-04-16
User SAGXX              - Scan Migration Paths -

Function ..... _ (M-Modify, S-Scan/Replace, .- Exit)
Confirmation Required .. Y

Path Selection Criteria
  Application ..... * _____
  From Status ..... * _____ Type .. *
  To Status ..... * _____ Type .. *

Scan
  Job ..... _____

Replace
  Job ..... _____
  Batch/Online ..... _
  Workfile Usage ..... _
  Copy/Move/Include .... _

Command ===>

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

The following table describes the attributes of the Scan Migration Paths screen that can be modified to satisfy your selection criteria:

Attribute	Description
Function	Enter one of the following values: "M" To modify the selected migration path defaults on the Modify Migration Path Defaults screen; or press PF4 (Mod). "S" To access the Scan/Replace Migration Path screen in order to scan for a job used by all specified migration paths and replace it with another job; or press PF5 (Scan). The job can only be replaced if there is a replace value; otherwise, the user has the option to modify. "(.)" To exit the function.
Confirmation Required	When S (Scan/Replace) is used in the Function field, the following values are valid: "Y (Default)" Results in the user being prompted on the Scan/Replace Migration Path screen for the confirmation of each change before the change is made so that the user may update (by entering U), or ignore (by entering I) unwanted changes. "N" To automatically update all migration paths that meet the selection criteria and display the resulting changes on a report screen.
Path Selection Criteria:	
Application	The name of the application for which the migration paths are defined. A range may be specified.
From Status	The origin status of the migration path(s). A range may be specified.
To Status	The destination status of the migration path(s). A range may be specified.

Attribute	Description
Type	The the status type. Valid values are as follows: "A" Archive "C" Control "D" Development "I" Incorporation "M" Maintenance "P" Production "R" Retire "T" Test
Scan:	
Job	The name of the current job used by the selected migration path(s). The name must be the complete name and not a string (as for an absolute scan). If left blank, all jobs are displayed.
Replace:	(Optional) Replace the following:
Job	The name of the job to replace the existing job for the selected migration path(s). If left blank, the existing job name is retained. Note: The name of the job used to replace must exist; a check is performed to verify. A list is displayed on the Select Job window if you enter an asterisk (*) in this field.
Batch/Online	This field is an attribute of the migration path. "B" The event is to be run in batch; "O" The event is to be run online. These values will override the existing values. If no replace value is specified, the existing value is retained.
Workfile Usage	"Y" A work file is to be used; "N" A work file is not to be used. These values will override the existing values. If no replace value is specified, the existing value is retained.
Copy/Move/Include	This field is an attribute of the migration path. C Objects are to be copied and still exist in the origin status; M Objects are to be moved and not to exist in the origin status; I Objects are to be included from a work file (from development or incorporation status types only). These values will override the existing values. If no replace value is specified the existing value is retained.

Modifying Migration Path Defaults

This section describes the steps for modifying migration path defaults.

Step 1. Access and Modify the Modify Migration Path Defaults Screen

1. On the Scan Migration Paths screen, enter M in the Function field and your selection criteria, and press ENTER; or press PF4 (Mod).

The Modify Migration Path Defaults screen is displayed as shown in the following example:

```

15:21:23          ***** PREDICT APPLICATION CONTROL *****          2000-04-16
User SAGXX          - Modify Migration Path Defaults -
MODIFY Path Application ORD-EXAM FM Status * Type * TO Status * Type *
Origin Status      Dest Status      Job
-----
ARCHIVE            CONTROL          _____      B   Y   C
ARCHIVE            RETIRE           _____      B   N   C
CONTROL            PRODUCTION      _____      O   N   C
CONTROL            TEST             _____      B   Y   C
CONTROL            MAINTENANCE     _____      B   Y   C
CONTROL            ARCHIVE          _____      B   Y   C
CONTROL            DEVELOPMENT     NATURAL_MIGRATE_____      B   Y   C
CONTROL            CONTROL          _____      B   N   C
CONTROL            RETIRE           _____      B   N   C
DEVELOPMENT        TEST             ARCHIVE-PURGE-JCL_____      B   N   C
DEVELOPMENT        USER_TEST       PREDICT_MIGRATE_IN_____      B   N   C
DEVELOPMENT        SYSTEMS_TEST    NATURAL_MIGRATE_____      O   N   C
INCORPORATION      TEST             _____      O   N   C
INCORPORATION      CONTROL          _____      O   N   C

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit      Updat  --      +      <      >      Canc
    
```

This screen displays the direct command or request being processed under the User field, followed by the name of the application.

The Origin Status and Dest Status columns list all of the defined migration paths for the application. The status names are highlighted if they have been truncated.

The attributes that you are allowed to modify on the Modify Migration Path Defaults screen are highlighted on terminals which have the highlighting facility.

The following information may be modified on this screen:

Column	Description
Job	The name of the current job.
Bat/Onl	Whether the event is run in batch (B) or online (O). If O (online) is specified, the value in the WKF Use field must be N.
WKF Use	Whether a work file is used (Y) or not (N).
Copy/Move	Whether the Copy option (C), the Move option (M), or the Include (I) option is specified. If the destination status is a Retire status type, M (move) must be specified.

The cursor moves to each value that requires modification until all values on the screen have been correctly modified with a valid value based on the origin and destination status types.

2. Make the desired modifications.
3. Press ENTER to verify your modifications.

Note:

If you enter a new job name, a verification check is made to ensure the job exists; if not, an error is issued. If you enter an asterisk (*) in the Job name field, a selection list is displayed.

Step 2. Confirm the Modifications

Press PF5 (Upd) to confirm your modifications.

An information message is displayed indicated the total number of migration paths that have been updated.

To cancel your modifications and display the Scan Migration Paths screen, press PF3. To cancel your modifications and display the next screen (where available), press PF8.

Step 3. Display Additional Information

Display additional information about the selected migration paths on the Modify Migration Path Defaults screen as follows.

1. PF10 (<) displays the application name, the job name, and the type of migration path in the Path column. On this screen, the job names are modifiable.

```

15:21:42          ***** PREDICT APPLICATION CONTROL *****          2000-04-16
User SAGXX          - Modify Migration Path Defaults -
MODIFY Path Application ORD-EXAM FM Status * Type * TO Status * Type *

Application          Job          Path
-----
ORD-EXAM          _____ Archv->Cntrl
ORD-EXAM          _____ Archv->Retre
ORD-EXAM          _____ Cntrl->Prod
ORD-EXAM          _____ Cntrl->Test
ORD-EXAM          _____ Cntrl->Maint
ORD-EXAM          _____ Cntrl->Archv
ORD-EXAM          NATURAL_MIGRATE_____ Cntrl->Devlp
ORD-EXAM          _____ Cntrl->Cntrl
ORD-EXAM          _____ Cntrl->Retre
ORD-EXAM          ARCHIVE-PURGE-JCL_____ Devlp->Test
ORD-EXAM          PREDICT_MIGRATE_IN_____ Devlp->Test
ORD-EXAM          NATURAL_MIGRATE_____ Devlp->Test
ORD-EXAM          _____ Incrp->Test
ORD-EXAM          _____ Incrp->Cntrl

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help          Exit          Updat  --          +          <          >          Canc
    
```

2. PF11 (>) displays the origin status, the destination status, and the type of migration path in the Path column. These attributes are not modifiable.

```

15:21:53          ***** PREDICT APPLICATION CONTROL *****          2000-04-16
User SAGXX          - Modify Migration Path Defaults-
MODIFY Path Application ORD-EXAM FM Status * Type * TO Status * Type *

Origin Status          Destination Status          Path
-----
ARCHIVE                CONTROL                    Archv->Cntrl
ARCHIVE                CANCEL                    Archv->Retre
CONTROL                PRODUCTION                Cntrl->Prod
CONTROL                TEST                      Cntrl->Test
CONTROL                MAINTENANCE              Cntrl->Maint
CONTROL                ARCHIVE                  Cntrl->Archv
CONTROL                DEVELOPMENT              Cntrl->Devlp
CONTROL                CONTROL                  Cntrl->Cntrl
CONTROL                RETIRE                   Cntrl->Retre
DEVELOPMENT           TEST                     Devlp->Test
DEVELOPMENT           USER_TEST                Devlp->Test
DEVELOPMENT           SYSTEMS_TEST             Devlp->Test
INCORPORATION         TEST                     Incrp->Test
INCORPORATION         CONTROL                  Incrp->Cntrl

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit      Updat  --      +      <      >      Canc

```

Scanning/Replacing Migration Path Defaults

The procedure for scanning/replacing migration path defaults differs depending on whether you need to confirm updates before they are implemented.

Confirmation Required

When the Confirmation Required attribute on the Scan Migration Paths screen is set to Y (Default), the user is prompted for confirmation of each change before the change is made so that unwanted changes can be ignored. The following procedure is used if confirmation of changes is required:

Step 1. Access the Scan/Replace Migration Paths Screen

From the Scan Migration Paths screen, either press PF5 (Scan) or enter the following and press ENTER:

1. The relevant selection criteria;
2. S (Scan/Replace) in the Function field; and
3. Y in the Confirmation Required field.

The Scan/Replace Migration Path screen appears as shown in the following example:

```

15:22:15          ***** PREDICT APPLICATION CONTROL *****          2000-04-16
User SAGXX          - Scan/Replace Migration Path -

Application ..... ORD-EXAM
Origin Status ..... ARCHIVE          Type .. Archive
Destination Status ... CONTROL          Type .. Control

Update Path ..... U (U-Update, I-Ignore)

Current Values
Job .....
Batch/Online ..... B          Workfile Usage ... Y
Copy/Move/Include .. C

New Values
Job .....
Batch/Online ..... B          Workfile Usage ... Y
Copy/Move/Include .. C

PAC7000: (I) Enter 'U' to update Path, 'I' to Ignore.
Command ==>
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help          Exit          Updat          Canc
    
```

The Scan/Replace Migration Path screen displays the first migration path that satisfies the selection criteria. The following table describes the fields on this screen that indicate the current defaults for the specified migration path. These fields cannot be modified.

Attribute	Description
Non-modifiable:	
Application	The name of the application to which the migration path (origin/destination statuses) is defined.
Current Values	The current values for the following:
Job	The name of the existing job for the selected migration path(s).
Batch/Online	This field is an attribute of the migration path. "B" The event is to be run in batch; "O" The event is to be run online.
Workfile Usage	This field is an attribute of the migration path. "Y" A work file is to be used; "N" A work file is not to be used.
Copy/Move/ Include	This field is an attribute of the migration path. "C" Objects are to be copied and still exist in the origin status; "M" Objects are to be moved and not to exist in the origin status; "I" Objects are to be included from a work file (from development or incorporation statuses only.)
Destination Status	The destination status of the selected migration path.
Origin Status	The origin status of the selected migration path.
Type	The status type of the specified origin and destination statuses.

Step 2. Update the Migration Path Defaults

The remaining fields on the screen are input fields where you can enter values to update the migration path defaults, if required.

- Review the current default information:
 - If you want to update the current migration path defaults, enter U in the Update Path field.
 - If you do not want to update this migration path, enter I to ignore, then press ENTER to display the next migration path.
- If you entered U in the Update Path field, enter new values in the New Values fields as described in the following table:

Attribute	Description
New Values	New values that you can enter for the following:
Job	The name of the job to replace the existing job for the selected migration path(s). If left blank, the existing job name is retained.
Batch/Online	B The event is to be run in batch; O The event is to be run online. These values will override the existing values. If no replace value is specified, the existing value is retained. (This field is an attribute of the migration path.)
Workfile Usage	Y A work file is to be used; N A work file is not to be used. These values will override the existing values. If no replace value is specified, the existing value is retained. (This field is an attribute of the migration path.)
Copy/Move/Include	C Objects are to be copied and still exist in the origin status; M Objects are to be moved and not to exist in the origin status; I Objects are to be included from a work file. These values will override the existing values. If no replace value is specified, the existing value is retained. (This field is an attribute of the migration path.)

- Press ENTER or PF5 (Upd) to verify the modifications.

When the currently displayed migration path has been modified, the next migration path that meets the specified selection criteria is displayed. This process continues until all of the specified migration paths have been displayed/updated.

To cancel the process at any time before all of the migration paths have been reviewed and/or updated, press PF3 (Exit) or PF12 (Canc).

When all of the migration paths that meet the specified selection criteria have been reviewed and/or updated, the following message is displayed: "... Migration Path(s) has been modified." where "..." is the total number of migration paths.

Confirmation Not Required

Where the Confirmation Required attribute on the Scan Migration Paths screen is set to N, no confirmation is required and the changes are automatically made for the selected migration paths. The following procedure is used if confirmation of changes is not required:

- From the Scan Migration Paths screen, enter the following and press ENTER:
 - The relevant selection criteria;

- S (Scan/Replace) in the Function field; and
- N over the Y default in the Confirmation Required field.

The selected migration paths for the specified application(s) are updated and the following Scan/Replace Migration Paths screen is displayed:

```

15:21:53          ***** PREDICT APPLICATION CONTROL *****          2000-04-16
User SAGXX          - Scan/Replace Migration Paths

Application          Origin Status          Destination Status          Message
-----
ORD-EXAM             CONTROL                DEVELOPMENT                Updated
ORD-EXAM             DEVELOPMENT            USER_TEST                 Updated
ORD-EXAM             INCORPORATION          CONTROL                    Updated
ORD-EXAM             SYSTEMS_TEST           PRODUCTION                 Updated
ORD-EXAM             USER-TEST              SYSTEMS-TEST              Updated

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit      Upd  --      +      <      >      Canc
    
```

This screen displays the migration paths (Origin/Destination statuses) for the application(s) and the message "Updated" in the Message column for each migration path updated. The information on this screen cannot be modified.

2. Display additional non-modifiable information about the migration paths as follows:
 - PF10 (<) displays the application name, the job name, and the type of migration path in the Path column.
 - PF11 (>) displays the origin status, the destination status, and the type of migration path in the Path column.

Refer to Step 3. Display Additional Information for screen examples.

Scan Natural Object Version Utility - SCANOBJ

This section covers the following topics:

- User Exit for SCANOBJ
- SCANOBJ Processing Rules
- Invoking the SCANOBJ Utility
- Online SCANOBJ Utility

- SCANOBJ Utility in Batch
- Using SCANOBJ Results

The SCANOBJ utility allows you to scan for any string of characters in the source code of versioned objects in an application defined to PAC. The utility can be run in batch or online.

For any one scan request, the SCANOBJ utility scans objects in one particular application only. The application must be valid and defined to the current PAC.

The object(s) scanned may be any of the valid Natural object types; for example, program, subroutine, map, data area, help routine.

Each line in a specific versioned object (except for maps) that is found to satisfy the scan criteria is displayed as if it were in the normal editor for that object. These lines may be viewed, but not modified.

If the scan string is set to absolute, PAC looks for the existence of the string anywhere in the object source code. If the scan string is not set to absolute, only those instances of the requested string that are surrounded (delimited) by blanks are scanned.

The SCANOBJ utility allows you to scan an application for

- a single object;
- a range of objects beginning with the same name character string;
- all objects currently in a specific status;
- all objects with a specific type;
- all objects within a specific version range.

Scan by Status.

When scanning objects in a particular status, the status must be valid and linked to the application specified. PAC ignores any version range settings; object type criteria are respected.

Scan by Version Number.

When scanning a range of objects with a range of version numbers or a specific version number, the status must be set to CONTROL. CONTROL is the default. Object type criteria are respected.

If the current (most recent) versions are to be scanned, the From Version and To Version numbers must be set to 0 (zero) and the status set to CONTROL.

User Exit for SCANOBJ

The scan utility exit, User Exit PACEX035, is invoked with the SCANOBJ utility for every object to be scanned in PAC. PACEX035 allows the user to perform security checking for each request and then for each object at the time the SCANOBJ utility is invoked.

Refer to section User Exits for information about coding this user exit.

SCANOBJ Processing Rules

The following rules apply when using SCANOBJ:

- If the source for an object is not in PAC (for example, the object has been archived, or the object source was not incorporated into PAC), a message to that effect is displayed and the object is ignored.

- Lines containing PASSWORD=, PASSW=, CIPHER=, or CIPH=, are ignored as a security precaution.

Invoking the SCANOBJ Utility

When invoked, the SCANOBJ utility clears the object source area before scanning. Therefore, you must SAVE (STOW) any object source you may be modifying before you invoke any SCANOBJ function.

SCANOBJ may be invoked using keywords, or directly as a command in either batch or online mode. The SCANOBJ utility may be invoked in the following ways:

- Online, using the Scan Natural Object Version Utility screen;
- Online, using keywords;
- In batch, using keywords;
- In batch, using batch commands.

If the SCANOBJ and SCN* routines are in library SYSTEM, then the user need not log onto PAC; however, the PAC NTFILE 210 must be set.

Online SCANOBJ Utility

1. To access the SCANOBJ utility online, logon to library SYSPAC, then enter the command SCANOBJ at the NEXT prompt.

The SCAN Natural Object Version Utility screen is displayed as shown in the following example:

```

15:20:59          ***** PREDICT APPLICATION CONTROL *****          2000-04-01
User SAGXX        - SCAN NATURAL Object Version Utility -          Library SYSPAC

Function ..... S
Application ..... _____

Object
Name ..... _____
Type ..... _____
Status ..... CONTROL_____
Version ..... 1___ To .. 9999

Scan Parameters
String ..... _____
Absolute Scan .. N
Trace Option ... N

Command ==>
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Menu  Exit

```

2. Enter the selection criteria on this screen using the following table as a reference.

Attribute	Information to be Entered
Function	Enter one of the following values: "S" to scan the object(s) of an application. "?" to view the help facility of SCANOBJ. "." to exit the SCANOBJ utility.
Application	(Required) The PAC application to which the Natural object(s) belong.
Object Name	Enter a single object name or range notation for some or all object names as follows: * To scan all object names, leave the field blank or enter an asterisk. ...* To scan only object names beginning with particular characters, enter those characters followed by an asterisk. ...> ...< To scan only object names in one part of the alphabet, enter the beginning characters followed by a greater than (>) or less than (<) sign. The list of object names may be limited by entries for object type, status, and version.
Object Type	Enter one or more object type codes as follows: a combination of object types, or all object types. If a specific type is selected, it will limit the number of objects scanned. A combination of any of the following values is permitted: * To scan all object types, leave the field blank or enter an asterisk. n... To scan one or more object types, enter the code for each object type to be scanned in any order or combination (for example, GAL) where n is: "A" Parameter data area "C" Copy code "G" Global data area "H" Help routine "K" Server "L" Local data area "M" Map "N" Subprogram "P" Program "R" Report "S" Subroutine "T" Text "Z" Recording "3" Dialog "4" Class "5" Processor
Object Status	To limit the scan to objects which have been promoted to a particular PAC status, enter the status name. The default is CONTROL which contains all objects defined to PAC.
Object Version	To limit the object version levels that will be scanned, enter the From and, optionally, the To object version numbers. When specified, a To version number cannot be greater than a From version number unless To is 0 (zero). To scan only the most current versions, set both To and From to 0 (zero). The default (1-9999) scans all object versions.
Scan Parameters:	
String	(Required) The value or character string to be scanned for in each object.
Absolute Scan	If Y, PAC scans for the string anywhere in the object source. If N (the default), PAC scans for the string only when it is surrounded (delimited) by blanks.
Trace Option	To display a window listing the object type and version being processed, change the default N to Y. Do not turn on the trace option if the user's terminal does not support the SET CONTROL N facility.

