



VisualAge Pacbase 2.5

P a c / I m p a c t
Reference Manual

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Note

In the text :

- the terms followed by ° refer to their definition in the *Glossary*.

1. Purposes and Principles

1.1. Introduction

Pac/Impact is a facility of the VisualAge Pacbase offering which analyzes Y2K impacts on your applications developed with VisualAge Pacbase, and enables to prepare the transformation^o of impacted applications.

Y2K consequences on data consistency, and thus on its processing are numerous. In many applications, years are coded on 2 characters, without recognition of the century, for example, 1996 is coded '96'. There may be problems of chronology inversion since years from the year 2000 are transcribed '00', '01'..., in the case of date comparison, or problems of storage in databases or of restoration in the right order if these dates are set as primary keys, for example.

If extending a date format from 6 to 8 characters in a Data Element Definition screen is easy, it is more difficult to see its consequences on the data storage or display in applications. If you add 2 characters to a Data Element format called in the screen-top category of a Screen, you will have to regenerate the Screen. In the same way, if the modified Data Element is a table column, you will have to regenerate your database in order for this modification to be taken into account.

Pac/Impact was developed with a rigorous methodological approach. This facility enables you to make an inventory of the concerned data and to analyze it at all levels of the application.

Pac/Impact can analyze the VisualAge Pacbase language. It automatically searches the date-type data elements^o and character strings^o associated with a date in VisualAge Pacbase applications. Using integrated syntactic analyzers, it analyzes cross-references between the impacted fields^o and the entities and the links between these impacted fields and other fields where they are used. The results of these analyses are printed in Reports. Therefore the user can easily locate the impacted fields and determine those whose format is to be modified or not.

Pac/Impact is a productivity tool helping identify virtually all of the fields impacted by the Y2K issue. This identification cannot be totally exhaustive; in particular, cross-references of data elements not defined in the VisualAge Pacbase Repository are not processed in all cases¹. It is therefore recommended to perform quality tests allowing to identify the possibly remaining problems.

¹ For more details, see section 3.4.2, "IANA Procedure: Limits".

1.2. Methodological Approach

The Pac/Impact analysis comes within a methodological approach intended to ensure the year 2000 roll-over with rigour and security. This methodology, whose general principles will be documented here, must be applied according to the specificity and management methodology of each company.

The proposed methodology involves four steps:

1. **The preliminary study.** It consists in:

- *making the inventory* of applications that may be impacted by the year 2000 roll-over, thus allowing the company's exposure to the Y2K issue to be measured;
- *defining a process strategy* for the concerned applications (discard, replace, transform);
- *choosing the tools* that will be used to perform each step of your Y2K project°;
- *planning* the impact analysis.

☞ This first step is described in chapter *Preliminary Study*.

2. **The impact analysis,** performed by Pac/Impact. It consists in an iterative process using batch procedures which

- *identify* date-type data;
- *analyze* their use(s) in the entities and/or their relationship(s) with other data.

☞ This step is described in chapter *Impact Analysis*.

3. The **preparation for transformation** consists in determining an evolution strategy and the operations to be carried out, from the results of the impact analysis.

☞ This step is described in chapter *Preparation for Transformation*.

4. The **transformation** is the enforcement of the strategy defined in the previous step. It consists in modifying the applications that are to be kept beyond 2000 in order for them to remain consistent.

This methodological approach must be adapted to your company's particular situation after the existing system's analysis produced by the preliminary study.

1.3. Widening the Scope of Pac/Impact

From the first of January 1999, European interbank transactions and public debt issues will use EURO. In 2002, EURO coins and banknotes will be introduced in parallel with the national currencies they are intended to replace progressively. All applications handling amounts of money will be impacted as well as applications managing currencies.

Pac/Impact can be used to carry out these impact analyses thanks to its analyzers which recognize this type of data. In these cases, the methodology and use mode are the same as those used in the analysis of the date-type data, the only difference being the selection criteria the user must specify before starting the impact analysis (refer to chapter *Impact Analysis*, subchapter *Search of Entry Points : ISEP Procedure*). These impact analyses can be carried out in parallel with your Y2K^o project.

1.4. Functional Architecture of Pac/Impact

Pac/Impact uses batch procedures:

- **Selection of entities to be analyzed: INFP** procedure

This procedure is compulsory. It can be used to limit the scope of the impact analysis to some occurrences of chosen entity types.

- **Search of entry points: ISEP** procedure

This procedure is used to search, in a context specified by the user (session number and subnetwork), data that may be dates and matches the specific selection criteria selected by the user:

- generic code and/or format, for data elements and character strings
- keyword for data elements (the format is optional)

- **Search of generated dates, operators, strings, constants: ISOS** procedure

This optional procedure selects:

- generated dates which will become entry points,
 - operators, strings and constants which will not become entry points but may be printed in Reports via the IPIA procedure.
- ☞ The fields impacted by constants become entry points if you run ISEP after ISOS, and use these fields as input.

- **Impact analysis: IANA** procedure

This procedure is used to search and analyze the fields impacted by the entry points^o in the specified context.

- **Printing the entry points or impact search criteria: IPEP** procedure

This optional procedure is used to print a Report resulting from the ISEP and IANA procedures that contains a list of data elements and character strings that have been detected.

- **Group fields analysis: IGRA** procedure

This optional procedure breaks down the group fields found among the entry points and impact search criteria detected by ISEP or IANA.

- **Reinitializing the accumulated entry points/impact search criteria: INFQ** procedure

This procedure is used to reinitialize the accumulated entry points/impact search criteria before starting a new impact analysis.

- **Printing the accumulated entry points/impact search criteria: IPFQ** procedure

- **Exploiting the results: IPIA** procedure

This procedure is used to print Reports on the analysis results and to format these results in batch update transactions.



These procedures are documented in chapter *Impact Analysis*.

2. Preliminary Study

This chapter provides some advice that will allow you to prepare in the best possible way your applications for Y2K. This preparation step is to be performed before using Pac/Impact, described entirely in chapter *Impact Analysis*.

The preliminary study is an essential step that needs to be carried out rigorously in order for the impact analysis to be completed correctly. The more exhaustive the preliminary study is, the more reliable the results of the impact analysis will be, and the quicker the preparation and transformation will be carried out, with minimum risks.

The operations to be carried out during the preliminary study step are:

- **making an inventory** of the applications, interfaces and links between applications, to quantitatively measure your company's exposure to the Y2K issue;
- **defining the process strategy** for applications concerned by the year 2000 roll-over (Pac/Impact is part of a strategy of application transformation);
- **choosing the tools** that will allow you to carry out the various steps of your Y2K project, and among them Pac/Impact for the impact analysis step;
- **planning** the impact analysis for the different applications.

2.1. Making an Inventory of Applications

The inventory of applications allows to determine the scope of the study itself and provides at a company level, a global view of the applications that may be Y2K-impacted.

During the inventory, the following operations must be carried out:

- listing the applications in use in the company and determining:
 - applications using dates,
 - applications Y2K-ready or those not,
 - applications that will remain operational by the year 2000 (if not, the applications concerned will be immediately removed from the preliminary study).

You now have a global quantitative estimate of the applications that require the impact analysis.

- listing, when necessary, other software and software packages, as well as data exchanges between these products and your VisualAge Pacbase applications.

This step will allow to coordinate the modifications in files exchanged with other systems, *via* EDI for example.

- listing the standards used in date management, if any.

This step will allow to determine to what extent it will be possible to rely on the standards to carry out the impact analysis. Consequently, it will allow to estimate the duration and difficulty of maintaining the applications concerned.

The results of this inventory allow you to estimate the number of applications impacted by the year 2000 roll-over and the difficulty the impact analysis will be faced with.

You can then have a first estimate of the length of time the whole Y2K project will take and begin to plan the following steps more precisely.

2.2. Defining the Process Strategy

Thanks to the inventory of your applications, you have determined a process strategy for each application:

- **Giving up the application**, if it is not used or no longer matches the company's or user's needs.
- **Replacing the application**, if the transformation it requires is not cost-effective. With a long standing application, it is better to replace it with either an existing software package that can handle the date issue, or with a new application to be developed.
- **Transforming the application**. The transformation is the solution that is chosen most of the time. It consists in transforming the application by analyzing and changing dates.

Among all the solutions, you have identified the one which corresponds best to the specificity of your application database: i.e. the **transformation**.

2.2.1. Transformation

Transformation is chosen when its cost is lower than the cost of replacement. In the same way, when the application fits the company's or the users' needs perfectly, replacement is unnecessary.

This step follows the impact analysis logically, since it works with a detailed inventory of the data requiring a format modification. Transformation directly depends on the impact analysis results.

Pac/Impact is particularly recommended in this case, since it aims at listing and analyzing the date-type data in all the applications developed with VisualAge Pacbase. It lists in reports the date-type data to be modified and the entities, directly or indirectly related to these dates, which must also be modified. Consequently, it will be easy for you to plan the transformation, relying more specifically on the "Summary Report" which provides a general view of the number of impacted entities. (These reports are documented in chapter *Impact Analysis*, subchapter *Exploiting the Results*).

2.3. Choosing the Tools

Once you have decided on the technical solution you will use for your applications, and chosen Pac/Impact as the most adapted tool for the preparation of this technical solution, you now have to choose the tools that will enable you to carry out the transformation.

