

Application Analysis and Documentation with X-Analysis

Version 9

Overview

*A guide to the benefits of using
X-Analysis Professional Toolset*

Databorough Limited
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Application Analysis and Documentation with X-Analysis

Preface

Developing tools and services for analyzing and reengineering applications for the last 20 years, has given Databorough a unique view of the very large and complex world of legacy applications running on System i. This management overview document focus on Documentation and Analysis for System i applications using X-Analysis. It discuss new concepts and methods for application analysis and documentation of entire application.

Contact info@databorough.com for a copy of the trial software.



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Application Analysis and Documentation with X-Analysis

Introduction to X-Analysis Professional

Gathering knowledge about System i applications is not a straightforward task. In situations where developers are not familiar with a system or its documentation is inadequate, the system's source code becomes the only reliable source of information. Unfortunately, source code has much more detail than is needed just to understand the system, also it disperses or obscures high-level constructs that would ease the system's understanding.

X-Analysis Professional aids in system understanding by identifying recurring program features, classifying the system modules based on their purpose and usage patterns, and analyzing dependencies across the modules. This analysis provides detailed design information about the entire system, accessible to non RPG/COBOL experts, and be easily updated to incorporate ongoing changes in the base system.

Whatever the business needs driving companies to look for analysis tool, most of them want to ensure that the business logic and functional design which are core assets to the company, are preserved. The X-Analysis Professional engineers a cross-reference library, based on which the X-Analysis interface presents various analytical modules/graphs/diagrams to assist user in better understanding of the complete application. The X-Analysis Professional constitute of following three parts:

- Application Analysis
- Application Documentation
- Application Subdivision

Let us discuss them one by one.



Application Analysis

X-Analysis builds a detailed repository over an entire application. The repository maintains all information about application objects, their relationships and all necessary information to obtain detailed information from each object across the entire system.

More than twenty years of ongoing development, over thousands of System i applications written in all variants of RPGII/400/IV, COBOL, 2E and CL, has produced an unmatched capability to extract everything about an application from object right down to individual variables.

The repository is built automatically using a single command, and initially collects all object related information, but then parses every source member in the specified system and every source line mapping the contextual information of each variable in the system. A certain amount of logical abstraction processing then takes place while building the repository to account for some of the idiosyncrasies typical in an RPG application. This includes constructs such as variable program calls, file overrides, prefixing and renaming in RPG. The repository thus represents a map of how the entire application functions right down to individual variables.

Here is a brief description of some features of application analysis:

Interactive Source Code Browser

X-Analysis has interactive source code browser which picks up the latest code from the System i and displays it in a comprehensive and searchable form using proper color coding and indentation.

```
Object List  CB906R x
Source List of CB906R in XAN4CEM/QRPGSRC, Lines: 150, View Level: 4
Seq No  *...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+...
0021.00      C* Initialise Parameters
0022.00      0636C          SDP001      DOUEQ'N'
0023.00      0640C          @@@RTN      DOUEQ'E'
0024.00      0642C          @@@CTL      ANDEQ' '
0025.00      C              SSRLNB      IFEQ *BLANKS
0026.00      C              MOVEL*ON          ZZERR      1
0027.00      C              MOVEL'OEM0003'  MSGID      7
0028.00      C              ENDIF
0029.00      C              MOVE ACACFN          WWACFN
0030.00      0765C          EXSR $PVOO1
0031.00      C              READ CBACPF
0032.00      C* INITIALISE SCREEN :
```



Application Analysis and Documentation with X-Analysis

Variable Level Impact Analysis

X-Analysis is the world's leading solution for Variable level impact analysis. As the Where Used Level is increased, references with greater indirection levels are displayed.

| Name | Seq No | *...+... 1 | ...+... 2 | ...+... 3 | ...+... 4 | ...+... 5 | ...+... |
|----------|---------|------------|-------------|------------|-----------|-----------|---------|
| CLET | 0004.00 | DCL | VAR(&CUSNO) | TYPE(*DEC) | LEN(5 0) | | |
| CLET | 0009.00 | CHGVAR | &CUSNO | &CUSNC | | | |
| CLETN | | | | | | | |
| CLETN | | | | | | | |
| CNTACS | 0030.00 | C | | MOVEACMD,1 | | CMDDTA | |
| CNTACS | 0062.00 | C | | MOVEACMD,3 | | CMDDTA | |
| CNTCMAIN | 0073.00 | C | | MOVEACMD,2 | | CMDDTA | |
| CNTCMAIN | 0084.00 | A | CMDDTA | 78A | 0 24 | 2 | |

Member X-Reference

Lists all the Source Lines where the field/variable has been used/referenced, in the Member source and its associated Device Files and Copybooks.

