

# A WHITE PAPER

By Silwood Technology Limited

## Using Safyr® to facilitate metadata transparency and communication in major Enterprise Applications

### Executive Summary

*Enterprise systems packages such as SAP, Salesforce, J.D. Edwards EnterpriseOne, PeopleSoft, Siebel, Oracle E-Business Suite and Microsoft Dynamics are critical to the effective running of virtually all large and medium sized enterprises. These are commonly known as ERP or CRM applications.*

*In addition organizations are under ever mounting pressure to make more of their investment in these applications by ensuring that they interact with other systems, provide data for reporting and analytics as well as participate in corporate initiatives such as mergers and acquisitions, improving customer retention and experience, reducing costs and complying with governance and compliance requirements.*

*As one would expect in applications that support such broad business processes, each of these packages have large databases underlying the complex application functionality. The sophistication of the application is mirrored in the structure of the database which means that it is very challenging to easily understand the metadata which underpins it. This is further complicated by cryptic naming of tables and columns and application specific data management rather than the use of features in the database.*

*Having access to and understanding the metadata information in these systems is vital step in ensuring the success of a range of different projects which support the organizational aspirations and objectives. These include application implementation and rationalization, data migration, data integration and take on, master data management (MDM), data warehousing, reporting and analytics, as well as data governance. Any requirement for access to Enterprise Application data will require a detailed understanding of the underlying metadata structures.*

*Safyr is a simple but powerful tool that makes the exploration and utilization of Enterprise Application metadata practical for technical and non technical users. Safyr helps data modelers, architects and analysts to understand and utilize the metadata in major ERP applications more easily.*

*It reduces the time and cost of the data discovery phase and helps to ensure the accuracy of the data deliverables which improves the trust the business has in the results.*

## Background

Enterprise Resource Planning (ERP) applications dominate the IT landscape and most organizations have at least one ERP package and often many other legacy or specialist applications as well.

ERP applications have been developed to provide a broad set of functionality, which means that they offer a valuable solution for running many business processes. However the breadth of functionality comes at the price of ERP applications having equivalently broad and complex data structures. For example SAP has around 90,000 base tables. Typically due to the packaged nature of these applications it can be extremely challenging to extract the detailed metadata from them when it is needed unless one is an application specialist. Finding out more about the metadata in these systems is further complicated because in the majority of instances the application has been customized to fit particular business requirements.

The need to know about and analyse the metadata in these applications is often the function of the job of the data architect, data analyst, data modeler or data warehouse designer etc., whose technical skills may not extend to being able to manually extract the data required from the base system. Often they will not be aware that a tool such as Safyr exists and so believe that being able to have ready access to the metadata information is not possible and so defer to the technical specialists for the information.

Without a software tool to automate the process, all the major ERP applications (SAP, SAP/BW, Salesforce, Microsoft Dynamics, Oracle EBS, Siebel, PeopleSoft, and JD Edwards) require significant manual effort to be expended to find the detailed metadata necessary to allow a data analyst or modeler to do his or her job. This adds significant time, cost and risk to critical projects.

## Why is metadata management important?

Metadata is data about data. Metadata is a road map of the information resources available to an organization.

For example, in a system designed to hold Invoices, Invoice number 7 is a piece of *Data*. The properties, "Invoice Number", "Invoice Date", "Customer Number", etc. are *metadata* for the Invoice. They describe the characteristics of the data, rather than being the data itself.

Typically, metadata describes the structure and location of data. For example, the organization has a Customer table with a set of fields, each of a particular data type, and the table resides on a particular computer on the network. In addition, the metadata may describe how pieces of information in the organization relate to each other. So for example, the Customer has a series of Contacts associated with it which can be located by accessing all the Contacts with the same Customer code.

Metadata becomes important whenever there is a need to understand where and how data is stored. In all the following examples, one of the crucial questions will be: “where can I find the information about the data that I am looking for?”

\* **Creating a data warehouse**

Data warehousing is a good example of the need for having a clear understanding of the metadata in your applications.

Given the strategic nature of ERP applications like SAP, the data in these systems will be prime candidates for inclusion in a warehouse.

Without a clear understanding of the sources of potential data for the warehouse, it will be very difficult to determine the location of the data to be loaded into the warehouse. Without the confidence that all of the correct data for inclusion in the data warehouse has been identified there is a risk that the information contained therein may not be correct and cannot be trusted by the business.

