



VisualAge Pacbase



Date processing in VisualAge Pacbase in relation to the Year 2000

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SITUATION BEFORE RELEASE 2.0

Operators	Description	Batch, TP	Impact YEAR 2000
ADI	Inversion of a 6-char. date : xxyyzz -> zzyyxx	Batch	No
ADE	Insertion of / in a 6-char. date: xxyyzz -> xx/yy/zz	Batch	No
ADS	Inversion of an 8-char. date c : ccyymmdd -> mmdccyy	Batch	No
ADM	Insertion of / in an 8-char. date : mmdccyy -> mm/dd/ccyy	Batch	No
AD6	Call of the system date by loading DATOR ¹ and result formatted mmddy in the operands field	TP	No
AD8	Call of the system date by loading DATOR and result formatted mm/dd/yy in the operands field	TP	No
ADT	Call of the system date on 6 char. by loading DATOR [and transfer of DATOR in the operands field] ²	Batch/TP	Yes
ADC	Call of the system date on 6 char. by loading DATOR [and transfer of DATCE ¹ in the operands field (the value of the CENTUR century is 19)] ²	Batch/TP	Yes
AD xy ³ date1 date2	Transformation of date1 format x into date2 format y: the century included in date2 takes the CENTUR value, that is 19	Batch/TP	Yes

¹ Reminder: Format of DATOR and DATCE :

01 DATCE.
 05 CENTUR PIC XX VALUE '19'.
 05 DATOR.
 10 DATOA PIC XX.
 10 DATOM PIC XX.
 10 DATOJ PIC XX.

² Since release 1.2 V12, the value of CENTUR had been assigned by a windowing on the year 61 for COBOL 2, 370 and 85

³ Where x is a date format without the century and y a date format with the century.

ENHANCEMENT OF RELEASE 2.0

The release 2.0 enhances date processing to make it easier to transform applications for the year 2000 roll-over. This enhancement focuses on:
The processing of system date,
The handling of dates in specific procedures,
The check of dates in the applications produced with Pacbench (on-line) or Pacbench Client/Server.
In general terms, with these specifications, the century (19 or 20) is added to a date without the century by a fixed windowing technique based on the date year.
Other specifications are under study, especially in Reports. They aim at extending the transformation operations to the -CE.

Processing of System Date

Principle

The principle is to assign the correct value to the century, CENTUR, included in the system date (or processing date) according to the year of this system date.

The value is assigned by a windowing technique in relation to a year of reference positioned in the DAT-CTYD variable. This variable is set to 61 by default. The rule is the following:

In the WORKING-STORAGE SECTION:

```
01  DATCE.
    05  CENTUR    PICTURE XX      VALUE '19'.
    05  DATOR.
    10  DATOA     PICTURE XX
    10  DATOM     PICTURE XX
    10  DATOJ     PICTURE XX
01  DAT-TRANS.
    10  DAT-CTYD  PICTURE XX      VALUE '61'.
```

.....

In the PROCEDURE DIVISION:

Call of system date (specific to each generation variant and/or TP monitor)

```
IF DATOA < DAT-CTYD MOVE 20 TO CENTUR END IF
```

Warning: the century is assigned a value by the windowing technique only if the following conditions are fulfilled:

for an IBM MVS target: generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition and generation variant = X on the Definition of the entity to be generated.

for all the other targets: : generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition.

In other cases, the instruction IF DATOA ... is not generated and the century (CENTUR) included in the system date is set to the value 19 by default.