Keywords can be used to invoke the SCANOBJ utility either online or in batch. A list of valid keywords is described in the following table:

Keywords	Description
FUNC	Function
TYPE	Object type
SVAL	String value
APPL	Application
STATUS	Status name
ABSOL	Absolute scan
OBJ	Object name
FMVER	From version number
TOVER	To version number

Example

The following example of SCANOBJ invoked using keywords indicates that all subroutines are to be scanned with names that begin with PGM, in application ORDERS, in the Production status, for the string FIND:

```
SCANOBJ FUNC=S,APPL=ORDERS,OBJ=PGM*,TYPE=S,STATUS=PRODUCTION,
SVAL=FIND
```

SCANOBJ Utility in Batch

The SCANOBJ utility can be invoked in batch. The parameters are positional and must be specified in the following order:

```
SCANOBJ s, application, object name, object type, status, From version, To version, scan string, absolute indicator
```

Example

The following example of SCANOBJ invoked using positional parameters indicates that all subroutines are to be scanned with names that begin with RTN, in application ORDERS, in the Production status, for the string FIND:

```
SCANOBJ S,ORDERS,RTN*,S,PRODUCTION,,,FIND,Y
```

Using SCANOBJ Results

When you press ENTER after entering your search criteria information (online or in batch, using screens or commands), the Natural object version information that satisfies your selection criteria is displayed.

Example 1

```

Applic .. ORD-EXAM                               Object ... APGMP2.0011 (Progrm)
String .. M                                       Command .. _____
.....1.....2.....3.....4.....5.....6.....7..
0010 DEFINE DATA LOCAL USING APGML2
0030 WRITE '93-05-31 10:49:06          - VERSION 0001' *program
0040 INCLUDE APGMC1
0050 INPUT USING MAP 'APGMM1'
0060 CALLNAT 'APGMN1' AAA BBB
0070 PERFORM APGM-RTN1
0080 FETCH RETURN 'APGMP5'
0090 WRITE '93-05-31 10:49:19          - VERSION 0001' *PROGRAM
0100 FETCH 'APGMP3'
    
```

The example screens display the following information:

- The name of the application to which the selected object belongs;
- The object name and type that meets the selection criteria;
- The specified scan string (in the above screen example, "M") in the String field;
- A Command line on which you may enter commands;
- The line numbers and the lines of source code of the object (in the above example, a Program) that contain the specified scan string.

Note:

Currently, the SCAN editor limits the line length of the object source to 72.

SCANOBJ Commands

The following commands may be issued on the command line of the screens that satisfy your selection criteria:

Command	Description
Blank + ENTER	Continue with the normal processing of the SCANOBJ utility for the next object that meets the specified selection criteria.
Q or PF3	Exit the current SCANOBJ processing for the specified selection criteria and return to the menu.
I	Ignore the object currently being scanned and continue with the next object. This is useful if more than one page of output is being displayed.

Example 2

The following screen example shows parameter data area APGMA1.0006 in the application ORD-EXAM containing the requested string "A" (String field):

```

Applic .. ORD-EXAM                               Object ... APGMA1.0006 (Param)
String .. A                                       Command .. _____
I T L Name                                       F Leng  Index/Init/EM/Name/Comment
- - - ----- ALL -----
  1 AAA                                         A   10 /* VERSION 0003 04.06.92
  1 BBB                                         A    9 INIT<'TESTL2-03'>
    
```

Example 3

The window in the following screen example appears when an object that meets the specified selection criteria is encountered, but it has no corresponding source code; that is, it exists in PAC only as a cataloged object. The SCANOBJ utility ignores such an object.

```

Applic .. ORD-EXAM                               Object ... APGMA1.0006 (Param)
String .. A                                       Command .. _____
I T L Name                                     F Leng  Index/Init/EM/Name/Comment
- - - ----- ALL -----
      1 AAA                                     A   10 /* VERSION 0006 ALIGN 002
      1 BBB                                     A    1

+-----+
| No Saved object exists for .. |
|   APGMA1  (PARAM) ver 0005   |
| ** Object has been ignored ** |
+-----+

```

User Exits

Each user has unique change management requirements that may vary from time to time, or with different situations or special circumstances.

PAC accommodates the user's needs by providing user exit facilities. Control can be passed to user-written Natural programs (user exit routines) to override the change management procedure defaults established by PAC.

The following sections describe PAC user exits in detail. Refer to the General Defaults Maintenance chapter in the PAC Administration documentation for information about displaying and modifying PAC user exits.

This chapter covers the following topics:

- User Exit Groups
- Overview of Exits
- PACEX001 - PAC Initialization
- PACEX002 - PAC Termination
- PACEX004 - PAC Entity Purge Validation
- PACEX005 - Locking Objects at Migration Time
- PACEX006 - Compilation Error Verification
- PACEX007 - Change Control List Verification
- PACEX008 - Application Status Library Validation
- PACEX009 - Duplicate Object Verification
- PACEX010 - Object List Verification
- PACEX011 - Job Validation
- PACEX012 - Job Submission Verification
- PACEX013 - Migration Event Validation
- PACEX014 - Status Validation
- PACEX015 - Application Validation
- PACEX016 - File Translation Table Validation
- PACEX017 - Application Status Link Validation
- PACEX018 - Object Version Reporting
- PACEX019 - Maintenance Request Validation
- PACEX020 - Maintenance Request Processing Validation
- PACEX021 - Maintenance Request Name Verification

- PACEX022 - Object Version Used-By-List Reporting
- PACEX023 - Object Verification for Autoexpand
- PACEX025 - Migration Event Names
- PACEX026 - Object List Selection for Archiving
- PACEX027 - User Substitution Parameter Verification
- PACEX028 - Audit Report Message Verification
- PACEX030 - Event Authorization Verification
- PACEX031 - Passing CATALL Parameters to PAC
- PACEX032 - Rejecting Objects for Object List
- PACEX034 - Direct Command User Exit
- PACEX035 - SCANOBJ Utility
- PACEX036 - Object Origin Deletion
- PACEX037 - Predict Generation
- PACEX040 - Remote Node and Dataset Security Check
- MIGEX003 - File Security Check

User Exit Groups

PAC groups its user exits as follows:

Group	Members	Description
General	1, 2, 40	PAC initialization, termination; node security check
Maintenance	4, 8, 13-17, 19 - 21, 25, 26, 30	Custom maintenance of PAC entities
Migration	5-7, 9-12, 23, 27, 28, 31, 32	Customized migration events
Reporting	18, 22	Customized access to versioned object information
Special Use	34, 36, 37	Customize object purges in origin status with Move option; customize view generation for Predict migration, direct commands
Scan Utility	35	Exits for the scan utility
Migration Utility	MIGEX003 (3)	Exits for the migration utilities, file security
Not assigned:	24, 29, 33, 38, 39, 41-48	

Overview of Exits

This section covers the following topics:

- General Group
- Maintenance Group
- Migration Group
- Reporting Group
- Special Use Group
- Scan Utility Group
- Migration Utility Group
- Common Data Area used by all Exits

General Group

Exit	Description
PACEX001	PAC initialization: invoked during the initialization of PAC; allows the user to pass a 50-byte parameter area throughout the session.
PACEX002	PAC termination: invoked during the termination of PAC; any required processing may be done in this routine.
PACEX040	Security check for non-Natural datasets and nodes. When using Entire System Server to access a remote node, this exit allows you to specify a different user ID and password and the password for protected PDSs.

Maintenance Group

Exit	Description
PACEX004	PAC entity purge validation: invoked before the deletion of a PAC entity; allows the user to interrogate the entity to be deleted before processing by PAC.
PACEX008	Application status library validation: invoked during the creation of application status links for a particular application; allows the user to validate the specific libraries assigned to each specific application status link.
PACEX013	Migration event name/access validation: invoked whenever any migration event maintenance function is invoked; can be used to implement audits and security.
PACEX014	Status name/access validation: invoked whenever any status maintenance function is invoked; can be used to implement audits and security.
PACEX015	Application name/access validation: invoked whenever any application maintenance function is invoked; can be used to implement audits and security.
PACEX016	File translation table name/access validation: invoked whenever any FTT maintenance function is invoked; can be used to implement audits and security.
PACEX017	Application status link access validation: called whenever any migration paths function is invoked; can be used to implement audits and security.
PACEX019	Maintenance request name/access validation: invoked during the processing of a maintenance request subfunction. Because information can be passed to or from the exit, maintenance request information can be verified or derived from an external problem-tracking system.
PACEX020	Maintenance request processing validation: invoked for maintenance request processing whenever any maintenance request function is invoked; allows the user to implement audits and security.
PACEX021	Maintenance request name verification: invoked to validate the maintenance request name attribute whenever a migration event is added or modified; may be used to implement audits and security.
PACEX025	Migration event names: invoked when function code A (Add) or C (Copy) is selected from the Migration Event Maintenance menu; allows the user to implement automated migration event name generation/ verification routines.
PACEX026	Verification of object list selection for Archiving: invoked during the onset of the generation of an object list for an Archive unload event; allows the user to set up and/or verify the criteria for selecting the objects to be archived.
PACEX030	Event authorization verification: invoked before and after authorization begins; may be used to implement any required audits or security.

Migration Group

Exit	Description
PACEX005	Locking objects: invoked before locking an object for out-migrations only as well as when the 'from-status' is CONTROL. Non-zero response value will reject the object from locking and taking no further part in the migration. Is invoked once for every object that is to be locked.
PACEX006	Compilation Error Verification: invoked after the compile processing step of the event is completed when any compilation errors are detected. Normally, PAC would force the event to abnormally terminate; however, this exit may be used to prevent the termination.
PACEX007	Change control list validation: invoked during the check-out of objects to a development/maintenance type status and check-in from a development/maintenance type status, although change control logs are created only for the maintenance status type. The user may accept or reject the request to process each object in the event object list.
PACEX009	Verification of duplicate objects for migration. When PAC determines that the object being checked in from development or maintenance has the same date-time stamp as the most recent version in CONTROL, the object is treated as a duplicate. Normally, PAC creates a new version of all objects except copy code and text. This exit allows you to override PAC's decision to create a new version.
PACEX010	Object list verification: invoked for each entry in the object list when PAC is validating the objects to be processed for a migration event. As each entry in the object list is passed to the exit, the PAC administrator has the option to disallow that entry.
PACEX011	Job validation: called when a job maintenance subfunction is invoked; allows the user to implement tracking and customized security.
PACEX012	Job submission verification: invoked during JCL submission; passes the first 10 lines of JCL so that the user can examine them and make any desired changes or substitutions prior to job submission.
PACEX023	Object verification for autoexpand. During the Expand option processing of a migration event, this user exit is called before a particular object is expanded. PAC passes the object and the Expand option to the exit to be verified. The user may change the Expand option for the particular object or suppress the expansion of the object.
PACEX027	Verification of user substitution parameters for jobs: called whenever a batch job with user substitution parameters is submitted from PAC. Because it may be called before and after the substitution parameters are specified, the exit may be used to specify the default parameters before the job is presented to the user or for verification after the user has modified the job.
PACEX028	Migration audit report message verification: invoked during migration event processing, usually when a message is being written to the audit report; may optionally be used to suppress the writing of an audit message to the audit report.
PACEX031	Pass CATAL parameters to PAC: invoked prior to the CATAL; used for compiling objects in PAC during migrations from development or maintenance.
PACEX032	Reject objects for object list: invoked for each object elected by PAC during object list selection from the object list editor; used to reject objects based on a moving nonzero value for the MSG-NO parameter (Natural Optimizer Compiler).

Reporting Group

Exit	Description
PACEX018	Object version reporting: invoked whenever any versioned objects reporting function is invoked; can be used to implement audits and security.
PACEX02	Object versions 'used by list' reporting. When the Expand option of a migration event is in effect during the processing of a migration event, PAC audits and passes for verification each subordinate object for the object being processed. This facilitates the expansion of objects defined across applications; that is, STEPLIB applications.

Special Use Group

Exit	Description
PACEX034	Verification of PAC direct commands: allows you to process a string of characters before it is submitted to PAC as a direct command.
PACEX036	Object origin deletion: When the Move option is in effect for a batch work file migration, this exit provides the ability to generate CMSYNIN cards to be used with a batch Natural utility (SYSMAIN, MIGUNLD) for purging objects in the origin status.
PACEX037	Predict generation: an interface exit that may be used to suppress the generation of views during Predict migrations. Additionally, in the case of files linked to multiple databases, allows you to override the database ID for which the generation must be performed. PAC uses information from the generation defaults to determine which default database to use. This is only valid for files linked to multiple databases.

Scan Utility Group

Exit	Description
PACEX035	The scan utility exit, User Exit PACEX035, is invoked with the SCANOBJ utility for every object to be scanned in PAC.

Migration Utility Group

Exit	Description
MIGEX003	Security check for Natural or Predict files: invoked whenever PAC needs to access a Natural or Predict file to retrieve or store Natural or Predict objects; allows the user to establish the password and cipher code to be used when PAC accesses these files.

Common Data Area used by all Exits

PAC user exits are delivered in library SYSPACUS and serve as an example only on how the user exit is to be coded.

All PAC user exits use a standard Parameter Data Area PACEPDA, and it is explained in the table below:

Parameter	Format	Data Area
ENTITY-TYPE	A1	Applic, Event, Status, Job
ENTITY-NAME	A32	Name of Entity.
ENTITY-IDENTIFIER	A32	Secondary ident for Entity.
ENTITY-FUNCTION	A2	Function requested
RESP	P5	Response code to PAC.
MSG	A78	Message corresponding to RESP.
USER-AREA	A50	User data for all exits.

PACEX001 - PAC Initialization

This user exit is invoked during the initialization of PAC, and allows the user to set up a 50-byte parameter area to be passed throughout the session.

Control must be restored to PAC at the termination of the exit.

Possible Use

- Pre-initialization logic;
- Additional security;
- Accounting, logging, or tracking statistics.

Parameter

Parameter	Format	Description
USER-AREA	A50	Modifiable; area for user to use

PACEX002 - PAC Termination

This user exit is invoked during the termination of PAC. Any required processing may be done in this routine. The user area, if set up in PACEX001, will be made available for use in PACEX002. Because the user area is passed to PACEX002 using a stack, an INPUT statement is required to access it.

The user will be at ET status on entry into the routine. Control may optionally be returned to PAC at termination of this exit.

Possible Use

- Additional security;
- Accounting, logging, or tracking statistics;
- "Post-PAC" processing.

Parameter

Parameter	Format	Description
USER-AREA	A50	Modifiable; area for user to use; passed via STACK Data.

PACEX004 - PAC Entity Purge Validation

This user exit is invoked before a PAC entity is purged, and allows the user to interrogate the entity to be purged before processing by PAC. The purge request may optionally be disallowed.

The user will be at ET status on entry into the routine. Control must be restored to PAC at the termination of the exit.

Possible Use

This exit can be used to interrogate the entity to be purged before processing by PAC.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the output is one of the following entity types: -A Application E Migration event F File translation table J Job L Application status link M Maintenance request S Status T Migration Path
ENTITY-NAME	A32	Not modifiable; the output is the entity name; for example, the name of the status, event, or application.
ENTITY-IDENTIFIER	A32	Not modifiable; the output is a secondary name to identify the entity; for example, the status name of an application status link.
ENTITY-FUNCTION	A2	Not modifiable; the output is the requested function: P Purge entity
RESP	P5	Input; return code. A non-zero return code disallows the purge function for the entity currently being processed.
MSG	A78	Input; user message to be displayed when disallowing the purge function for an entity.
USER-AREA	A50	Modifiable; area for user to use.

PACEX005 - Locking Objects at Migration Time

This user exit is invoked before the locking of an object, under the following two conditions:

- For out-migrations (migrations with the to-status either of type (D) or (M)).

- For migrations whose from-status is of type (C) Control.

A non-zero response value will stop the object being locked by PAC and thus excluding the said object from the migration. The user exit is invoked once for every object that is to be locked. If the response value is set to zero (0), PAC will process the object in the normal way.

Possible Use

When migrating objects out of PAC, the exit allows the user the opportunity to stop certain objects being migrated. If an event had already been created and authorized but the user wanted to stop a certain object from being migrated, without having to modify the event in any way, then this could be achieved with the use of this exit.

Parameters

Parameter	Format	Description
APPL	A32	Not modifiable; name of the application for the event FM-STAT A32 Not modifiable; origin status name.
TO-STAT	A32	Not modifiable; destination status name.
FM-STAT-TYPE	A1	Not modifiable; origin status type.
TO-STAT-TYPE	A1	Not modifiable; destination status type.
EVENT	A32	Not modifiable; name of the event being processed.
OBJ	A32	Not modifiable; object name.
OBJ-TYPE	A4	Not modifiable; object type
OBJ-VERS	N4	Not modifiable; object version.
RESP	P5	Modifiable; response code.

PACEX006 - Compilation Error Verification

This user exit is invoked after the compile processing step of the event is completed when any compilation errors are detected. Normally, PAC would force the event to abnormally terminate; however, this exit may be used to prevent the termination.

If the error number (ERROR-NUM) is set to a non-zero value, it will instruct PAC to terminate processing abnormally as usual. The batch condition code will be 48. The Backout or Recovery functions may be performed normally. If necessary, the next step in the job may invoke a batch job to back out the event. When processing is terminated due to compile errors, this information is written to the event audit report.

If the error number is set to zero (0), PAC will not terminate the event and processing will continue.

Any required processing may be done in the routine. The user will not be at ET status on entry into the routine.

Possible Use

When migrating objects into PAC from development or maintenance status types, the object list may be an arbitrary list of objects or it may be a "unit of work" comprising a specific set of objects. In the latter case, it may be important for the event to be terminated and subsequently backed out if any of the objects are not successfully compiled.

By issuing a TERMINATE nn statement in the exit, or by leaving the error number as a non-zero value, the user may terminate the compile step of the migration with a specific condition code so that the next step in the JCL/JCS will be executed only if that condition code was received from the compile step. This conditional step may then be a batch command to PAC to back out the event that just failed.

Parameters

Parameter	Format	Description
USER-AREA	A50	Modifiable; area for user to use
EVENT-NAME	A32	Not modifiable; name of the event being processed
APPLICATION	A32	Not modifiable; name of the application for the event
FROM-STATUS	A32	Not modifiable; origin status name
FROM-STATUS-CODE	A1	Not modifiable; origin status type
TO-STATUS	A32	Not modifiable; destination status name
TO-STATUS-CODE	A1	Not modifiable; destination status type
COMPILED-OBJECTS	P8	Not modifiable; total objects compiled
ERROR-OBJECTS	P8	Not modifiable; total objects not compiled
ERROR-MSG	A32	Modifiable; error message text
ERROR-NUM	P5	Modifiable; error message number

PACEX007 - Change Control List Verification

This user exit is invoked during the check-out of objects to and the check-in from a development or maintenance status type. The user has the option to process the information or to reject the request.

Note:

Since PAC currently does not support message switching facilities, it is recommended that you integrate your own message switching facilities. For example, use Connect from User Exit 7 (PACEX007) in the check-out/check-in process of PAC so that all users are correctly informed about check-out/check-in activities.

