

X-ANALYSIS ADVISOR

Automated Graphical Documentation, Impact Analysis,
Code Quality Analysis and Business Rule Extraction
For RPG and COBOL Applications on IBM i

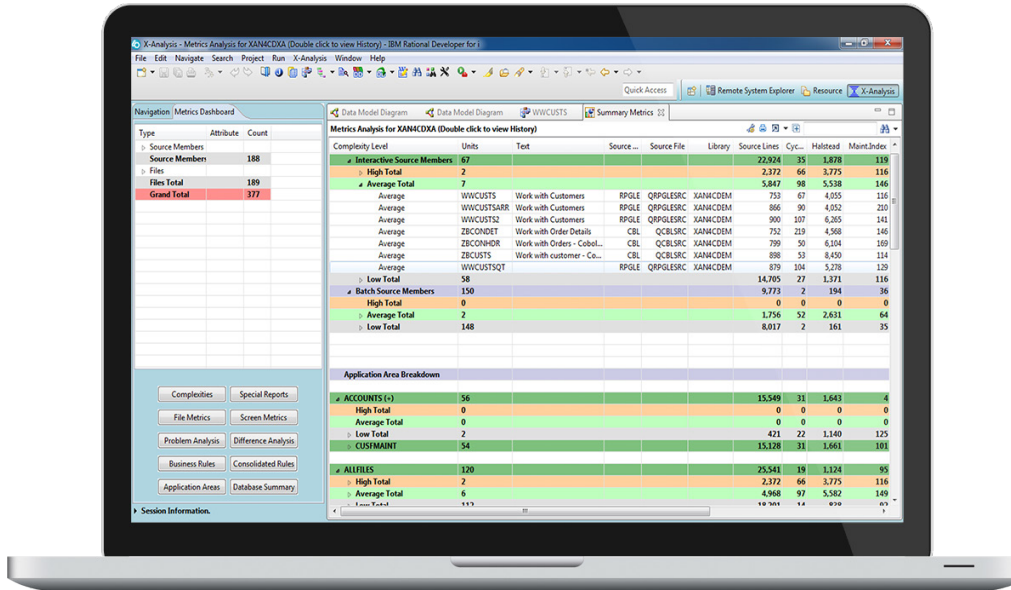
What's Inside

A description of X-Analysis Advisor, the flagship solution in the X-Analysis toolset. X-Analysis Advisor provides automated and interactive documentation, impact analysis, code quality analysis and business rule extraction for RPG and COBOL applications on IBM i.



X-Analysis Advisor

Analyze, Manage and Enhance Your IBM i Applications with Ease



UNLOCKING VALUABLE KNOWLEDGE ON IBM i

The knowledge and information contained in your organization's business software has been accumulated over many years and is extremely valuable. This information covers the operation, metrics, and design of the software but is often tantalizingly just out of reach.

Without this knowledge, maintenance and changes to the system are not as efficient or effective as they could be, and the risk of problems increases exponentially the larger the enhancement required. This can lead to paralysis, where changes aren't made due to a lack of confidence in the outcome.

BUSINESS BENEFIT OF X-ANALYSIS ADVISOR

Accurate and current information about an entire system can greatly improve the productivity of your IT staff and reduce maintenance costs by eliminating the need to research, catalog and assemble the information manually for each service request or modernization project.

X-Analysis Advisor is the foundation for any decision you need to make about applications running on your IBM i. Complete, automated analysis and documentation together with business rule extraction and impact and code quality analysis smooth the path to efficient, well-managed development.



X-Analysis Advisor:
Fresche's application analysis and management solution for IBM i environments.

Some Highlights:

- ▶ Provides understanding at a program, application and system level.
- ▶ Automated extraction of relational data model from RPG and COBOL.
- ▶ Variable Tracing – Rich drill downs through multiple layers or variables and programs/files/screens in RPG, COBOL, CL, SQL.
- ▶ Interactive source code browser, structure chart diagrams and data flow diagrams
- ▶ Entity relationship diagrams.
- ▶ Impact analysis on objects and procedures.
- ▶ Plug-in to Eclipse or WDS/CDI/RDP
- ▶ Instant and automated structured drill-down browsing of test/live data.
- ▶ Application Area diagrams.
- ▶ MS Word project/static documentation wizard.
- ▶ Identification and documentation of business rule logic.
- ▶ Business rule annotation, 'where used', auditing, and summaries
- ▶ Program, screen and data entity metrics
- ▶ Problem analysis for design oddities, such as unused elements and application level difference analysis... and much more...

X-Analysis Advisor

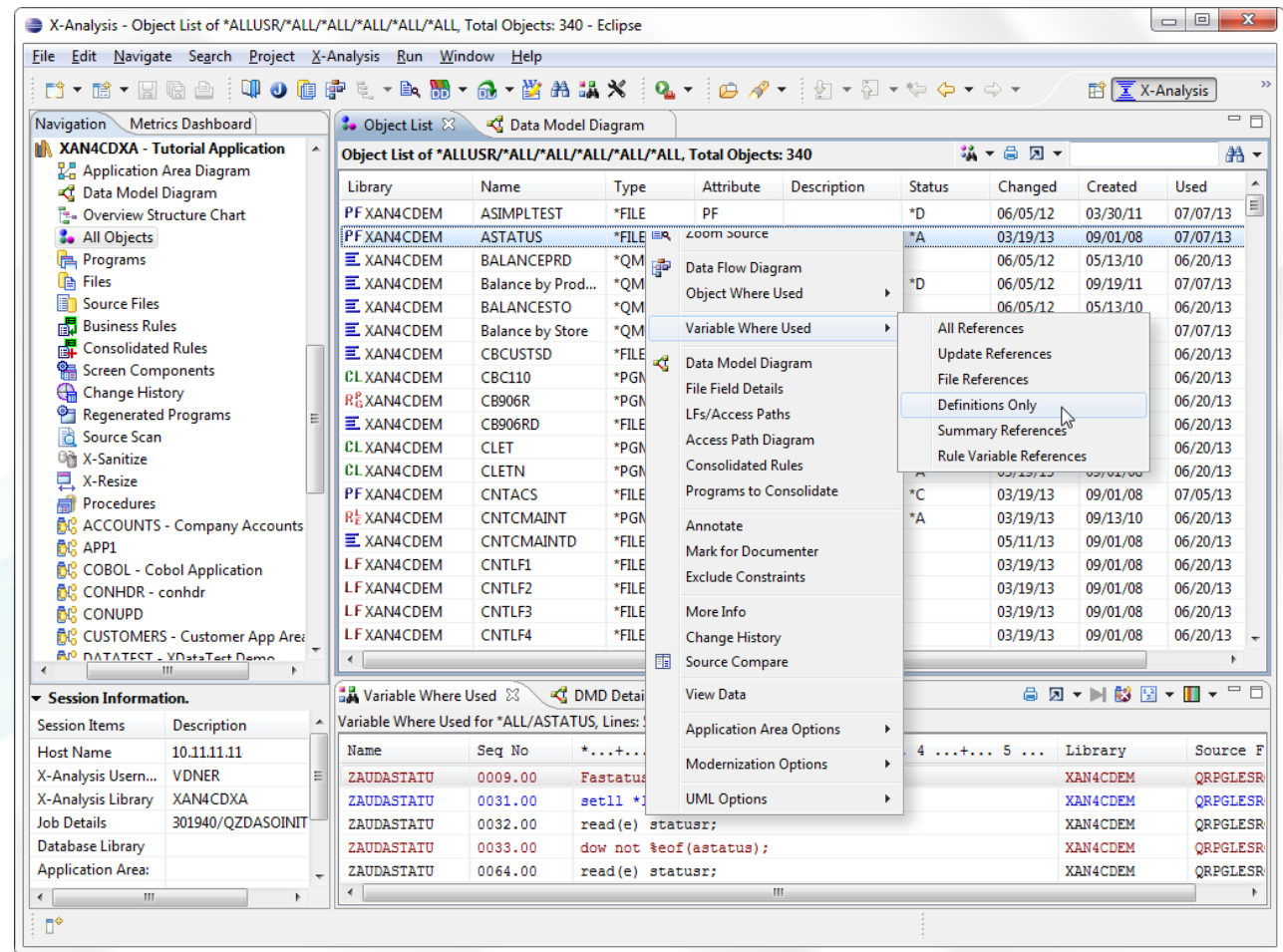
Automated Application Documentation, Impact Analysis, Business Rule Extraction and Code Quality Metrics

For the past 25 years, X-Analysis has given users critical insight into IBM i applications to help them better maintain and evolve those applications and better support business. X-Analysis Advisor provides analysts, developers and operations teams with detailed analysis and interactive diagrams that enable in-depth understanding of RPG and COBOL applications and data. This tool is used to document, analyze and describe systems in an easy-to-understand manner that can then be shared throughout the organization, even with members who do not understand RPG, COBOL, or any programming language at all.