Handling of Dates in Specific Procedures

Principle

To handle dates in specific procedures, the release 2.0 offers you new operators which complement the existing AD operator. These operators transform a date which does not include the century into a date which includes the century. The century is assigned using the following techniques:

Operators	Description
AD xy date1 date2 (reminder)	Transformation of date1 format x into date2 format y, without windowing: the century included in date2 takes the value of the DAT-CTY variable which is loaded by CENTUR (CENTUR is set to 19 or takes the value of the century included in the system date in Pacbench (on-line) or if preceded by operator ADT and/or ADC).
AD0 xy date1 date2	Transformation of date1 format x into date2 format y, without windowing: the century included in date2 takes the value of the DAT-CTY variable (initialized to 19) which must be set previously via user processing.
AD1 xy date1 date2	Transformation of date1 format x into date2 format y, with windowing: the century included in date2 takes the value 19 if date1 year < DAT-CTYT variable, or the value 20 otherwise. DAT-CTYT is set to 61 by default.
AD2 xy date1 date2	Transformation of date1 format x into date2 format y, with windowing: the century included in date2 takes the value 20 if date1 year < DAT-CTYT variable, or the value 19 otherwise. DAT-CTYT is set to 61 by default.

These AD, AD0, AD1 and AD2 operators can be used in specific procedures with whatever generator (Pacbench (on-line and batch) or Pacbench Client/Server) and whatever generated language (COBOL 1 or COBOL 2) and generation variant.

These operators, coded ADn xy DATE1 DATE2, are sensitive to the year 2000 only if x corresponds to a date format without the century (values D, E, I) and y a date format with the century (values C, M, S, G).

Of course they can be used with other values for x and y and if so they will always give equivalent results whatever ADn operator is used.

Date Check in the Applications Developed with Pacbench (on-line) or Pacbench Client/Server

Principle

Pacbench (on-line) and Pacbench Client/Server generate an automatic check for dates entered on the screen, if these dates are declared with a date format in the Dictionary. Before release 2.0, when a date without the century was checked, the century added to it always corresponded to CENTUR, that is the date system. With release 2.0, the century corresponding to the year entered can now be added, that is the century's value is given according to the same windowing technique as that used for ADn operators.

Operations and Recommendations in Pacbench (Batch)

Processing of System Date

Operations

The system date is called via the ADT and/or ADC operators in specific procedures.

Reminder: the century is assigned a correct value if the following generation conditions are fulfilled:

for an IBM MVS target: generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition **and generation variant = X** on the Definition of the entity to be generated.

for all the other targets: : generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition.

In other cases, the CENTUR century of the system date is set to the value 19 by default.

For ADT and ADC operators, the system date is retrieved without the century (on 6 characters) in the DATOR variable in the YYMMDD format and the value of the century is assigned in CENTUR. The system date with the century (on 8 characters) is then always available in DATCE.

The only difference between ADT and ADC lies in the presence of an operand following the operator. In this case, the value of this operand is given by DATOR for ADT and by DATCE for ADC.

Recommendations

-The system date has a precise meaning since it is the date of the processing. So it is highly recommended to use the receiving variables DATCE, CENTUR and DATOR (and its breakdown) only in this way. In particular CENTUR is and must remain the century associated with the processing date and must not be used to give the value to the century in dates (entered or already stored) which do not functionally correspond to the processing date.

-The level 01 DATCE and its breakdown in CENTUR and DATOR are always generated in the WORKING-STORAGE Section. But these variables are assigned a value only after the execution of an ADT/ADC operator. So such an operator must be inserted (at the beginning of the program) before these variables are handled.

-The year of reference, 61, used in the windowing technique to give a value to the century included in the system date can be modified in DAT-CTYD variable. But you must be aware that the windowing is fixed. The year of reference must be chosen once for all according to the expected durability of your application or program and cannot vary according to the date of processing. The default value, 61, should be adapted to most cases.

-If the above generation conditions are not possible, in particular because the target is COBOL 1 or 74, **after the call of the system date, the correct value must be assigned to the CENTUR century**. This can be done via the same windowing technique as that used by the generator (the new operators can be used, see.0).

Handling of Dates in Specific Procedures

Operations

The date handling operators available in Pacbench (batch) generator can be used in specific procedures (line P).

These operators are presented in the following two charts:

The first chart groups operators which bear in themselves the expected formats of the source and target dates. They are coded ADi DATE1 DATE2 are have always been available.