Object/Variable Where Used/Updated/Defined

Lists all the instances in the application where the specified Object/Variable has been used/referenced or Defined/Updated.

Variable where used can be expanded to show where variables move into variables and are passed as parameters into programs, get used as aliases and so on down through the entire stream.

Understanding Design & Function More Easily

For efficient familiarization of an application's structure and general function, an abstraction above the source code combined with object-to-object relational information is required. A few simple but rich types of color-coded, graphical diagrams can reveal the data flow and architecture of individual objects or parts of an entire system. This is combined with automatically derived descriptions in the form of Pseudo narratives either in the diagrams or while browsing source code.

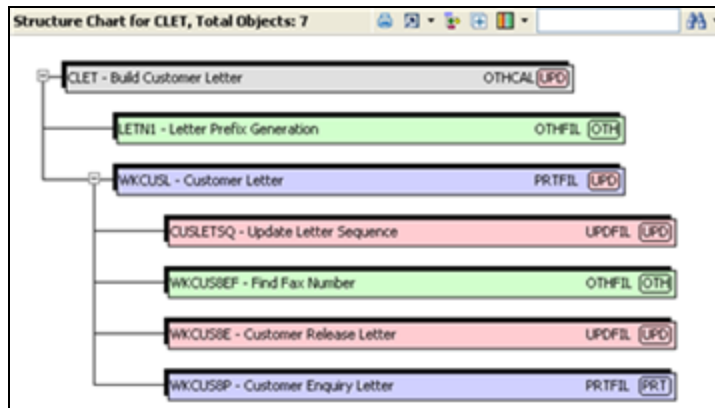
Here is a brief description of some of these diagrammatic constructs and views:

Structure Chart Diagram

A Structure Chart Diagram (SCD) Display gives a graphic representation of how the control passes from one program to another program within the application. This follows the call structure down the complete stack. The diagram also reveals data input objects and also automatically derives a summarized description of each of the object in the diagram. Color-coding also reveals important functional aspects such as updates, prints, and displays, which help the user to zone in on commonly, sought after details.

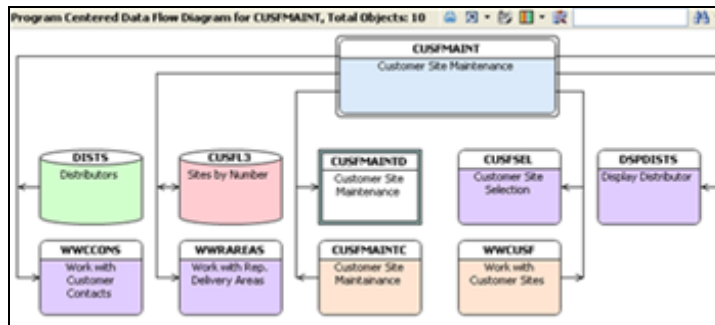


Application Analysis and Documentation with X-Analysis



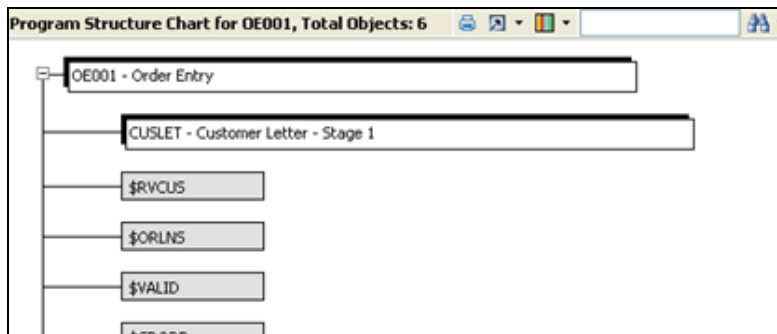
Data Flow Diagram

A Data Flow Diagram (DFD) is a graphical representation of a program/object where used, showing the files and programs accessed by the subject object. It is also color-coded and shows both flow of data at a high object level, and contextual information about the specific variables / parameters passed between objects.



