X-Rules   
Tutorial

Software version 13.3.02, 20230822

Contents

[Contents 2](#_Toc143510351)

[Publication Information 3](#_Toc143510352)

[Preface 4](#_Toc143510353)

[About this guide 4](#_Toc143510354)

[Version 4](#_Toc143510355)

[How to use this guide 4](#_Toc143510356)

[What is new in the latest release? 5](#_Toc143510357)

[Overview 6](#_Toc143510358)

[Prerequisites 7](#_Toc143510359)

[Business Rules 8](#_Toc143510360)

[What are Business Rules? 9](#_Toc143510361)

[Typical Reason for Extracting Business Rules 10](#_Toc143510362)

[How to Extract Business Rules? 11](#_Toc143510363)

[Using Extracted Business Rules 12](#_Toc143510364)

[Business Rules: Extraction & Analysis 13](#_Toc143510365)

[Getting Started with X-Analysis 14](#_Toc143510366)

[Derive Business Rules 19](#_Toc143510367)

[View Business Rules 23](#_Toc143510368)

[Business Rules Overlay 27](#_Toc143510369)

[Business Rules Legends 28](#_Toc143510370)

[Business Rules Analysis 29](#_Toc143510371)

[Consolidated Rules 31](#_Toc143510372)

[Index 37](#_Toc143510373)

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Preface

About this guide

In this guide, we will learn how to use the X-Rules module to extract business rules and analyze them. It discusses the following topics:

* Reasons for extracting Business Rules
* Using the extracted Business Rules
* Extracting and analysing Business Rules
* Setting status for Business Rules

Version

X-Rules, software version 13.3.02.

How to use this guide

This guide covers all the salient features of the X-Rules toolset under different sections.

Each chapter in this guide establishes the significance of restoring the underlying logic in a modern format. The topics explain how to extract rules and use them. This guide contains a detailed chapter on the extraction and analysis of the business rules via X-Analysis. The last chapter explains how to set statuses for business rules.

The X-Analysis suite of products contains a total of eight modules. This guide only covers the X-Rules module. For information about the other modules, please contact your Fresche Solutions representative, or visit us at:

<https://freschesolutions.com/products/x-analysis-suite/>

What is new in the latest release?

|  |  |
| --- | --- |
|  | For this release, we updated this document. Here is the change that were made to this document. |

* [Business Rules Legends](#_Ref-1624738779): Added new topic describing the option Legend in Business Rules toolbar.

Overview

The logic buried inside the code and process models gives an application its characteristics. The generic term for such logic is Business Rules. The challenge is to extract or “harvest” these rules from the legacy code.

Traditionally, business analysts or consultants find the rules for a new application by organizing workshops and interviews, then manually writing use cases to describe the rules as text. However, with a legacy application, all the rules are already there, prescribed in the application code – the user just need to retrieve it!

The problem is that in the vast majority of legacy RPG and COBOL programs, the business rules logic is mixed in with screen handling, database I/O, and flow control. Therefore, harvesting these business rules from legacy applications requires knowledge of the application and the language used to implement it, both of which are steadily diminishing resources. Once harvested, these rules need to be narrated and indexed, thus providing critical information for any analyst, architect, or developer charged with rebuilding a legacy application. The task of harvesting business rules is therefore a highly-skilled, labor-intensive, and costly exercise for any organization.

The X-Rules# toolset is responsible for the automatic extraction of the explicit business rules and UI-metadata from an RPG, COBOL, or CA:2E (SYNON) application. X-Rules accomplishes the task of extracting Business Rules by automatically scanning the RPG and COBOL programs, and programmatically scanning the 2E model. It then separates the rule code from the body of the application and identifies, indexes, narrates, and stores business rule logic code into a structured, usable repository. In the final part of the process, it supplies appropriate text narratives to describe these harvested rules. Once extracted the business rules can be analyzed, documented, and exported into DDL, XML metadata repositories, and tools such as MyEclipseBlue, Rational, Erwin, and Together.

Prerequisites

Before starting this tutorial, the following are required:

* The X-Analysis server and the client components should be installed into an IBM i server and a Windows PC, respectively.
* The demo library – XAN4CDEM and its cross-reference library – XAN4CDXA should be successfully restored on the IBM i.

For details on how to implement these prerequisites, refer to the document “X-Analysis\_User\_Manual” for this release.

**#The product is under continuous improvement; hence, you might notice some differences in the screens.**

Business Rules

Understanding an application’s Business Rules is essential, primarily because the rules provide a complete picture of how an organization works. Most business rules persist over time and across all applications, languages, and platforms. The user can rewrite their RPG IBM i application to any other language on any other platform, and still have the same business rules.

What are Business Rules?

Business Rules define exactly how the applications, function.

There are two broad categories of Business Rules: Structural and Functional.

* Structural Business Rules define how the database is modeled. It defines the tables, their attributes, and the relationships between different tables. Structural Business Rules also define much of the user interface – how it is designed into individual use cases or activities, and the flows among them.
* Functional Business Rules define how data is processed in the application. A typical Functional Business Rule is in the form of “if this condition is met, then take these actions.”

In X-Rules, there are specific repositories for each type of Business Rule: The Data Model, the User Interface, and the Functional Business Rules.

Typical Reason for Extracting Business Rules

Business Rules are most commonly extracted during the transition to new applications or platforms. They are used to facilitate the process and lower both transition costs and risks.

However, by analyzing the business rules right away, a user can benefit from opportunities to reduce application management costs, improve maintenance results, and increase an application’s value throughout its lifecycle. The overall benefits are:

* To help business analysts to understand the system and how to work with it. To communicate system functionality to users and management
* To help developers understand existing functionality, what it is, and where it is located
* To improve system quality by facilitating consistency and accuracy
* To increase programmer productivity by enabling code reuse
* To feed the process of reengineering and migration
* To evaluate the suitability of packaged software being considered for purchase

A repository of Business Rules should do more, rather than simply becoming another system reference. It should also be used to shape IT processes and communications. As noted in the overview section, the Business Rules go through multiple iterations of application life cycles and platform installations.

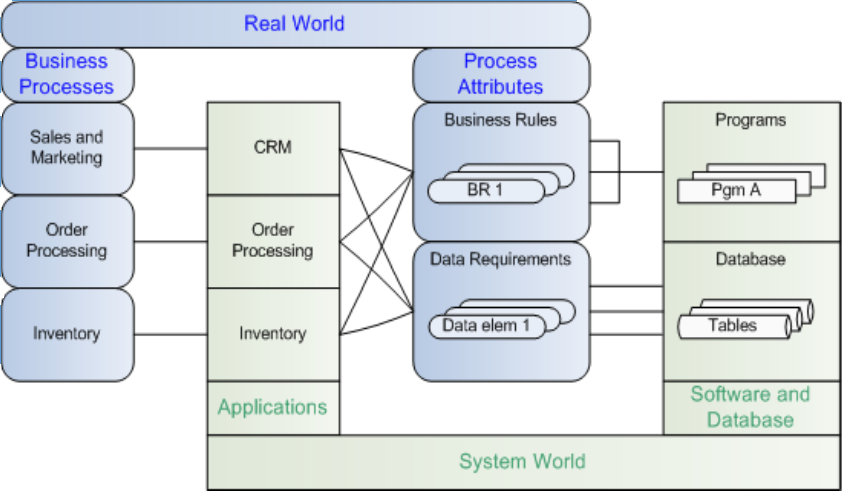


Fig. 1.1.1 – Business Rules

How to Extract Business Rules?

