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Preface

ABOUT THIS GUIDE

The X-Analysis Professional guide is a handy, step-by-step, illustrative document that has been specially designed to highlight the practical features of X-Analysis. In particular it discusses the following topics:

- Impact Analysis
- Graphical Documentation
- Data Model Extraction

Version

This guide describes version 11.1 of X-Analysis.

How to use this guide

Each chapter in this guide focuses on the advanced analytical aspects of X-Analysis. The guide begins with a few words on the overall benefits of X-Analysis and mentions certain software pre-requisites to be met. Thereafter, the guide discusses the main topics comprising Impact Analysis, Graphical Documentation and Data Model Extraction for IBM i.

The X-Analysis suite of products contains a total of eight modules. This guide describes only the module: X-Analysis Professional. For information about the other modules, please contact your Fresche Legacy representative, or visit us at www.freschelegacy.com.

Important Note

X-Analysis client release 10.x onwards is digitally signed.

Since this product is under continuous improvement, you might notice some differences in the screens.

Windows 8 users – In case any problems occur in running X-Analysis:

- ***Right-click on the 'Clean start Eclipse' or the 'X-Analysis for Eclipse' shortcuts.***
- ***Then, select 'Run as administrator'.***

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Overview

X-Analysis is an advanced and easy-to-use analysis tool. The tool's instant and automated features like visual impact analysis, cross-referencing, and graphical documentation of RPG and COBOL applications endow this software with a remarkable edge. This section briefly explains the benefits of X-Analysis and the hardware prerequisites needed for successful installation of the software.

BENEFITS OF X-ANALYSIS

The X-Analysis product suite is an essential tool for IBM i application documentation, design recovery, and re-engineering. The X-Analysis software works as a plugin under IBM's RDi / RDp / WDSC and Eclipse, enabling you to browse and visualize applications from a high-level model down to individual lines of code. This globally renowned tool is packed with features like RPG & COBOL as pseudo code, variable level impact analysis, graphical flow/structure charts, graphical data flowcharts, PDF/MS Word and MS Visio documentation wizards. X-Analysis allows technical analysts to navigate graphically through an IBM i application from a Windows PC. Working in a true client-server mode, X-Analysis automatically cross-references databases and ensures that the display is always up-to-date and a true representation of the application on the IBM i.

PREREQUISITES

Before starting this tutorial, the following are required:

- The X-Analysis server and the Client components should be installed to 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.

ACRONYMS USED IN THIS DOCUMENT

Feature	Full Name
APD	Access Path Diagram
DFD	Data Flow Diagram
DMD	Data Model Diagram
FFD	File Field Details
SCD	Structure Chart Diagram
HSC	Hierarchical Structure Chart
PSC	Program Structure Chart

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Impact Analysis & Graphical Documentation

Continual technical enhancements, syntax, variations in programming styles, financial and time constraints, absence of original application designers, and/or monolithic application codes are some reasons that necessitate changes in the existent application designs. System analysts or software professionals must be equipped with the technological knowhow for redesigning business applications.

The X-Analysis toolset meets the requirements mentioned above. It is patterned to convert all IBM i applications into the latest format. This software suite has precise tools for conducting advanced application and documentation tasks.

This chapter covers Impact Analysis and Graphical Documentation. The features and options discussed here provide prompt and automated documenting and computing solutions.

CHRONOLOGY OF FEATURES

The Analysis & Documentation solution set is a sophisticated tool for instant and automated cross-referencing, impact analysis and graphical documentation of Synon/2E, RPG, and COBOL applications. All the functionality above (and more) is contained in the following separate features, explained in this chapter:

Feature	Brief Description
Work with Objects	A list of all the objects in a chosen application or application area.
Object Where Used	A list of all usage references for an object.
Export List to PDF/MS Word or MS Excel	The option to export data to MS Excel or a PDF/MS Word.
Data Flow Diagram	An interactive, colour-coded bus routing block diagram for displaying an object relationship within an application.
Variable Where Used	A list of all instances of the specified variable in the application.
Structure Chart Diagram	A graphical display that shows program-to-program relationships.
Detailed Structure Chart Diagram	A graphic display that shows program-to-program relationships with files used by each program. It also explains each program's generated program text.
Hierarchical Structure Chart Diagram	Colour-coded bus routing block diagram, which enhances the visual of program-to-program interrelationships. Through this, you get an exact idea of the hierarchical set-up of the programs.
Document Manager	A utility that automatically generates structured system document in PDF / MS Word format.
Source Browser	The interface used for system analysis, reviewing, re-factoring, maintaining, and redeveloping in source code.
Source Browser Toolbar	The toolbar that contains a list of different options for viewing code within the Source Browser, such as Pseudo Code and Source View Level options etc.

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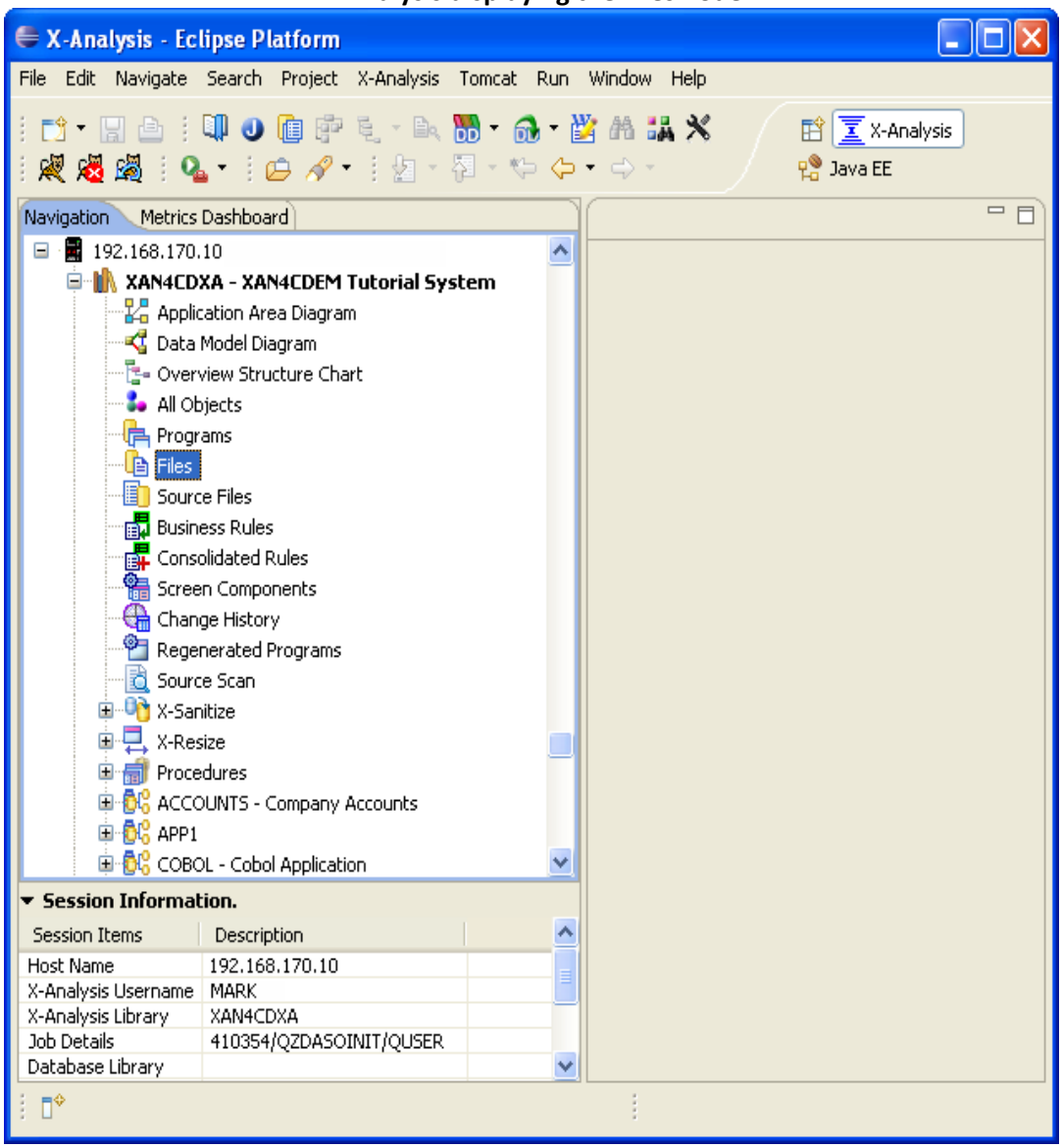
WORK WITH OBJECTS

Work with Objects displays a list of all the objects for a chosen application or application area.

To generate the Object List for all files, double-click on the **Files** node available under the application library.

X-Analysis displaying the Files node



The double-click action invokes the **Work with Objects** dialog with 'Type' set as *FILE and 'Attribute' as PF. The dialog is displayed on the following page:

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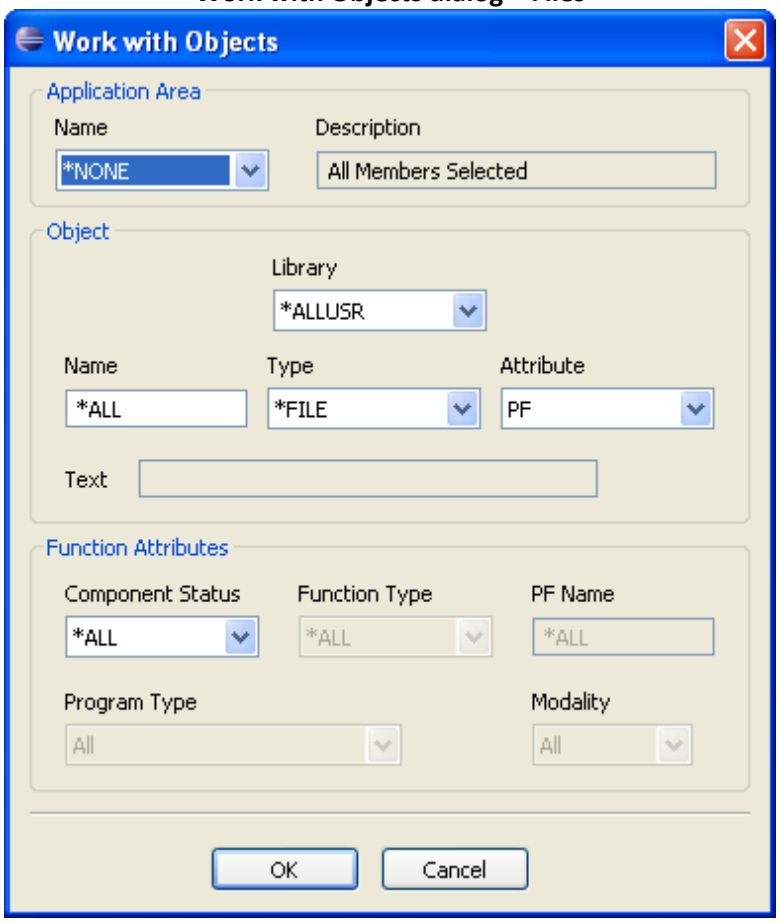
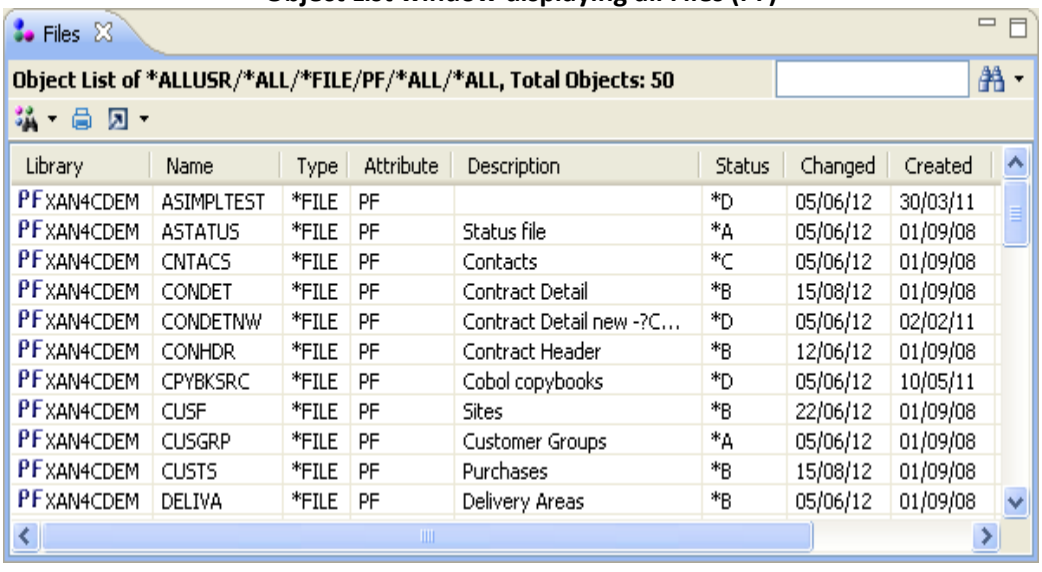
Work with Objects dialog – Files



Click **OK** to invoke the Object List window showing all the files.

Object List window displaying all Files (PF)



Library	Name	Type	Attribute	Description	Status	Changed	Created
PF XAN4CDEM	ASIMPLTEST	*FILE	PF		*D	05/06/12	30/03/11
PF XAN4CDEM	ASTATUS	*FILE	PF	Status file	*A	05/06/12	01/09/08
PF XAN4CDEM	CNTACS	*FILE	PF	Contacts	*C	05/06/12	01/09/08
PF XAN4CDEM	CONDET	*FILE	PF	Contract Detail	*B	15/08/12	01/09/08
PF XAN4CDEM	CONDETNW	*FILE	PF	Contract Detail new -?C...	*D	05/06/12	02/02/11
PF XAN4CDEM	CONHDR	*FILE	PF	Contract Header	*B	12/06/12	01/09/08
PF XAN4CDEM	CPYBKSRC	*FILE	PF	Cobol copybooks	*D	05/06/12	10/05/11
PF XAN4CDEM	CUSF	*FILE	PF	Sites	*B	22/06/12	01/09/08
PF XAN4CDEM	CUSGRP	*FILE	PF	Customer Groups	*A	05/06/12	01/09/08
PF XAN4CDEM	CUSTS	*FILE	PF	Purchases	*B	15/08/12	01/09/08
PF XAN4CDEM	DELIVA	*FILE	PF	Delivery Areas	*B	05/06/12	01/09/08

The Object List window displays multiple columns. In this window, you can sort a column's data by clicking a column heading.

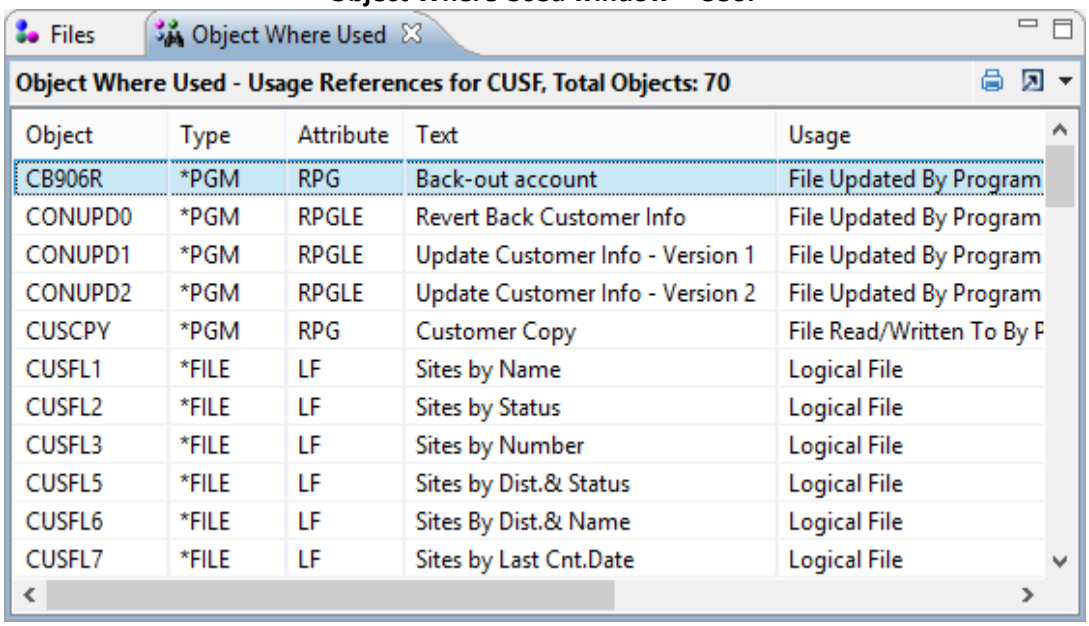
OBJECT WHERE USED

The **Object Where Used** feature generates a list of all usage references for an object.

To make an Object Where Used list for the object, locate and select the **CUSF** object from the Object List. Right-click on **CUSF**, and select the **Usage References** option from the **Object Where Used** submenu.

This brings up the **Object Where Used** list for the **Usage References** of **CUSF**.

Object Where Used window – CUSF

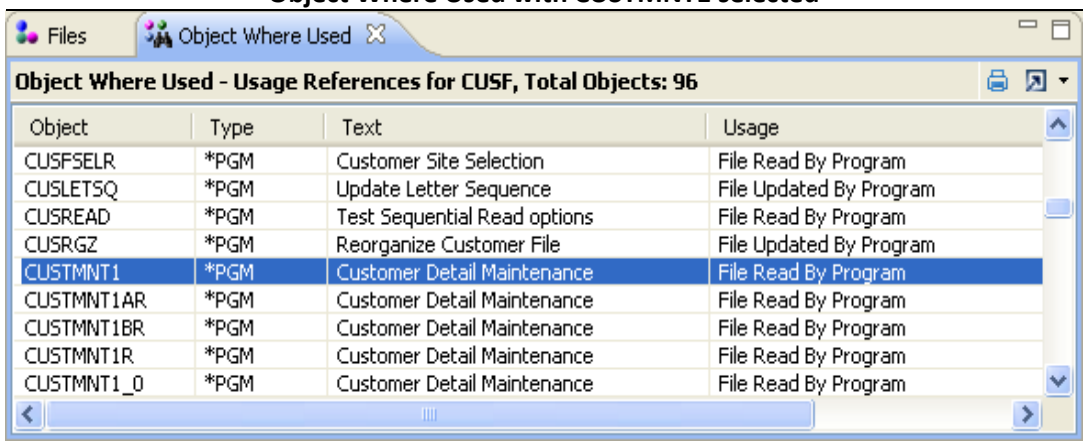


Object	Type	Attribute	Text	Usage
CB906R	*PGM	RPG	Back-out account	File Updated By Program
CONUPD0	*PGM	RPGLE	Revert Back Customer Info	File Updated By Program
CONUPD1	*PGM	RPGLE	Update Customer Info - Version 1	File Updated By Program
CONUPD2	*PGM	RPGLE	Update Customer Info - Version 2	File Updated By Program
CUSCPY	*PGM	RPG	Customer Copy	File Read/Written To By P
CUSFL1	*FILE	LF	Sites by Name	Logical File
CUSFL2	*FILE	LF	Sites by Status	Logical File
CUSFL3	*FILE	LF	Sites by Number	Logical File
CUSFL5	*FILE	LF	Sites by Dist.& Status	Logical File
CUSFL6	*FILE	LF	Sites By Dist.& Name	Logical File
CUSFL7	*FILE	LF	Sites by Last Cnt.Date	Logical File

The **Object Where Used** window displays multiple columns. The **Usage** column displays uses of **CUSF** in a particular object. The **Object Where Used** window also allows you to drill down to a specific line of code and find out where an object is used.

Scroll down to the object **CUSTMNT1** in the Object Where Used window displayed below:

Object Where Used with CUSTMNT1 selected



Object	Type	Text	Usage
CUSFSELR	*PGM	Customer Site Selection	File Read By Program
CUSLETSQ	*PGM	Update Letter Sequence	File Updated By Program
CUSREAD	*PGM	Test Sequential Read options	File Read By Program
CUSRGZ	*PGM	Reorganize Customer File	File Updated By Program
CUSTMNT1	*PGM	Customer Detail Maintenance	File Read By Program
CUSTMNT1AR	*PGM	Customer Detail Maintenance	File Read By Program
CUSTMNT1BR	*PGM	Customer Detail Maintenance	File Read By Program
CUSTMNT1R	*PGM	Customer Detail Maintenance	File Read By Program
CUSTMNT1_0	*PGM	Customer Detail Maintenance	File Read By Program

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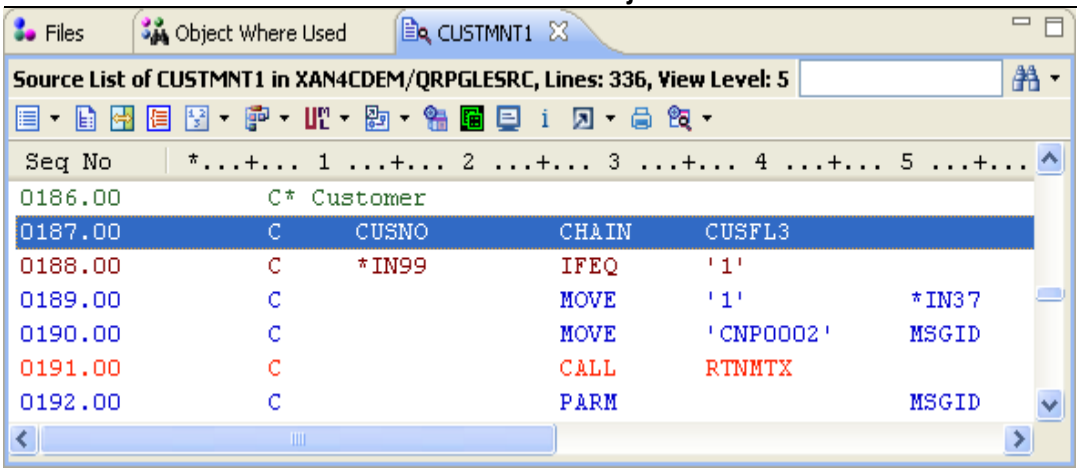
Double-click on the row displaying **CUSTMNT1**. This retrieves the source member for the **CUSTMNT1** object with the highlighted line referring to **CUSF**.

Drill down to an individual line for the Object Where Used Reference



EXPORT A LIST TO PDF, MS WORD OR MS EXCEL

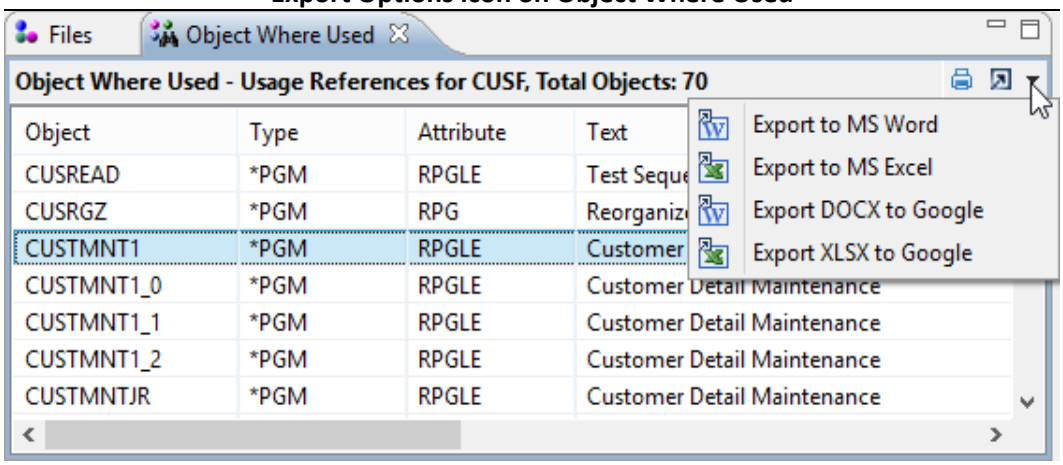
X-Analysis provides a facility to export data from any displayed window. The window toolbar on the **Object Where Used** view has an **Export Options** drop-down button, with **Export to PDF** and **Export to MS Excel** as options.

Select your desired option to export the list into PDF/MS Word or Excel.

Note: You can set the export option as Export to MS Word using the X-Analysis Preferences. For the settings to take effect, you must select/unselect the X-Ref.

If you have activated the Google Drive Export feature from X-Analysis Preferences, then you can export the data to DOCX or XLSX format. For more details, refer to the X-Analysis User Manual 11.1.

Export Options icon on Object Where Used



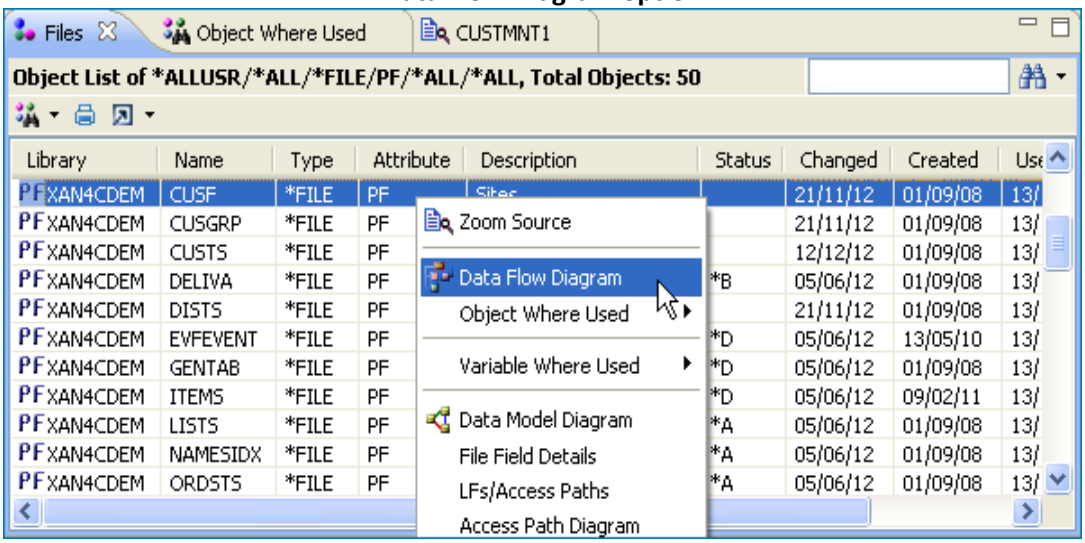
DATA FLOW DIAGRAM / DFD

A **Data Flow Diagram** or DFD is the diagrammatic representation of the data flow. A DFD depicts all the possible interrelationships among the files and programs contained within a particular application. A color-coded DFD simultaneously plays the dual role of showing the data flow at high object level, besides providing contextual details regarding specific variables and parameters passed between objects.

The DFD uses bus-routing layout, thus, allowing two benefits. One, it gives a precise idea of where and how the entered data affects the output desired; two, it helps you visualize how an object within an application correlates with the other objects. The diagrams showing the data flow in neat blocks help even a non-technical user get a clear idea of the object(s) interrelationships.

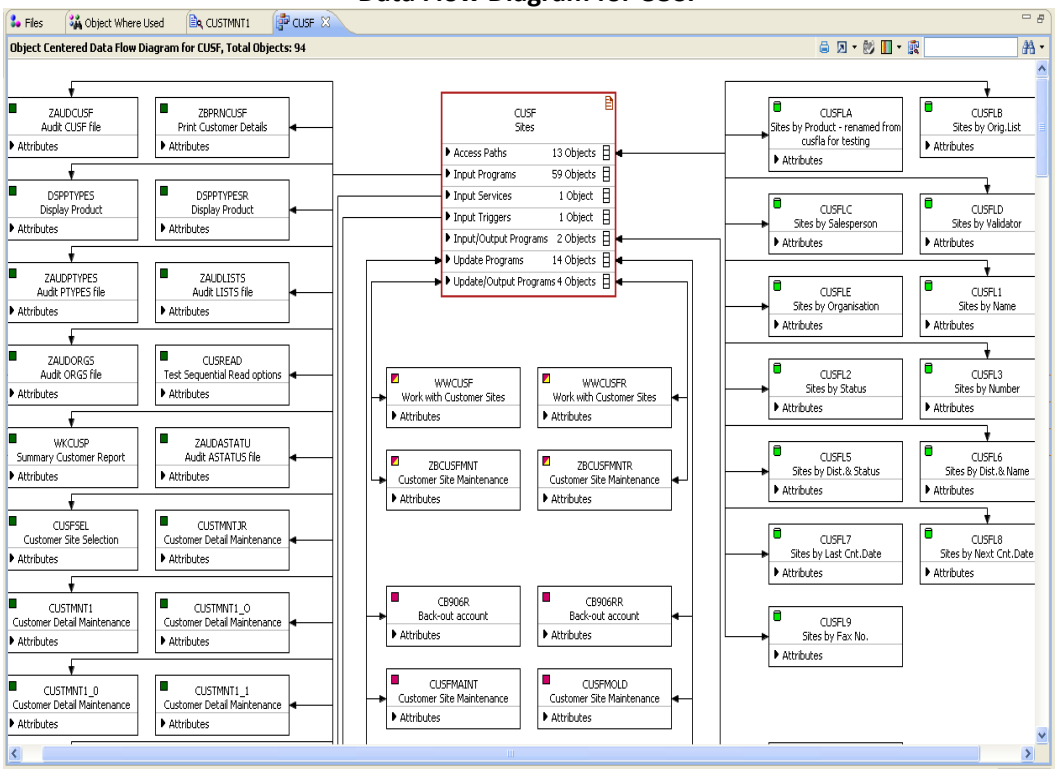
To generate the DFD, return to the Object List using the navigation arrows available on the Eclipse toolbar. Select the object, **CUSF** and then choose the **Data Flow Diagram** option from the context menu as shown below:

Data Flow Diagram option



This brings up the DFD for **CUSF**, as shown below:

Data Flow Diagram for CUSF



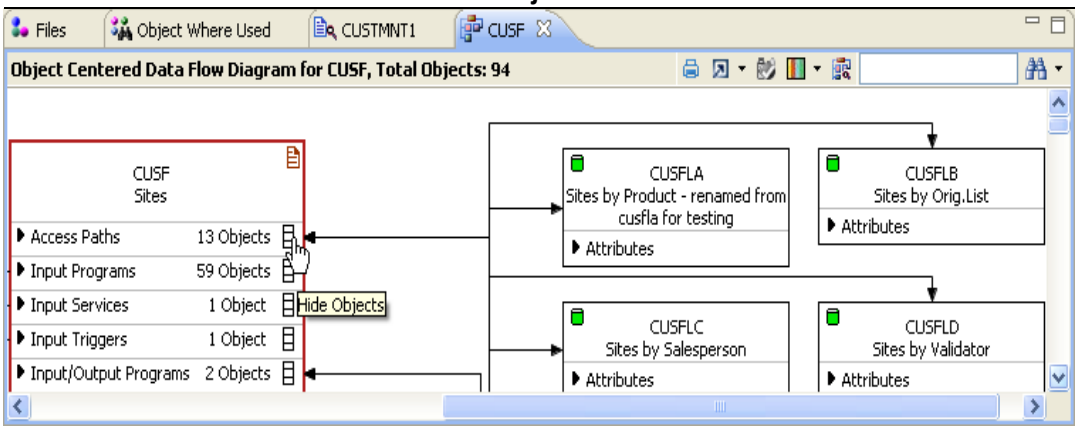
The DFD is also a graphic equivalent of the Object Where Used data. Besides the Logical Views/Access Paths for **CUSF**, you can see how **CUSF** fits into the application (i.e. the programs that update **CUSF**, programs that use **CUSF** as an input file and so on).

The dynamic and interactive DFD makes it easier to access other features contained within an object. There are varied and flexible features and options like **Hide/Show Objects**, **Expand/Collapse Referenced Objects**, **View Annotation**, **Attributes** – all of these and more are explained in the sections ahead.

Hide/Show Objects

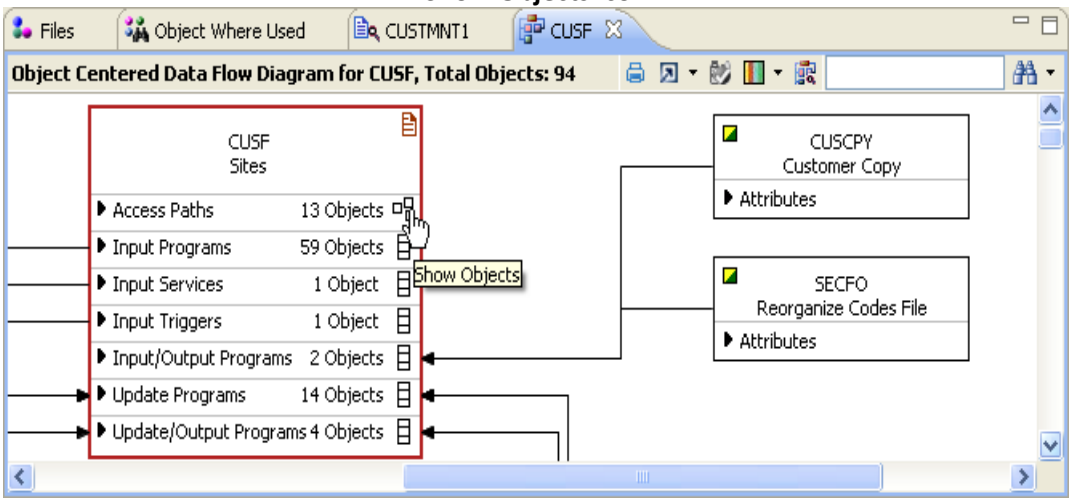
For a better grasp of object interrelationships, you can hide/show all objects concerning programs. A single-click action on the icon alongside the objects enables you to hide/show objects. In the following screenshot, the icon against **Access Paths** is clicked to hide objects.

Hide Objects icon



Clicking the icon again displays all the objects within.

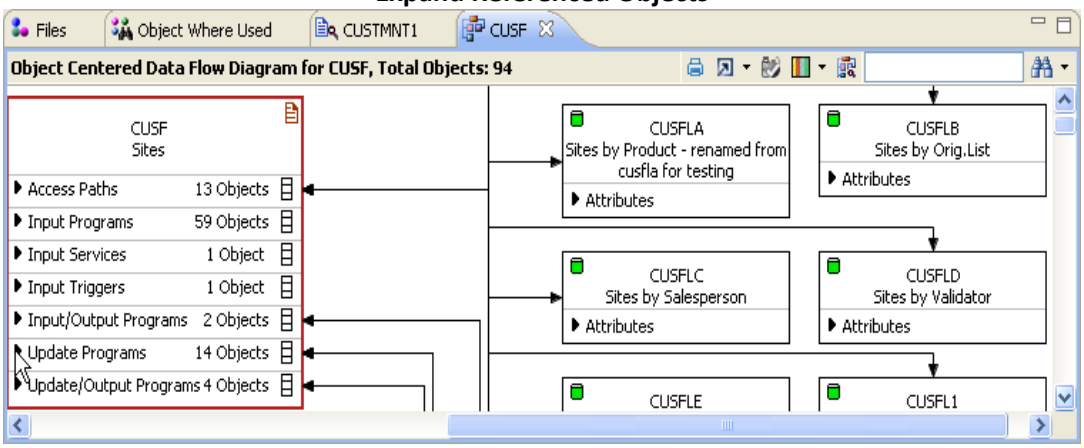
Show Objects icon



Expand/Collapse Referenced Objects

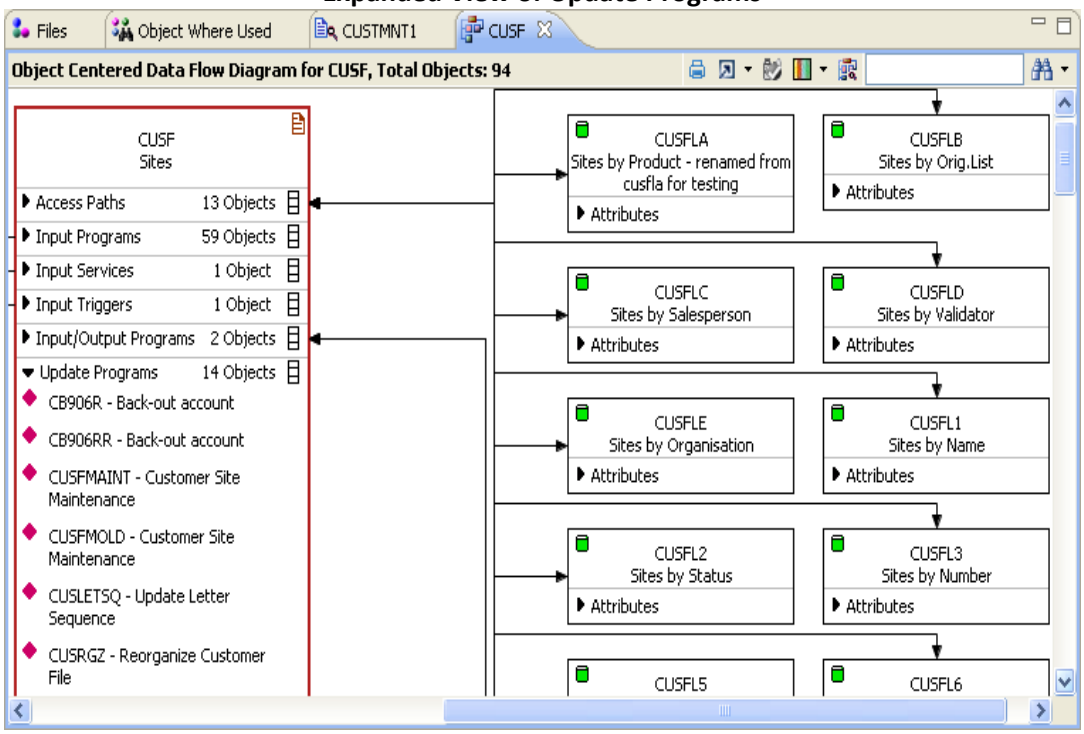
In a DFD, referenced object(s) can be expanded by selecting a particular category from the main object box. The following screenshot displays the action to be performed:

Expand Referenced Objects



Clicking the arrow icon adjacent to **Update Programs** reveals all objects updating **CUSF**. The following screenshot displays the expanded view of the referenced objects' list:

Expanded View of Update Programs



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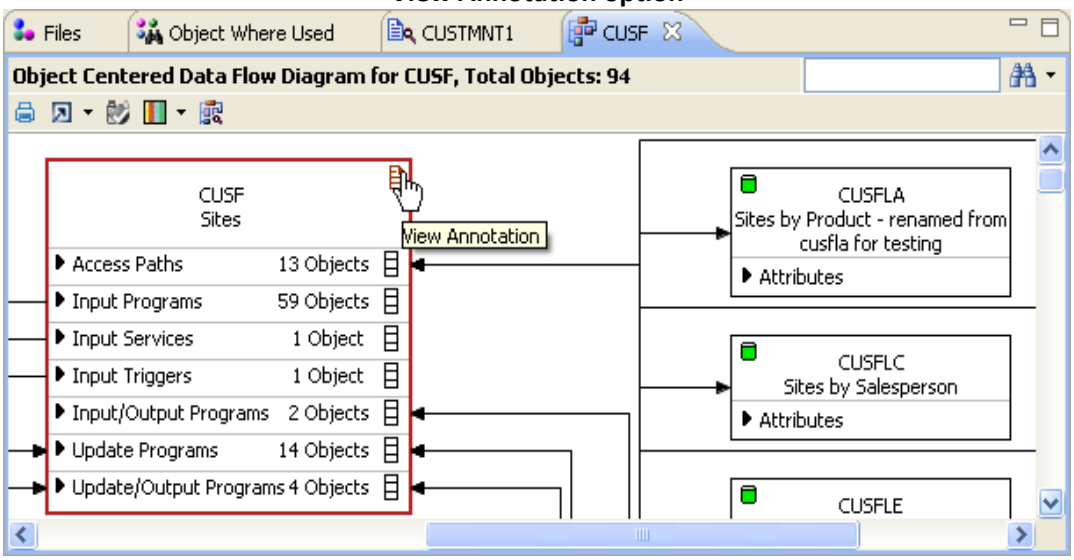
View Annotation

The **View Annotation** option displays annotations for a specific object. A red icon denoting annotated text is present on the right side of the Object (see the following screenshot).