Program Structure Chart

A Program Structure Chart graphically displays the sequence of calls in the program. The call could be to execute a Subroutine / Program / Module / Service Program.





Application Analysis and Documentation with X-Analysis

RPG as Pseudo Code

With a single click, RPG can be viewed as a form of structured English or Pseudo code. Mnemonics' are substituted with file/field/variable texts and constants or literals.

The screenshot displays two side-by-side windows from the X-Analysis application. The left window shows the source list of an RPG program, listing sequence numbers (Seq No) and corresponding code lines. The right window shows the same source list converted into pseudo-code, where mnemonics are replaced by descriptive text. A red arrow points from the left window to the right window, and a blue callout box with the text "View RPG as Pseudo Code" is positioned over the arrow.

| Seq No | RPG Code | Pseudo Code |
|---------|--------------------------|--|
| 0008.00 | C *ENTRY PLIST | Parameter List : *ENTRY |
| 0009.00 | C PARM WWACFN 3 | ----- Account Type (3) |
| 0010.00 | C PARM WWACTP 10 | ----- Work Account Type (1.0) |
| 0011.00 | C PARM WWACSS 1 | ----- Account Status (1) |
| 0012.00 | C PARM WWDPAG 60 | ----- Date Of Last Posting (6.0) |
| 0013.00 | C PARM WWPTIT 104 | ----- Predicted Interest (10.4) |
| 0014.00 | C PARM WWPTTR 104 | ----- Pred Tax Relief (10.4) |
| 0015.00 | C PARM WWTATP 3 | ----- Transaction Type (3) |
| 0016.00 | C PARM WWVLDA 60 | ----- Value Date (6.0) |
| 0017.00 | C PARM WWTAAM 83 | ----- Transaction Amount (8.3) |
| 0018.00 | C PARM WWACFG 1 | ----- Account Flag (1) |
| 0019.00 | C PARM XXTODA 60 | ----- To Date (6.0) |
| 0020.00 | C PARM WUCHG 1 | ----- Change Option (1) |
| 0021.00 | C* Initialise Parameters | /* Initialise Parameters |
| 0022.00 | 0636C SDPO01 DOUEQ'N' | Repeat until (Redisplay Screen equal to 'N') |
| 0023.00 | 0640C 888RTN DOUEQ'E' | Repeat until (Return Code equal to 'E') |
| 0024.00 | 0642C 888CTL ANDEQ' ' | And (Mode equal to ' ') |
| 0025.00 | C SSRLNB IFEQ *BLANKS | If (Srl.no. equal to *BLANKS) |
| 0026.00 | C MOVEL *ON | Move left *ON to ZZERR (1) |
| 0027.00 | C MOVEL 'OEM0003' | Move left 'OEM0003' to MSGID (7) |
| 0028.00 | C ENDDIF | End |
| 0029.00 | C MOVE ACACFN | Move ACACFN to Account Type |
| 0030.00 | 0765C EXSR SPV001 | Perform (Validate Screen) |
| 0031.00 | C READ CBACPF | Read Accounts Master File < 26> |
| 0032.00 | C* INITIALISE SCREEN : | /* INITIALISE SCREEN : |
| 0033.00 | C WWACFN IFEQ 'ACT' | If (Account Type equal to 'ACT') |
| 0034.00 | C WWACSS OREQ 'D' | Or (Account Status equal to 'D') |