\* **Developing custom reports**

It is often vital to provide consistent, accurate and timely reports from ERP applications. However the sophisticated nature of the systems and resulting breadth of their underlying metadata makes it difficult to understand and share knowledge about the underlying data structures with those who are producing the reports.

Having details of the metadata structures will ensure that information is taken from the right tables and fields in the underlying database and also reduce the time taken to develop the reports.

\* **Building interfaces between ERP’s and other disparate systems**

Despite the broad functionality available from ERP applications it is unlikely that it will be the only system in use within an enterprise.

It is also rare for a software package to be implemented in isolation so there will be a need for data to be exchanged between applications. Meeting the challenge of application integration requires a thorough knowledge of the data structures in all of the participating applications so that accurate mapping and integration rules can be established.

Without a detailed knowledge of the ERP metadata in order to identify the key points of integration, these projects can be prolonged and delay the benefits of the overall initiative to the business.

\* **Upgrading or rationalizing multiple ERP applications**

Organizations that are engaged on a project to upgrade to a newer version of an ERP application will require information on any changes that had been made to the original so that they can be replicated easily in the new implementation.

Being able to compare the metadata in both versions will enable the project team to identify where customizations have been made in the past and where they might be required in the new version. This is likely to reduce the time taken to perform the metadata analysis and therefore the overall project time whilst also increasing accuracy.

When rationalizing existing ERP applications it is critical to have a very clear picture of the metadata in all instances so that any customizations can be taken into consideration before finalizing the design of the final version..

\* **Migrating from a legacy application to packaged ERP system**

When planning to migrate from legacy applications to packaged ERP applications there are two specific areas which would benefit from having a clear view of the detailed ERP metadata.

Firstly in order to align business process between the two products it is important to understand the metadata in the ERP application to ensure that it provides the breadth of functionality previously available and also to enable staff to identify where there may be gaps which need to be filled through customer development.

Secondly during the 'data take on' phase it is imperative that historical data from the legacy application is loaded into the correct tables and columns in the ERP database. Accurate understanding of the metadata in the ERP application will

reduce the time taken to model the target system and the risk of having to rerun data loads due to inaccuracy.

\* **Implementing a Master Data Management strategy**

Implementing an effective master data management strategy ultimately requires a deep knowledge of the metadata in the participating applications. This helps to ensure accuracy and efficiency in delivery of objective of the project whether it is customer, product or employee focused.

\* **Data Governance projects**

Data Governance involves putting into place policies and controls which affect how data is used across an entire company with the objective of enabling that organization to make best use of data as an asset of the business.

In many ways trying to implement some of the above projects without Data Governance means that additional data silo's and inconsistent policies and definitions are possible.

Governance policy is critically dependent on methods, tools and metadata for the implementation phase.

**Why is it difficult to extract meaningful metadata from the main ERP application packages?**

There are a number of factors which contribute to the difficulty in obtaining value from the metadata in the main ERP packages.

Firstly there is the nature of the ERP application itself. It was originally designed to be a functional 'black box' and to stand on its own and so access to the detailed metadata was not deemed to be necessary except perhaps for implementers and technical staff who were involved in customization and maintenance. This means that virtually no tools were developed to assist non technical staff to understand this level of detail.

Secondly the sheer size of the databases (for example a standard SAP implementation now contains over 90,000 tables) and the complexity of their structures and relationships means that without some mechanism which allows for items to be searched and relationships displayed between data tables it is a very long winded and highly technical process to find the data one is seeking. For example 'Customer' is found

in over 400 SAP tables, but which ones are the most important and relevant to a particular project and which transactions are they part of?

Further because of the need to be able to support multiple languages and run on different database platforms, ERP applications tend to use only the simpler features of the underlying databases, other features they need being incorporated into their own proprietary design. These two important factors influence the way the database is used.

**1. Multiple Language Support:** Most ERP packages support multiple languages. Users can see the screen dialogs and report texts in their language of choice (English, German, Italian....). In order to accommodate this multi -language capability, textual screen prompts and report headings, etc. are stored as part of the product's Data Dictionary. This means that the physical table and column names where the data is stored bear little resemblance to the descriptive text for each respective column. For example, in SAP, the table called KNA1 holds data about Customers and in that table there is a column called ORT01 which holds the City.

This means that it is very difficult to understand the structure of the metadata by looking at the Table and Column names, as you might do with any other database. The 'meaningful' textual descriptions are held in the data dictionary and do not relate easily to the table and column names.