Introduction to X-Analysis Advisor

Understanding an IBM i application is not always easy, especially if developers are not familiar with the system or if the documentation is not clear. In these cases, the system's source code is the only resource, and understanding it is a critical factor in managing and developing the system. X-Analysis Advisor also allows developers to analyze and document their systems in detail, extract design information and easily update the base system, even if they aren't expert in the language it was programmed in.

In addition to fully documenting IBM i applications (including business rules and code quality metrics), X-Analysis Advisor provides the ability to perform impact analysis. This identifies all areas that would be impacted by any code changes, saving time and removing the risks associated with modifying code.



Intuitive graphical user interface for Program understanding at an application level
Solution for multi-level impact analysis and cross-referencing of complex RPG & COBOL applications
Business rules extracted into a repository and code quality analyzed
Graphical and Pseudo Code documentation of the entire system

Graphical Documentation - Automated

X-Analysis Advisor is the most sophisticated and user-friendly analysis tool for instant interactive graphical documentation and cross-referencing of RPG and COBOL applications.

With X-Analysis Advisor, you can easily abstract the implementation of the code to help visualize and easily understand the application design and flow, even for non-programmers. You can also sub-divide a system into application areas and drill down through any of these interactive diagrams to see high level information and details simultaneously.

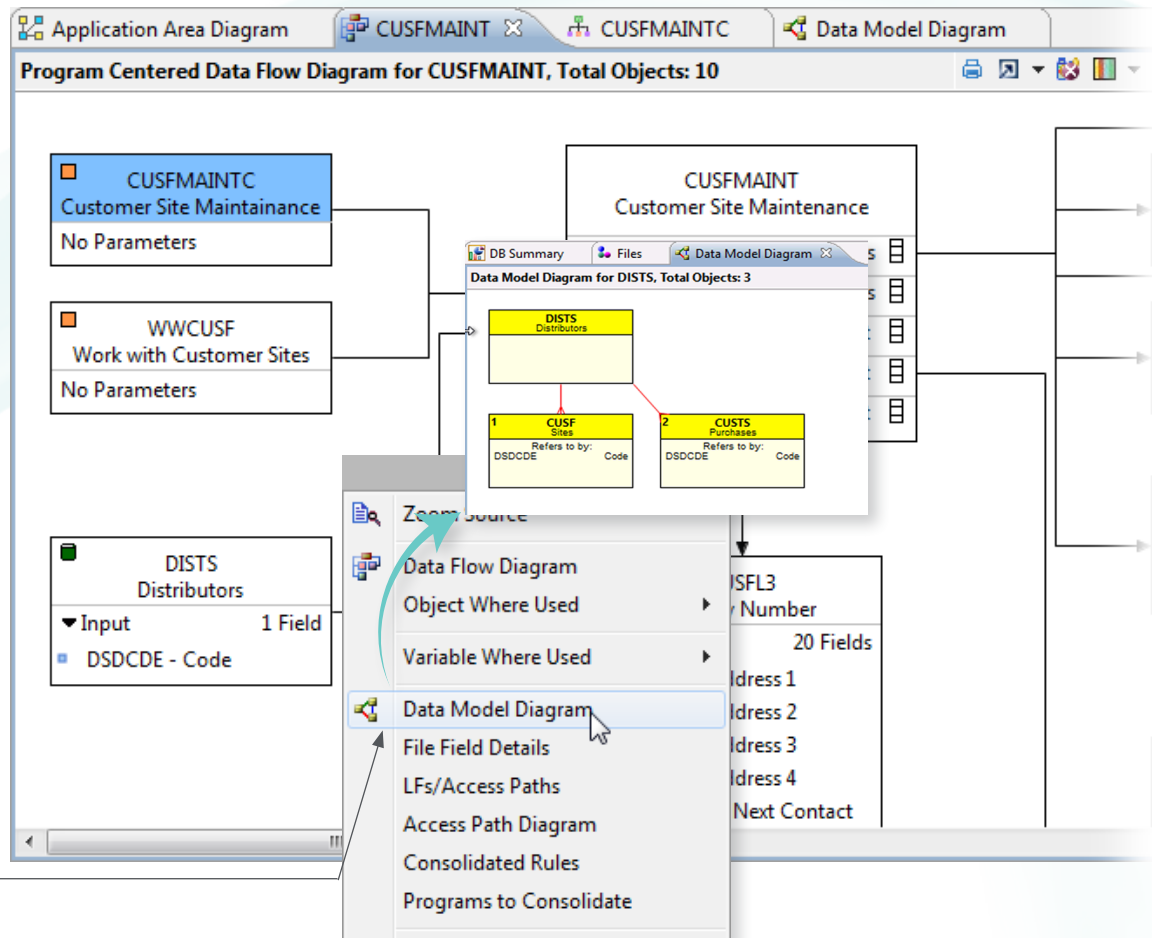
X-Analysis Advisor provides powerful go-anywhere-from-anywhere hyper-navigation capabilities while analyzing:

- ▶ Application interfaces
- ▶ Call structures
- ▶ Data flows
- ▶ Screen flows
- ▶ Subroutine diagrams
- ▶ Data model diagrams
- ▶ Variable tracing diagrams.

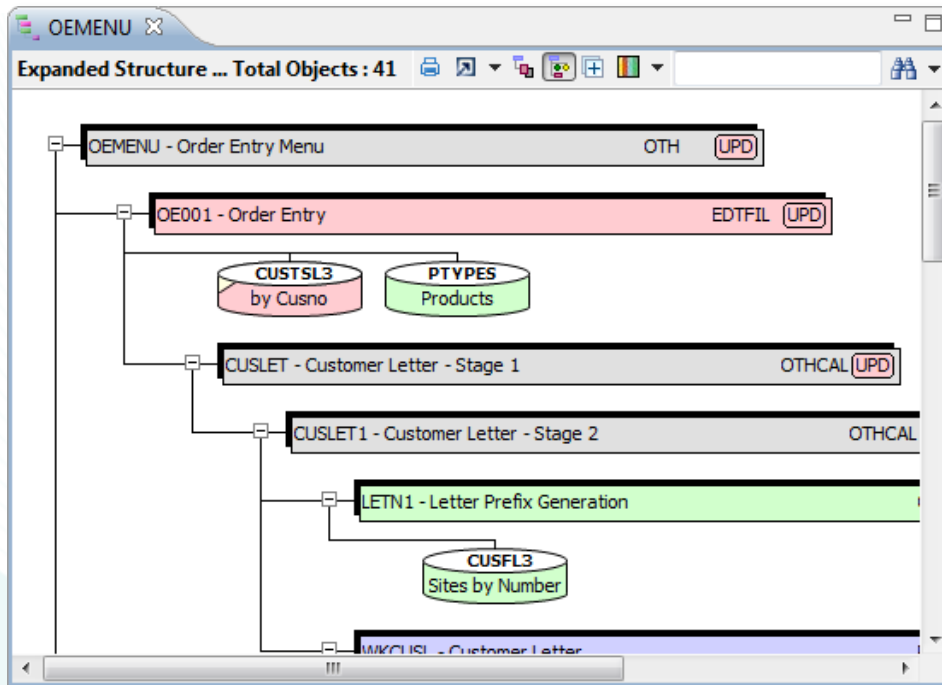
These interactive, color-coded diagrams are downloadable, exportable (Word, Visio, JPG) and integrated with RDi/p or Eclipse.

X-Analysis Advisor lets you hyper-navigate from anywhere to anywhere. Pop-up menus drive your navigation and permit deep drill-downs.