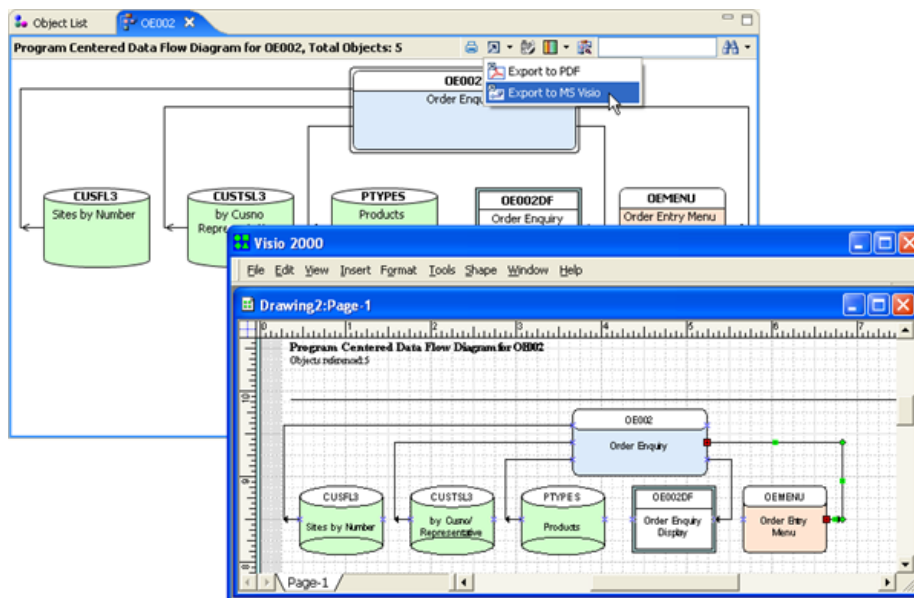


Application Documentation

Interactive analysis via a graphical client is generally the most intuitive manner in which to analyze a system, but there is often a requirement for various types of static information in the form of structured documentation. Examples of this are project documentation, auditing information, testing instructions, and customer support documentation (such as with ISV supplied business software). X-Analysis produces a number of these outputs including:

Data Flow Chart in MS Visio

Any interactive diagram produced by X-Analysis 8 in the client, can be automatically exported to MS Visio



Lists and Results sets

Any source, object, or impact-analysis result list can be directly exported to formatted MS Excel or PDF / MS Word from the client.



Application Analysis and Documentation with X-Analysis

The screenshot shows the X-Analysis 'Object List' window and a Microsoft Excel spreadsheet. The Object List window displays a table of objects with columns for Library, Name, Type, Attribute, Description, and Status. The Excel spreadsheet shows the same data being exported, with a title bar 'X-Analysis - Object List of *ALLUSR/*ALL/*ALL/*ALL/*ALL/*ALL, Total Objects: 249'.

| Library | Name | Type | Attribute | Description | Status | Used |
|---------|----------|---------|-----------|-------------|--------------------------|-------------|
| PF | XAN4CDEM | ASTATUS | *FILE | PF | Status file | *A 06/05/09 |
| CL | XAN4CDEM | CBC110 | *PGM | CLP | Order Entry System | *A 06/03/09 |
| R | XAN4CDEM | CB906R | *PGM | RPG | Back-out account | *B 06/03/09 |
| E | XAN4CDEM | CB906RD | *FILE | DSPF | Order Entry display file | 06/03/09 |

PDF/MS Word Project Documentation Wizard

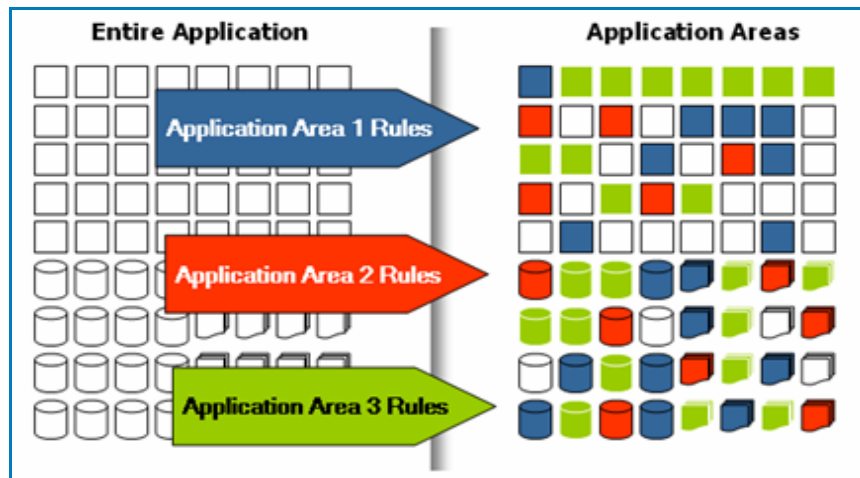
With the use of a simple wizard, documents that might take weeks to produce manually, allow the user to select any of the graphical diagrams, lists, flowcharts, annotation and business rules summaries generated interactively by the client interface, can be collated into a single document with contents and index. This can be done for a single object, an application area (explained below), a list of objects, or an entire system. Any of these documents can then be edited and distributed as required.