Operator	DATE1	DATE2
ADE	mmddy	mm/dd/yy
ADI	mmddy yymmdd	mmddy mmddy
ADS	ccyymmdd	mmddccyy
ADM	mmddccyy	mm/dd/ccyy

The COBOL generated for these operators includes the date transformation instructions. These operators never assign a value to the century, so they are not sensitive to the year 2000. The second chart groups generic operators: the expected formats of the source and target dates are specified in the operands and are not borne by the operators themselves. These operators are coded ADn xy DATE1 DATE2, where :
 ADn can be AD, AD0, AD1, ou AD2, and
 x and y specify the expected format of the DATE1 source date and of the DATE2 target date respectively, according to the following values:

ADn xy where x= and y =	E mm/dd/yy	D mmddy	I yymmdd	C mmddccy y	M mm/dd/ccyy	S ccyyymmdd	G ccyy-mm-dd
E mm/dd/yy							
D mmddy							
I yymmdd							
C mmddccyy	Year 2000	Year 2000	Year 2000				
M mm/dd/ccyy	Year 2000	Year 2000	Year 2000				
S ccyyymmdd	Year 2000	Year 2000	Year 2000				
G ccyy-mm-dd	Year 2000	Year 2000	Year 2000				

All combinations of x and y are possible (if x=y, no result visible).

These operators have been available in Pacbench (batch) since release 2.0.

The COBOL generated for these operators does not directly include the instructions for the date transformation but the PERFORM of a sub-function which transforms dates. By default, it is the sub-function 9520 whose level is 10. If this sub-function is used in other user processing, you can change the code of the date transformation sub-function by entering an optional parameter in the program's -G in the following way:

O DATPRO=FUSF where FUSF is the code of the function/sub-function desired.

Some combinations of these operators (x = D, E, I combined with y = C, M, S, G) which transform a date without the century into a date with the century are sensitive to the year 2000. In this case, the value of the century varies according to the operator itself:

for AD: the century included in DATE2 is the CENTUR variable,

for AD0: the century included in DATE2 is the DAT-CTY variable, whose expected value must be given before the execution of the operator,

for AD1 : the century included in DATE2 takes the value 19 if the year included in DATE1 < DAT-CTYT variable, or the value 20 otherwise. DAT-CTYT is set to 61 by default,

for AD2 : the century included in DATE2 takes the value 20 if the year included in DATE1 < DAT-CTYT variable, or the value 19 otherwise. DAT-CTYT is set to 61 by default.

Except these differences in the value assigned to the century, AD, AD0, AD1, and AD2 always give equivalent results.

Recommendations

For the year 2000-non sensitive operators

These operators are not sensitive to the year 2000 because they do not assign a value to the century.

-However in a YEAR 2000 transformation project, they must be considered because the date variables entered in the operands field may undergo changes in their format. Then the existing operator must be replaced by the appropriate one. For example:

If in the transformation strategy, DATE1 and DATE2 are extended (by the addition of the century), then the ADI DATE1 DATE2 instruction must be replaced either by ADn CS DATE1 DATE2.

Or, if DATE2 alone is extended, the same instruction must be replaced by an instruction coded ADn DS DATE1 DATE2. ADn is chosen according to the desired value of the century.

-In this type of transformation, it is also recommended **to check that DATE1 and DATE2 have the expected formats**. In the previous example, ADI (which switches round the first two characters and the last two ones) may be used not only for the transformation of DATE1 formatted mmddyy into DATE2 formatted yymmdd, which is the standard case, but also for the transformation of DATE1 formatted yymmdd into DATE2 formatted mmddyy. In the first case its equivalent if the formats are extended is ADn CS DATE1 DATE2 (switch round of mm and ccyy), but in the second case ADn SC DATE1 DATE2 (switch round of ccyy and mm).

For the year 2000-sensitive operators

These operators are sensitive to the year 2000 because they transform a date without the century into a date with the century by assigning a value to the century according to the rules indicated above.