There are tools which will help you to carry out some tasks of the Y2K project automatically. Some of these tools are presented below.

2.3.1. Test Tools

On the marketplace there are tools for system date simulation which allow modified applications to operate as they will operate after 2000, without having to change the system date.

2.3.2. Aid Tools for Transformation

For the transformation of certain types of dates, it is possible to use VisualAge Pacbase to develop Macro-instructions for date processing, century assignment according to the year and format conversion for some dates.

VisualAge Pacbase also enables the automatic processing of Data Divisions. Since the Data Divisions are Segment calls, the Data Division modification will automatically be taken into account in the Program, the Screen or the Database after being regenerated.

For some types of data to be modified, you will have to develop utilities to re-format the contents of the files, or utilities to download/re-format/load the contents of the Databases for retrieval purposes.

2.4. Planning the Impact Analysis

Once you have identified the applications that require the impact analysis, and have chosen the process strategy and the tools that will help you to carry out your Y2K project, you must plan the impact analysis precisely.

To do so, you must define a priority order for the impact analysis of the impacted applications, according to several key factors:

- **risk factor:** a strategic application like a pay-roll application must be corrected as soon as possible in order to be restored before 2000.
- **volume factor:** you will need to allow a longer correction time for an application that occupies a large memory space and in which there are a great number of impacted fields.
- **urgency factor:** for example, an application dealing with schedules **MUST** be corrected before 1999.
- **complexity factor:** you will need to allow a longer correction time if the modifications are complex or tricky, in the case of applications in which the date format is little or not standardized.
- **interaction factor:** in the case of external or inter-application data exchanges, for example a database described at the mainframe level and called in several applications, you will have to plan the coordination of the corrections in the different applications.

3. Impact Analysis

The impact analysis is performed by single-session batch procedures in a subnetwork of Libraries.

The aim of the impact analysis is to identify the date-type data used in your applications and their relationships with other data in the database. In this way, you can assess the consequences of a possible format change and decide with full knowledge of the situation which dates are to be extended to an 8-character format.

Caution: the impact analysis is reliable only for Programs and Screens that have been correctly generated and compiled.

The results of the impact analysis are printed in one or more Reports, each of which presents a type of result classification.

The execution sequence of the batch procedures is represented by a diagram on the next page.

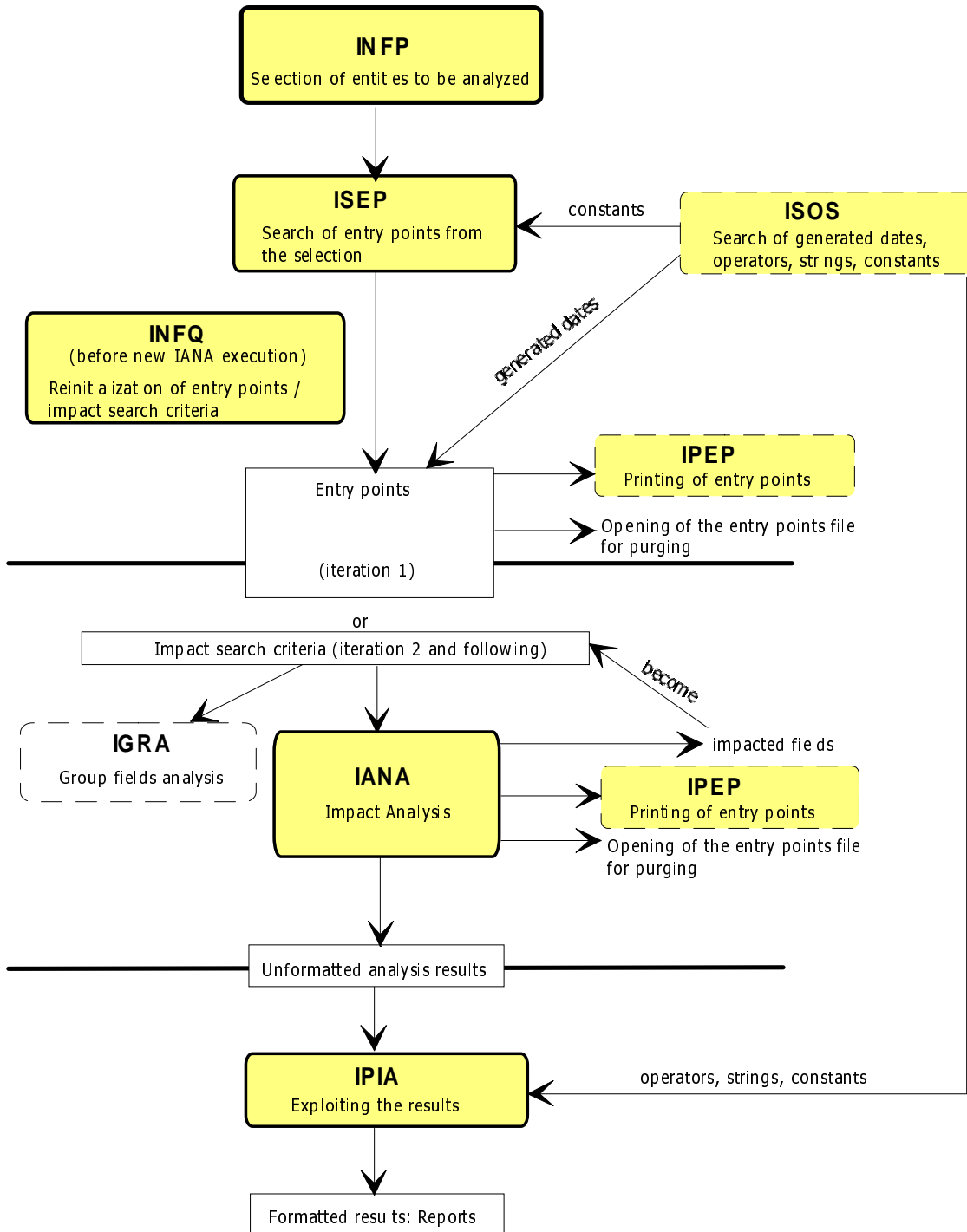


This part of the manual describes Pac/Impact from a functional point of view. The installation and all the technical specificities of Pac/Impact are documented in the corresponding VisualAge Pacbase Operations Manual.



In the following chart, the required (or recommended) procedures are highlighted as their frames are thicker than those of optional procedures.

Impact Analysis Sequence



3.1. Narrowing the Selection Scope: INFP and/or UXSR Procedures

Since the impact analysis uses a lot of machine time, it is advised to narrow the analysis scope. You can narrow the scope via two procedures (INFP and UXSR) that you may even combine to obtain a more precise analysis scope and thus a more significant impact analysis.

INFP and UXSR must be executed before ISEP and ISOS.

3.1.1. INFP Procedure: Functions

Via this procedure, you can limit the scope of the impact analysis to some (or all) occurrences of the entities you specify. For example you can limit the analysis to one or more occurrences for each of these entities or analyze the occurrences of only one of these entities...



Even if all occurrences of all entities are to be analyzed (i.e. if you do not enter any user input), you must run this procedure to initialize the file of the entities which will be analyzed.



If a Data Element defined in the Repository meets the selection criteria, it will always be selected by the ISEP procedure (search of entry points), whatever the INFP selection is. The selection will be effective on these Data Elements when the IANA procedure is run.

3.1.2. INFP Procedure: User input

You can enter one or more lines, conforming to the following structure:

POSITION	LENGTH	VALUE	MEANING
01	03	'B' 'F' 'O' 'P' 'T' 'V' '\$nn' '\$**'	Entity type: Database Block User Entity Screen Program Text Volume UEO with 'nn' type code All UEO
04	06		Entity code (or ***** generic code for all the occurrences of the specified entity type).

If you enter the same input twice, only the first input will be kept.

You must always specify an occurrence code but this code might not exist in the database.

User input is checked against the rules stated here below and an execution report is output. Only correct user input generates a selection of entities. Incorrect user input generates an error message in the execution report.

If you specify a generic occurrence code for an entity, you cannot specify any other code for this entity.

If you specify a '\$**' entity type, you cannot specify a '\$nn' type and the occurrence code must be '*****'.

You can indicate only one occurrence per line.

For example, if you want to limit the analysis to two Programs PROGR1 and PROGR2, you must enter two lines:

```
P  PROGR1
P  PROGR2
```

If you have indicated only one line for an entity type, and if you want the impact analysis to include one, several or all of the other entity types recognized by the procedure, you must explicitly indicate it. If you do not do this, only the occurrences of the specified entity type will be analyzed.

Examples:

If you want to analyze only Programs, enter only one line:

```
P  *****
```

But if you want to analyze the PROGR1 Program specifically, but also all the Screens and Database Blocks, enter the following three lines:

```
P  PROGR1
O  *****
B  *****
```

3.1.3. UXSR Procedure

Via this procedure, you can run the impact analysis on a database which is a restructured and/or renamed sub-network of the initial database.



This procedure is fully explained in the *VisualAge Pacbase Operations Manual, Vol. II : Administrator's Guide*, Chapter *Manager's Utilities*, Subchapter *UXSR: Partial Sub-Network Extraction*.