The screenshot shows a Windows Explorer window titled 'PCF_XAN4CDXA'. The address bar shows the path 'D:\Program Files\Databorough\X-Analysis\192.168.170.10\PCF_XAN4CDXA'. The folder contains two files: 'System Document for XAN4CDXA.pdf' (Adobe Acrobat Document) and 'System Document for XAN4CDXA.log' (Text Document).



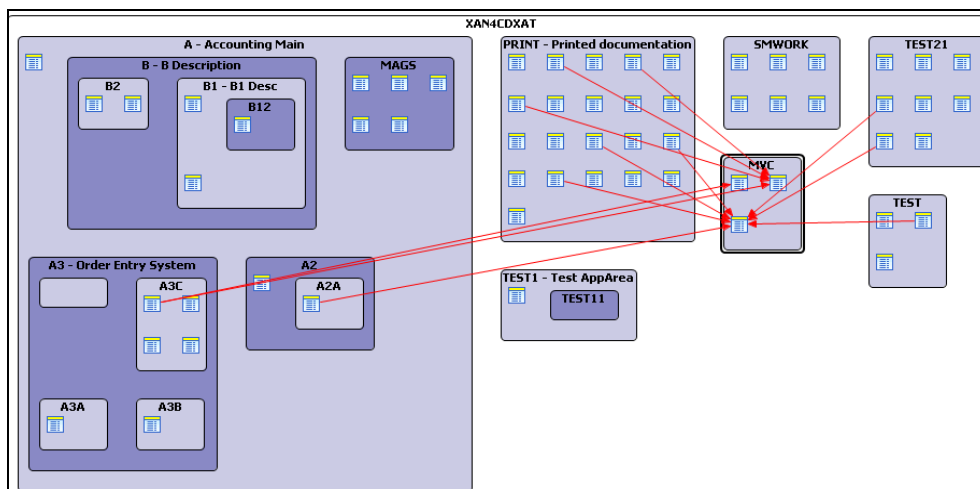
Application Subdivision

Entire legacy applications are often too large to effectively comprehend or effect wholesale change. For this reason it is often necessary or helpful to sub divide a system into application areas. X-Analysis provides facilities for subdividing an application area into groups of objects that meet user defined selection criteria. These criteria might be based on function or even generic name. X-Analysis then uses the sophisticated cross-reference information and Data Model relationships to include, automatically all related elements such as programs, displays, or files in the application area.



Application Overview

The Application Area Diagram displays an overview for the application. It is an interactive diagram and by clicking on different parts of the system you can see the relationships between either all parts or just the area you've clicked on and the areas it relates to.





Application Analysis and Documentation with X-Analysis

Highlights of Professional Toolset

- ✓ Works under IBM Rational products 7.x / WDS Sc 7.x or Eclipse 3.2 and above
- ✓ Program understanding at an application level, rather than a complete system level
- ✓ Solution for multi-level impact analysis and cross-referencing of complex RPG and COBOL applications
- ✓ Graphical & Pseudo Code Documentation of the entire system
- ✓ Handles programs/files/screens (RPGII/400/LE/Free, COBOL36/400, CL, SQL)
- ✓ Subroutine layering diagrams
- ✓ Link to SEU, CODE/400 and LPEX editors
- ✓ Source levels (summarization of source members)
- ✓ Application Flow Diagram
- ✓ System Documentation



Summary

Comprehensive, accurate, and current documentation of a legacy application improves quality, productivity and reduces risk, for any maintenance IT project.

X-Analysis Professional provides analysts, developers, architects and operations teams with detailed analysis and interactive diagrammatic constructs that enable rich understanding of existing applications. With the help of very powerful cross-referencing functionality, graphical, narratives or a combination of both, X-Analysis used to abstract and describe the system in a simple and intuitive way, even for non-RPG/COBOL experts.