

# ICL MAINFRAME APPLICATION UNDERSTANDING, MIGRATION & MODERNISATION

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## **Executive Summary**

Many IT departments are currently considering ways of either improving the operation of their ICL VME systems and/or replacing them with different hardware and more standard operating systems, such as Microsoft Windows, UNIX and Linux.

Improvements to the ICL-based operation and applications, before considering moving platform, can include:

- Obtaining a full understanding of the applications to assist change management, impact analysis, data mining, application restructuring and partitioning, and documentation
- Supplementing the character-based screens with a graphical user interface, typically via a browser
- The periodic (daily, weekly, etc) off-loading of the IDMS-X data into a relational database, such as Oracle or Microsoft SQL Server, on a separate server, for data warehousing or Executive Information Systems (EIS) activities
- The conversion of the Application Master (AM) applications into structured COBOL. This may be a strategic requirement as either a first step to migration or because it

The Transoft Legacy Liberator ICL migration toolset is a comprehensive set of tools and facilities to automate as much as possible the migration process; not only for the application code but also the TP monitor, user interface, database, job control language and the data to your platform of choice. Transoft Legacy Liberator offers you a wide choice of user interface from character screens to modern Windows thin client or browser environments. It also takes your IDMS-X data to a modern relational database management system, such as Oracle or SQL Server.

Transoft views migration as the first step towards being able to obtain business process improvement or business-on-demand computing offered by new technologies on open systems platforms. This is achieved through Transoft application modernisation and integration products and services to build new business processes from the existing application services. This allows you to extend these processes beyond your traditional organisational boundaries, leading to improved customer service and reduced transaction costs.

## Introduction

Many IT departments plan to phase out their ICL VME proprietary platform. Even if this is the intended final result, it usually starts with the need to better understand these VME applications in addition to implementing immediate new business and technology requirements.

The options for moving off the ICL mainframe are application replacement, either through a package implementation or re-development, or application migration.

ICL mainframe applications typically contain decades of business process refinement and value. They fundamentally meet the processing needs of the organisation, but usually there are new drivers that are best suited to modern technologies.

These new business and technology drivers fall into the following broad requirements:

- 'e-Business enabling' of the application
- Transforming the user interface of the application
- Changing the application's database technology
- Integrating the application with other enterprise systems
- Being in a position to easily meet changing business functions or models.

This is by no means a complete list but it does represent some common themes among ICL mainframe users.

Some organisations with pressing business requirements would like, if it were possible, to take advantage of new technology solutions even before moving from the ICL mainframe.

## Application Understanding

Whatever your goals, it is essential to understand what your existing applications do and the options available to meet these goals.

A thorough understanding of your existing applications is an essential prerequisite for successful migration, modernization and integration projects. Transoft offers a comprehensive **Pathfinder Project** to provide this understanding, the

options, recommended solutions, technical issues, risk mitigation plans, business continuity plans and project plans together with timescales and costs.

### ***Transoft Pathfinder Projects***

**“We know where we would like to be. All we have to do now is figure out how to get there.”**

The purpose of a Pathfinder is to gain a full understanding of your software assets as they currently stand, the current and future requirements of the business, and a detailed exploration of all of the possible options to assemble an IT environment that will best support those requirements. It can also cover current staff skill sets and identifies any areas where there are new requirements that may need to be addressed.

A Pathfinder Project is centred on a series of interactive workshops that will involve Transoft’s specialist consultants and the relevant personnel from your organisation. The purpose of the workshops is to address, in advance, all aspects of the application migration, modernisation or integration projects being planned. The exact composition and timing of the workshops varies from client to client depending on the nature of the applications and the specific goals of the planned project. Types of workshop include:

- Application & Architecture
- Migration requirements
- Modernization requirements
- Integration requirements
- Testing

- Project Management
- Risk Review.

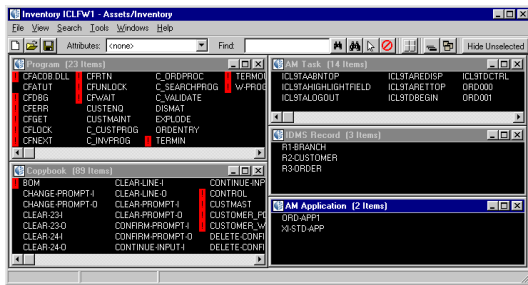
In addition to the workshops, Transoft has various application understanding tools. The Transoft evolveIT toolset, in particular, can be used to aid documentation and understanding of COBOL-centric applications, and is used on Pathfinder Projects.

A key concern of IT management is the ability to accurately establish the scope, timescale, cost and risk associated with any change to core applications. Transoft evolveIT provides this information quickly and accurately because it uniquely combines a total model of the entire application and excellent graphical outputs - in addition to comprehensive reports.