The parameter list provided with this exit allows you to customize the check-in and check-out processing to your exact requirements.

As each object is being processed for maintenance, the user is given the opportunity to verify the information. A non-zero response will instruct PAC not to accept the specific object for processing.

Control must be restored to PAC after processing in the exit is completed.

Because PACEX007 processing can be complex, it is recommended that you keep the logic in this exit simple by using subprograms to perform specific functions, depending on the FUNCTION or OPTION TYPE parameters.

A detailed explanation of the parameters for PACEX007 is included later in this section.

Possible Use

The exit may be used to verify the check-out of objects as follows:

- Validate the user and the object being checked out, and optionally disallow the check-out; that is, restrict access to the object.
- Disallow the check-out for a particular object.
- Obtain reports using information about an object being checked out.
- Get a list of other users who also may have previously checked out the same object (concurrent maintenance).
- Validate the user and the object being checked in and optionally disallow the check-in.
- Perform message switching logic to inform users of the checking in or checking out of an object.
- Ensure that all maintenance activities have an associated maintenance request.
- Attach comments or instructions to an object being checked in or out.
- Validate the library where the object is being checked in or out for a user.

Parameters

Parameter	Format	Description
FUNCTION	A1	Not modifiable; the function may be one of the following: I check-in O check-out
OPT-TYPE	A1	Not modifiable; the option type may be one of the following: blank self (first time call) C closed D duplicate I check-in of object N object not checked out O check-out of object
ACC-TYPE	A1	Not modifiable; the type of access may be one of the following: A access only C check-out request cancelled D development type event called U update
APPLICATION	A32	Not modifiable; name of the application for the object
EVENT	A32	Not modifiable; name of the migration event
MAIN-REQ-ID	A20	Not modifiable; maintenance request ID
FROM-STATUS	A32	Not modifiable; origin status
FROM-STATUS-TYPE	A1	Not modifiable; origin status type
TO-STATUS	A32	Not modifiable; destination status
TO-STATUS-TYPE	A1	Not modifiable; destination status type
OBJECT-ID	A32	Not modifiable; object currently being processed
CHECKOUT-VERNO	P5	Not modifiable; check-out version number
CHECKOUT-USER	A8	Not modifiable; identity of user who checked out the object

Parameter	Format	Description
CHECKOUT-DATE	T	Not modifiable; date and time the object was checked out
CHECKOUT-TID	A8	Not modifiable; identity of terminal from which the object was checked out
CHECKIN-VERNO	P5	Not modifiable; check-in version number for closed logs only
CHECKIN-USER	A8	Not modifiable; identity of user who checked in the object
CHECKIN-DATE	T	Not modifiable; date and time the object was checked in
CHECKIN-TID	A8	Not modifiable; identity of terminal from which the object was checked in
MNT-LIBRARY	A8	Not modifiable; destination library
MNT-DBID	N5	Not modifiable; destination DBnr
MNT-FNR	N5	Not modifiable; destination Fnr
COMMENT-01	A60	Modifiable; comment area
COMMENT-02	A60	Modifiable; comment area
COMMENT-03	A60	Modifiable; comment area
WORK-AREA	A100	Modifiable; area for user to use
AUD-MSG	A72	Modifiable; text of message to audit report
RESP	N4	Modifiable; response code

Explanation of Parameters

FUNCTION

When objects are migrated to a (destination) maintenance status type, change control logs containing check-out information are created for each object being migrated. For migrations with an (origin) maintenance status type, the change control log is updated with check-in information for each object checked in from maintenance. No change control logs are created for migrations to or from a development status type. The following options are valid:

- I Check-in function being performed on object.
- O Check-out function being performed on object.

OPT-TYPE

Option type specifies the following:

- blank Indicates the first time the exit is called for a particular object. At this point, the user may reject the object check-out/check-in based on the name of the object or the user invoking the request. For check-in, the user may wait to decide whether to reject the object until the exit is invoked again with a subsequent call (the exit is invoked with the I option or the N option if the object was not checked out before the check-in request).
- C Closed. Indicates that the object being checked in was previously checked out and then checked back in (which closed the check-out log).
- D Duplicate object. Indicates that the object being checked out was already checked out to this library with a previous migration event. This could occur when the wrong version was checked out or the version being checked out needs to be refreshed. This situation does not occur with check-ins. It is the user's responsibility to resolve inconsistencies that may occur when multiple versions of the same object are maintained at the same time. Depending on timing and circumstances, programmers may implement the same change in different ways and PAC has no way to determine this.
- I In. Indicates that the log information being passed to the exit is for the object currently being checked in. This occurs only on check-ins and gives all of the check-out information about this object. I differs from the (blank) option in that the check-out information is not made available to the user with the (blank) option.
- N Never checked out. Indicates that an object now being checked in was never checked out of PAC (for example, a completely new object with no versions in PAC, or a version of a PAC object that was created in development but is being migrated into PAC through maintenance).
- O Out. Always indicates that the object is checked out. This may be seen with check-ins or check-outs. Thus, with a check-out, the user is informed about other users who have checked out this same object (but perhaps a different version). For check-ins, the user is informed about the user who still has this same object (but perhaps a different version) checked out. This information is stored in the audit report of the migration event.

ACC-TYPE

Access type informs the user whether or not the object has been modified after a check-out.

- U Update. When the object is checked out, PAC always sets the access type to U (update) and is retained as a U if the object checked out was changed.
- A Access. If PAC notes at check-in that the object checked out was not modified, then the access type is set to A (access).
- C Cancelled. Occurs when an object was checked out for maintenance, but the request is being cancelled. This is only possible when the user is performing a migration from a maintenance (M) status type to a retire (R) status type.
- D Development. This special access type, which can be ignored, occurs when users are migrating objects out of PAC to a development (D) status type. It allows the user to control programming changes between development and maintenance. For example, it may be useful for development to know of changes to objects in a maintenance environment so that the same changes may be made to the objects in the development environment. Where development and maintenance are the same environment, the D option is irrelevant. Alternatively, development may be disallowed if the object is in maintenance.

APPLICATION

This parameter identifies the application to which the object belongs. In PAC, all activities on objects are always performed at the application level.

EVENT

This parameter is the migration event being used for the processing of objects. If event naming standards are defined, the event name may help to determine whether or not the checking in or checking out of an object is valid.

MAIN-REQ-ID

This parameter may be useful to relate a particular migration to a specific problem. All objects being checked in and out will be assigned to that particular maintenance request thus making tracking easier. For example, it may be useful to disallow check-in or check-out of an object unless there is an associated maintenance request.

Status Parameters

FROM-STATUS origin status of the migration; that is, where the objects are being migrated from.
 FROM-STATUS-TYPE origin status type.
 TO-STATUS destination status of the migration; that is, where the objects are being migrated to.
 TO-STATUS-TYPE destination status type.

OBJECT-ID

This parameter identifies the object currently being processed by PAC.

Check-Out Parameters

CHECKOUT-VERNO object version number of the object being checked out.
 CHECKOUT-USER user who is checking out the object.
 CHECKOUT-DATE date and time the object is being checked out.
 CHECKOUT-TID terminal where the object is being checked out.

Check-In Parameters

CHECKIN-VERNO object version number of the object being checked in.
 CHECKIN-USER user who is checking in the object.
 CHECKIN-DATE date and time the object is being checked in.
 CHECKIN-TID terminal where the object is being checked in.

Maintenance Parameters

MNT-LIBRARY maintenance library location to which the object was checked out, or the maintenance library location from which the object is being checked in. For example, if the migration is from production to maintenance, then PAC does not provide the location of production; that is, the origin status.
 MNT-DBID database number of the maintenance library.
 MNT-FNR file number of the maintenance library.

COMMENT

This parameter identifies the comments passed to the exit. Comments may be modified by the user, for example, to pass messages, reminders, or instructions to someone reviewing change control logs. This information may be set up during the check-out and then used as verification of the object during check-in.

WORK-AREA

The WORK-AREA parameter is a 100-byte area that the user may use during the processing of the exit. The work area may be set up when the exit is invoked for the first time (OPT-TYPE blank) and then used each time the exit is invoked for that particular object. PAC does not clear the area until the next object is processed.

AUD-MSG

If this parameter is set to a non-blank value, PAC will write the value as a message to the audit report.

RESP

This parameter tells PAC what to do with the object being processed.

- A zero response indicates that there are no problems and processing can continue.
- A non-zero response instructs PAC to reject the object.

If updates are performed on user-defined files during exit processing, the End Transaction (ET) is performed by PAC. If the user wants to write information to the job listing or to the screen, then this should be done in the exit itself.

PACEX008 - Application Status Library Validation

This user exit is invoked during the creation of application status links for a particular application. The exit allows the user to validate the specific libraries assigned to each specific application status link.

If the error number (ERROR-NUM) is set to a non-zero value, it will instruct PAC to not accept the specific library being validated. No END/BACKOUT TRANSACTION statements should be issued.

Any required processing may be done in this routine. The user will not be at ET status on entry into the routine.

Possible Use

Possible uses for this exit are as follows:

- Restrict the assignment of a library for use by a specific application;
- Assign automatic definitions for the value of a library and/or file and/or database for an application when it is linked to a status;
- Override the default settings of the library, database, and file number when an application is linked to a status.

Parameters

Parameter	Format	Description
FUNCTION	A1	Not modifiable; type of request: A add M modify
APPLICATION	A32	Not modifiable; name of application
STATUS	A32	Not modifiable; name of status
STATUS-TYPE	A1	Not modifiable; type of status
LIBRARY	A8	Modifiable; library for link
DBID	N5	Modifiable; database location of library
FNR	N5	Modifiable; file location of library
XREF-FLAG	A1	Modifiable; XREF usage indicator
ERROR-NUM	P5	Modifiable; response code
MSG	A78	Modifiable; text of message to be given to user
USER-AREA	A50	Modifiable; area for user to use

PACEX009 - Duplicate Object Verification

This user exit is invoked when PAC finds a duplicate object. The duplication is determined by comparing the date-time stamp of the development version with the most recent PAC version of the object.

Normally, PAC ignores duplicate versions of text and copy code object types only. The reason for this is that, while the saved objects may be identical, the cataloged objects may be different. The difference is caused by the external objects (data areas, copy code, views, and rules) used by the compiled object. Since the cataloged and saved objects must always be in sync, a new version must be created. PAC does not check the status of an object's external objects; therefore, it must create a new version of all objects except copy code and text.

The user may override PAC's decision by setting RESP-CODE as follows:

- If RESP-CODE is set to zero, PAC processes the duplicate object;
- If RESP-CODE is set to a non-zero value, PAC ignores the duplicate object.

The user is at the End Transaction (ET) status on entry to the routine. Control must be returned to PAC when the exit terminates.

The following is the table of corresponding values for object types used by PAC. The value passed by PAC is the short text.

Code	Short Text	Long Text
C	Copycd	Copycode
T	Text	Text
G	Global	Global
L	Local	Local
A	Param	Parameter
P	Progrm	Program
S	Subrtn	Subroutine
N	Subpgm	Subprogram
H	Help	Helproutine
M	Map	Map
Z	Record	Recording
Y	XpertM	Xpert Model

Possible Use

Possible uses for this exit are as follows:

- Override PAC to ignore or not ignore the creation of a new version of a particular object;
- Establish different rules of duplication for each application according to object naming conventions, or the type of origin status.

Parameters

Parameter	Format	Description
PAC-STATUS	A1	Not modifiable; origin status type: D development M maintenance
PAC-APPLICATION	A32	Not modifiable; application for the migration
OBJECT	A8	Not modifiable; object being processed
OBJ-TYPE	A15	Not modifiable; object type
OBJECT-DATE	T	Not modifiable; save date of the object
RESP-CODE	N4	Modifiable; response code

PACEX010 - Object List Verification

This user exit is invoked during object list processing whenever an entry is processed from the object list of the event. This user exit is valid for all migrations.

As each entry in the object list is passed to the exit, the user has the option to disallow that entry by moving a non-zero response code to the RESP-CODE field. An entry is allowed with a zero response code. Control must be restored to PAC at the termination of the exit.

Possible Use

PACEX010 is called during the actual reading of the object list before PAC processes each entry on the list; for example:

```
SUBRTN1 , S ,
HELP* , M , PRODUCTION
```

This allows the user to verify the following:

- Use of range notation;
- Use of references (version or status); these may be disallowed or restricted;
- Use of certain types of objects (perhaps for exclusion);
- Use of itemized objects to ensure that standards are satisfied with naming conventions; that is, that *, <, and > have not been specified for range notations;
- Use of other external subsystems;
- Secure the definition of which objects belong to which applications.

Parameters

Parameter	Format	Description
APPLICATION	A32	Not modifiable; application name
FM-STATUS	A32	Not modifiable; origin status name
TO-STATUS	A32	Not modifiable; destination status name
EVENT	A32	Not modifiable; migration event name
OBJECT	A32	Not modifiable; object name
OBJ-TYPE	A15	Not modifiable; object type text
STAT-VER	A37	Not modifiable; status/version reference
EXIT-AREA	A20	Not modifiable
REDEFINE EXIT-AREA		
LIBRARY	A8	Not modifiable; library of the From/To status (see note below)
DBID	N5	Not modifiable; DBnr of the From/To status
FNR	N5	Not modifiable; Fnr of the From/To status
RESERVED	A4	Not used
FROM-STAT	A1	Not modifiable; From status type
TO-STAT	A1	Not modifiable; To status type
RESP-CODE	N4	Modifiable; response code

Note:

LIBRARY will contain the value of the library for the application status link of either the origin or destination status. If the object is being migrated into PAC, then this will be the library of the development, maintenance, or incorporation status. If the object is being migrated out of PAC, then it will be the library of the destination status.

PACEX011 - Job Validation

This user exit is called when a job maintenance subfunction is invoked to perform updates or access jobs defined to PAC.

Possible Use

This exit can be used to implement tracing and customized audit security.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the type of entity: "J" job
ENTITY-NAME	A32	Not modifiable; name of the job being processed
ENTITY-IDENTIFIER	A32	Not modifiable; name of new job when ENTITY-FUNCTION is "C" or "R"
ENTITY-FUNCTION	A2	Not modifiable; requested function: "A" add job "C" copy job "D" display job "E" edit JCL "M" modify job "R" rename job "S" select job "U" submit a job
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the job currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the job currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX012 - Job Submission Verification

This user exit is invoked during JCL submission, and provides the first 10 lines of JCL so that the user may examine them and make any desired changes prior to job submission.

If job processing is to be terminated, then a non-zero response must be returned to PAC.

Possible Use

This exit can be used to enforce site-specified standards for performing various substitutions (for example, with jobs cards, account information).

Parameters

Parameter	Format	Description
USER-AREA	A50	Modifiable; area for user to use
EVENT-NAME	A32	Not modifiable; name of the event. This name is available when submitting JCL with the migration event Submit function
JCL	A72/1:10	Modifiable; I/O JCL cards to be examined and optionally modified
ERROR-MSG	A78	Modifiable; user message to be displayed when disallowing the Submit function for the job currently being processed
ERROR-NUM	P5	Modifiable; return code. A non-zero value disallows the Submit function for the job currently being processed

PACEX013 - Migration Event Validation

This user exit is invoked whenever any option on the Migration Event Maintenance subfunction is invoked.

Possible Use

This exit can be used to implement audits and security.

Parameters

Note:

The ENTITY-FUNCTION (R), refresh event, cannot be used as an input parameter but if this is set when the "refresh" command is used, then the exit will be invoked.

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; type of entity "E" migration event
ENTITY-NAME	A32	Modifiable; migration event name
ENTITY-IDENTIFIER	A32	Modifiable; new migration event name
ENTITY-FUNCTION	A2	Not modifiable; requested function: "A" add an event "C" copy an event "D" display an event "M" modify an event "R" refresh an event "S" select an event "U" submit an event
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the migration event currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the migration event currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX014 - Status Validation

This user exit is invoked when any option on the Status Maintenance subfunction is invoked.

Possible Use

This exit can be used to implement audits and security.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; type of entity "S" status
ENTITY-NAME	A32	Not modifiable; status name
ENTITY-IDENTIFIER	A32	Not used
ENTITY-FUNCTION	A2	Not modifiable; requested function: "A" add a status definition "D" display a status definition "L" link status to applications "M" modify status definition "S" select status
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the status currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the status currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX015 - Application Validation

This user exit is invoked when an Application Maintenance subfunction is invoked to perform updates or access applications defined to PAC.

Possible Use

This exit can be used to implement tracing and customized audits and security.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the type of entity: "A" application
ENTITY-NAME	A32	Not modifiable; the name of the application being processed
ENTITY-IDENTIFIER	A32	Not modifiable; new application name when ENTITY-FUNCTION is C
ENTITY-FUNCTION	A2	Not modifiable; the requested function: "A" add application "C" copy application "D" display application "L" link application to a status "M" modify application "S" select application
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the application currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the application currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX016 - File Translation Table Validation

This user exit is invoked whenever any option on the FTT Maintenance subfunction is invoked.

Possible Use

This allows the user to implement audits and security.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the type of entity: "F" file translation table
ENTITY-NAME	A32	Not modifiable; FTT name
ENTITY-IDENTIFIER	A32	Not modifiable; new FTT name when ENTITY-FUNCTION is C
ENTITY-FUNCTION	A2	Not modifiable; the requested function: "A" add FTT "C" copy FTT "D" display FTT "M" modify FTT "S" select FTT
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the FTT currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the FTT currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX017 - Application Status Link Validation

This user exit is invoked whenever any option on the Migration Paths subfunction is invoked.

Possible Use

This exit can be used to implement audits and security.

Parameters

Parameter	Format	Description
APPLICATION	A32	Not modifiable; the application name
FM-STATUS	A32	Not modifiable; origin status name
TO-STATUS	A32	Not modifiable; destination status name
FUNCTION	A2	Not modifiable; the requested function: "A" add migration path "D" display migration path "M" modify migration path "S" select migration path
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the migration path currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the migration path currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX018 - Object Version Reporting

This user exit is invoked whenever any option on the Versioned Objects Reporting subfunction is invoked.

Possible Use

This exit allows the user to implement audits and security. For example, access to certain objects belonging to certain applications may be restricted to specific users.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the type of entity: "V" object version
ENTITY-NAME	A32	Not modifiable; application name
ENTITY-IDENTIFIER	A32	Not modifiable; object name
ENTITY-FUNCTION	A2	Not modifiable; the requested function: "D" display versioned object "H" hardcopy versioned object "S" select versioned object "U" list versioned objects with no application status "V" display versioned object history data
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the object version currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the object version currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX019 - Maintenance Request Validation

This user exit is invoked whenever ENTER is pressed when using a Maintenance Request subfunction.

Possible Use

This exit can be used as follows:

- To move objects in and out of PAC;
- To automate modifications to the maintenance request;
- To retrieve information from an external problem-tracking system;
- To perform audits or any automated processing, especially with an external problem-tracking system.