-The use of AD operator must be reserved for the formatting of dates which correspond to the processing date (equivalent to DATOR) since the century taken into account is CENTUR. Therefore when you transform your applications for the year 2000 roll-over, you are advised to replace the AD operator related to dates which do not correspond to the processing date with the appropriate ADn operator.

-The use of AD operator must be preceded by an ADT or ADC operator in the programs generated with Pacbench (batch) so that CENTUR is assigned the correct value.

- The use of AD0 operator must always be preceded by the assignation of the value to the century in the DAT-CTY variable, because DAT-CTY must be considered as a volatile variable.

-The AD1 and AD2 operators are to be used if the value of the century is to be assigned by a windowing technique, for all the dates (entered or already stored) which do not functionally represent the processing date.

-The windowing used with the AD1 and AD2 operators is fixed. The year of reference positioned in the DAT-CTYT variable (set to 61 by default) must be chosen according to the functional durability of the dates processed. You must be aware that dates whose functional durability is more than a century (ex: date of birth) cannot be processed with a windowing technique all the more since this technique is based on the year only.

-The AD0 and AD1 operators are available but they are very seldom used.

General Rule

-Before using ADn operators, with whatever operator and value of xy, you must check that:

the sub-function 9520 is not used in user processing,

no function 95 is performed,

no sub-function 95XX precedes function 9520 with a level lower than 10 because it would then include sub-function 9520.

no sub-function 95XX follows function 9520 with a level higher than 10 because it would then be include in sub-function 9520.

If one of these conditions is not fulfilled, you must choose a code different from 9520 for the date transformation sub-function in the program's -G, as explained in 3.2.1.

Handling of dates in Reports

Operations

Reports include operations in their –CE to print dates:

Operation code	Source format	Printed format
D	mmddy	mm/dd/yy
I	yymmdd	mm/dd/yy
C	mmddccyy	mm/dd/ccyy

The release 2.0 does not modify these operators. However specifications are being studied to extend the possibility of date transformation in Reports.

Recommendations

In the YEAR 2000 transformation projects, the printing of dates in Reports can be modified:

If the date has been extended but is still printed without the century,

The date to be printed must be formatted in specific procedures in a working area before the printing (use of perform in the –D of the Report associated with the printing structure) and the modification of the source date in the Report. It is then recommended to use the ADn operators for this formatting.

For source dates formatted ccymmdd, you can use the following tip: if the language is COBOL 85, enter 3:6 in the index field of –CE without changing the operation (generation of MOVE DATE (3:6)).

If the source date is extended and printed with the century,

A source date formatted mmddccyy can be printed in an automatic way under the format mm/dd/ccyy only (replacement of code operation D with C).

If the source date has another format, the date to be printed must be formatted in a working area before the printing (use of perform in the –D of the Report associated with the printing structure) and the modification of the source date in the Report. It is then recommended to use the ADn operators for this formatting.

If the source date remains without the century but must be printed with the century.

The date to be printed must be formatted in specific procedures in a working area before the printing (use of perform in the –D of the Report associated with the printing structure) and the modification of the source date in the Report. It is then recommended to use the ADn operators for this formatting and for the assignation of the century value.

Operations and Recommendations in Pacbench (on-line) and in the Client Components of Pacbench Client/Server

Processing of System Date

Operations

The system date, or processing date, is called in function F010 automatically in all the programs generated by Pacbench (on-line) and in the client components generated by Pacbench Client/Server.

Two operators, AD6 and AD8, also call the system date and transfer it in the receiving operands field under the formats mmddyy and mm/dd/yy respectively.

Reminder: the century is assigned a correct value if the following generation conditions are fulfilled:
for an IBM MVS target: generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition **and generation variant = X** on the Definition of the entity to be generated.

for all the other targets: : generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition.

In other cases, the CENTUR century of the system date is set to the value 19 by default.

The system date is retrieved without the century (on 6 characters) in the DATOR variable in the YYMMDD format and the value of the century is assigned in CENTUR. The system date with the century (on 8 characters) is then always available in DATCE.