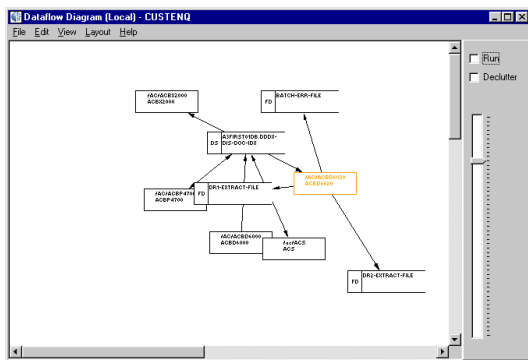
Transoft evolveIT is able to assist in the following key IT missions:

- Change Management - scope, time, cost and risk of change
- Impact Analysis - drilling down to application assets impacted
- Data Mining - determining change to data items
- Understanding & documentation
- Application re-structuring & partitioning
- Gap analysis for package replacement.

Transoft evolveIT is deployed as a Windows workbench giving unique graphical insights into your entire mainframe application. It 'understands' all the COBOL programs and DDS segments, AM code, IDSMX data, TPMS screens and SCL jobs.



Transoft evolveIT Inventory Viewer showing VME assets



Transoft evolveIT IDMS-X Data Flow Diagram

From the Pathfinder Project a comprehensive roadmap is produced based on the results of these detailed investigations. The roadmap is presented in the form of a **Pathfinder Report** and includes sections on:

- Investigation findings
- Options available
- Recommended solutions
- Technical issues
- Business continuity plans
- Risk mitigation plans
- Project plans
- Timescales, and
- Costs.

## Improve before you move

In addition to a Transoft Pathfinder project and the use of the Transoft evolveIT toolset to better understand your VME-based applications and gain productivity and quality benefits, you are able to implement a range of business and technology improvements *now* before considering application replacement. These include:

- Supplementing the VME character-based screens with a graphical user interface, typically via a browser
- The periodic (daily, weekly, etc) off-loading of the IDMS-X data into a relational database, such as Oracle or Microsoft SQL Server, on a separate server, for data warehousing or Executive Information Systems (EIS) activities
- The conversion of the Application Master (AM) applications into structured COBOL. This may be a strategic requirement as either a first step to migration or because it is increasingly difficult to recruit and retain AM developers.

### **Implement a graphical user interface**

Existing applications may well still be using the traditional ICL 'green-screens' supported by TPMS (or indeed other TP monitors such as TPS and TPE).

Improvements can be made to this type of user interface by deploying Fujitsu's Dialogue Manager and other products in the Host-Talk set. This excellent set of products offers a modern (Web-based) interface to legacy systems.

Transoft's professional services team can offer expertise in this area thus enabling you to take the greatest advantage of the facilities available within the product set.

### **Off-load IDMS-X data**

Do you have the requirements to:

- Obtain improved reporting from your IDMS-X data, via modern SQL-based business intelligence tools, report writers or spreadsheets
- Reduce the load on the enterprise server
- Warehouse the IDMS-X data or make it available to other applications
- Ensure a business archive today which can be accessed now and still be available in a few years time when you may no longer be using VME?

The IDMS-X data can be pumped to an industrial strength relational database, such as Oracle or Microsoft SQL Server, on UNIX or Windows platforms on a periodic basis, daily, weekly, etc.

Once the selected data is retrieved, the Transoft supplied Officemaster's Navidata toolset enables:

- Loading the output file into your relational database of choice, say, Oracle or SQL Server from which you can then perform EIS activities, using tools such as Cognos Impromptu, Business Objects or Crystal Reports making reports available across the Web; in addition to passing the data to spreadsheets.

- HTML access directly to the data, allowing you to view the IDMS-X relationships and data, as if it was in the VME environment.

### **Application Master conversion to COBOL**

No new version of AM has been released on VME for many years now and as a result AM has become an unfashionable means of producing application code. This has made it sometimes difficult and expensive to recruit qualified developers to work with AM.

The Transoft approach is to convert the existing AM application into easily maintainable COBOL that continues to run on the VME platform. This approach immediately overcomes the staffing issues.

The **AM Converter** produces COBOL code that is VME C2 compliant. The COBOL is easily maintainable as it uses the data names defined within the dictionary and produces a standard structured procedure division. A short training course is available, if necessary, to enable the developers to understand the structure of the resulting COBOL programs.

### **Implement package, re-develop or migrate?**

The implementation of a package or the re-development of the application may initially seem attractive routes to obtain new business and technology needs. But there is one thing organisations frequently overlook. That is, unless business processes have changed significantly, the minimum requirement of a new application is that it does all the things the existing application does – if it doesn't then

you will never get to the point where you can turn off the existing system.

The experience of many organisations has been that often large modifications have to be made to a packaged solution. This functionality shortfall can frequently elongate package implementation projects and of course drive up the costs. Add to this the technical learning curve and the users' learning curve, and an organisation can be presented with a scale of project that at the very least will impact its daily operations for a period of time, and in extreme cases could actually seriously affect its overall performance.