Parameters

Parameter	Format	Description
REQUEST-ID	A32	Not modifiable; the maintenance request ID
REQUEST-ID-2	A32	Not modifiable; the new maintenance request ID when the FUNCTION is C (copy)
FUNCTION	A1	Not modifiable; the requested function: "A" add request ID "C" copy request ID "D" display request ID "L" list by request ID "M" modify request ID "S" select request ID
PROBLEM-SUBJECT	A60	Modifiable; subject of the problem
PROBLEM-TYPE	A8	Modifiable; type of the problem
PRIORITY	N3	Modifiable; priority
STATUS	A12	Modifiable; status defined to PAC using Table Maintenance in administrator functions
ACTION	A12	Modifiable; action defined to PAC using Table Maintenance in administrator functions
CONTACT-NAME	A32	Modifiable; name of the contact person who reported or is responsible for the maintenance request
CONTACT-TEL	A20	Modifiable; telephone number of the contact person
ERROR-NUM	P5	Input; return code. A non-zero code disallows the requested function for the maintenance request currently being processed.
MSG	A78	Input; user message to be displayed when disallowing the requested function for the maintenance request currently being processed
USER-AREA	A50	Modifiable; area for user to use as set up by the PAC initialization exit

PACEX020 - Maintenance Request Processing Validation

This user exit is invoked when a Maintenance Request subfunction is invoked.

Possible Use

This exit can be used to implement tracing, audits, and/or customized security.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the type of entity: "M" maintenance request
ENTITY-NAME	A32	Not modifiable; the name (ID) of the maintenance request being processed. The first 20 characters are valid.
ENTITY-IDENTIFIER	A32	Not modifiable; the new maintenance request name (ID) when ENTITY-FUNCTION is C. The first 20 characters are valid.
ENTITY-FUNCTION	A2	Not modifiable; the requested function: "A" add request ID "C" copy request ID "D" display request ID "L" list by request ID "M" modify request ID "S" select request ID
RESP	P5	Input; return code. A non-zero code disallows the requested function for the maintenance request currently being processed.
MSG	A78	Input; user message to be displayed when disallowing the requested function for the maintenance request currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX021 - Maintenance Request Name Verification

This user exit is invoked whenever any modification of the Maintenance Request name is performed during migration event maintenance.

Possible Use

This exit allows the user to implement audits and security. It can be used to ensure the specification of a maintenance request whenever a migration event is created.

Parameters

Parameter	Format	Description
MAINTENANCE-REQUEST	A32	Modifiable; name (ID) of the maintenance request
EVENT	A32	Input; name of the migration event
APPLICATION	A32	Input; name of the event's application
ORIGIN-STATUS	A32	Input; name or the event's origin (From) status
DESTINATION-STATUS	A32	Input; name of the event's destination (To) status
RESP	P5	Input; return code. A non-zero code disallows the requested function for the maintenance request currently being processed
MSG	A78	Input; user message to be displayed when disallowing the requested function for the maintenance request currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX022 - Object Version Used-By-List Reporting

This user exit is invoked whenever subordinates (maps, data areas, or copy code) in use by another object(s) are migrated from development or maintenance status types.

For objects compiled with the steplib option, this user exit identifies the application to which the object belongs so that when the subordinate changes, you can obtain a complete list across all applications of all objects that use that subordinate.

Possible Use

With Natural, objects using subordinates need not be recompiled until the objects affected by the subordinate change; this user exit can be used to warn the user that this change has taken place.

It can be used as well to write the list of affected objects to a work file for use in the generation of a subsequent migration event, thus automating the change to all objects using a particular subordinate. The work file dataset created by this exit can be used as input to the Generate function that creates another migration event, or it can be used to create the object list for an existing event.

Alternatively, the exit may be used to write the list of affected objects to a print file so that reports can be created that satisfy user requirements.

Parameters

Parameter	Format	Description
EVENT	A32	Input; name of the migration event
APPLICATION	A32	Input; name of the object's application
ORIGIN-STATUS	A32	Input; name of the event's origin status
DESTINATION-STATUS	A32	Input; name of the event's destination status
OBJECT	A32	Input; name of the object
TYPE	A4	Input; object type
VERSION	N4	Input; object version
USED-BY-OBJECT	A32	Input; name of the used-by object; that is, the object that uses the OBJECT as a subordinate object
USED-BY-TYPE	A4	Input; object type of the used-by object
USED-BY-VERSION	N4	Input; object version of the used-by object
USED-BY-APPLICATION	A32	Input; application of the used-by object
USER-AREA	A50	Modifiable; area for user to use

PACEX023 - Object Verification for Autoexpand

This user exit is called before a particular object is expanded. PAC passes the object name, type, version, and the Expand option to the exit.

Possible Use

The user may change the expand option for the particular object by modifying the Expand option value; or suppress the expansion of the object by returning a non-zero value in the return code field.

Parameters

Parameter	Format	Description
EVENT	A32	Input; name of the migration event
APPLICATION	A32	Input; name of the application
ORIGIN-STATUS	A32	Input; name of the origin status
DESTINATION-STATUS	A32	Input; name of the destination status
OBJECT	A32	Input; name of the object
TYPE	A4	Input; object type as specified in the object list
VERSION	N4	Input; object version
EXPAND-OPTION	A1	Modifiable; "C" subordinate objects (compile time) "E" subordinate and referenced objects "N" no expansion "R" referenced objects (run time) "U" used-by objects
RETURN-CODE	P5	Modifiable; "zero" expand object "non-zero" do not expand
USER-AREA	A50	Modifiable; area for user to use

PACEX025 - Migration Event Names

This user exit allows the user to implement the routines for generating and verifying event names. It is invoked when function code A (Add) or C (Copy) is selected from the Migration Event Maintenance menu before the event name (entered by the user) is verified by PAC.

Since this exit is called before validation of the migration event name, the user may optionally leave the Event or the New Event field blank.

Possible Use

This user exit allows the user to implement the routines for automatically generating and verifying event names. It may be used to perform audit or security functions on existing events or it may be used to restrict the creation of an event.

Parameters

Parameter	Format	Description
ENTITY-TYPE	A1	Not modifiable; the type of entity "E" migration event
ENTITY-NAME	A32	Modifiable; name of the migration event.
ENTITY-IDENTIFIER	A32	Modifiable; new name of the migration event when the ENTITY-FUNCTION is C
ENTITY-FUNCTION	A2	Not modifiable; requested function: "A" add an event "C" copy an event
RESP	P5	Modifiable; return code. A non-zero value disallows the requested function for the migration event currently being processed
MSG	A78	Modifiable; user message to be displayed when disallowing the requested function for the migration event currently being processed
USER-AREA	A50	Modifiable; area for user to use

PACEX026 - Object List Selection for Archiving

This user exit interface provides criteria for selecting objects to be archived. The selected objects are added to the object list of an existing migration event. Only the selection criteria for archiving objects for a particular application are identified. User routine UMENARCH verifies the actual objects selected.

The exit is invoked using the ARCEVENT or Generate Archive List functions.

Note:

If an event is used, it must be an existing event; it must have a migration path Control to Archive; it must be in a pending or validated state; and its object list will be deleted.

Possible Use

This exist may be used to set up or override the archive selection criteria parameter values.

Parameters

Parameter	Format	Description
FUNC	A1	Not modifiable; indicates when to select objects to be archived: "A" after the exit is invoked "B" before the exit is invoked
REDEFINE-OPTS	A8	Options for archive processing
1. DEF-TYPE	A1	Modifiable; when FUNC is B (before), PAC can use either: "A" the archive selection criteria defaults from the application "U" the parameter defaults passed by the user exit
2. SHOW-MAP	A1	Modifiable; show map for input (Y) or get parameters from exit (N): "Y" show an input map to use when overriding parameter values passed by the exit "N" do not show an input map
3. ARCEVENT	A1	Modifiable; A = invoked by Archive; R = invoked by Retire Event
TO-STATUS	A1	Modifiable; A = Archive; R = Retire
APPLICATION	A32	Name of application to be processed
EVENT	A32	Name of migration event to be used if the object list must be created
MIN-VERSION	P2	Number of valid versions to be exempted from archiving; number begins with most recent; default is 3; minimum of three objects must remain.
RETENT-DAYS	P3	Age of object, in days, before it can be selected for Archiving/Retiring; Zero (0) indicates no data checking
STATUS-CHECK	A1	Modifiable; used in conjunction with STATUS-LIST when an object in a status is selected: "Y" the default; ignore the selection of an object for archiving in a STATUS-LIST status "N" archive the selected object
STATUS-LIST	A6	Modifiable; if STATUS-CHECK is Y, this parameter contains the list of status types in which an object selected for archiving is ignored. The default list is as follows: "P" production (any object in a production status is ignored) "M" maintenance "T" test "A" Archive; that is, objects not yet purged
RESP-CODE	N4	Not used

PACEX027 - User Substitution Parameter Verification

This user exit is called whenever a batch job with user substitution parameters is submitted from PAC.

Possible Use

PAC jobs may contain substitution parameters. This exit may be called before and after the substitution parameters are specified; thus the exit may be used to specify the default substitution parameters. These parameters will then be displayed to the user according to normal job substitution functionality; the user may then change them. Once the user has made the substitutions, the parameters may once again be passed to the exit for validation.

The user may need to perform additional processing (such as additional database calls or input parameters) within this exit to derive the values for the substitution parameters.

Parameters

Parameter	Format	Description
FUNC	A1	Not modifiable; select objects to be archived before (B) or after (A) the exit is invoked
SUBS-CHAR	A1	Not modifiable; JCL substitution character
SUBS-PARM	A32/1:10	Not modifiable; names of substitution variables
SUBS-VALU	A32/1:10	Modifiable; values of substitution variables
SUB1	P3	Input; parameter in error
USER-AREA	A50	Modifiable; area for user to use
RESP	P5	Input; error code
MSG	A78	Input; error message

PACEX028 - Audit Report Message Verification

This user exit is invoked during migration event processing, usually when a message is being written to the audit report. This exit returns a non-zero response so that the user may optionally suppress the writing of an audit message to the audit report.

Any required processing may be performed in this routine; however, because the user may not be at ET status, control must always be returned to PAC to complete any internal processing.

Note:

The user should not write to the Natural work source area. That is, do not use the DEFINE PRINTER OUTPUT 'SOURCE' option.

Possible Use

In most cases, the messages written by the migration process invoke PACEX028 before they are written either to the audit report or to the printer. This allows the user to perform the following:

- Instruct PAC to suppress the writing of the message to the audit report;
- Print for the migration message, including headings;
- Write additional messages to the report listing (not the actual audit report);
- Change a message before it is written to the audit report;
- Check for errors (E), cautions (C), and warnings (W); and optionally write these to an exception report, for example, CMPRT01;
- Change the attributes of the message (for example, color, format).

Parameters

Parameter	Format	Description
EVENT-NAME	A32	Not modifiable; migration event name
APPLICATION	A32	Not modifiable; application name
FROM-STATUS	A32	Not modifiable; origin status name
FROM-STATUS-CODE	A1	Not modifiable; origin status type
FROM-LIBRARY	A8	Not modifiable; origin status library name
FROM-DBID	N5	Not modifiable; origin status library database number
FROM-FNR	N5	Not modifiable; origin status library file number
TO-STATUS	A32	Not modifiable; destination status name
TO-STATUS-CODE	A1	Not modifiable; destination status type
TO-LIBRARY	A8	Not modifiable; destination status library name
TO-DBID	N5	Not modifiable; destination status library database number
TO-FNR	N5	Not modifiable; destination status library file number
PRINT-IT	A1	Modifiable; N Suppress = Print
ERROR-MSG	A78	Not modifiable; error message text
ERROR-NUM	P5	Modifiable; error message number

How to Use PACEX028

When the exit is invoked, do the following to suppress the message:

1. Perform any special validation (for example, batch versus online processing, application, migration path).
2. Set the response code ERROR-NUM to a non-zero value.
3. Override the message, replace the contents of the ERROR-MSG field.

The format of all PAC error messages is as follows:

PACnnnn: (t) message-text

where:

nnnn	is the message number
(t)	is the message type:
	E (errors)
	C (caution)
	W (warning)
	A (audit)
	I (information)
message-text	is the actual message

Note:

Users should not write to the Natural work source area; that is, do not use the DEFINE PRINTER OUTPUT 'SOURCE' option.

The user may or may not be at ET status and no ET or BT should be issued from the exit; PAC does this.

Creating an Exception Report

An exception report for all errors can be created as follows:

```

FORMAT (2) LS=80 PS=0
IF ERROR-MSG = MASK (.....'(E)' /* Is this an error message?
OR ERROR-MSG = MASK (.....'(C)' /* Is this a caution message?
WRITE (2) ERROR-MSG /* Yes, write exception report to CMPRT02
END-IF
    
```

Color-Coded Reports

With color terminals, messages can be color-coded for reports of online migrations. For example:

Message Type	Color
Audit messages	Turquoise
Warnings	Highlighted turquoise
Cautions	Highlighted yellow
Errors	Highlighted red

Alternatively, dynamic variables can be used for color-coding the message. For example:

```

.
.
.
REDEFINE ERROR-MSG
MSG-PREFIX (A8)
MSG-DYN1 (A1)
MSG-TYPE (A3)
MSG-DYN2 (A1)
.
.
.
MOVE '|' TO MSG-DYN1
MOVE '→' TO MSG-DYN2
DECIDE ON FIRST VALUE OF MSG-TYPE
VALUE '(A)' PRINT ERR-MSG (CD=TU DY=|TU→)
VALUE '(W)' PRINT ERR-MSG (CD=TU DY=|TUI→)
VALUE '(C)' PRINT ERR-MSG (CD=TU DY=|YEII→)
VALUE '(E)' PRINT ERR-MSG (CD=TU DY=|REI→)
ANY MOVE 4 TO ERR-NUM /*suppress message in PAC
NONE PRINT ERR-MSG (CD=BL DY=|BLI→)
    
```

Note:

The PAC audit report stores only the first 72 bytes of any message.

PACEX030 - Event Authorization Verification

This user exit allows the user to implement additional controls for event authorization before it is actually authorized. The event is invoked before and after authorization begins. Any required processing may be performed in this routine. The user will be at End Transaction (ET) status on entry into the routine.

Possible Use

- Automatic override of parameters for certain authorizations;
- Additional audit of the security checking for authorizations;
- Set up of parameters not previously defined in the migration path.

Parameters

Parameter	Format	Description
FUNCTION	A1	Input; indicates when the exit is to be invoked: "A" after authorization begins "B" before authorization begins
EVENT	A32	Input; event name
APPLICATION	A32	Input; event's application name
FROM-STATUS	A32	Input; event's origin status name
TO-STATUS	A32	Input; event's destination status name
JOB	A32	Modifiable; job name for batch processing
EXPAND-OPT	A1	Modifiable; Expand option: "C" subordinate objects (compile time) "E" subordinate and referenced objects "N" no expansion "R" referenced objects (run time) "U" used-by objects
EXPAND-STATUS	A1	Modifiable; name of the status to be used as the reference of expanded objects
BATCH-ONLINE	A1	Modifiable; "B" run the migration event in batch "O" run the migration event online
COPY-MOVE	A1	Modifiable; "C" copy objects "I" include objects "M" move objects
WORKFILE-USAGE	A1	Modifiable; "Y" use work file "N" do not use work file
APPLYMODS	A50	Modifiable; applymod default settings (A/D/Y/N) are still enforced
SCHED-DATE	T	Modifiable; date/time the migration event is scheduled to run
TRANSLATION-TABLE	A32	Modifiable; name of the file translation table to be used for the migration event
MSG-NO	P5	Modifiable; error message number
MSG	A78	Modifiable; error message text
USER-AREA	A50	Modifiable; area for user to use

PACEX031 - Passing CATALL Parameters to PAC

This exit is invoked prior to CATALL during the migration of objects from development or maintenance. It allows you to pass CATALL parameters to PAC for use during the compile.

If "NOREN" is specified, the following CATALL will not renumber the lines of the sources which it compiles; it will renumber them if "NOREN" is not specified. If "NOSCROLL" is specified, the following CATALL will not scroll the list of compiled objects which it produces; it will scroll the list if "NOSCROLL" is not specified.

Parameter	Format	Description
APPLICATION	A32	Input; name of the application
FROM-STATUS	A32	Input; event's origin status name.
TO-STATUS	A32	Input; event's destination status name.
PARM	A50	Modifiable; "U" or "NOREN" or "NOSCROLL" or "NOREN,NOSROU"

PACEX032 - Rejecting Objects for Object List

This exist is invoked for each object selected by PAC during the selection of objects for the Object List from the Object List Editor. It is used to reject objects based on a moving non-zero value for the MSG-NO parameter (Natural Optimizer Compiler).

Parameter	Format	Description
EVENT	A32	Input; the name of the event.
APPL	A32	Input; the application of the event.
FM-STAT	A32	Input; the origin of the event.
TO-STAT	A32	Input; the destination of the event.
OBJ	A8	Input; the name of the object.
OBJ-TYPE	A4	Input; the type of the object.
OBJ-VERS	N4	Input; the object's version number if the object resides in CONTROL compartment, 0 otherwise.
DATASET	A54	Input; the name of the PDS from which the foreign object would be immigrated or deleted. Blank if the object is not foreign or the origin of the event is not of type incorporation, development, test, or maintenance or the event does not involve migration and is not of the type "retirement".
RESP	P5	Modifiable; if not equal to 0, the object is rejected.

PACEX034 - Direct Command User Exit

This exist is passed by the command line in chunks of alphanumeric 32 blocks. This exit is called before the validation of the command line. Any modifications to the commands will be validated.

Possible Use

PACEX0034 can be used to pass site-specific syntax to PAC, for example ADD EVENT my be entered as CREATE LIST.

Parameter	Format	Description
COMMAND	A32/36	Each command as entered.
MSG	A78	Message.
RESP	P5	Response code.

PACEX035 - SCANOBJ Utility

The scan utility exit, User Exit PACEX035, is invoked with the SCANOBJ utility for every object to be scanned in PAC.

Because SCANOBJ makes use of windows for online processing, caution should be used when issuing WRITE, PRINT, DISPLAY, or INPUT statements from within the user exit.

Possible Use

PACEX035 allows the user to perform security checking for each request and then for each object at the time the SCANOBJ utility is invoked.

Parameters

Parameter	Format	Description
FUNC	A1	Not modifiable; "I" the initial call for allowing a specific scan request "S" the scan call for a specific object being called
APPLIC	A32	Not modifiable; application name
OBJECT	A8	Not modifiable; Natural object name
STATUS	A32	Not modifiable; status name (set up by user). If empty, control will be used.
VERSION	N4	Not modifiable; object version number
OBJ-TYPE	A15	Not modifiable; object type
RESP	N4	Input. Response code. If set not equal to 0, the object will be skipped for FUNC "S", and the whole Scan request will be stopped for FUNC "I".

PACEX036 - Object Origin Deletion

This user exit is used in a migration to synchronize objects in the origin status with PAC by creating the input data to be used for the deletion of objects at the origin status.

During the processing of the event, the objects in the origin status may be on another CPU or database and inaccessible to PAC. To synchronize the objects in the origin status with PAC, a job may be run at the location of the origin status.

This routine creates the input data to be used for the deletion at the origin status. The input data may be used as input to either SYSMAIN or NATUNLD. This exit is only invoked when the FROM-STATUS of the event is of type (T), and the TO-STATUS us either of type P, M or D .