- ▶ Document system functionality for audit, interfacing or planning purposes
- ▶ Improve quality and lower cost of maintenance tasks
- ▶ Fill the gap of system knowledge when key people leave
- ▶ Accelerate system learning and research for developers and analysts



Graphical Documentation - Diagrams



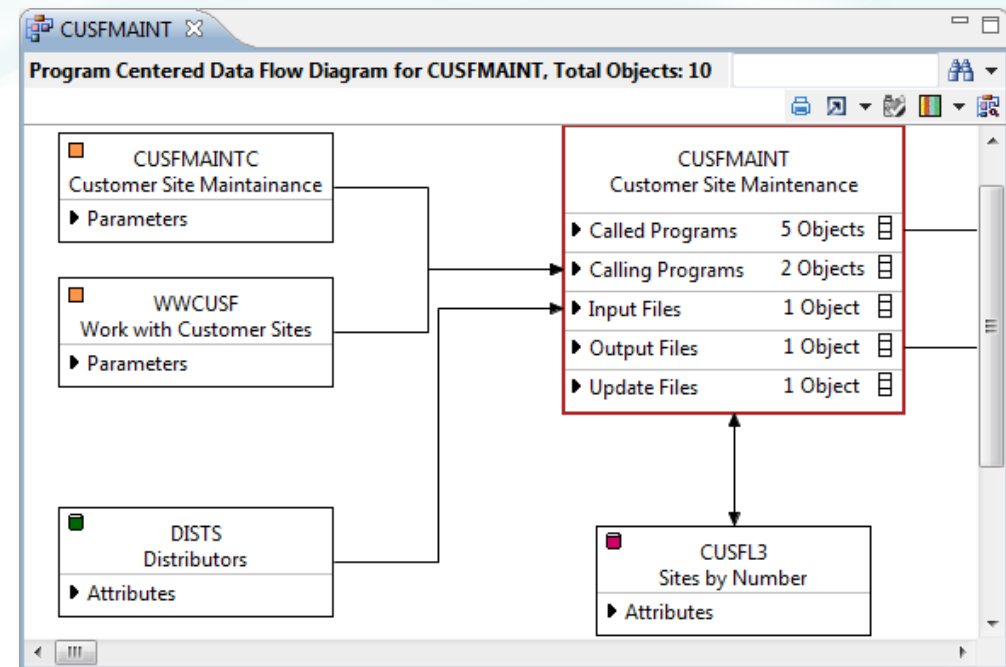
Structure Chart Diagram

A Structure Chart Diagram (SCD) gives a graphic representation of how 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 objects in the diagram. Color-coding also reveals important functional aspects such as updates, prints, and displays, which help the user to zero in on commonly sought after details.

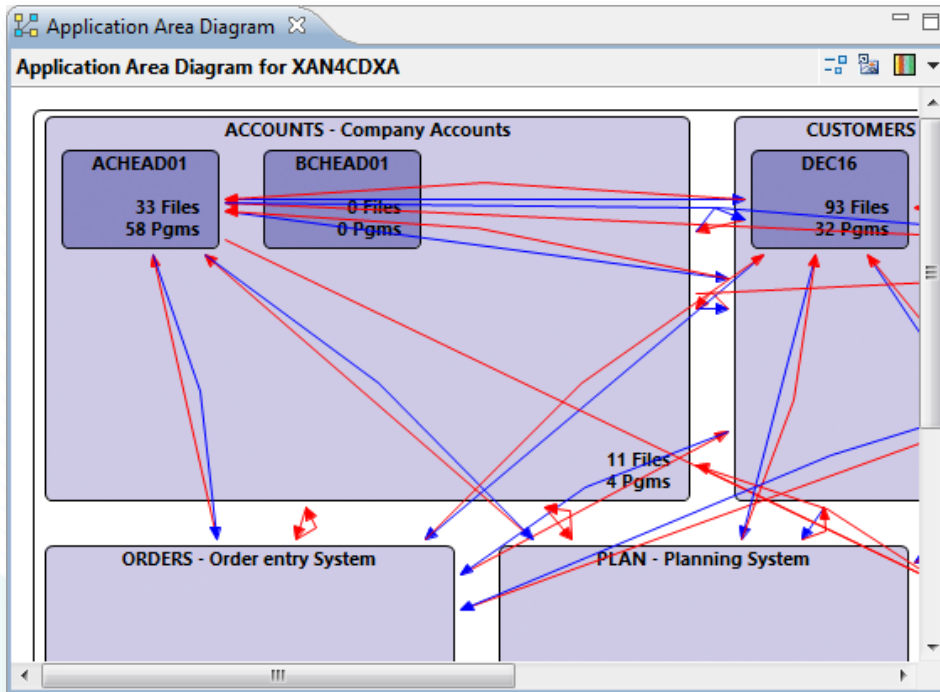
Related diagrams: Hierarchical Structure Chart, Inverted Structure Chart, Program Structure Chart

Data Flow Diagram

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



Graphical Documentation - Diagrams



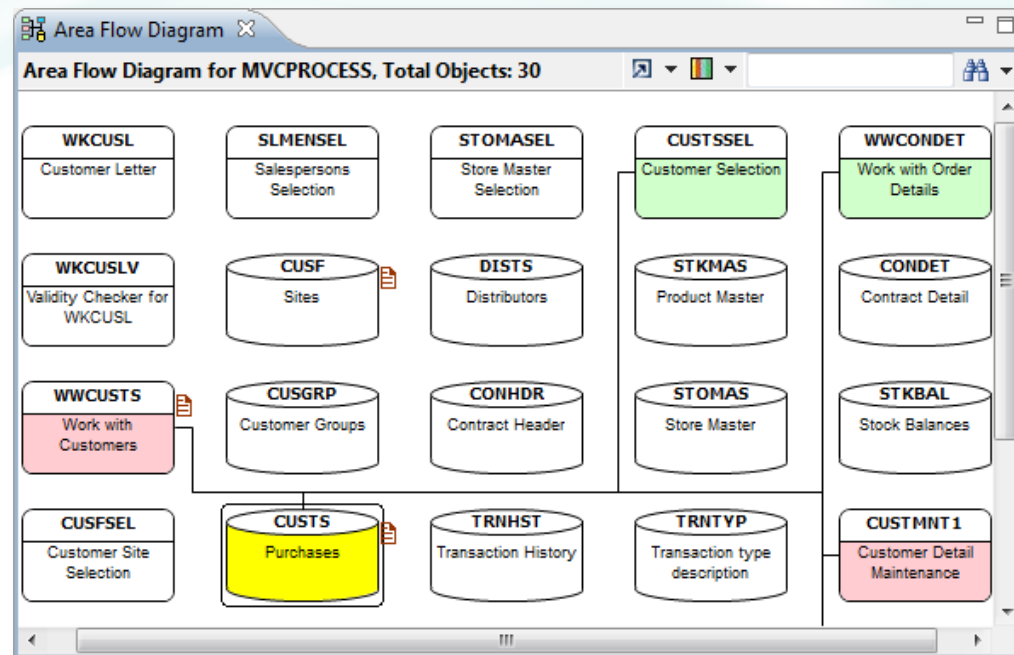
Application Area Diagram

Entire IBM i applications are often too large to effectively comprehend or carry out wholesale change. For this reason, it is often necessary or helpful to subdivide a system into application areas. The reasons and specifications for these areas may also change with time. X-Analysis Advisor 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 Advisor then uses the sophisticated cross-reference information and data model relationships to automatically include all related elements such as programs, displays or files in the application area.

These are just several of the diagram types available - to see more, please contact your Fresche representative.

Area Flow Diagram

Area Flow Diagrams display programs and files in an application area along with the relations between them. All diagrams are color-coded. A drop-down legend to the upper right of each diagram explains the significance of the colors. All diagrams are exportable to Visio.



Automated Relational Data Modeling

Effective data modeling is crucial to the management of databases designed for business and commercial use. X-Analysis Advisor helps programmers and systems analysts save time and effort by automatically extracting and documenting the data model buried in their RPG or COBOL application code.