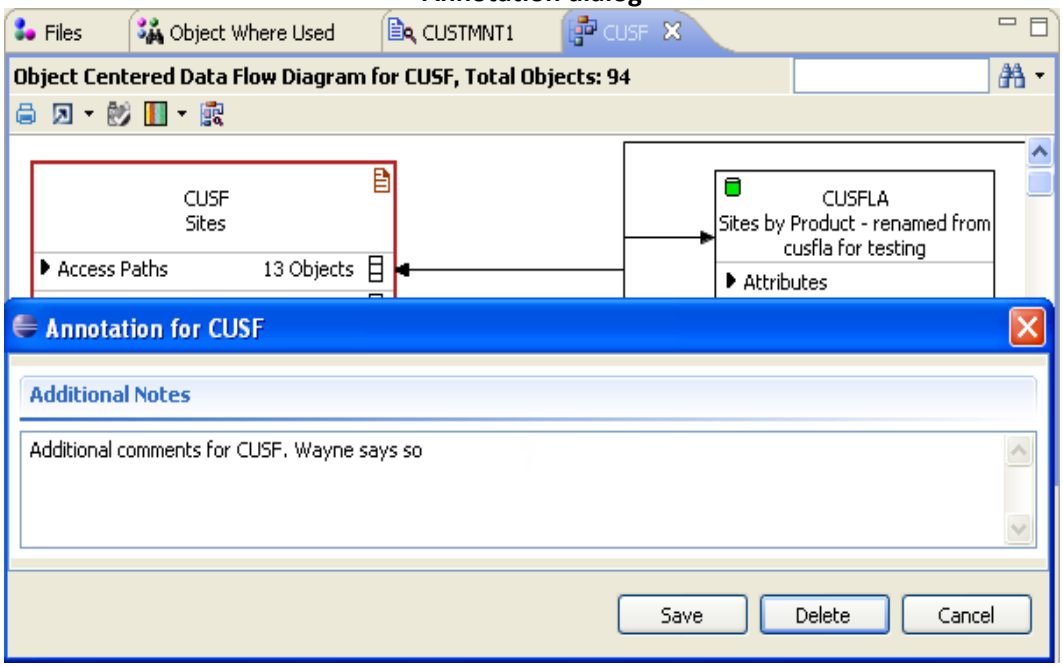
View Annotation option



Double-clicking on the **View Annotation** icon invokes the **Annotation** dialog box, displaying the notes that were written earlier.

You can add/modify notes in the **Annotation** dialog box and click **Save**. These notes can be viewed later using the same option.

Annotation dialog



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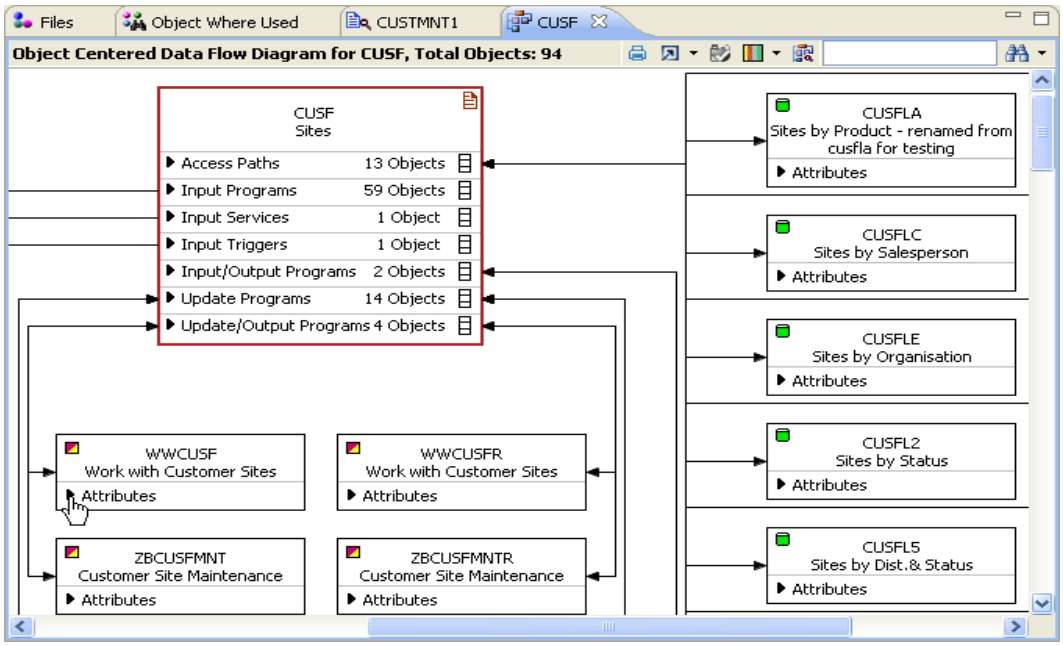
Attributes

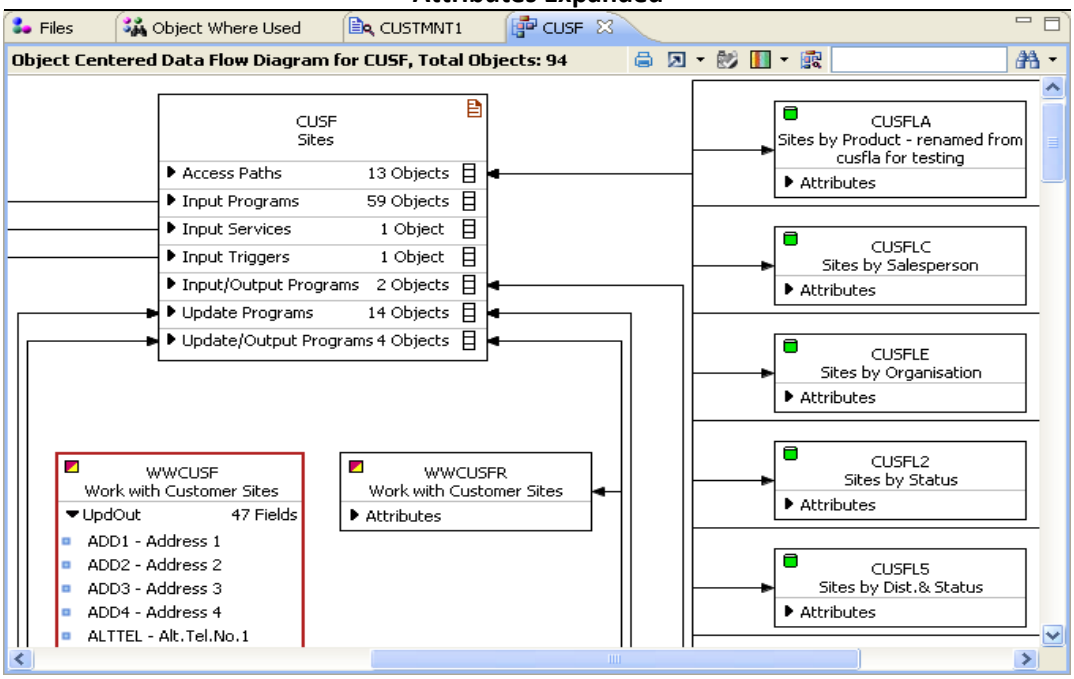
The **Attributes** feature comprises impacted fields of a particular object. The main object is referenced through these fields.

Attributes icon



The different objects corresponding to the main object have fields within them. The fields are known as 'Attributes,' and these are easily accessible by clicking on the **Attributes** icon. The term 'Attributes' changes to related attribute like Input, Update, Output etc. on expanding the **Attributes** button, as shown below:

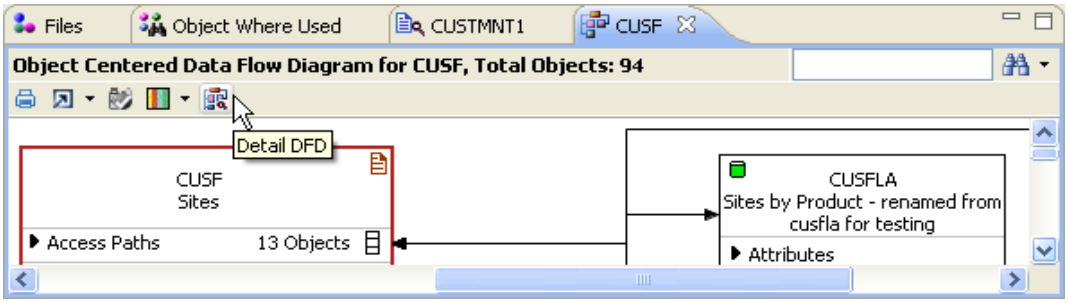
Attributes Expanded



Detail DFD icon

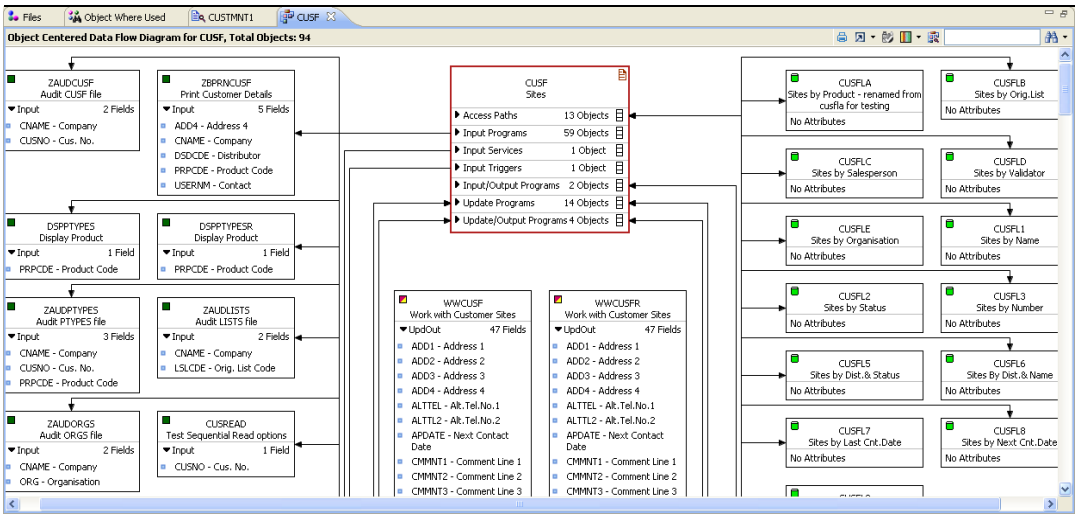
Select the **Detail DFD** icon from the toolbar for viewing field usage of all the objects.

Detail DFD icon



When the **Detail DFD** icon is clicked, the 'Attributes' section of all the objects gets expanded displaying the referred fields from all objects. The following screenshot displays the detailed DFD screen:

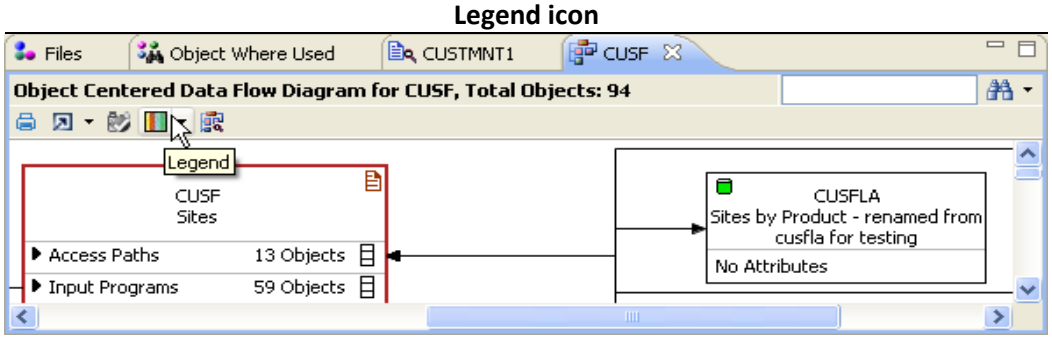
Detailed DFD view



Legend icon

The **Legend** icon on the Eclipse toolbar displays the details of the color scheme used by a DFD. Click the **Legend** icon shown below:

Legend icon



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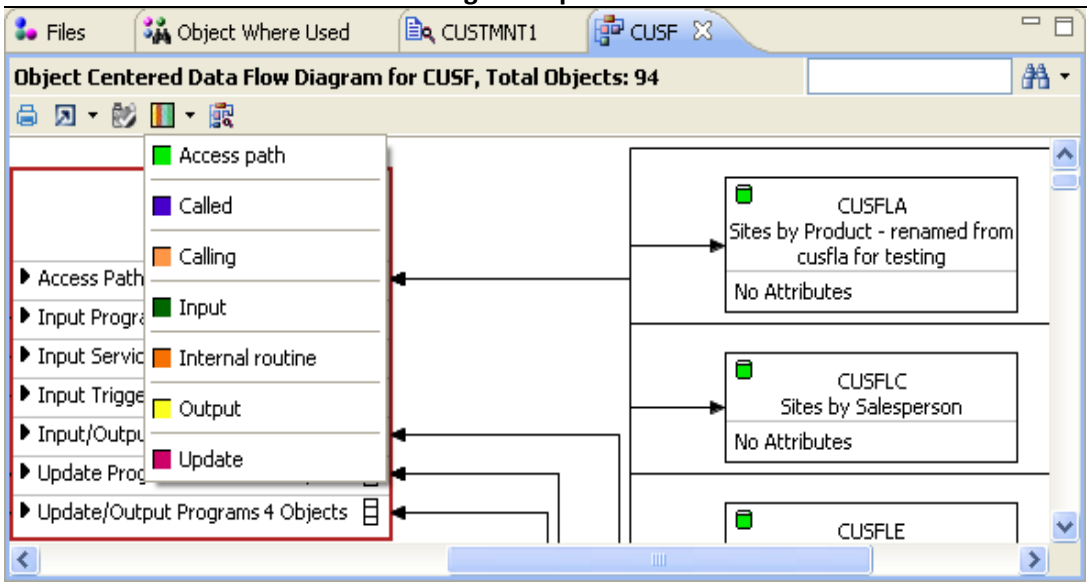
The color scheme clarifies the reference and association of specific objects with one another.

Legend expanded

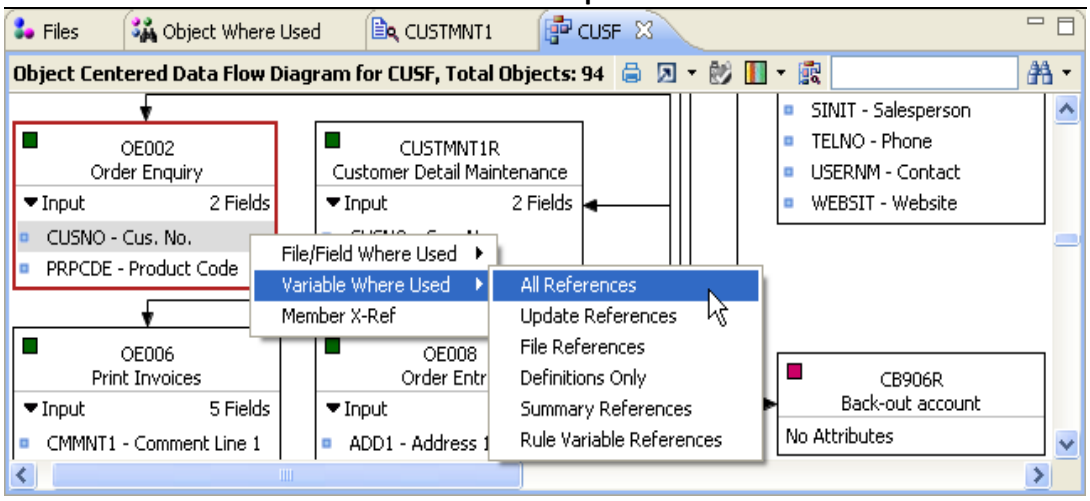


VARIABLE WHERE USED

This option is specifically useful for conducting impact analysis. It returns all source lines, where field/variable of a file or program is used and/or referenced, in any of the source members. The source members searched also include device files and copybooks.

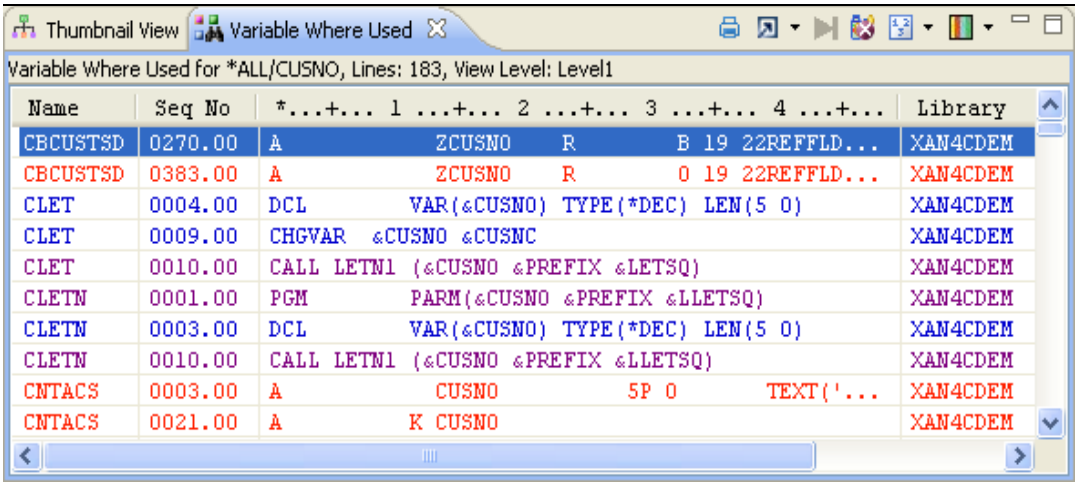
From the DFD for **CUSF**, search and select the **OE002** object. We can clearly see that the fields used by **CUSF** are **CUSNO** and **PRPCDE**. Select **CUSNO** and opt for **Variable Where Used** from the context menu, as shown below:

Variable Where Used option for CUSNO



Select **All References** to invoke the **Variable Where Used** window for the **CUSNO** field.

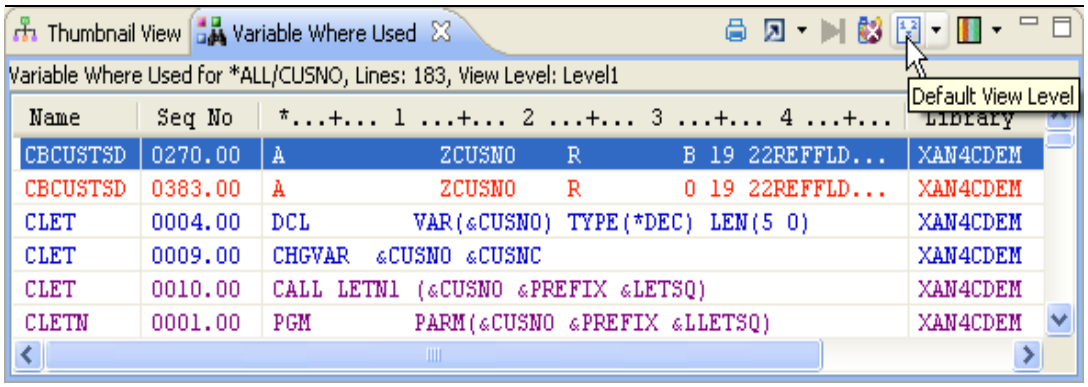
Variable Where Used window for CUSNO



The window displayed above lists all references of **CUSNO** field from the entire application.

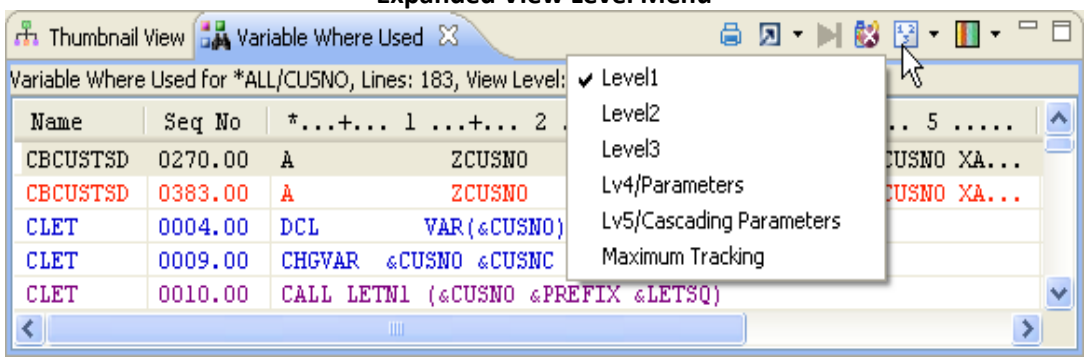
The **Default View Level** icon is located on the X-Analysis toolbar, and the menu allows access to six levels of Variable Where Used information.

Default View Level icon



The following image shows the expanded View Level menu in the Variable Where Used window:

Expanded View Level Menu



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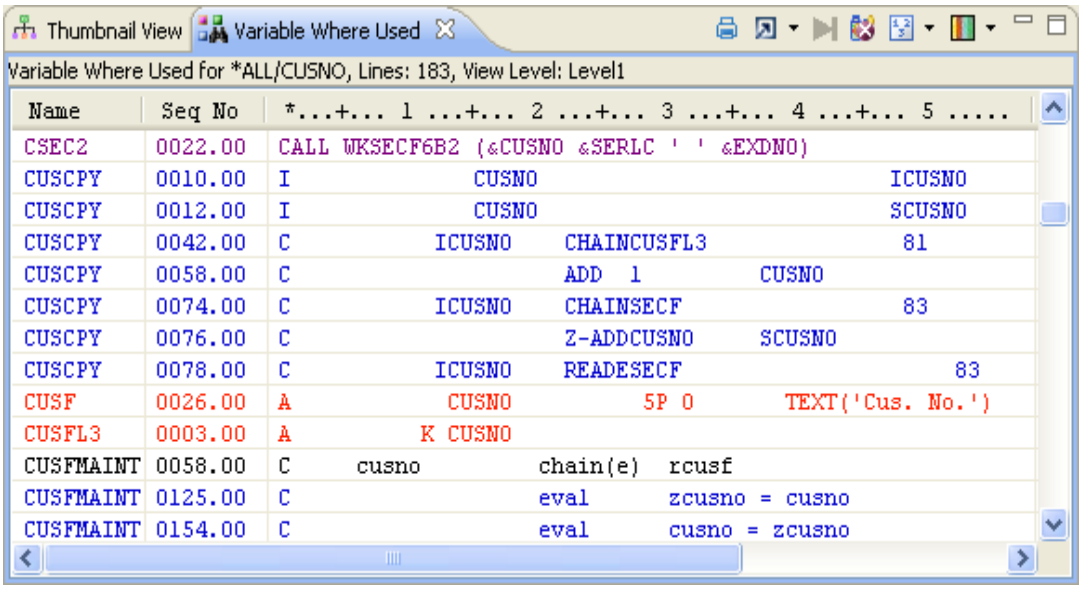
The Default View Level for the Variable Where Used option can be set in the X-Analysis Preferences (General Preferences) window.

As an example, let us test the View Levels for the **CUSNO** field.

Level 1: Level 1 lists all direct references to the **CUSNO** field.

Variable Where Used – View Level 1



Name	Seq No	*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 .....
CSEC2	0022.00	CALL WKSECF6B2 (&CUSNO &SERLC ' ' &EXDNO)
CUSCPY	0010.00	I CUSNO ICUSNO
CUSCPY	0012.00	I CUSNO SCUSNO
CUSCPY	0042.00	C ICUSNO CHAINCUSFL3 81
CUSCPY	0058.00	C ADD 1 CUSNO
CUSCPY	0074.00	C ICUSNO CHAINSECF 83
CUSCPY	0076.00	C Z-ADDCUSNO SCUSNO
CUSCPY	0078.00	C ICUSNO READESECF 83
CUSF	0026.00	A CUSNO 5P 0 TEXT('Cus. No.')
CUSFL3	0003.00	A K CUSNO
CUSFMAINT	0058.00	C cusno chain(e) rcusf
CUSFMAINT	0125.00	C eval zcusno = cusno
CUSFMAINT	0154.00	C eval cusno = zcusno

Level 2: Level 2 adds extra indirect references, "one reference removed," to the Level 1 list. For example, CUSTOMER is set equal to CUSNO (a direct reference), and then CUSTOMER is a variable in the statement "IF CUSTOMER = ZEROES" (a one reference removed indirect reference).

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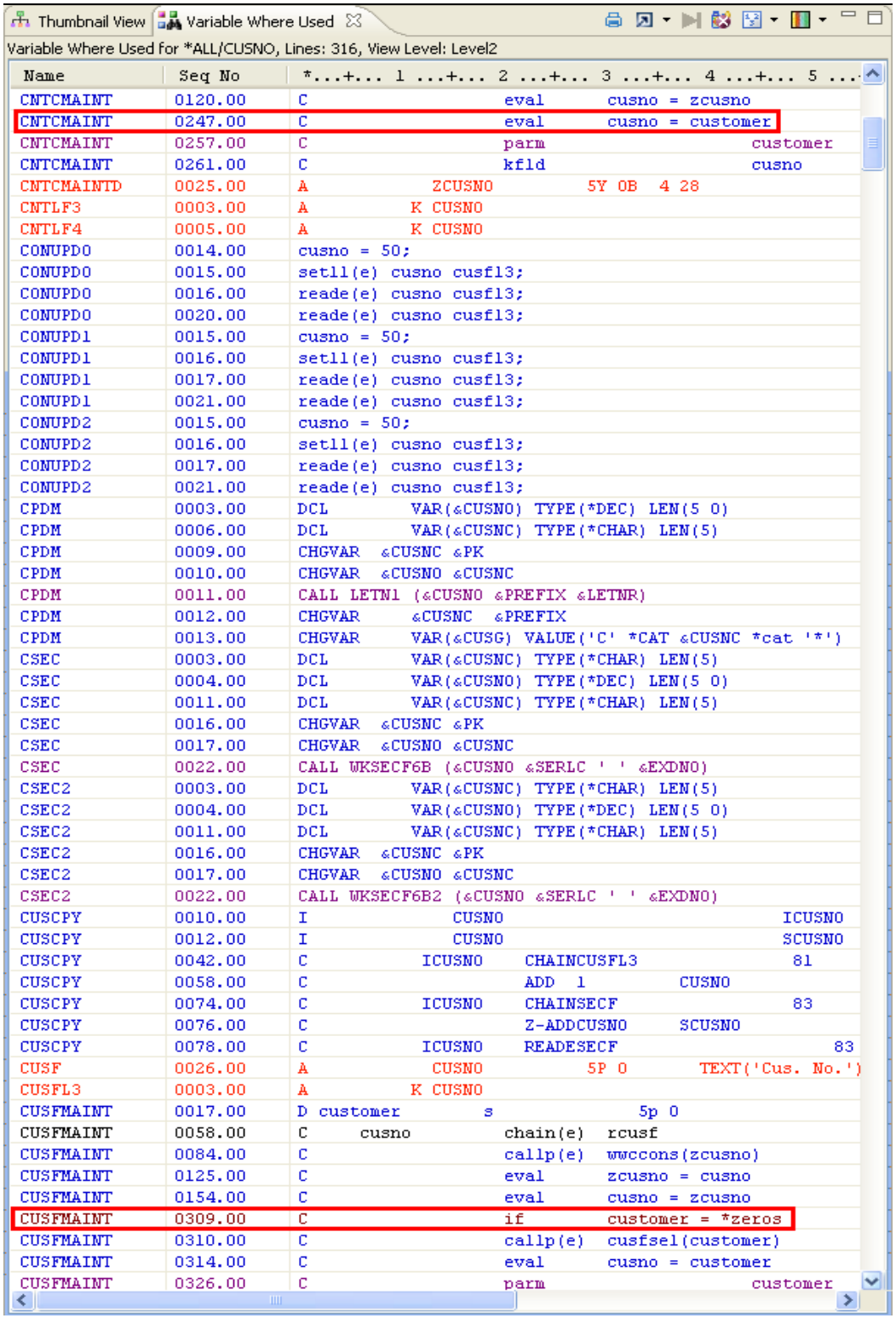
Variable Where Used – View Level 2

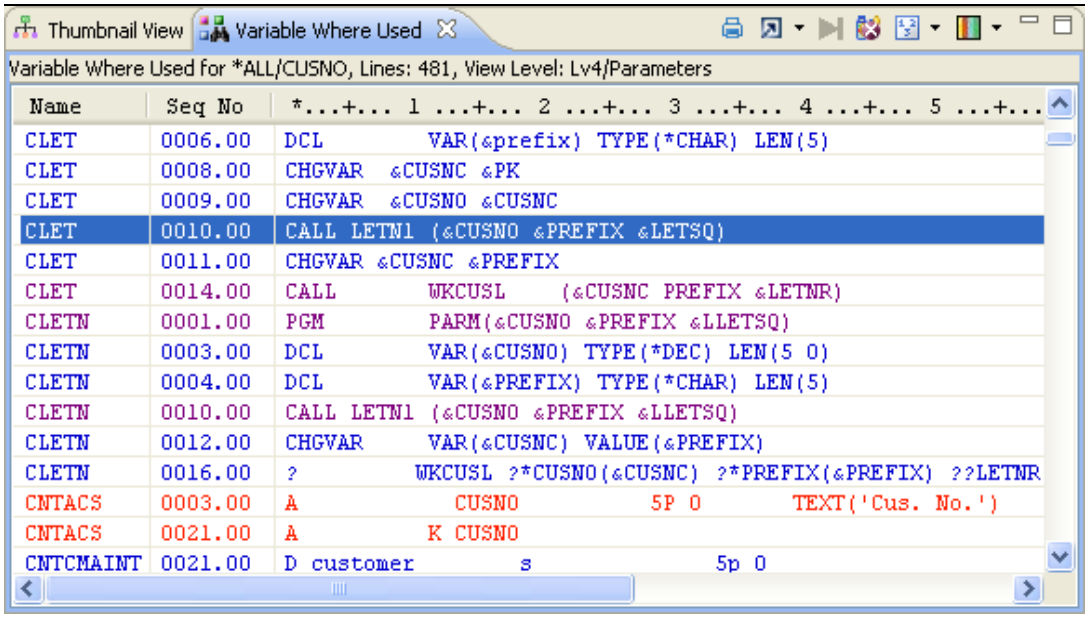


Name	Seq No	*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...
CNTCMAINT	0120.00	C eval cusno = zcusno
CNTCMAINT	0247.00	C eval cusno = customer
CNTCMAINT	0257.00	C parm customer
CNTCMAINT	0261.00	C kfld cusno
CNTCMAINTD	0025.00	A ZCUSNO 5Y 0B 4 28
CNTLF3	0003.00	A K CUSNO
CNTLF4	0005.00	A K CUSNO
CONUPD0	0014.00	cusno = 50;
CONUPD0	0015.00	setll(e) cusno cusfl3;
CONUPD0	0016.00	reade(e) cusno cusfl3;
CONUPD0	0020.00	reade(e) cusno cusfl3;
CONUPD1	0015.00	cusno = 50;
CONUPD1	0016.00	setll(e) cusno cusfl3;
CONUPD1	0017.00	reade(e) cusno cusfl3;
CONUPD1	0021.00	reade(e) cusno cusfl3;
CONUPD2	0015.00	cusno = 50;
CONUPD2	0016.00	setll(e) cusno cusfl3;
CONUPD2	0017.00	reade(e) cusno cusfl3;
CONUPD2	0021.00	reade(e) cusno cusfl3;
CPDM	0003.00	DCL VAR(&CUSNO) TYPE(*DEC) LEN(5 0)
CPDM	0006.00	DCL VAR(&CUSNC) TYPE(*CHAR) LEN(5)
CPDM	0009.00	CHGVAR &CUSNC &PK
CPDM	0010.00	CHGVAR &CUSNO &CUSNC
CPDM	0011.00	CALL LETN1 (&CUSNO &PREFIX &LETNR)
CPDM	0012.00	CHGVAR &CUSNC &PREFIX
CPDM	0013.00	CHGVAR VAR(&CUSG) VALUE('C' *CAT &CUSNC *cat '*')
CSEC	0003.00	DCL VAR(&CUSNC) TYPE(*CHAR) LEN(5)
CSEC	0004.00	DCL VAR(&CUSNO) TYPE(*DEC) LEN(5 0)
CSEC	0011.00	DCL VAR(&CUSNC) TYPE(*CHAR) LEN(5)
CSEC	0016.00	CHGVAR &CUSNC &PK
CSEC	0017.00	CHGVAR &CUSNO &CUSNC
CSEC	0022.00	CALL WKSECF6B (&CUSNO &SERLC ' ' &EXDNO)
CSEC2	0003.00	DCL VAR(&CUSNC) TYPE(*CHAR) LEN(5)
CSEC2	0004.00	DCL VAR(&CUSNO) TYPE(*DEC) LEN(5 0)
CSEC2	0011.00	DCL VAR(&CUSNC) TYPE(*CHAR) LEN(5)
CSEC2	0016.00	CHGVAR &CUSNC &PK
CSEC2	0017.00	CHGVAR &CUSNO &CUSNC
CSEC2	0022.00	CALL WKSECF6B2 (&CUSNO &SERLC ' ' &EXDNO)
CUSCPY	0010.00	I CUSNO ICUSNO
CUSCPY	0012.00	I CUSNO SCUSNO
CUSCPY	0042.00	C ICUSNO CHAINCUSFL3 81
CUSCPY	0058.00	C ADD 1 CUSNO
CUSCPY	0074.00	C ICUSNO CHAINSECF 83
CUSCPY	0076.00	C Z-ADDCUSNO SCUSNO
CUSCPY	0078.00	C ICUSNO READESECF 83
CUSF	0026.00	A CUSNO 5P 0 TEXT('Cus. No.')
CUSFL3	0003.00	A K CUSNO
CUSFMAINT	0017.00	D customer s 5p 0
CUSFMAINT	0058.00	C cusno chain(e) rcusf
CUSFMAINT	0084.00	C callp(e) wwccons(zcusno)
CUSFMAINT	0125.00	C eval zcusno = cusno
CUSFMAINT	0154.00	C eval cusno = zcusno
CUSFMAINT	0309.00	C if customer = *zeros
CUSFMAINT	0310.00	C callp(e) cusfsel(customer)
CUSFMAINT	0314.00	C eval cusno = customer
CUSFMAINT	0326.00	C parm customer

Level 3: Level 3 builds on the Level 2 references, adding indirect references that are “one further reference removed.”

Level 4/Parameters: Level 4 further includes fields used as parameters. For example, in the statement "CALL LETN (&CUSNO &PREFIX &LETSQ)", CUSNO is a parameter to call LETN.

Variable Where Used – View Level 4



Level 5/Cascading Parameters: Extending the information in Level 4, Level 5 includes references where CUSNO fields are parameters in a function, called by another function.

Maximum Tracking: Tracks the usage of a variable or a field to its maximum level of indirection.

This is the highest view level, also referred to as 'Maximum Tracking'. It displays Variable Where Used information for all the levels mentioned above, as well as any other possible references of the **CUSNO** field.

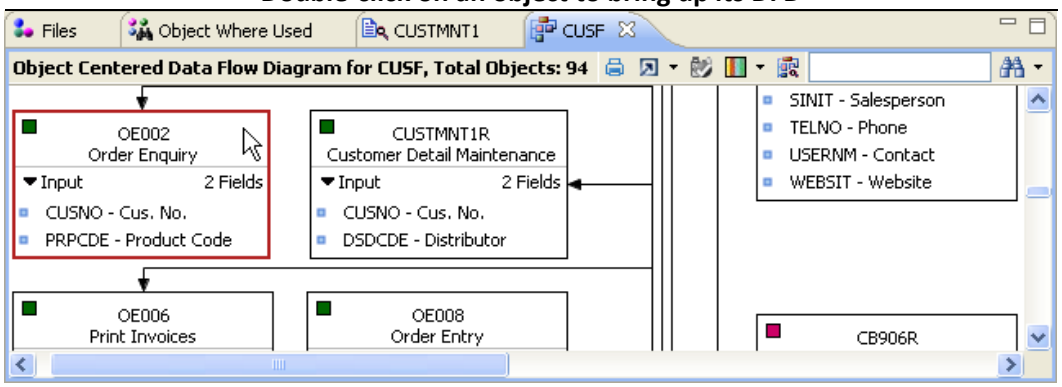
The **Variable Where Used** option can be opted over a large variety of items including: Files, Array Definitions, Data Structures, Sub-Fields of a Data Structure, Indicators, Key Lists, Data Fields, File Formats, Subroutines, Program Variable, Array Elements, Parameter Lists, Parameters, Key Fields, Message Ids, EXCPT Names, etc.

STRUCTURE CHART DIAGRAM / SCD

In order to interpret the application design it is important to have an idea of how the control transfers from one program to the next. The Structure Chart Diagram or SCD addresses this need by presenting a graphical diagram. It contains relevant information as per control flow and call structure. In addition, the data input objects and the summarized description of each object can be viewed. Important functional aspects like updates, prints, and displays are color coded to help you quickly focus on these commonly-preferred details.