Parameters

Parameter	Format	Description
REQUEST	A1	Modifiable; F: first (initial) call; N: normal call; L: last call
OBJECT-LIB	A8	Modifiable; name of the library in which the object resides
OBJECT-NAME	A32	Modifiable; name of the object (only if N - i.e., "Normal")
OBJECT-TYPE	A4	Modifiable; object type code (only if N - i.e., "Normal")
OBJECT-VER	P5	Modifiable; version of the object (only if N - i.e., "Normal")
OBJECT-STATUS	A32	Modifiable; origin status of the object
USER-AREA	A50	Modifiable; area for user to use
PAC-ERR	P5	Not modifiable; error message number

Example

```
SYSMAIN DELETE,STOWED,object-name IN LIBRARY object-library
```

PACEX037 - Predict Generation

This interface exit restricts the generation of DDMs/views or rules during Predict migrations and optionally verifies the database ID for files linked to multiple databases.

When each DDM/view to be generated is passed to this exit, the user may set the RESP code to a non-zero value to suppress the generation, and/or place a message in the MSG parameter for PAC to write into the audit report.

Additionally, in the case of files linked to multiple databases, the user may override the database ID for which the generation must be performed. PAC uses information from the generation defaults to determine which default database to use. This is only valid for files linked to multiple databases.

- If the Specification DB-ID is set to N, the database ID is not used.
- If the Specification DB-ID is set to Y and the database ID is set to blank, the Predict generation results in an error.

The user will be at End of Transaction (ET) status on entry into the routine. Control should be returned to PAC at termination of the routine.

Parameters

Parameter	Format	Description
FUNC	A1	Not modifiable
OBJECT	A32	Not modifiable; name of a view or rule
DATABASE-ID	A32	Modifiable
OBJ-TYPE	A15	Not modifiable; name of the object type
MSG	A78	Modifiable; error message text
RESP	N4	Modifiable; return doe number. If set to not equal to 0, the DDM will not be generated.

PACEX040 - Remote Node and Dataset Security Check

PACEX040 is called whenever the current user does not have logon access to the requested Entire System Server node. It allows you to specify a different user ID and/or password and the password for protected PDSs.

Using PACEX040, you can

- change the value of a USERID field and
- specify the value of a PASSWORD field.

The authorization of the resulting pair to access the node is checked by PAC.

Parameter	Format	Description
FUNCTION	A1	Input; constant "N".
NODE	N3	Input; the number of the node being accessed.
DATA-SET-NAME	A54	Input; the name of the dataset being accessed.
USERID	A8	Input/modifiable; the current value of *INIT-USER. The ID to be used at the authorization check.
PASSWORD	A8	Modifiable; the password for node access

MIGEX003 - File Security Check

Function

This exit is invoked whenever PAC needs to access a Natural or Predict file to retrieve or store Natural or Predict objects. This allows the user to establish the password and cipher code to be used when PAC accesses these files.

Remarks

Although this exit is defined as User Exit PACEX003, it is not invoked with this name; instead, exit MIGEX003 is invoked. This is because PAC comprises three subsystems loaded into libraries SYSPAC, SYSPAA and SYSTEM; and, in order to minimize the amount of maintenance, all three subsystems use exit MIGEX003 to obtain the password and cipher information needed to access the Natural/Predict system file.

Normally, when using Natural, passwords and cipher codes may be specified through the NATPARMS (for example, FNAT, FUSER, FDIC, NTFILE, SYSCIP, SYSPSW); however, depending on the user's security definition, this may not be adequate. MIGEX003 allows the user to provide the relevant password or cipher definitions for any and every file accessed by PAC. PAC passes the DBnr and Fnr of the file to be accessed so that the exit may return the corresponding password and cipher.

When the database and/or file number to be accessed by PAC must be translated to another database and/or file number, the exit may be used to perform the translation.

Parameters

Parameter	Format	Description
DBID	N5	Modifiable; database ID number
FNR	N5	Modifiable; file ID number
PSWD	A8	Modifiable; password
CIPH	A8	Modifiable; cipher

System Applymods

This chapter describes the applymods currently used by PAC. Refer to the section Applymod Defaults chapter PAC Administrator Functions in the PAC Administration documentation for more information.

This chapter covers the following topics:

- Applymod Groups
- Applymod Functions

Applymod Groups

PAC groups its system applymods as follows:

Group	Members	Description
Authorizations	1	Disallows override of authorization parameters.
Migrations	2, 4-6, 8-14, 18-19, 23, 24, 29, 30, 31	Customize migrations.
Migration events	16, 20	Customize migration events.
Not assigned	3, 7, 15, 17, 21, 22, 25-28	Currently not assigned.

Applymod Functions

Authorizations Group

Num.	Function
1	Disallow override of parameters during authorization. During authorization, the authorizer can override certain parameters (for example, job). This applymod deactivates that facility.

Migrations Group

Num.	Function
2	Do not optimize the size of the cataloged object. During the unload of a cataloged object, certain information about an object may be omitted without affecting the integrity of the object. The benefits of using the applymod are less resource usage and improved performance (during migration only). Do not use this option if the cataloged object is being downloaded to a PC for use with .DBF files or with dBase III (that is, an extension of .DBF) because the field names will then not be available to Entire Connection.
3	Not assigned.

Num.	Function
4	<p>Suppress audit report.</p> <p>This applymod may be used to suppress the creation of the audit report, thus conserving space on the ACF system file. This may be desirable for large events where the retention of the audit report is not necessary. Currently, it is not possible to purge only the audit report of an event. During migration processing, the audit report is usually written into the ESIZE before being stored on the PAC ACF system file. Because the object list is also processed in the ESIZE, a conflict in resource usage can be caused. To avoid this conflict, this applymod can be set on so that the audit report will not be written to the ESIZE. The advantage is that larger object lists may be used without incurring a NAT0886 error. The disadvantage is that the audit report will not be stored on the ACF system file.</p>
5	<p>Suppress global data area (GDA) Auto Expand during migration.</p> <p>During migration processing, if PAC finds a GDA, it will automatically include (migrate) all objects that use that GDA to ensure that all objects that use it are compiled with the version being migrated. This is because a NAT0933 error may otherwise occur during execution time in the destination environment. If the user does not want PAC to perform the automatic expand, then the applymod should be specified during the actual migration.</p>
6	<p>Migrate only objects previously migrated.</p> <p>During migration processing, migrate only those objects that already exist (with the same or different version number) in the assigned destination status. If an object does not already exist in the destination status, it is ignored in the migration.</p>
7	<p>Not assigned.</p>
8	<p>Force unloading of all views or local/parameter data areas during migration.</p> <p>During migration processing, PAC unloads only VSAM views, because only VSAM views are required at execution time. All other views are used at compile time. If you want all views or local/parameter data areas to be unloaded, activate Applymod 8 for the migration. If Applymod 8 is activated, Applymod 2 will automatically be activated for the migration. If the destination status supports dynamic source programs, then Applymod 8 should be activated.</p>
9	<p>Expand maps for multiple languages.</p> <p>Without this applymod, the "&" notation used by an object is normally replaced with the current value of *LANGUAGE. When this applymod is switched on, the expand will result in all valid objects that exist for languages 1-9 being included in the migration. This means that PAC systematically replaces the "&" with the values 1-9 and includes each valid occurrence for migration processing.</p>
10	<p>Migrate objects to a status only if they have changed.</p> <p>During the unload of migration processing, all objects in the object list are unloaded by default; this ensures that the objects are loaded as a unit. It is possible that the environment does not need to be refreshed. When this applymod switched on, only new versions of objects will be migrated; unchanged versions of the objects will be ignored.</p>
11	<p>Check runtime subordinates.</p> <p>Check whether all runtime subordinates used by each PAC object in the Object List in a migration from development or maintenance are currently under PAC control. If any subordinate is not found and this applymod is set, PAC issues the PAC7028 message and the migration event is aborted.</p>
12	<p>Check object compile date-time stamp.</p> <p>Retain those objects with the most recent compile date-time stamp during migrations from test or production statuses. PAC always migrates the specified version of the object to the specified status. If this applymod is on, PAC checks the compile date-time stamps of the version being migrated and the version being replaced. If the object being replaced has a more recent compile date-time, it is not replaced.</p>

Num.	Function
13	<p>Activate a recursive expand of objects when expanding.</p> <p>By default, PAC expands only one level of objects in the object list; it does not subsequently expand the objects that are added to the object list by the first expansion. If Applymod 13 is turned on, PAC expands the object list recursively; when objects are added to the list by the first expansion, the new objects are then expanded, and so on.</p>
14	<p>Reject objects with compilation errors.</p> <p>During the migration from a development or maintenance status type into PAC, new versions of objects are created regardless of the compile results of the object. When this applymod is active, no new version will be created for the object if it does not compile successfully. If the Move option is in effect for the migration event, then this applymod is ignored.</p>
15	Not assigned.
17	Not assigned.
18	<p>Suppress building the object list for incorporation.</p> <p>With the incorporation migration, PAC requires the original object list to be a single entry with or without the range notation when including objects from a work file. During migration processing, PAC updates this list with the expanded list of individual objects actually incorporated. If this applymod is active, the object list is not expanded. This applymod may be required with large migrations when the total list of objects exceeds the ESIZE.</p>
19	<p>Force the migration of saved copy code, programs, and maps.</p> <p>By default, PAC migrates only cataloged objects (except text objects) to environments other than development or maintenance. If Applymod 19 is turned on, PAC always migrates both source and cataloged objects.</p>
22	Not assigned.
23	<p>Allow objects in any status to be selected for archiving, purging, or retiring.</p> <p>Use for archiving objects, object maintenance (purge function), and retiring objects. 1) Allow objects in any status to be selected for archiving. If this applymod is not active, only objects in Control status can be selected for archiving. Objects are removed from the status and placed in the Archive status. 2) Allow objects in any status (except Archive) to be selected for purging. If this applymod is not active, only objects in Control status can be purged. Objects in Archive can be separately purged. 3) Allow objects in any status to be selected for retiring. If this applymod is not active, only objects in Control and Archive statuses can be retired.</p>
24	<p>Suppress purging of cataloged objects with Move option.</p> <p>Allow cataloged objects in a maintenance status type not to be purged with the Move option for migrations into PAC from maintenance or development status types.</p>
25	Not assigned.
26	Not assigned.
27	Not assigned.
28	Not assigned.
29	<p>Compare object save date and event authorization date.</p> <p>For each object on the Object List during a migration from development or maintenance, PAC compares the date the object was saved with the Event's authorization date. If the object save date is later than the authorization date and this applymod is set, PAC terminates the migration event.</p>
30	<p>Control message scrolling.</p> <p>This applymod toggles the automatic scrolling of PAC messages during an online migration.</p>

Num.	Function
31	Do not migrate cataloged objects to a status. No: Migrate the loadable part of a Natural object whenever the object is migrated. Yes: Do not migrate the loadable part of a Natural object to a status.

Migration Events Group

Num.	Function
16	Update object list with the highest version object found. During Expand, PAC ignores objects resulting from the Expand process that already exist in the object list. When this applymod is active, PAC compares the versions of the two objects and updates the object list with the highest version found.
20	Retain the job name specified in the source event when an event is being copied. During a Copy Event function, this applymod instructs PAC to retain the job name specified in the source event rather than use the job name specified in the migration path. During group event submission, this applymod allows PAC to submit the group event even when one or more of its member events is not in Authorized state.

Object Type Codes

The following tables list and describes the object type codes used in PAC.

Note:

Non-Natural types are site-specific and defined by the PAC administrator.

This chapter covers the following topics:

- Natural Object Type Codes
- Predict Object Type Codes

Natural Object Type Codes

A	Parameter Data
C	Copycode
E	Error message
G	Global Data
H	Helproutine
L	Local Data
M	Map
N	Subprogram
P	Program
R	Rule
S	Subroutine
T	Text
V	View
Y	Expert Model
Z	Recording
3	Dialog
4	Class
5	Processor
*	All object types

Note:

Error messages, DDMs and rules may, in some cases, be listed together with Natural objects for migrations of applications other than Predict. In these cases, their type denotations are "E" (for error messages), "View" (for DDMs) and "Rule". Some screens take "V" for DDMs and "R" for rules.

Predict Object Type Codes

Type Code	Description
DA	Predict database
DS	Predict dataspace
FIA (FILE)	Predict Adabas file
FIC	Other Predict file
FIU (VIEW)	Predict userview
KY	Predict keyword
NW	Predict network
PA	Predict packagelist
PR	Predict program
RE	Relationship
RULE	Rule (generated from verification)
ST	Predict storagespace
SY	Predict system
US	Predict user
VE	Predict verification rule
VM	Virtual machine
Y	Expert model

Application Programming Interface

PAC's Application Programming Interface (API) facilities are Natural subprograms invoked using CALLNAT statements to access PAC directly from within a user-written program without invoking PAC with MENU, ADMIN, or SYSPAC commands, see Invoking the APIs.

The APIs provide a wide range of flexibility, making it easier for you to customize the interface with PAC to meet your site requirements.

PAC provides the following APIs:

API Routine	PAC Entity	PAC Function
APINAPPL	Application	Add, Display, Modify
APINAUTH	Event Authorization	Add, Display, Purge
APINCCLG	Change Logs	Display, Purge
APINDSC	Event, Maintenance Request, Job	Display, Modify, Purge
APINJOB	Job	Display, Submit
APINLNK	Application Status Link	Add, Display, Modify
APINLSRC	Object Version Natural Source	Load (read into Natural work area)
APINMEOL	Migration Event Locked Object	Display
APINMGEV	Migration Event	Add, Display, Modify, Submit, Purge
APINMR	Maintenance Request	Add, Display, Modify, Purge
APINNSRC	Objects, Used Lists	Display
APINOBJV	Object Version	Display
APINOBL	Object List	Add, Display, Purge
APINPATH	Migration Path	Add, Display, Modify
APINPRF	User Profile	Add, Modify, Retrieve
APINPRFS	User Profile	Select
APINSEL	Application Application Status Link Maintenance Request Migration Event Migration Path Job Object Version Status	Select
APINSELE	Event handling	Select
APINSELO	Object Status Link	Display
APINSTAT	Status	Add, Display, Modify
APINTEXT	Event, Maintenance Request, Job	Display

Library SYSPACUS contains example programs for each of the individual APIs. These programs can be tailored to meet the specific needs of your site.

Invoke UGNXMAIN to access the API example programs.

How to invoke PAC APIs is described in Invoking the APIs.

Invoking the APIs

During execution, the API routines use PAC subroutines residing in the SYSPAC and SYSTEM libraries.

1. If the application that calls the PAC API subroutines does not reside in the SYSPAC library, define the SYSPAC library as steplib to the Natural session.
2. Use the following syntax to invoke a PAC API:

```
CALLNAT 'APINxxxx' UGNLPARM UxxLyyyy
```

where

- the first parameter (supplied as local data area UGNLPARM) has a fixed format; and
- the second parameter (supplied as UxxLyyyy) has a variable format, depending on the particular API call. The variable format for each API is detailed in the following API descriptions.

This chapter covers the following topic:

- Local Data Area UGNLPARM

Local Data Area UGNLPARM

The first parameter of all PAC APIs is the following structure API-PARM. Its definition is provided in the local data area UGNLPARM:

Field Name	Format	Description
API-PARM	-	-
API-FUNC (R)	A2	(optional) Identifies the code of the subfunction for the request.
API-MAIN-FUNC	A1 (I)	The code of the function to execute on the entity.
API-SUB-FUNC	A1 (I)	(optional) Identifies the code of the subfunction for the request.
API-MSG-NO	P5 (O)	PAC error message number.
API-MSG	A78 (O)	Detailed message of any error occurred during processing.
API-USER-AREA	A50 (I/O)	Area used by additional routines or exits invoked during the processing of the API request.

Application API

API Routine: APINAPPL

Parameters: UGNLPARM, UAPLAPPL

The Application API allows users to add, modify or display (retrieve) information about a particular application. The following functions are valid:

- A Add application.
- D Display application (Retrieve).
- M Modify an existing application.

This chapter covers the following topics:

- Local Data Area UAPLAPPL
- Application API Return Codes

Local Data Area UAPLAPPL

The fields to be passed to the API as the second parameter are in the supplied local data area UAPLAPPL. The following is a detailed description of these fields:

Field Name	Format	Description
APPLICATION	A32	Name of the application. You may use application name or alias for the Display and Modify functions.
TITLE	A60	Title of the application.
PREFIX	A3	Prefix of the application.
LEVEL	A10	Level of the application.
GEN-NUMBER	P5	Number to be used during event name generation.
PRD-XREF-FORCE	A1	Force Predict documentation. Valid options are:
		Y Predict documentation entries must be present before a Natural program can be migrated into PAC.
		N Default.
PCA-USAGE	A1	Predict Case usage. Valid options are:
		Y Natural objects for this application have been composed by Predict Case.
		N Default.
DEF-NAT-LIB-DEV	A8	Name of the default Development library.
DEF-NAT-LIB-INC	A8	Name of the default Incorporation library.
DEF-NAT-LIB-MAINT	A8	Name of the default Maintenance library.
DEF-NAT-LIB-PROD	A8	Name of the default Production library.

Field Name	Format	Description	
DEF-NAT-LIB-TEST	A8	Name of the default Test library.	
MCG	A4	The machine code generator MCG option. Valid options are:	
		blank	MCG is not used.
		N	MCG OFF
		Y	MCG ON
		I	INDX is to be activated.
		O	OVFLW is to be activated.
		M	MIX is to be activated.
V21-SYNTAX	A1	Natural Version 2.1 syntax restriction. Valid options are:	
		Y	Natural syntax is to be restricted to Version 2.1 syntax rules.
		N	Default.
MIN-CURR-VERS	P3	Minimum current versions.	
CURR-RETENTION-PERIOD	P3	Current retention period.	
MIN-ARCH-VERS	P3	Minimum archive versions.	
ARCH-RETENTION-PERIOD	P3	Archive retention period.	
LOG-PURGES	A1	Log all object purges. Valid options are:	
		Y	All purges through the Purge Object Version function are to be logged.
		N	Default.
MOD-TIME	T	Date and time application was last modified.	
MOD-BY	A8	User that last modified application.	
MOD-TID	A8	Terminal that last modified application.	
ADD-TIME	T	Date and time application was added.	
ADD-BY	A8	User that added application.	
ADD-TID	A8	Terminal that added application.	

Application API Return Codes

7250 Application exists.

7251 Application not found.

7253 Application added.

7254 Application has been modified.

Event Authorization API

API Routine: APINAUTH

Parameters: UGNLPARM, UMELAUTH

The Event Authorization API allows users to add, display, or purge information about a particular migration event authorization. The following functions are valid:

- A Authorize a migration event.
- D Display authorization information for a specific migration event.
- P De-authorize a migration event.