Traditionally, business analysts extracted business rules by sitting down with developers and walking through the code, often using existing documentation that map out the business rules.

X-Rules, Fresche Solutions Business Rules Extraction software, can be used to highlight the business rules within a source member using X-Analysis. While X-Analysis can expose the Business Rules implicit in the data and process models of an application, this does not entirely account for the vast amount of business logic that is buried inside the source code of the programs.

X-Rules is capable of automatically identifying and narrating this logic from individual programs or parts of the entire system. The business rules logic can then be analyzed and documented with the powerful and interactive source browser integrated with X-Analysis. All this can be achieved with just a few simple clicks in a matter of seconds.

Using Extracted Business Rules

Business analysts can use extracted Business Rules to document existing application functionality for purposes of specifying changes to applications, specifying functionality in new applications, or comparing existing functionality to software packages being considered for purchase.

A good Business Rules extraction tool enables the business analyst to add comments to business rules to further explain their purpose or use. This tool should also help the business analyst to perform cross-reference and drill-down activities interactively, as needed. It should also translate the extracted functionality into some form of structured English or pseudo-code and allow it to be exported to MS Office applications for further development.

Developers can use the extracted Business Rules to locate existing functionality throughout the system for reuse, cross-reference, or general research and analysis. Having access to an immediate, interactive tool encourages code reuse and facilitates application consistency. The mapping of Business Rules directly back to the source code is also important for developers.

X-Rules provides all these features to business analysts, developers, and IT managers.

Business Rules: Extraction & Analysis

X-Rules, Fresche Solutions Business Rules Extraction software, can be used to highlight the business rules within a source member using X-Analysis. While X-Analysis can expose the Business Rules implicit in the data and process models of an application, this does not entirely account for the vast amount of business logic that is buried inside the source code of the programs.

X-Rules is capable of automatically identifying and narrating this logic from individual programs or parts of the entire system. The business rules logic can then be analyzed and documented with the powerful and interactive source browser integrated with X-Analysis.

Getting Started with X-Analysis

Start IBM's RDi / RDp or Eclipse. Start IBM's Rational product 9.5 and above or Eclipse (see [KB article](https://www.myfreschesolutions.com/nexus/ui/docs?root=0&docId=590&kbnum=15954) for supported Eclipse version).

**Select: Window > Open Perspective > Other > X-Analysis**

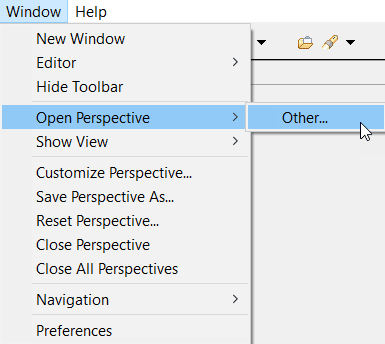


Fig. 2.1.1 – Open Perspective > Other

Select the X-Analysis Perspective

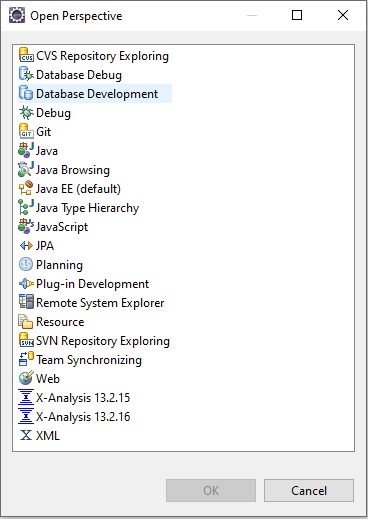


Fig. 2.1.2 – Open Perspective

Click OK to start the X-Analysis Perspective.

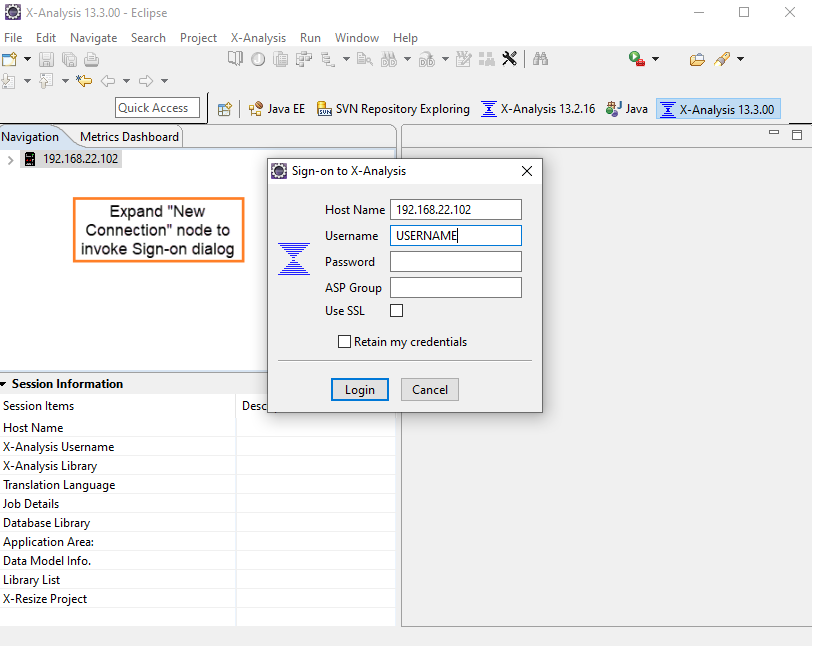


Fig. 2.1.3 – X-Analysis Perspective

Expand the New Connection node to bring up the Sign-on dialog box.

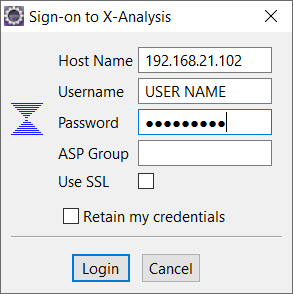


Fig. 2.1.4 – X-Analysis Sign-on dialog box

Instructions to fill the Sign-on dialog box:

1. Enter the TCP/IP address/Computer Name of the IBM i to be accessed.
2. Type the username and password of a valid IBM i profile.
3. Check the Use SSL box for additional security.

|  |  |
| --- | --- |
|  | Refer to the section “Use SSL feature” in the document “X-Analysis\_User\_Manual” for this release. |

1. Click Login.

After a successful sign on, the X-Analysis Client displays a list of application libraries. These libraries are initialized from the X4WRKAPP screen on the IBM i.