The ADT and ADC operators are available but useless.

Recommendations

-The system date has a precise meaning since it is the date of the processing. So it is highly recommended to use the receiving variables DATCE, CENTUR and DATOR (and its breakdown) only in this way. In particular CENTUR is and must remain the century associated with the processing date and must not be used to give the value to the century in dates (entered or already stored) which do not functionally correspond to the processing date.

-The year of reference, 61, used in the windowing technique to give a value to the century included in the system date can be modified in DAT-CTYD variable. But you must be aware that the windowing is fixed. The year of reference must be chosen once for all according to the expected durability of your application or program and cannot vary according to the date of processing. The default value, 61, should be adapted to most cases.

-If the above generation conditions are not possible, in particular because the target is COBOL 1 or 74, **CENTUR must be assigned its correct value right after the execution of function F010**. This can be done via the same windowing technique as that used by the generator (the new operators can be used, see.0).

Handling of Dates in Specific procedures

Operations

The date handling operators available in Pacbench (on-line) and Pacbench Client/Server via the use of structured code (P lines) are generic operators: the expected formats of the source and target dates are specified in the operands and are not borne by the operators themselves. These operators are coded ADn xy DATE1 DATE2, where :

ADn can be AD, AD0, AD1, or AD2, and

x and y specify the expected format of the DATE1 source date and of the DATE2 target date respectively, according to the following values:

ADn xy where x= and y =	E mm/dd/yy	D mmddy	I yymmdd	C mmddccy y	M mm/dd/ccyy	S ccyymmdd	G ccyy-mm- dd
E mm/dd/yy							
D mmddy							
I yymmdd							
C mmddccyy	Year 2000	Year 2000	Year 2000				
M mm/dd/ccyy	Year 2000	Year 2000	Year 2000				
S ccyymmdd	Year 2000	Year 2000	Year 2000				
G ccyy-mm-dd	Year 2000	Year 2000	Year 2000				

All combinations of x and y are possible (if x=y, no result visible).

These operators have been available since release 2.0.

The COBOL generated for these operators, like for the existing AD operator, does not directly include the instructions for the date transformation but the PERFORM of a sub-function which transforms dates. By default, it is the sub-function 8120 whose level is 10. The function 81 and consequently all the sub-functions 81XX have always been reserved functions/sub-functions in Pacbench (on-line) and Pacbench Client/Server.

Some combinations of operators (x = D, E, I combined with y = C, M, S, G) which transform a date without the century into a date with the century are sensitive to the year 2000. In this case, the value of the century varies according to the operator itself:

for AD: the century included in DATE2 is the CENTUR variable,

for AD0: the century included in DATE2 is the DAT-CTY variable, whose expected value must be given before the execution of the operator,

for AD1 : the century included in DATE2 takes the value 19 if the year included in DATE1 < DAT-CTYT variable, or the value 20 otherwise. DAT-CTYT is set to 61 by default,

for AD2 : the century included in DATE2 takes the value 20 if the year included in DATE1 < DAT-CTYT variable, or the value 19 otherwise. DAT-CTYT is set to 61 by default.

Except these differences in the value assigned to the century, AD, AD0, AD1, and AD2 always give equivalent results.

Recommendations

For the year 2000-non sensitive xy combinations (see previous chart)

These operators are not sensitive to the year 2000 because they do not assign a value to the century.

-However in a YEAR 2000 transformation project, they must be considered because the date variables entered in the operands field may undergo changes in their format. Then the existing operator must be replaced by the appropriate one. For example:

If in the transformation strategy, DATE1 and DATE2 are extended (by the addition of the century), then the AD DI DATE1 DATE2 instruction must be replaced either by ADn CS DATE1 DATE2.

Or, if DATE2 alone is extended, the same instruction must be replaced by an instruction coded ADn DS DATE1 DATE2. ADn is chosen according to the desired value of the century.