This chapter covers the following topics:

- Local Data Area UMELAUTH
- Event Authorization API Return Codes

Local Data Area UMELAUTH

The fields to be passed to the API as the second parameter are in the supplied local data area UMELAUTH. The following is a detailed description of these fields:

Field Name	Format	Description
EVENT	A32	Name of the event.
FM-LIBRARY	A8	Output - From library name.
FM-FUSER-DBID	N5	Output - Database of the Natural system file where the From library is located.
FM-FUSER-FNR	N5	Output - File of the Natural system file where the From library is located.
FM-FDIC-DBID	N5	Output - Predict database for the From library.
FM-FDIC-FNR	N5	Output - Predict file for the From library.
TO-LIBRARY	A8	Output - To library name.
TO-FUSER-DBID	N5	Output - Database of the Natural system file where the To library is located.
TO-FUSER-FNR	N5	Output - File of the Natural system file where the To library is located.
TO-FDIC-DBID	N5	Output - Predict database for the To library.
TO-FDIC-FNR	N5	Output - Predict file for the To library.
JOB	A32	Name of the job that is to perform the migration event.
EXPAND-OPT	A1	Auto Expansion option. Valid options are:
		C Include all subordinates

Field Name	Format	Description
		E Include all subordinate and referenced objects
		R Include referenced objects
		U Include used-by objects
		N Do not Auto Expand
EXPAND-STATUS	A32	Name of the status to be used during object list expand.
BATCH-ONLINE	A1	Run migration event in batch or online. Valid options are:
		B Migration event is to be run in batch.
		O Migration event is to be run online.
WORKFILE-USAGE	A1	Work file usage. Valid options are
		Y (batch migrations only) Work file is to be used during the processing of migration events.
		N Objects to be migrated directly to the target location without using a work file.
COPY-MOVE-INCLUDE	A1	Copy, move or include objects.
		C Objects are to be copied, retaining a copy in the source location.
		M Objects are to be moved from the source location with no copy retained. 'Move' is only valid when the origin status is a development, test, or maintenance status.
		I Objects are to be included from a work file. 'Include' is only valid for batch migrations when the origin status is a development or incorporation status.
REPLACE	A1	Replace objects at target destination (Y/N). Valid for development and maintenance destination statuses only.
SCHED-DATE	(T)	The earliest date and time this event may be submitted.
APPLYMODS	A50	Applymods(s) to be switched on during processing of the migration event.
TRANSLATION-TABLE	A32	Name of the file translation table (FTT) to be used during processing of the migration event.
GENERATION-DEFAULTS	A8	Predict Generation Defaults to be used during the migration.
AUTH-TIME	T	Date and time event was authorized.
AUTH-BY	A8	User that authorized event.
AUTH-TID	A8	Terminal that authorized event.

Event Authorization API Return Codes

7251 Migration Event not found.

7253 Migration Event authorization added.

APINCCLG

This API lets the user retrieve and purge a change control log. It also allows the user to purge an open change control log.

APINCCLG can be invoked thus:

```
CALLNAT 'APINCCLG' API-PARM #API-CCLG-PARM
```

D to retrieve a change control log.

P to purge an open change control log.

Important:

Reset the field SEL-DATE programmatically before the call is made to APINCCLG.

This chapter covers the following topics:

- Local Data Area UCCLCCLG
 - Application API Return Codes
-

Local Data Area UCCLCCLG

A definition of #API-CCLG-PARM is provided in LDA UCCLCCLG.

Field Name	Format	I/O
#API-CCLG-PARM		
#API-CCLG-PARM-1	A250	
#API-CCLG-PARM-1		
APPLICATION	A32	in
OBJECT	A8	in
LIBRARY	A8	in
DBID	N5	in
FNR	N5	in
VERSION	N4	in
SEL-DATE	T	in
REQUEST-ID	A20	out
STATUS	A32	out
OUT-VERSION	N4	out
OUT-LIBRARY	A8	out
OUT-DBID	N5	out
OUT-FNR	N5	out
OUT-USERID	A8	out
OUT-TIME	T	out
OUT-TID	A8	out
IN-VERSION	N4	out
IN-LIBRARY	A8	out
IN-DBID	N5	out
IN-FNR	N5	out
IN-USERID	A8	out
IN-TIME	T	out
IN-TID	A8	out

When APINCCLG is called:

- #API-CCLG-PARM.APPLICATION should carry the name of the change control log's application.
- #API-CCLG-PARM.OBJECT should carry the name of the object.
- #API-CCLG-PARM.LIBRARY should carry the library name of the NATURAL location of the maintenance deployment.
- #API-CCLG-PARM.DBID should carry the database number of the NATURAL location of the maintenance deployment.

- #API-CCLG-PARM.FNR should carry the file number of the NATURAL location of the maintenance deployment.
- #API-CCLG-PARM.VERSION should carry the object's version number.

If [API-PARM.API-MAIN-FUNC] = 'D' and the change control log is found then APINCCLG returns in the remaining parameter fields the change control log data including the name of the maintenance status and the name of the maintenance request (if one is associated with the log).

If [API-PARM.API-MAIN-FUNC] = 'P' and the change control log is found then APINCCLG purges it even if it is open.

Application API Return Codes

APINCCLG returns the following [API-PARM.API-MSG-NO]:

- 1011 if an [API-PARM.API-MAIN-FUNC] distinct from both 'D' and 'P' has been specified,
- 7251 if the application is unknown or the change control log has not been found,
- 7255 if the change control log has been retrieved,
- 7256 if the change control log has been purged.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations.

APINDSC

This API lets the user:

- obtain a chunk of
 - the description of an event,
 - the description of a maintenance request,
 - a JCL text,
 - the audit report of an event,
 - the audit report of a finalized archiving event,
- append a chunk to
 - the description of an event,
 - the description of a maintenance request,
 - a JCL text,
 - the audit report of an event,
 - the audit report of a finalized archiving event,
- delete
 - the description of an event,
 - the description of a maintenance request,
 - a JCL text, the audit report of an event,
 - the audit report of a finalized archiving event.

APINDSC can be invoked thus:

```
CALLNAT 'APINDSC' API-PARM API-DSC-PARM
```

Choose a value for API-PARM.API-MAIN-FUNC from the following table:

	a description	a JCL text	an audit report
to obtain a chunk of	D	J	R
to append a chunk to	E	K	S
to delete	F	L	T

Set API-PARM.API-SUB-FUNC at:

- E To handle an event. H To handle a finalized archiving event.
 M To handle a maintenance request.
 J To handle a JCL text.

This chapter covers the following topics:

- Local Data Area UGNLDSC
- Application API Return Codes

Local Data Area UGNLDSC

A definition of API-DSC-PARM is provided in LDA UGNLDSC.

Field Name	Format	I/O
API-DSC-PARM		
OBJECT-NAME	A32	in
LINE-CNT	P5	in/out
TEXT-RECORD	A80(1:60)	in/out
API-PAC-AREA	B20	in/out

When APINDSC is called:

- API-DCS-PARM.OBJECT-NAME should carry the name of the entity (event, finalized archiving event, maintenance request, or JCL text).
- If [API-PARM.API-MAIN-FUNC] is:
 - D, J, or R
then [API-DSC-PARM.LINE-CNT] is made 0, if negative; it is made 60, if greater than 60. It is then interpreted as the number of lines (the size of the chunk) to be returned. In particular, no lines will be returned, if LINE-CNT = 0.
 - E, K, or S
then [API-DSC-PARM.LINE-CNT] is made 0, if negative; it is made 60, if greater than 60. It is then interpreted as the number of lines (the size of the chunk) to be appended. In particular, an empty chunk will be appended, if LINE-CNT = 0.
 - F, L, or T
then API-DSC-PARM.LINE-CNT is not used by APINDSC.
- If [API-PARM.API-MAIN-FUNC] is:
 - D, J, or R
then API-DSC-PARM.TEXT-RECORD will carry the returned chunk.
 - E, K, or S
then the chunk in API-DSC-PARM.TEXT-RECORD(1 : [API-DSC-PARM.LINE-CNT]) will be appended.
 - F, L, or T
then API-DSC-PARM.TEXT-RECORD is not used by APINDSC.
- Normally, API-DSC-PARM.PAC-AREA should be reset when the first chunk of the description, text, or report is wanted or is to be appended. API-DSC-PARM.PAC-AREA should be left untouched for a next call to obtain or append an immediately following chunk of the same description, text, or report.

- If [API-PARM.API-MAIN-FUNC] is D, J, or R then APINDSC returns in API-TEXT-PARM.LINE-CNT the number of lines of the returned chunk. It may be less than the adjusted original value, if the end of the description, text, or report has been reached.

Application API Return Codes

APINDSC returns the following [API-PARM.API-MSG-NO]:

- 0000 if the entity has been found and a non-final chunk is being returned, a chunk has been appended, or the description, text, or report has been deleted,
- 1011 if the specified ([API-PARM.API-MAIN-FUNC],[API-PARM.API-SUB-FUNC]) is meaningless,
- 7251 if the entity has not been found,
- 9999 if the entity has been found and a final chunk is being returned.

Job API

API Routine: APINJOB

Parameters: UGNLPARM, UJBLJOB

The Job API allows users to display (retrieve) information about a particular job. The following function is valid:

D Display job (Retrieve).

This chapter covers the following topics:

- Local Data Area UJBLJOB
- Job API Return Codes

Local Data Area UJBLJOB

The fields to be passed to the API as the second parameter are in the supplied local data area UJBLJOB. The following is a detailed description of these fields:

Field Name	Format	Description
JOB	A32	Name of the job.
MOD-TIME	T	Date and time job was last modified.
MOD-BY	A8	User who last modified job.
MOD-TID	A8	Terminal that last modified job.
ADD-TIME	T	Date and time job was added.
ADD-BY	A8	User who added job.
ADD-TID	A8	Terminal that added job.
NOTES	A60 (1:3)	Comments.
USER-VARIABLES	A32 (1:10)	User-defined variables from the job.

Job API Return Codes

7250 Job exists.

7251 Job not found.

APINLNK

This API lets the user not only obtain data from an application - status link but also create a new application - status link and modify an existing one.

APINLNK replaces APINLINK and can be invoked thus:

```
CALLNAT 'APINLNK' API-PARM API-LNK-PARM
```

- A To add an application status link
- D To obtain data from an application status link
- M To modify an application status link

This chapter covers the following topics:

- Local Data Area USLLLNK
 - API Return Codes
-

Local Data Area USLLLNK

A definition of API-LNK-PARM is provided in LDA USLLLNK.

Field Name	Format	I/O
API-LNK-PARM		
APPLICATION	A32	in
STATUS	A32	in
FILE-TRANS-TABLE	A32	in/out
STEPLIB-CNT	N3	in/out
PRD-CASE-LIB	A32(1:8)	in/out
LIBRARY	A32	out
FUSER-DBID	N8	in/out
FUSER-FNR	N5	in/out
FDIC-DBID	N5	in/out
FDIC-FNR	N5	in/out
FPAA-DBID	N5	in/out
FPAA-FNR	N5	in/out
XREF	A1	in/out
ESY-NODE	N3	in/out
OP-SYSTEM	A8	out
FOREIGN-PDS-CNT	N3	in/out
FOREIGN-PDS	A79(1:50)	in/out
ADD-DATE	T	out
ADD-BY	A8	out
ADD-TID	A8	out
MOD-DATE	T	out
MOD-BY	A8	out
MOD-TID	A8	out

Whenever APINLNK is called:

- API-LNK-PARM.APPLICATION should carry the name of the link's application.
- API-LNK-PARM.STATUS should carry the name of the link's status.

If [API-PARM.API-MAIN-FUNC] = 'A' and the application status link is not found, APINLNK tries to add an application status link with the characteristics specified in the "in/out" fields.

If [API-PARM.API-MAIN-FUNC] = 'D' and the application status link is found, APINLNK returns in the remaining parameter fields the application status link data, ignoring any values put by the user in the "in/out" fields.

If [API-PARM.API-MAIN-FUNC] = 'M' and the application status link is found, APINLNK tries to modify the application status link endowing it with the characteristics specified in the "in/out" fields.

Which of the parameter fields can carry meaningful values for a link depends on the application (Predict or not) and on the type of the status. APINLNK tries to reset all irrelevant parameter fields when called with API-PARM.API-MAIN-FUNC at 'A' or 'M'.

If [API-PARM.API-MAIN-FUNC] is 'M' then [API-LNK-PARM.STEPLIB-CNT] is made 0, if negative.

The names of the step applications are returned or expected to be specified [API-LNK-PARM.STEPLIB-CNT] is the number of step applications (to be) specified in the link.

If [API-PARM.API-MAIN-FUNC] is 'A' or 'M' then [API-LNK-PARM.STEPLIB-CNT] is made 8, if greater than 8. If [API-PARM.API-MAIN-FUNC] is 'A' then a negative [API-LNK-PARM.STEPLIB-CNT] is interpreted as an instruction to make the link inherit the sequence of step applications specified in the application record. (if API-LNK-PARM.STEPLIB-CNT GT 0) in API-LNK-PARM.STEPLIB(1:[API-LNK-PARM.STEPLIB-CNT]).

A Predict Case library specification in an application status link can be retrieved but not introduced with APINLNK.

If [API-PARM.API-MAIN-FUNC] is 'A' and a relevant [API-LNK-PARM.LIBRARY] is not specified then APINLNK seeks the value among the defaults in the application record. If [API-PARM.API-MAIN-FUNC] is 'A' and a relevant ([...-DBID],[...-FNR]) = (0,0) then APINLNK seeks the values in the status record. If [API-PARM.API-MAIN-FUNC] is 'A' and a relevant [API-LNK-PARM.XREF] is not specified then APINLNK seeks the value in the status record.

The type of operating system is unique for a node and is discovered by APINLNK regardless of any value possibly put in API-LNK-PARM.OP-SYSTEM by the user. APINLNK processes the user-specified values of API-LNK-PARM.FOREIGN-PDS-CNT and API-LNK-PARM.FOREIGN-PDS only if API-LNK-PARM.ESY-NODE not equal to 0. [API-LNK-PARM.FOREIGN-PDS-CNT] is the number of foreign PDSes (to be) specified in the link.

If [API-PARM.API-MAIN-FUNC] is A or M then [API-LNK-PARM.FOREIGN-PDS-CNT] is made 0, if negative, it is made 50, if greater than 50. The foreign PDS specifications are returned or expected to be supplied (if API-LNK-PARM.ESY-NODE not equal to 0 AND API-LNK-PARM.FOREIGN-PDS-CNT greater than 0) in API-LNK-PARM.FOREIGN-PDS(1:[API-LNK-PARM.FOREIGN-PDS-CNT]).

Each element of API-LNK-PARM.FOREIGN-PDS contains or should contain:

- a foreign location type code (bytes 1 - 4), a PDS name (bytes 5 - 58), and operation system specific data:
- (optional) OS/390 volume specification (bytes 59 - 64) or (required) BS2000/OSD LMS element type specification (byte 59).

In byte 67 of an element of API-LNK-PARM.FOREIGN-PDS APINLNK puts a S(ource) or L(oadable) marking.

API Return Codes

APINLNK returns the following [API-PARM.API-MSG-NO]:

- 1011 If an [API-PARM.API-MAIN-FUNC] distinct from A, D and M has been specified.
- 6303 If the LMS element type specification is invalid.
- 7102 If an out-of-range database number is specified.
- 7103 If an out-of-range file number is specified.
- 7136 If an attempt has been made to link application Predict to status ARCHIVE or RETIRE.
- 7250 If the link has been found.
- 7251 If an application or the status or a foreign type is unknown or the link (to be retrieved) has not been found.
- 7253 If the link has been added.
- 7254 If the link has been modified.
- 7259 If the link (to be added) has not been added for an unspecified reason.
- 7264 If the link (to be modified) is held.
- 7267 If more than one location of a single foreign type has been specified.
- 7428 If an inappropriate [XREF] has been specified.
- 7517 If Predict or Predict Case has been specified as a step application.
- 7577 If an attempt has been made to link to a status application Predict Case.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations. APINLNK may pass an Entire System Server message resulting from the ESY's inactivity or an unsuccessful search for a node or a PDS.

Failure to assign to the just added or modified application status link an FTT does not get reflected in API-PARM.API-MSG-NO; it causes the resetting of API-LNK-PARM.FILE-TRANS-TABLE.

Load Object Version Natural Source API

APIs APINLSRC API Routine: APINLSRC

Parameters: UGNLPARM, UOVLLSRC

The Load Object Version Natural Source API allows users to load the Natural source code for a particular object version to Natural source area. The following function is valid:

L Load Natural source to source area.

This chapter covers the following topics:

- Local Data Area UOVLLSRC
 - Load Object Version Natural Source API Return Codes
-

Local Data Area UOVLLSRC

The fields to be passed to the API as the second parameter are in the supplied local data area UOVLLSRC. The following is a detailed description of these fields:

Field Name	Format	Description
APPLICATION	A32	Name of the application.
OBJECT	A8	Name of the object version.
VERSION-NUM	N4	Version number of the object version.

Load Object Version Natural Source API Return Codes

7251 Object Version not found.

Locked Objects API

API Routine: APINMEOL

Parameters: UGNLPARM, UMELOLOK

The Locked Objects API allows users to review locked objects during migration event processing. Users can interrogate the object list for a migration event currently being processed after the objects have been locked and before the migration event is unlocked. The following functions are valid:

T Display locked objects for an active migration event.

blank Print the locked objects report.

This chapter covers the following topics:

- Local Data Area UMELOLOK
- Locked Objects API Return Codes

Local Data Area UMELOLOK

The fields to be passed to the API as the second parameter are in the supplied local data area UMELOLOK. The following is a detailed description of these fields:

Field Name	Format	Description
FUNC	A1	Requested function. Valid options are
		T Display locked objects for the migration event currently being processed.
		blank Print the locked objects report to print file 1.
EVENT-NAME	A32	Name of the event to be interrogated.
RESP-CODE	P5	Response code to be returned.
USER-AREA	A50	Additional area for user parameters.

Locked Objects API Return Codes

1011 Invalid function specified. Invalid event name specified.

7251 Migration event not found.

9999 End of locked objects report processing.

Migration Event API

API Routine: APINMGEV

Parameters: UGNLPARM, UMELMGEV

The Migration Event API allows users to add, modify, submit, purge or display (retrieve) information about a particular migration event. The following functions are valid:

- A Add Migration Event.
- D Display Migration Event (Retrieve).
- M Modify an existing Migration Event.
- P Purge Migration Event.
- U Submit Migration Event.

This chapter covers the following topics:

- Local Data Area UMELMGEV
 - Migration Event API Return Codes
-

Local Data Area UMELMGEV

The fields to be passed to the API as the second parameter are in the supplied local data area UMELMGEV. The following is a detailed description of these fields:

Field Name	Format	Description
EVENT	A32	Name of the event.
APPLICATION	A32	Name of the application to be migrated.
FM-STATUS	A32	Name of the status from which the application is to be migrated.
TO-STATUS	A32	Name of the status to which the application is to be migrated.
ARCH-EVENT	A32	Name of the archive event.
MAINT-REQ	A20	Name of the maintenance request for which the migration event was created.
REPLACE	A1	Replace objects (Y/N) at development or maintenance destination status.
SCHED-FLAG	A1	Y indicates that the event is schedules (production status only).
SCHED-DATE	T	Earliest date and time this event may be submitted.
EXEC-START	T	Date and time the event was started.
EXEC-END	T	Date and time the event was ended.
STATE-TEXT	A10	State of the event.
STEP-NUMBER	N2	Current step number of the event.
STEP-TEXT	A16	Current step of the event.
NATURAL-OBJ-CNT	N5	Number of Natural objects migrated.
PREDICT-OBJ-CNT	N5	Number of Predict objects migrated.
MESSAGE-OBJ-CNT	N5	Number of user error messages migrated.
ERROR-CNT	N5	Number of errors detected during migration.
NOTES	A60(1:3)	Notes
GENERATE-TYPE	A1	Generate List Type. Valid options are
		P PAC Generate
		A Predict Application Generate
		M Maintenance Request Generate
		S Predict Set Generate
		H Automatic Archiving
GEN-SET-USER	A8	Name of the Predict set used with GENERATE-TYPE S.
GEN-SET-NO	N2	Predict set number.
GEN-SET-LOC	A1	Location (local or remote) of the Predict set.
MOD-TIME	T	Date and time event was last modified.
MOD-BY	A8	User that last modified event.
MOD-TID	A8	Terminal that last modified event.
ADD-TIME	T	Date and time event was added.
ADD-BY	A8	User that added event.