**2. RDBMS Independence:** Enterprise Applications can be implemented on a range of RDBMS types (DB2, Oracle, MS SQL Server...) These databases are utilized at a very simple level, implementing many of the features normally associated with an RDBMS via the Application's own Data Dictionary. For example, the relationship information defining how SAP tables are joined is held in the data dictionary, not in the underlying database.

### **Traditional methods for finding and using ERP metadata**

Gaining knowledge about the ERP package metadata is challenging because of the large number of tables and database implementation. Traditionally analysts, architects and modelers who require detailed information about the metadata use a variety of methods to find the details they need.

- \* **Exploring the package documentation or publications**

Often package vendors will provide documentation about the application, however this tends to be focused towards the system administration functions or the end user rather than providing information about the data structures

behind the application. Documentation about the application can also become out of date quickly, especially if modifications are made to the applications.

Systems Integrators or internal consultants who have put in the application may also provide documentation specific to the implementation especially if it has been customized to meet requirements. Whether detailed information regarding the metadata is included will largely depend on the instructions the implementer was given and whether that particular information is available to the documentation team.

\* **Searching the internet**

Searching the internet can also provide some detailed information on application metadata. However it may not be as detailed as required, may be out of date, and is clearly unlikely to reflect any customizations that have been made to the standard product.

Internet forums can be a useful source of information although they are not always active.

\* **Seek out an expert**

It is always possible to find a specialist who may have the knowledge required, if the application has not been customized.

Additionally it is possible to engage external or internal technical resources to make use of the tools available in the ERP application (e.g. ABAP Workbench for SAP) to isolate the appropriate data, analyze the relationships between different tables, find the business definitions and then consolidate and present that information in an easily consumable fashion, perhaps in a data modeling tool.

This can be very time consuming and expensive especially if external resources are used. Internal resources may be dedicated to other projects and not available when required.

This approach also reduces the potential for detailed knowledge of the application metadata and how to find it to be retained in house, or within the teams who have need of it.

## **How Safyr aids metadata extraction, exploration and management**

The software tools market is crowded with products offering reporting, data movement, data cleansing and a host of other functionality and which are related to data warehousing, master data management, integration and other project requirements. Many of these are based on some kind of metadata architecture. Most recognize the importance of metadata for good project governance and implementation. However, in the Enterprise Application market, very specific metadata is required to make project implementation practical.

Safyr provides a non technical user with the ability to extract and store metadata from standard or customized ERP application from SAP, Salesforce, Oracle EBS, PeopleSoft, Siebel., Microsoft Dynamics and JD Edwards.

Once stored in Safyr's repository the user can explore and search the detailed metadata for specific topics, applications and discover all relevant relationships between tables. Metadata is presented in a meaningful way by combining the technical and business terminology. Safyr makes it practical for both technical and business users to quickly discover the location of the data items in which they have an interest.

Once the relevant objects have been identified the information can be exported to a range of modeling or repository tools. (Erwin, ERStudio, PowerDesigner, ASG Rochade etc.)

The interface to these Case tools allows entity-relationship diagrams of chosen data structures to be easily created.

## **Safyr product description**

Safyr is an application with the following features:

- Extraction of all metadata from SAP, SAP BW, Siebel, J.D. Edwards OneWorld, PeopleSoft, Salesforce, Microsoft Dynamics and Oracle E-Business Suite for storage in the Safyr repository, regardless of whether the application implementation is standard or customized.
- Powerful text search and filter capabilities of the metadata.
- Metadata export to wide variety of 3<sup>rd</sup> party modeling tools, metadata repository products and data integration software.



- System-to-system comparison features to help identify differences between releases and installations.
- Detailed Logical and Physical views of the tables.

Extracted metadata is held in the Safyr repository, a set of database tables implemented in Oracle, SQL Server or a range of other RDBMS types.

Safyr makes available the following information:

- Tables (physical and logical names)
- Fields
- Relationships
- Data Elements
- Domains
- Views
- Indexes
- Table row count
- Application hierarchy

Safyr has powerful generic search features that allow tables and fields to be quickly located. For example it becomes easy to find all the tables that use a particular field, or find all tables with a particular string in their name.