Different nodes (options) are available under the cross-reference library node. Expand the XAN4CDXA node to see the available options.

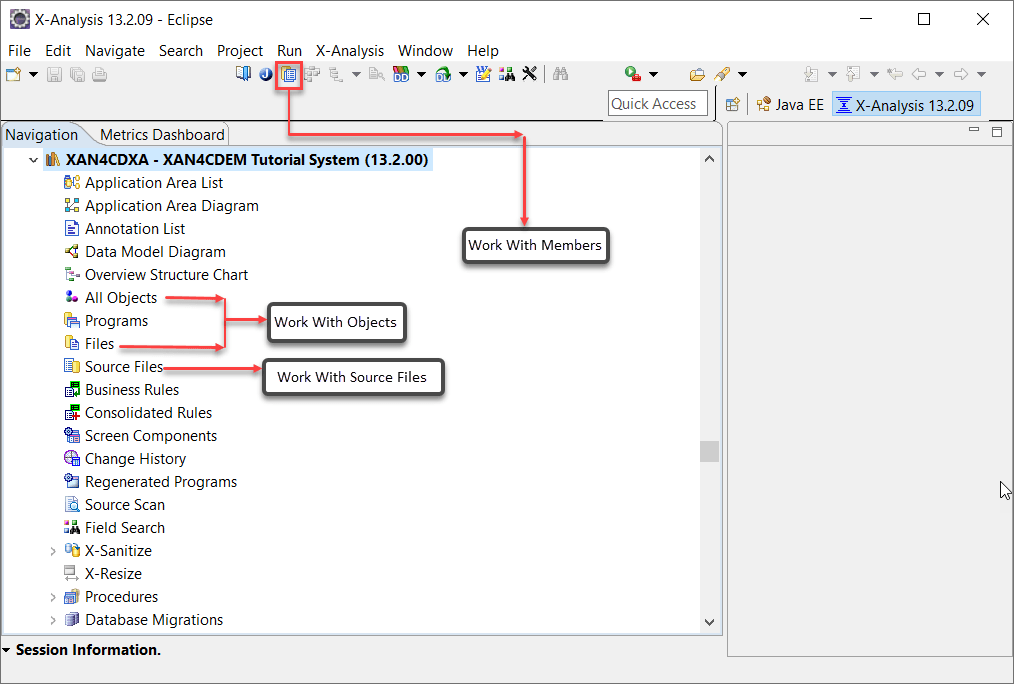


Fig. 2.1.5 – Application Library expanded

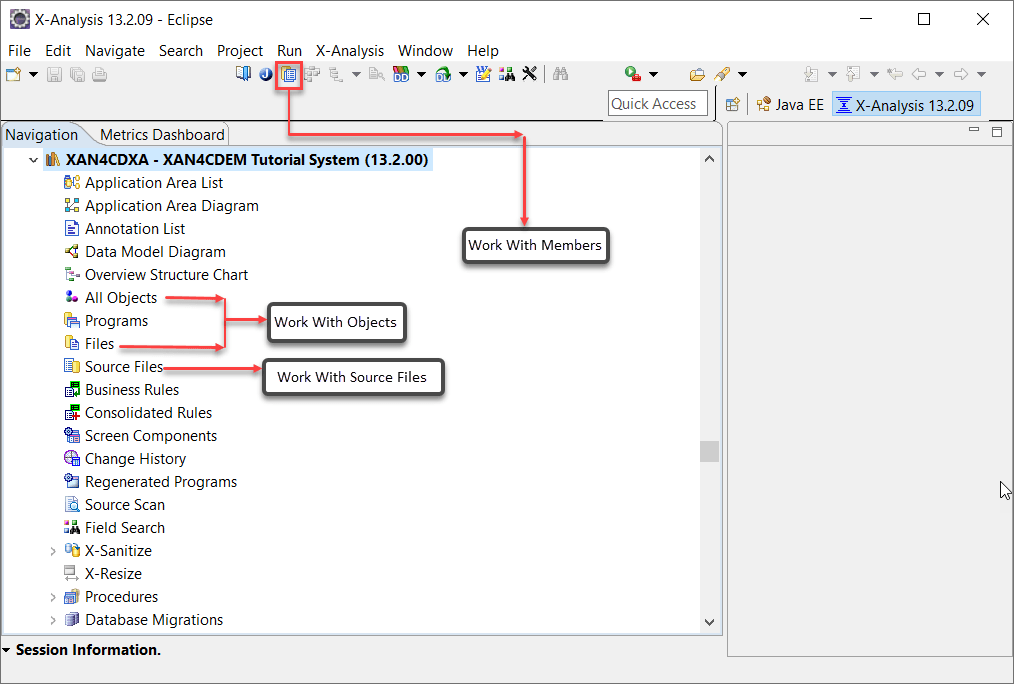


Fig. 2.1.6 – Application Library expanded

Derive Business Rules

X-Analysis extracts the business rules with the help of a single option – Derive Business Rules. This option is available on the context menu of a cross-reference library, application area, and on \*PGM or \*MODULE type objects.

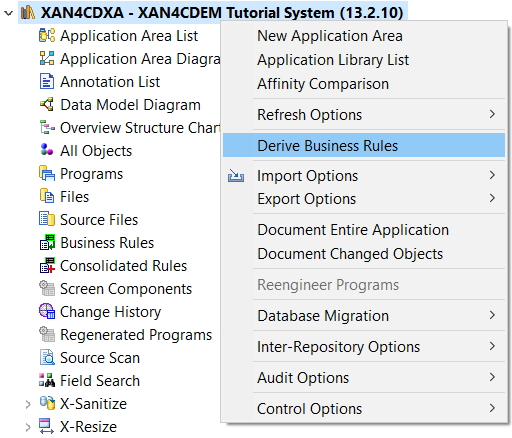


Fig. 2.2.1 – Application Library view

The Business Rules may be generated for RPG, RPGLE, and CBL type of objects.

The Derive Business Rules option on an individual program calls the XBIZRULES command. This command uses the X-Analysis databases to re-engineer all relevant functionality from a legacy program.

The extracted code comprises the following:

* Validations
* Batch Program Calls
* Secondary File Updates
* Non-owner File reads

The Derive Business Rules option on an individual \*PGM or \*MODULE object invokes the following dialog:

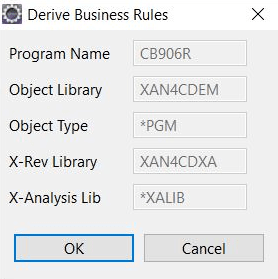


Fig. 2.2.2 – Derive Business Rules dialog box for a Program

The process involves identifying some of the important components of the program, including message statements, return codes, and validation flags. Then the significant update files are identified. After the process is over, the program is scanned for statements, which represent any of the above logic types. These statements are written to XEXTRGLINS – the "Trigger Lines" file, which is then used to produce the required output.

The Derive Business Rules option for the entire application or a single application area calls the XGENBRULES command.