Migration Event API Return Codes

- 7250 Migration event exists.
- 7251 Migration event not found.
- 7253 Migration event added.
- 7254 Migration event has been modified.
- 7256 Migration event has been purged.
- 1163 Migration event submitted.

Maintenance Request API

API Routine: APINMREQ

Parameters: UGNLPARM, UMRLMREQ

The Maintenance Request API allows users to add, modify, purge or display (retrieve) information about a particular maintenance request. The following functions are valid:

- A Add Maintenance Request.
- D Display Maintenance Request (Retrieve).
- M Modify an existing Maintenance Request.
- P Purge Maintenance Request.

This chapter covers the following topics:

- Local Data Area UMRLMREQ
 - Maintenance Request API Return Codes
-

Local Data Area UMRLMREQ

The fields to be passed to the API as the second parameter are in the supplied local data area UMRLMREQ. The following is a detailed description of these fields:

Field Name	Format	Description
REQUEST	A20	Name of the maintenance request.
NEW-REQUEST	A20	Not currently implemented.
PROBLEM-SUBJECT	A60	Problem subject.
PROBLEM-TYPE	A8	Problem type.
PRIORITY	N3	Priority of the maintenance request.
STATUS	A12	Current status of the maintenance request.
ACTION	A12	Action to be taken.
CONTACT-NAME	A32	Contact name.
CONTACT-TEL	A20	Contact telephone number.
CLOSED-TIMX	T	Date and time maintenance request was closed.
CLOSED-BY	A8	User that closed the maintenance request.
CLOSED-TID	A8	Terminal that closed the maintenance request.
RELATED-PROB	A60	Related problem.
NOTES-1	A60	Notes line 1.
NOTES-2	A60	Notes line 2.
NOTES-3	A60	Notes line 3.
MOD-TIME	T	Date and time request was last modified.
MOD-BY	A8	User that last modified request.
MOD-TID	A8	Terminal that last modified request.
ADD-TIME	T	Date and time request was added.
ADD-BY	A8	User that added request.
ADD-TID	A8	Terminal that added request.

Maintenance Request API Return Codes

Maintenance Request API

Maintenance Request API Return Codes

- 1018 Maintenance Request is locked.
- 7251 Maintenance Request not found.
- 7253 Maintenance Request has been added successfully.
- 7254 Maintenance Request has been modified.
- 7260 Maintenance Request ID missing.
- 7561 Maintenance Request Problem Subject missing.
- 7562 Maintenance Request Priority missing.
- 7563 Maintenance Request Status missing.
- 7564 Maintenance Request Status not found.
- 7565 Maintenance Request Action missing.
- 7566 Maintenance Request Action not found.
- 7580 Closed Maintenance Request may not be modified.

APINNSRC

This API lets obtain chunks of

- Natural sources,
- short error messages,
- long error messages,
- foreign sources,
- USED (object) lists, and
- USED BY (object) lists resident in the ACF.

APINNSRC can be invoked thus:

CALLNAT 'APINNSRC' API-PARM API-NSRC-PARM

D To obtain a chunk of a Natural or foreign source or an error message.

U To obtain a chunk of the USED list of a PAC object

B To obtain a chunk of the USED BY list of a PAC object

S The value of API-PARM.API-SUB-FUNC is ignored except when API-PARM.API-MAIN-FUNC=D, in which case [API-PARM.API-SUB-FUNC] = S indicates that a short rather than long error message is required.

This chapter covers the following topics:

- Local Data Area UOVLNSRC
- API Return Codes

Local Data Area UOVLNSRC

A definition of API-NSRC-PARM is provided in LDA UOVLNSRC.

Field Name	Format	I/O
API-NSRC-PARM		
APPLICATION	A32	in
OBJECT	A32	in
VERSION-NUM	N4	in/out
TYPE	A15	in/out
LINE-CNT	P5	in/out
OTHER-APPLICATION	A32(1:10)	out
SOURCE	A94(1:10)	out
PAC-AREA	B23	in/out

When APINNSRC is called:

API-NSRC-PARM.APPLICATION should carry the name of the application in whose compartment the (versioned) object resides.

- API-NSRC-PARM.OBJECT should carry the name of the object.
- [API-NSRC-PARM.VERSION-NUM], if positive, is interpreted as the version number of the object; if negative or zero, it is interpreted as the highest available version number of an object in the given compartment, with the given (if TYPE not equal to ' ') or chosen (see below) type.
- [API-NSRC-PARM.TYPE], if non-blank, is interpreted as the type designation of the object; if blank, it is interpreted as the lexicographically least available type designation of an object in the given compartment, with the given name.

The possibility to specify the type of the required object is new.

The type designations to be used are the following:

NA Parameter data area
 NC Copycode
 NG Global data area
 NH Helproutine
 NL Local data area
 NM Map
 NN Subprogram
 NP Program
 NS Subroutine
 NT Text
 EN Error message
 VIEW DDM
 RULE Rule
 AFIA ADABAS file
 AFIU User file

- For foreign objects, their four-character type designations beginning in '3' can be used.
- [API-NSRC-PARM.LINE-CNT] is made 0, if negative; it is made 10, if greater than 10. It is then interpreted as the number of lines (the size of the chunk) to be returned; no lines will be returned, if LINE-CNT = 0.
- Normally, API-NSRC-PARM.PAC-AREA should be reset when the first chunk of the object's source or list is required and left untouched for a next call to obtain an immediately following chunk of the same source or list. If the (three) directory lines are to be part of the first chunk, H'F0F0F1' should be put in bytes 18 - 20 of API-NSRC-PARM.PAC-AREA.

If an object satisfying the selection criteria is found, a positive [API-NSRC-PARM.VERSION-NUM] and a non-blank [API-NSRC-PARM.TYPE] are returned.

APINNSRC returns in API-NSRC-PARM.LINE-CNT the number of lines (the size) of the returned chunk. It may be less than the adjusted original value if the end of the source or list has been reached.

- If API-PARM.API-MAIN-FUNC = 'D' then APINNSCR returns blanks in API-NSRC-PARM.OTHER-APPLICATION(1: API-NSRC-PARM.LINE-CNT).
- If API-PARM.API-MAIN-FUNC = 'U', I GE 1, and I LE API-NSRC-PARM.LINE.CNT then APINNSCR returns a blank in API-NSRC-PARM.OTHER-APPLICATION(I) unless API-NSRC-PARM.SOURCE(I) contains a reference to an object of an application other than API-NSRC-PARM.APPLICATION, in which case the name of the other application is put into API-NSRC-PARM.OTHER-APPLICATION(I).
- If API-PARM.API-MAIN-FUNC = 'B', I GE 1, and I LE API-NSRC-PARM.LINE.CNT then APINNSCR puts into API-NSRC-PARM.OTHER-APPLICATION(I) the name of the application of the object referred to in API-NSRC-PARM.SOURCE(I).

API Return Codes

APINNSRC returns the following [API-PARM.API-MSG-NO]:

- 0000 if the object has been found and a non-final chunk is being returned,
- 1011 if the specified, ([API-PARM.API-MAIN-FUNC],[API-PARM.API-SUB-FUNC]) is meaningless,
- 7251 if the object has not been found,
- 7255 if the object has been found and a final chunk is being returned.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations.

Object Version API

API Routine: APINOBJV

Parameters: UGNLPARM, UOVLOBJV

The Object Version API allows users to display (retrieve) information about a particular Object Version. The following function is valid:

D Display Object Version (Retrieve).

This chapter covers the following topics:

- Local Data Area UOVLOBJV
- Object Version API Return Codes

Local Data Area UOVLOBJV

The fields to be passed to the API as the second parameter are in the supplied local data area UOVLOBJV. The following is a detailed description of these fields:

Field Name	Format	Description
APPLICATION	A32	Name of the application.
OBJECT	A32	Name of the object.
VERSION-NUM	N4	Version number of the object.
MAINT-VERSION-NUM	N4	Version number of the maintenance request.
TYPE	A15	Object type.
SAVED-TIME	T	Date and time the object was saved.
CAT-TIME	T	Date and time the object was cataloged.
MIGRATE-EVENT	A32	Name of the migration event.
CREATE-TIME	T	Create date time.
INC-IND	A1	Incorporation indicator.
ARC-IND	A1	Archive indicator.
NAT-LIBRARY	A8	Natural development directory library.
NAT-USER	A8	Natural development directory user.
NAT-SAVE-TIME	T	Natural development directory save date and time.
NAT-TP-SYS	A8	Natural development directory TP system.
NAT-TID	A8	Natural development directory TID.
NAT-OP-SYS	A8	Natural development directory operating system.
NAT-TRANS	A8	Natural development library transaction.
NAT-VERS	A6	Natural development library Natural version.

Field Name	Format	Description
NAT-MODE	A10	Natural development library mode.
NAT-ESIZE	N7	Natural development library SIZE.
PRD-MIGRATE-EVENT	A32	Name of the Predict migration event.
PRD-INIT-TIME	T	Predict migration event initialization date and time.
PRD-INIT-USER	A8	Predict migration event initialization user.
PRD-OP-SYS	A8	Predict migration operating system.
PRD-TP-SYS	A8	Predict migration TP system.
PRD-DBID	N3	Predict migration DBID.
PRD-FNR	N5	Predict migration Fnr.
PRD-VERSION	A4	Predict migration version.
PRD-TRUNCATE-CREATOR	A1	Predict Truncate Creator.
PCA-CREATE-TIME	T	Predict Case creation date and time.
PCA-CREATE-USER	A8	Predict Case creation user.
PCA-MAINT-TIME	T	Predict Case maintenance time.
PCA-MAINT-USER	A8	Predict Case maintenance user.
PCA-STATUS	A14	Predict Case status.
NUM-SHORT	P2	Number of user error message short text.
NUM-LONG	P2	Number of user error message long text.
LANGUAGES	A1 (1:9)	User error message languages.
MOD-TIME	T	Date and time the object version was last modified.
MOD-BY	A8	ID of the user who last modified the object version.
MOD-TID	A8	ID number of terminal at which the object version was last modified.
ADD-TIME	T	Date and time the object version was added.
ADD-BY	A8	ID of the user who added the object version.
ADD-TID	A8	ID number of terminal at which the object version was added.

Object Version API Return Codes

7251 Object Version not found.

7255 The specified entry has been displayed.

Object List API

API Routine: APINOBLS

Parameters: UGNLPARM, UOLLOBLS

The Object List API allows users to add, purge or display (retrieve) object list objects for a particular migration event. The following functions are valid:

- A Add objects to objects list.
- D Display (Retrieve) object list for a migration event.
- P Purge the entire object list for a migration event.

This chapter covers the following topics:

- Local Data Area UOLLOBLS
- Object List API Return Codes

Local Data Area UOLLOBLS

The fields to be passed to the API as the second parameter are in the supplied local data area UOLLOBLS. The following is a detailed description of these fields:

Field Name	Format	Description
EVENT	A32	Name of the migration event.
LINE-CNT	P5	Input - number of objects to return. Output - number of objects returned.
OBJECT-NAME	A32	Name of the object.
OBJECT-TYPE	A4	Type of the object.
OBJECT-VERSION	A32	Version or the status of the object.
PAC-OBLS-AREA	B20	Reserved PAC work area.

Object List API Return Codes

- 7250 Object List exists.
- 7251 Object List not found.
- 7253 Object List added.
- 7256 Object List has been purged.
- 7259 Object List was not added.

Migration Path API

API Routine: APINPATH

Parameters: UGNLPARM, UMPLPATH

The Migration Path API allows users to add, modify or display (retrieve) information about a particular migration path. The following functions are valid:

- A Add migration path.
- D Display migration path (retrieve).
- M Modify an existing migration path.

This chapter covers the following topics:

- Local Data Area UMPLPATH
 - Migration Path API Return Codes
-

Local Data Area UMPLPATH

The fields to be passed to the API as the second parameter are in the supplied local data area UMPLPATH. The following is a detailed description of these fields:

Field Name	Format	Description
APPLICATION	A32	Name of the application linked to the statuses.
FM-STATUS	A32	Name of the status from which the application is to be migrated.
TO-STATUS	A32	Name of the status to which the application is to be migrated.
EXPAND-STATUS	A32	Name of the status to be used during object list expand.
JOB	A32	Name of the job that is to perform that migration event.
AUTO-EXPAND	A1	Autoexpansion option.
BATCH-ONLINE	A1	Run migration event in batch or online. Valid options are
		B Migration event is to be run in batch.
		O Migration event is to be run online.
WORKFILE-USAGE	A1	Work file usage. Valid options are
		Y Work file is to be used during the processing of migration events, valid for batch migrations only.
		N Default.
COPY-MOVE-INCLUDE	A1	Copy, move, or include objects:
		C Objects are to be copied, but still exist in the origin location.
		M Objects are to be moved from the origin location with no copy to exist in the origin location. 'Move' is only valid from a development, test, or maintenance status.
		I Objects are to be included from a work file. 'Include' is only valid for batch migrations from a development or incorporation status.
SEPARATE-AUTHORITY	A1	Authorizer of the event who is different from the person who created the event.
AUTHORIZERS	A8 (1:8)	ID of the user or group who can authorize the event.
ADD-TIME	T	Date and time the migration path was added.
ADD-BY	A8	ID of the user who added the migration path.
ADD-TID	A8	ID of the terminal at which the migration path was added.
MOD-TIME	T	Date and time the migration path was last modified.
MOD-BY	A8	ID or the user who last modified the migration path.
MOD-TID	A8	ID of the terminal at which the migration path was last modified.

Migration Path API Return Codes

7250 Migration path exists.

7251 Migration path not found.

7253 Migration path added.

7254 Migration path has been modified.

APINPRF

This API lets obtain data from a PAC profile, create a new profile, and modify an existing one.

APINPRF can be invoked thus:

```
CALLNAT 'APINPRF' API-PARM API-PRF-PARM
```

A definition of API-PARM is provided in LDA UGNLPARM in library SYSPACUS.

- A add a profile
- D obtain data from a profile
- M modify a profile

This chapter covers the following topics:

- Local Data Area UPILPRF
 - API Return Codes
-

Local Data Area UPILPRF

A definition of API-PRF-PARM is provided in LDA UPILPRF in library SYSPACUS.

Field Name	Format	I/O
API-PRF-PARM		
PROFILE	A8	in
NAME	A32	in/out
BATCH-ID	A8	in/out
LIST-LOCKED	A1	in/out
RIGHTS	A20	in/out
ADMINISTRATION	A1	
AUTHORISATION	A1	
SUBMISSION	A1	
2X	A1	
APPLICATION	A1	
LINK	A1	
CCL	A1	
FTT	A1	
JCL-TEXT	A1	
KEYWORD	A1	
MAINT-REQUEST	A1	
EVENT	A1	
PATH	A1	
OBJECT	A1	
STATUS	A1	
ADD-DATE	T	out
ADD-BY	A8	out
ADD-TID	A8	out
MOD-DATE	T	out
MOD-BY	A8	out
MOD-TID	A8	out

If [API-PARM.API-MAIN-FUNC] = 'A' and the profile is not found, APINPRF tries to add a profile with the characteristics specified in the "in/out" fields.

If [API-PARM.API-MAIN-FUNC] = 'D' and the profile is found, APINPRF returns in the remaining parameter fields the profile data, ignoring any values put by the user in the "in/out" fields.

If [API-PARM.API-MAIN-FUNC] = 'M' and the profile is found, APINPRF tries to modify the profile endowing it with the characteristics specified in the "in/out" fields.

The meaningful values of the "in/out" fields are listed in the following table.

NAME	A32	any
BATCH-ID	A8	any
LIST-LOCKED	A1	Y, N
ADMINISTRATION	A1	Y, N
AUTHORISATION	A1	Y, N
SUBMISSION	A1	Y, N
APPLICATION	A1	M, R, N
LINK	A1	M, R, N
CCL	A1	R, N
FTT	A1	M, R, N
JCL-TEXT	A1	M, R, N
KEYWORD	A1	M, R, N
MAINT-REQUEST	A1	M, R, N
EVENT	A1	M, R, N
PATH	A1	M, R, N
OBJECT	A1	R, N
STATUS	A1	M, R, N

The meanings of the values are the same as those of their menu system counterparts.

API Return Codes

APINPRF returns the following [API-PARM.API-MSG-NO]:

- 1011 if an [API-PARM.API-MAIN-FUNC] distinct from A, D and M has been specified,
- 7250 if the profile has been found,
- 7251 if the profile has not been found,
- 7253 if the profile has been added,
- 7254 if the profile has been modified,
- 7264 if the profile (to be modified) is held,
- 7407 if a meaningless [API-PRF-PARM.LIST-LOCKED] has been specified,
- 7600 if a meaningless [API-PRF-PARM.ADMINISTRATION], [API-PRF-PARM.AUTHORISATION], or [API-PRF-PARM.SUBMISSION] has been specified,
- 7601 if a meaningless value has been specified for any of the redefined members of [API-PRF-PARM.RIGHTS] not covered by 7600.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations.

APINPRFS

This PAC API lets obtain chunks of lists of user ids for which there are PAC profiles.

APINPRFS corresponds to the Select Profiles function of the menu system. Unlike them, it produces only the user ids, including SYSTEM: the name of the default profile. These user IDs can then be used as input to APINPRF which in turn corresponds to the Add, Display, and Modify Profile functions of the menu system.

APINPRFS can be invoked thus:

```
CALLNAT 'APINPRFS' API-PARM API-PRFS-PARM
```

A definition of API-PARM is provided in LDA UGNLPARM in library SYSPACUS.

S obtain a chunk of a list of user IDs.

The value of API-PARM.API-SUB-FUNC is ignored.

This chapter covers the following topics:

- Local Data Area UPILPRFS
- API Return Codes

Local Data Area UPILPRFS

A definition of API-PRFS-PARM is provided in LDA UPILPRFS in library SYSPACUS.

Field Name	Format	I/O
API-PRFS-PARM		
PROFILE	A9	in
PROF-CNT	N3	in/out
PROF	A8(1:60)	in/out
API-PAC-AREA	A145	in/out

When APINPRFS is called:

- API-PRFS-PARM.PROFILE should carry a range of profile names or be blank. A blank API-PRFS-PARM.PROFILE has the same effect on the selection as one carrying an initial asterisk.
- [API-PRFS-PARM.PROF-CNT] is made 0, if negative; it is made 60, if greater than 60. It is then interpreted as the maximum number of user ids to be returned; no user ids will be returned, if API-PRFS-PARM.PROF-CNT = 0.
- Normally, API-PRFS-PARM.API-PAC-AREA should be reset when the first chunk of a list of user ids is wanted. API-PRFS-PARM.API-PAC-AREA should be left untouched for a next call to obtain an immediately following chunk of the same list.
- APINPRFS returns in API-PRFS-PARM.PROF-CNT the number of user ids in the returned chunk; it may be less than the adjusted original value, if the end of the user id list has been reached. If no profile-owning user id satisfying the selection criteria is found or a non-positive [API-PRFS-PARM.PROF-CNT] has been

specified then AINPRFS returns 0 in API-PRFS-PARM.PROF-CNT.