The screenshot shows the 'Model Overview [Tables]' window in Safyr. At the top, there are tabs for 'Tables', 'Views', 'Data Elements', and 'Domains'. Below these is a search filter section with the following fields:

- Table Name: ~
- Short Description: ~\*customer\*
- Subject Area ID: [Dropdown]
- Buttons: Search, X, Advanced Search

The main table displays the following data:

Tbl Name	Short Desc	Tbl Type	No. of Child Tbls	No. of Parent Tbls	Row Count
KNA1	General Data in Customer Master	Transparent	847	51	98
TS82A	Infotypes: Customer-Specific Settings	Transparent	123	2	3964
TBRF100	BRF: Application Class (Customer-Specific Features)	Transparent	110	5	17
T151	Customers: Customer Groups	Transparent	66	0	28
T171	Customers: Sales Districts	Transparent	46	0	40
T188	Conditions: Groups for Customer Classifications	Transparent	40	0	10
TINC	Customers: Incoterms	Transparent	40	0	93
TZONE	Customers: Regional zones	Transparent	30	2	338
T077D	Customer account groups	Transparent	28	2	140
THIT	Customer Hierarchy Types	Transparent	22	2	5
THV_APP_C	Customer Tab:Details for Hierrachy Visualization applica	Transparent	19	0	2
TPRIO	Customers: Delivery Priorities	Transparent	19	0	10
THVOBJCAT_C	Customer Tab: Object Categories for Application	Transparent	17	1	4
TSKD	Customer Taxes	Transparent	16	2	260
KNB1	Customer Master (Company Code)	Transparent	15	25	84
/DSD/HH_RACVHD	DSD Route Settlement: Customer Visit - Header	Transparent	15	5	0
TVKT	Customers: Account Assignment Groups	Transparent	14	0	18
TVKD	Customer Pricing Procedures	Transparent	12	0	21
TVSD	Customers: Statistics groups	Transparent	11	0	20
T176	Sales Documents: Customer Order Types	Transparent	11	0	20

At the bottom of the window, it shows 'No of Records: 1215' and a 'Change No of Rec Limit' button.

Browsing with Safyr. Searching for tables containing "customer". Note information about numbers of Child and Parent tables and Row count are also provided.

The screenshot displays the 'Table Details: KNA1 | General Data in Customer Master' window. The 'Fields' tab is active, showing a list of fields with their positions and descriptions. The 'REGIO' field (position 8) is selected. The 'Field Details' pane on the right provides specific information for this field, including its name, short description, position, key flag, mandatory status, parent table/field, data element name, domain name, data type/ERP, length, and entity table. A 'Descriptions' section at the bottom of the field details pane provides technical information about the field's usage in addresses.

Fieldname	Posit	Fieldtext
MANDT	1	Client
KUNNR	2	Customer
LAND 1	3	Country
NAME 1	4	Name
NAME 2	5	Name 2
ORT01	6	City
PSTLZ	7	Postal Code
REGIO	8	Region
SORTL	9	Search term
STRAS	10	Street
TELF 1	11	Telephone 1
TELFX	12	Fax Number
XCPDK	13	One-time account
ADRNR	14	Address
MCOD 1	15	Name
MCOD 2	16	Name 2
MCOD 3	17	City
ANRED	19	Title
AUFSD	20	Central order block
BAHNE	21	Express station
BAHNS	22	Train station
BBBNR	23	Int. location no. 1
BBSNR	24	Int. location no. 2
BEGRU	25	Authorization Group
BRSCH	26	Industry