-In this type of transformation, it is also recommended **to check that DATE1 and DATE2 have the expected formats**. In the previous example, AD DI (which switches round the first two characters and the last two ones) may be used not only for the transformation of DATE1 formatted mmddy into DATE2 formatted yymmdd, which is the standard case, but also for the transformation of DATE1 formatted yymmdd into DATE2 formatted mmddy. In the first case its equivalent if the formats are extended is ADn CS DATE1 DATE2 (switch round of mm and ccyy), but in the second case ADn SC DATE1 DATE2 (switch round of ccyy and mm).

For the year 2000- sensitive xy combinations (see previous chart)

These operators are sensitive to the year 2000 because they transform a date without the century into a date with the century by assigning a value to the century according to the rules indicated above.

- The use of AD operator must be reserved for the formatting of dates which correspond to the processing date (equivalent to DATOR) since the century taken into account is CENTUR. Therefore when you transform your applications for the year 2000 roll-over, you are advised to replace the AD operator related to dates which do not correspond to the processing date with the appropriate ADn operator.
- The use of AD0 operator must always be preceded by the assignation of the value to the century in the DAT-CTY variable, because DAT-CTY must be considered as a volatile variable.
- The AD1 and AD2 operators are to be used if the value of the century is to be assigned by a windowing technique, for all the dates (entered or already stored) which do not functionally represent the processing date.
- The windowing used with the AD1 and AD2 operators is fixed. The year of reference positioned in the DAT-CTYT variable (set to 61 by default) must be chosen according to the functional durability of the dates processed. You must be aware that dates whose functional durability is more than a century (ex: date of birth) cannot be processed with a windowing technique all the more since this technique is based on the year only.
- The AD0 and AD1 operators are available but they are very seldom used.

Automatic Date Check

Operations

An automatic date check is generated for all the dates entered on a screen if these dates are defined with a date format in the Dictionary.

The generated check function (F20) includes a perform of the sub-function F8120 which formats and checks the date.

Before release 2.0, the century associated with a date which did not include the century at the time of the check function was always CENTUR, that is the century of the processing date.

With release 2.0, the century associated with a date which does not include the century at the time of the check function can now be given by the windowing technique on the value of the DAT-CTYT variable.

To do so, you simply have to set the value 1 or 2 to the DAT-ADO variable before function F20 (Data Element check).

The century will then be assigned a value like for the AD1 and AD2 operators respectively.

Recommendations

-Even if the only difference in the date validity between the 20th and the 21st centuries is February 29th 00, it is recommended to use this functionality following the technique explained above because otherwise:

If no AD0, AD1 or AD2 operator is coded, the DAT-ADO variable will be assigned the value SPACE by default, and the century associated with the date being checked will be CENTUR, that is the century of the processing date.

However the dates entered do not generally functionally correspond to the processing date.

If an AD0, AD1 or AD2 operator is coded, the DAT-ADO variable will be assigned the value 0, 1 or 2 depending on the last operator executed, and the century associated with the date being checked will be that of the last date transformed.

Operations and Recommendations in the Server Components of Pacbench Client/Server

Processing of System Date

Operations

The system date is called, if necessary, by the ADT and/or ADC operators in specific procedures.

Reminder: the century is assigned a correct value if the following generation conditions are fulfilled:

for an IBM MVS target: generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition **and generation variant = X** on the Definition of the entity to be generated.

for all the other targets: : generated language = D (COBOL 2, COBOL 85, COBOL 370) on the Library Definition.

In other cases, the CENTUR century of the system date is set to the value 19 by default.

For both ADT and ADC operators, the system date is retrieved without the century (on 6 characters) in the DATOR variable in the YYMMDD format and the value of the century is assigned in CENTUR. The system date with the century (on 8 characters) is then always available in DATCE.

The only difference between ADT and ADC lies in the presence of an operand following the operator. In this case, the value of this operand is given by DATOR for ADT and by DATCE for ADC.