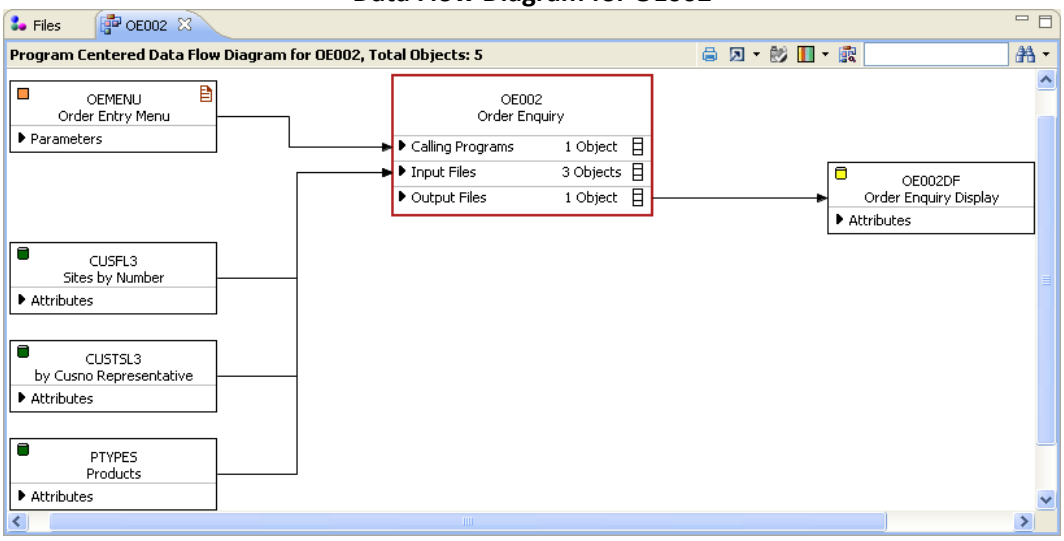
To create an SCD, select the **OE002** object from the DFD for **CUSF**.

Double-click on an object to bring up its DFD



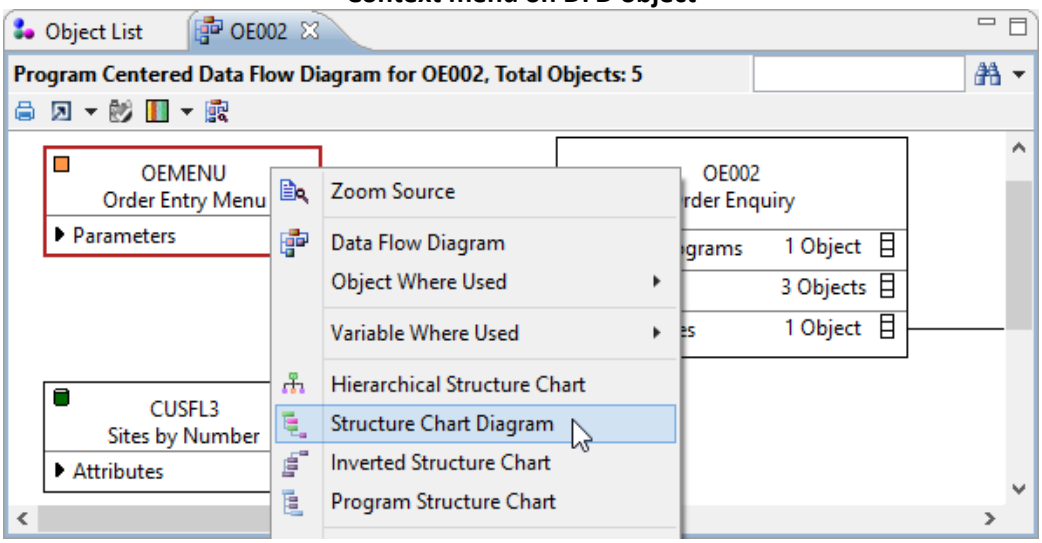
The DFD for **OE002** will be displayed as shown below:

Data Flow Diagram for OE002



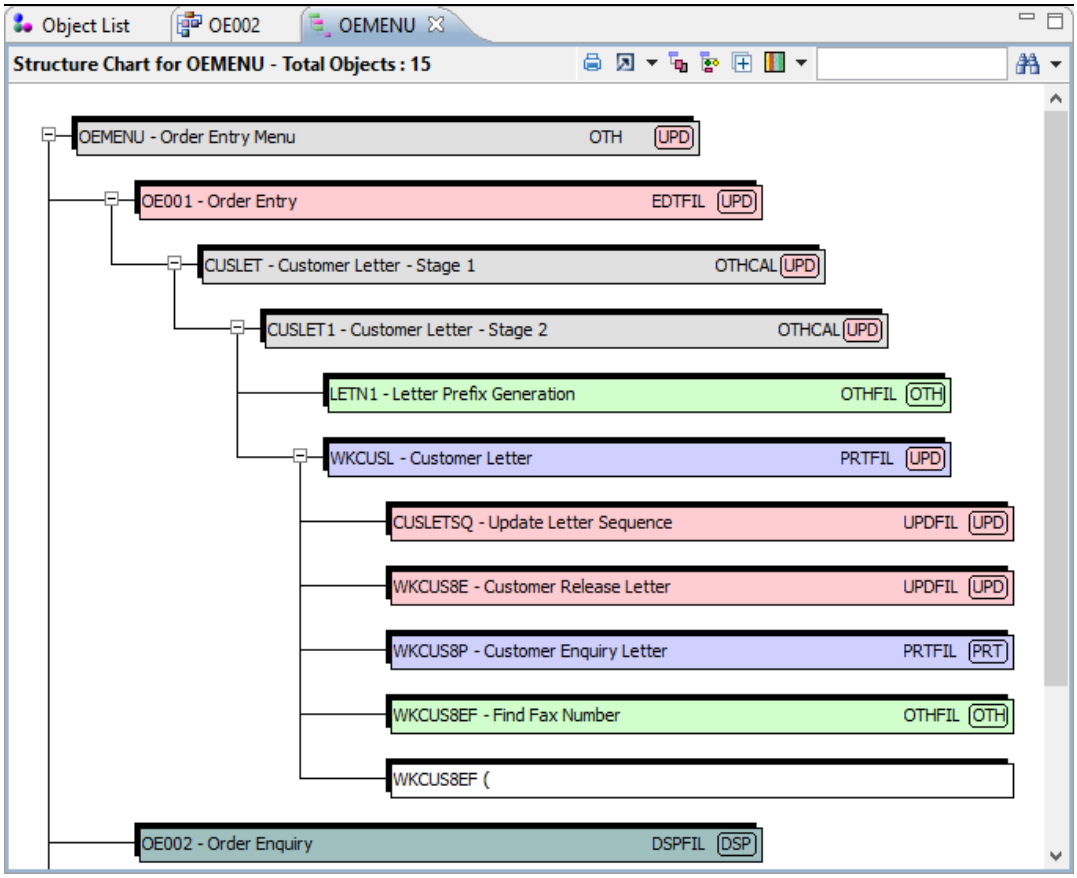
Select **OEMENU** and opt for **Structure Chart Diagram** from the context menu.

Context menu on DFD object



The SCD is a nested tree diagram that displays the complete call hierarchy of the 'programs called.'

SCD for OEMENU

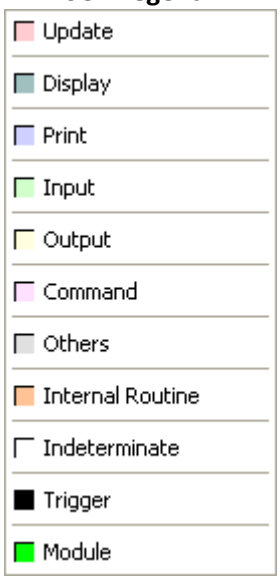


The normal view of an SCD is shown above. The **Legend** button available on the toolbar helps to interpret the different colors used in the SCD.

X-Analysis also allows annotation on the Structure Chart.

Select an object displayed in the SCD and opt for the **Annotate** option from the context menu.

SCD Legend



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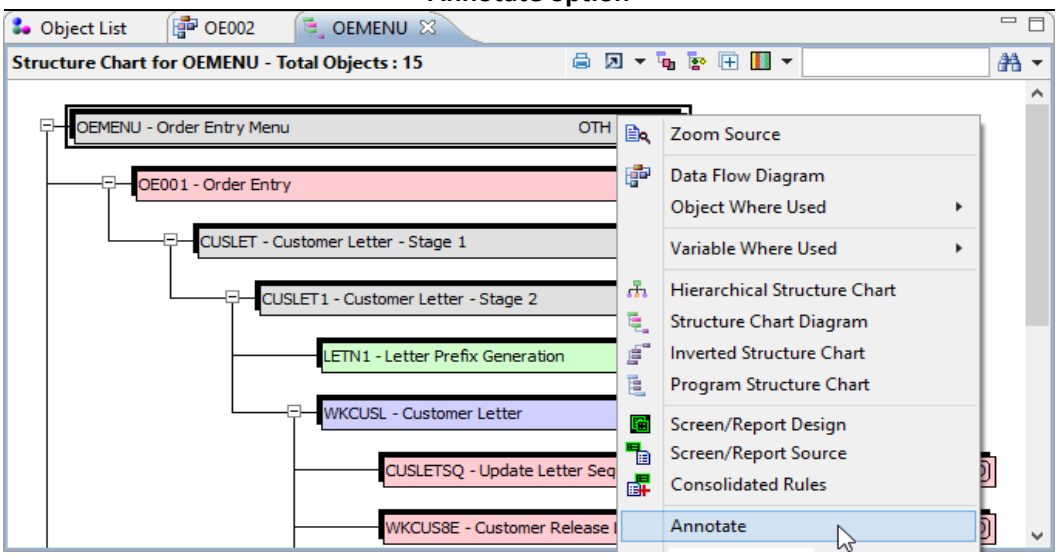
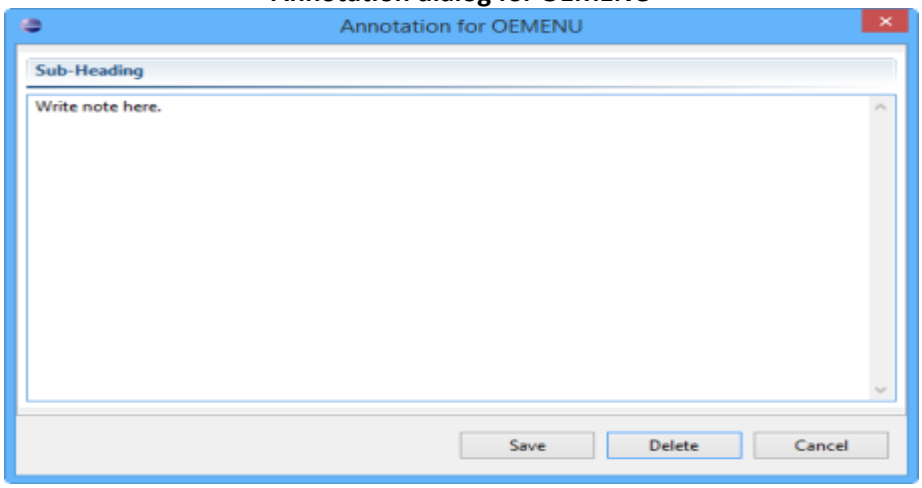
Annotate option



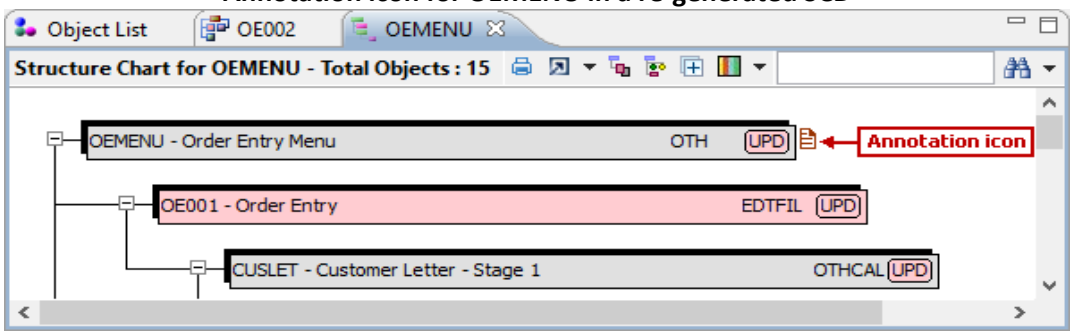
This brings up the **Annotation** dialog. Write your note and click **Save**. The annotation is stored in a file available in the cross-reference library.

Annotation dialog for OEMENU



Regenerate the SCD to check for any object annotations.

Annotation icon for OEMENU in a re-generated SCD



(Double-click on the **Annotation** icon to bring up the **Annotation** dialog).

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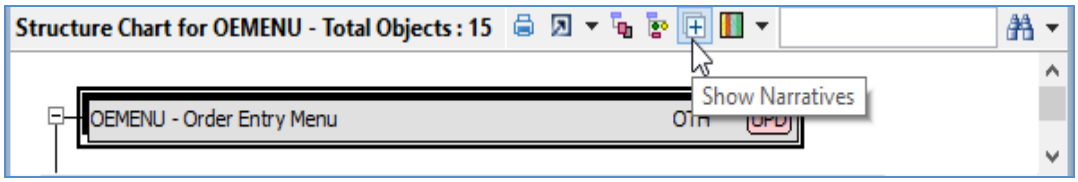
DETAILED STRUCTURE CHART

The SCD in detailed format displays the files used by each program, together with each program's generated program text. (X-Analysis automatically recovers the generated program text which describes the purpose of the listed programs.)

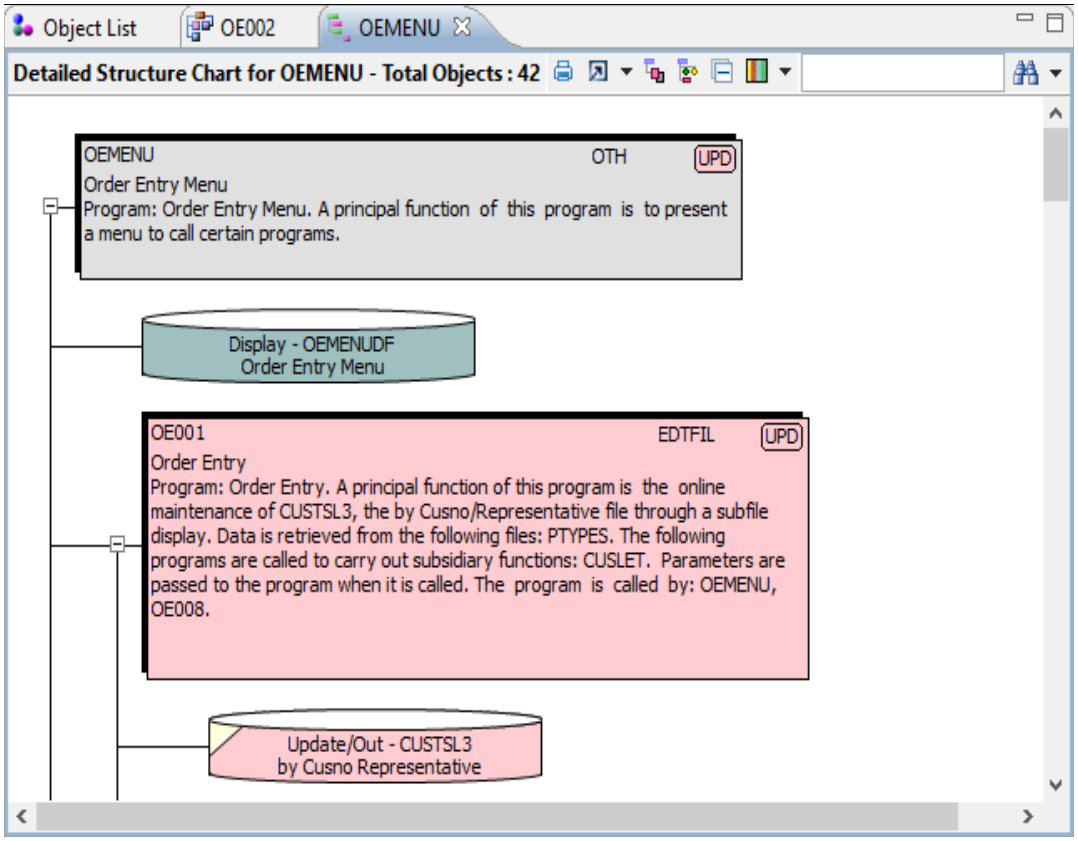
To generate the Detailed SCD, click the **Show Narratives** icon.

Show Narratives icon on toolbar



After clicking the icon, the following window will open, displaying the details.

Detailed SCD



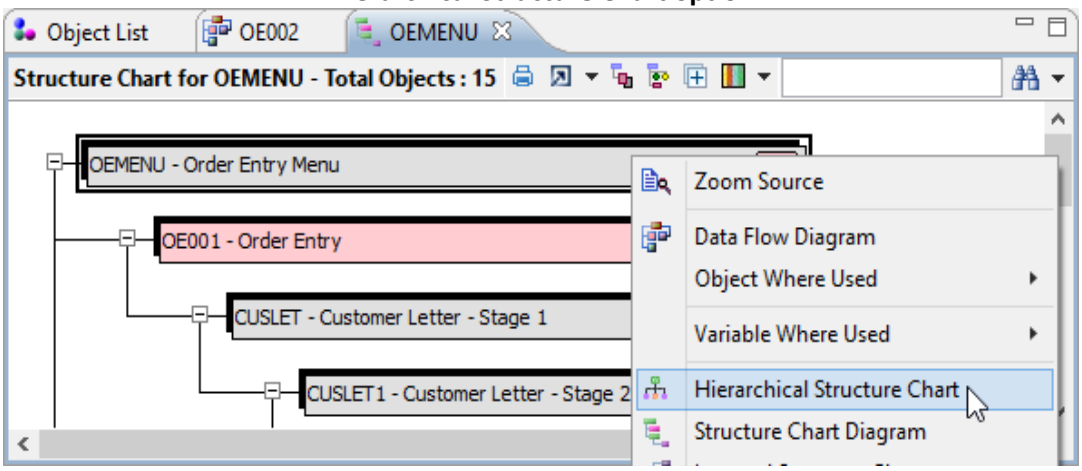
The **Show Narratives** icon has toggle behavior. Click it again (**Normal SCD** icon) to return to the normal view of the Structure Chart.

Note: The Structure Chart Diagram can be limited by level as well as volume. This is applicable to the interactive mode of SCDs. You need to set the 'Preferred Volume Limit' through the X-Analysis General Preferences dialog.

HIERARCHICAL STRUCTURE CHART

The Hierarchical Structure Chart offers a different layout for viewing the SCD. The HSC layout is a precise view of all the programs representing their control flow and call structure through neatly color-coded bus routing block diagrams. Select the **Hierarchical Structure Chart** option from the context menu over **OEMENU** from the SCD.

Hierarchical Structure Chart option



The following image shows the delineation of the main object – **OEMENU** into several blocks of related objects in the order of calling. The color codes indicate whether an object is command-based or input-based, or print-based and so on.

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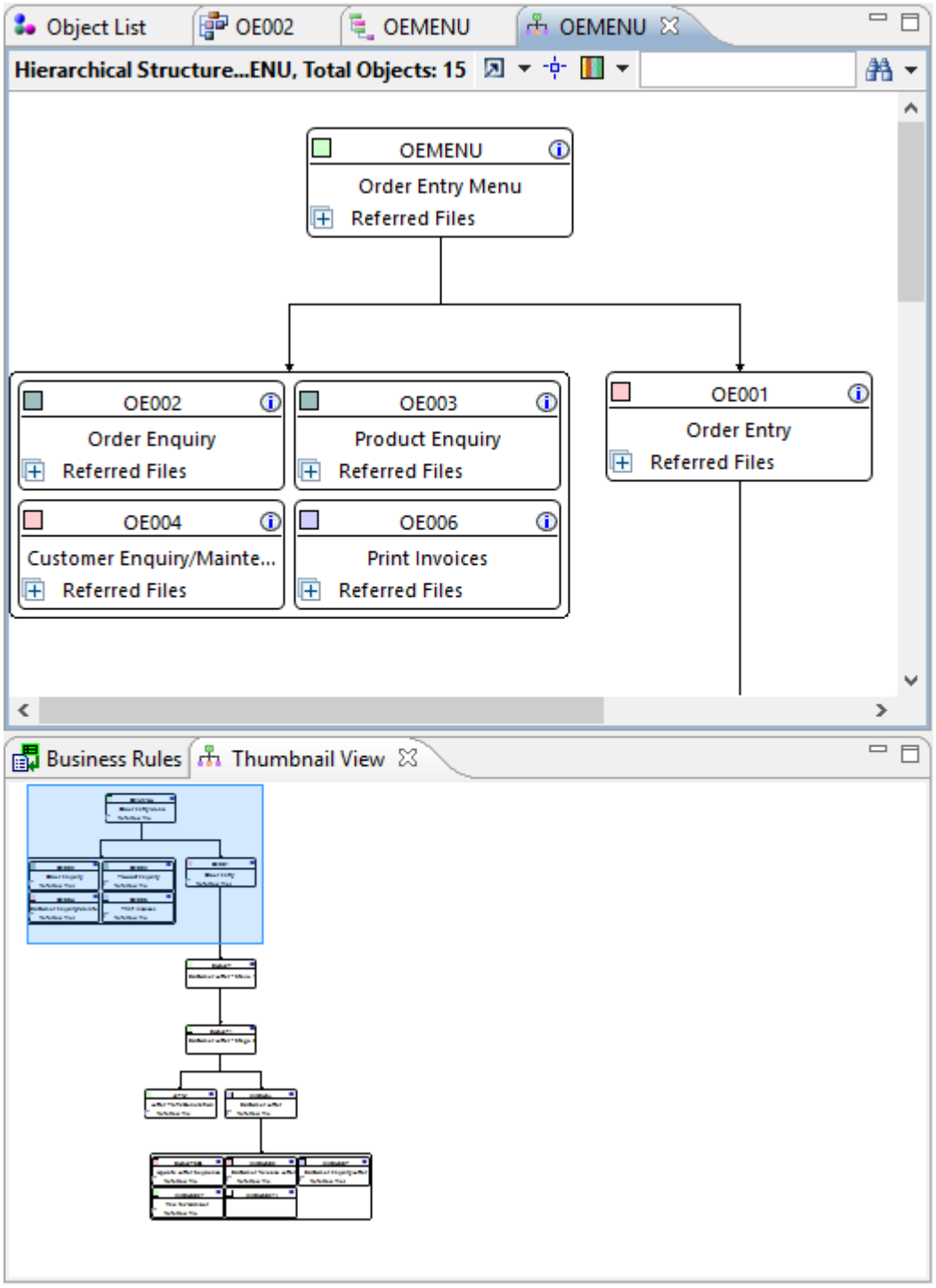
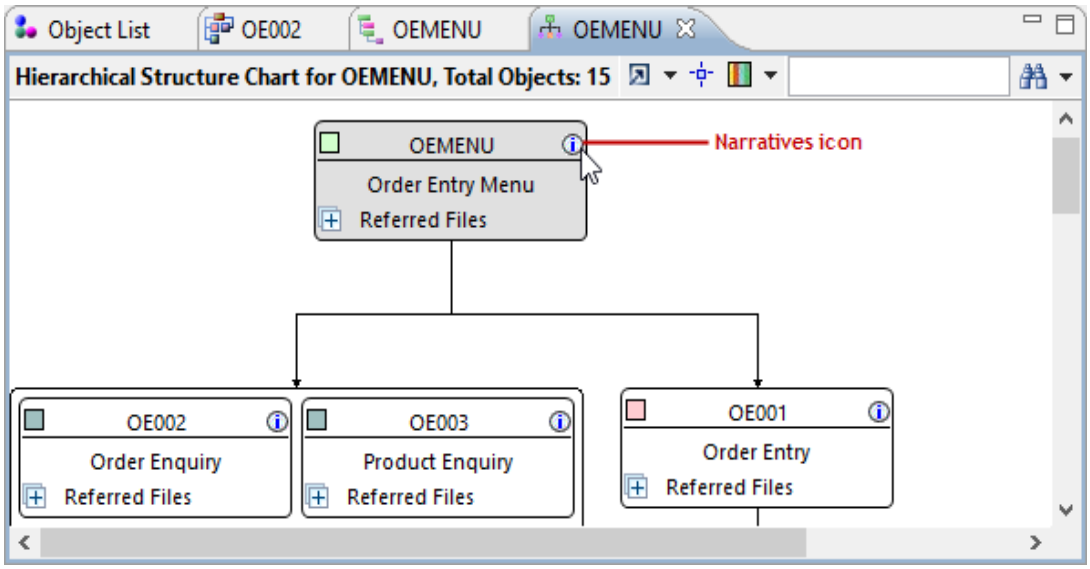
Hierarchical Structure Chart – OEMENU



Narration

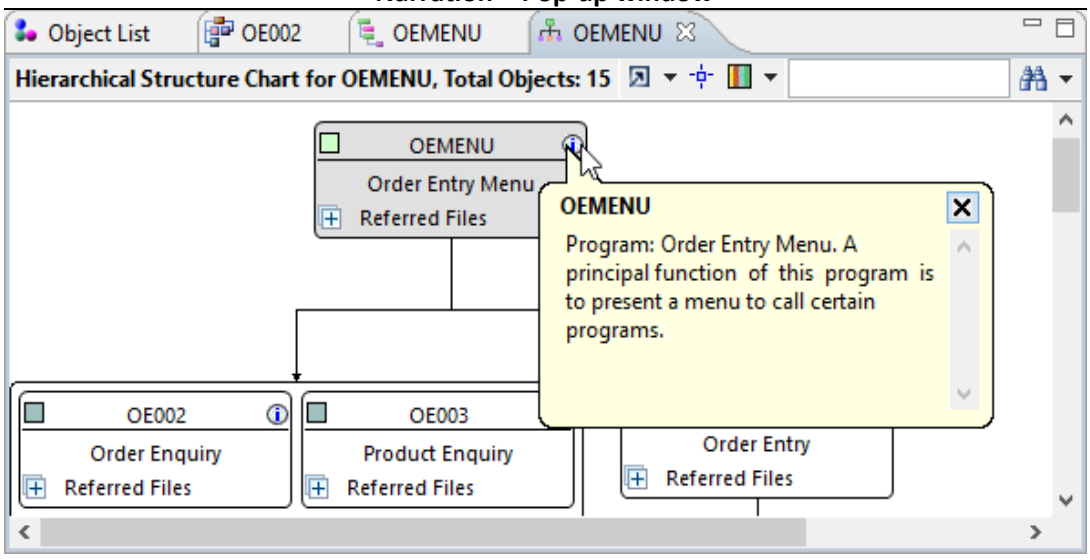
You can access additional details of a specific object through the **Narratives** icon shown below.

Narratives icon



After clicking the icon, a window will appear, providing the auto-generated narration for the program.

Narration – Pop-up window



Referred Files

The HSC has a feature to display referred files inline. An expandable icon called **Referred Files** is available in each box as shown in the image below.

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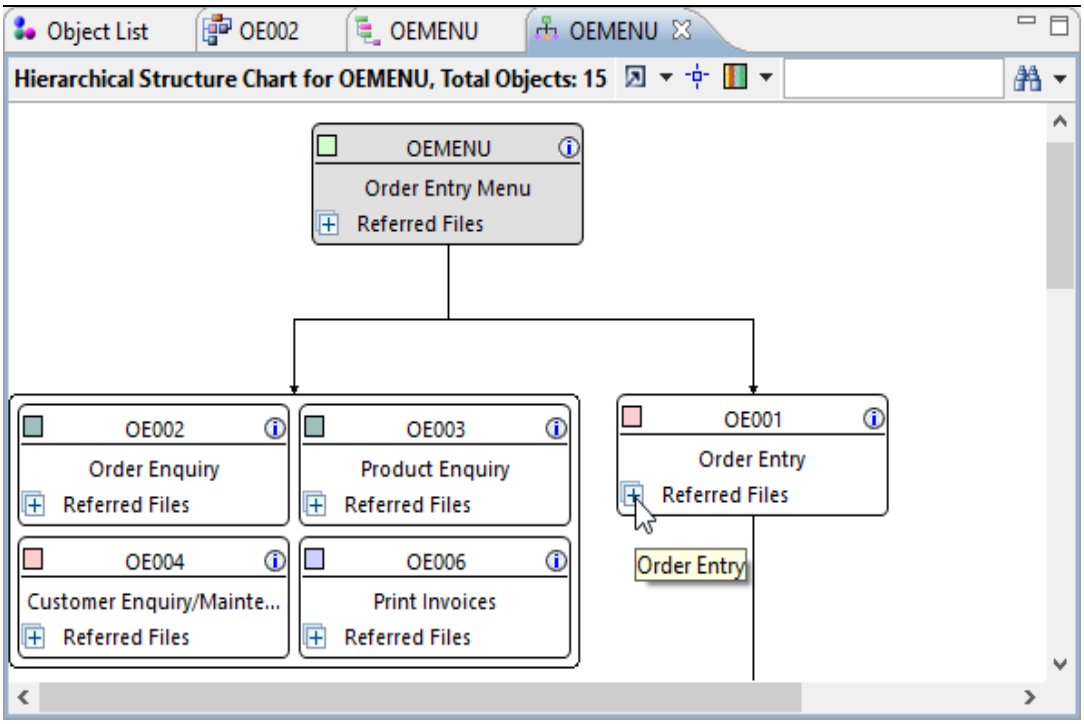
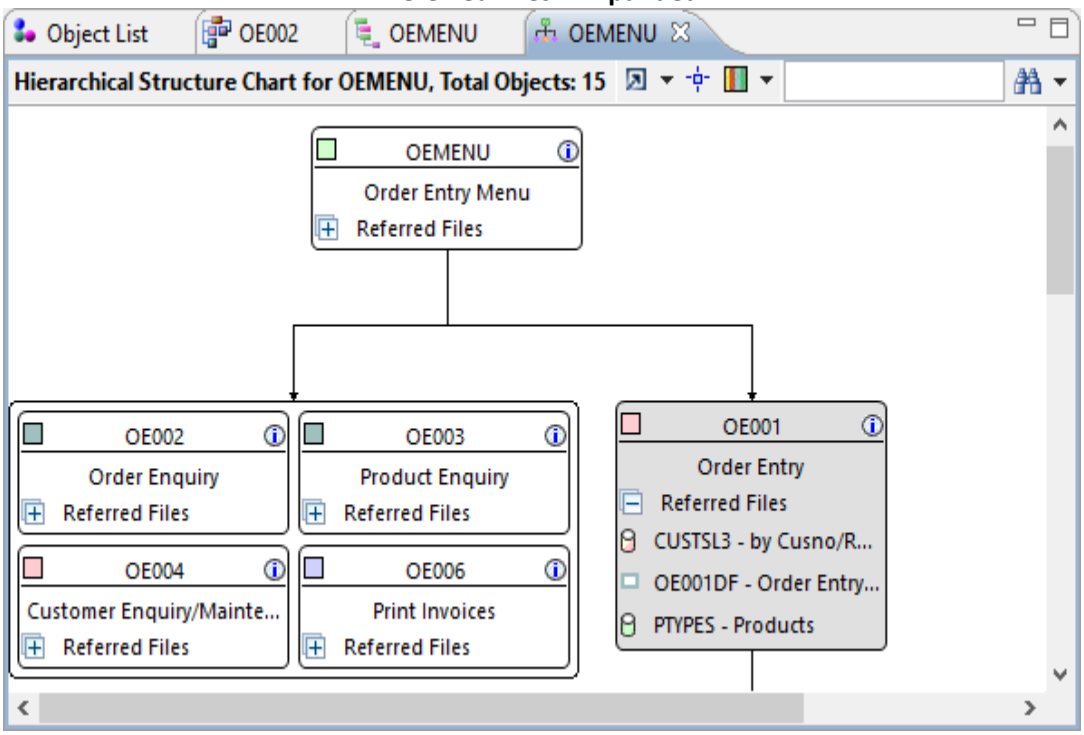
Referred Files icon



Clicking on this icon displays the Referred Files of **OE001**. The color-coded geometric shape before the file name indicates the file type.

Referred Files – Expanded



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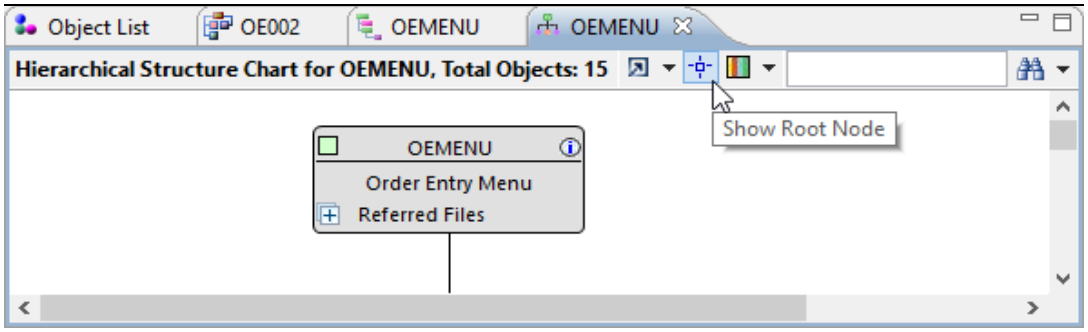
Show Root Node

When the **Show Root Node** icon is clicked, the root node gets displayed:

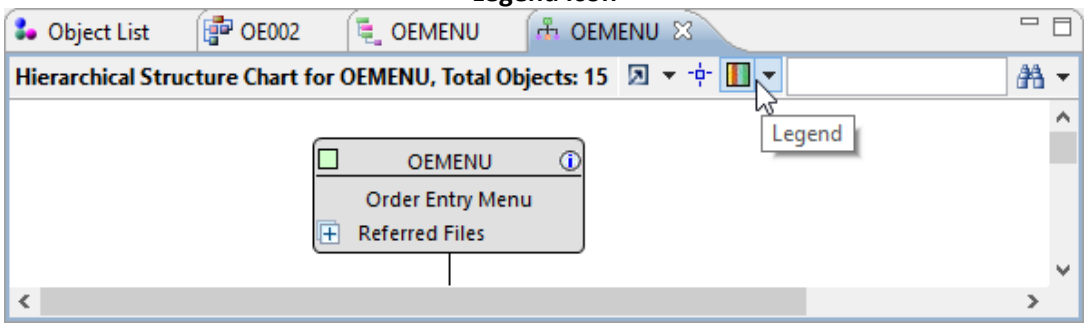
Show Root Node icon



Legend

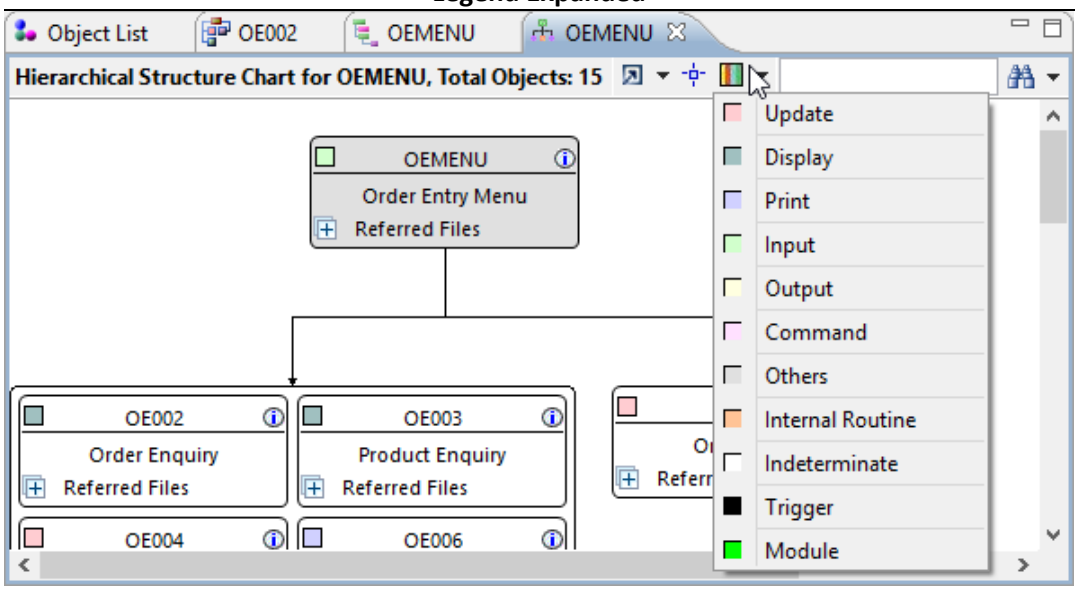
The **Legend** icon on the toolbar shows the color scheme used by the HSC. This color scheme helps to understand the reference and association of specific objects.

Legend icon



Click the icon to expand the Legend.

Legend Expanded



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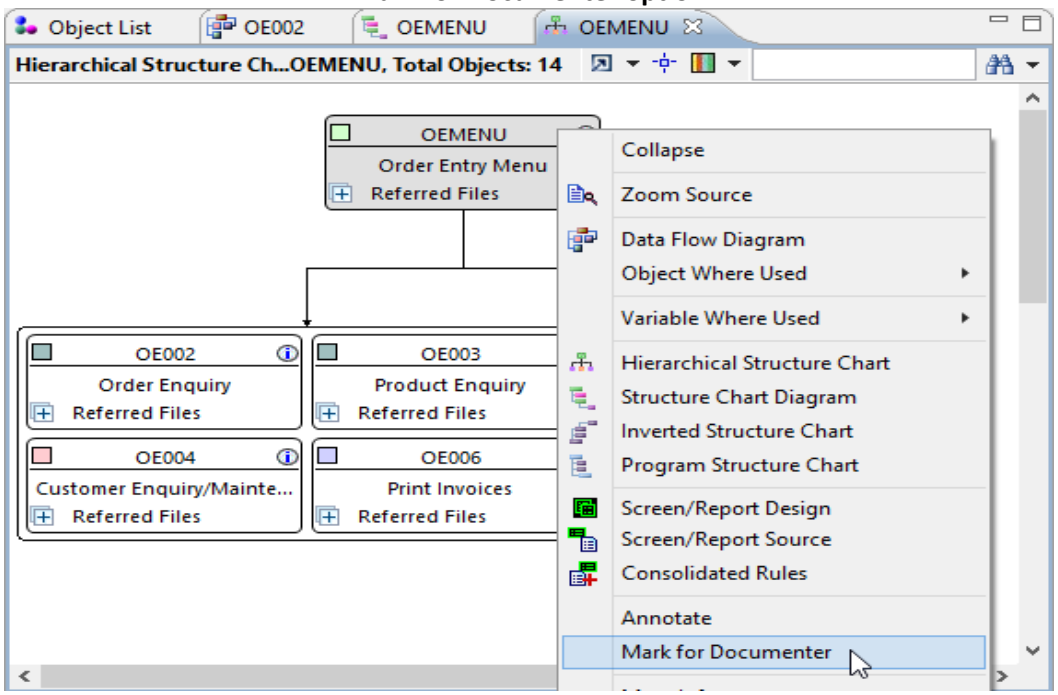
DOCUMENT MANAGER

One of the most powerful functionalities of X-Analysis is its ability to automatically generate structured documentation. The built-in Document Manager facilitates the generation of PDF/MS Word documents containing the system design information of selected objects.