**Field Details for REGIO:**

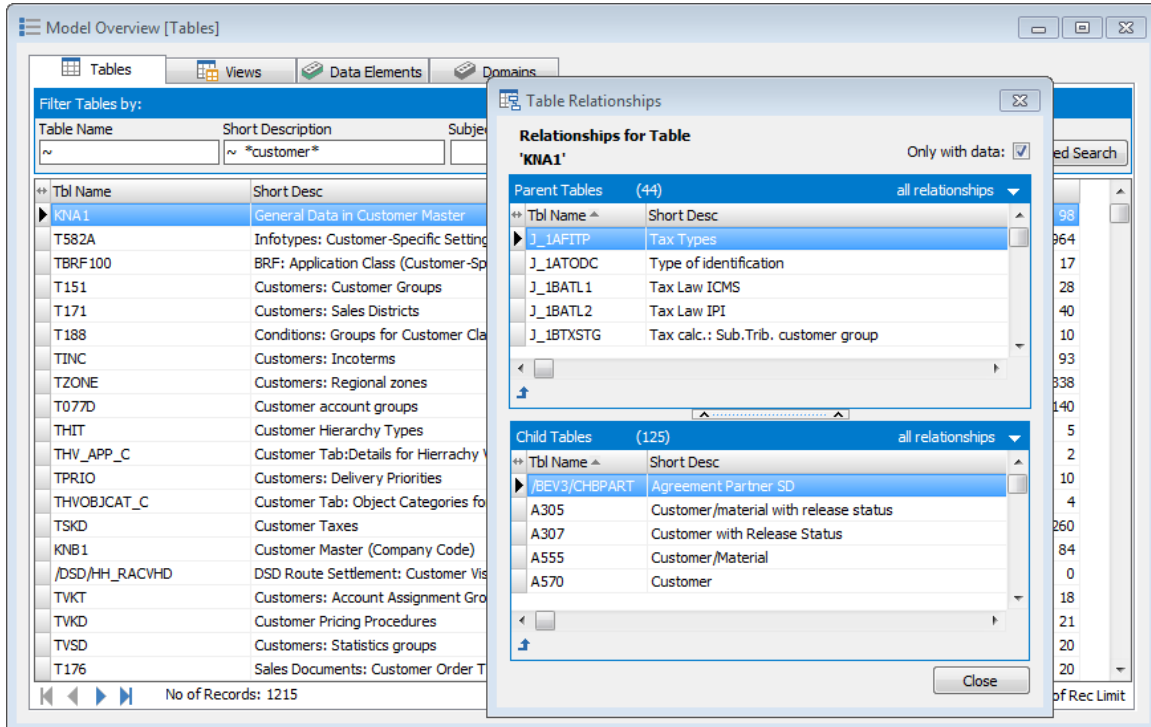
- Field Name: REGIO
- Short Desc: Region
- Posit: 8
- Key Flag: N
- Mandatory: N
- Parent Table/Field: T005S BLAND
- Data Element Name: REGIO
- Short Desc: Region
- Domain Name: REGIO
- Short Desc: Regional code
- Data Type / ERP: String / CHAR
- Length: 3
- Entity Table: T005S

**Descriptions (T = technical description):**

- Field (T):** In some countries, the region forms part of the address. The meaning depends on the country.
- Data Element:** The automatic address formatting function prints the region in addresses in the USA, Canada, Italy, Brazil or Australia, and the county in Great Britain.

*Browsing with Safyr. Drill down to table and field details. Fields are identified as primary or foreign keys as appropriate and navigation route to related tables is shown.*