The Derive Business Rules option on a cross-reference library (XAN4CDXA) invokes the following dialog:

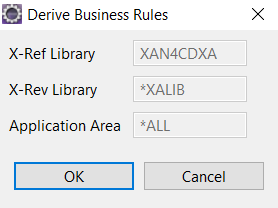


Fig. 2.2.3 – Derive Business Rules dialog box for Cross-Reference Library

The Derive Business Rules option on an application area (MVCPROCESS) invokes the following dialog box:

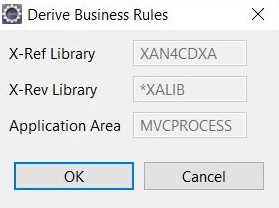


Fig. 2.2.4 – Derive Business Rules dialog box for an Application Area

This command will identify the business rules logic in each program in the application over which the specified cross-reference database has built. A source member containing the business rule logic and narrative describing each rule gets generated for each program. This is achieved by invoking the X-Model command, XBIZRULES for each program in the application.

Modify the Business Rules Extraction & Analysis by changing the values of the data area XBZRMODE (Business Rule Mode). The possible values are:

\*STD (by default) – Only data base fields are tracked to extract the rules. Refer to the screen below.



Fig. 2.2.5.A – Tracked Condition



Fig. 2.2.5.B – Tracked Condition Result From File - xexbizrles

\*EXTEND – In addition to database fields, any non-tracked conditions are also extracted. It means it is not able to track the database field then it also considers other conditions to derive the business rules. Refer to the screen below.

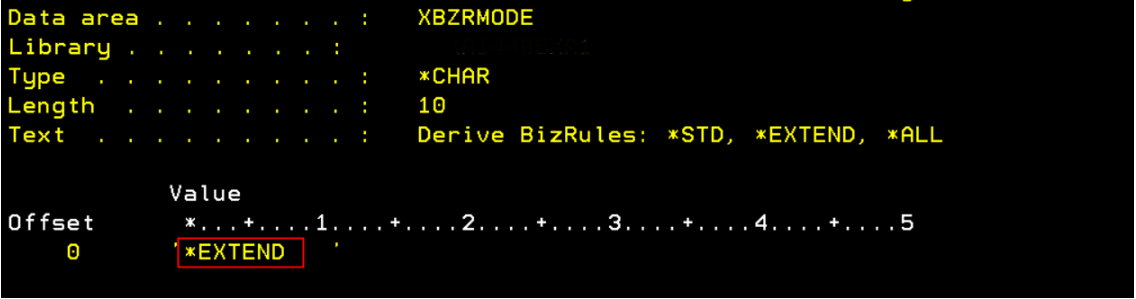


Fig. 2.2.5.A – Non – Tracked Condition



Fig. 2.2.5.B – Non – Tracked Condition Result From File - xexbizrles

\*All – All conditions are tracked other than any explicit exclusions.

View Business Rules

Double-clicking the Business Rules node under the cross-reference library displays a list of all the business rules and their narrations for the selected cross-reference library/application area.

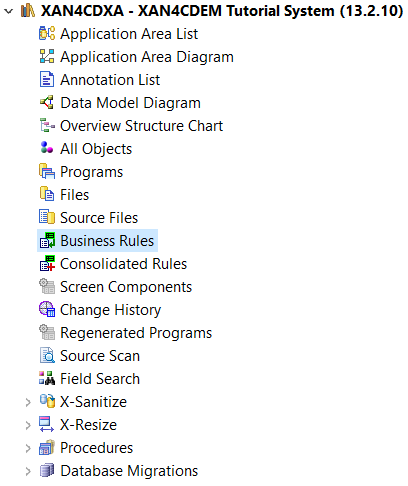


Fig. 2.3.1 – Business Rules node under XAN4CDXA

The following screen displays the Business Rules window for the entire cross-reference library:

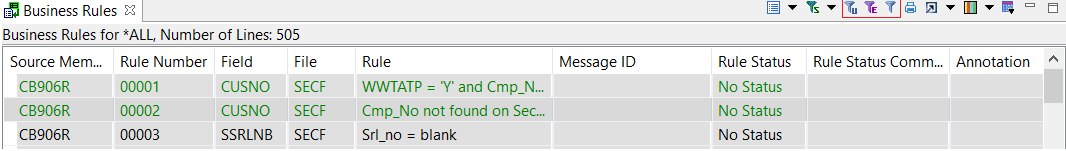


Fig. 2.3.2 – Business Rules window

|  |  |
| --- | --- |
|  | During the business rules generation process, if any field interacts with a data area or database file, then business rules are generated as described below: |

Relation of Data Area and Business Rules: When field dependency is tracked on a data area, the business rule is generated for that field, and the business rule file and field get updated with the data area name.

Relation of Database file and Business Rules: When a field is tracked on a database file, then that specific field from the database file is selected as the business rule field, and the database file as the business rule file.

The user can display the source member for any program in the application. When the source member is displayed, the user needs to click the Source Options dropdown menu and select Business Rules to see the business rules logic highlighted within the member. Then the user can immediately see the business logic within the context of the program.

When the business rule attributes (that is, file, field, and rule text) are found for the first time, they get classified together as the Original Rule.

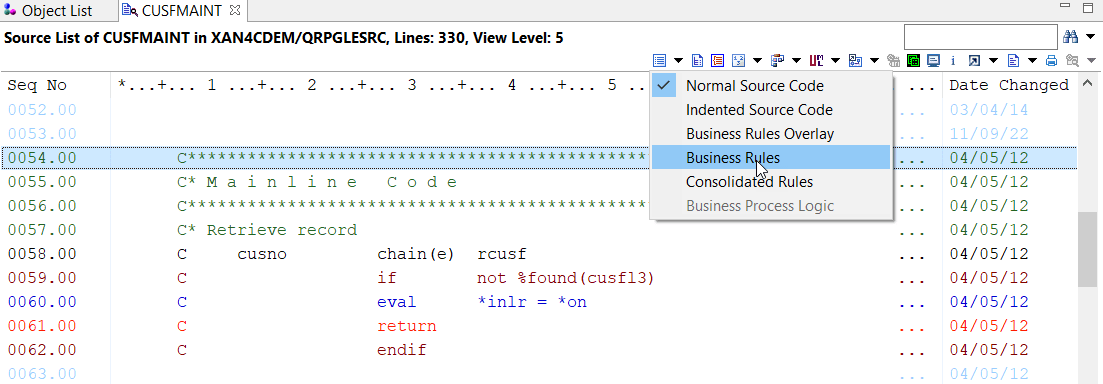


Fig. 2.3.3 – Source Code of CUSFMAINT with Business Rules option

The following window is displayed:

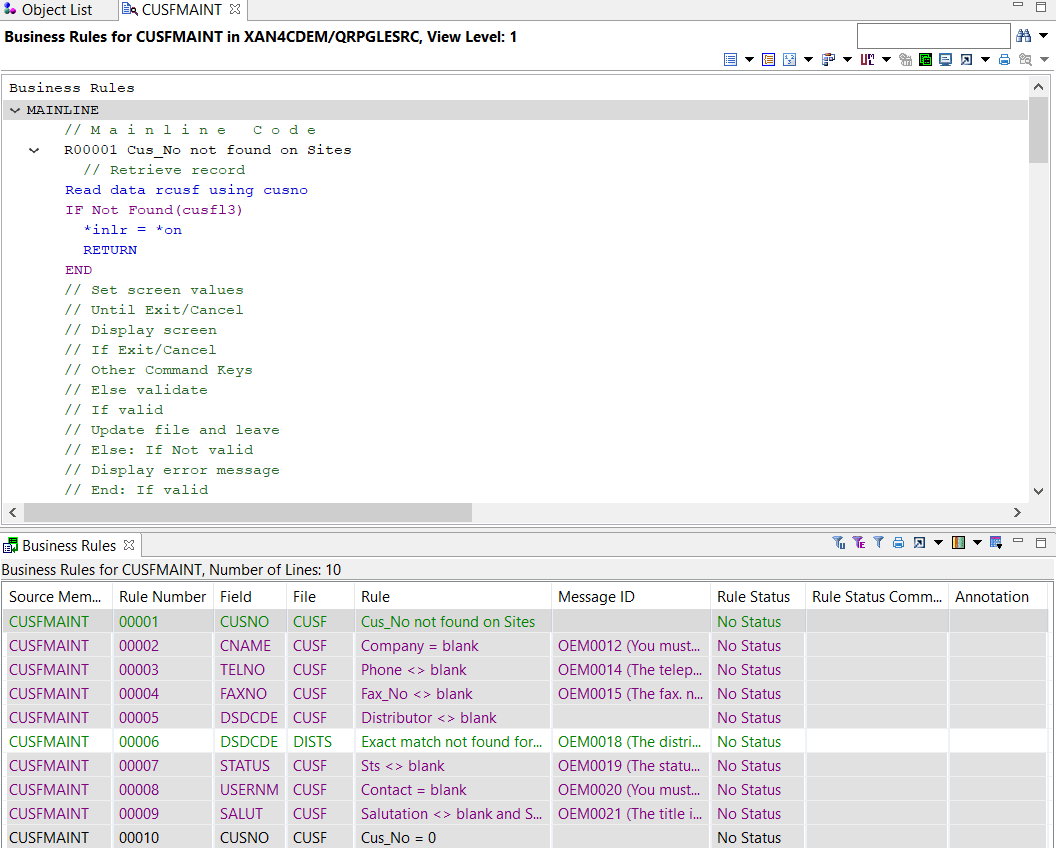


Fig. 2.3.4 – Business Rules for CUSFMAINT

Right-clicking on a specific rule will display the Matched Rules option. For example, refer to the screen below for the Matched Rules option:

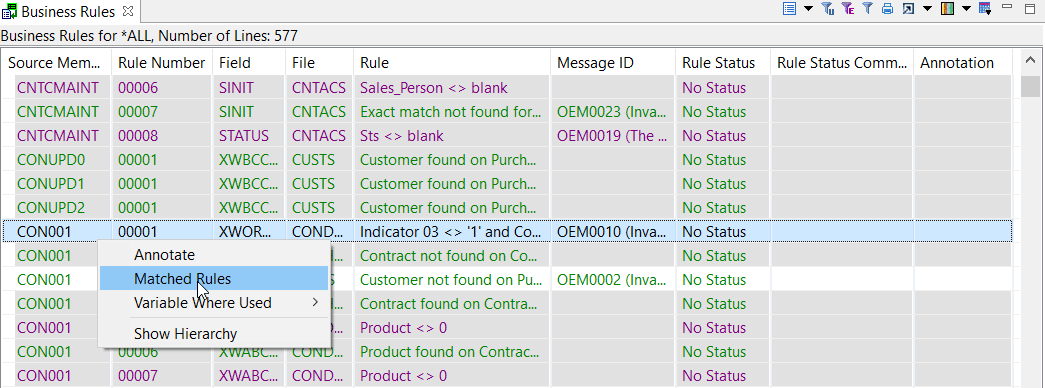


Fig. 2.3.5 – Business Rules window showing the right-click option – Matched Rules

Click this option to see the Exact Rule Match and Similar Rule Match. Refer to the screen below which display the two match types.

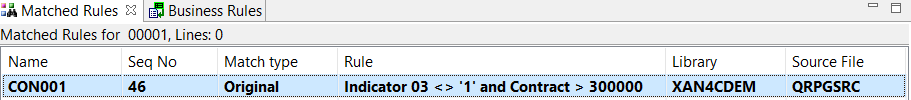


Fig. 2.3.6 – Matched Rules window showing the Exact and Similar Match type

Exact Rule Match – When a Business Rule’s attributes (that is, file, field, and the rule text) match the BR attributes of another rule in any existing program and the rule’s BR condition also matches, then the rule is called an Exact Matching Rule.

Similar Rule Match – When a Business Rule’s attributes (that is file, field, and the rule text) match the BR attributes of another rule in an existing program but the BR condition of the rule does not match, then the rule is called a Similar Matching Rule.

Business Rules Overlay

The user can also observe the business rules embedded in the Normal Source Code by choosing the Business Rules Overlay option from the Source Options drop-down menu as shown below:

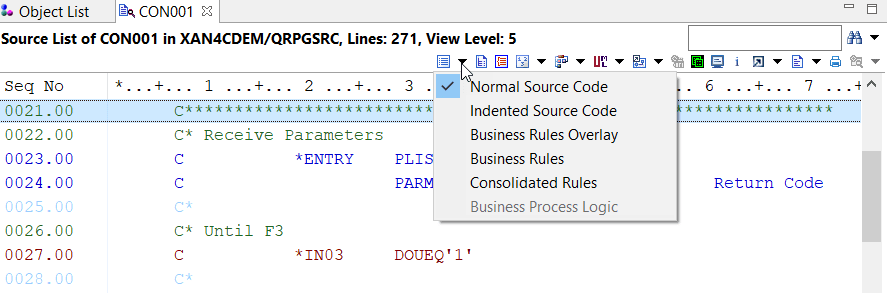


Fig. 2.4.1 – Business Rules Overlay option

When this option is selected, the following window is invoked:

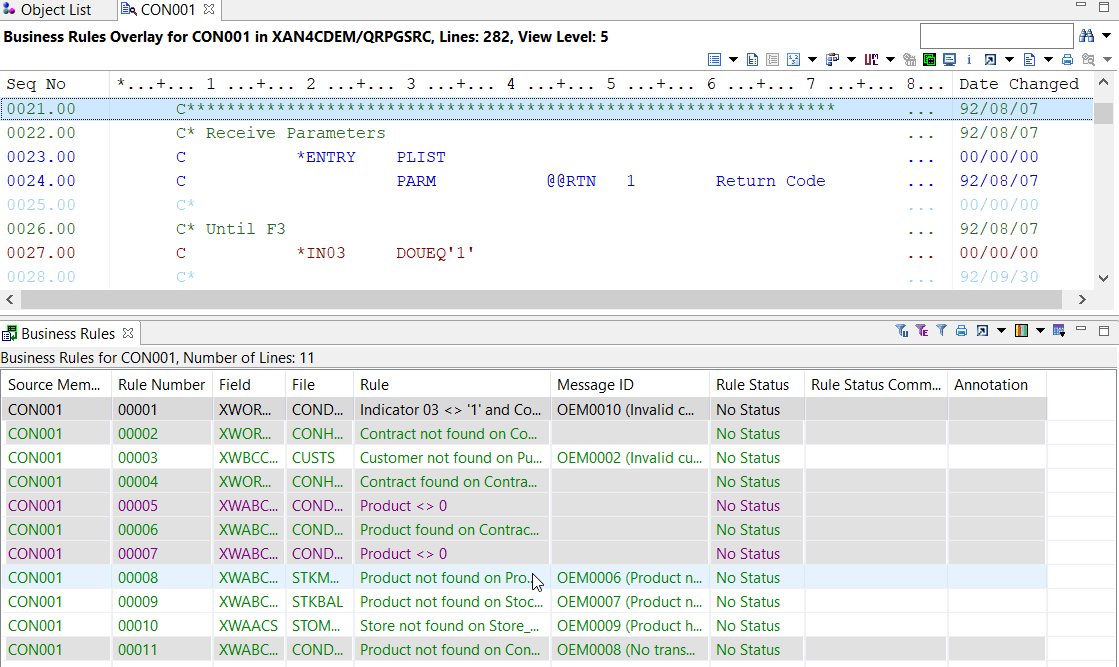


Fig. 2.4.2 – Business Rules Overlay window

|  |  |
| --- | --- |
|  | The screen above displays the Rule Number 50001 and above. These type of program rules indicate that they are extracted from a Range or Validation defined on an associated device file. The RRN for such rules also start with 50001. |

Business Rules Legends

The Legend icon on the Business Rules toolbar displays the details of the color scheme used by the Business Rules. Refer to the screen below.

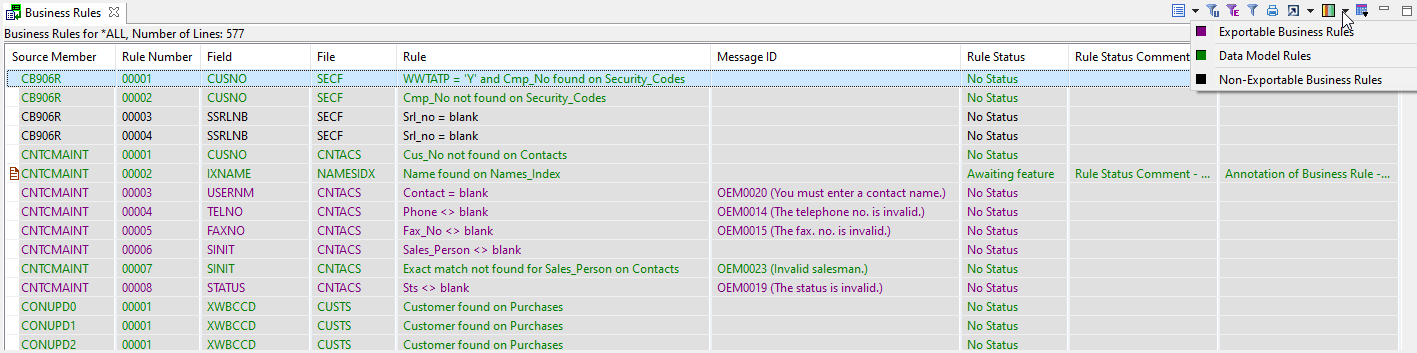


Fig. 2.5.1 – Legend Icon

There are three categories of business rules, as described below.

* Exportable Business Rules: Exportable Business Rules are the rules containing work field(s)/variable(s) which are directly associated with the database file-field(s).
* Data Model Rules: Data Model Rules are based on the Business Rules condition related to the database I/O operation in the program and the data model.
* Non-Exportable Business Rules: Non-Exportable Business Rules are the rules containing work fields/variables that are not associated with any database field.

Business Rules Analysis

The program source is grouped into discrete blocks of logic so that each block represents the execution of a business rule. This block of code is then converted to ‘Pseudo Code’ that describes the execution of the logic. Literals and constants are used where possible in the narration, thereby, giving very accurate descriptions of the logic. Each rule has a unique identifier that makes system-wide analysis and documentation of business rules possible in X-Analysis.

The entire process is achieved by entering a single command in X-Analysis. The process of generating business rules identifies the various components of the business rules and writes them to either:

1. A new source member
2. An index over the original source member

|  |  |
| --- | --- |
|  | X-Analysis can display business rules automatically using the generated index. |

X-Rules not only identifies the Business Rule Logic, but also generates a prototype application for a part of the original application.

X-Rules uses the X-Analysis cross-reference database and the original application program source code to provide shadow programs for the functions in the prototype application. These shadow programs contain all the business rules logic from the original programs. These rules include all field validation that is additional to the normal database integrity checks (which are generated automatically), calls to batch programs for additional functions, and secondary file processing.

CAS, COMP, IF, ELSEIF, and WHEN statements are the primary criteria needed to track Business Rules.

For the secondary criteria, the following are specified:

* The condition involves one or more database fields.
* The condition contains the screen fields which get tracked to the database fields.
* The condition involves the %EQUAL, %FOUND, and %EOF built-in functions.
* The condition contains the resulting indicators for the database I/O operations (analogous to %EQUAL, %FOUND, and %EOF built-in functions).
* The presence of the conditioning indicators for some other operation codes (for example CHECK, SCAN, and LOOKUP).

Based on the above specifications, the recovered logic contains the following business rules components:

* Field Validations
* Calls to other (significant) programs
* Secondary (database) file updates
* Non-owner file reads

Consolidated Rules

X-Analysis provides an important feature related to file-fields and business rules. Through this feature the user can view all the business rules related to a file-field.

Double-click the Consolidated Rules node. This opens Consolidated Rules dialog.

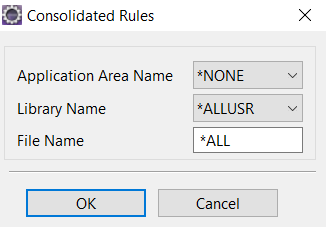


Fig. 2.6.1 – Consolidated Rules dialog

Select the Application Area Name, Library Name, and File Name on the dialog and Click OK. A window displaying the Consolidated Rules will open.