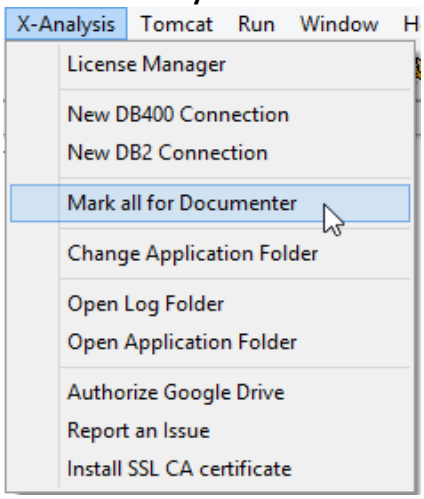
First, mark the objects for documentation using the **Mark for Documenter** option from the context menu over **OEMENU**.

Mark for Documenter option



The **Mark all for Documenter** option is also available under the X-Analysis menu. Using this option will flag all objects displayed in the diagram.

X-Analysis Menu



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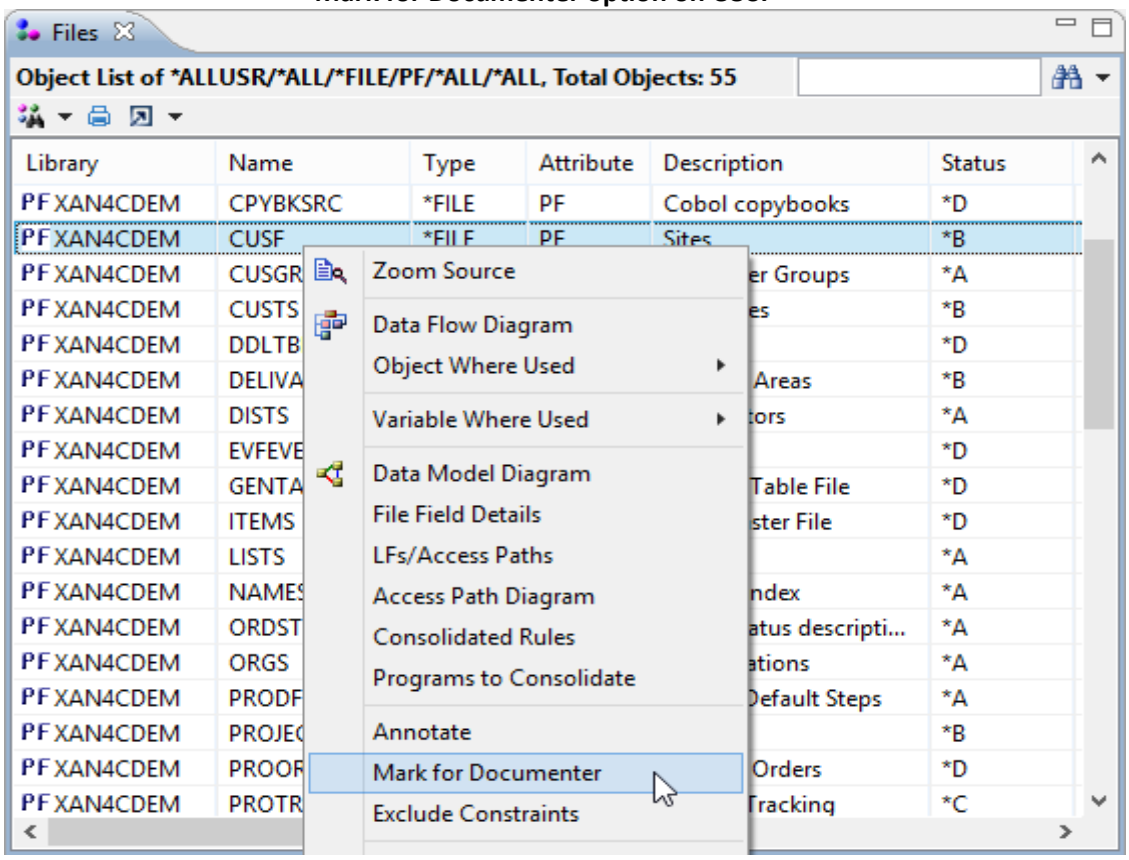
The 'Mark all for Documenter' option is available for all diagrams and lists.

Next, navigate back to the Object List window using the back arrow on the Eclipse toolbar and select **CUSF**.

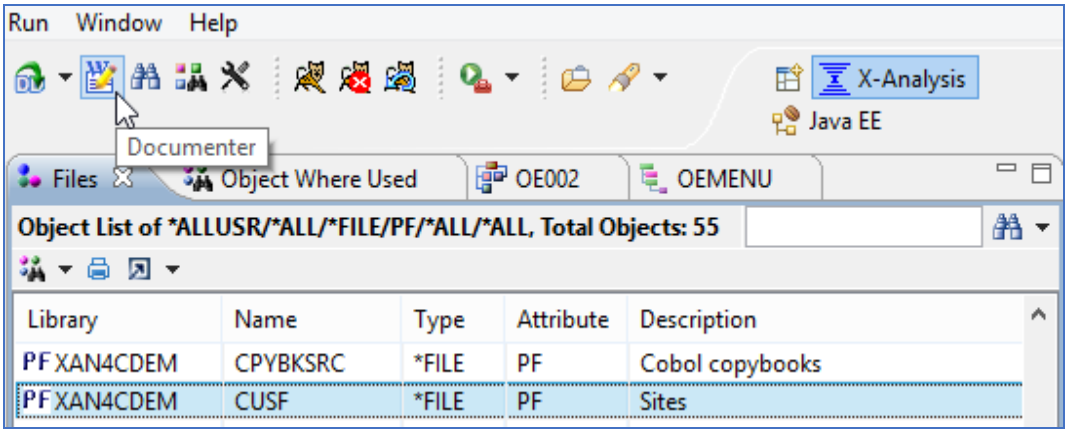
Then, select the **Mark for Documenter** option from the context menu on **CUSF**.

Mark for Documenter option on CUSF



Click the **Documenter** icon on the toolbar to begin the documentation process.

Documenter icon



This invokes the **Document Manager** dialog.

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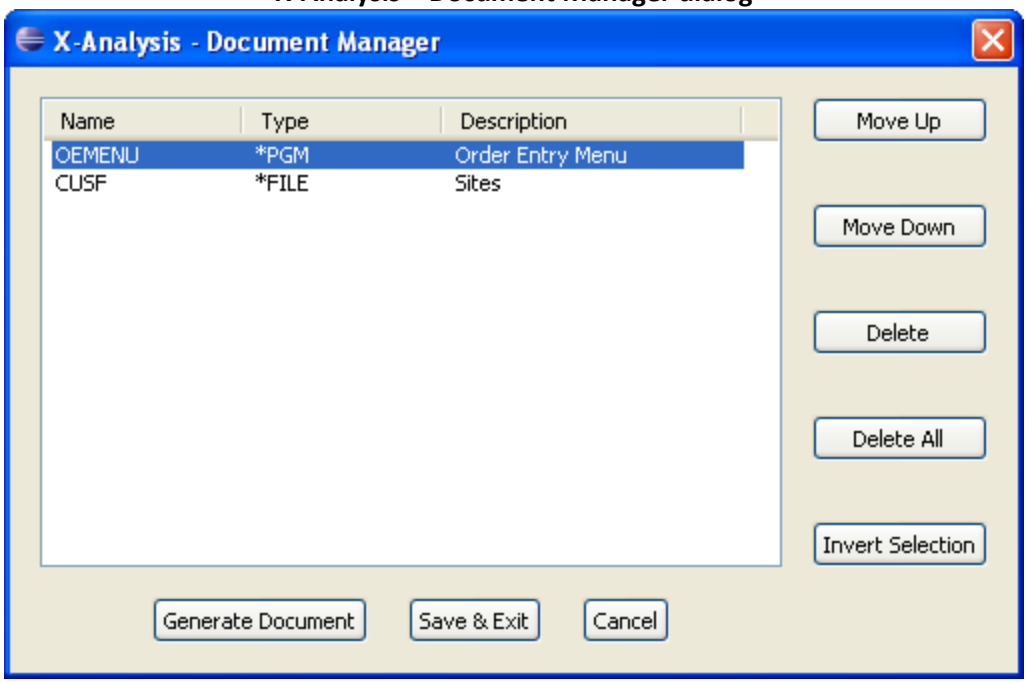
X-Analysis – Document Manager dialog



The **Document Manager** dialog lists all the marked objects for documentation. Use the **Move Up** / **Move Down** / **Delete** / **Delete All** buttons to organize Objects/Members on the documenter list.

The **Invert Selection** button on the **Document Manager** dialog unselects the selected objects and selects all the un-selected objects.

After organizing the listed objects, click **Generate Document**. This invokes the Documenter Wizard as shown on the following page.

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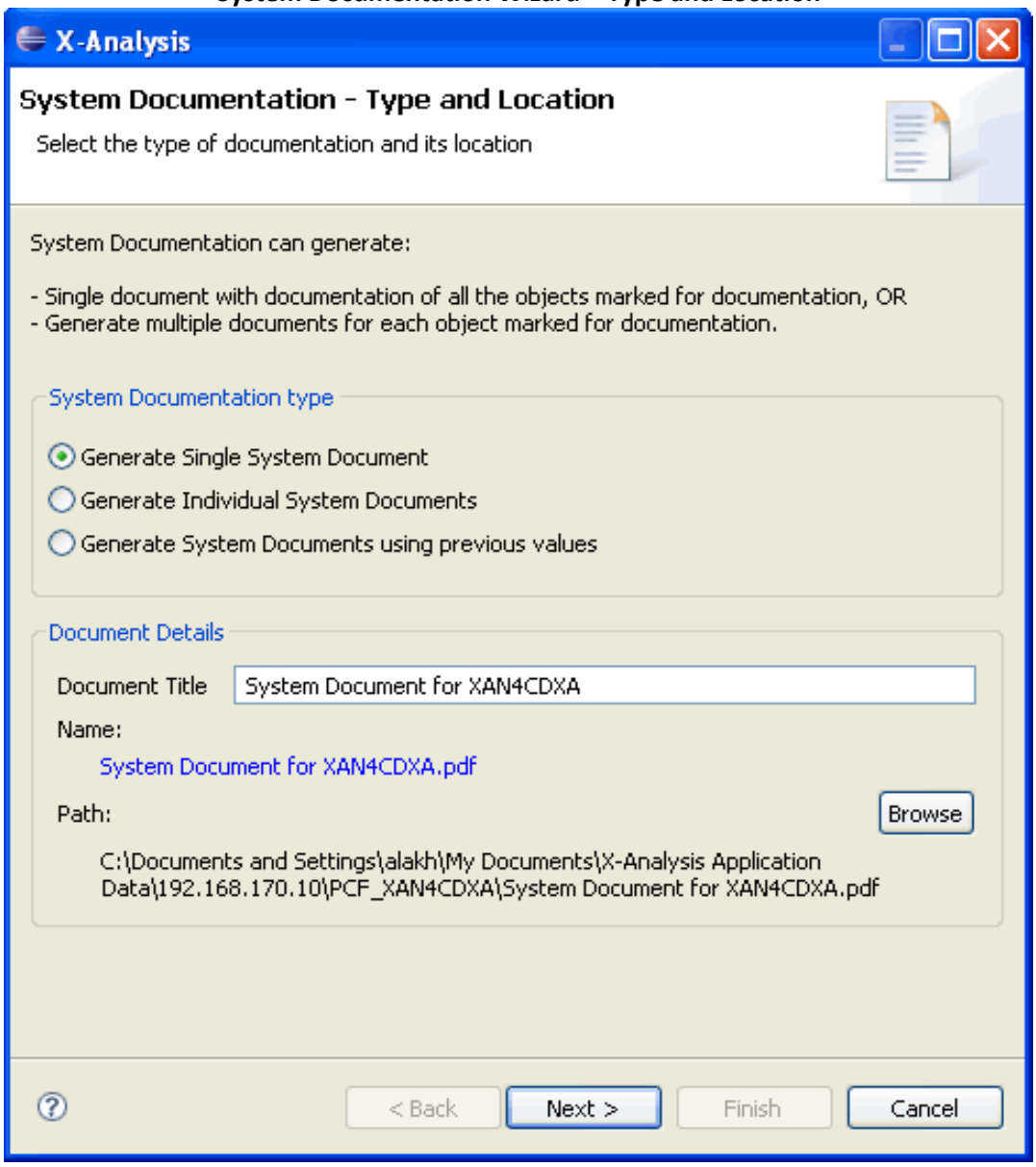
System Documentation Wizard – Type and Location



The **Type and Location** dialog consists of two sections:

- System Documentation type
- Document Details

The **System Documentation type** section provides options to generate the following types of documents:

- **Generate Single System Document:** Generates a single PDF/MS Word document.
- **Generate Individual System Documents:** Generates a PDF/MS Word document for each object.

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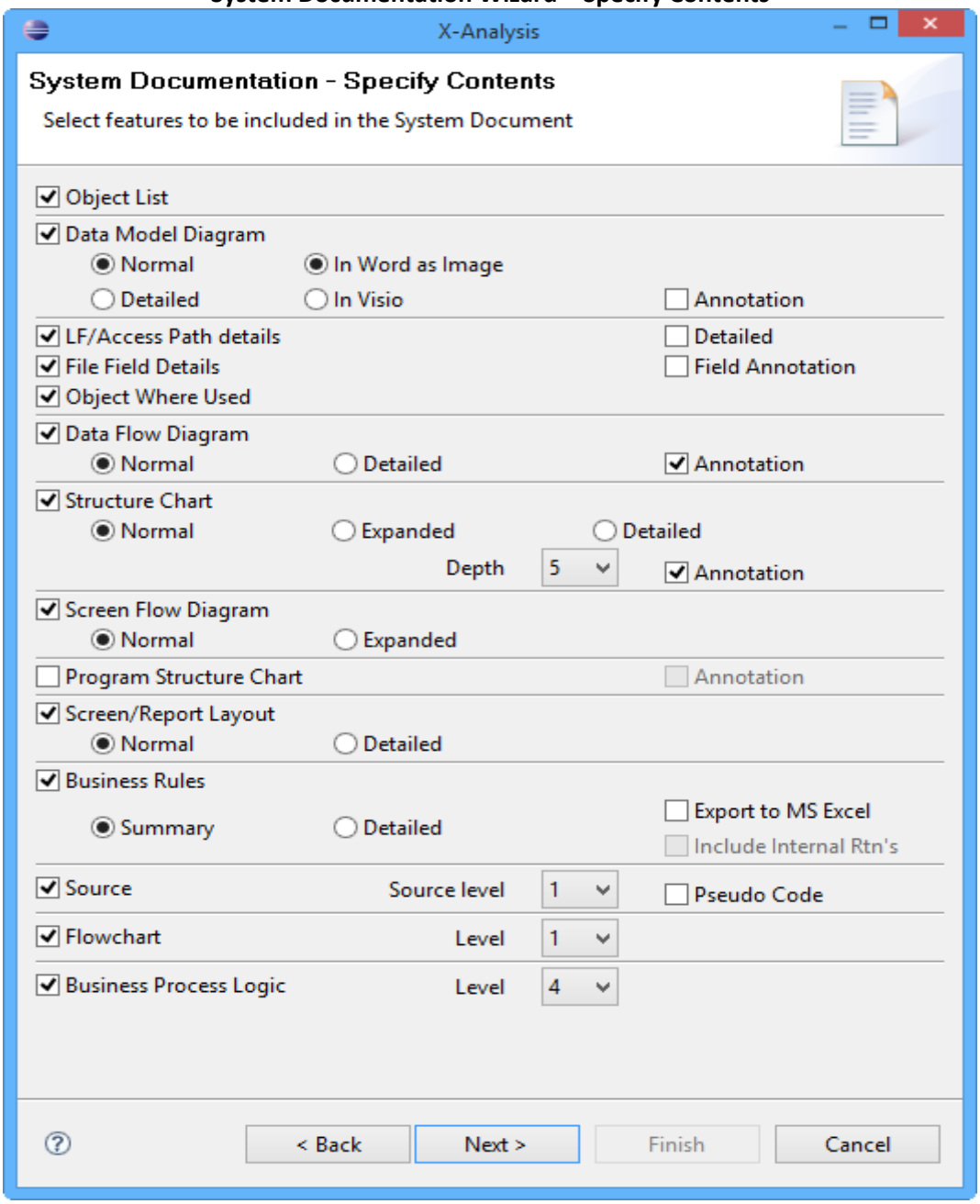
- **Generate System Documents using previous values:** Generates system documentation using the options selected in previous instance of system documentation. (This option is only available for generated system documents.)

Select the **Generate Single System Document** option.

The **Document Details** section specifies the Document Title, generated system document Name and its location. You can choose a different file name for the generated PDF/MS Word document and a different location to save the generated document.

Click **Next**.

System Documentation Wizard – Specify Contents



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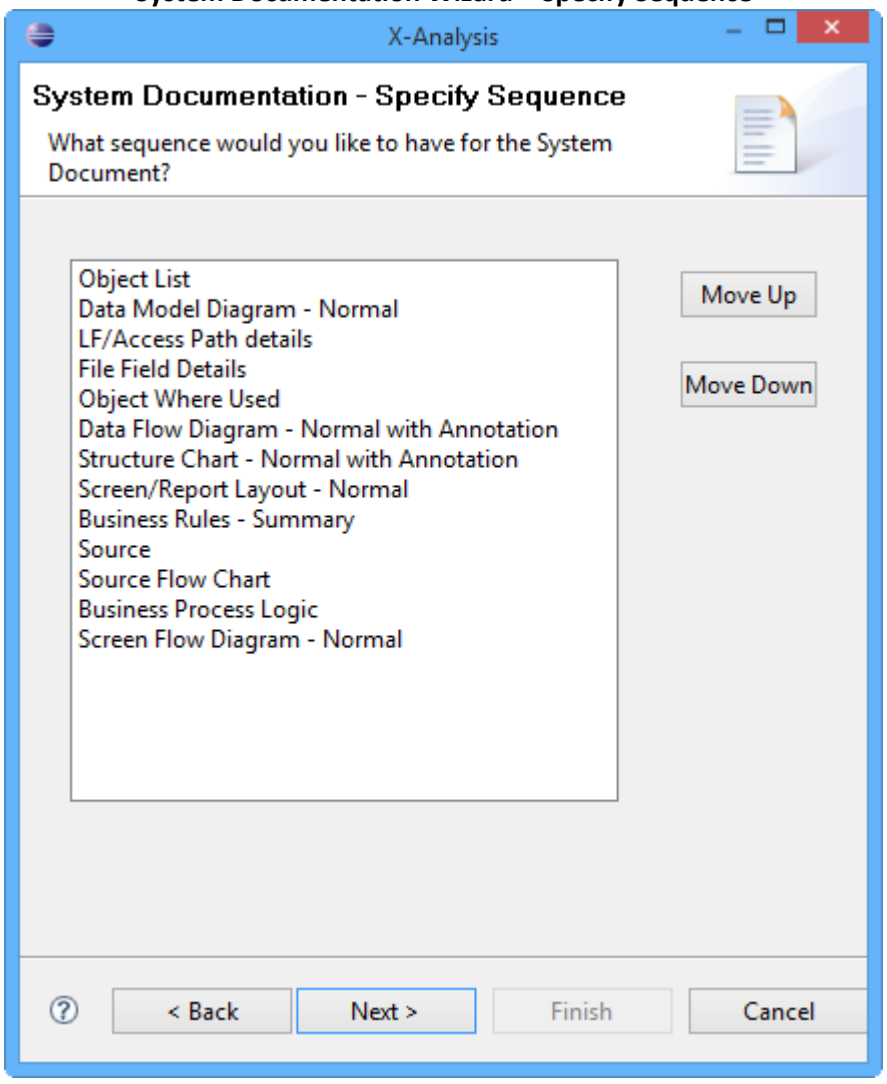
Choose the features or attributes to be included in the System Document as shown in the above screenshot.

Click **Next**.

System Documentation Wizard – Specify Sequence



Confirm the sequence of the selected features and click **Next**.

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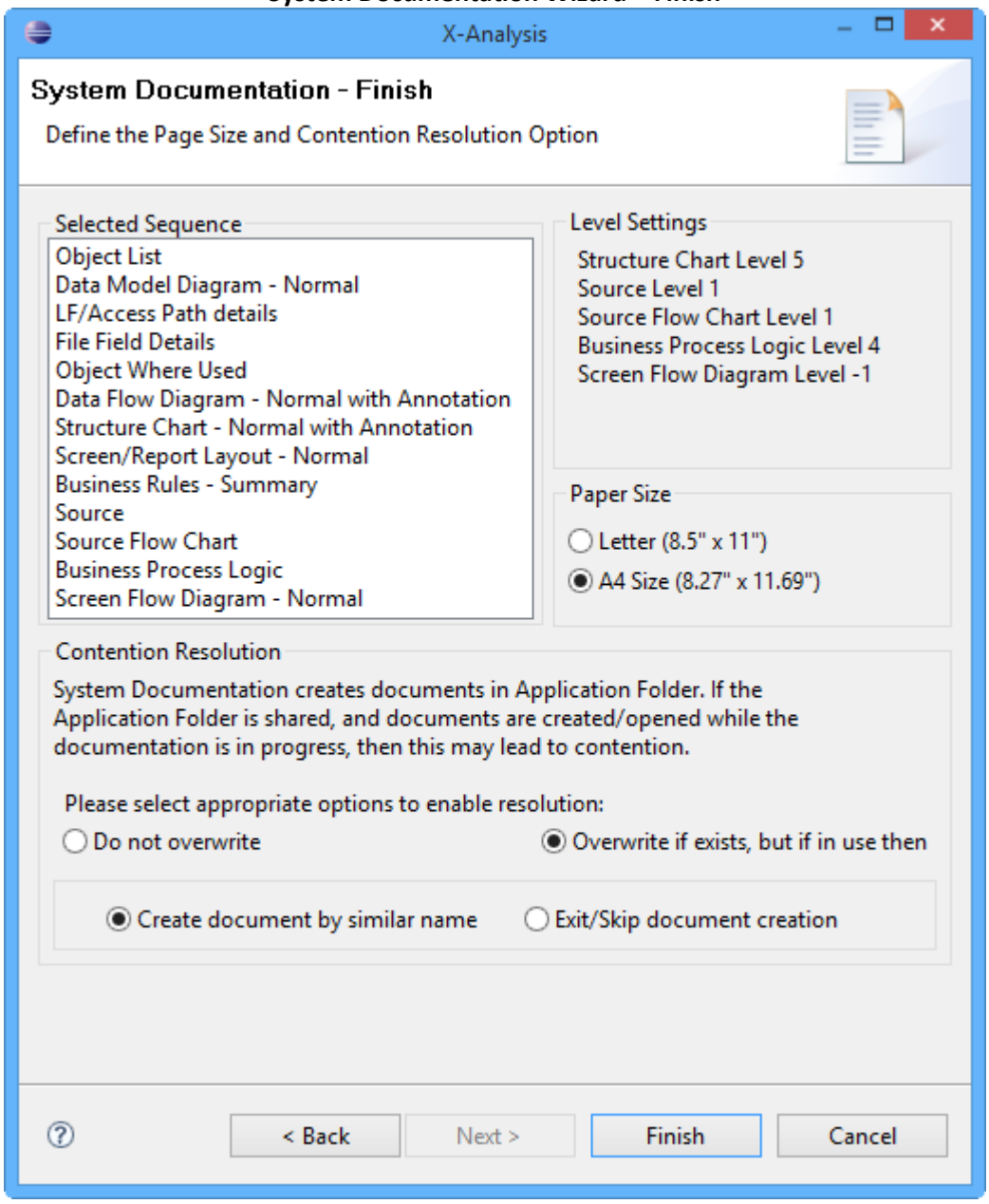
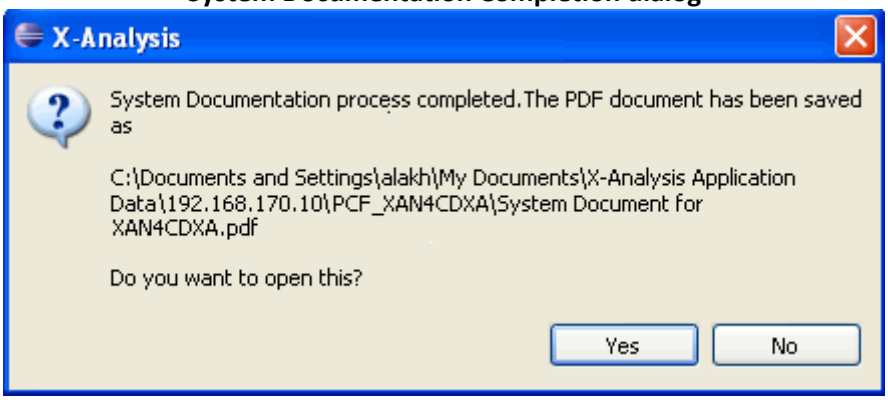
System Documentation Wizard – Finish



Choose the appropriate paper size and contention resolution options. Click **Finish**. This will end the configuration process and start the generation of the document.

After the document generation is complete, the following dialog appears:

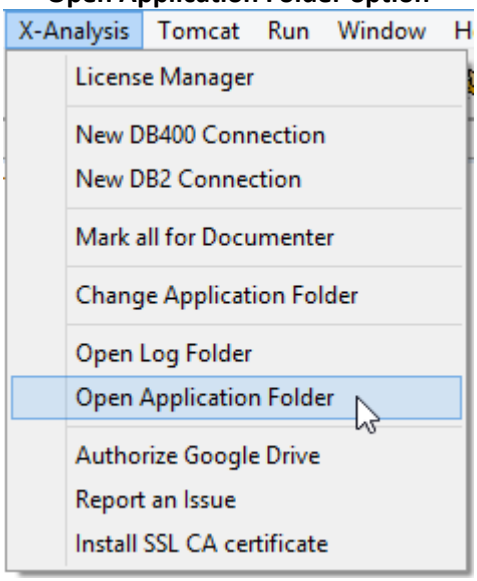
System Documentation Completion dialog



Click **Yes** to open the generated document.

To view a previously generated document, select the **Open Application Folder** option from the X-Analysis menu.

Open Application Folder option



This will open the Application Folder containing the previously generated documents. Double-click on a generated document to open it.

X-Analysis also creates a log file in the Application Folder which logs what the 'Document Generator' does in the process of documenting the selected objects.

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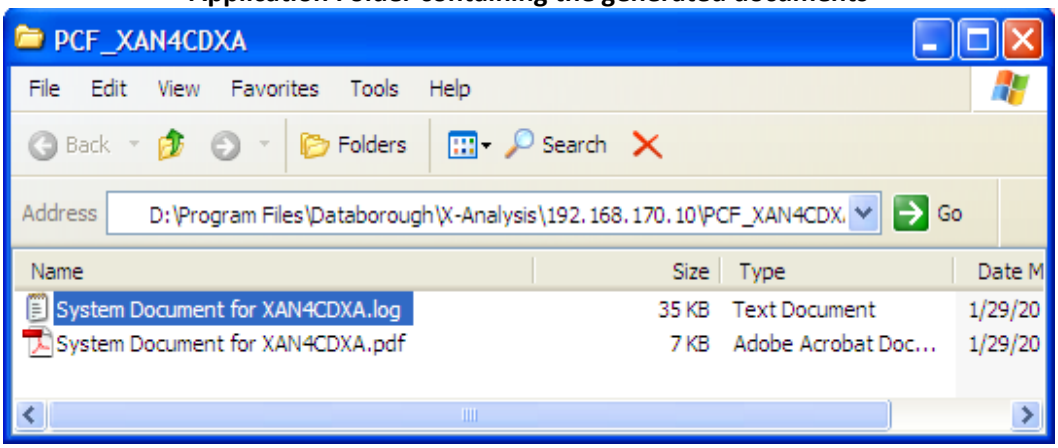
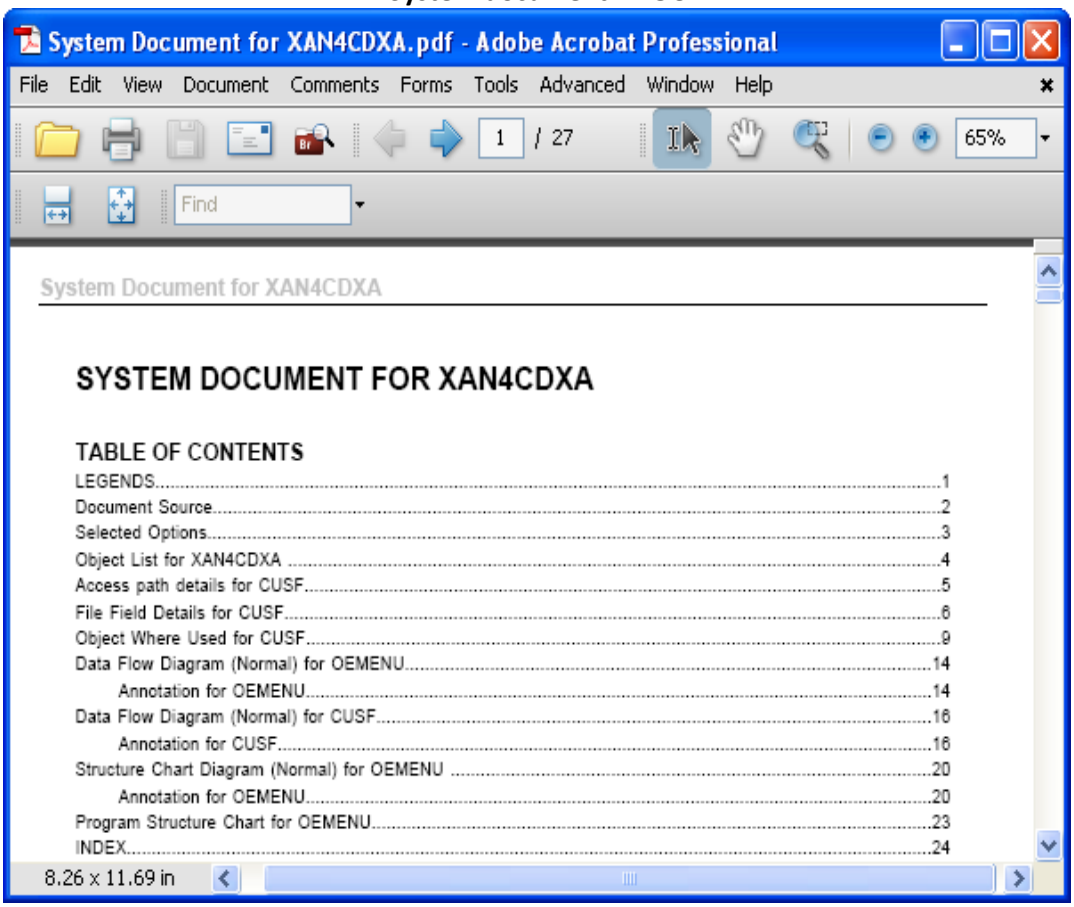
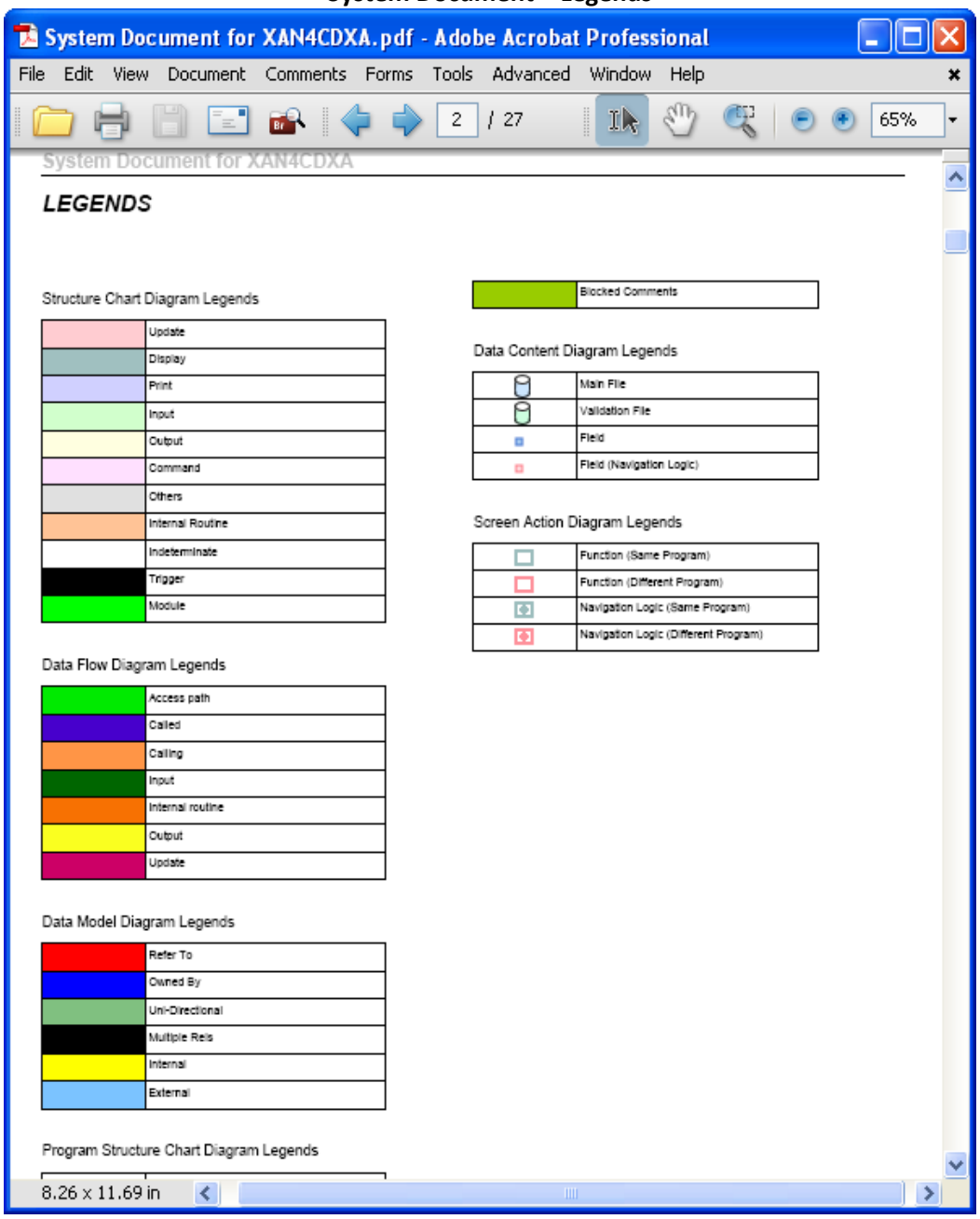
Application Folder containing the generated documents