- If APINPRFS returns a non-zero [API-PRFS-PARM.PROF-CNT] then it returns the chunk of the list of the profile-owning user ids satisfying the selection criteria in API-PRFS-PARM.PROF(1:[API-PRFS-PARM.PROF-CNT]).

API Return Codes

APINPRFS returns the following [API-PARM.API-MSG-NO]:

- 0000 if at least one profile-owning user id satisfying the selection criteria has been found and a non-final chunk of a list of the profile-owning user ids satisfying the selection criteria is being returned,
- 1011 if [API-PARM.API-MAIN-FUNC] other than 'S' has been specified,
- 7251 if profile-owning user ids satisfying the selection criteria have been sought but none has been found,
- 9999 if at least one profile-owning user id satisfying the selection criteria has been found and a final chunk of a list of the profile-owning user ids satisfying the selectioncriteria is being returned.

Selection API

API Routine: APINSEL

Parameters: UGNLPARM, UGNLSEL

The Selection API allows users to select PAC objects with specific selection criteria. The following functions are available:

- A Select an Application.
- E Select a Migration Event.
- H Select an Archive Event.
- J Select a Job.
- L Select an Application Status Links.
- M Select a Maintenance Request.
- S Select a Status.
- T Select a Migration Path.
- V Select a Versioned Object.

This chapter covers the following topics:

- Local Data Area UGNLSEL
 - Selection API Return Codes
-

Local Data Area UGNLSEL

A definition of API-SEL-PARM is provided in LDA UGNLSEL.

APINSEL now returns 7251 rather than 7250 in API-PARM.API-MSG-NO if an existing application has been specified and there are no versioned objects or change control logs satisfying all selection criteria.

Field Name	Format	I/O
API-SEL-PARM		
CRIT-1	A32	in
CRIT-2	A32	in
CRIT-3	A32	in
OBJ-CNT	P5	in/out
OBJ-1	A32(1:10)	out
OBJ-1		
OBJ-1-ENTRY	(1:10)	
CCL-PGM	A8	
CCL-VER	N4	
CCL-MREQ	A20	
OBJ-1		
OBJ-1-ENTRY-V	(1:10)	
OBJV-OBJECT-ID	A32	
OBJ-2	A32(1:10)	out
OBJ-2		
OBJ-2-ENTRY	(1:10)	
CCL-LIB	A8	
CCL-DB	N3	
CCL-FNR	N3	
CCL-USER	A8	
CCL-STATE	A3	
CCL-DATE	T	
OBJ-2		
OBJ-2-ENTRY-V	(1:10)	
OBJV-VERSION	A4	
OBJV-TYPE	A6	
PAC-AREA	B126	in/out

Selection API Return Codes

1011 Invalid function.

7251 Object not found.

9999 End of selection.

APINSELE

This API lets obtain chunks of lists of event names.

APINSELE corresponds to the Select Events function of the menu system. It produces only the names of the events. These names can then be used as input to APINAUTH, APINDSC, APINMEOL, APINMGEV, APINOBLs, or APINTEXT.

APINSELE can be invoked thus:

```
CALLNAT 'APINSELE' API-PARM API-SELE-PARM
```

S obtain a chunk of a list of event names.

The value of API-PARM.API-SUB-FUNC is ignored.

This chapter covers the following topics:

- Local Data Area UPILSELE
- API Return Codes

Local Data Area UPILSELE

A definition of API-SELE-PARM is provided in LDA UPILSELE.

Field Name	Format	I/O
API-SELE-PARM	-	-
EVENT	A33	in
APPLICATION	A33	in
STATUS-FM-TYPE	A1	in
STATUS-FM	A33	in
STATUS-TO-TYPE	A1	in
STATUS-TO	A33	in
EXECUTION	A1	in
JCL-TEXT-NAME	A33	in
STATE	A1	in
NATURAL-COUNT-FM	N8	in
NATURAL-COUNT-TO	N8	in
ERRMESS-COUNT-FM	N8	in
ERRMESS-COUNT-TO	N8	in
PREDICT-COUNT-FM	N8	in
PREDICT-COUNT-TO	N8	in
FOREIGN-COUNT-FM	N8	in

Field Name	Format	I/O
FOREIGN-COUNT-TO	N8	in
USER-MODI	A9	in
USER-AUTH	A9	in
USER-SUBM	A9	in
USER-HOLD	A9	in
TIME-MODI-FM	T	in
TIME-MODI-TO	T	in
TIME-SCHE-FM	T	in
TIME-SCHE-TO	T	in
TIME-AUTH-FM	T	in
TIME-AUTH-TO	T	in
TIME-SUBM-FM	T	in
TIME-SUBM-TO	T	in
TIME-COMP-FM	T	in
TIME-COMP-TO	T	in
TIME-BACK-FM	T	in
TIME-BACK-TO	T	in
EV-CNT	N3	in/out
EV	A32 (1:60)	out
API-PAC-AREA	A145	in/out

When APINSELO is called:

- API-SELE-PARM.EVENT should be blank or carry a range of names of the events to be selected.
- API-SELE-PARM.APPLICATION should be blank or carry a range of names of the applications to which events must belong to be selected.
- API-SELE-PARM.STATUS-FM-TYPE should carry a character designating the type(s) of the origin statuses of the events to be selected. The following characters designate status types:

A	type of ARCHIVE
C	type of CONTROL
D	development
I	incorporation
M	maintenance
P	production
T	test
*	any
space	any

- API-SELE-PARM.STATUS-FM should be blank or carry a range of names of the statuses that may be the origin statuses of the events to be selected.
- API-SELE-PARM.STATUS-TO-TYPE should carry a character designating the type(s) of the destination statuses of the events to be selected.
- API-SELE-PARM.STATUS-TO should be blank or carry a range of names of the statuses that may be the destination statuses of the events to be selected.
- API-SELE-PARM.EXECUTION should carry a character designating the mode of execution of the events to be selected. The following characters designate modes of event execution:

B	batch
O	online
*	any
space	any

- API-SELE-PARM.JCL-TEXT-NAME should be blank or carry a range of names of the JCL texts used by the events to be selected.
- API-SELE-PARM.STATE should carry a character designating the state(s) of the events to be selected. The following characters designate job states.

A	authorised
B	backed out
C	completed
P	pending
S	started
U	submitted
V	validated
*	any
space	any

- API-SELE-PARM.NATURAL-COUNT-FM should carry a lower bound of the numbers of NATURAL objects that have participated in the migrations defined by the events to be selected.
- API-SELE-PARM.NATURAL-COUNT-TO should carry 0 or an upper bound of the numbers of NATURAL objects that have participated in the migrations defined by the events to be selected. If API-SELE-PARM.NATURAL-COUNT-TO = 0 then the selection of events is not restricted on the account of this parameter.
- API-SELE-PARM.ERRMESS-COUNT-FM should carry a lower bound of the numbers (counts) of error messages that have participated in the migrations defined by the events to be selected.
- API-SELE-PARM.ERRMESS-COUNT-TO should carry 0 or an upper bound of the numbers (counts) of error messages that have participated in the migrations defined by the events to be selected.

If API-SELE-PARM.ERRMESS-COUNT-TO = 0 then the selection of events is not restricted on the account of this parameter.

- API-SELE-PARM.PREDICT-COUNT-FM should carry a lower bound of the numbers of PREDICT objects or DDMs that have participated in the migrations defined by the events to be selected.
- API-SELE-PARM.PREDICT-COUNT-TO should carry 0 or an upper bound of the numbers of PREDICT objects or DDMs that have participated in the migrations defined by the events to be selected.

If API-SELE-PARM.PREDICT-COUNT-TO = 0 then the selection of events is not restricted on the account of this parameter.

- API-SELE-PARM.FOREIGN-COUNT-FM should carry a lower bound of the numbers of foreign objects that have participated in the migrations defined by the events to be selected.
- API-SELE-PARM.FOREIGN-COUNT-TO should carry 0 or an upper bound of the numbers of foreign objects that have participated in the migrations defined by the events to be selected. If API-SELE-PARM.FOREIGN-COUNT-TO = 0 then the selection of events is not restricted on the account of this parameter.
- API-SELE-PARM.USER-MODI should be blank or carry a range of ids of the users who have last modified the events to be selected.
- API-SELE-PARM.USER-AUTH should be blank or carry a range of ids of the users who have last authorised the events to be selected.
- API-SELE-PARM.USER-SUBM should be blank or carry a range of ids of the users who have last submitted the events to be selected.
- API-SELE-PARM.USER-HOLD should be blank or carry a range of ids of the users by whom the events to be selected remain locked.
- API-SELE-PARM.TIME-MODI-FM should carry a lower bound of the modification times of the events to be selected.
- API-SELE-PARM.TIME-MODI-TO should carry an upper bound of the modification times of the events to be selected or 0.

If API-SELE-PARM.TIME-MODI-TO = 0 then the selection of events is not restricted on the account of this parameter.

- API-SELE-PARM.TIME-SCHE-FM should carry a lower bound of the schedule times of the events to be selected.

- API-SELE-PARM.TIME-SCHE-TO should carry an upper bound of the schedule times of the events to be selected or 0. If API-SELE-PARM.TIME-SCHE-TO = 0 then the selection of events is not restricted on the account of this parameter.
- API-SELE-PARM.TIME-AUTH-FM should carry a lower bound of the authorisation times of the events to be selected.
- API-SELE-PARM.TIME-AUTH-TO should carry an upper bound of the authorisation times of the events to be selected or 0.

If API-SELE-PARM.TIME-AUTH-TO = 0 then the selection of events is not restricted on the account of this parameter.

- API-SELE-PARM.TIME-SUBM-FM should carry a lower bound of the submission times of the events to be selected.
- API-SELE-PARM.TIME-SUBM-TO should carry an upper bound of the submission times of the events to be selected or 0.

If API-SELE-PARM.TIME-SUBM-TO = 0 then the selection of events is not restricted on the account of this parameter.

- API-SELE-PARM.TIME-COMP-FM should carry a lower bound of the completion times of the events to be selected.
- API-SELE-PARM.TIME-COMP-TO should carry an upper bound of the completion times of the events to be selected or 0. If API-SELE-PARM.TIME-COMP-TO = 0 then the selection of events is not restricted on the account of this parameter.
- [API-SELE-PARM.EV-CNT] is made 0, if negative; it is made 60, if greater than 60. It is then interpreted as the maximum number of event names to be returned; no event names will be returned, if API-SELE-PARM.EV-CNT = 0.
- Normally, API-SELE-PARM.PAC-AREA should be reset when the first chunk of a list of event names is wanted. API-SELE-PARM.PAC-AREA should be left untouched for a next call to obtain an immediately following chunk of the same list.

APINSELE returns in API-SELE-PARM.EV-CNT the number of event names in the returned chunk; it may be less than the adjusted original value, if the end of the event name list has been reached.

If no job satisfying the selection criteria is found or a non-positive [API-SELE-PARM.EV-CNT] has been specified then APINSELE returns 0 in API-SELE-PARM.EV-CNT.

If APINSELE returns a non-zero [API-SELE-PARM.EV-CNT] then it returns the chunk of the list of the names of the events satisfying the selection criteria in API-SELE-PARM.NUMBER(1:[API-SELE-PARM.EV-CNT]).

API Return Codes

APINSELE returns the following [API-PARM.API-MSG-NO]:

- 0000 if at least one event satisfying the selection criteria has been found and a non-final chunk of a list of the names of the events satisfying the selection criteria is being returned,
- 1011 if [API-PARM.API-MAIN-FUNC] other than 'S' has been specified,
- 7251 if events satisfying the selection criteria have been sought but none has been found,
- 9999 if at least one event satisfying the selection criteria has been found and a final chunk of a list of the names of the events satisfying the selection criteria is being returned.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations.

APINSELO

This API lets obtain chunks of lists of current and historical object status links.

APINSELO can be invoked thus:

CALLNAT 'APINSELO' API-PARM API-OBJECT-STATUS API-PAC-AREA

- H get a list of both the current and the historical object status links satisfying the selection criteria
- N get a list of objects not assigned to a status.
- O obtain a chunk of a list of objects belonging to a given application and emigrated to a given test, production, or maintenance deployment
- S obtain a chunk of a list of object status links for any, or one given, application and any status
- blank get a list of only the current object status links satisfying the selection criteria

This chapter covers the following topics:

- Local Data Area UGNASELO
- API Return Codes

Local Data Area UGNASELO

A definition of API-OBJECT-STATUS is provided in PDA .

Field Name	Format	I/O
API-OBJECT-STATUS		
API-APPLICATION	A32	in
API-STATUS	A32	in
API-SEL-OBJECT	A32	in
API-OBJECT-LIST	A32(10)	out
API-OBJVER-LIST	N5(10)	out
API-OBJTYP-LIST	A6(10)	out
API-APPLICATION-LIST	A32(10)	out
API-STATUS-LIST	A32(10)	out
API-TIME-IN-LIST	T(10)	out
API-TIME-OU-LIST	T(10)	out
API-COUNT	N2	out
API-PAC-AREA	B126	out

When APINSELO is called:

- API-OBJECT-STATUS.API-SEL-OBJECT should carry an object name specification. '*', '<', or '>' may be used.
- A single application must be specified in API-OBJECT-STATUS.API-APPLICATION if [API-PARM.API-MAIN-FUNC] = 'O'.
- A single application may be specified in API-OBJECT-STATUS.API-APPLICATION if [API-PARM.API-MAIN-FUNC] = 'S'.

Please note that inter-application searches may take very long.

- A single status must be specified in API-OBJECT-STATUS.API-STATUS if [API-PARM.API-MAIN-FUNC] = 'O'; the field's value is ignored if [API-PARM.API-MAIN-FUNC] = 'S'.
- Normally, API-OBJECT-STATUS.API-PAC-AREA should be reset when the first chunk of a list is required and left untouched for a next call to obtain the following chunk of the same list.
- To select objects that have no status, set [API-PARM.API-MAIN-FUNC] = 'N' and [API-PARM.API-SUB-FUNC] = blank. This will produce a list of objects that have no status.

APINSELO returns in API-OBJECT-STATUS.API-COUNT the number of object status links in the returned chunk.

The [API-OBJECT-STATUS.API-TIME-IN-LIST] of a link is the time of the versioned object's emigration to the deployment.

The [API-OBJECT-STATUS.API-TIME-OU-LIST] of a link is the time at which a PAC migration was run to remove the object from, or supersede it in, the deployment. This value is non-null only if the link is historical.

API Return Codes

APINSELO returns the following [API-PARM.API-MSG-NO]:

- 0000 if object - status links satisfying the selection criteria have been found and a chunk of their list is being returned,
- 1011 if the specified ([API-PARM.API-MAIN-FUNC],[API-PARM.API-SUB-FUNC]) is meaningless,
- 7325 if no object - status links have been found to satisfy the selection criteria,
- 9999 only if object status links satisfying the selection criteria have been found and the final chunk of their list is being returned.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations.

Status API

API Routine: APINSTAT

Parameters: UGNLPARM, UAPLSTAT

The Status API allows users to add, modify or display (retrieve) information about a particular status. The following functions are valid:

- A Add status.
- D Display status (Retrieve).
- M Modify an existing status.

This chapter covers the following topics:

- Local Data Area UAPLSTAT
 - Status API Return Codes
-

Local Data Area UAPLSTAT

The fields to be passed to the API as the second parameter are in the supplied local data area UAPLSTAT. The following is a detailed description of these fields:

Field Name	Format	Description	
STATUS	A32	Name of the Status.	
STATUS-TYPE	A2	Type of the Status. Valid Status types are:	
		A	Archive
		C	Control
		D	Development
		H	History
		I	Incorporation
		M	Maintenance
		P	Production
		R	Retire
		T	Test
FUSER-DBID	N5	Database ID number where the application is located.	
FUSER-FNR	N5	File number where the application is located.	
FDIC-DBID	N5	Database ID number where the XREF information is located.	
FDIC-FNR	N5	File number where the XREF information is located.	
XREF	A1	Local or remote XREF.	
MOD-TIME	T	Date and time status was last modified.	
MOD-BY	A8	User that last modified status.	
MOD-TID	A8	Terminal that last modified status.	
ADD-TIME	T	Date and time status was added.	
ADD-BY	A8	User that added status.	
ADD-TID	A8	Terminal that added status.	
NOTES	A60 (1:3)	Comments.	

Status API Return Codes

7250 Status exists.

7251 Status not found.

7253 Status added.

7254 Status has been modified.

APINTEXT

This API lets obtain chunks of

- migration lists of events,
- migration lists of finalized archiving events,
- audit reports of events,
- audit reports of finalized archiving events,
- descriptions of events,
- descriptions of maintenance requests, JCL texts.

APINTEXT can be invoked thus:

CALLNAT 'APINTEXT' API-PARM API-TEXT-PARM

- D obtain a chunk of a description
- E handle an event
- H handle a finalized archiving event
- J obtain a chunk of a JCL text
- J handle a JCL text
- M obtain a chunk of a migration list
- M handle a maintenance request
- R obtain a chunk of an audit report

This chapter covers the following topics:

- Local Data Area UGNLTEXT
- API Return Codes

Local Data Area UGNLTEXT

A definition of API-TEXT-PARM is provided in LDA UGNLTEXT.

Field Name	Format	I/O
API-TEXT-PARM	A32	in
OBJECT-NAME	A32	in
LINE-CNT	P5	in/out
TEXT-RECORD	A80(1:10)	out
PAC-AREA	B20	in/out

When APINTEXT is called:

- API-TEXT-PARM.OBJECT-NAME should carry the name of the entity (event, finalized archiving event, maintenance request, or JCL text).
- [API-TEXT-PARM.LINE-CNT] is made 0, if negative; it is made 10, if greater than 10. It is then interpreted as the number of lines (the size of the chunk) to be returned. In particular, no lines will be returned, if LINE-CNT = 0.
- Normally, API-TEXT-PARM.PAC-AREA should be reset when the first chunk of the list, report, description, or text is required and left untouched for a next call to obtain an immediately following chunk of the same list, report, description, or text.
- APINTEXT returns in API-TEXT-PARM.LINE-CNT the number of lines (the size) of the returned chunk. It may be less than the adjusted original value if the end of the list, report, description, or text has been reached.

API Return Codes

APINTEXT returns the following [API-PARM.API-MSG-NO]:

- 0000 if the entity has been found and a non-final chunk is being returned,
- 1011 if the specified ([API-PARM.API-MAIN-FUNC],[API-PARM.API-SUB-FUNC]) is meaningless,
- 7251 if the entity has not been found,
- 9999 if the entity has been found and a final chunk is being returned.

Other values of API-PARM.API-MSG-NO may be received in more unusual situations.