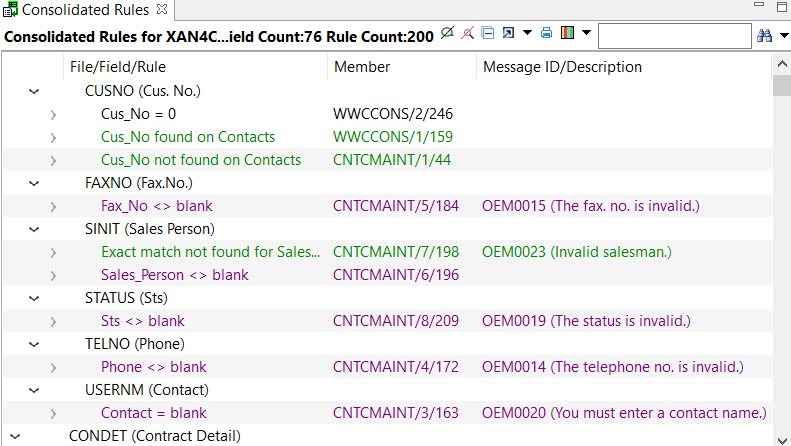


Fig. 2.6.2 – Consolidated Rules for XAN4CDXA

Select any business rule listed under a file and expand the business rules node to check the actual business rules code used, as shown below:

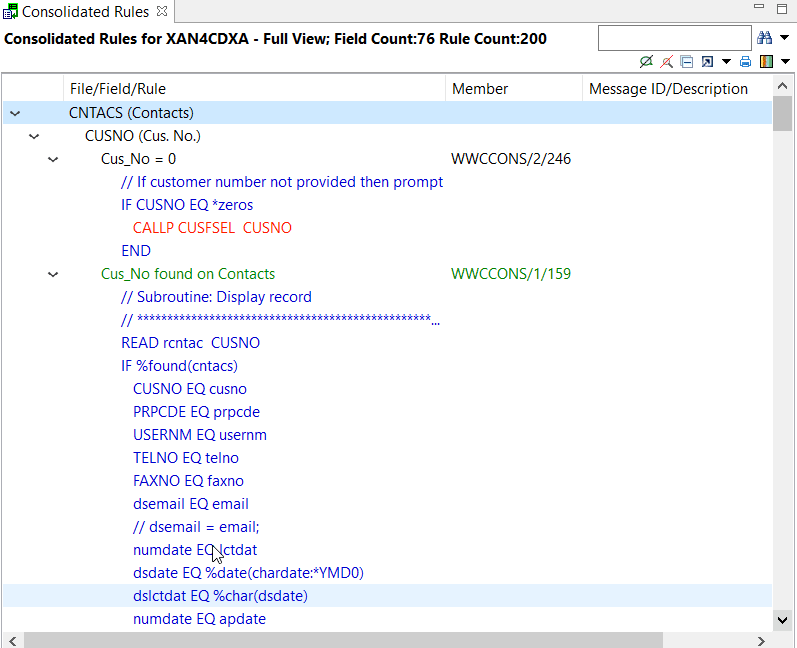


Fig. 2.6.3 – Expand Business Rules node to see the actual code

When the user right-click for the context menu of an object (\*FILE type) from the Object List or Member List, the user will get the Programs to Consolidate option as shown below:

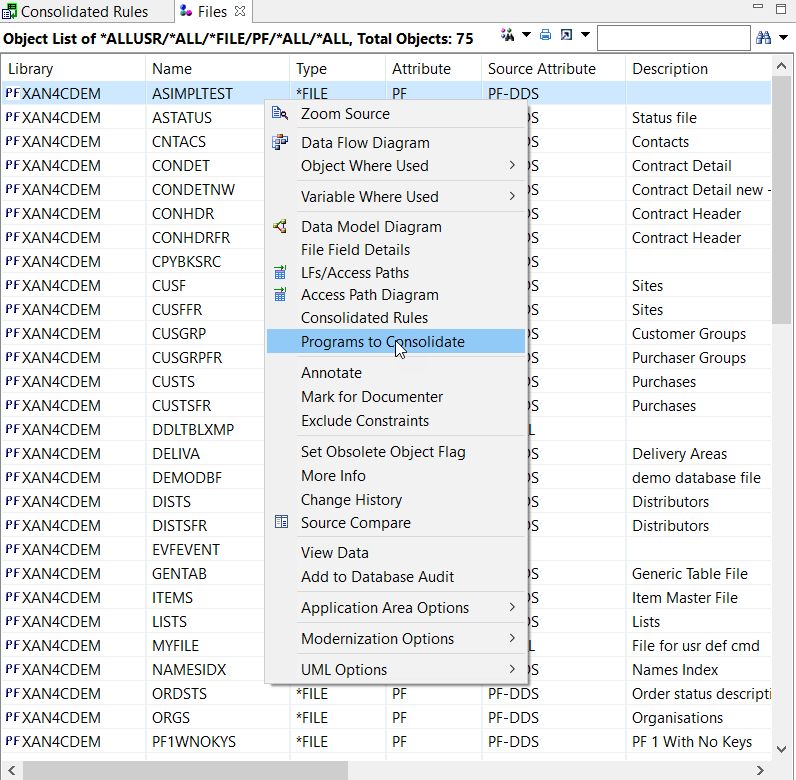


Fig. 2.6.4 – Right-click menu showing the Programs to Consolidate option

Click this option. A list of programs having consolidation rules for the corresponding file-field is displayed.

Select the program(s) to be excluded from the consolidation processing. Check the corresponding box(es) provided under the Exclude column.

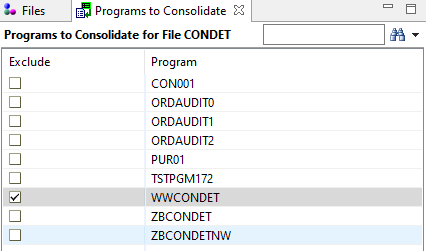


Fig. 2.6.5 – Programs to Consolidate window showing the Excluded program, WWCONDET

Now select the Consolidated Rules option again (on the originally-selected object or the entire X-Ref library). The user will notice that the programs other than WWCONDET are grayed out. The following screenshot shows the Consolidated Rules display taken on the originally-selected object, CONDET.

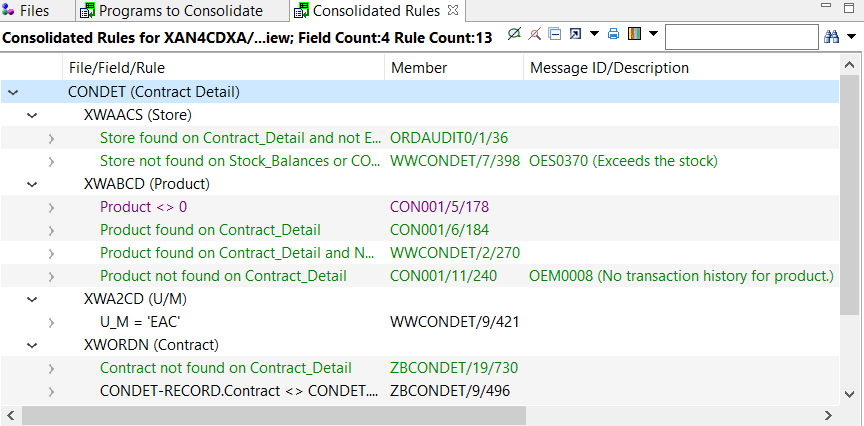


Fig. 2.6.6 – Consolidated Rules display on CONDET

When the user checks the Allow editing in Consolidated Rules checkbox on the Preferences setting, then the user will see checkboxes in the Consolidated Rules window.