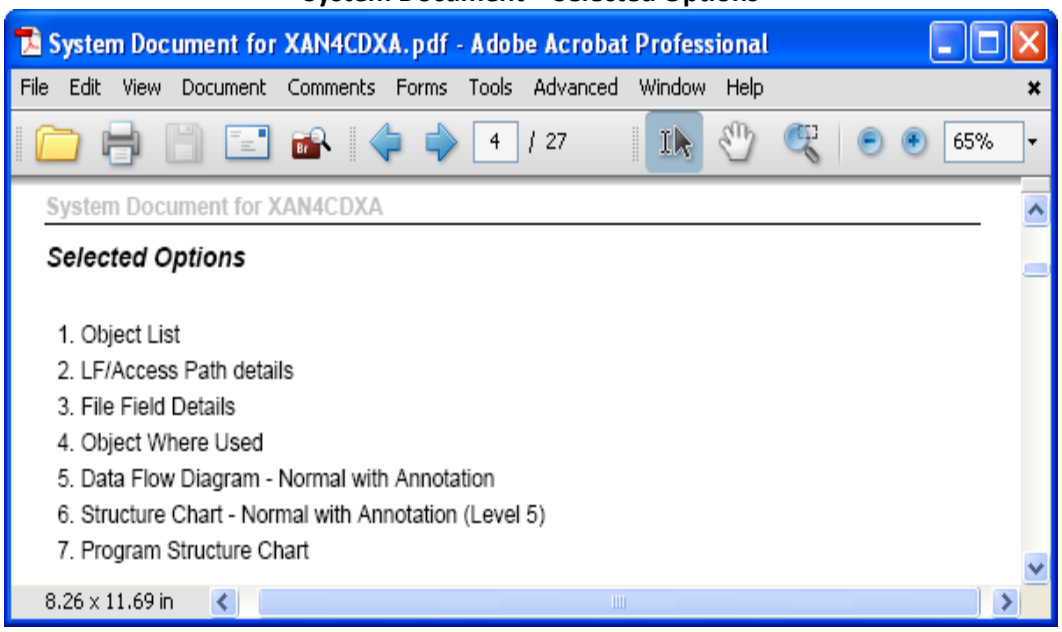
System document – TOC



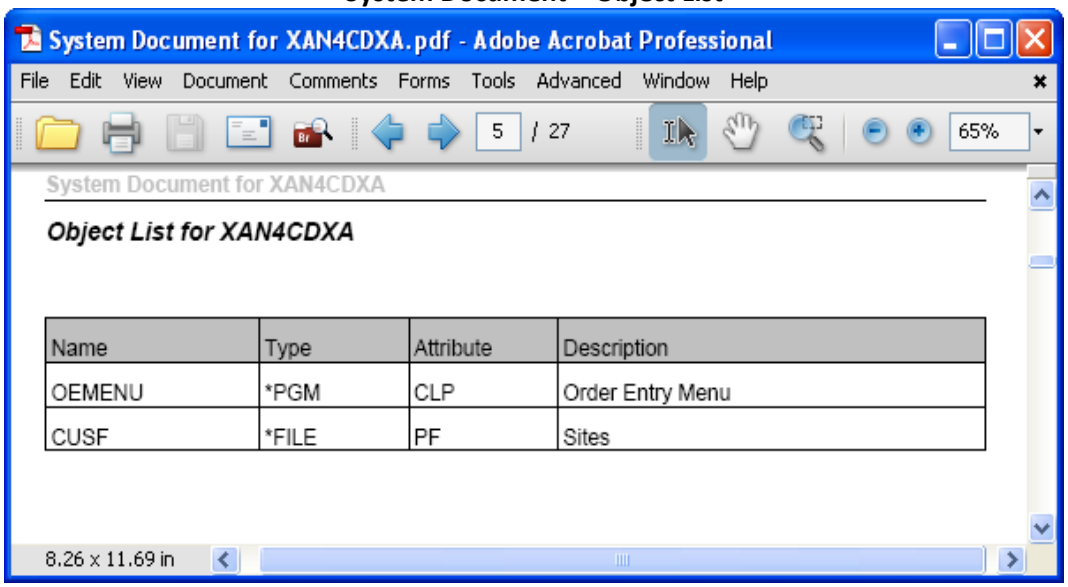
System Document – Legends



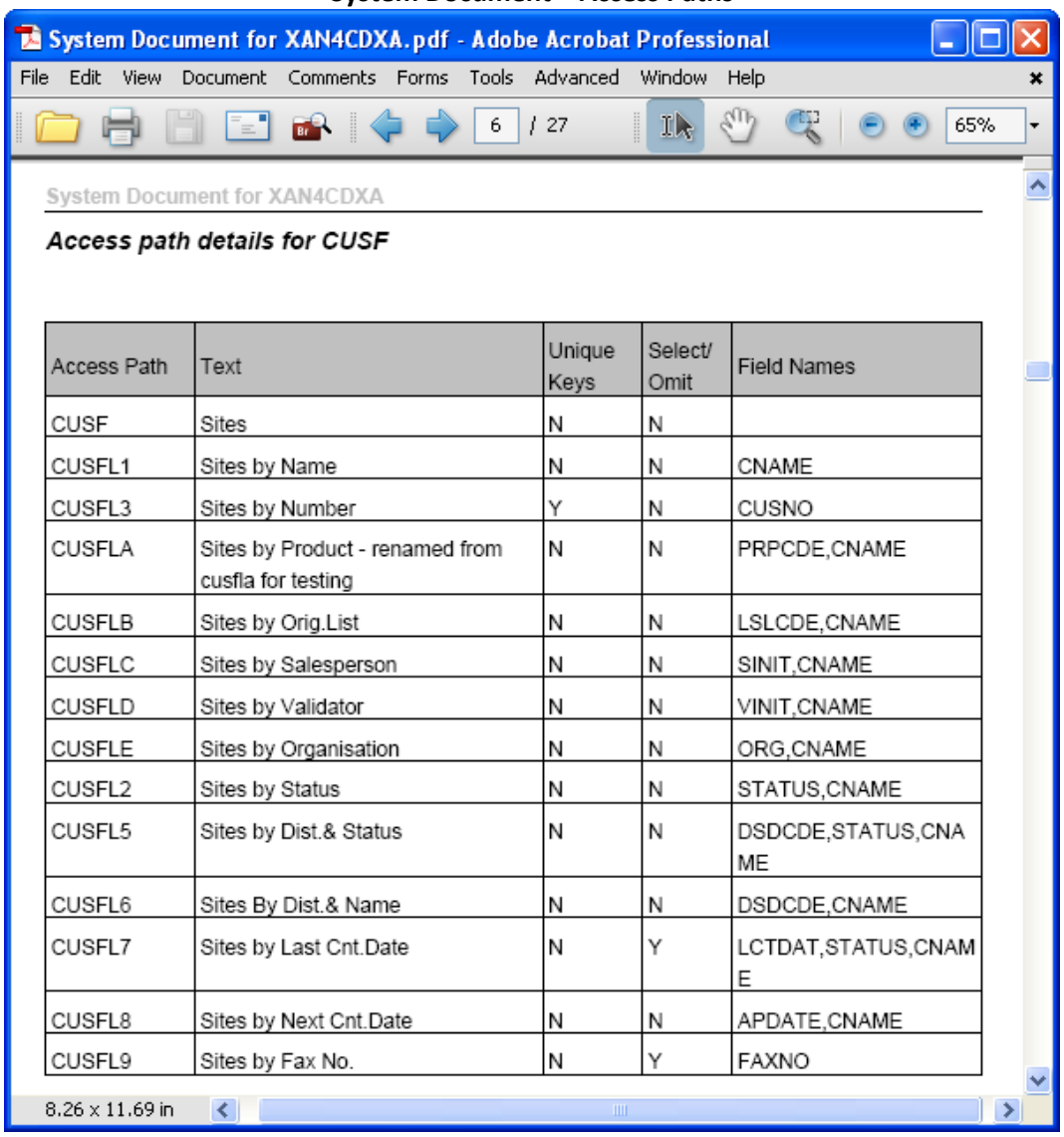
System Document – Selected Options



System Document – Object List

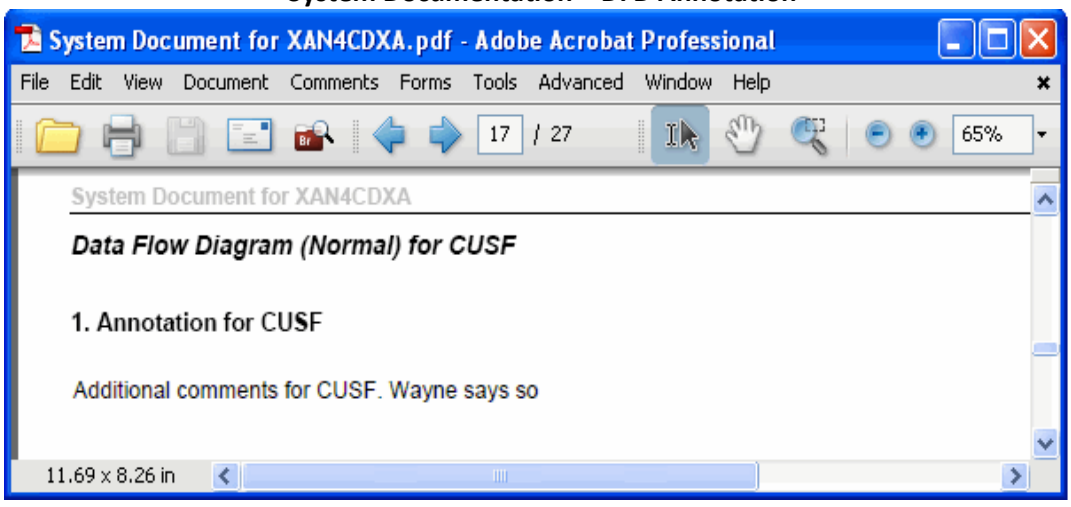


System Document – Access Paths

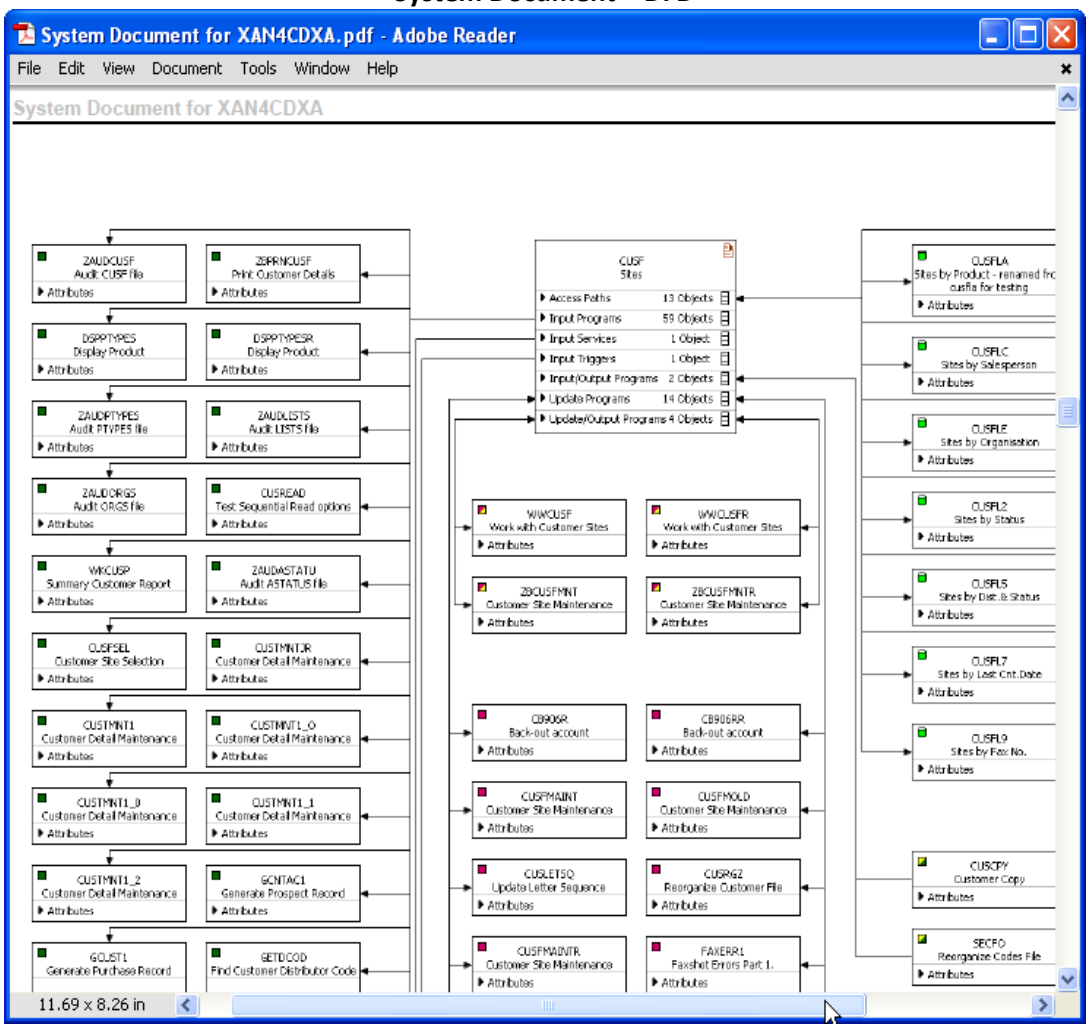


Access Path	Text	Unique Keys	Select/ Omit	Field Names
CUSF	Sites	N	N	
CUSFL1	Sites by Name	N	N	CNAME
CUSFL3	Sites by Number	Y	N	CUSNO
CUSFLA	Sites by Product - renamed from cusfla for testing	N	N	PRPCDE,CNAME
CUSFLB	Sites by Orig.List	N	N	LSLCDE,CNAME
CUSFLC	Sites by Salesperson	N	N	SINIT,CNAME
CUSFLD	Sites by Validator	N	N	VINIT,CNAME
CUSFLE	Sites by Organisation	N	N	ORG,CNAME
CUSFL2	Sites by Status	N	N	STATUS,CNAME
CUSFL5	Sites by Dist.& Status	N	N	DSDCDE,STATUS,CNAME
CUSFL6	Sites By Dist.& Name	N	N	DSDCDE,CNAME
CUSFL7	Sites by Last Cnt.Date	N	Y	LCTDAT,STATUS,CNAME
CUSFL8	Sites by Next Cnt.Date	N	N	APDATE,CNAME
CUSFL9	Sites by Fax No.	N	Y	FAXNO

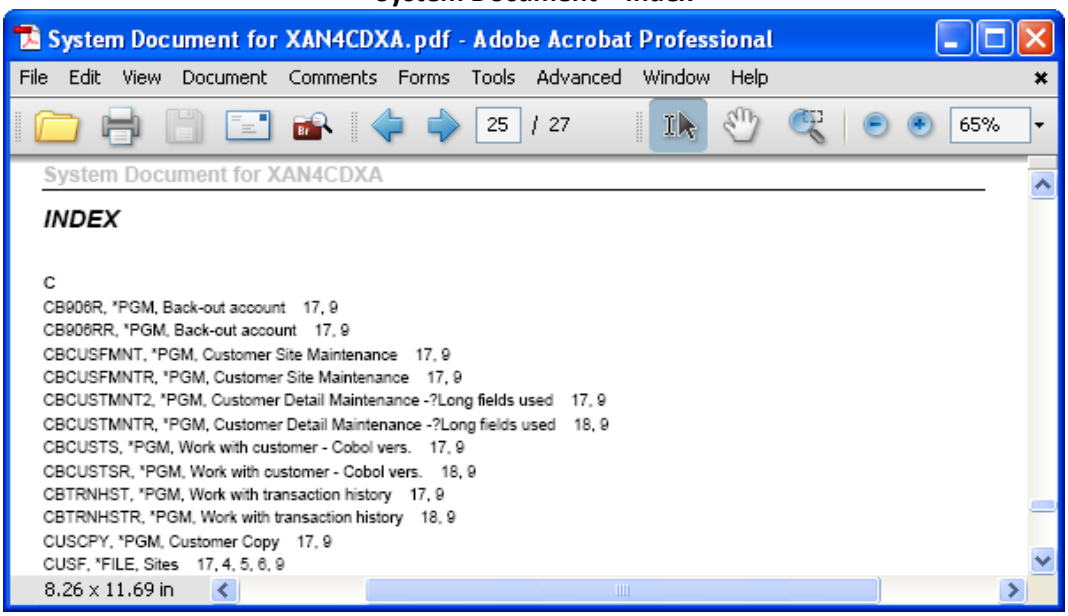
System Documentation – DFD Annotation



System Document – DFD



System Document – Index

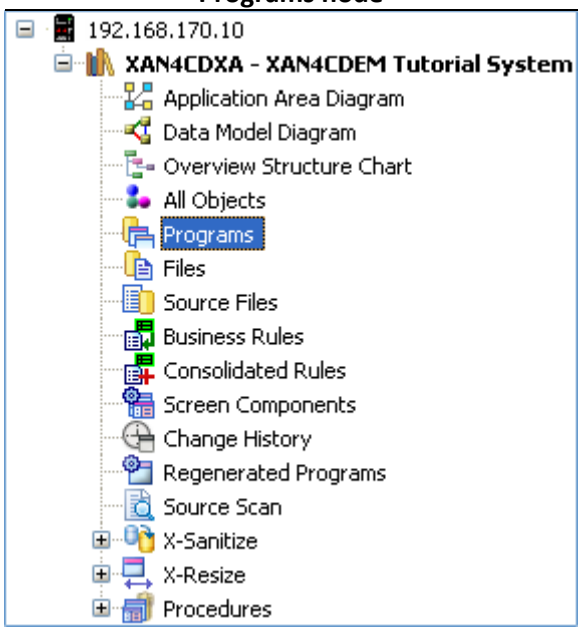


SOURCE BROWSER

The Source Code of the application is the key to the process of analyzing, reviewing, re-factoring, maintaining, or re-developing a system. X-Analysis supports some very advanced features in its Source Browser.

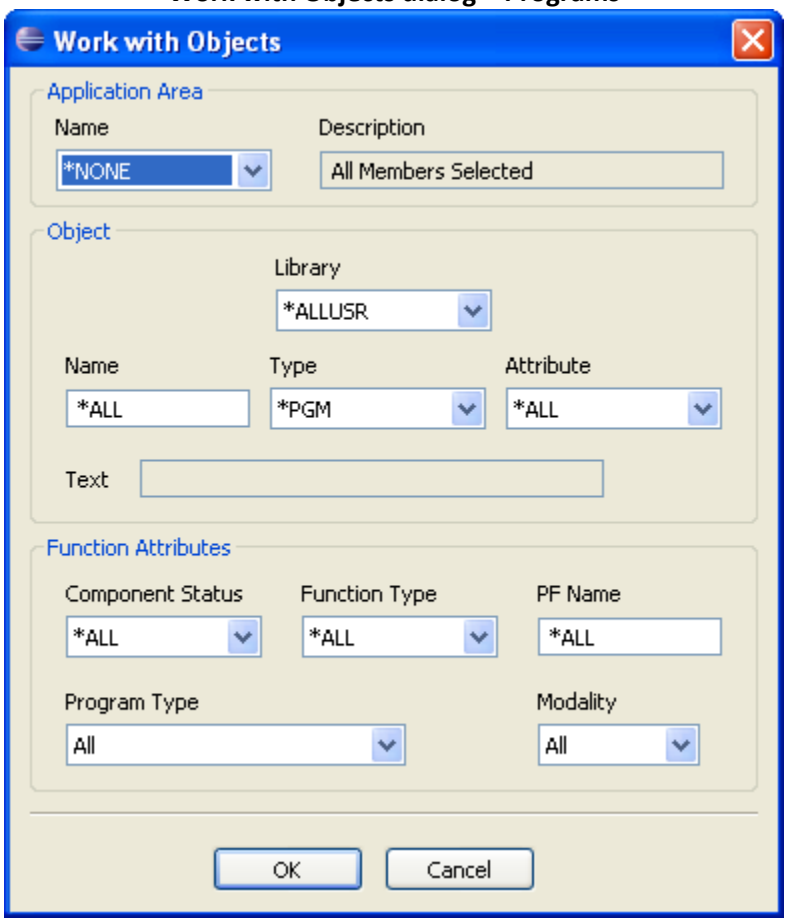
Double-click on the **Programs** node to get the Object List for all programs available in the application library.

Programs node



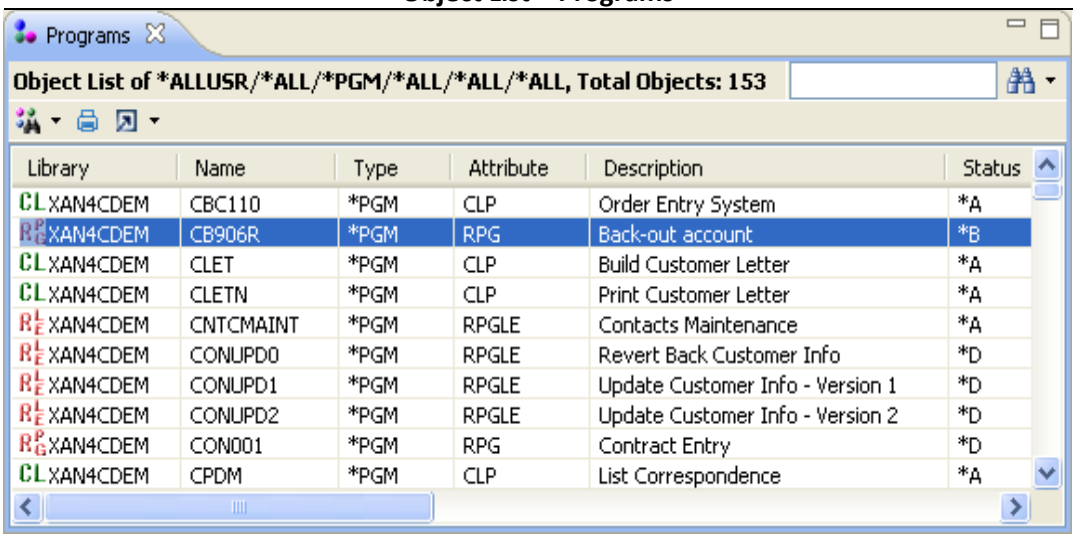
The **Work with Objects** dialog for ***PGM** object type will be invoked.

Work with Objects dialog – Programs



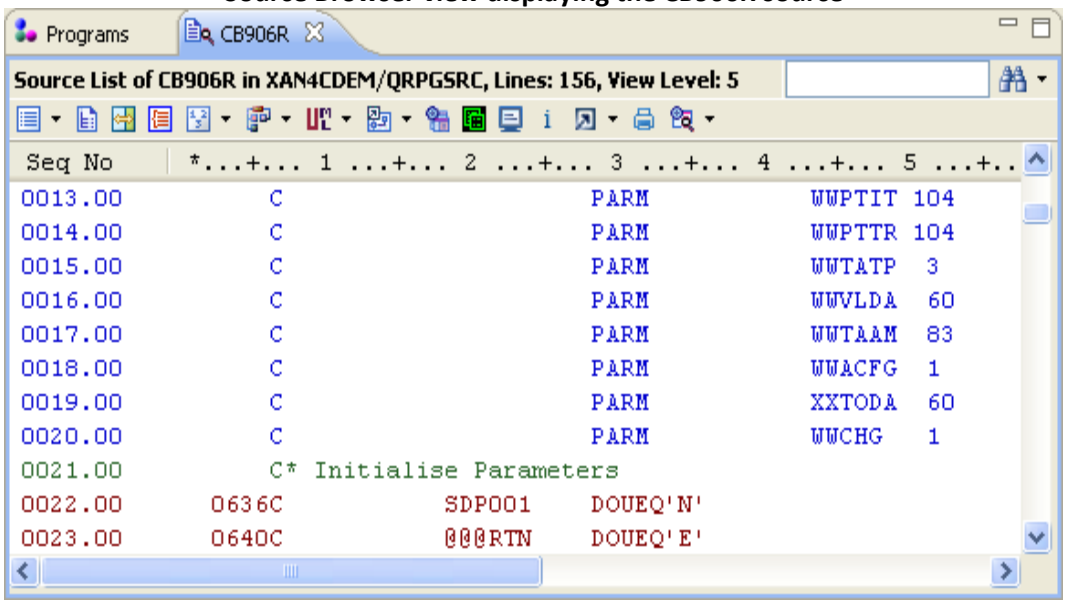
Click **OK** to generate the list of program objects.

Object List – Programs



Double-click the **CB906R** program. This will call its **Source Browser** view.

Source Browser view displaying the CB906R source



SOURCE BROWSER TOOLBAR

The Source Browser toolbar is displayed below:

Source Browser toolbar

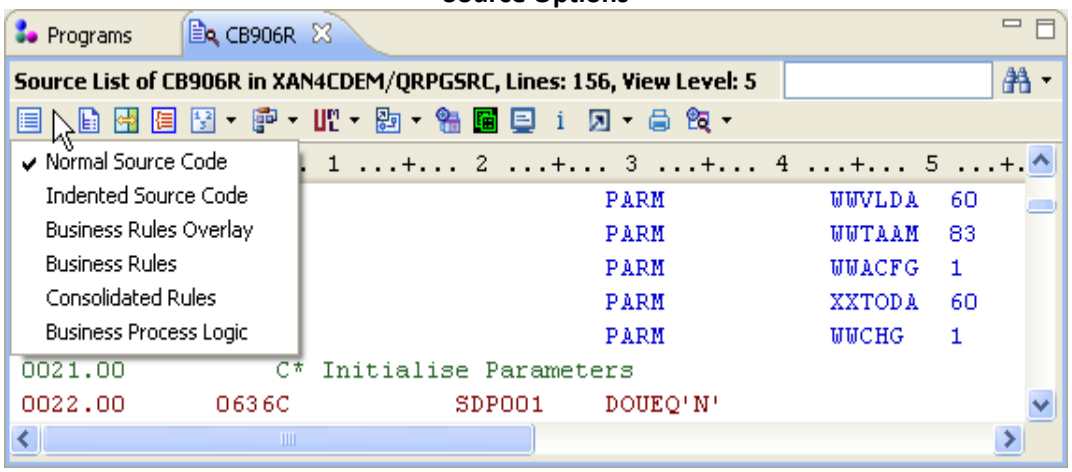
The toolbar consists of the following options:

- Source Options
- Source Outline
- Show Split Panel
- Pseudo Code
- Source Level
- Diagram Options
- Generate UML
- Flowchart
- Screen Components
- Screen/Report Design
- Zoom in Lpex (available on WDSc/RDi only)/SEU option (Set XA Preferences to select the appropriate option)
- More Info
- Export Options
- Print
- View Code

Source Options

Use the **Source Options** menu to view various source modes. The **Normal Source Code** is the default source view.

Source Options

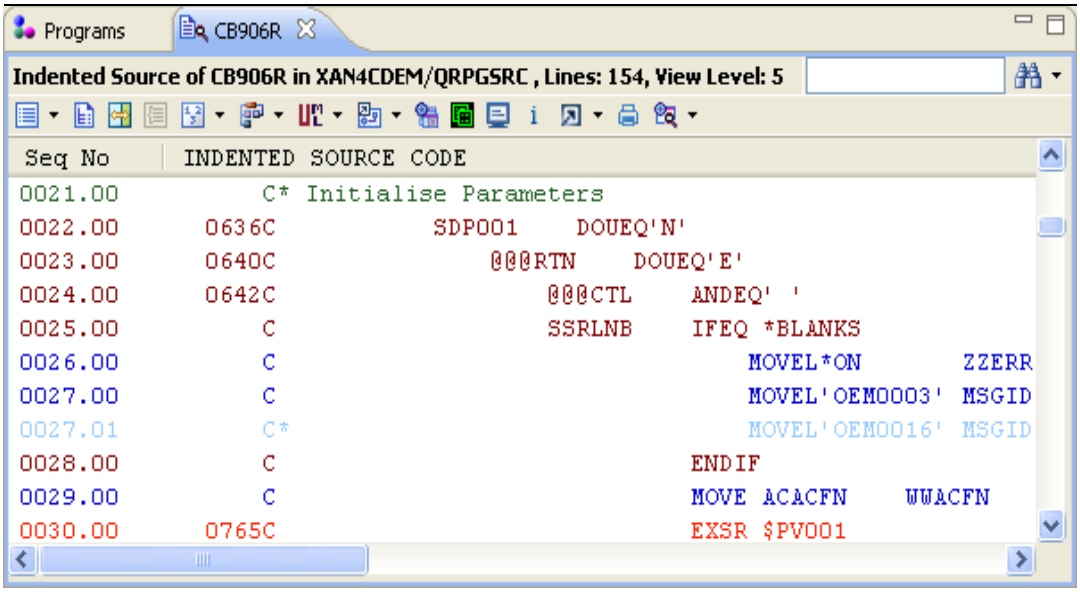


Note: Source Options related to Business Rules will be only available to customers who have purchased the X-Rules module.

Indented Source Code view

Select the **Indented Source Code** option from the **Source Options** menu. This displays the Indented Source Code view.

Indented Source Code

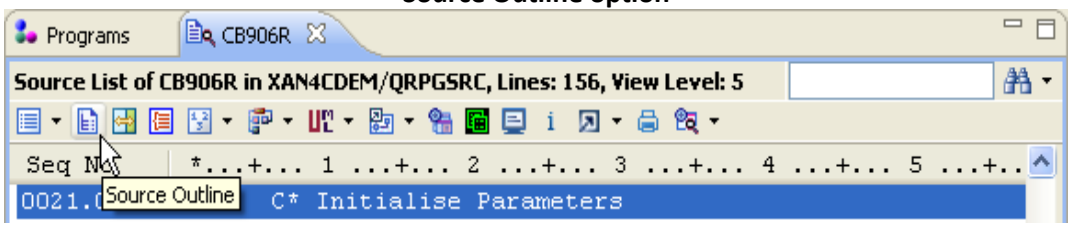


Select the **Normal Source Code** option to return to the normal source code view.

Source Outline

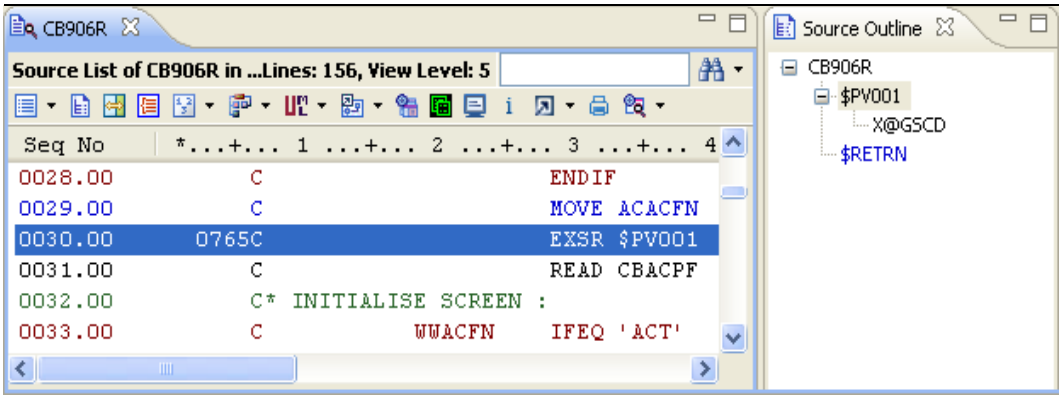
The **Source Outline** option displays an outline of the source member. This view lists all the subroutines available in the code.

Source Outline option



Double-click on any of the listed subroutines. This positions the cursor on the subroutine inside the source browser.

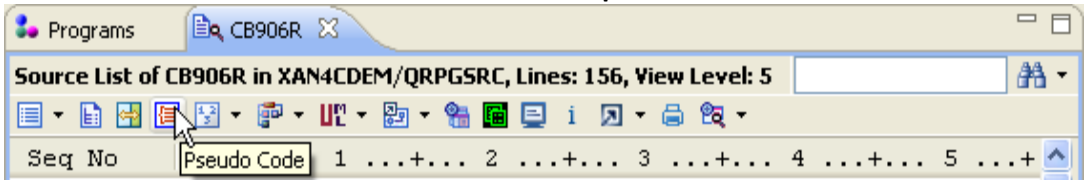
Source Outline view of CB906R



Pseudo Code

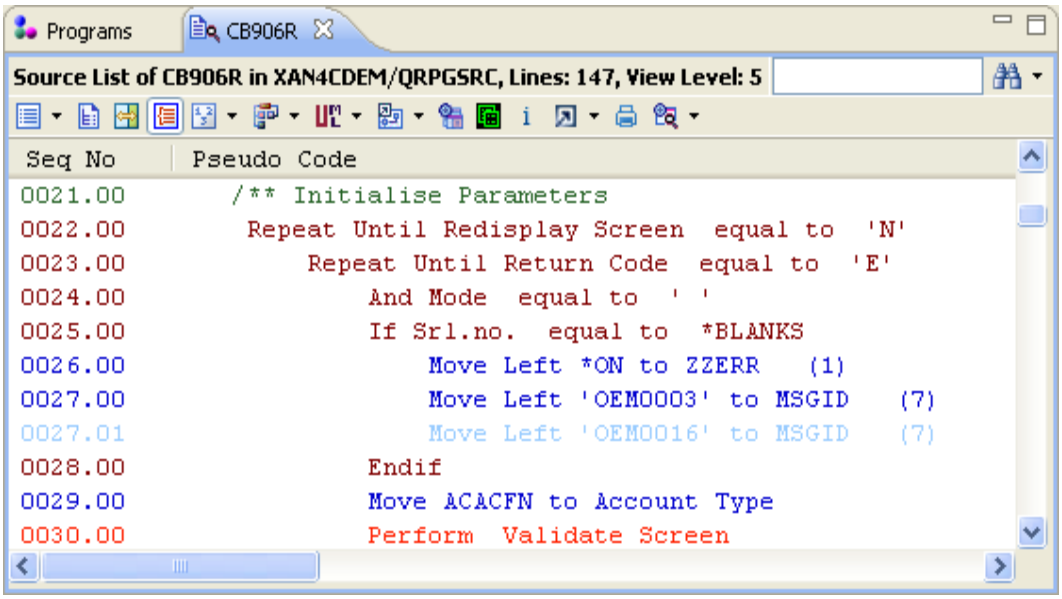
The Pseudo Code (or the structured English view) is meant to help a non-technical user understand the code in a better manner. Click the **Pseudo Code** option on the toolbar.

Pseudo Code option



This invokes the Pseudo Code view.

Pseudo Code window

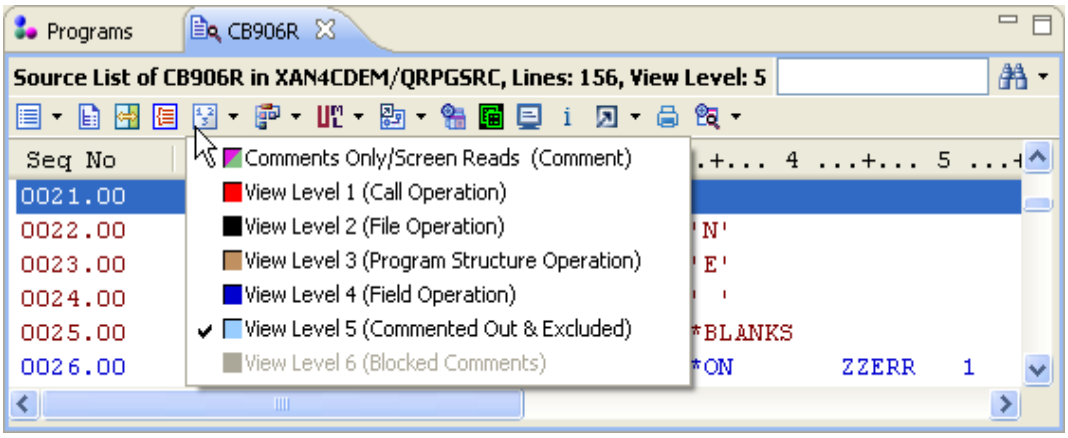


The **Pseudo Code** icon has a behavior toggle. Click it again to return to the Normal Source Code.

Source Level

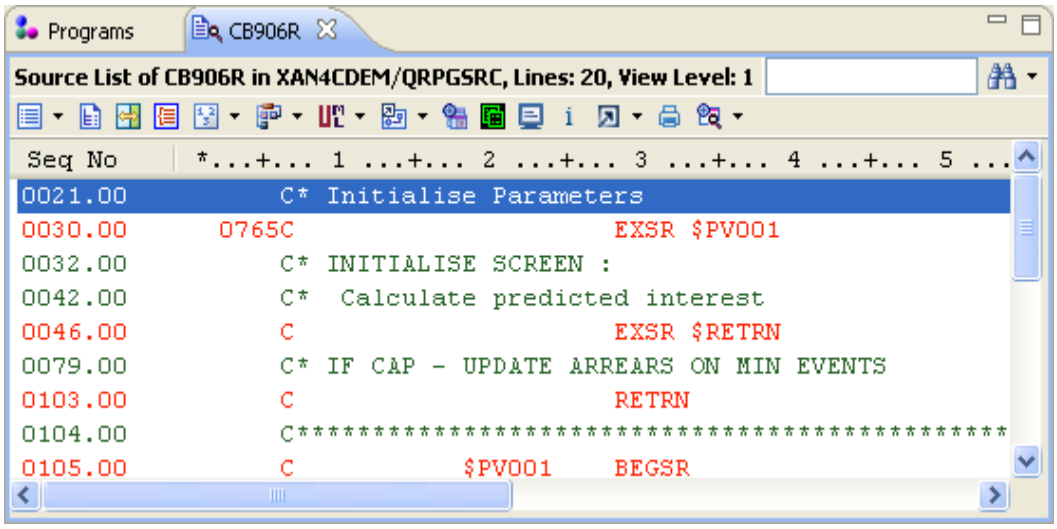
The **Source Level** icon is to access different view levels to view specific type of source lines. It enhances the understanding of the code. The default source level is '5'.

Source Levels



For instance, if you switch the source level to **View Level 1**, it restricts the Source List from displaying comments and only allows for call operations.

Source List at View Level 1

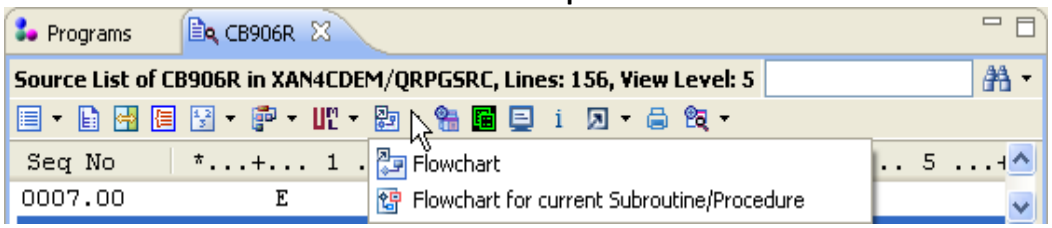


- **View Level 2** includes **File Operations**.
- **View Level 3** includes **Program Structure Operations**.
- **View Level 4** includes **Field Operation**.
- **View Level 5** includes the **Commented Out & Excluded** codes.

Flowchart

One way to view a program source code is to check the execution model of that program through the Data Flowchart. Select the **Flowchart** option from the source browser.

Flowchart option



This generates the program flowchart in MS Visio, as shown in the following page.

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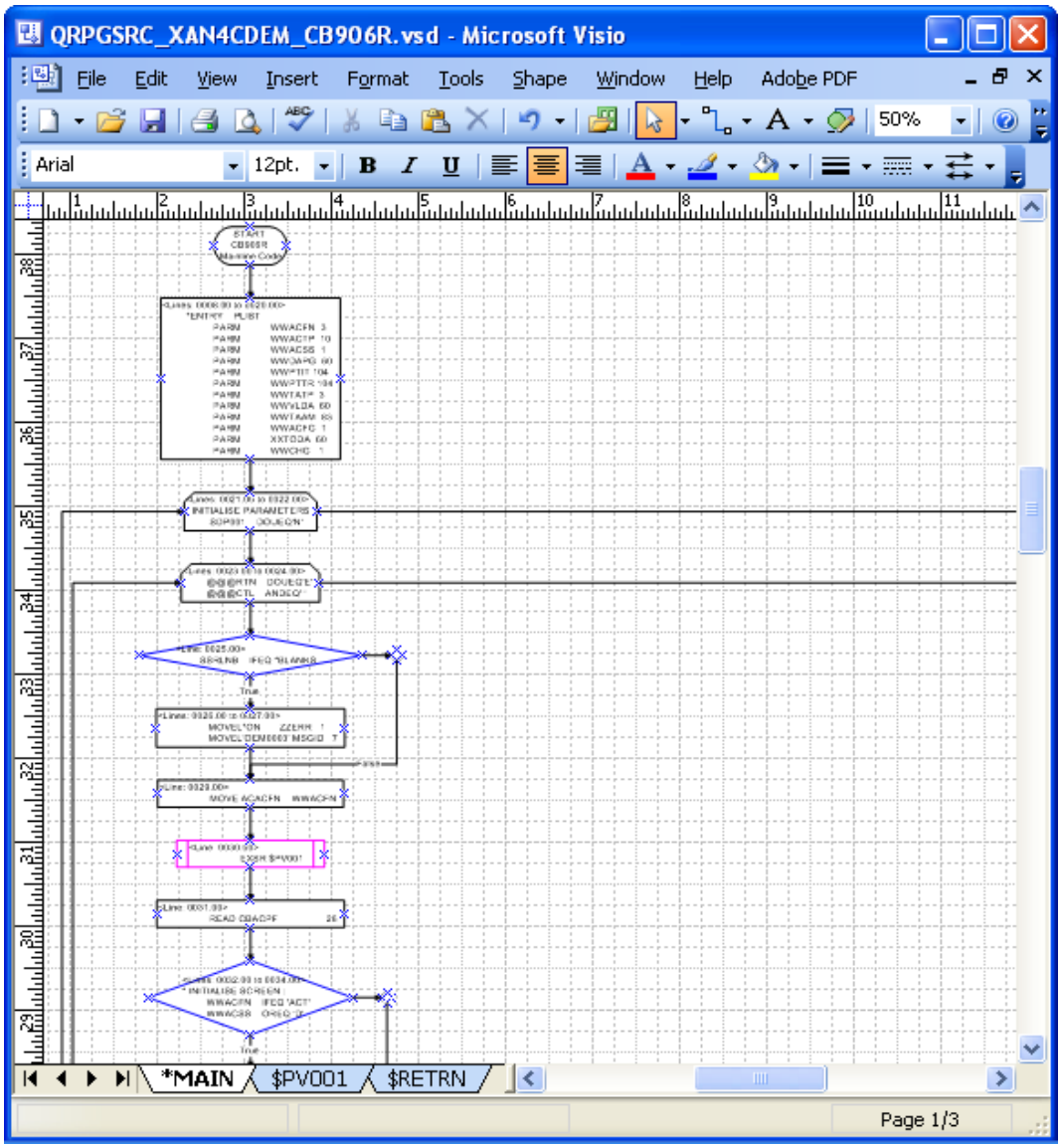
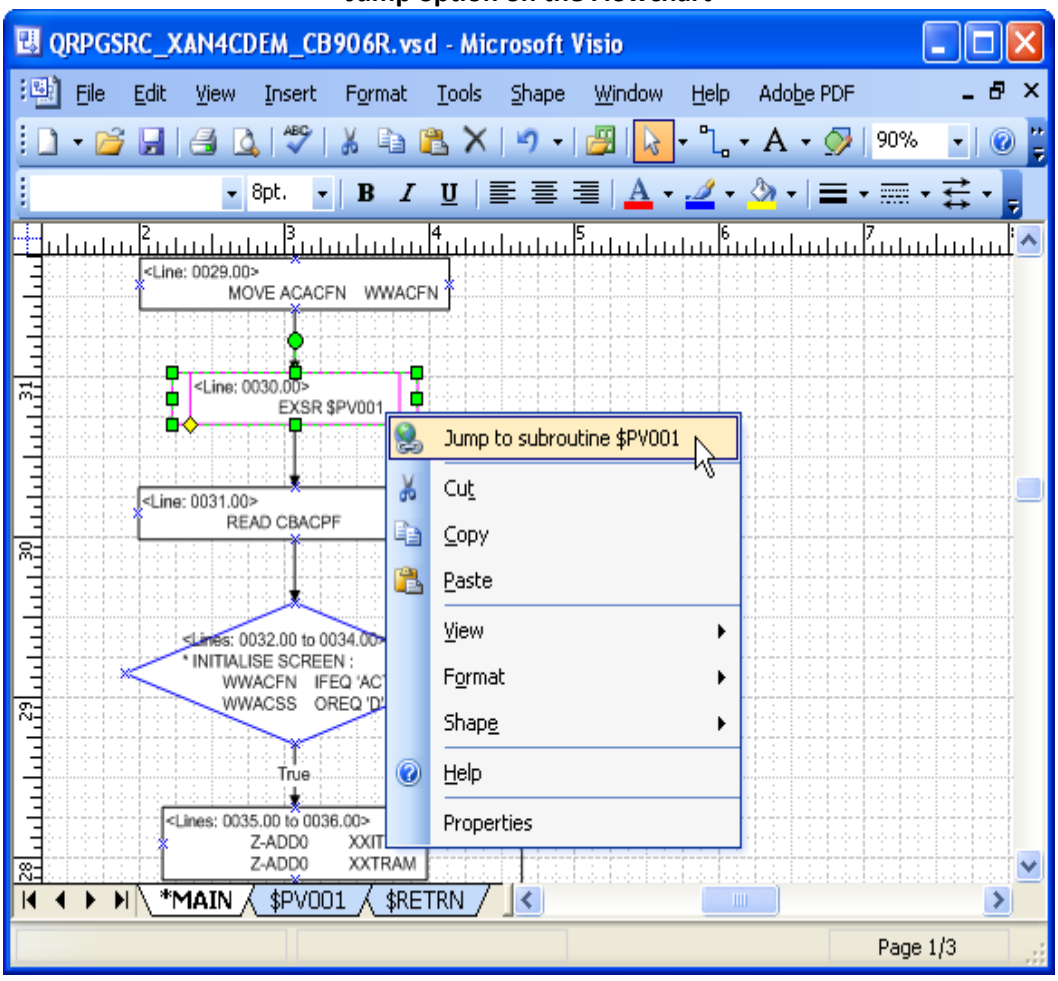
Flowchart in MS Visio



Note that the **Flowchart** option creates an individual flowchart for each subroutine. The first page of the flowchart displays the processing for the Main Procedure. From the Main Procedure, you can jump to any of the subroutines available in the program.