3.2. Search of Entry Points: ISEP Procedure

3.2.1. ISEP Procedure: Functions

The ISEP procedure searches data elements and character strings which are likely to correspond to dates, according to the selection criteria strings you have specified:

- selection of data elements strings by code and /or by formats;
- selection of data elements by keyword and format and/or by code (optional) ;
- selection of character strings by code and/or by format.

☞ For the definition of data elements and character strings, refer to the *Glossary*, at the end of this manual.

The data elements and character strings that correspond to the specified criteria are called entry points strings: they are stored in a file that will be used as input to the impact analysis (IANA procedure).

Consequently, choosing good selection criteria is essential because the quality of the impact analysis depends on it.

It is recommended to narrow the selection scope via the INFP and/or UXSR procedures to reduce the execution time and obtain a more precise analysis.

☞ Refer to subchapter *Narrowing the Selection Scope: INFP and/or UXSR Procedures*.

Only someone who knows the functional aspect of the applications and their coding standards perfectly can choose relevant selection criteria and determine whether the entry points found by the ISEP procedure actually correspond to the dates used in the applications.

The formatted printout of the entry points is obtained by the IPEP procedure, documented in subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Printing Entry Points and Impact Search Criteria: IPEP procedure*.

If you are satisfied with the printed list of entry points, you can start the impact analysis. If not it may be because:

- either the entry points do not meet your expectation. The selection criteria you have specified were not precise enough, or on the contrary, they were too specific. You must start the ISEP procedure again with new selection criteria, until the entry points correspond to what you expect. The new entry points delete and replace the previous ones.
- or the entry points are correct, except some of them which have to be refused. You can suppress the incorrect entry points by opening the entry points file output by the ISEP procedure and by suppressing the corresponding lines. For details, refer to subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Purging Entry Points and Impact Search Criteria*.

3.2.2. ISEP Procedure: User Input

After the identification line, which is required, you may indicate one or more selection lines. Three selection types may be used and at least one selection type is required, knowing that no particular type is required.

A selection may combine several selection types, and several command lines for each type.

The number of selection lines is not restricted and their order is not significant.

3.2.2.1. Identification Line

The identification line is required and must be at the beginning of the stream. There must be only one identification line (if there is more than one, only the first one will be recognized). On this line, you must indicate the context, i.e a particular session and the highest Library of the subnetwork you want to analyze (Z1 view). The ISEP batch procedure will automatically recognize the indicated Library and the dependent Libraries in the hierarchy.

The session number is important and must be carefully thought out because it stands for the image of the applications at a given moment, from which it is not advisable to modify the programs if you want to prevent the results from being altered.

The identification line is as follows:

POSITION	LENGTH	VALUE	MEANING
02	01	*	Line code
03	08		User code
11	08		Password
19	03		Code of the highest Library of the subnetwork
22	05		Session number and status
28	01	'F' or 'E'	Language code, if different from that of the database. It is used in the Report labels.
69	03		Code of the lowest Library of the subnetwork (optional)

If the lowest Library is not specified, all the Libraries of the specified subnetwork will be analyzed.

If the lowest Library code is specified, it must be lower than the highest Library and belong to the same subnetwork. In this case, the lowest Library will delimit the subnetwork for the entry points search, the impact analysis and the printout.

3.2.2.2. Selection Line of Data Elements by Code and/or Formats

You can select a data element using one or more of the following criteria: code, format, usage.

POSITION	LENGTH	VALUE	MEANING
02	01	'E'	Line code
03	06		Data element code (possibly generic, always coded on 6 characters, where '*' is the generic character) or ?dt, where dt is a string included anywhere in the data element's code
09	10		Input format of the data element
19	10		Internal format of the data element
29	01		Internal usage code (D by default)
		*	All usages
30	27		Output format of the data element
57	1	blank	Child data elem. impacted by parent data elem. (default)
		'N'	Child data elements not impacted

The group data elements declared on the -CE lines of a Segment or on the -W lines of a Screen or a Program, will be considered as entry points only when the code matches the code entered as a criterion; since the format is not calculated, it cannot be compared. If these group data elements are defined in the Repository, they will make up two distinct entry points (one for the data element declared in -CE and one for that declared in -W), different from that made up by the defined data element.

Impact on child data elements:

With the option specified on position 57, you can indicate that you do not want child data elements to be impacted by the IANA procedure if the entry point is a parent data element (and if the child data element inherits its parent's formats).

This option will affect all the entry points and impact search criteria with the data element-type. You can modify this option manually on the file you can open via an editor.

For details on this file, refer to subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Purging Entry Points and Impact Search Criteria*.

If you have set this option to 'N' (no impact):

- if the entry point is a parent data element, the child data elements are not impacted,
- if the entry point is a child data element, the parent data element is not impacted and its own child data element will not be impacted either in the next iteration of the IANA procedure.

Warning: if a data element is selected both by an 'E'-type line and a 'W'-type line, and if the impact option is different on those two lines, the result is unpredictable (depending on the sort).

3.2.2.3. Selection Line of Data Elements by Keyword

You can select data elements by keyword. You may specify the keyword type, and the data element formats, usage and/or code.

The keywords can be assigned a type: 'M' for explicit keywords, 'L' for implicit keywords (extracted from the label) or '' for the two types of keywords.

POSITION	LENGTH	VALUE	MEANING
02	01	'W'	Line code
03	01		Keyword type:
		'M'	Explicit keyword
		'L'	Implicit keyword
		''	Explicit and implicit keyword
04	13		Keyword (generic character unauthorized)
17	10		Input format of the data element
27	10		Internal format of the data element
37	01		Internal usage code (D by default)
		*	All usages
38	27		Output format of the data element
65	06		Data element code (possibly generic, always coded on 6 characters, where '*' is the generic character)
71	01	blank	Child data elem. impacted by parent data elem. (default)
		'N'	Child data elements not impacted

Impact on child data elements:

With the option specified on position 71, you can indicate that you do not want child data elements to be impacted by the IANA procedure if the entry point is a parent data element (and if the child data element inherits its parent's formats).

This option will affect all the entry points and impact search criteria with the data element type. You can modify this option manually on the file you can open via an editor.



For details on this file, refer to subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Purging Entry Points and Impact Search Criteria*.

If you have set this option to 'N' (no impact):

- if the entry point is a parent data element, the child data elements are not impacted,
- if the entry point is a child data element, the parent data element is not impacted and its own child data element will not be impacted either in the next iteration of the IANA procedure.

Warning: if a data element is selected both by an 'E'-type line and a 'W'-type line, and if the impact option is different on those two lines, the result is unpredictable (depending on the sort).

3.2.2.4. Selection Line of Character Strings

You can select a character string by a code, an internal format, or by the two criteria combined.

POSITION	LENGTH	VALUE	MEANING
02	01	'S'	Line code
03	30		Character string (possibly generic where '*' is the generic character)
			or
			?date, left-flushed and not followed by asterisks, where data is a string
33	10		Character string internal format for the selection on -W line
43	01		Internal usage code (D by default)
		*	All usages

The group fields (non-defined strings) declared on the -W line of a Program or a Screen will be selected as entry points only when the character string matches, since the format is not calculated.

Selection on a code:

You may select a character string on a code in two different ways:

- If you enter a code not preceded by a question mark, the procedure will search all the strings which match the entered code exactly.
*For example, to find all the strings beginning with 'dat', you must enter the string 'dat***...***' on the 'S' line.
To find all the strings whose last three characters are 'dat', you must enter the string '***...***dat' on the 'S' line.*
- If you select by a code preceded by a question mark, the procedure will search all the strings containing the entered code, wherever it is found in the sequence of characters.
For example, to find all the strings (of all lengths) which contain the 'dat' string, you must enter '?dat' on the 'S' line. The procedure will find 'datcom' as well as 'deliverydate'...

Both selections detect all the fields which include the entered code, whether they include a data element (field ended with -x, where x does not exceed 6-character long) or not. But the selection does not apply to defined data element's call lines (I, E or S type).

3.2.2.5. Determining the Formats and Usage

Determining the Format

- For the data elements not defined in the Repository and used on the -W line of a Program or a Screen, or -CE line of a Segment: the format is considered as an internal format,
- For the data elements not defined in the Repository and used on the -CE line of a Report: the format is considered as an output format.
- For the data elements not defined in the Repository and the character strings, the determination of the format is based on a table of words built up from the COBOL Level Number to the period (ex : in the same Level Number 05 two consecutive lines are indicated: **7-DELCO1 PIC X** (without period) and **7-DELCO2 PIC X(6).** (with a period)). When there is no period on a -W line, only the first format detected in the Level Number will be recognized (in this example, **7-DELCO1** and **7-DELCO2** will have the same format: **PIC X**). Only the lines with the ' ' type are analyzed.
- For each elementary field declared on the -W line of a Program or a Screen (data element defined or not, or character string), the format is the word following the words **PIC** or **PICTURE** (possibly even the word **IS**). The usage comes after the format (even after the words **USAGE** or **IS**).

Determining the Usage

- For the data elements not defined in the Repository and the character strings, the determination of the usage is based on the usage retrieved from the -W lines and the generation variant of the Library this line belongs to, independently of the generation variant of the Library where this line will be generated, because it is unknown and besides the line can be generated in several Libraries.
- The usage is converted into VisualAge Pacbase usage coded on one character for IBM (MVS and DOS VSE) and BULL (GCOS7 and GCOS8) platforms.