Recommendations

-The system date has a precise meaning since it is the date of the processing. So it is highly recommended to use the receiving variables DATCE, CENTUR and DATOR (and its breakdown) only in this way. In particular CENTUR is and must remain the century associated with the processing date and must not be used to give the value to the century in dates (entered or already stored) which do not functionally correspond to the processing date.

-The level 01 DATCE and its breakdown in CENTUR and DATOR are always generated in WORKING. But these variables are given a value only after the execution of an ADT/ADC operator. So such an operator must be inserted (at the beginning of the program) before these variables are handled.

-The year of reference, 61, used in the windowing technique to give a value to the century included in the system date can be modified in DAT-CTYD variable. But you must be aware that the windowing is fixed. The year of reference must be chosen once for all according to the expected durability of your application or program and cannot vary according to the date of processing. The default value, 61, should be adapted to most cases.

-If the above generation conditions are not possible, in particular because the target is COBOL 1 or 74, **CENTUR must be assigned its correct value right after the call of the system date**. This can be done via the same windowing technique as that used by the generator (the new operators can be used, see.0).

Handling of Dates in Specific Procedures

Operations

The date handling operators available in Pacbench (on-line) and in the client components of Pacbench Client/Server via the use of structured code (P lines) are generic operators: the expected formats of the source and target dates are specified in the operands and are not borne by the operators themselves. These operators are coded ADn xy DATE1 DATE2, where :

ADn can be AD, AD0, AD1, or AD2, and

x and y specify the expected format of the DATE1 source date and of the DATE2 target date respectively, according to the following values:

ADn xy where x= and y =	E mm/dd/yy	D mmddy	I yymmdd	C mmddccy y	M mm/dd/ccyy	S ccyymmdd	G ccyy-mm- dd
E mm/dd/yy							
D mmddy							
I yymmdd							
C mmddccyy	Year 2000	Year 2000	Year 2000				
M mm/dd/ccyy	Year 2000	Year 2000	Year 2000				
S ccyymmdd	Year 2000	Year 2000	Year 2000				
G ccyy-mm-dd	Year 2000	Year 2000	Year 2000				

All combinations of x and y are possible (if x=y, no result visible).

These operators have been available since release 2.0.

The COBOL generated for these operators, like for the existing AD operator, does not directly include the instructions for the date transformation but the PERFORM of a sub-function which transforms dates. By default, it is the sub-function 8120 whose level is 10. The function 81 and consequently all the sub-functions 81XX have always been reserved functions/sub-functions in these generators.

Some combinations of operators (x = D, E, I combined with y = C, M, S, G) which transform a date without the century into a date with the century are sensitive to the year 2000. In this case, the value of the century varies according to the operator itself:

for AD: the century included in DATE2 is the CENTUR variable,

for AD0: the century included in DATE2 is the DAT-CTY variable, whose expected value must be given before the execution of the operator,

for AD1 : the century included in DATE2 takes the value 19 if the year included in DATE1 < DAT-CTYT variable, or the value 20 otherwise. DAT-CTYT is set to 61 by default,

for AD2 : the century included in DATE2 takes the value 20 if the year included in DATE1 < DAT-CTYT variable, or the value 19 otherwise. DAT-CTYT is set to 61 by default.

Except these differences in the value assigned to the century, AD, AD0, AD1, and AD2 always give equivalent results.

Recommendations

For the year 2000-non sensitive xy combinations (see previous chart)

These operators are not sensitive to the year 2000 because they do not assign a value to the century.

-However in a YEAR 2000 transformation project, they must be considered because the date variables entered in the operands field may undergo changes in their format. Then the existing operator must be replaced by the appropriate one. For example:

If in the transformation strategy, DATE1 and DATE2 are extended (by the addition of the century), then the AD DI DATE1 DATE2 instruction must be replaced either by ADn CS DATE1 DATE2.

Or, if DATE2 alone is extended, the same instruction must be replaced by an instruction coded ADn DS DATE1 DATE2. ADn is chosen according to the desired value of the century.