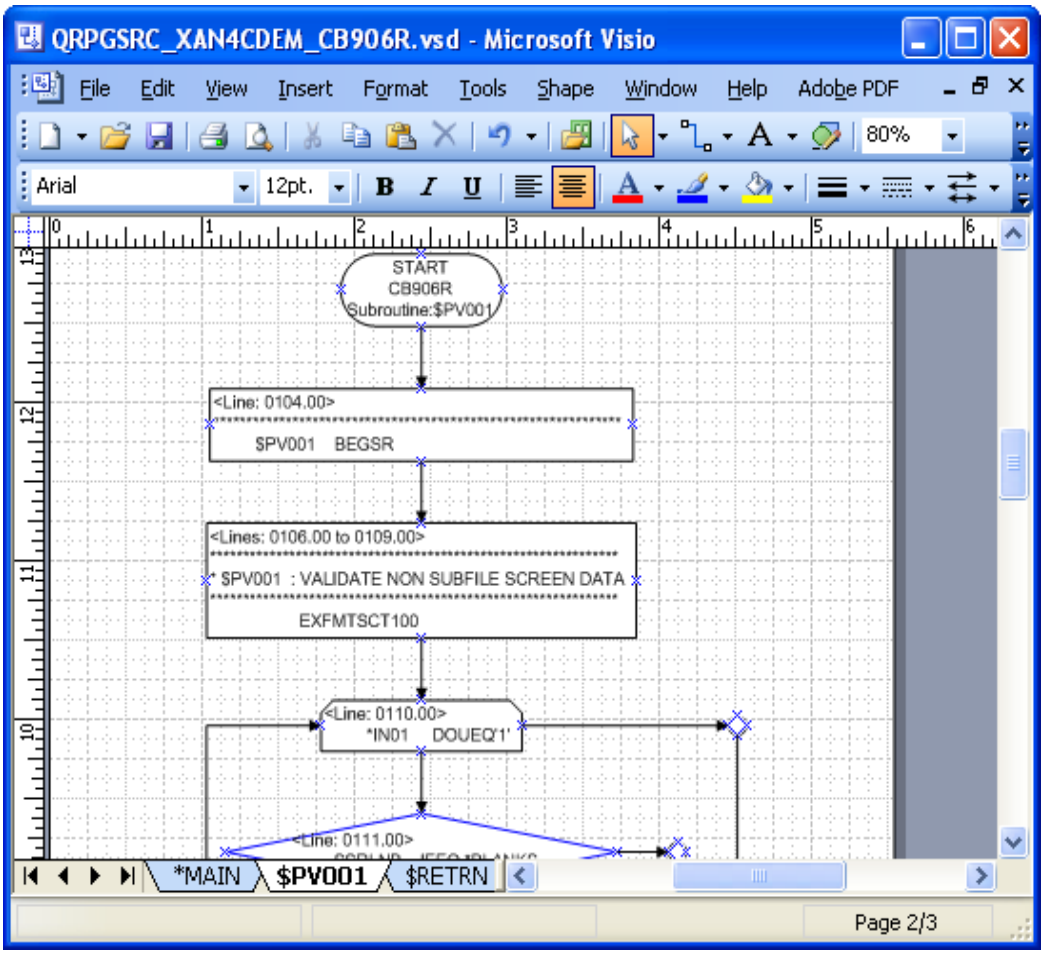
Jump option on the Flowchart



As shown above, click the **Jump to subroutine $PV001** option to switch to the flowchart for the subroutine **$PV001**.

The related screenshot is shown on the following page.

Subroutine Flowchart

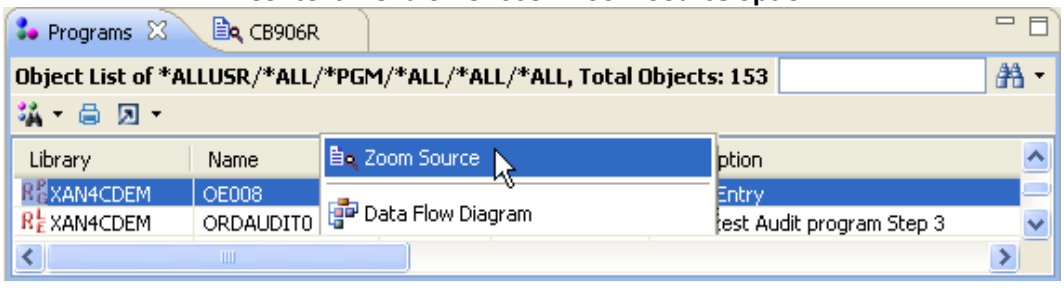


Other Options on the Source Browser

There are several other options available on the source browser toolbar. To understand these, open the source browser for the program, **OE008**.

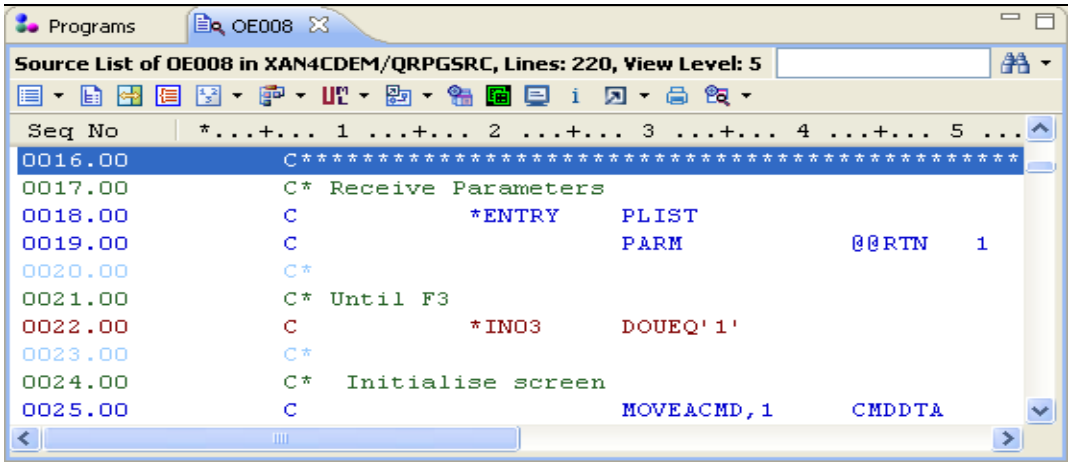
Locate and select **OE008** from the Object List. Bring up its context menu by right-clicking, and then choose the **Zoom Source** option from it.

Context menu on OE008 – Zoom Source option



This brings up the Source Browser.

Source Browser for OE008

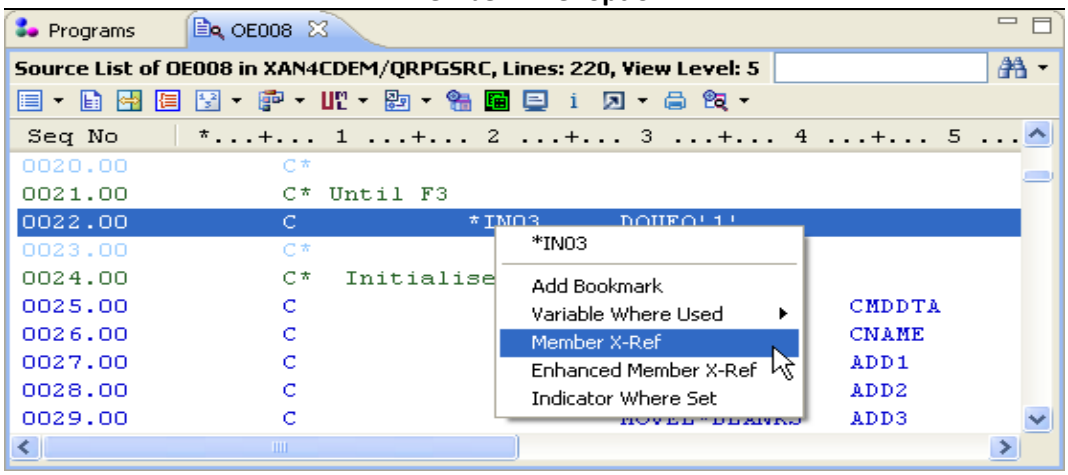


Other important options available on the source browser are:

Member X-Reference

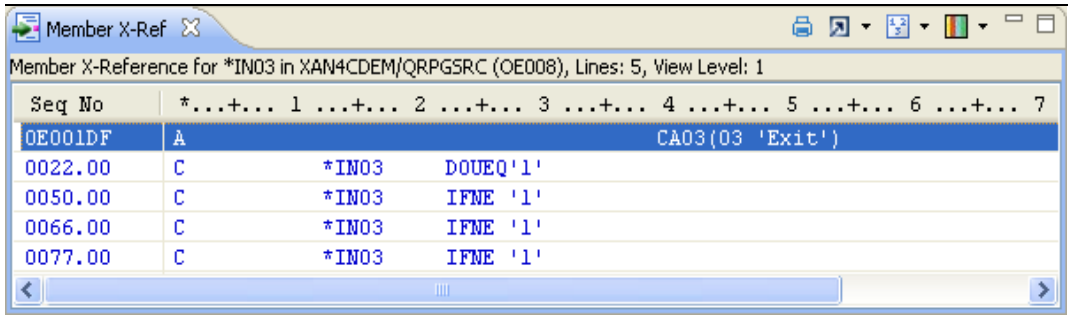
On the source browser for **OE008**, select the line number **0022.00** with indicator ***IN03**. Right-click for the context menu on ***IN03**, and select the **Member X-Ref** option.

Member X-Ref option



This displays the Member X-Ref view for the selected variable, ***IN03**. The Member X-Ref view lists all source lines where the selected Field/Variable has been used/referenced.

Member X-Ref window



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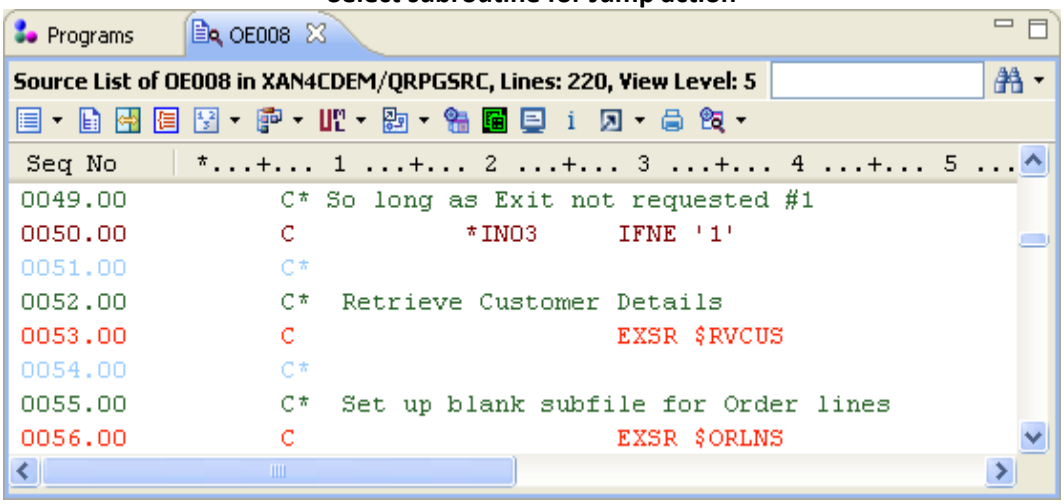
Jump to Subroutine

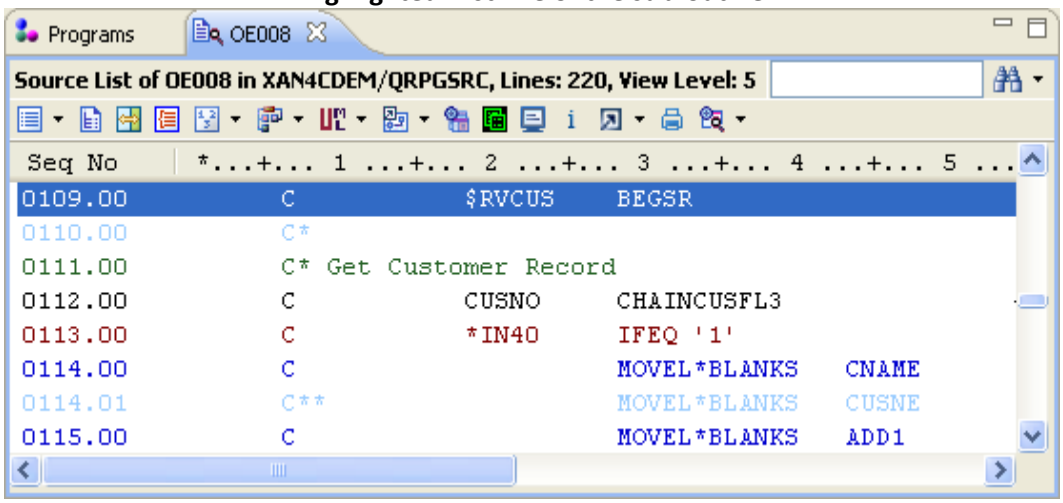
Through the source browser, you can jump to a subroutine. Double-click on one of the subroutines in the source browser for **OE008**.

Select subroutine for Jump action



Double-click on **$RVCUS** to position the cursor at the beginning of the subroutine, $RVCUS.

Highlighted first line of the subroutine



Click the back navigation arrow to return to the line where the **$RVCUS** subroutine is called.

Program Structure Chart

The **Program Structure Chart** option provides a different way of looking at the program structure.

A PSC graphically displays the sequence of calls in the program. Click the option from the **Diagram Options** dropdown menu on the Source Browser toolbar.

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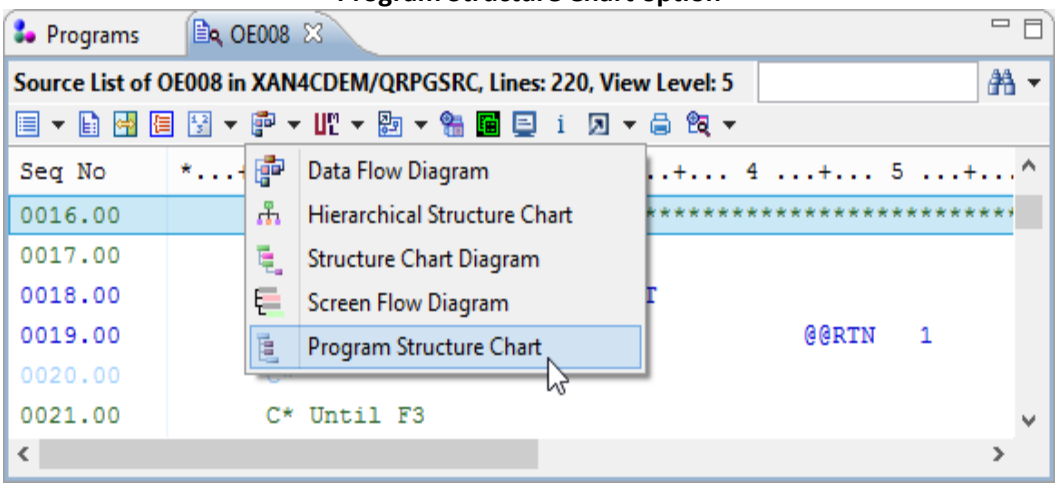
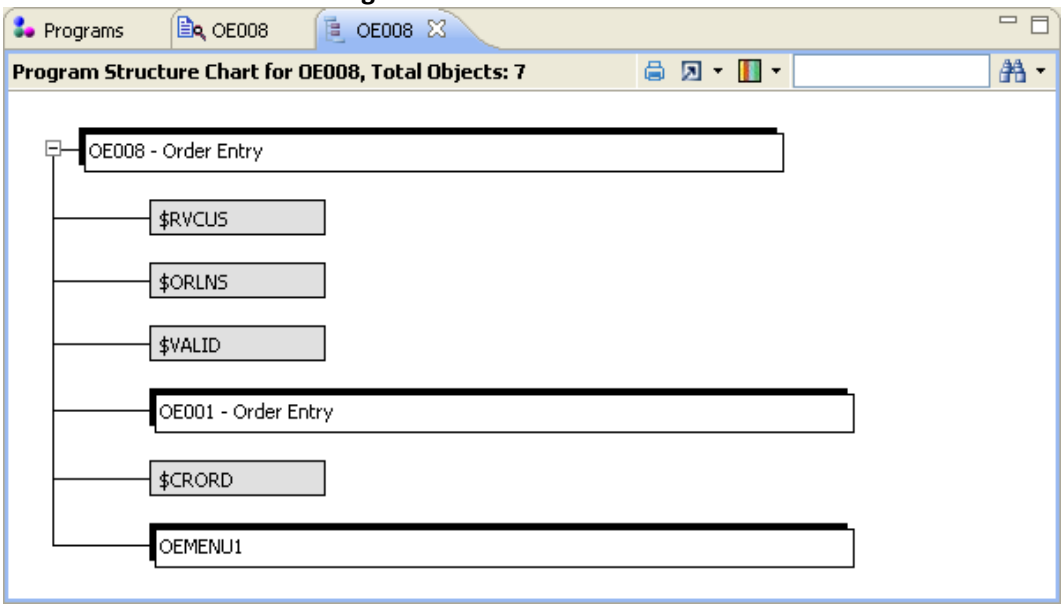
Program Structure Chart option



When this option is selected, a diagram appears displaying the PSC for that program.

Program Structure Chart for OE008



The PSC presents each subroutine as a small grey rectangle displaying the name of each subroutine. The object type i.e. the Function Type determines the coloring of all other shapes, Programs, Modules, and Service Programs.

(Boxes, other than the subroutines, are the same size of a program element as used in the Structure Chart Diagram).

On the PSC, double-click on a subroutine. This initiates the Source Browser for the **OE008** program with the particular subroutine selected.

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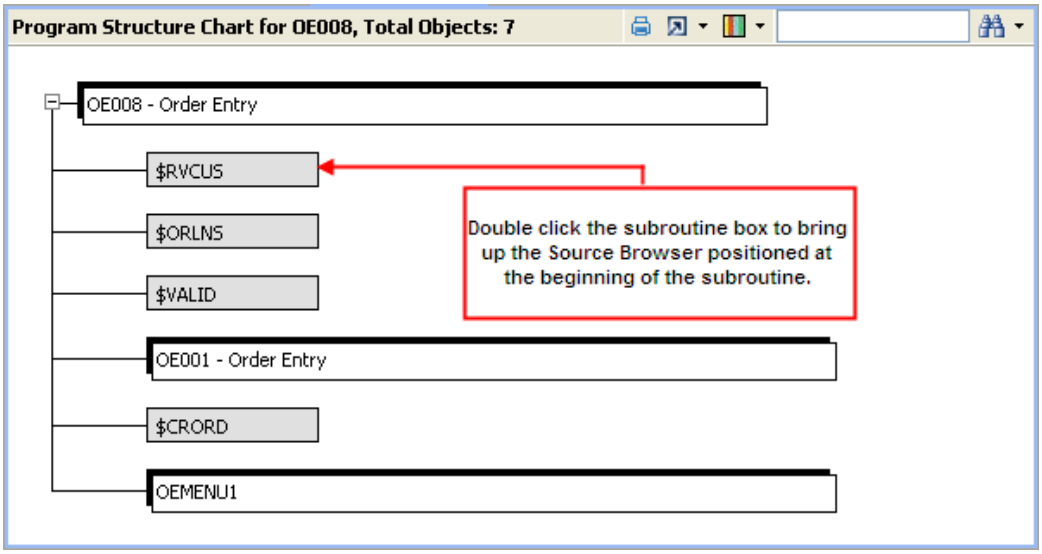
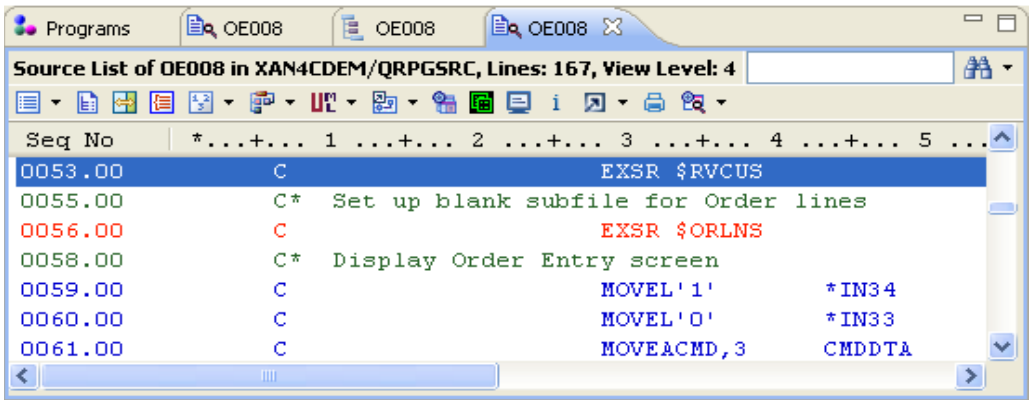
PSC with the selected subroutine



The source browser for **OE008** with the selected $RVCUS subroutine is shown below:

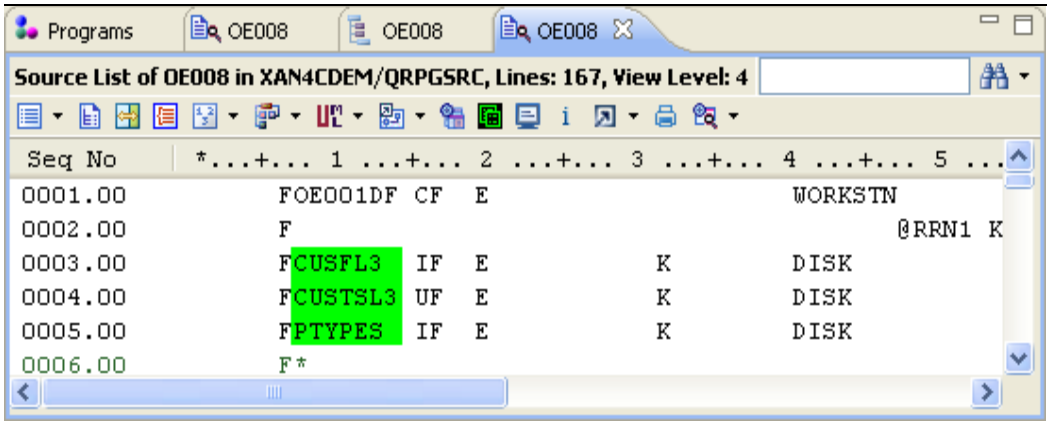
Source Browser for OE008 with the selected subroutine



Zoom Source to Files defined in File Specification

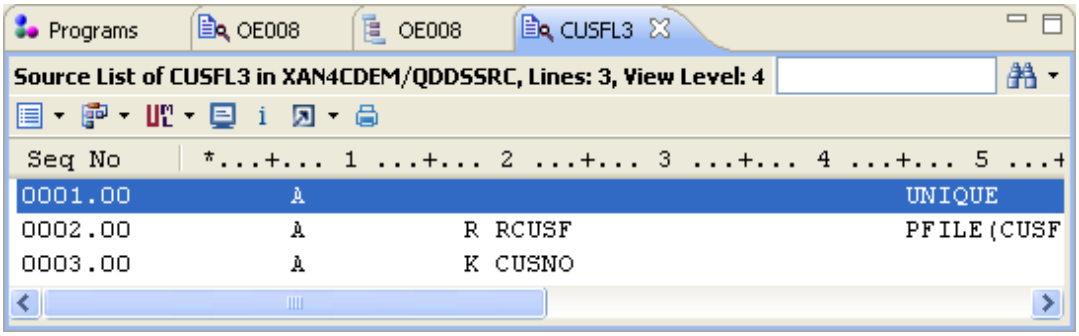
The selected program OE008 has files defined in the File Specification.

Files listed in OE008 source



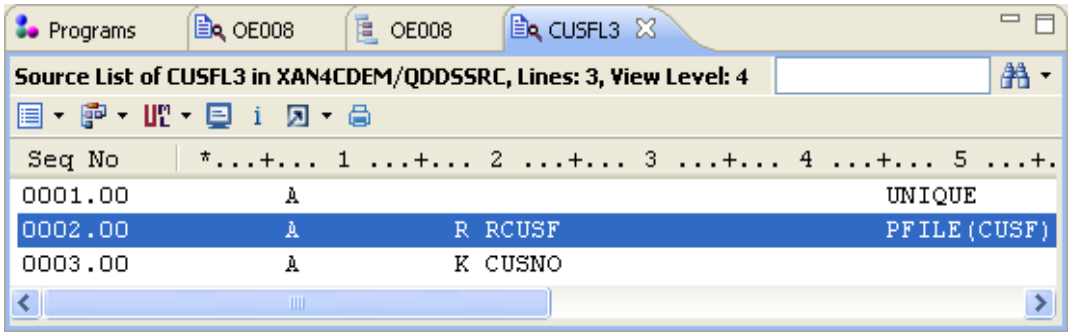
Browse the source codes of the associated files by double-clicking on them. Alternatively, select any file from the source browser and opt for the **Zoom Source** option from the context menu. In this case **CUSFL3** is selected.

Source Browser for CUSFL3



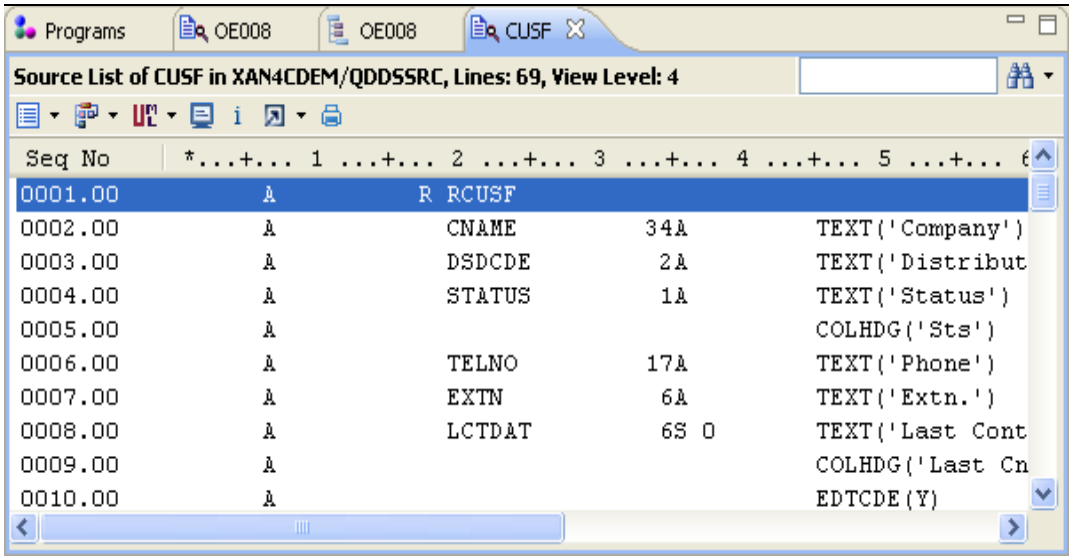
Further drill down to the source code of the associated PFILE (CUSF) of the LF, CUSFL3.

PFILE selected on the Source Browser for CUSFL3



Double-click on **CUSF** to invoke the Source Browser for it.

Source Browser for CUSF



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The Source Browser display helps to navigate and drill down to various related features, thus, facilitating the overall browsing and understanding of the application.

Bring up the **OE008** source browser to become familiar with some more features.

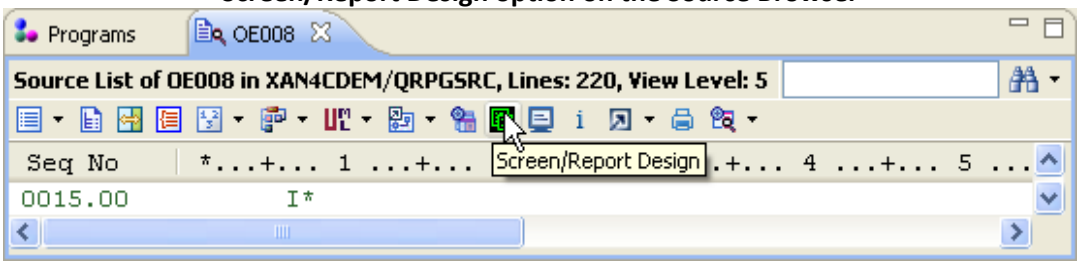
Screen/Report Design

Most of the application programs interact either with the display files (DSPFs) or the printer files (PRTFs). The Source Browser provides a feature to view layout of the associated display/printer files.

This feature does not require the execution of an actual program.

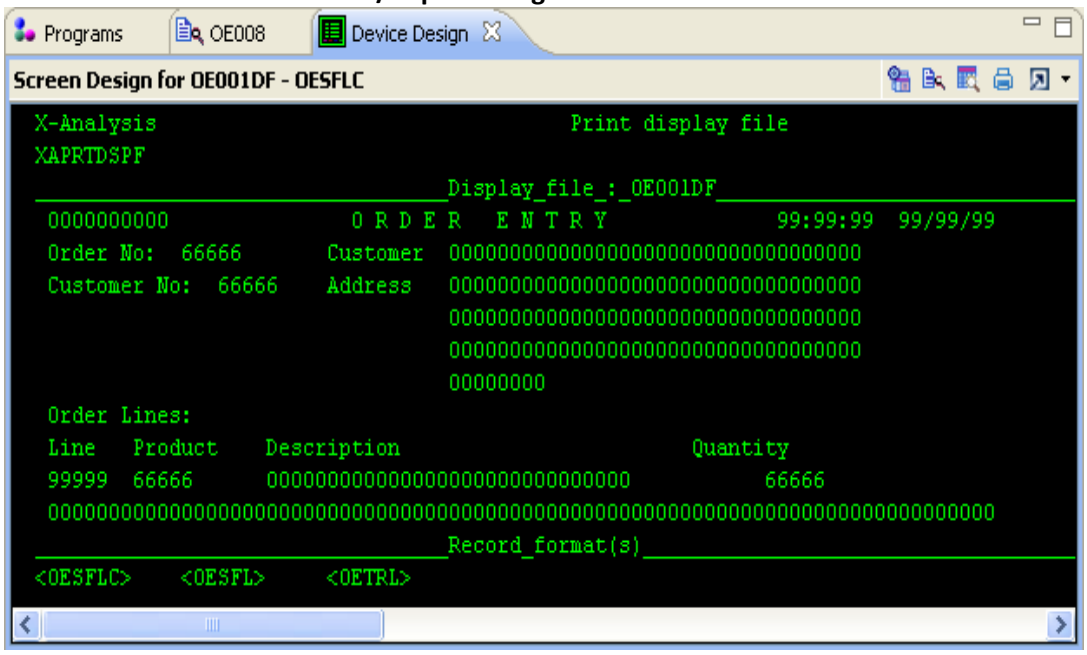
Click the **Screen/Report Design** icon available on the Source Browser.

Screen/Report Design option on the Source Browser



This brings up the Screen/Report Design window for the **OE008** program.

Screen/Report Design window for OE008



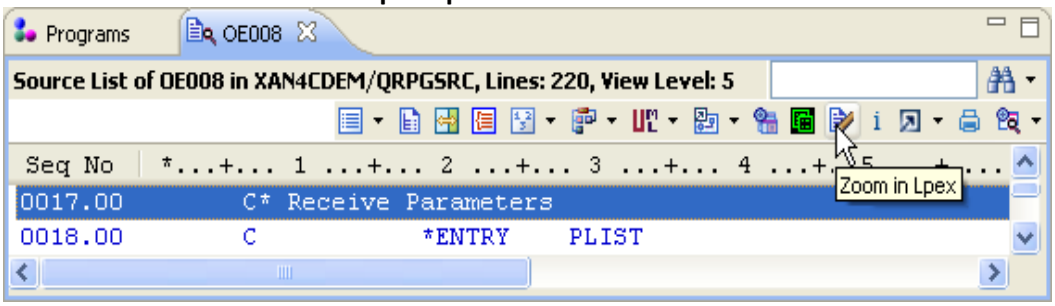
Navigate back to the Source Browser for **OE008** using the back navigation arrow.

Zoom in SEU/Lpex Editor

Lpex Editor

Make changes to the source code using the **Zoom in Lpex** option. Click the **Zoom in Lpex** icon available on the Source Browser toolbar.

Zoom in Lpex option on the Source Browser

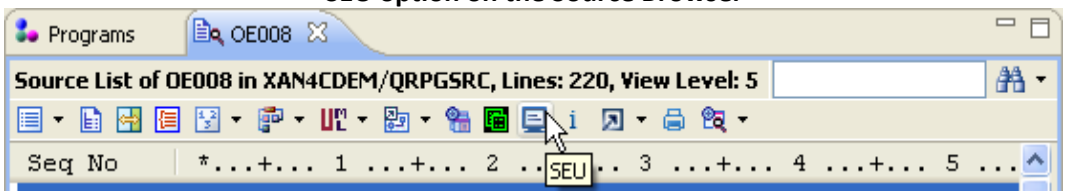


This invokes the Lpex editor from within the X-Analysis Perspective.

SEU

Make changes to the source code using the **SEU** option. Click the **SEU** icon available on the Source Browser toolbar.

SEU option on the Source Browser



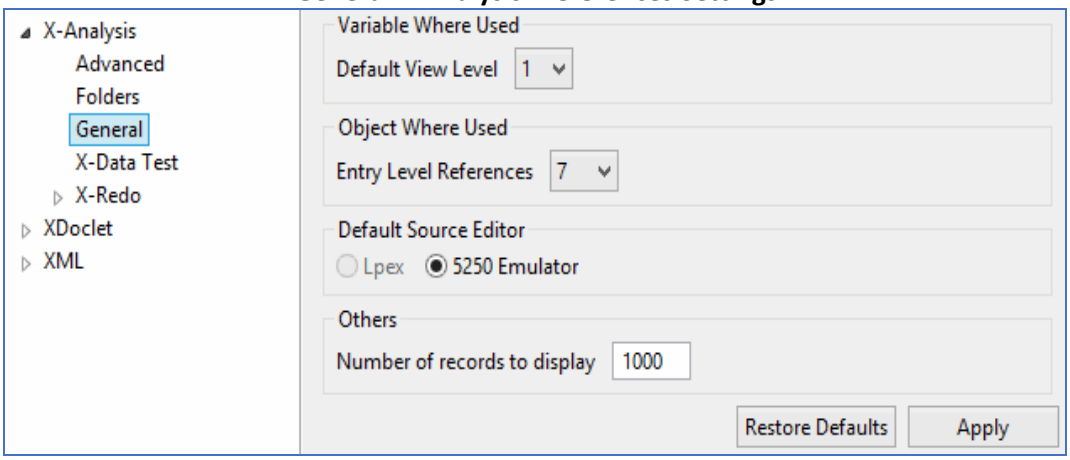
'Zoom in Lpex' is a default option for all IBM Rational products having an RSE plugin. For all other Eclipse products, SEU (5250 Emulator) is the default option. You can change the default settings using the X-Analysis 'General Preferences' option. Creating an SEU (5250 Emulator) session requires the XAN4SEU IBM i user. Please refer to the Appendix for creating the XAN4SEU user.

The X-Analysis Plugin comes with default preference settings. To change the preference settings, start IBM's RDi / RDp / WDSC/ or Eclipse 3.4 (and above), then select **Window > Preferences** to display the **Preferences** dialog.

Preferences option

To view / modify various X-Analysis Preferences, select the **X-Analysis** node.

General X-Analysis Preferences Settings



Relational Data Model Extraction for IBM i

Configuring the design of an application depends on an accurate data model.

X-Analysis features the advanced capability of automatically extracting data model from an RPG/COBOL-based application. The data model derived through X-Analysis is viewable as an interactive diagram. The software extends the benefit of perusing the file-centric or application area specific filtering of the diagram.