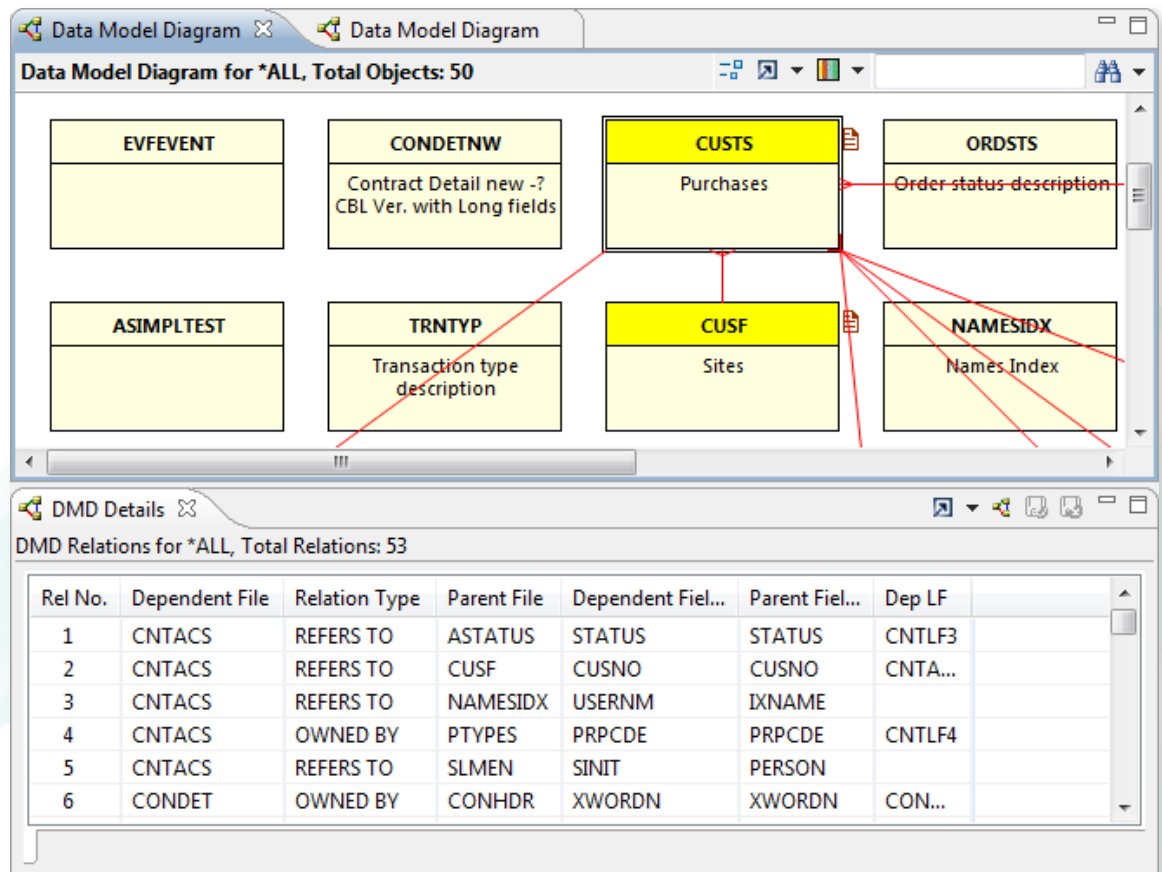
Business Success is Driven by Data

The effective management of information or business data has become a key differentiator for successful businesses. Many IBM i applications span 30 or more years of ongoing development, including database design and data input changes. Business pressures produce a constant architectural erosion of original database designs. This can make the management and access of critical business data increasingly difficult.

Business professionals become increasingly frustrated with their older systems because they know the data is there, but they just can't get it quickly enough. X-Analysis Advisor helps solve this problem by providing you with a key map to exploit competitive business data buried in IBM i application databases.

Some additional benefits of having an explicit data model from X-Analysis Advisor include:

- ▶ Data quality can be regularly automated and managed
- ▶ Using the explicit model to create accurate test data will help improve data quality proactively
- ▶ BI initiatives and reporting tools can be populated with the data model for higher report development productivity by users
- ▶ Database modernization can be seeded productively with the data model including long field and object names



- ▶ Complete foreign key relationships in diagrams and text, describing parent-child relationship join rules
- ▶ Automated generation of data model through propriety design recovery extraction algorithms (RPG and COBOL)
- ▶ Entity relationship diagrams
- ▶ Visio exports for graphical diagrams
- ▶ Browsing and analysis of data dictionary, and much more...

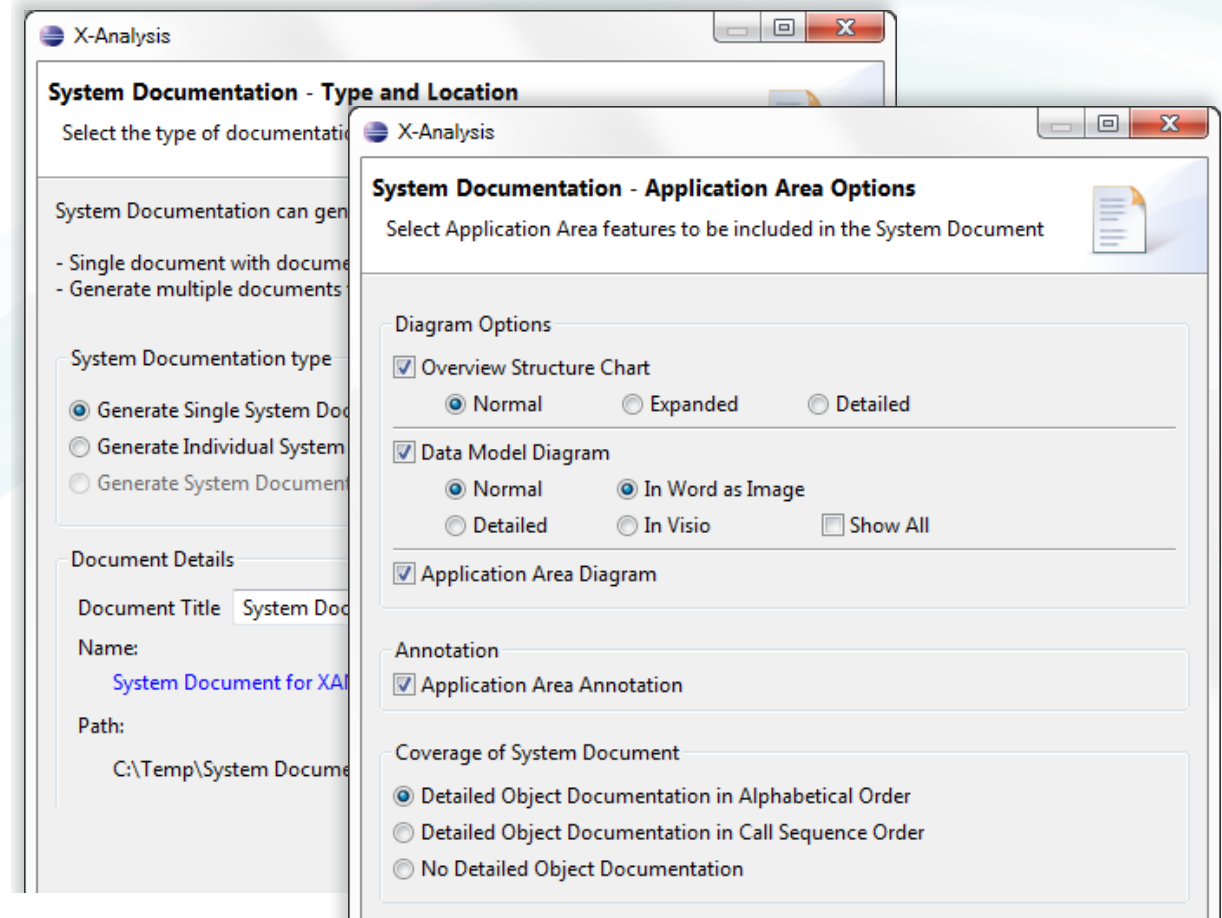
Graphical Documentation - Flexibility

A Wide Array of Functionality

X-Analysis Advisor provides numerous ways to view your application code and architecture. In addition to the diagrams described above, the tool offers the following:

- ▶ **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. Pseudo code is a great help even for experienced professionals as it explains the program logic in simple English.
- ▶ **Diagrams in Visio:** Any interactive diagram produced by X-Analysis 10 in the client can be automatically exported instantly to MS Visio with a single click. In addition to this, an RPG or COBOL program can be produced as a data flow chart interactively while browsing the source from within X-Analysis. If the RPG program is in Pseudo Code mode, the Data Flow Chart will use the narratives from the Pseudo code. This enables non-System i technologists and analysts to assimilate information at a detailed level of the application without any dependency on RPG or COBOL experts.
- ▶ **Lists and result sets:** Any source, object, or impact-analysis result list can be directly exported to formatted MS Excel, Word or Open Office with a single click while using the client.