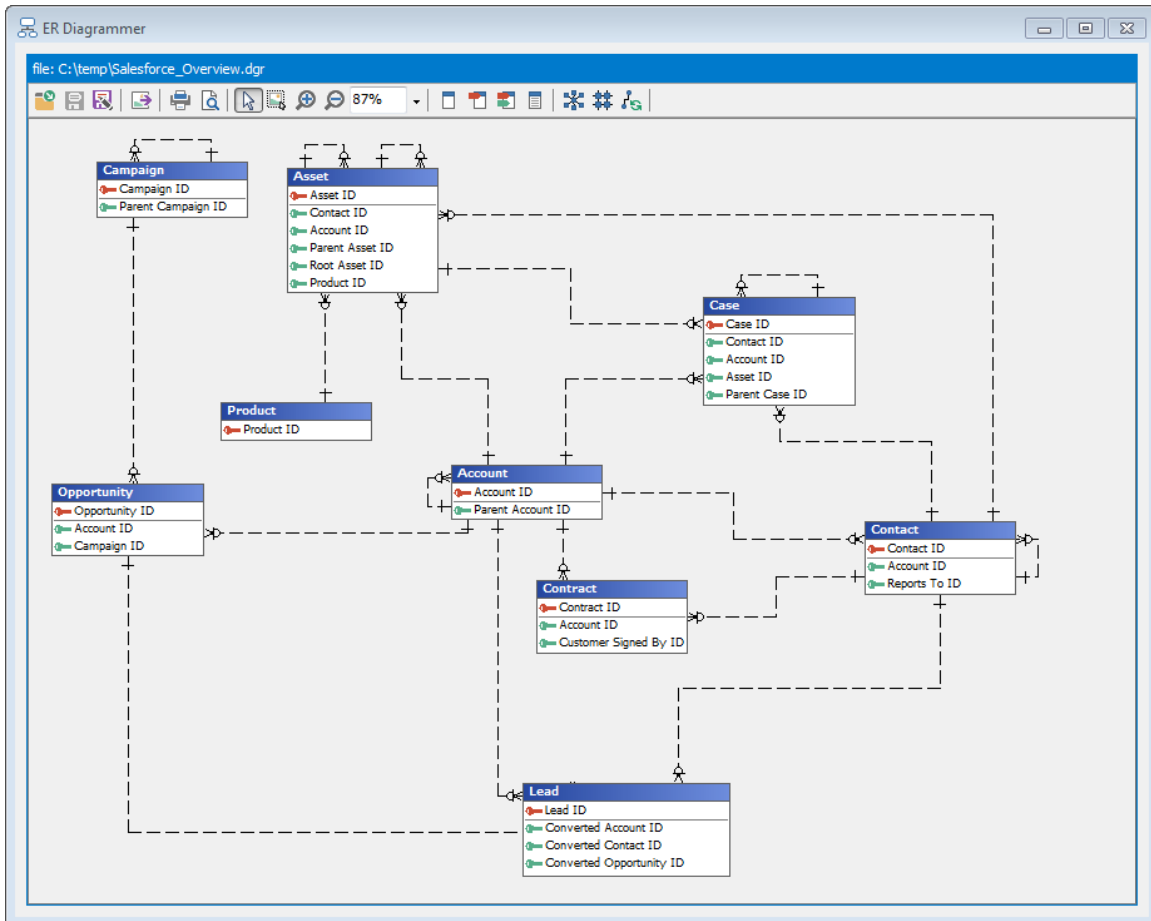


Viewing Parent and Child tables for a chosen SAP table. Note 'only with data' is selected so only those related tables which contain data will be seen.

Safyr also has simple-to-use data browsing capabilities – valuable confirmation that the data items found really do hold the data required.

Exporting the results of scoping and analysis out from Safyr into data modeling tools (such as PowerDesigner, Erwin, ER/Studio, System Architect) makes the results available for further modeling and architecture work. Safyr can also export to data integration, metadata management and other products.

In addition Safyr has its own Enterprise Relationship Diagrammer which allows for results to be quickly viewed and shared.



Example of Data model visualization using Safyr Enterprise Diagrammer

## Safyr Summary

Any project that involves accessing data from large ERP packages like SAP will need an understanding of the data structures involved. Normally, the personnel in such projects do not have the specialist knowledge of these applications and are reliant on scarce and expensive resources outside the project team to give them that knowledge. Safyr reduces this dependency on external resources by providing such projects with an *exploration technology* for Enterprise Applications.

Using the Safyr tool to interface with data modeling technologies creates data models that provide a *unique* view which helps to unlock the complexities of these key Enterprise Applications.

Safyr stores a copy of the extracted metadata in its own repository, and once this repository is populated, there is no need to access the 'source' system for day-to-day access to these structures.

Safyr recognizes and reveals any customization made to the standard 'reference model' delivered by the Enterprise Application vendor.

Safyr's 'Model Comparison' feature provides a simple yet powerful means to identify changes between two different releases or two different implementations of the application.

### **Main benefits from using Safyr**

- Significant reduction in the time and cost normally associated with any project that requires detailed insight into the metadata of major ERP applications.

Estimates are that most Safyr implementations will pay for themselves with a matter of a few months.

- Reduced risks associated with inaccurate or unavailable metadata.
- Enhanced visibility and control over ERP metadata quality.
- Improved communication between IT and the business and greater levels of trust in data accuracy.

We welcome your feedback: If you have any comments on this document we would value your input. Please send your comments or questions to [info@silwoodtechnology.com](mailto:info@silwoodtechnology.com)

### **About Silwood Technology Ltd**

**Silwood Technology** is the leading supplier of tools & services that enable enterprise architects and data modellers to explore, document and visualize data structures of large Enterprise Application Packages such as SAP, SAP BW, Salesforce, PeopleSoft, JDEdwards, Siebel, Microsoft Dynamics and Oracle E-Business Suite.

Silwood Technology's unique toolset, Safyr allows users to build up their own domain knowledge of these complex application packages in support of key projects such as BI, Data Governance, Enterprise Architecture and Master Data Management.

Visit [www.silwoodtechnology.com](http://www.silwoodtechnology.com) to find out how you can use Safyr technology to ensure that your enterprise applications can be fully integrated with your corporate metadata management strategies and modelling toolsets such as Erwin, PowerDesigner, ER/Studio and leading repositories such as ASG Rochade and Adaptive.

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