This section highlights the importance of understanding an application design and describes how the Data Modelling solution set helps in deciphering complicated codes of databases, thereby, making data maintenance and development work a less cumbersome process.

Feature	Brief Description
Data Model Diagram	Diagram which displays file relationships for an application or an application area.
LFs/Access Paths	Displays all access paths related to a specific file.
File Field Details	Displays the field details of a specific file.
Access Path Diagram	Diagram which displays all access paths belonging to a specific file.
View Data	Displays actual records held in the PFs.

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The Data Modelling solution set is an add-on module dedicated to data model extraction. Prior to analyzing a legacy system, it is important for you to understand the application design. An analyst looks for the Data Model information of the legacy system, which forms the foundation of the application design.

In the context of X-Analysis, the term Data Model refers not only to the physical model of a database design but also to the foreign key or the relational model.

X-Analysis automatically derives an explicit physical and logical data model by analyzing both the actual data and the programs that use that data, and thus verifies the existence of any potential cross-file relationships. It performs an integrity check to ensure that all data from dependent file validly refers to the data records from the owning file.

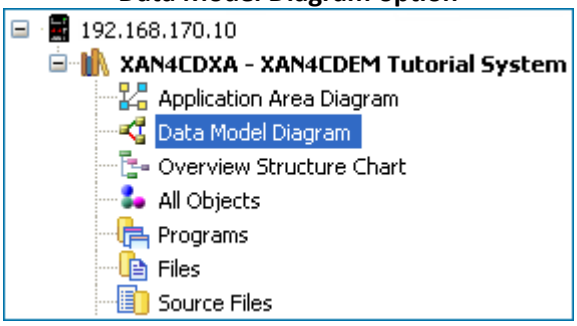
A complete data model that accurately describes all possible relationships among the files is essential for productive maintenance and development work. Such a model also provides a foundation to automate critical data administration tasks such as referential integrity testing and test data extraction.

The graphical representation of automatically generated Data Model information in X-Analysis is a Data Model Diagram. The Data Model Diagram displays file relationships for an application or an application area.

GENERATING DATA MODEL DIAGRAM

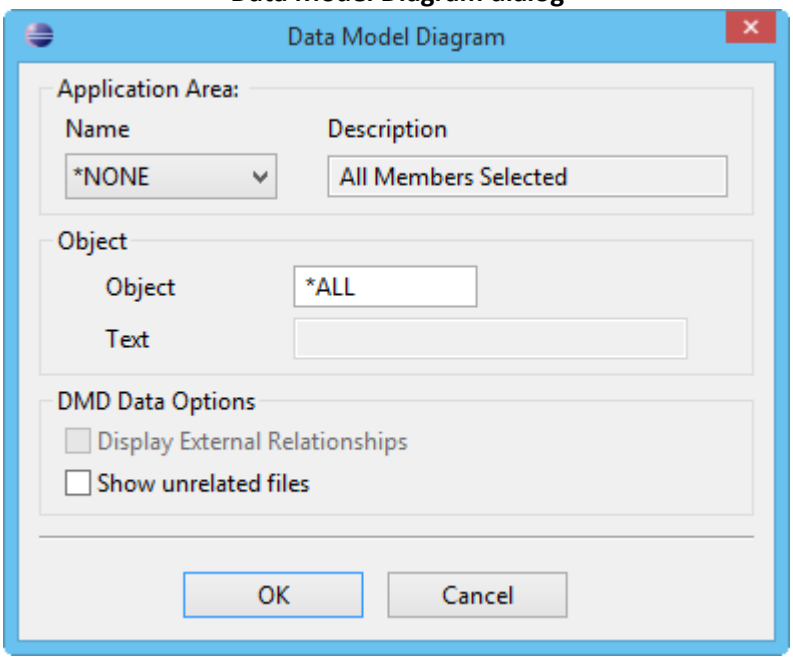
Double-click on the **Data Model Diagram** node under the cross-reference library, **XAN4CDXA**.

Data Model Diagram option



This invokes the **Data Model Diagram** dialog as shown below:

Data Model Diagram dialog



It prompts you to input the following:

1. Application Area Name (leave it as *NONE)
2. Object Name (leave it as *ALL)
3. DMD Data Options to Display External Relationships (available only when the DMD is opted on an Application Area) or Show unrelated files.

Click **OK** to generate the Data Model Diagram for the entire application.

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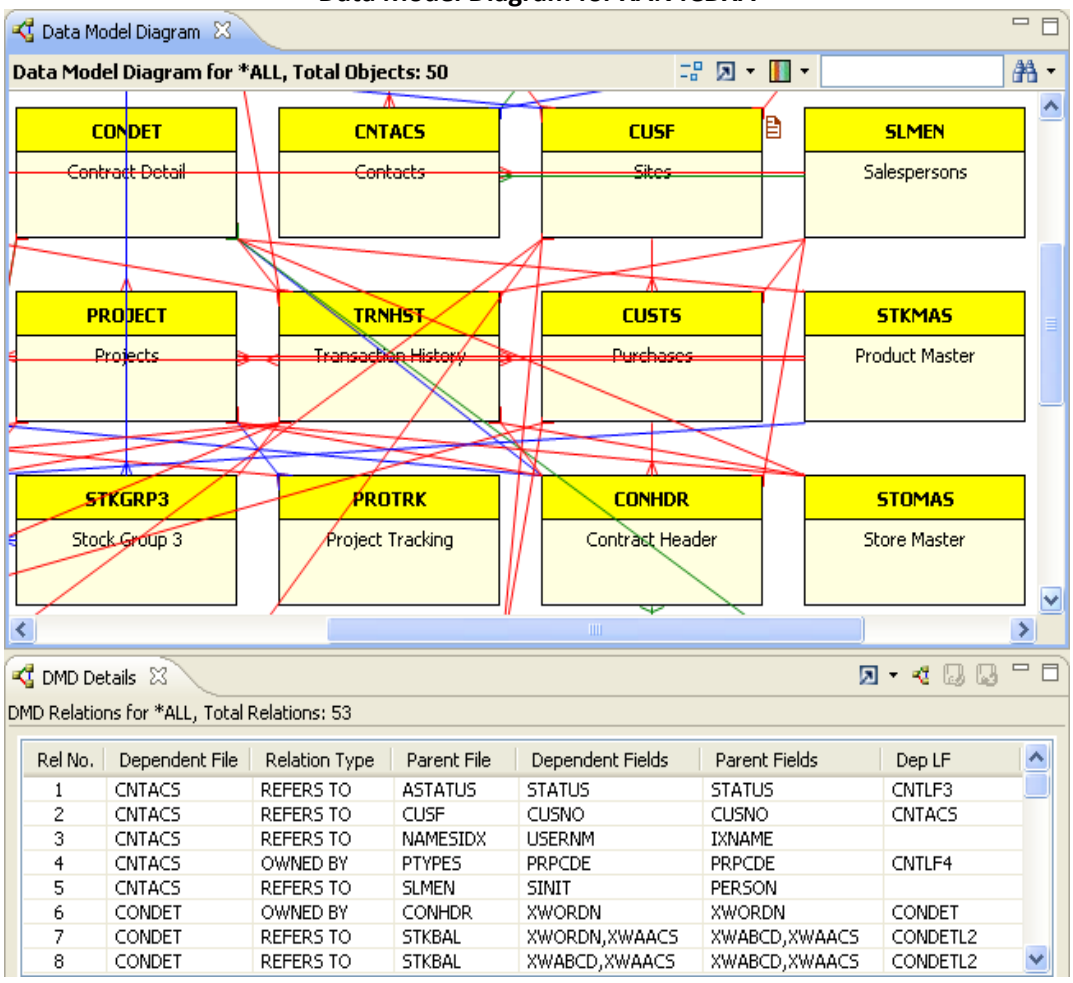
Data Model Diagram for XAN4CDXA



Rel No.	Dependent File	Relation Type	Parent File	Dependent Fields	Parent Fields	Dep LF
1	CNTACS	REFERS TO	ASTATUS	STATUS	STATUS	CNTLF3
2	CNTACS	REFERS TO	CUSF	CUSNO	CUSNO	CNTACS
3	CNTACS	REFERS TO	NAMESIDX	USERNM	IXNAME	
4	CNTACS	OWNED BY	PTYPES	PRPCDE	PRPCDE	CNTLF4
5	CNTACS	REFERS TO	SLMEN	SINIT	PERSON	
6	CONDET	OWNED BY	CONHDR	XWORDN	XWORDN	CONDET
7	CONDET	REFERS TO	STKBAL	XWORDN,XWAACS	XWABCD,XWAACS	CONDETL2
8	CONDET	REFERS TO	STKBAL	XWABCD,XWAACS	XWABCD,XWAACS	CONDETL2

The Data Model Diagram or DMD displayed above consists of two halves. The upper half is the DMD and the lower half is the DMD Details view. The DMD is the graphical representation of the derived data model information.

The DMD toolbar has a **Legend** icon. The different colors on the **Legend** drop-down convey the type of association represented by the colored lines connecting various files.

DMD Legend

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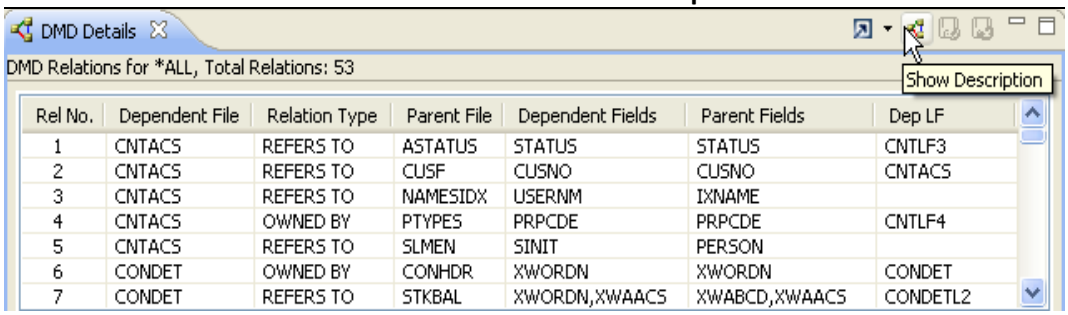
With the help of the DMD Legend, you can easily understand the relations displayed on the DMD.

The DMD Details view displays the Files Connection Details. On the DMD Details view, the **Relation Type** column states the relationship between the files in the **Dependent File** column and the files in the 'Parent File' column. The 'Dependent Fields' and the 'Parent Fields' columns list the fields which relate to the 'Dependent File' and the 'Parent File', respectively.

The DMD Details list displays actual names of the listed Files and Fields. The DMD details list provides a toggle button, **Show Description**, to switch the DMD details list to display the description of the listed Files and Fields.

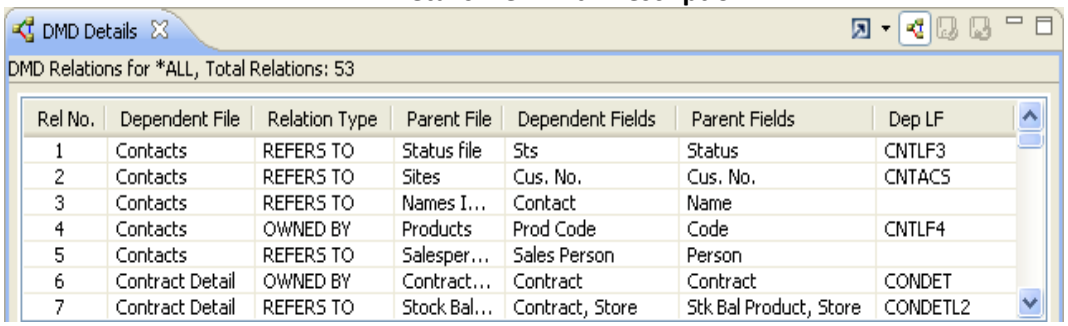
DMD Details view with Show Description icon



Rel No.	Dependent File	Relation Type	Parent File	Dependent Fields	Parent Fields	Dep LF
1	CNTACS	REFERS TO	ASTATUS	STATUS	STATUS	CNTLF3
2	CNTACS	REFERS TO	CUSF	CUSNO	CUSNO	CNTACS
3	CNTACS	REFERS TO	NAMESIDX	USERNM	IXNAME	
4	CNTACS	OWNED BY	PTYPES	PRPCDE	PRPCDE	CNTLF4
5	CNTACS	REFERS TO	SLMEN	SINIT	PERSON	
6	CONDET	OWNED BY	CONHDR	XWORDN	XWORDN	CONDET
7	CONDET	REFERS TO	STKBAL	XWORDN,XWAACS	XWABCD,XWAACS	CONDETL2

Click the **Show Description** icon to see descriptive names for all the files and the fields.

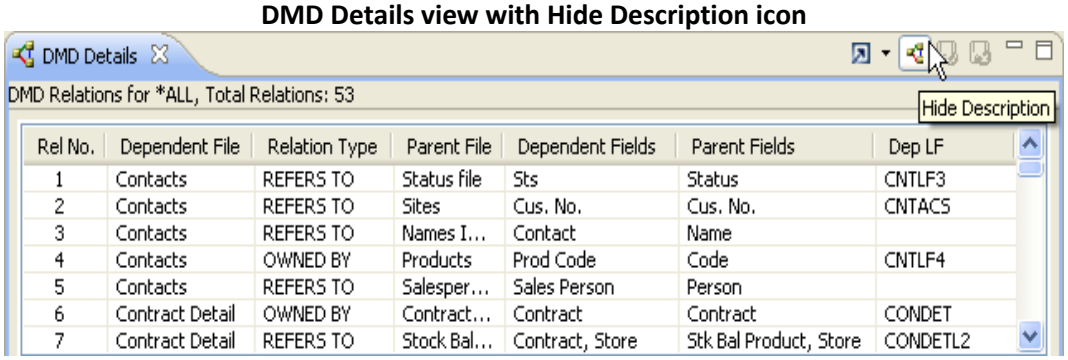
DMD Details view with Description



Rel No.	Dependent File	Relation Type	Parent File	Dependent Fields	Parent Fields	Dep LF
1	Contacts	REFERS TO	Status file	Sts	Status	CNTLF3
2	Contacts	REFERS TO	Sites	Cus. No.	Cus. No.	CNTACS
3	Contacts	REFERS TO	Names I...	Contact	Name	
4	Contacts	OWNED BY	Products	Prod Code	Code	CNTLF4
5	Contacts	REFERS TO	Salesper...	Sales Person	Person	
6	Contract Detail	OWNED BY	Contract...	Contract	Contract	CONDET
7	Contract Detail	REFERS TO	Stock Bal...	Contract, Store	Stk Bal Product, Store	CONDETL2

Click the **Hide Description** icon to switch back the DMD Details list to the actual names mode.

DMD Details view with Hide Description icon



Rel No.	Dependent File	Relation Type	Parent File	Dependent Fields	Parent Fields	Dep LF
1	Contacts	REFERS TO	Status file	Sts	Status	CNTLF3
2	Contacts	REFERS TO	Sites	Cus. No.	Cus. No.	CNTACS
3	Contacts	REFERS TO	Names I...	Contact	Name	
4	Contacts	OWNED BY	Products	Prod Code	Code	CNTLF4
5	Contacts	REFERS TO	Salesper...	Sales Person	Person	
6	Contract Detail	OWNED BY	Contract...	Contract	Contract	CONDET
7	Contract Detail	REFERS TO	Stock Bal...	Contract, Store	Stk Bal Product, Store	CONDETL2

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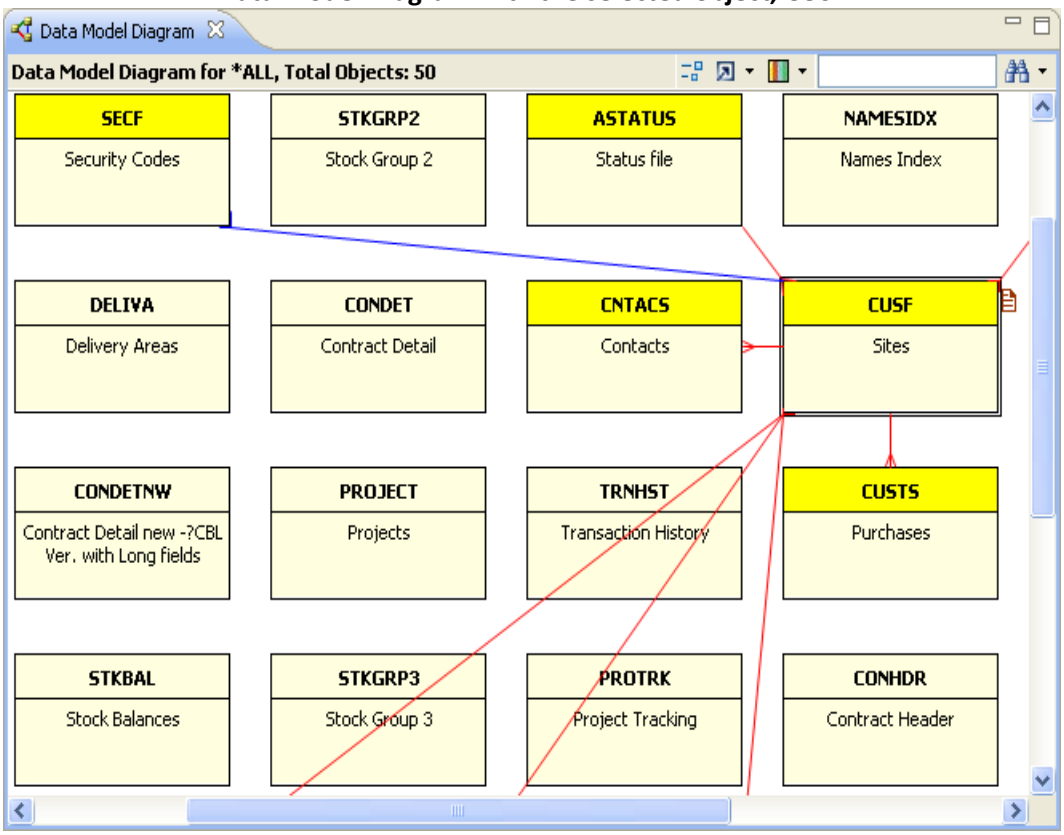
Let us consider another aspect of the DMD. A single-click on an object displays the references of that object with the other objects in the DMD. Click on **CUSF** to view its references.

Data Model Diagram with the selected object, CUSF



The screen above displays relations for **CUSF**. This helps you understand all the relationships for the selected object. Another way of understanding file relations for any specific file is to have a file-specific Data Model Diagram. A file-specific DMD displays the data model information for a given file only. Double-click on **CUSF** to get the file-specific DMD.

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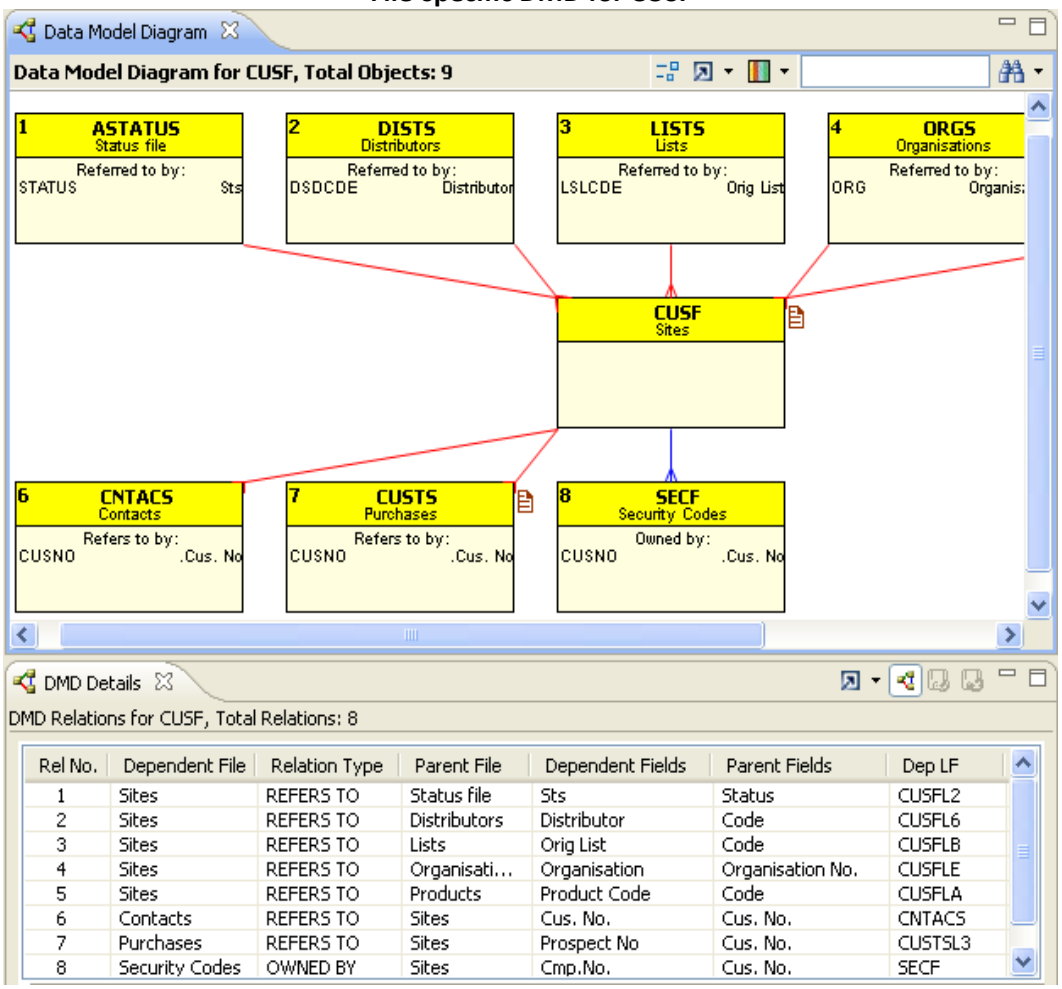
File-specific DMD for CUSF



Rel No.	Dependent File	Relation Type	Parent File	Dependent Fields	Parent Fields	Dep LF
1	Sites	REFERS TO	Status file	Sts	Status	CUSFL2
2	Sites	REFERS TO	Distributors	Distributor	Code	CUSFL6
3	Sites	REFERS TO	Lists	Orig List	Code	CUSFLB
4	Sites	REFERS TO	Organisati...	Organisation	Organisation No.	CUSFLE
5	Sites	REFERS TO	Products	Product Code	Code	CUSFLA
6	Contacts	REFERS TO	Sites	Cus. No.	Cus. No.	CNTACS
7	Purchases	REFERS TO	Sites	Prospect No	Cus. No.	CUSTSL3
8	Security Codes	OWNED BY	Sites	Cmp.No.	Cus. No.	SECF

The DMD displayed above is the file-specific DMD for **CUSF**. It only contains objects related to **CUSF**. Furthermore, the DMD Details list displays only those relationships related to **CUSF**.

With the help of a file-specific DMD, you can view relationships between any available files. These relationships can be understood better after reading **View Data** section.

LFs/Access Paths

Select the **LFs/Access Paths** option for a file from the DMD. The **LFs/Access Paths** option shows all access paths associated with a selected file.

Select **CUSF**, and then choose the **LFs/Access Paths** option from the context menu.

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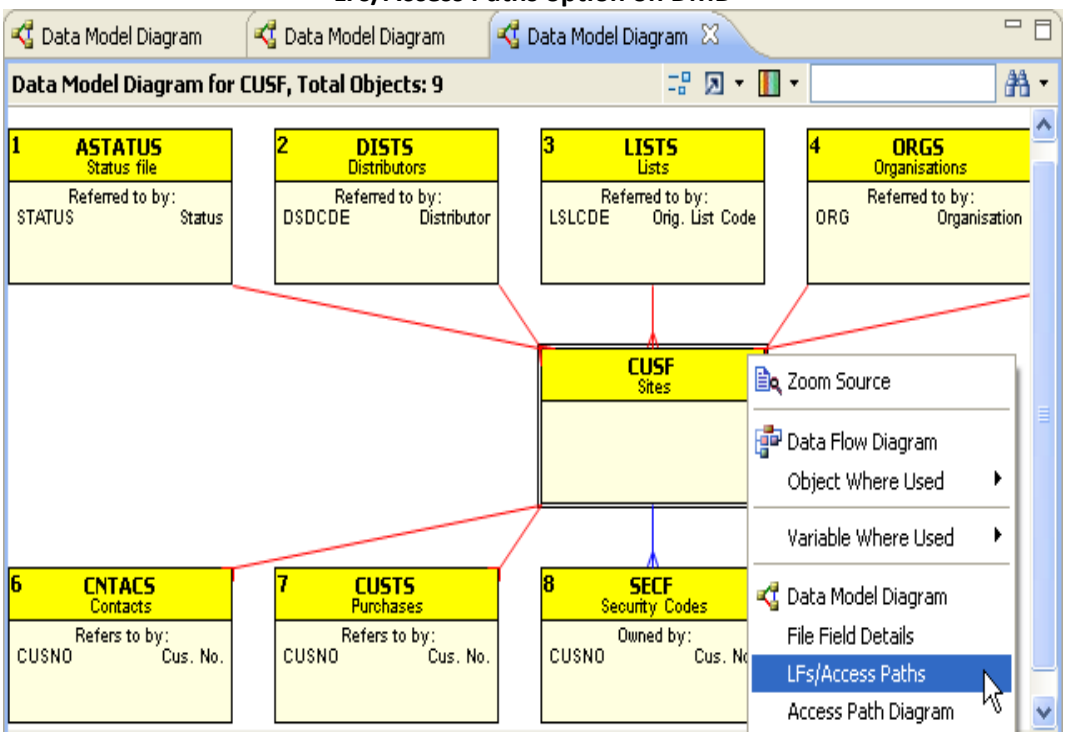
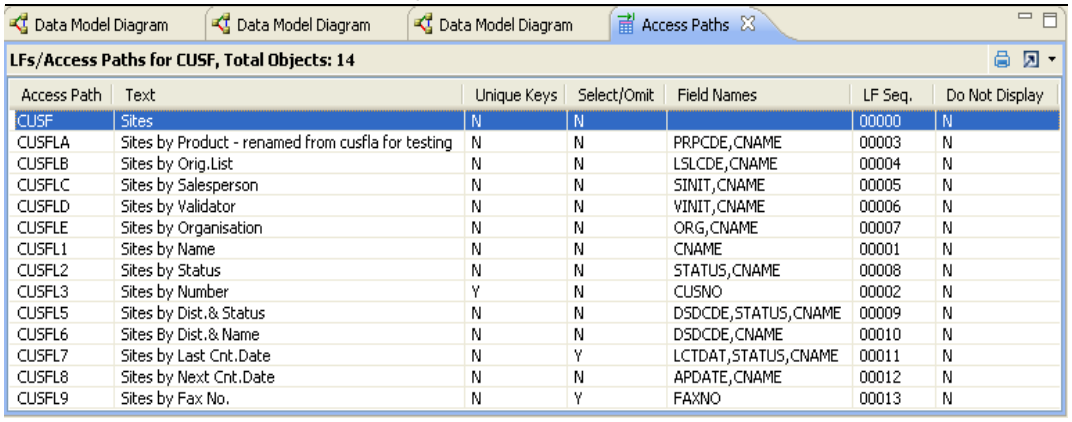
LFs/Access Paths option on DMD



This brings up the **Access Paths** list.

LFs/Access Paths for CUSF

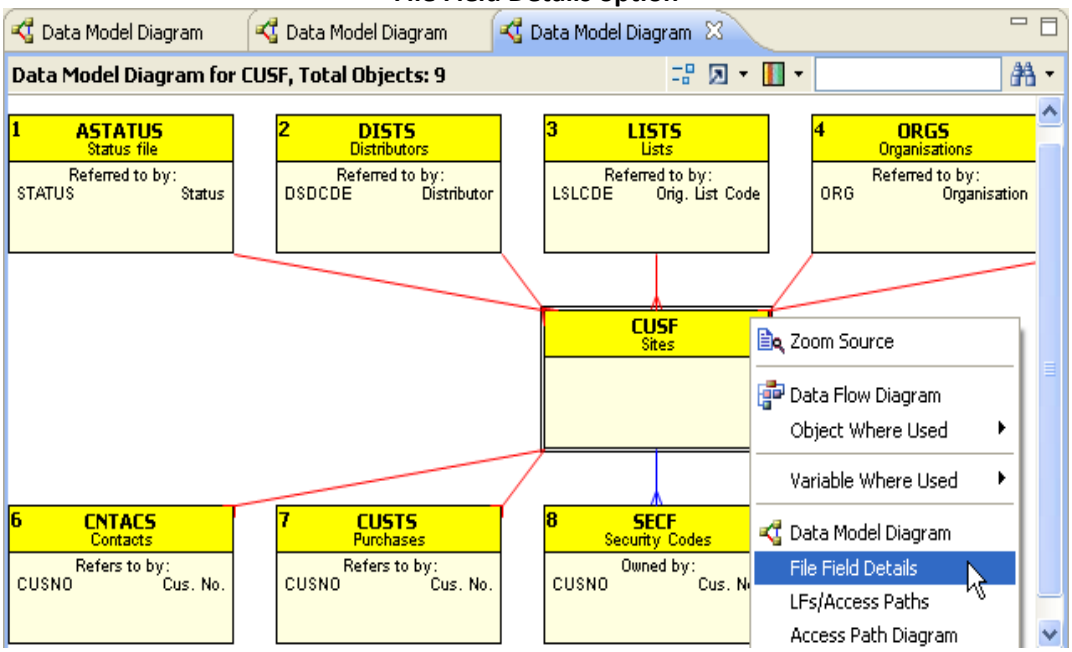


Access Path	Text	Unique Keys	Select/Omit	Field Names	LF Seq.	Do Not Display
CUSF	Sites	N	N		00000	N
CUSFLA	Sites by Product - renamed from cusfla for testing	N	N	PRPCDE,CNAME	00003	N
CUSFLB	Sites by Orig.List	N	N	LSLCDE,CNAME	00004	N
CUSFLC	Sites by Salesperson	N	N	SINIT,CNAME	00005	N
CUSFLD	Sites by Validator	N	N	VINIT,CNAME	00006	N
CUSFLE	Sites by Organisation	N	N	ORG,CNAME	00007	N
CUSFL1	Sites by Name	N	N	CNAME	00001	N
CUSFL2	Sites by Status	N	N	STATUS,CNAME	00008	N
CUSFL3	Sites by Number	Y	N	CUSNO	00002	N
CUSFL5	Sites by Dist.& Status	N	N	DSDCDE,STATUS,CNAME	00009	N
CUSFL6	Sites By Dist.& Name	N	N	DSDCDE,CNAME	00010	N
CUSFL7	Sites by Last Cnt.Date	N	Y	LCTDAT,STATUS,CNAME	00011	N
CUSFL8	Sites by Next Cnt.Date	N	N	APDATE,CNAME	00012	N
CUSFL9	Sites by Fax No.	N	Y	FAXNO	00013	N

FILE FIELD DETAILS/FFD

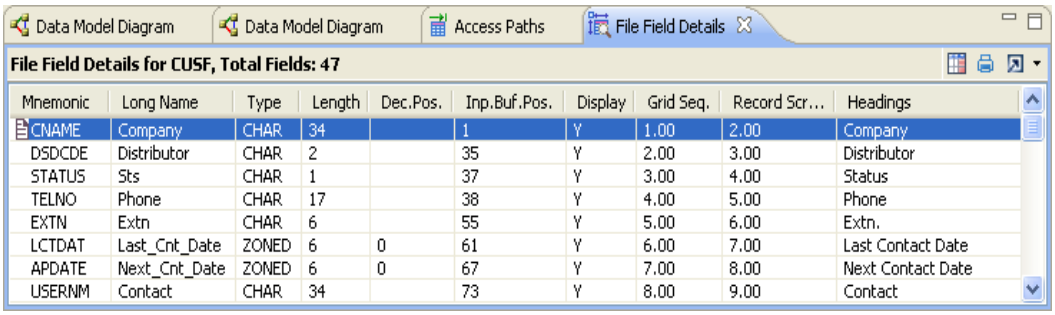
You need more details of a particular file to gain wholesome understanding of the data model of an existing application. A particular file may consist of several fields. The **File Field Details** option helps you here. Select the option from the context menu to gain easy access to particular field details of a selected file, **CUSF**.

File Field Details option



A new window appears displaying File Field Details information.

File Field Details for CUSF

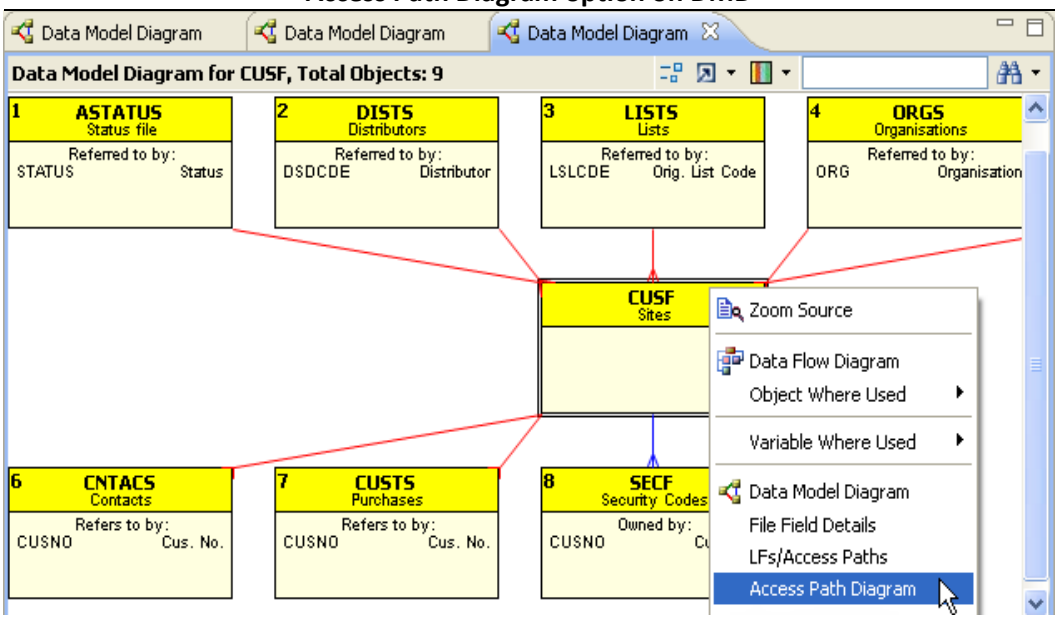


Mnemonic	Long Name	Type	Length	Dec.Pos.	Inp.Buf.Pos.	Display	Grid Seq.	Record Scr...	Headings
CNAME	Company	CHAR	34		1	Y	1.00	2.00	Company
DSDCDE	Distributor	CHAR	2		35	Y	2.00	3.00	Distributor
STATUS	Sts	CHAR	1		37	Y	3.00	4.00	Status
TELNO	Phone	CHAR	17		38	Y	4.00	5.00	Phone
EXTN	Extn	CHAR	6		55	Y	5.00	6.00	Extn.
LCTDAT	Last_Cnt_Date	ZONED	6	0	61	Y	6.00	7.00	Last Contact Date
APDATE	Next_Cnt_Date	ZONED	6	0	67	Y	7.00	8.00	Next Contact Date
USERNM	Contact	CHAR	34		73	Y	8.00	9.00	Contact

ACCESS PATH DIAGRAM/APD

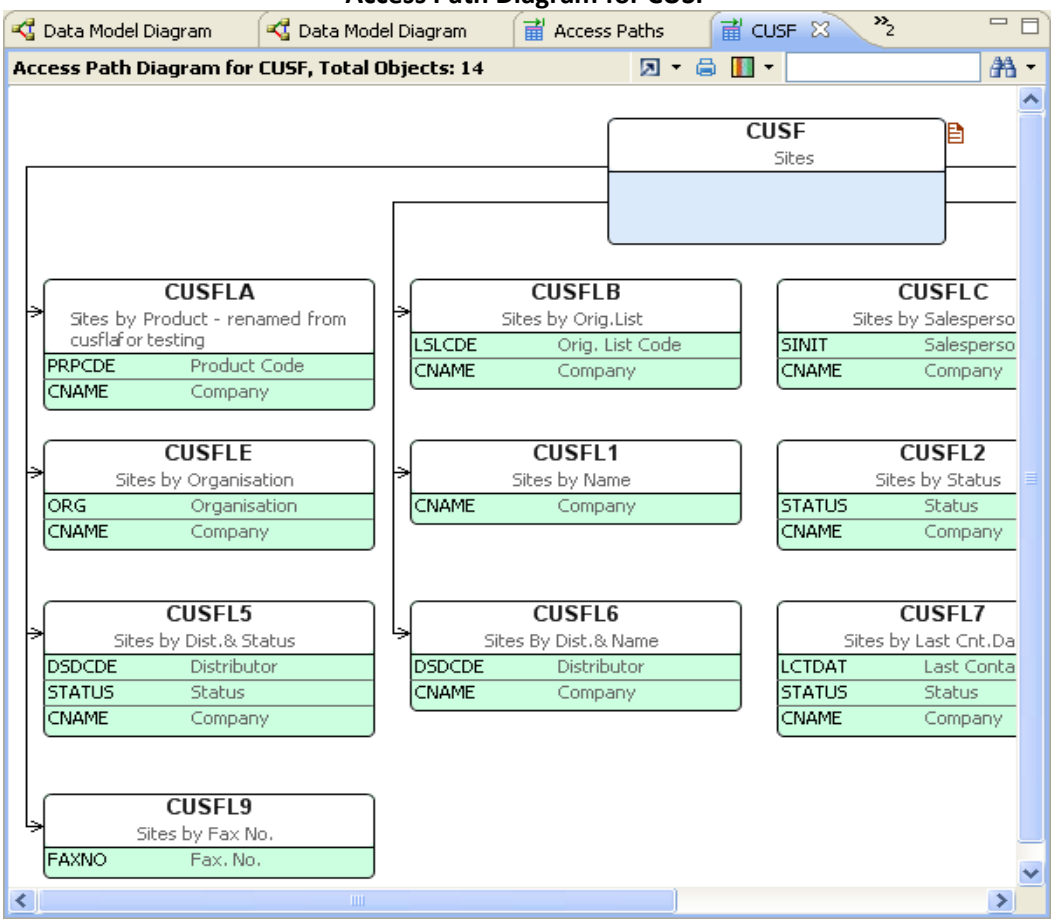
The Access Path Diagram is a graphical presentation of all the access paths related to a specific file. Generate the diagram by selecting the **Access Path Diagram** option from the context menu over a selected file, **CUSF**.

Access Path Diagram option on DMD



This brings up the APD for **CUSF**.