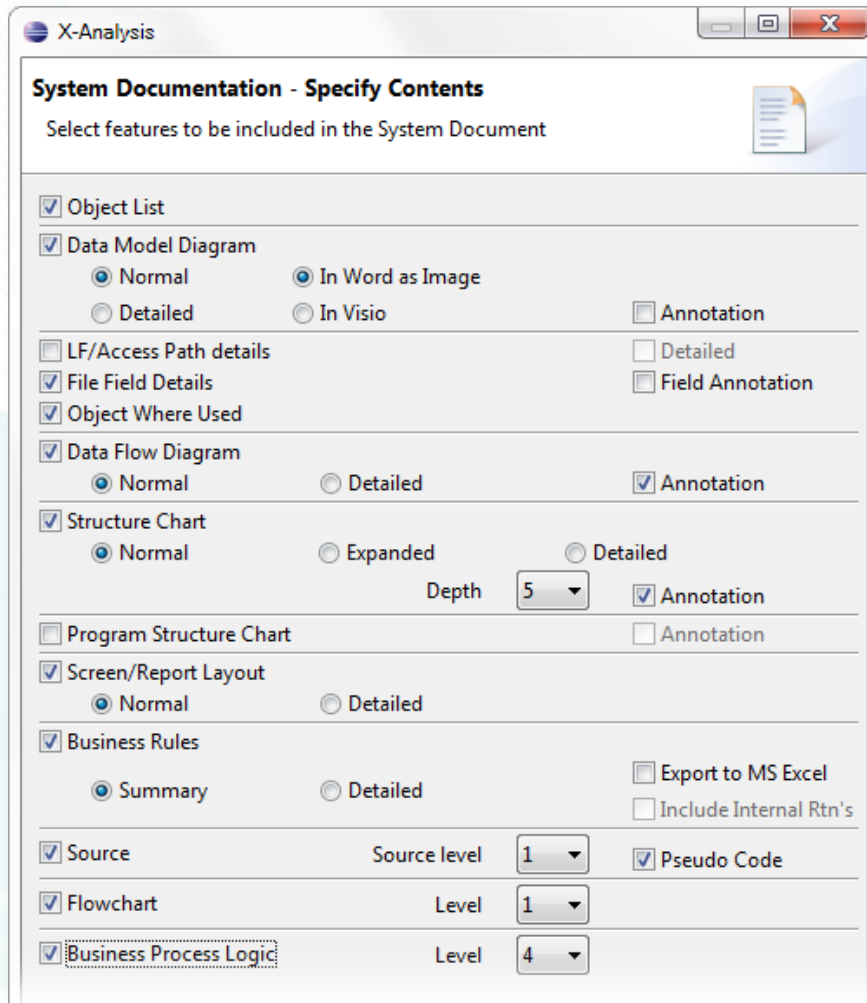
- ▶ **Microsoft Word Project Documentation Wizard:** Documents often take weeks to produce manually. With a simple wizard, a user can select any of the graphical diagrams, lists, flowcharts, annotation and business rule summaries generated interactively by the client interface, and collate the information into a single document with contents and index. This can be done for a single object, an application area, a list of objects, or an entire system. These documents can be edited and distributed as required.



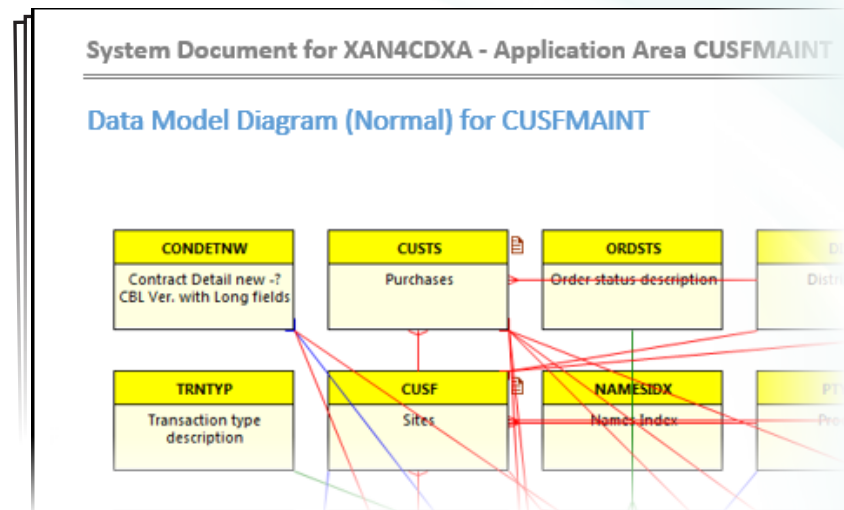
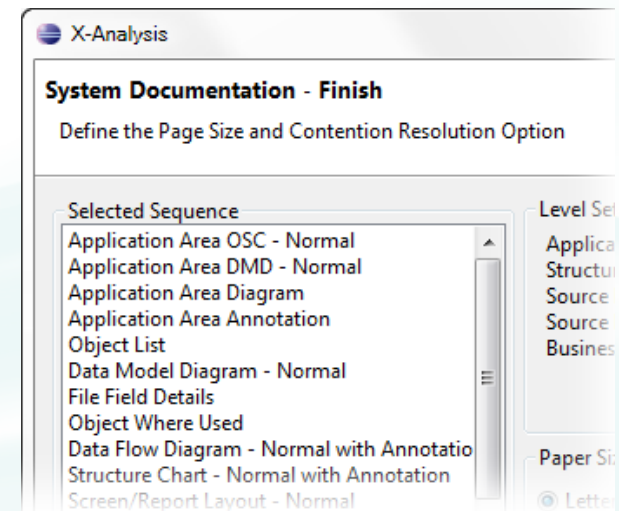
Graphical Documentation - Flexibility

As Much Detail As You Need

These are just some of the configuration screens that let you customize the system documentation to fit your exact needs.



System documentation automatically published to MS Word can be as detailed as you need it. Full documentation in Word includes a table of contents, index, color-coded legend, and all of the interactive charts, diagrams, object lists, references, etc., that you specify.



Impact Analysis - Fields, Variables, Levels

X-Analysis Advisor saves you weeks of manual analysis in just a few seconds with capabilities at both an object and a variable level. The variable level impact analysis can track where used information starting from a single field or variable, through all iterations and associated variables and fields and down through the entire call stack of a system with a single click. It can reduce analysis tasks done manually or with older tools down from weeks into seconds with absolute accuracy and confidence.

Download any output, drill-down into the source for more detail, or view results-coded visual diagrams for quicker and more focused analysis.

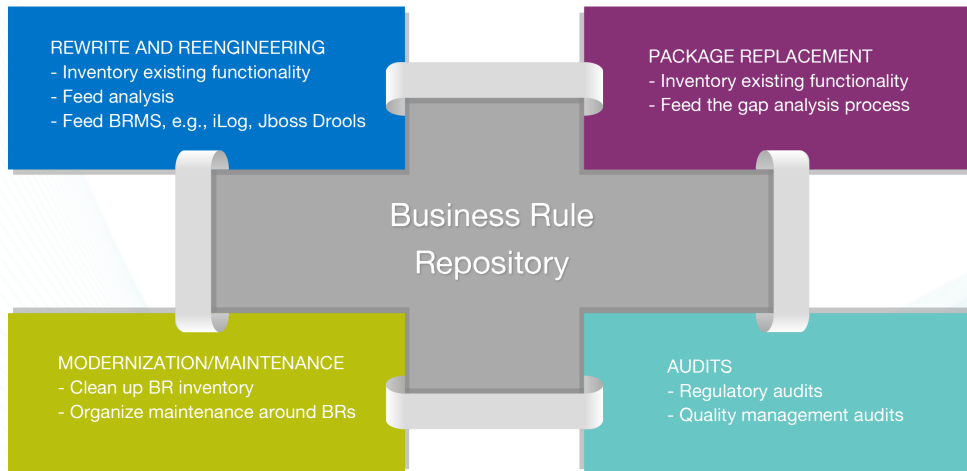
- ▶ Field where used
- ▶ Variable where used
- ▶ Where used levels
- ▶ Specialized where used

The screenshot displays the X-Analysis Advisor interface. The top window shows the source code for CUSF in XAN4CDEM/QDDSSRC, Lines: 69, View Level: 5. A context menu is open over the CUSNO variable, with options like 'File/Field Where Used', 'Variable Where Used', and 'Annotate'. The bottom window shows the 'Variable Where Used' results for CUSF/CUSNO, Lines: 135, View Level: Level1. A sub-menu is open for 'Where used levels', showing options like 'Level1', 'Level2', 'Level3', 'Lv4/Parameters', 'Lv5/Cascading Parameters', and 'Maximum Tracking'.

Name	Seq No	*...+... 1	*...+... 2	*...+... 3	*...+... 4	*...+... 5	Library	Source File
CUSCPY	0058.00	C		ADD 1		CUSNO		QRPGRSRC
CUSCPY	0070.00	C		WRITERCUSF6				QRPGRSRC
CUSCPY	0076.00	C		Z-ADDCUSNO		SCUSNO		QRPGRSRC
CUSF	0026.00	A		CUSNO	SP 0	TEXT ('Cu		QDDSSRC
CUSFL3	0003.00	A		K CUSNO				QDDSSRC
CUSFMAINT	0058.00	C	cusno	chain (e)	rcusf		XAN4CDEM	QRPGRSRC
CUSFMAINT	0125.00	C		eval	zcusno = cusno		XAN4CDEM	QRPGRSRC
CUSFMAINT	0154.00	C		eval	cusno = zcusno		XAN4CDEM	QRPGRSRC
CUSFMAINT	0176.00	C		update (e)	rcusf		XAN4CDEM	QRPGRSRC

Business Rule Extraction

Analysis and Documentation of Business Rules from RPG and COBOL Code on IBM i



X-Analysis Advisor's rule extraction suite creates a highly structured repository of business rules written in easily readable pseudo code. This repository provides a basis for all ongoing activity: Rewriting and reengineering, package replacement analysis, modernization and maintenance, and all types of audits.