3.2.3. ISEP Procedure: Output Report

The ISEP procedure outputs a report which lists the errors detected on the selection requests. If the identification line is missing, all the other requests are rejected.

This Report is identical to the error report of most batch procedures. This is why it is not documented in this manual.

3.3. Search of Generated Dates, Operators, Strings, Constants: ISOS Procedure

3.3.1. ISOS Procedure: Functions

This procedure is a complement to the ISEP procedure. It selects entry points that the ISEP procedure cannot select. The ISOS procedure selects:

- dates generated by VisualAge Pacbase (**DATOR**, **DATCE** for example) which will be used as entry points in the impact analysis in the first iteration (IANA procedure).
 - ☞ The **DAHTA** historical account date processed by Pactables can be selected via ISEP and not ISOS.
- Character strings (**ORDER BY** for example) without considering them as entry points. If you want them to be entry points, use the ISEP procedure.
- Operators used in procedural code (-P) lines, without considering them as entry points, except **ADT** which triggers the generation of **DATOR**.
 - ☞ Refer to the *Structured Code* manual for the list of these operators.
- Lines which use a constant either defined (**VALUE**), moved (**MOVE**) or conditioned (**IF**). To consider the fields impacted by this value as entry points, run the ISEP procedure with these fields as input.

To see in which entities these generated dates, character strings, operators, and constants are used, you can print Reports via the IPIA procedure.

☞ For the description of these Reports, refer to subchapter *Exploiting the Results: IPIA Procedure, IPIA Procedure: Output Reports and File*.

3.3.2. ISOS Procedure: User Input

After the identification line, which is required, you may specify one or more selection lines. Four selection types may be used, and at least one selection type is required (no particular type is requested).

You may enter several command lines for each selection type.

Since the execution time of this procedure is rather long, you are advised to group the user input in order to read the database only once.

3.3.2.1. Identification Line

The identification line is required and must be at the beginning of the stream. There must be only one identification line (if there is more than one, only the first one will be taken into account). On this line, you must indicate the context, i.e a particular session and the highest Library of the subnetwork you want to analyze (Z1 view). The ISOS batch procedure will automatically recognize the indicated Library and the dependent Libraries in the hierarchy.

The session number is important and must be carefully thought out because it stands for the image of the applications at a given time, from which it is not advisable to modify the programs if you want to prevent the results from being altered.

The identification line is as follows:

POSITION	LENGTH	VALUE	MEANING
02	01	*	Line code
03	08		User code
11	08		Password
19	03		Code of the highest Library of the subnetwork
22	05		Session number and status
28	01	'F' or 'E'	Language code, if different from that of the database. It is used in the Report labels
69	03		Code of the lowest Library of the subnetwork (optional)

If the lowest Library is not specified, all the Libraries of the specified subnetwork will be analyzed.

If the lowest Library code is specified, it must be lower than the highest Library and belong to the same subnetwork. In this case, the lowest Library will delimit the subnetwork.

3.3.2.2. Selection Line of Generated Dates

You may select a date-type generated data element from its code. This data element must exist in the system.

POSITION	LENGTH	VALUE	MEANING
02	01	'D'	Line code
03	09		Data Element code

The number of 'D' lines cannot exceed 40.

3.3.2.3. Selection Line of Operators

You may select an operator present in the -P lines from its code. This operator must exist in the system.

POSITION	LENGTH	VALUE	MEANING
02	01	'O'	Line code
03	03		Operator code

The number of 'O' lines cannot exceed 50.

3.3.2.4. Selection Line of Character Strings

You may select character strings which will not be considered as entry points by the IANA procedure.

These strings may include one or more blanks. If they do, you must specify the delimiter and the number of blanks.

POSITION	LENGTH	VALUE	MEANING
02	01	'C'	Line code
03	01		End-of-string delimiter
04	31		String code. It must be ended by the delimiter if a delimiter is specified.
35	01		Search location of the string:
		'D'	Definition part (-W of Programs and/or Screens and -9 of Programs)
		'T'	Processing part (-P of Programs and/or Screens, -8, -9, -SC of Programs, -CE and -CS of Screens)
		'R'	Processing part specific to Reports: . category condition and structure . source data element code (structure)
		''	Search in the three parts

The number of 'C' lines cannot exceed 50 per location (definition part for example).

3.3.2.5. Selection Line of Constants

The ISOS procedure detects the lines which include a constant. The fields which include a constant declared in -W or which are conditioned or filled in by this constant are not considered as entry points by IANA. To make them entry points, run the ISEP procedure afterwards and use them as input.

POSITION	LENGTH	VALUE	MEANING
02	01	'V'	Line code
03	01	' or "	Beginning-of-value delimiter. Required
04	31		Constant code. Required and ended by the delimiter (' or ").
35	01		Search location of the string:
		'D'	Definition part (-W of Programs and/or Screens and -9 of Programs)
		'T'	Processing part (-P of Programs and/or Screens, -8, -9, -SC of Programs, -CE and -CS of Screens)
		'R'	Processing part specific to Reports: . category condition and structure . source data element code (structure)
		''	Search in the three parts

3.4. Impact Analysis: IANA Procedure

3.4.1. IANA Procedure: Functions

The IANA procedure is an iterative procedure which requires no user input. It produces a file which will be re-used as input in the execution of the next procedure. It produces an impact analysis on the number of fields and consequently the entities (that contain these fields) impacted by the modification of one or more dates.

The first time you run it (first iteration), the IANA procedure uses as input the entry points file which is the output file produced by the ISEP procedure. It lists all the entities that directly use the entry points, the search being based only on the direct cross-references stored in the Repository for data elements, or on the character strings. In these entities, the entry points impact other data elements or character strings: these new data elements or character strings are termed impacted fields.

*For example, if an entry point-type data element is used within a Program in a **Move** statement, all the data elements concerned by this statement will be analyzed. If the data element is part of a condition, the same reasoning is true.*

The second time you run the IANA procedure (second iteration), the data element and character strings which are impacted fields become impact search criteria: they are analyzed to find the entities in which they are used and the impacted fields within these entities. The iterations are run successively according to this principle, until the procedure finds no new impact search criterion. You must re-start IANA until the end of the last iteration. As long as the return code is 0, the procedure must be re-started. If the return code 4 appears in the report, it indicates that the analysis is completed.

Duplicates are automatically suppressed at the end of each iteration.

The entry points or impact search criteria found in Database Blocks, Data Structures, Texts, Volumes, User Entities and User Entity Occurrences do not produce impacted field, because they cannot impact any other data element or character string in these entities; you just have to regenerate these entities in order for the format modification to be taken into account.

On the contrary, the entry points or impact search criteria found in Programs, Screens, Reports and Segments produce impacted fields. The analysis is carried out on the following lines:

- -P and -W for the Program Entity,
- -P, -W and -CE for the Screen Entity,
- -D and -CE for the Report Entity,
- -CE for the Segment Entity.



If they are defined in the Repository, the group data elements used on the -CE lines of a Segment or on the -W lines of a Screen or a Program, will make up two distinct search criteria (one for the data element used in -CE and one for that used in -W), different from that made up by the defined data element.

The uses of these entry points and impact search criteria in -8, -9, -CD, -CS and -SC lines of the Program entity produce no impacted field but are printed in the reports (by default). However you can inhibit their printing via an option.

Similarly, the data elements whose description includes a value and a type (other than blank) do not produce any impacted field but are printed in Reports.

After each iteration of the IANA procedure, you can run the IPEP procedure to display the new impact search criteria that have been found. The IPEP procedure is described in subchapter *Printing and Purging Entry Points or Impact Search Criteria*, section *Printing Entry Points or Impact Search Criteria: IPEP procedure*.

If the new impact search criteria are as expected, run the next iteration. If some of the criteria do not suit you, you can open the impact search criteria file output by the IANA procedure, and delete the corresponding lines. For details, refer to subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Purging Entry Points and Impact Search Criteria*.

The IANA procedure stores the results of the impact analysis in a file where all the results add up. This file cumulates the results until you reinitialize it. These results may even correspond to different contexts and/or entry points. However it is recommended to reinitialize it after a new ISEP execution because it might accumulate too many criteria, criteria have different uses according to the context.

The IANA procedure does not output any report.

3.4.2. IANA Procedure: Limits

A number of limitations have been set up deliberately in the impact analysis process. It certainly cannot aim at analyzing all the finer aspects of COBOL. However, it does take into account the specific structuring of specifications in the VisualAge Pacbase Repository (Libraries, sessions, cross-references, etc.).

You will find in this section some examples of the limitations applicable to impact analysis.

When a data element is not defined in the Repository but defined in a program or macro-structure, its possible uses in other macro-structures cannot be analyzed.

If an entry point/search criterion is used in a **case of** on a -P line, the fields compared with this entry point will be impacted. But if the entry point/criterion is a compared field in a **case of**, the field of the **case of** statement will not be impacted.

The same principle applies to the group fields. If an entry point or impact search criterion is part of a group field, the group field becomes an impacted field. But the group field will not be broken down into its elementary fields automatically. To do it, you must run the IGRA procedure. But this procedure does not generate any impact search criterion.



For details on the IGRA procedure, refer to subchapter *Group Fields Analysis: IGRA Procedure*.

If an impacted field is a data element defined in a Library outside the scope of the selected context (on the identification line of the ISEP procedure), this data element will not become an impact search criterion in the next iteration.