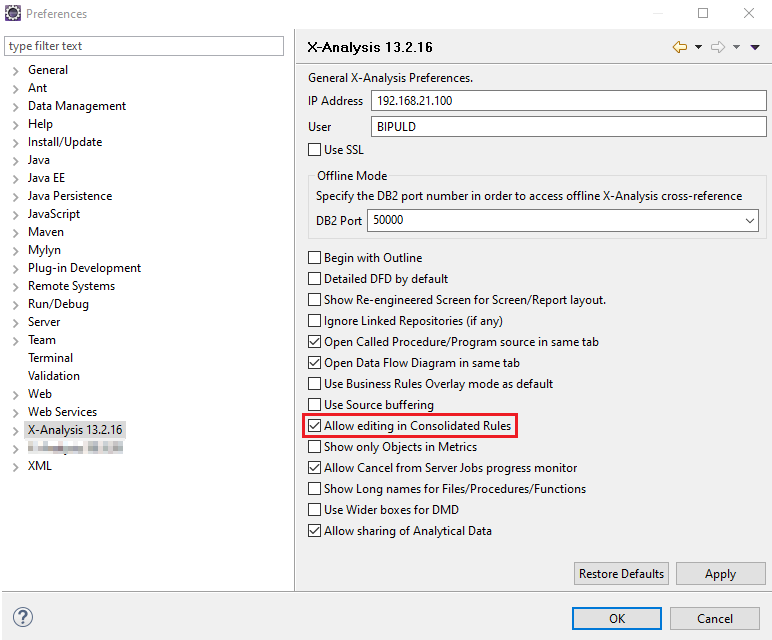


Fig. 2.6.7 – X-Analysis Preferences

The corresponding boxes can be checked/unchecked to show/hide the exportable rules. The below screen displaying both the Exportable Business Rules and Non-Exportable Business Rules.

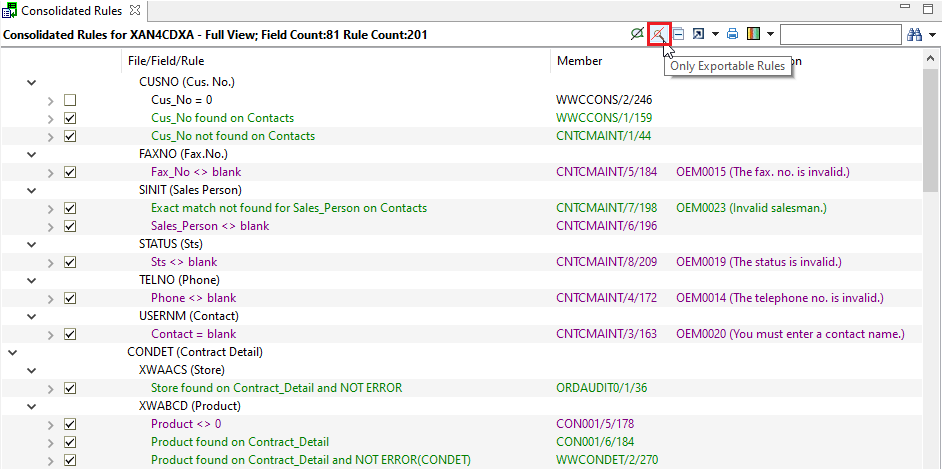


Fig. 2.6.8 – Consolidated Rules window showing the checkboxes

When the user select the option Only Exportable Rules from the above screen, a new window gets displayed showing only the Exportable Business Rules.

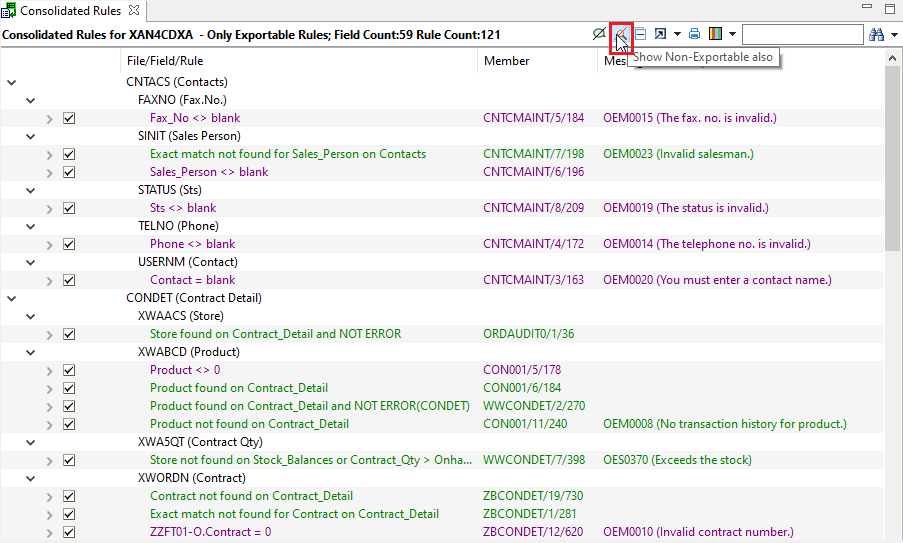


Fig. 2.6.9 – Consolidated Rules window showing the checkboxes

Index

2E, 6

application area, 19, 23, 31

Attributes, 9, 24

Batch programs, 29

Business Rules, 4, 5, 6, 8, 9, 10, 11, 12, 13, 19, 23, 27, 28, 29, 31

Business Rules Analysis, 29

Business Rules Overlay, 27

Client, 7, 17

Client Components, 7

COBOL, 6

Consolidated Rules, 31

cross-reference library, 7, 17, 19, 23

data model, 9, 28

Database Fields, 21, 29

DDL, 6

documentation, 11, 29

Eclipse, 14

Exportable Rules, 35

Fields, 21, 28, 29, 31

IBM, 3, 7, 8, 14

IBM i, 7, 8, 16

legacy application, 6

libraries, 17

Member List, 32

metadata, 6

Narratives, 6

Object List, 32

Preferences, 34

pseudo code, 29

RDi, 14

repository, 6, 10

RPG, 6, 8, 19

Server, 7

SOURCE, 11, 12, 13, 21, 24, 27, 29

Source Browser, 11, 13

Source Options, 24, 27

Structural Business Rules, 9

Suite of products, 4

SYNON, 6

Use SSL, 17

Work Fields, 28

X-Analysis, 3, 4, 7, 11, 13, 14, 19, 29, 31

X-Analysis Client, 17

X-Analysis Perspective, 14

X-Model, 21

X-Rules, 1, 3, 4, 6, 9, 11, 12, 13, 29