Your Business Rules Run the Company, but They're Hidden Deep in Your Code

Definitions of the term 'business rule' range from the highly theoretic to the immensely practical, but IBM commonly refers to business rules as: "anything that captures and implements business policies and practices. A rule can enforce business policy, make a decision, or infer new data from existing data." In systems that have been developed over decades, business rules ultimately come to run the business, though the rules are rarely documented or fully understood.

This situation produces a typical cart-before-the-horse legacy scenario, where the business is no longer truly in control of how it is run. Ideally, the business defines each rule, so the business should be able to understand each business rule,

even ones that were implemented 25 years earlier. A shaky grasp of business rules leads to numerous issues. Notably, programmers often must implement new programs with only a basic understanding of how the program impacts existing rules and processes. Worse, what isn't documented isn't tested during implementation, setting the stage for discrepancies, new rounds of testing and extra cost.

Ultimately, the old adage holds: You cannot improve what you do not know and do not measure. Documenting and understanding the rules that run your business is the first step to improving the business. X-Analysis Advisor is designed to meet the challenge.

Some business rule documentation highlights in X-Analysis Advisor:

- ▶ Identifies and documents business rule logic from RPG
- ▶ Provides analysis and cross referencing of business rule logic in RPG
- ▶ Permits individual business rule annotation
- ▶ Provides business rule status editing and reporting
- ▶ Displays rule hierarchy
- ▶ Specifies business rule 'Where Used' and provides summaries
- ▶ Creates business rule database
- ▶ Exports business rules to MS Word and EXCEL
- ▶ Provides business rules consolidation by:
 - ▶ Program
 - ▶ Table/Field
 - ▶ Display formats/Screens
- ▶ Provides screen design and report layouts at a glance
- ▶ Creates Screen Flow Diagrams
- ▶ Creates Screen Activity Diagrams
- ▶ And much more...

Business Rule Extraction

X-Analysis Advisor Instantly Exposes Your Complete Business Rules Inventory

Here's an example of how X-Analysis Advisor tool provides instant access to a system's business rule assets, even for non-experts. A company has the following business rule: "A customer order must be allocated to a sales representative". This rule will end up being implemented in RPG as seen on the left below. On the right hand side is an example of how this code is summarized in a form of readable Pseudo code by X-Analysis Advisor.

```

0261.00 C      SPERSON      CHAIN  SLMEN
0262.00 C      *IN99  IFEQ    '1'    *IN34
0263.00 C              MOVE    '1'
0264.00 C              MOVE    'OEM0023'      MSGID
0265.00 C      CALL      RTNMTXMSGID  7
0266.00 C      PARM
0267.00 C      PARM      *ALL'- '  ERRMSG132
0268.00 C      MOVE      PNAME
0269.00 C      LEAVE
0270.00 C      ENDIF      ...
    
```



```

Rule 71 Rep not found on Salespersons
IF Not Found(Salespersons)
  ERROR 'Salesperson not found'
  Full_Name = *ALL'- '
END
    
```

These pseudo rules can be printed, viewed, cross referenced, exported as XML and consolidated back to the database files/fields by user interface or programs.

How many rules does the typical IBM i application have?

X-Analysis Advisor has been used by many IBM i shops around the world over the last 25 years to analyze many different applications. A "typical" RPG application consists of around a million lines of code (though some are much, much larger) and contains around 30,000 business rules.

Why Care About Business Rules?

Critical business rules used to operate your company legally and effectively are scattered across your software code.

Fresche's services and technologies have analyzed billions of lines of RPG, Cobol and CA 2E code on IBM i machines over 25 years. Some compelling reasons for business rule management have evolved from these experiences:

- ▶ Business rules often outlive people and software applications. A company might replace, rewrite or modernize a system, but most of the rules will stay the same.
- ▶ Management decisions and/or regulatory changes are often implemented as business rule logic in source code.
- ▶ The same business rule may not necessarily be implemented consistently in multiple places across the software code. The business will run, but not as effectively as it could.
- ▶ Some inherited business rules embedded in systems might actually hinder the business.
- ▶ In very old systems where architects, management and designers have long since left, the software code may be the only source of some critical business rules.
- ▶ Companies that have direct access and visibility of all the business rules in their software code respond more quickly to business dynamics.
- ▶ Companies that optimize the reuse of proven business rules in the software code improve business agility and overall costs. Proven business rules software code is expensive to develop.
- ▶ RPG source code might be a good way to implement business rules; it is not a very good way to document or analyze them. Simplifying and improving communication between various business stakeholders is a critical requirement for any company.
- ▶ Business rules are defined by (and belong to) the business - not IT. It is therefore imperative they should be able to read and understand them.

Business Rule Extraction

Using business rules for rewrite/reengineering projects

Starting new rewrite projects by attempting to define business rules from scratch is hugely time consuming. In most cases, the majority of business rules will be carried forward to the new system. There will be additions and changes, but most of the existing business rules remain valid and useful. X-Rules lets you feed the recovered rules to analysts, users and developers through the tool's GUI and its generated Word, Excel and XML documents. This greatly facilitates analyst development of specifications for the new system, reducing time and cost, and improving communication and accuracy.

Using Business Rules for COTS packages

The primary challenge of aiding existing systems with purchased Commercial Off The Shelf (COTS) packages is understanding the gaps between the systems. While IT and users are more familiar with their own system, they typically do not have a complete inventory of all business logic, which the business is dependent upon for operations and management. Using a tool like X-Rules to systematically recover all the business rules (as well as the data model rules) provides a solid foundation from which to evaluate gaps with the COTS package.

Business Rules For Maintenance Activities

IT organizations that support older systems are now moving to implement business logic through the use of Business Rule Management Systems. Such systems are more portable, durable, accessible and easier to maintain. An excellent beginning is to use X-Rules to recover your business rules from your older systems; clean them up by identifying and refactoring duplicate, obsolete or inconsistent rules; and build a simple working repository of business rules that analysts, users and developers can use as the basis for all future development.

Business Rules for Audits

Whether audits are performed for regulatory compliance or to determine code quality, a complete set of business rules (along with extensive where-used drill-downs) is essential to ensure that all crucial aspects of the business are covered.

Direct Benefits to IT

Here are a few direct IT benefits associated with a structured approach to business rules management in software code:

- ▶ To help Business Analysts understand and work with the system
- ▶ To communicate system functionality to users and management
- ▶ To help developers understand (and find) existing functionality
- ▶ To improve system quality by facilitating consistency and accuracy
- ▶ To increase programmer productivity by enabling code reuse
- ▶ To feed the reengineering and migration process with design documentation
- ▶ To help evaluate the suitability of packaged software replacements

The screenshot displays the X-Rules software interface. The top window, titled 'Consolidated Rules', shows a business rule for 'R00005 CusGrp not found on Customer'. The rule text is as follows:

```
R00005 CusGrp not found on Customer
// - Customer Group must be valid:
Read data CUSGRP using XWBNCDC
IF Not Found(CUSGRP)
  ERROR OES0374
  LEAVE
END
```

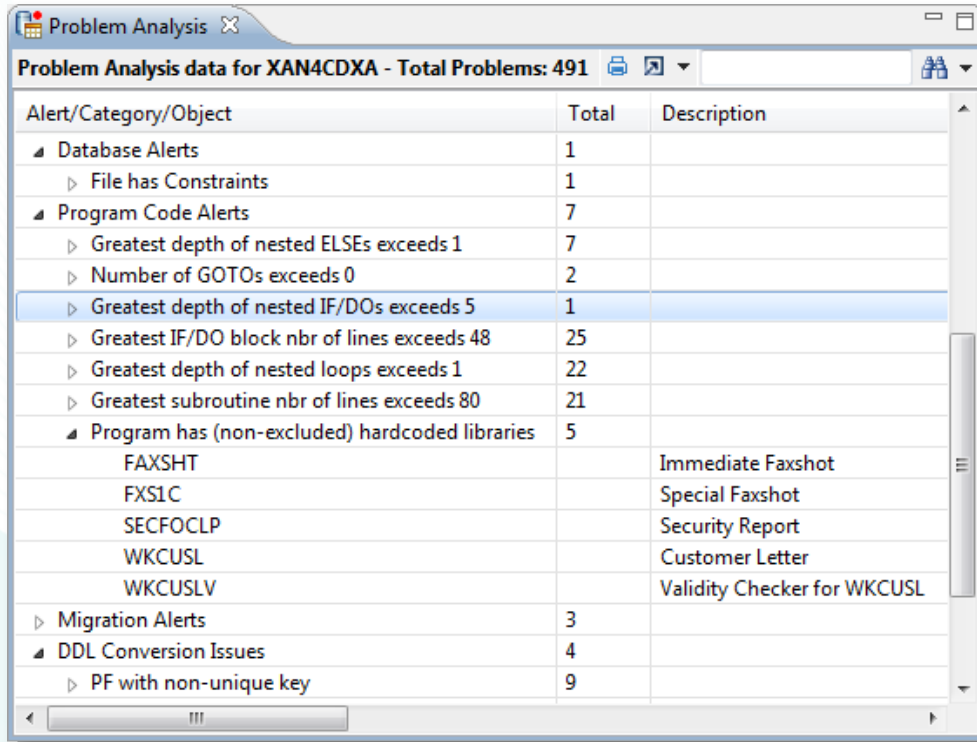
A context menu is open over the rule text, with 'Business Rules' selected. Below this, another window titled 'Business Rules' shows a table of rules:

Source Member	Rule Number	Field
WWCUSTS	00005	XWBNCDC
WWCUSTS	00006	PERSON
WWCUSTS	00007	DSDCDE
WWCUSTS	00008	DSDCDE

A context menu is open over the table, with 'Variable Where Used' selected, which has opened a sub-menu showing 'All References' and other options.