If a Report or a Segment is defined and described in the database, but not called in any Program, the use of this entry point or impact search in this Report or Segment is detected only if the entry point or impact search criterion is part of the description. Actually, it will not be detected if it is used only in fields which have a strong link with the Program supposed to call the Report or the Segment: a data element specified in the **UPD/TRGET** column on the -CE screen of a Segment, a source data element or a data element used in the condition on the -CE screen of a Report or a data element used in the condition of the -D screen of a Report.

3.5. Printing and Purging Entry Points or Impact Search Criteria

3.5.1. Printing Entry Points or Impact Search Criteria: IPEP procedure

3.5.1.1. IPEP procedure: Functions

The IPEP procedure which requires no user input, prints out the list of entry points if you execute it after running the ISEP procedure, or the list of impact search criteria if you execute it after running the IANA procedure. IPEP lists all the entry points/criteria, accepted or rejected by the user.

The accepted entry points/criteria will be used as input to the impact analysis. They are not the impact analysis results, which will be printed out via the IPIA procedure.

3.5.1.2. IPEP Procedure: Output Report

When it is printed after the ISEP procedure, the Report produced by the IPEP procedure is titled "List of entry points". When it is printed after the IANA procedure, it is titled "List of impact search criteria".

You may also print it after opening the reduced file output by ISEP or IANA (see next section). In this case:

- if you have not purged any entry points/criteria contained in this file, this Report will be entitled "List of Accepted Entry Points/Criteria".
- if you have purged some entry points/criteria contained in this file, this Report will display:
 - ♦ the accepted entry points/criteria,
 - ♦ the eliminated entry points/criteria.

Before the printout, the duplicates of the entry points or the impact search criteria are automatically deleted.

LIST OF ENTRY POINTS

DATE : 1998/10/11

PAGE:1

SESSION :9999

SELECTED LIBRARY: AAA

LIB.	ENTRY POINT ELEMENT - NAME OR STRING	FORMAT				SOURCE (ONLINE CHOICE)
		INPUT	INTERNAL	USAGE	OUTPUT	
AAA	7-DELIVERYDATE	X(6)	D			P PROGR1 W BB 300
	INVDAT - INVOICE DATE	X(6)	X(6)	D	X(8)	E INVDAT N

This Report displays:

- the entry points or the impact search criteria, sorted by definition library and in alphabetical order inside each category. In the printout order, these categories are:
 - Character strings,
 - Data elements defined in the Repository,
 - Data elements defined in the Segment description,
 - Data elements defined in the Report structure,
 - Data elements defined in the Screen or Program Working area.
- their input, internal, output format and their internal usage. For the group fields, the format and usage are not indicated. Only "Group" is indicated. Note: for information on the formats and usages retrieved, refer to subchapter *Search of Entry Points: ISEP procedure*, section *ISEP Procedure: User Input*, paragraph *Determining the Formats and Usage*.
- the online choice allowing to access the entry point or impact search criterion (see the column "Source (online choice)"). If it is a VisualAge Pacbase data element, defined in the Repository, **E DELCO** (with **DELCO** = Data Element code) will be indicated. If it is a data element not defined in the Repository or a character string, the type and the code of the entity where it is located, and the line identifier will be indicated. The letter 'N' might be found on the right if you have requested not to impact the child data elements ('N' in position 57 of the 'E' and in position 71 of the 'W' user input lines of the ISEP procedure).

3.5.2. Purging Entry Points or Impact Search Criteria

This purging is not carried out via a batch procedure. You have to open the file output by ISEP or IANA, via an editor.

This file contains a partial view of the transactions. So its size is reduced (72 characters long) to display the entire records. You can carry out all types of operations, including sorts to ease the purging.



In this file, you can only purge entry points or impact search criteria and in no case add or modify some.

To purge entry points or impact search criteria, you must:

- either physically delete the corresponding lines.
- or inhibit them by entering an 'E' (or any other code) in the action code of the corresponding lines. In this case, you will keep a trace of these entry points or impact search criteria without using them for the continuation of the operation. So if you think *a posteriori* that you should have kept them, you can start the impact analysis again, making them available again by simply deleting the action code.

In this file, Libraries are separated by a line of "=".

The various origins for the same Libraries are separated by a line of "-".

The first line of this file is made up of the ISEP or ISOS identification line. There is a '*' in column 3 and a 'Y' in column 72. 'Y' is the default option for the impact of group fields. If you do not want group fields to be impacted, you must overwrite 'Y' with 'N', before each IANA iteration. You must not modify any other field of this first line.

The other records of this file follow the same structure, detailed in the following table.

POSITION	LENGTH	VALUE	MEANING
01	01	blank other	Acceptance Inhibition
02	01		Blank
03	03		Code of the Library where the entry point or the impact search criterion is defined
06	01		Blank
07	01	E C 3 6 7	Origin of the entry point or impact search criterion: Data element defined in the Repository Character string defined in a Screen or Program -W Data element defined in a Segment -CE Data element defined in a Report -CE Data element defined in a Screen or Program -W
08	01		Blank
09	48		Coding depending on the origin of the entry point or the impact search criterion For a data element defined in the Repository (E): Data element code Blanks Data element name For other origins: Code of the character string or of the data element Blank on-line identifier of the line: S . for a data element defined in a Segment -CE (3): Blank Segment code Blanks CE Blank Line number in -CE Blanks R . for a data element defined in a Report -CE (6): Blank Report code Blanks CE Blank Structure code and beginning column of the data element in the structure P . for a data element or string defined in a Program -W O . for a data element or string defined in a Screen -W (C) or (7): Blank Code of the Program or the Screen Blank W Blanks Line number in -W
09	06		Data element code
15	06		Blanks
21	36		Data element name
09	30		Code of the character string or of the data element
39	01		Blank
40	17		on-line identifier of the line:
40	01	S	. for a data element defined in a Segment -CE (3):
41	01		Blank
42	04		Segment code
46	03		Blanks
49	02	CE	
51	01		Blank
52	03		Line number in -CE
55	02		Blanks
40	01	R	. for a data element defined in a Report -CE (6):
41	01		Blank
42	03		Report code
45	04		Blanks
49	02	CE	
51	01		Blank
52	05		Structure code and beginning column of the data element in the structure
40	01	P O	. for a data element or string defined in a Program -W . for a data element or string defined in a Screen -W (C) or (7):
41	01		Blank
42	06		Code of the Program or the Screen
48	01		Blank
49	01	W	
50	02		Blanks
52	05		Line number in -W
57	01		Blank
58	10		Internal format if not group field (if format > 10, it is shortened to 8, and ends with '++')
68	01		Blank
69	01		Internal usage code if not group field
70	02		For group field used in Segment -CE: Number of data elements making up the group field For other group fields:
70	01	' '	Blank
71	01	'G'	Group field
72	01	' '	Child data el. impacted by parent data el. (default)
		N	Child data el. not impacted by parent data el.

3.6. Group Fields Analysis: IGRA Procedure

The IGRA procedure breaks down group fields into elementary fields (an elementary field can be itself a group field).

These group fields come from the –CE lines of Segments and from the –W lines of Screens, Programs or Parameterized Macro-Structures and were found by the ISEP or IANA procedures.

So you can run the IGRA procedure after ISEP or after any IANA iteration.

The IGRA procedure is optional and does not generate any impact search criterion.

Before running this procedure, you can purge some of the group fields found in order to ignore them in the analysis but it is useless to manually purge non-group fields, since these will simply be ignored by the procedure.

☞ To know how to purge some group fields, refer to subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Purging Entry Points and Impact Search Criteria*.

The IGRA procedure does not require any specific user input.

You can print the results of the IGRA procedure in a Report output by the IPIA procedure (with value '1' in position 24 of the 'P' user input line).

☞ For details on this Report, refer to subchapter *Exploiting the Results: IPIA Procedure*, section *IPIA Procedure: Output Reports and File*.

3.7. Reinitializing and Printing the Accumulated Entry Points/Search Criteria: INFQ and IPFQ Procedures

3.7.1. Reinitializing the Accumulated Entry Points/Search Criteria: INFQ Procedure

It is highly recommended to reinitialize the accumulated entry points/impact search criteria before running a new analysis.

You can begin a new analysis if you have modified the entry points or the analysis context via ISEP. You do not even have to wait for the preceding analysis to finish if you want to stop it.

The INFQ procedure reinitializes the file which accumulates all the search criteria already impacted, whether you have accepted or not. This accumulation prevents these criteria from being analyzed again. If you do not reinitialize this file, it will contain all the criteria, even if they correspond to different analysis contexts.

If you do not run INFQ, this file will accumulate numerous criteria which will not trigger any new impact in the new context as they will be considered as already analyzed. A lot of impacts might then be undetected.



You must not run this procedure between two iterations of the same impact analysis.

3.7.2. Printing the Accumulated Entry Points/Search Criteria: IPFQ Procedure

This procedure prints all the entry points/search criteria accepted or rejected throughout a whole impact analysis. These entry points/criteria are those accumulated since the first IANA iteration, and not those used as input to the current iteration, which are printed via IPEP.

The list of all the entry points/criteria which have been accepted or rejected in the impact analysis makes up the historical account of your analysis.

The IPFQ procedure prints, in the order:

- Accepted entry points,
- Eliminated entry points,
- Accepted impact search criteria,
- Eliminated impact search criteria.