Access Path Diagram for CUSF

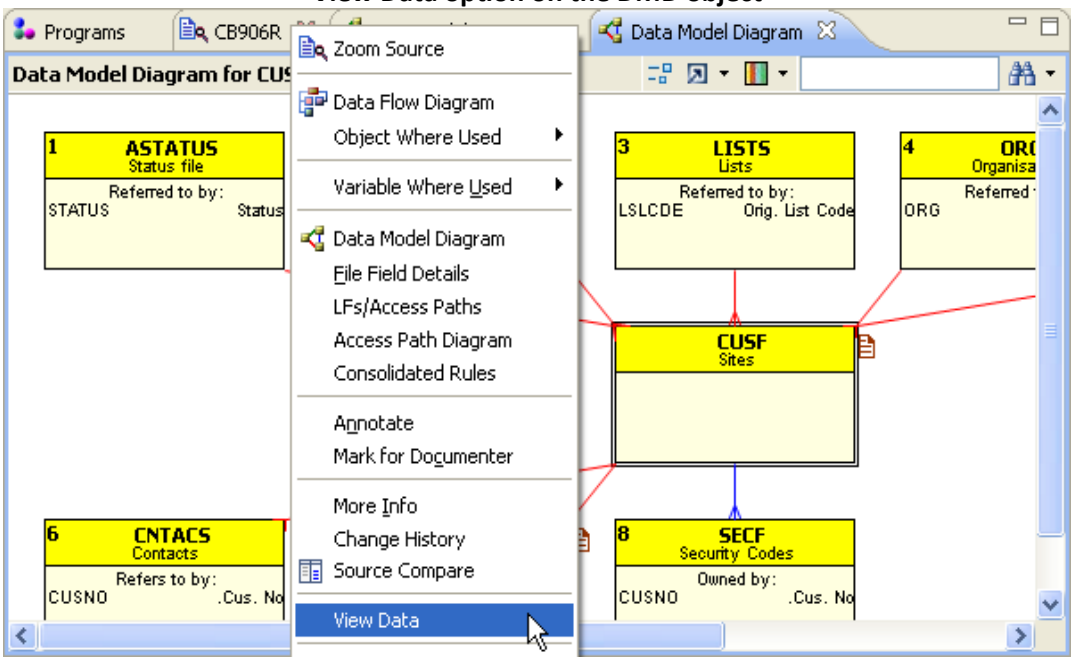


Go back to the DMD displaying the file-specific DMD for **CUSF**.

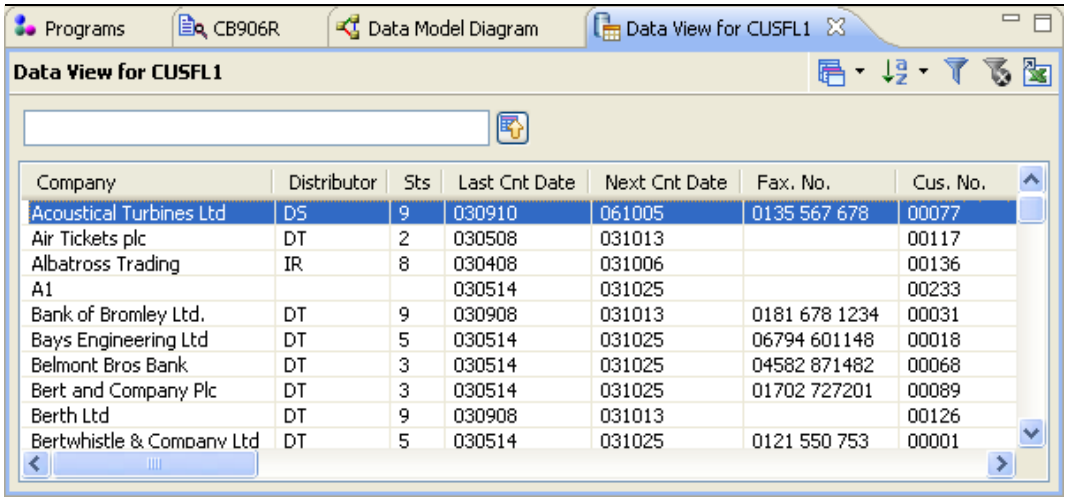
VIEW DATA

You can also view file records from the data model of an application. Select the **View Data** option to view the actual records held in PFs. The option is available on all the objects displayed in the DMD.

View Data option on the DMD object



Data View for CUSF



Company	Distributor	Sts	Last Cnt Date	Next Cnt Date	Fax. No.	Cus. No.
Acoustical Turbines Ltd	DS	9	030910	061005	0135 567 678	00077
Air Tickets plc	DT	2	030508	031013		00117
Albatross Trading	IR	8	030408	031006		00136
A1			030514	031025		00233
Bank of Bromley Ltd.	DT	9	030908	031013	0181 678 1234	00031
Bays Engineering Ltd	DT	5	030514	031025	06794 601148	00018
Belmont Bros Bank	DT	3	030514	031025	04582 871482	00068
Bert and Company Plc	DT	3	030514	031025	01702 727201	00089
Berth Ltd	DT	9	030908	031013		00126
Bertwhistle & Company Ltd	DT	5	030514	031025	0121 550 753	00001

Record Display

The **View Data** window lists records for a selected file. Double-click on a record to display the complete record.

In this example, if you double-click on **Bertwhistle & Company Ltd**., the record display along with its dependent files data will appear.

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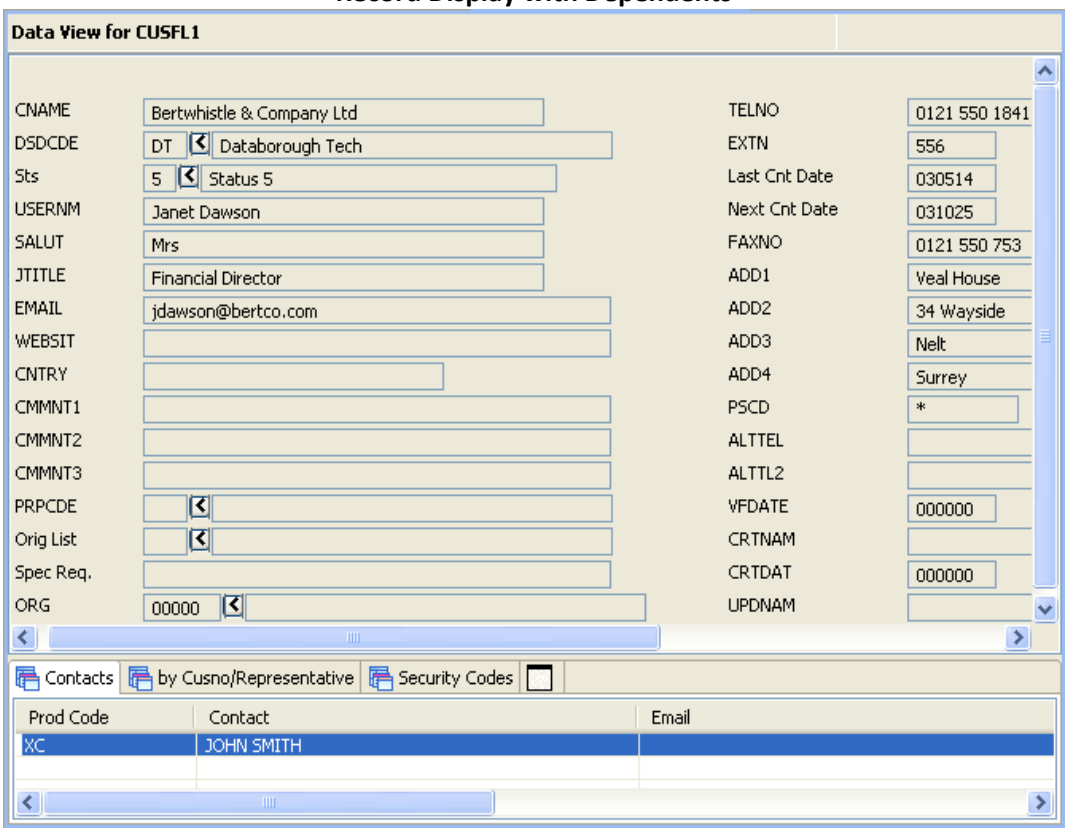
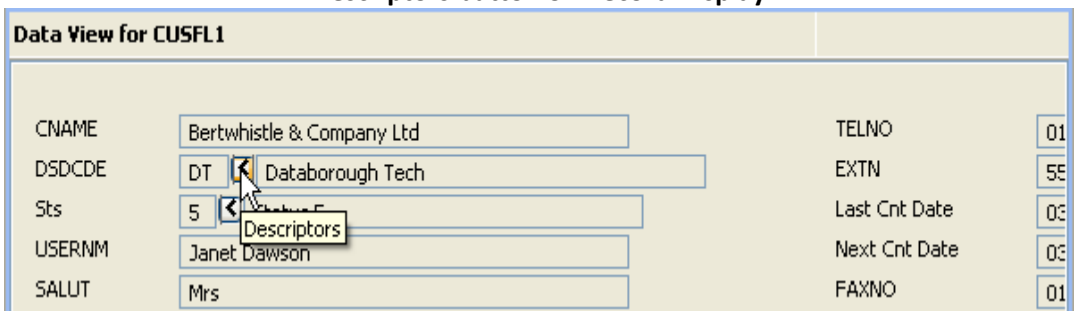
Record Display with Dependents



The tab at the bottom displays dependent file data. These are any ACCESSES/OWNS/REFERS TO relationships for **CUSF** in the DMD.

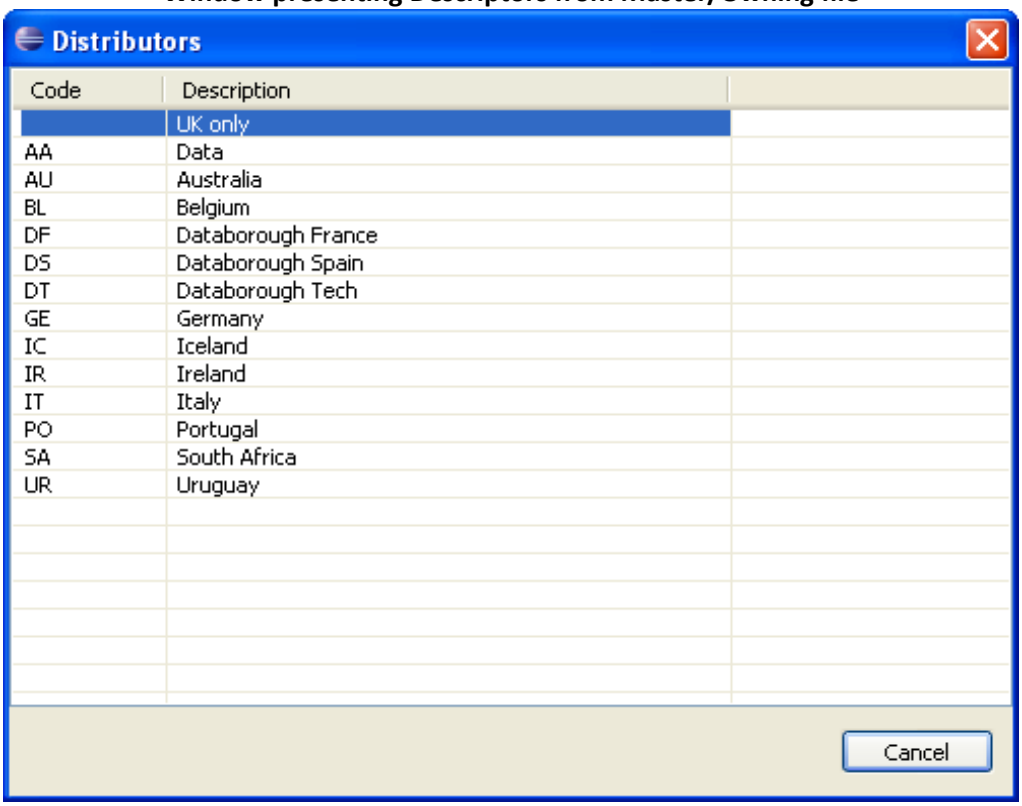
On the record display, the **Descriptors** button displays the ACCESSED BY/REFERS TO relationships. This is similar to a JOIN to a foreign file, to get the description for the code used from the Master/Owning file.

Descriptors button on Record Display



Click on the **Descriptors** button to invoke the following window:

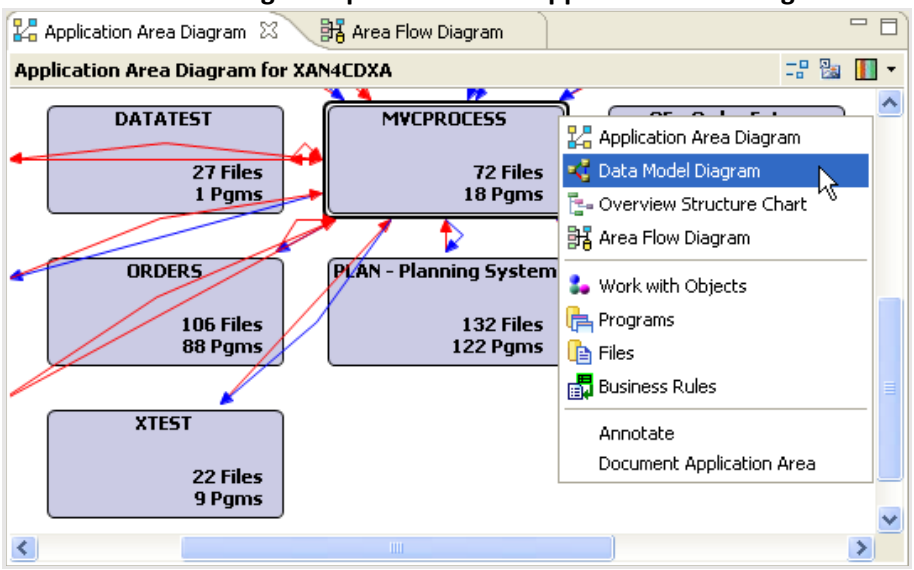
Window presenting Descriptors from Master/Owning file



DATA MODEL DIAGRAM – APPLICATION AREA SPECIFIC

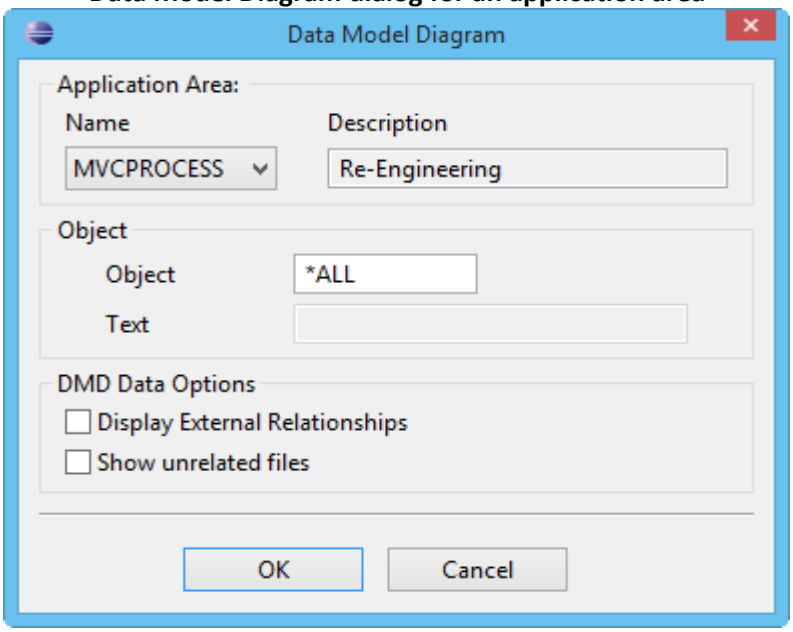
The DMD for an application area represents relationships among the related objects that belong to that application area only. Select the **Data Model Diagram** option for the application area – **MVCPROCESS**.

Data Model Diagram option from the Application Area Diagram



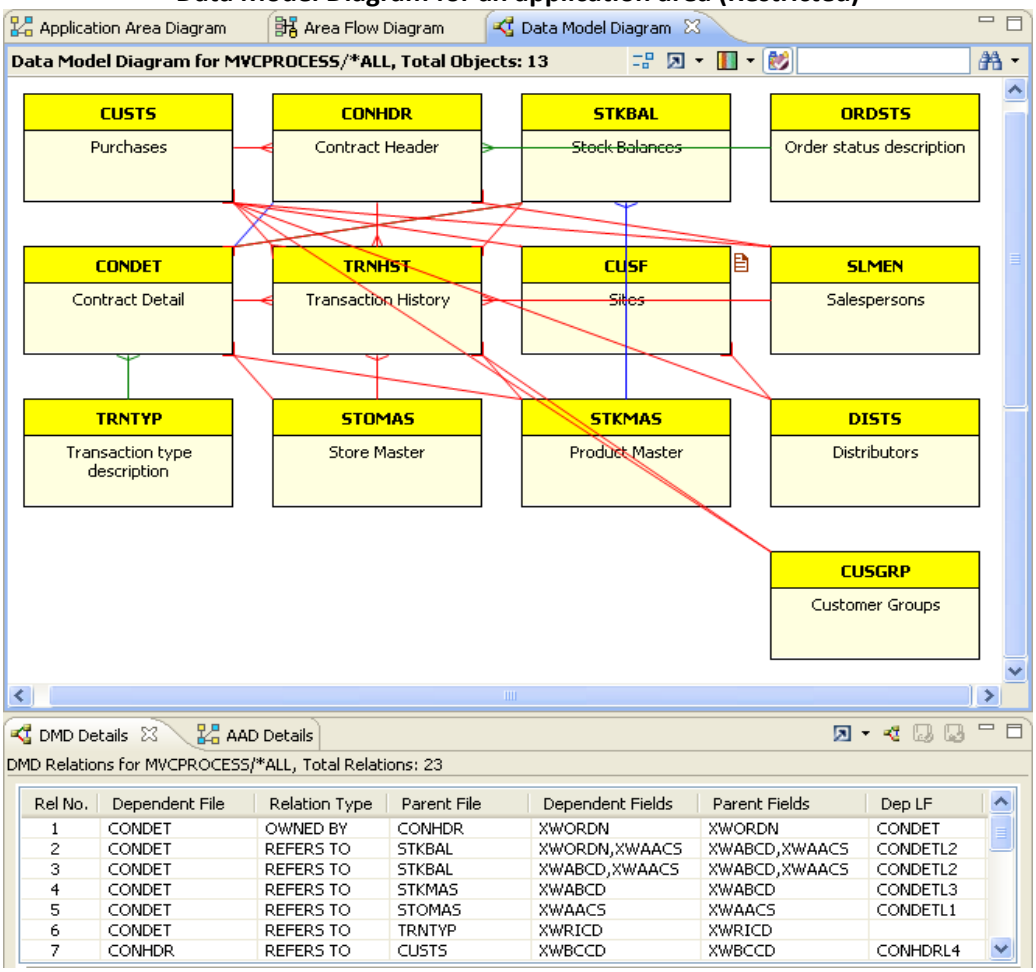
This invokes the **Data Model Diagram** dialog for the application area – **MVCPROCESS**.

Data Model Diagram dialog for an application area



Click **OK** to generate the DMD for the selected application area.

Data Model Diagram for an application area (Restricted)



Rel No.	Dependent File	Relation Type	Parent File	Dependent Fields	Parent Fields	Dep LF
1	CONDET	OWNED BY	CONHDR	XWORDN	XWORDN	CONDET
2	CONDET	REFERS TO	STKBAL	XWORDN,XWAACS	XWABCD,XWAACS	CONDETL2
3	CONDET	REFERS TO	STKBAL	XWABCD,XWAACS	XWABCD,XWAACS	CONDETL2
4	CONDET	REFERS TO	STKMAS	XWABCD	XWABCD	CONDETL3
5	CONDET	REFERS TO	STOMAS	XWAACS	XWAACS	CONDETL1
6	CONDET	REFERS TO	TRNTYP	XWRICD	XWRICD	
7	CONHDR	REFERS TO	CUSTS	XWBCCD	XWBCCD	CONHDRL4

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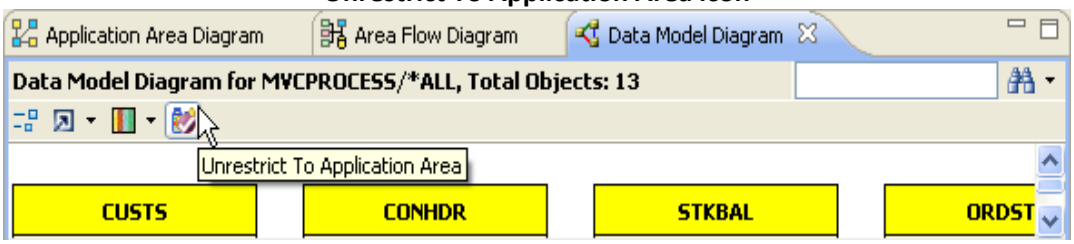
The DMD displayed above is a restricted Data Model and it only displays the objects which belong to the application area – **MVCPROCESS**.

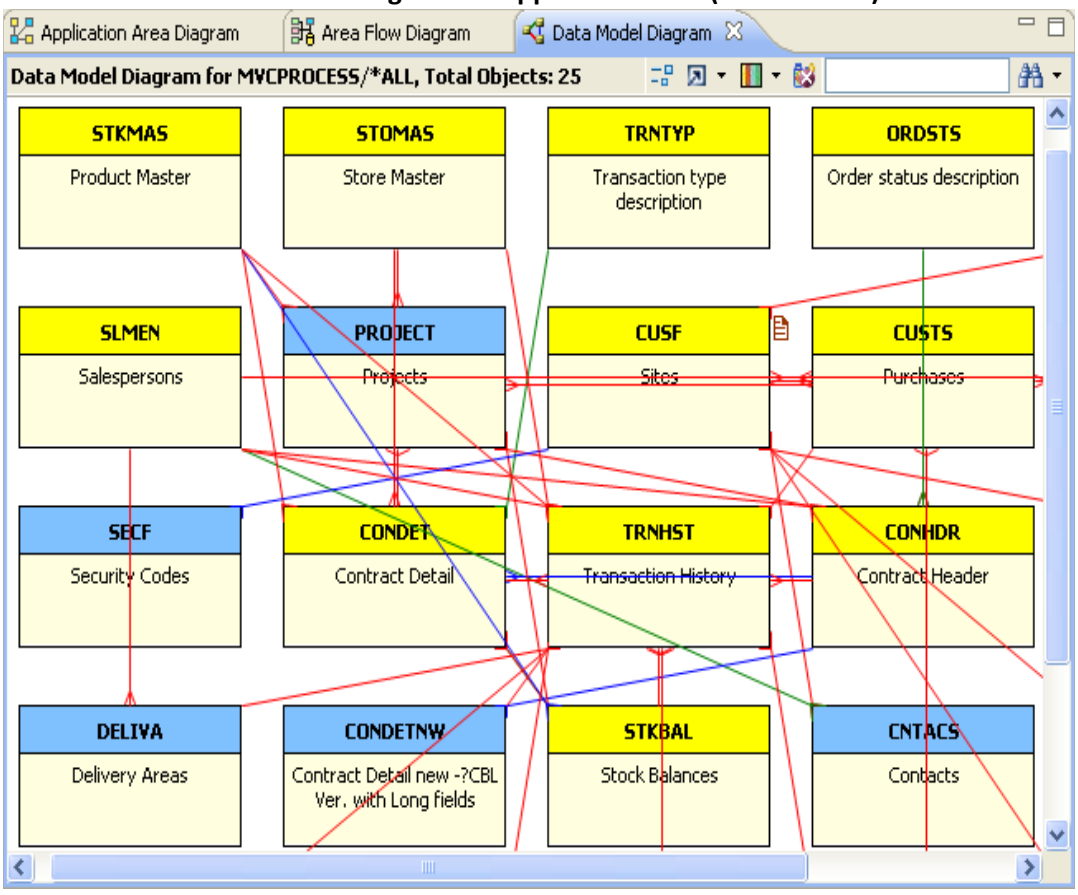
The toolbar on the DMD has an option to generate the unrestricted DMD. Click the **Unrestrict To Application Area** icon.

Unrestrict To Application Area icon



The following window will be displayed.

Data Model Diagram for Application Area (Unrestricted)



Note: The objects displayed in blue are the ones which do not belong to the application area, MVCPROCESS.

While using the 'Restrict To Application Area' feature, ensure that the originally-selected application area remains the same.

What's Next

Over two decades of dedicated research and development has rewarded us with a sophisticated software solution like X-Analysis. Built to meet the requirements of advanced computing and analysis, X-Analysis and its varied features make it easy to understand how a legacy application works. We also experienced how X-Analysis helps in analyzing one big application as smaller logical business areas. Its enhanced Data Modelling feature not only exposes the Business Rules implicit in the data and the process models of an application, but also digs out the vast amount of business logic buried inside the source code of the programs.

Today, we are at that exciting phase from where we can look forward to being more progressive and introduce futuristic Re-engineering or Re-architecting tools and solutions. The X-RPG/2E Modernize module is one such innovate.

As we already know, X-Analysis dissects legacy application programs to decouple screens from embedded business logic. This componentization can be leveraged by the X-RPG/2E Modernize module to generate JSFs, JavaBeans and ORM objects, thereby assisting in re-architecting a legacy application in J2EE.

Having seen the X-Analysis solution set in action, you are now equipped to get on with the application redevelopment.

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Appendix – Enabling the SEU Interface

CREATE USER PROFILE – XAN4SEU

When browsing source code using the IBM i (AS400) SEU, it is necessary to be logged in as **XAN4SEU** user. The following are instructions for creating the correct user profile.

Step 1 Login as **QSECOFR**.

Step 2 Create **XAN4SEU** user profile.

Use the **CRTUSRPRF** command to create the **XAN4SEU** user profile. Make sure that the following parameters are set:

User Password : XAN4SEU

User Class : *PGMR

Initial Program : XSEUCLP

Library : XAOBJ

```
                        Create User Profile (CRTUSRPRF)


 Type choices, press Enter.

 User profile . . . . . > XAN4SEU       Name
 User password  . . . . .   *USRPRF      Name, *USRPRF, *NONE
 Set password to expired  . . . .   *NO          *NO, *YES
 Status . . . . . .   *ENABLED      *ENABLED, *DISABLED
 User class . . . . . > *PGMR       *USER, *SYSOPR, *PGMR...
 Assistance level . . . . . .   *SYSVAL       *SYSVAL, *BASIC, *INTERMED...
 Current library  . . . . . .   *CRTDFT       Name, *CRTDFT
 Initial program to call  . . . . > XSEUCLP       Name, *NONE
   Library  . . . . . >   XAOBJ        Name, *LIBL, *CURLIB
 Initial menu . . . . . .   MAIN          Name, *SIGNOFF
   Library  . . . . . .     *LIBL        Name, *LIBL, *CURLIB
 Limit capabilities . . . . . .   *NO          *NO, *PARTIAL, *YES
 Text 'description' . . . . . > 'X-Analysis - SEU User'

                                                                      More...
F3=Exit    F4=Prompt    F5=Refresh    F12=Cancel    F13=How to use this display
F24=More keys
```

PRESS F10 AND PAGE DOWN

Set Special Authorities:

*ALLOBJ

*JOBCTL

*SAVSYS

```
                        Change User Profile (CHGUSRPRF)

Type choices, press Enter.

                             Additional Parameters

Special authority  . . . . . .   *ALLOBJ       *SAME, *USRCLS, *NONE...
                                 *JOBCTL
                                 *SAVSYS
Special environment  . . . . . .   *SYSVAL       *SAME, *SYSVAL, *NONE, *S36
Display sign-on information  . .   *SYSVAL       *SAME, *NO, *YES, *SYSVAL
Password expiration interval . .   *SYSVAL       1-366, *SAME, *SYSVAL, *NOMAX
Limit device sessions  . . . . .   *SYSVAL       *SAME, *NO, *YES, *SYSVAL
Keyboard buffering . . . . . .   *SYSVAL       *SAME, *SYSVAL, *NO...
Maximum allowed storage  . . . .   *NOMAX         Kilobytes, *NOMAX
Highest schedule priority  . . .   3             0-9
Job description  . . . . . .   QDFTJOBD      Name
  Library  . . . . . .     QGPL          Name, *LIBL, *CURLIB
Group profile  . . . . . .   *NONE         Name, *NONE

                                                                      More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Step 3 Log off

CREATING MACRO OF XAN4SEU

Macros allow you to automatically sign on for **XAN4SEU,** and seamlessly work with the SEU option. So, it is necessary to verify whether the **XAN4SEU macro** has been created. If not, then record this macro using the following steps:

Step 1: Press the **Start Recording** button. The **Record Macro/Script as** dialog will be displayed. Sign on with the **XAN4SEU** user profile.

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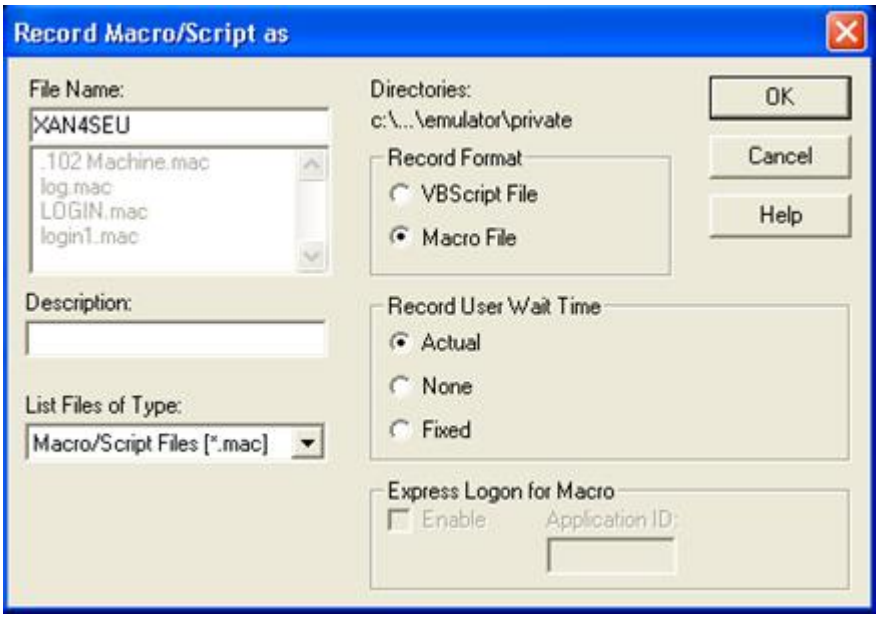
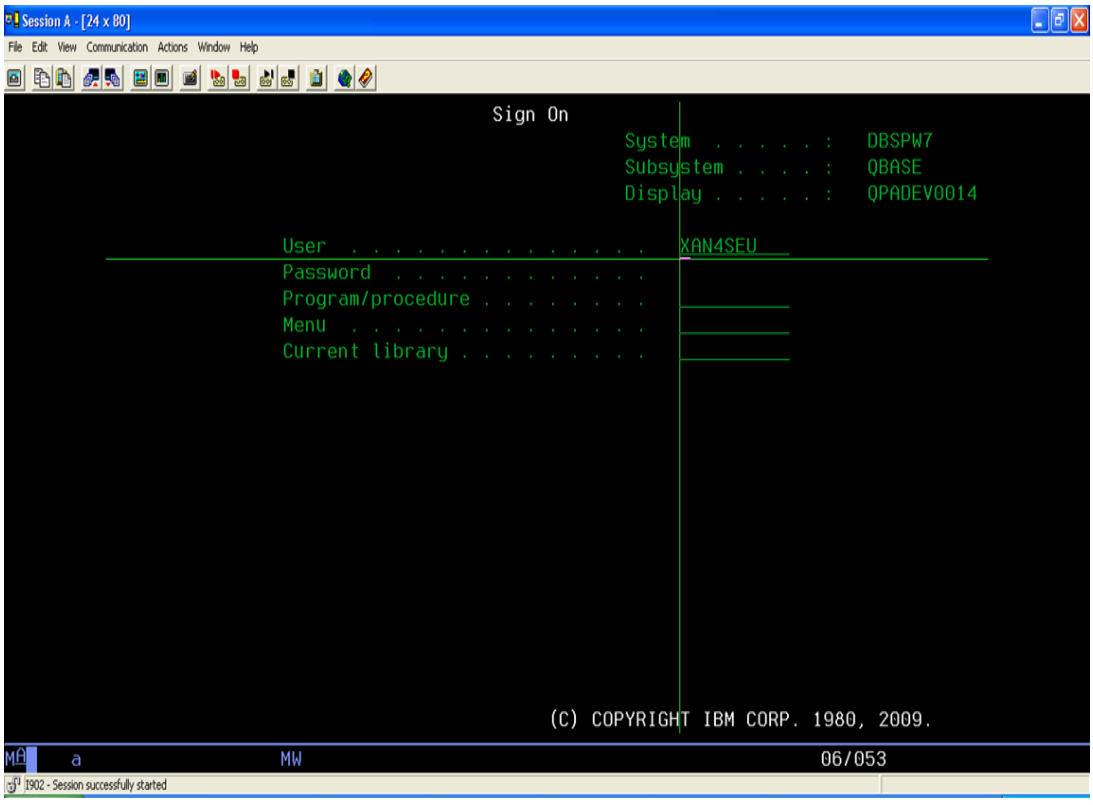
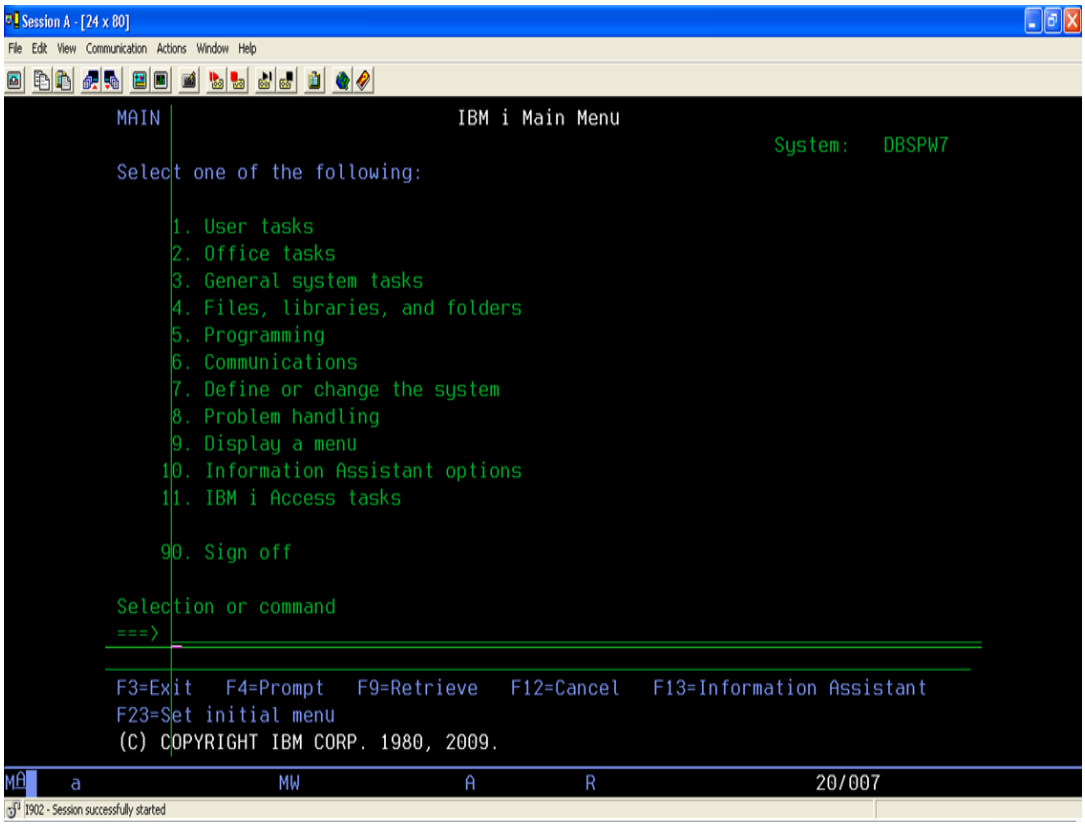


Step 2: On the Sign On screen, enter the User Profile – **XAN4SEU**. Press **Tab** and enter the Password also as **XAN4SEU**.

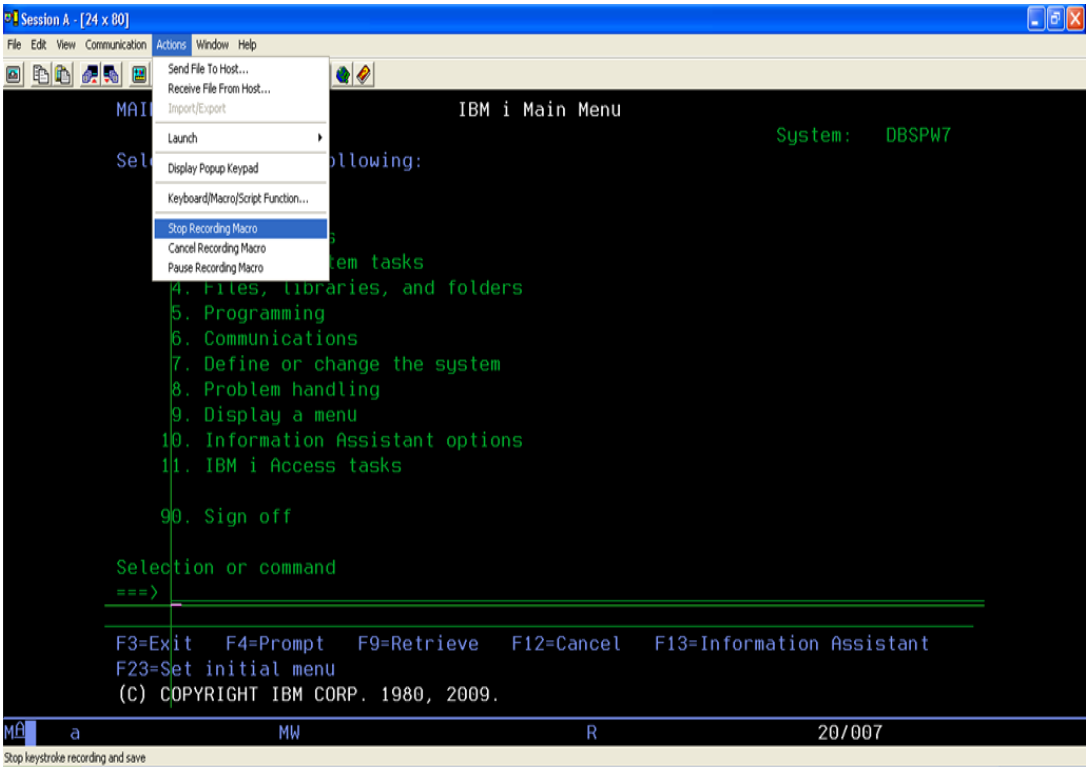


Press **ENTER**.

The **IBM i Main Menu** screen will be displayed:



Step 3: Stop the recording by selecting the **Stop Recording Macro** option from the **Actions** submenu or clicking the related button directly from the toolbar.



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