Audit, Quality and Change Management

Measure, Compare and Manage the Quality, Metrics and Complexity of Your IBM i Applications



The screenshot shows a window titled "Problem Analysis" with a sub-header "Problem Analysis data for XAN4CDXA - Total Problems: 491". The main content is a table with three columns: "Alert/Category/Object", "Total", and "Description". The table lists various alerts, including database constraints, program code issues like nested IF/DOs and loops, and migration alerts.

Alert/Category/Object	Total	Description
Database Alerts	1	
File has Constraints	1	
Program Code Alerts	7	
Greatest depth of nested ELSEs exceeds 1	7	
Number of GOTOs exceeds 0	2	
Greatest depth of nested IF/DOs exceeds 5	1	
Greatest IF/DO block nbr of lines exceeds 48	25	
Greatest depth of nested loops exceeds 1	22	
Greatest subroutine nbr of lines exceeds 80	21	
Program has (non-excluded) hardcoded libraries	5	
FAXSHT		Immediate Faxshot
FXSLC		Special Faxshot
SECFOCLP		Security Report
WKCUSL		Customer Letter
WKCUSLV		Validity Checker for WKCUSL
Migration Alerts	3	
DDL Conversion Issues	4	
PF with non-unique key	9	

X-Analysis Advisor gives you a highly detailed picture of your application and database metrics, including lists and locations of constraints, duplicates, unused files, multiple record formats, missing sources, unused subroutines and procedures and a host of database-related problems.

Some of X-Analysis Advisor's audit, quality and change management features:

- ▶ Program Complexity Metrics: low, medium and high complexity classification of programs
- ▶ Screen Display Complexity Metrics Analysis
- ▶ Database File Metrics Analysis
- ▶ Metrics Report Writer- Complete customizable report writer for building complexity and analysis reports
- ▶ Problem Analysis for design oddities, such as:
 - ▶ Database file with constraints defined
 - ▶ Duplicate logical files
 - ▶ Database files with FIFO/LIFO keywords in source
 - ▶ Joined logical files
 - ▶ And many more...
- ▶ Identifies unused Logical files, subroutines and procedures
- ▶ Audit Report - MS Word or PDF wizard generates structured reports of metrics and problem analysis results
- ▶ Link multiple repositories for combined analysis throughout all functions

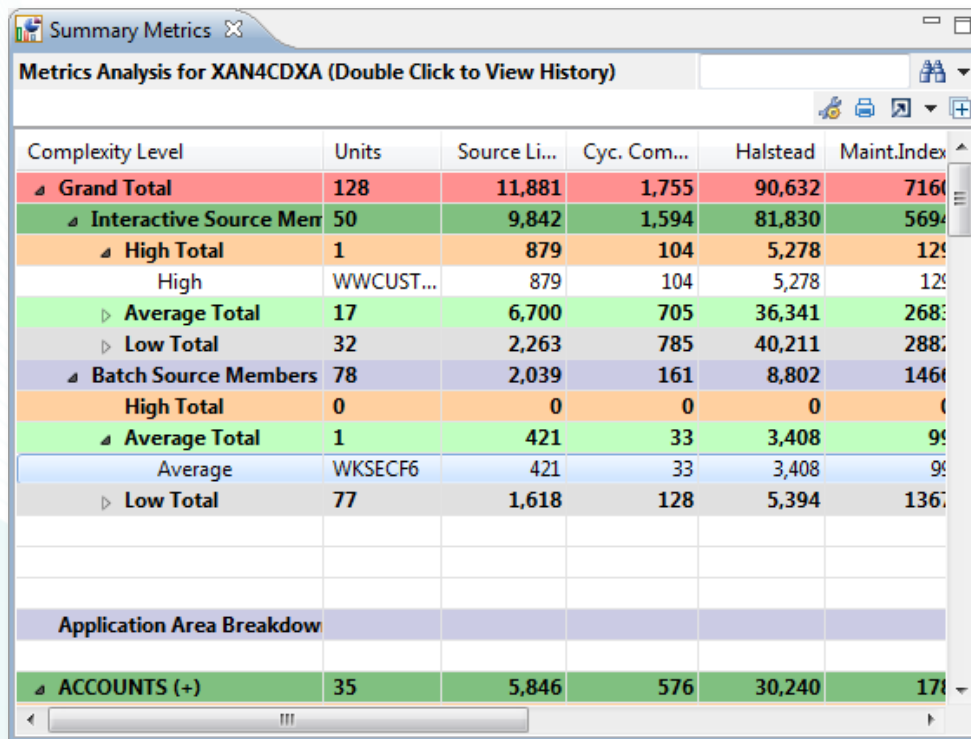
You Cannot Improve What You Do Not Measure

Applications running on IBM i are typically large, complex and have been developed by a variety of programmers and analysts over several decades. Without an automated audit and analysis tool, understanding such applications is almost impossible, especially for new resources who have to take over maintenance and development. X-Analysis Advisor provides an exhaustive breakdown of every aspect of your application

portfolio. Without this linked, cross-referenced summary of your applications and databases, change management becomes a guessing game, and testing times and remediation cycles increase. In addition, without thorough knowledge of your applications, modernization of even small parts of the system becomes daunting, as complete impact is unknown, so application agility is hampered.

Audit, Quality and Change Management

Metrics Analysis is the Key to Improving Your Applications and Development



The screenshot shows a window titled 'Summary Metrics' with a sub-header 'Metrics Analysis for XAN4CDXA (Double Click to View History)'. The table below displays various complexity metrics across different levels and application areas.

Complexity Level	Units	Source Li...	Cyc. Com...	Halstead	Maint.Index
Grand Total	128	11,881	1,755	90,632	716
Interactive Source Mem	50	9,842	1,594	81,830	569
High Total	1	879	104	5,278	129
High	WWCUST...	879	104	5,278	129
Average Total	17	6,700	705	36,341	268
Low Total	32	2,263	785	40,211	288
Batch Source Members	78	2,039	161	8,802	146
High Total	0	0	0	0	0
Average Total	1	421	33	3,408	99
Average	WKSECF6	421	33	3,408	99
Low Total	77	1,618	128	5,394	136
Application Area Breakdown					
ACCOUNTS (+)	35	5,846	576	30,240	17

The complexity metrics feature of X-Analysis Advisor enables managers of IBM i systems to measure, monitor and proactively manage complexity and changes to the applications.

Metrics Analysis Features

- ▶ Metrics calculated at both program and subroutine/procedure level
- ▶ All metrics exportable to Excel
 - ▶ Cyclomatic complexity
 - ▶ Halstead volume
 - ▶ Maintainability index
 - ▶ Number of source line statements in the program
 - ▶ Number of GOTOs or CABxx statements
 - ▶ Greatest nesting depth of IF/DO statements
 - ▶ Greatest number of statements within an IF/DO block of code
 - ▶ Greatest depth of nested DO/FOR loops
 - ▶ Greatest depth of nested ELSE statements
- ▶ Optionally transform the product into new languages with further use of transformation robots
- ▶ Test and deploy the iteration.