The entry points or impact search criteria are sorted by definition library and by alphabetical order inside each category. In the printing order, these categories are:

- Character strings,
- Data elements defined in the Repository,
- Data elements defined in Segment description,
- Data elements defined in Report structure,
- Data elements defined in the Working area of Screen or Program.

Even if IPFQ prints more entry points/criteria than IPEP, it outputs a Report whose layout is identical to that of the Report output by IPEP.



For explanations on this Report, refer to subchapter *Printing and Purging Entry Points and Impact Search Criteria*, section *Printing Entry Points and Impact Search Criteria: IPEP Procedure*, paragraph *IPEP Procedure: Output Report*. See the Report layout and the explanations which follow it.

3.8. Exploiting the Results: IPIA Procedure

3.8.1. IPIA Procedure: Functions

The IPIA procedure:

- Prints out Reports which use the results of the impact analysis or of the ISOS search. The information provided by these Reports is entirely different from that of the Report produced by IPEP (list of the entry points / impact search criteria used as input to IANA) or by IPFQ (list of entry points/search criteria already impacted in the preceding IANA iterations).
- Formats the results of the analysis in batch update transactions.

You can start the IPIA procedure:

- at the end of the impact analysis only,
- or after each iteration. In this case, you will be able to examine the results of the impact analysis as it progresses.

3.8.2. IPIA Procedure: User Input

After an identification line, you must enter only one 'P' user input line.

3.8.2.1. Identification Line

The identification line is as follows:

POSITION	LENGTH	VALUE	MEANING
02	01	*	Line code
03	08		User code
11	08		Password
19	03		Code of the highest library of the subnetwork
22	05		Session number and status
28	01	'F' or 'E'	Language code if different from that of the database. It is used in the Report labels
69	03		Code of the lowest Library of the subnetwork (optional)



If the IANA procedure output file contains several impact analyses corresponding to different analysis contexts, the code of the highest Library of the subnetwork and the session number allow you to specify which of these impact analyses you want to display.

The pair constituted by the highest Library code and the lowest Library code must be the same as that specified on the identification line of the ISEP procedure. If the lowest Library is specified, only the elements that depend on the specified subnetwork will be printed out.

There is no check on the user or the password since there is no access to the VisualAge Pacbase database.

3.8.2.2. Request Line

The IPIA procedure requires user input on the 'P' request line. You may request the output of one or more Reports or of a file and specify which entity type(s) you want to see in them (position 25 of the request line).



If you want to physically separate n entity types in n files, you must run IPIA n times and specify a new entity type each time.

POSITION	LENGTH	VALUE	MEANING
02	01	'P'	Line code
03	01	'I'	Day-Month inversion for the current date (DOS/VSE only)
04	03		Impacted Library code (available only with requests entered in positions 9, 10 and 22)
07	01	'1'	Result of impact analysis by entry point
08	01	'1'	List of impact search criteria by entry point
09	01	'1'	Result of impact analysis by Library
		'2'	Formatted result of impact analysis by Library
10	01	'1'	Impacted entities summary
11	01	'1'	Summary Report
12	01	'1'	Identical to value '1' in position 9, but the output is a file instead of a printout
13	01	'1'	General option: '1' inhibits indirectly impacted lines (e.g. -CD)
14	01	'1'	List of entry points by impacted search criterion
15	02	nn	Number of the wanted IANA iteration (available only with the request entered in position 7)
17	02	pp	Number of lines per page
19	01	'1'	Result of character strings analysis
20	01	'1'	Result of operators analysis
21	01	'1'	List of impacted entities by entry point
22	01	'1'	Statistics by description and by entity type
23	01	'1'	Result of constants analysis
24	01	'1'	Group Fields Analysis
25	10		Selection of generated transactions:
		blank	Selection of all entities
		other	Selection, where the following values can be combined:
		'B'	Database Blocks
		'E'	Data Elements
		'F'	User Entities
		'O'	Screens
		'P'	Programs
		'R'	Reports
		'S'	Segments
		'T'	Texts
		'V'	Volumes
		'\$'	User Entity Occurrences

3.8.3. IPIA Procedure : Output Reports and File

In the heading of all Reports, you find:

- the selected Library, indicated in position 19 of the identification line, or the selected sub-network if you have also indicated the lowest Library in position 69.
- the session number, indicated in position 22 of the identification line.

3.8.3.1. Impact Analysis

This Report is automatically printed after a request for IPIA execution. It prints all the errors detected on the print request and displays the full titles of the Reports you want to print.

3.8.3.2. Result of Impact Analysis by Entry Point

This Report is requested by value '1' in position 7 of the 'P' user input line.

After the first iteration, this Report lists, for each entry point, the entities where the entry point is used as well as the impacted fields in these entities. From the second iteration onwards, this Report makes an inventory of the entities where the different impact search criteria are used as well as the impacted fields in these entities.

If you print this Report at the end of the IANA execution, it will display the result of the whole impact analysis, iteration by iteration. However if you print it between two iterations, it will display the result of the current iteration only.

This Report is not essential for the impact analysis. However it will allow you to find the origin of the impact for any impact criterion which does not seem particularly relevant.

```

RESULT OF IMPACT ANALYSIS BY ENTRY POINT                                DATE : 1998/10/11                PAGE:1

SESSION: 9999                    SELECTED LIBRARY: AAA

ENTRY POINT: INV DAT              NAME: INVOICE DATE              DEFINITION LIB: AAA            SEARCH
LEVEL: 01

INPUT FORMAT: X(8)                INTERNAL FORMAT: X(8)           USAGE: D                       OUTPUT FORMAT: X(8)

IMPACT SEARCH CRITERION: INV DAT  UTILIZATION LIB.: BBB          SEARCH LEVEL: 02
    
```

ENT	ENTITY CODE	LIB.	G	VisualAge Pacbase TRANSACTION	IMPACTED FIELDS
S	SS00	BBB	G	3 SS00 100INV DAT 05 XX00-INV DAT	XX00-INV DAT
P	PROGR1	BBB		P 30BB100M SS00-INV DAT 7-WW00-CAL DAT	7-WW00-CAL DAT

On the heading of this Report, you find:

- a first part on the entry point, its code, name, definition Library, formats and usage. Moreover, the search level indicates the iteration during which the entry point was detected: always the iteration number 1 (on the Report, it corresponds to the field 'SEARCH LEVEL: 01').

Note: for information on the formats and usage retrieved, see subchapter *Search of Entry Points: ISEP procedure*, section *ISEP Procedure: User Input*, paragraph *Determining the Formats and Usage*.

- from the second iteration onwards, a second part on the impact search criterion, its code, its 'Utilization library', i.e. the Library of the VisualAge Pacbase transaction which originated the detection of the impact search criterion. Moreover, the search level indicates the iteration during which the VisualAge Pacbase transaction was detected.

The following are indicated in the detail lines of this Report:

- the type of the entity where the entry point or the impact search criterion is used,
- the code of the entity where the entry point or the impact search criterion is used,
- the code of the Library where the VisualAge Pacbase transaction containing the impacted field has been detected,
- the nature of the entry point ('G' column) : a 'G' letter appears when the entry point or the impact search criterion is a group field in the entity (-W of Programs and Screens, and -CE of Segments).
- the VisualAge Pacbase transaction,
- the impacted field, which will become an impact search criterion at the next iteration.

Note: if the entry point or impact search criterion is not used, the detail lines of this Report will be empty.

3.8.3.3. List of Impact Search Criteria by Entry Point

This Report is requested by value '1' in position 8 of the 'P' user input line.

This Report is a synthesis of the previous Report. It lists all the impact search criteria detected from the entry points, by Library, all search levels combined. You can exploit it at the end of IANA execution. It enables you to immediately identify the impacts on other data elements or on the definition of the character strings. If you are unclear as to the reason why an impact search criterion is present in the list, you can refer to the "Result of impact analysis by entry point" Report.

After the first iteration, this Report is always empty.

LIST OF IMPACT SEARCH CRITERIA BY ENTRY POINT

DATE: 1998/10/11

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

ENTRY POINT	LIB.	IMPACT SEARCH CRITERIA	LIB.
INVDAT	AAA	CALDAT	BBB
		INVDAT	BBB

This Report is made up of the following fields:

- the data element or character string code making up the entry point,
- the Library where this entry point comes from,
- the impact search criteria detected from this entry point,
- the Library containing the VisualAge Pacbase transactions which allowed these impact search criteria to be detected.

For each entry point, the impact search criteria are classified by Library, and within the Library, in alphabetical order.

3.8.3.4. Result of Impact Analysis by Library

This Report lists the VisualAge Pacbase transactions impacted by Library in:

- a Report if you enter value '1' or '2' in position 9 of the 'P' user input line and/or
- a file if you enter the value '1' in position 12 of the 'P' user input line. In this file, you can make search requests, update the transactions, then reintroduce them in the database to take them into account...