-In this type of transformation, it is also recommended **to check that DATE1 and DATE2 have the expected formats**. In the previous example, AD DI (which switches round the first two characters and the last two ones) may be used not only for the transformation of DATE1 formatted mmddy into DATE2 formatted yymmdd, which is the standard case, but also for the transformation of DATE1 formatted yymmdd into DATE2 formatted mmddy. In the first case its equivalent if the formats are extended is ADn CS DATE1 DATE2 (switch round of mm and ccyy), but in the second case ADn SC DATE1 DATE2 (switch round of ccyy and mm).

For the year 2000- sensitive xy combinations (see previous chart)

These operators are sensitive to the year 2000 because they transform a date without the century into a date with the century by assigning a value to the century according to the rules indicated above.

- The use of AD operator must be reserved for the formatting of dates which correspond to the processing date (equivalent to DATOR) since the century taken into account is CENTUR. Therefore when you transform your applications for the year 2000 roll-over, you are advised to replace the AD operator related to dates which do not correspond to the processing date with the appropriate ADn operator.
- The use of AD operator must always be preceded by the execution of an ADT or ADC operator, otherwise the value assigned to the CENTUR century remains 19.
- The use of AD0 operator must always be preceded by the assignation of the value to the century in the DAT-CTY variable, because DAT-CTY must be considered as a volatile variable.
- The AD1 and AD2 operators are to be used if the value of the century is to be assigned by a windowing technique, for all the dates (entered or already stored) which do not functionally represent the processing date.
- The windowing used with the AD1 and AD2 operators is fixed. The year of reference positioned in the DAT-CTYT variable (set to 61 by default) must be chosen according to the functional durability of the dates processed. You must be aware that dates whose functional durability is more than a century (ex: date of birth) cannot be processed with a windowing technique all the more since this technique is based on the year only.
- The AD0 and AD1 operators are available but they are very seldom used.

Automatic Date Check

Operations

An automatic date check is generated for any date which belongs to the Logical View if the option CHECKSER=YES has been coded in the -G of the corresponding Dialog entity and if the date is defined with a date format in the Dictionary.

The generated check function (Fvvvv-CHKD-CATA-DATE1) includes a perform of the sub-function F8120 which formats and checks the date.

Before release 2.0, the century associated with a date which did not include the century at the time of the check function was always CENTUR, that is the century of the processing date.

With release 2.0, the century associated with a date which does not include the century at the time of the check function can now be given by the windowing technique on the value of the DAT-CTYT variable.

To do so, you simply have to set the value 1 or 2 to the DAT-ADO variable before the Data Element check function. The century will then be assigned a value like for the AD1 and AD2 operators respectively.

Recommendations

-Even if the only difference in the date validity between the 20th and the 21st centuries is February 29th 00, it is recommended to use this functionality following the technique explained above because otherwise:

If no ADT or ADC operator is coded, the value of the CENTUR century remains 19,

If no AD0, AD1 or AD2 operator is coded, the DAT-ADO variable is assigned the value SPACE by default, and the century associated with the date being checked is CENTUR.

If an AD0, AD1 or AD2 operator is coded, the DAT-ADO variable will be assigned the value 0, 1 or 2 depending on the last operator executed, and the century associated with the date being checked will be that of the last date transformed.

Operations and Recommendations in the Client or Server Monitors Components of Pacbench Client/Server

The system date cannot be called and the date handling operators cannot be used in such components.

Enhancement of Release 2.5

Processing of the Century in the current date and modification of the windowing at the Library level.
Addition of two fields in the Library definition screen.

- Reference year for the calculation of the century (default value = '61'), value taken for the initialization of the working areas used in the various generators to adapt the century when modifying a 6-character date.

- Retrieval of the computer date :

= 'N' default value (no modification)

= 'C' the Cobol generated from ADT and ADC operators will be adapted to retrieve the computer date with Century.
Use of new cobol functions or calculation of the Century depending on the reference year (all cobols concerned).

= 'W' for the cobol 74 variants, the CENTUR field will be fed from a table described in Working (this table contains 20s and 19s depending on the windowing value).