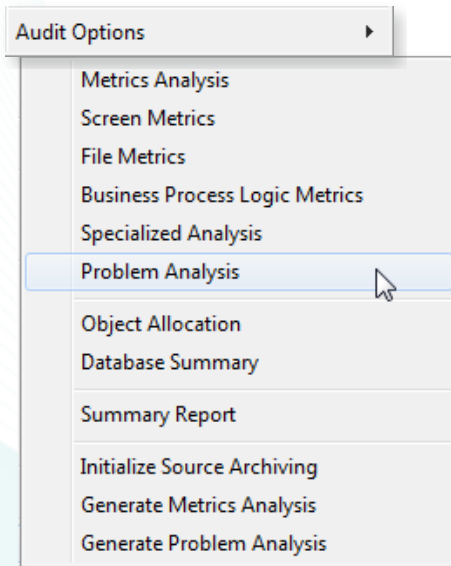
Audit for Problems, Complexity and Change

- ▶ Understand where the most complex code in the system resides and plan accordingly.
- ▶ Audit the difference between versions of a system at a design level—not just code.
- ▶ Be alerted to potentially harmful system conditions and defects before they cause production problems.
- ▶ Track changes in new versions of packaged applications to plan for refitting customizations.
- ▶ Externalize rules so they can be shared by multiple applications.
- ▶ Compare versions of your custom applications at different points in time to track where changes were deployed.

Audit, Quality and Change Management

A Wide Range of Options and Functionality

In addition to problem analysis (pictured on page 2) and metrics analysis (described on page 3), X-Analysis Advisor provides numerous functions to help manage your IBM i applications. Some of the highlights:



SPECIALIZED ANALYSIS

Allows you to design your own reports using the full metrics database in the defined system repository. This reporting provides a valuable way to measure and manage the quality and complexity of a code base. You can run one-off static reports or create DIFFERENCE REPORTS, in which you compare two or more versions of an application at different points in time to discover changes in:

- Source code
- Business rules
- Table and field definitions
- Table relationships

Difference Analysis for XAN4CDXC compared against XAN4CDXA

Heading/Object/Category	Description	Class	Type	Name
CHANGED	Changed Files			
CNTACS	Contacts	APPLY	*FILE	CUSFMA
FIELDS	Database File Fields	APPLY	*FILE	ORGS
RELNS	Database File Relationships	APPLY	*PGM	ORGL1
CNTLF1	Global Contacts by Salesman	APPLY	*PGM	CUSGRS
CNTLF2	Global Contacts by Name	APPLY	*PGM	CUSTSS
CNTLF3	Global Contacts by Status	APPLY	*PGM	DISTSS
CNTLF4	Global Contacts by Prod & Status	APPLY	*PGM	DSPTTY
CONDET	Contract Detail	MODIFIED	*FILE	CNTCMA
CONHDR	Contract Header	MODIFIED	*FILE	CONDET
CUSF	Sites	MODIFIED	*FILE	CONDET
DISTS	Distributors	MODIFIED	*FILE	CUSFSE
CUSFL7D		MODIFIED	*FILE	CUSTOM

Class	Type	Name	Description	PTF Change Date
NEW	HTML	HTML1	Sample HTML	12/08/10
NEW	RPGL	\$CSAMPLE	Copy book for C specs	12/08/10
NEW	RPGL	\$DSAMPLE	Copy book for D specs	12/08/10
NEW	SQL	DISTSQRY		12/08/10
REFERENCED	*FILE	CNTCMAINTD	Contacts Maintenance	19/03/10
REFERENCED	*FILE	CONDET	Contract Detail	19/03/10
REFERENCED	*FILE	CUSFMAINTD	Customer Site Maintenance	19/03/10

SCREEN METRICS

Displays low, medium and high complexity classification of all the available screen functions.

BUSINESS PROCESS LOGIC METRICS

Displays business process logic data in metrics form - total lines, included lines, excluded lines, unmarked lines etc.

DATABASE SUMMARY

Provides access to a summarized database report for the entire cross-reference library. The report contains information related to files, their unique keys and other necessary file-related details.

And So Much More...



X-Analysis Advisor:

Fresche's comprehensive application analysis and management solution for IBM i environments.

X-Analysis Advisor Summary of Functionality

- ▶ Variable Tracing - drilling down through multiple layers or variables and programs/files/screens in RPG, COBOL, CL, SQL
- ▶ Interactive source code browser
- ▶ View RPG as Pseudo code
- ▶ Interactive structure chart diagrams
- ▶ Interactive data flow diagrams
- ▶ Object where used
- ▶ Procedures where used
- ▶ Plug-in to Eclipse or WDSr/RDi/RDp
- ▶ Subdivide system into application areas and embed into other application areas
- ▶ Application Area diagrams
- ▶ Restrict diagrams or show the objects that belong to an application area only.
- ▶ MS Word project/static documentation wizard
- ▶ Visio exports for graphical diagrams

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- ▶ Subroutine layering diagrams (program structure charts)
- ▶ Link to LPEX editors
- ▶ Indented source code views
- ▶ Program understanding at an application level, rather than a complete system level.
- ▶ All other modules have use of application level control as opposed to entire system level functionality
- ▶ Object annotation repository or Word-based documentation
- ▶ MS Word/Visio/JPG exports of all lists and graphical diagrams.
- ▶ Automated generation of relational data model from RPG/COBOL
- ▶ Entity relationship diagrams
- ▶ Instant and automated structured drill-down browsing of test/live data
- ▶ Browsing and analysis of data dictionary
- ▶ Builds CRUD map and matrix for all DB IO
- ▶ Supports embedded SQL and SQL procedures

Functionality Summary - Cont'd.



X-Analysis
Advisor

X-Analysis Advisor:

Fresche's comprehensive application analysis and management solution for IBM i environments.

X-Analysis Advisor Summary of Functionality - Cont'd.

- ▶ Program Complexity Metrics – low, medium and high complexity classification of programs based upon each programs number of: Cyclomatic, Halstead, Maintainability Index, Source Lines and other useful metrics associated with program complexity
- ▶ Metrics Report Writer– Complete customizable report writer for building complexity and analysis reports using the X-Analysis metrics repository. Trends, static analysis and source change reports included.
- ▶ Problem Analysis for design oddities, such as files with constraints, PFs with non-unique keys, unused procedures, etc.
- ▶ Audit Report – MS Word or PDF wizard generates structured reports of metrics and problem analysis results
- ▶ Link multiple repositories for combined analysis throughout all functions
- ▶ Builds a difference analysis between two versions of a system comparing:
 - ▶ Business rules
 - ▶ Database designs
 - ▶ Database relations
 - ▶ Programs
- ▶ Builds a PTF impact analysis by comparing a PTF library repository with production repository
- ▶ Export of DDL from relational data model
- ▶ Identifies and documents business rule logic from Action Diagrams
- ▶ Analysis and cross referencing of business rule logic in Action Diagrams
- ▶ Individual Business Rule Annotation
- ▶ Business Rule Where Used & Summaries
- ▶ Business Rule Database
- ▶ Business Rule Exports to MS Word and EXCEL
- ▶ Screen design and report layouts at a glance
- ▶ Business rules consolidated by Program, Table/Field, Display formats/Screens
- ▶ Business processes as Pseudo code
- ▶ Screen Flow Diagrams
- ▶ Source levelling (summarization of source members) by source line type
- ▶ Export of UML Class Diagrams from relational data model
- ▶ Generation of UML Activity Diagrams

Ready to Learn More?

X-Analysis products are available in a variety of configurations. At Fresche Solutions, we work closely with you to assess your needs and recommend the best solutions. To get started, contact us using the information below:

www.freschesolutions.com | info@freschesolutions.com
1.800.361.6782 (Worldwide)

X-Analysis Advisor is the main offering in the X-Analysis suite, which includes productivity and modernization tools for your IBM i applications and databases. Following is a brief description of the solutions in the suite:

Understanding and Impact Analysis: An IBM i analysis tool that provides automated online documentation and powerful impact analysis.

Business Process Mapping and Metrics: A complete IBM i analysis tool, providing automated documentation, impact analysis, business rule extraction and code quality metrics.

Data and Test Management: Analysis of data quality; data archiving, data subsetting and data anonymization. Test data automation and management.

Field Resizing: Automated resizing of all occurrences of a field throughout your entire application environment; includes detailed problem analysis.

CA 2E Analysis: Everything required to analyze and document CA 2E applications. Includes business rule extraction and code quality auditing.

Application Modernization: RPG, COBOL and CA 2E (Synon) automatically converted to Java.

Database Modernization: Automated conversion of DDS to DDL, including creation of constraints, long field names and views.

Open Systems Analysis: Cross-referencing and documentation of Java, C#, PHP, and other languages.

About Fresche Solutions

Fresche is the leading provider of automated digital transformation enablement for companies who rely on IBM i systems. Through its transformation framework (tools, processes and methodologies), Fresche delivers high quality application modernization as a service (MaaS) in addition to a wide range of optimization solutions.

With over 400 digitally connected colleagues around the world and an extensive network of over 200 business partners, Fresche collectively brings clients the best solutions to drive innovation and IT success. For more information about our company, visit us on the Web at www.freschesolutions.com