3.8.3.4.1. Unformatted List

This Report is requested by the value '1' in position 9 of the 'P' user input line.

```

RESULT OF IMPACT ANALYSIS BY LIBRARY          DATE : 1998/10/11          PAGE:1
SESSION: 9999          SELECTED LIBRARY: AAA
IMPACTED LIBRARY: BBB

```

VisualAge Pacbase TRANSACTION	
* USER PASSWORD	BBB
3 SS00100INVDAT	05 XX00-ORDDAT
0	PROGR1
P 30BB100M SS00-ORDDAT	7-WW00-CALDAT

```

NUMBER OF IMPACTED LINES FOR THE LIBRARY : 0002
TOTAL NUMBER OF IMPACTED LINES :

```

In the heading of this Report, you find the impacted Library specified on position 04 of the 'P' request line. It enables you to display only the VisualAge Pacbase transactions detected in this Library. To display the VisualAge Pacbase transactions in another Library, you must start the IPIA procedure again specifying another impacted Library.

If you specified no impacted Library, all the VisualAge Pacbase transactions detected will be displayed for each Library.

In the detail lines of this Report, you find the VisualAge Pacbase transactions extracted from the impacted Library.

On the bottom part of this Report, you find:

- the number of impacted transactions for the impacted Library,
- the total number of impacted transactions. This line is displayed only when no impacted Library has been specified.

3.8.3.4.2. Formatted List

This Report is requested by the value '2' in position 9 of the 'P' user input line.

The data presented in this Report is the same as that of the previous Report, except that it is formatted: entities are sorted by type and each type is separated from the others by a page skip. In the same entity, occurrences are sorted in alphabetical order and, for each occurrence, transactions are sorted according to the on-line description of the line where they come from.

FORMATTED RESULT OF IMPACT ANALYSIS BY LIBRARY

DATE :1998/10/11

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

IMPACTED LIBRARY: BBB

ENTITY: PROGRAM

ENTITY CODE	DESCR. TYPE	VISUALAGE PACBASE TRANSACTION
PROGR1	-P	PROGR1PROGR1 INVOICE PROGRAM N PROGR1 PM P O 30BB100M SS00-ORDCOM v 7-WW00-CALDAT P

NUMBER OF IMPACTED LINES FOR THE LIBRARY : 0002

TOTAL NUMBER OF IMPACTED LINES : 0010

In this Report, the 'Descr. Type' column represents the type of the on-line description line where the transaction comes from. The last character of the 'VisualAge Pacbase Transaction' column represents the corresponding batch choice.

3.8.3.5. Impacted Entities Summary

This Report is requested by the value '1' in position 10 of the 'P' user input line.

This Report presents the list of impacted entities, all entry points combined. It allows you to identify the most impacted entities and to determine the priorities (one given Program must be corrected before another one...).

IMPACTED ENTITIES SUMMARY

DATE : 1998/10/11

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

IMPACTED LIBRARY: BBB

ENTITY TYPE	ENTITY CODE	NAME	LINE TYPE	IMPACTED LINES NBER
DATA ELEMENT			C	0003
PROGRAM	PROGR1	INVOICE PROGRAM	P	0001
SEGMENT	SS00	CUSTOMER DELIVERY	3	0001

In the heading of this Report, you find the impacted Library specified in position 04 on the 'P' request line. It enables you to display only the entities detected in this Library. To display entities detected in another Library, you must start the procedure again specifying another impacted Library. If you specified no impacted Library, all the entities detected will be displayed for each Library.

In the detail lines of this Report, you find:

- the entity type, written in full. The entity types are alphabetically classified according to their on-line code,
- the entity code,
- the entity name,
- the entity line type, i.e. the batch line code corresponding to the entity description,
- the number of impacted lines for each type of line.

Note: for data elements, only one line, specifying the number of impacted lines, is printed out.

3.8.3.6. Summary Report

This Report is requested by the value '1' in position 11 of the 'P' user input line.

This Report is the most basic one. It displays, for each Library of the selected subnetwork, the number of impacted entities by entity type, all entry points combined.

This Report represents the general view that may be used to calculate the time necessary for the transformation implementation. For example, if a great number of Programs and Screens are impacted, the transformation will be lengthy and complex. On the contrary, if a great number of Texts or Databases are impacted, the transformation will be quick and easy.

If you want a more detailed result with the number of impacted lines by description for each entity, refer to the "Statistics by description and by entity type" Report.

SUMMARY REPORT

DATE : 1998/10/11

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

LIBR.	IMPACTED ENTITIES NUMBER										
	D.STR	SEGM	PRGM	SCREEN	REPORT	BLOCK	U.E.	U.E.O.	ELEM.	TEX.	VOL.
BBB	0000	0001	0001	0000	0000	0000	0000	0000	0003	0000	0000

3.8.3.7. List of Entry Points by Impacted Search Criterion

This Report is requested by the value '1' in position 14 of the 'P' user input line.

After the first iteration this Report presents the search criteria impacted by the entry points.

From the second iteration onwards, the impacted search criteria become impact search criteria. New impacted search criteria are found from these impact search criteria. As for the entry points, they remain the same whatever the iteration.

After looking at the entry points which originated the impacted search criteria, you can then easily refer to the 'Result of impact analysis by entry point' Report, sorted by entry point, to see which transactions caused the impacts.

So you will rapidly know the transactions which caused the impacts and decide whether you want to purge the impact search criteria to discard them for the next iteration.

LIS OF ENTRY POINTS BY IMPACTED SEARCH CRITERION

DATE: 11/10/1998

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

IMPACTED SEARCH CRITERIA	LIB.	ENTRY POINTS	LIB.	IMPACT SEARCH CRITERIA
XX00-ORDDAT	BBB	INVDAT	AAA	ORDDAT
7-WW00-CALDAT	BBB	INVDAT	AAA	ORDDAT

In the detail lines of this Report, you find:

- the search criteria impacted by the entry points if it is the first iteration, or impacted by the impact search criteria for all the other iterations. In the next iteration, these impacted search criteria will become impact search criteria.
- the Library in which the impacted search criterion was found.
- the entry points. There may be several entry points for one impacted search criterion and an entry point may be found several times for an impacted search criterion if this criterion is detected in more than one Libraries and if it is impacted by the same entry point.
- the Library in which the entry point is defined.
- the impact search criteria. These are the impacted search criteria found in the previous iteration. If it is the first iteration, this column is empty.

3.8.3.8. Character Strings Analysis

This Report is requested by the value '1' in position 19 of the 'P' user input line. It lists the uses of the character strings searched by the ISOS procedure.

CHARACTER STRINGS ANALYSIS

DATE : 11/10/1998

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

CHARACTER STRING: ORDER BY

T E	ENTITY CODE	LOCAL	LIB.	VisualAge Pacbase TRANSACTION
P	PROGR1	-P	AAA	P PROGR1 30 BB 100 ORDER BY NUCOL
P	PROGR2	-W	AAA	7 PROGR2 BB100 ORDER BY DATEX

In the detail lines of this Report, you find:

- the type of the entity where the character string is used,
- the code of this entity,
- the on-line choice corresponding to the description where the transaction has been detected,
- the Library where the transaction has been detected,
- the transaction itself, with, in the first position, the code of the description where the transaction has been detected.

3.8.3.9. Operators Analysis

This Report is requested by the value '1' in position 20 of the 'P' user input line.
It lists the uses of the operators searched by the ISOS procedure.

OPERATORS ANALYSIS

DATE : 11/10/1998

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

OPERATOR: ADC

T E	ENTITY CODE	LIB.	VisualAge Pachase TRANSACTION
P	PROGR1	AAA	P PROGR1 30BB100 ADC
P	PROGR2	AAA	P PROGR2 02DA200 ADC DATEX

In the detail line of this Report, you find:

- the type of the entity where the operator is used,
- the code of this entity,
- the Library where the transaction has been detected,
- the transaction itself, with, in the first position, the batch code of the description where the transaction has been detected.

3.8.3.10. List of Entities Impacted by Entry Point

This Report is requested by the value '1' in position 21 of the 'P' user input line.

It lists the entities impacted by data element-type entry points, all search criteria combined.

It is not as detailed as the "Result of Impact Analysis by Entry Point" Report but is more detailed than the "List of Impact Search Criteria by Entry Point" Report. It displays the characteristics of the entry point (name, formats, usage) which do not appear on the "Result of Impact Analysis by Entry Point" but do not display the transactions which originated the impact as shown in the "List of Impact Search Criteria by Entry Point".

In the detail lines of this Report, the "User comments" field is left blank so that you can write in your own comments.

LIST OF IMPACTED ENTITIES BY ENTRY POINT

DATE : 11/10/1998

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

ENTRY POINT: INV DAT

NAME: DATE OF INVOICE

DEFINITION LIB. :AAA

INPUT FORMAT: X(8)

INTERNAL FORMAT: X(8)

USAGE :D

OUTPUT FORMAT: X(8)

LIB	ENTITY			USER COMMENTS
	TYPE	CODE	NAME	
BBB	PROGRAM	PROGR1	INVOICE PROGRAM	
BBB	SEGMENT	SS00	CUSTOMER DELIVERY	

3.8.3.11. Statistics by Description and by Entity Type

This Report is requested by the value '1' in position 22 of the 'P' user input line.

It details the results of the "Summary Report", from which you could roughly calculate the time necessary for transformation. This Report allows you to make these estimates more accurately.

STATISTICS BY DESCRIPTION AND BY ENTITY TYPE

DATE : 11/10/1998

PAGE:1

SESSION: 9999

SELECTED LIBRARY: AAA

IMPACTED LIBRARY: BBB

ENTITY NAME OF TYPE	NUMBER	NUMBER OL LINES BY DESCRIPTION	
DATA ELEMENT	03	-D	03
PROGRAM	02	-CE	01
		-P	01
SEGMENT	01	-CE	01

3.8.3.12. Constants Analysis

This Report is requested by the value '1' in position 23 of the 'P' user input line.
It lists the uses of the constants searched by the ISOS procedure.

CONSTANT ANALYSIS

DATE : 11/10/1998

PAGE:1

SESSION:9999

SELECTED LIBRARY:AAA

CONSTANT: 19

T E	ENTITY CODE	LOCAL	LIB.	VisualAge Pacbase TRANSACTION
P	PROGR1	-P	AAA	P PROGR1 30BB100M '19' 7-CENTURY

In the detail lines of this Report you find:

- the type of the entity where the constant is used,
- the code of this entity,
- the on-line choice corresponding to the description where the transaction has been detected,
- the Library where the transaction has been detected,
- the transaction itself, with, in the first position, the batch code of the description where the transaction has been detected.

3.8.3.13. Group Fields Analysis

This Report is requested by the value '1' in position 24 of the 'P' user input line.
It shows the results of the execution of the IGRA procedure which breaks down the group fields found by ISEP or IANA into elementary fields.

GROUP FIELDS ANALYSIS

DATE: 11/10/1998

PAGE:1

SESSION :9999

SELECTED LIBRARY : AAA

GROUP FIELD	LIB.	ENTITY			ELEMENTARY FIELDS			
		T	CODE	LINE	DETAIL OF THE LINE			
ZGROU	AAA	S	XX00	100	200	CODMV	X(6)	D
7-XX00-GROUPE	AAA	P	PROG01	BB100	BB110	10	7-XX00-PGR1	PIC X.
					BB120	I 10	7-XX00-PGR2.	

In the detail lines of this Report you find:

- the group field's code,
- the library in which the group field was found,
- the entity in which the group field was found,
- the breakdown of the group field.

4. Preparation for Transformation

This step aims at implementing the transformation. It consists in setting up a certain number of transformation scenarios according to the characteristics and use of the impacted fields in applications, and to the entry points identified during the impact analysis.

It is important to define, using the impact analysis results, a processing typology for these dates. This typology will enable to determine the technical solutions to be implemented, according to the date formats and the problems they raise.

4.1. Technical issues related to the date formats

The problems related to the year 2000 can come from an inadequate storage format and/or from the processes on date-type data which bring about incorrect results.

4.1.1. The storage format is not sufficient and leads to incorrect results

That is the case when the year is coded without the century (96 for 1996), or when the century is coded according to a rule perfectly defined in the source application but not correctly used by the end-user application (0 for 19, 1 for 20, etc.). Consequently, if the date processing is sort, calculation or comparison processing, or if it uses unspecified or long periods of time (i.e. any time the century is necessary to return correct results), the data and related processing must be corrected.

Examples of processing that lead to incorrect results on account of the storage format:

- addition and subtraction of a value to/from a date,
- comparison between two dates or between a date and a hard coded value,
- internal and external sort in a JCL,
- break calculation in a program (in a sorted or implicitly classified file),
- date which is part of an indexed file key,
- meaningful value of a date (99 for a unlimited date, 00 for unspecified date),
- use of a date over very long or unspecified periods of time; 00 can stand for 1900 or 2000 (this case is rather rare and can be identified only with a functional knowledge of the application).

In the cases mentioned above, the date formats **MUST** be modified.

4.1.2. The storage format is sufficient but the results are incorrect

Examples of processing that lead to incorrect results though the storage format takes the century into account:

- moving '19' as a hard coded value in the century,
- division by the two-digit coded year, which makes 2000 be divided by 0,
- insufficient coding rule for the century, in the case of a date coding according to an assignment rule that will be no more valid in the future (A for 1976, B for 1977,, Z for 2002),
- incorrect leap year calculation for the year 2000,
- erroneous beginning of the century for the year 2000: the 21st century will actually begin on the 1st of January, 2001.

In all cases, only the processing must be corrected. The impact is not as great but is harder to identify as data formats are correct.

4.2. Possible Technical Solutions

For each date, you must deal with both the storage format issue and the problem of incorrect processing of date-type data. It is possible to determine the technical solutions according to the different date formats identified by the impact analysis results.

4.2.1. Dates with no Century

For dates whose storage format is insufficient and in which the year is coded but not the century, three solutions are possible for the transformation:

1. Modifying the Format

The solution is to modify the storage format by adding two characters for the century:

For example : extending the format from X(6) to X(8).

2. Inferring the Century (or windowing)

This solution consists in inferring the century from the two characters constituting the year:

*For example : from 00 up to 49 the century code will be 20
from 50 up to 99 the century code will be 19*

3. Coding the Century

This solution consists in adding the century in the data without modifying the storage format, then in calling a coding/decoding routine any time the data is manipulated:

For example : transforming X(6) into S9(10) COMP-3

4.2.2. Dates with '19' as Hard Coded Century Value

There are two possibilities:

4. Moving '19' as hard coded century value

In this case, the program must be modified by using the windowing method (see paragraph *Inferring the Century* above).

5. Check against '19' as hard coded century value

The program must be modified to authorize value 20.

4.2.3. Dates in which the century coding is insufficient

For example, when dates are coded according to an assignment rule which will be invalid in the future (A for 1976, B for 1977,, Z for 2002), two solutions are possible:

6. Modifying the rule

It consists in modifying this rule without changing the date format and in correcting the program accordingly.

7. Modifying the format

The rule must be abandoned and the storage format must be modified by adding two characters for the century.

4.3. Standardization Strategy

For each application, a standardization strategy must be determined:

- **standardization of all the dates**

This is the most rigorous and secure solution but also the most costly since it consists in modifying all the dates to include the century.

- **standardization when necessary only**

This is the most risky, the less evolutionary but also the cheaper of the two solutions.

If the date processing is only for a date restitution purpose, the date is not to be imperatively corrected, unless you decide to set up a date standardization strategy.

4.4. Different Scenarios for Transformation

There are several possible scenarios for transformation according to the processing on the various date data identified during the impact analysis, the different possible technical solutions and the type of the impacted fields to be corrected.

To set up your scenarios, you can first use the Reports "List of entry points" or "List of impact search criteria" to constitute categories of dates according to how they are used:

- **Dates stored only for restitution**

These dates are present in the database, in a Screen or a Report but they are not involved in any processing;

- **Dates used by other dates**

These dates are defined in a file or a database and can be subjected to processing, like a simple **MOVE**, for example;

- **Dates involved in arithmetic**

These dates are used for arithmetic, comparison processing, etc.;

- **Dates involved in sorting**

These dates are used in an internal or external sort operation in a JCL, or used as a database index, a break criterion or an indexed file key.

4.4.1. Example of a Transformation Scenario

For each category of dates as seen above, one or more transformation scenarios are possible, as shown below.

In the case of a date used by other dates, three solutions are possible according to the standardization strategy and the category of the target date field.

8. If you decide on the standardization of all dates

☞ The technical solution is the modification of the storage format.

9. If you decide on the standardization of some dates only

In this case, the technical solution depends on the target date field:

- When the target date field is a date stored for restitution only, a date that is used by another date or a date involved in arithmetic, it is possible to correct the target date field directly.
 - ☞ There is no need to modify the source date format.
- When the target date field is used in sort operation, correcting the source date is absolutely necessary.
 - ☞ The technical solution is the modification of the storage format.

The next step is to determine what modifications are to be made on the fields impacted by this date, taking the date category and the technical solution you opted for into account. You can use the Report "Result of impact analysis by entry point" to carry out this operation.

Impacted fields to be modified

The entry point is a data element defined in the VisualAge Pacbase Repository. You decide to modify its format.

- Report and Screen layouts: they must be modified if some lines are beyond the limits of the layout after the modification of a date format.
- Programs: you must modify data descriptions and possibly the processing if the Data Element/Segment coding changes. The old Macroinstructions must be replaced by the Macroinstructions that take the new format into account.
- Database description: the database must be regenerated.
- Database content: it must be retrieved using a download / reformat / upload utility.
- Physical description of files: the record length, the blocking factor and, in some cases, the key length and position must be modified.
- File content: the content must be retrieved using a dedicated utility (reformatting).

Once you have set up and planned your transformation scenarios, you can implement the transformation itself.

5. Glossary

Some words used in this manual have a particular meaning.

impact analysis: identification of date-type data and evaluation of the consequences of their transformation on the applications in which they are being used.

character string: field that comprises 1 to 30 characters, when there is no hyphen before, but whose length is at least 6 characters when preceded by a hyphen. They are character strings defined on the -W lines of Screens and Programs.

impact search criteria: data element or character string used as the starting point for the search of new impacted fields during the second or third iteration, etc.

entry point: data element or character string used to analyze the database in order to produce the impact analysis.

Y2K project: generic term that refers to your Y2K project for your applications.

data element: field - defined or not in the VisualAge Pacbase Repository - whose maximum length is 6 characters preceded by a hyphen when defined on the -W lines of Screens and Programs and the -CE lines of Segments and Reports.

transformation: modification of the date-type data format with recognition of the century.

impacted field: any data element or character string that is directly or indirectly related to an entry point or impact search criterion.

6. Index

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- a page number in **bold** type indicates the definition of the term.

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