The 'green field' re-development approach has the compelling promise to deliver a solution that will meet the new technology requirements, give additional functionality requirements and still leave the company in control of its IT direction for the future. However, a re-development strategy is without question the most risky, and probably the most expensive, option to take.

Unfortunately the IT industry has a poor reputation for turning in such projects on time or on budget.

Also, frequently while these new developments are in progress, the existing systems are left with little or no maintenance resource and therefore start to fall even further behind the business needs. This in turn results in even more pressure for the new system. This forces corners to be cut to speed-up delivery, or costs to be escalated by throwing more resources at the new development project, with the belief this will speed-up completion.

The bottom line is that in the current business climate, there is just not the

IT budget available to undertake large-scale package replacement or re-development. CEOs are demanding greater ROI from existing assets, including those in IT.

However, there is now another approach available. Application migration and modernisation is rapidly being seen as the only really viable alternative to the *slash and burn* approach of replacing existing applications with packages, or through grandiose new development projects. The principles behind an application migration and modernisation solution are based on the optimum re-use of valuable existing business logic and data, combined with the marriage of new technology where appropriate.

The Aberdeen Group summarises it this way:

"Today's pressure on IT departments to use existing resources cost-effectively continues to increase... the answer is to leverage existing business-critical applications and information more effectively."

In the case of ICL mainframe applications, a generally ideal approach is firstly the migration of these applications to Linux, UNIX or Windows servers. Next is to, optionally, deploy new e-business or distributed solutions, using such technologies as Java/J2EE or Microsoft .NET, that integrate with the key business services and data from the migrated application.

### **Transoft Application Migration & Modernisation solutions**

Transoft, a leading expert in application migration and modernisation solutions, has more



## Transoft ICL mainframe migration project approach

Transoft's approach to ICL mainframe migration and modernisation projects consists of the following phases:

| Project Phase            | General Tasks  |
|--------------------------|--|
| Pathfinder               | Requirements Definition; Application Inventory; Roadmap; High Level Architecture; Scope          |
| Inception                | Establish Project Team & Set-Up; General Analysis; 3 <sup>rd</sup> Party Product Evaluation      |
| Design                   | Architecture; Database & ETL (Extract, Transform, Load); Prototypes; Test Plans                  |
| Technical Set-Up         | Product Installation & Configuration; Tool Set-Up; Construction Procedures                       |
| Construction/Development | COBOL Conversion; Screens, TP Monitor, System Calls; Database Build; I/O Module, SCL, Interfaces |
| Testing                  | Unit and System Integration  |
| Deployment               | Documentation, Training and Implementation   |

These key considerations include:

- Is the migration intended to be a short-term tactical solution, or a long-term foundation for business enhancement
- What platform, TP monitor replacement, user interface, database and new technology environment do you wish to go to
- Have you planned for all facets of the migration, or simply "code-conversion"
- Is your IT team ready to support the new technical environment
- Do you have a change management plan
- How do you intend to accept the application
- What is ?SDDJDX)SQkkDXcxODSX,xqSqDqq?)?JXox)

### Pathfinder

The initial phase of any migration is a Pathfinder project and is most important as it seeks to understand what assets the ICL mainframe applications consist of; review the key considerations and plan for all aspects of the migration and implementation.



## **Transoft Legacy Liberator - ICL migration toolset**

Transoft Legacy Liberator consists of a set of migration tools and facilities that automates, as far as possible, the migration process providing the widest possible choice of taking

## **Migrating application code - not only COBOL but also Application Master**

Although Transoft provides migration tools for languages, such as, Fortran, C, Assembler and so on, the majority of VME applications have been developed in COBOL or Application Master. The **COBOL Converter**, part of Transoft Legacy Liberator, migrates ICL mainframe COBOL programs to an ANSI '85 standard open systems COBOL, such as ACUCOBOL, from Acucorp, and Net Express or Application Server, from Micro Focus, both leading COBOL compiler vendors.

Application Master (AM) is the fourth-generation language available on the VME platform. AM may be used to produce on-line, batch and reporting applications.

The application developer uses the VME Data Dictionary System (DDS) in order to define the data present in the business environment along with the processes that are performed upon that data. These data and processing descriptions are held in both a business and a computing form.

In order to produce the application, the data and processes from the DDS are compiled directly into an executable form.

If you have Application Master code then this too is converted to fully structured COBOL by the **AM Converter**, allowing you to continue to maintain these applications in the new COBOL integrated development environment.

The COBOL code produced is again to ANSI '85 standards. The COBOL is easily maintainable as it uses the data names defined within the dictionary and produces a standard structured procedure division. Additionally, the new relational database of choice is also included in the conversion.

ICL9 system calls are either converted directly to COBOL, by the COBOL Converter, or to equivalent open systems callable routines.

## **TP monitor replacement**

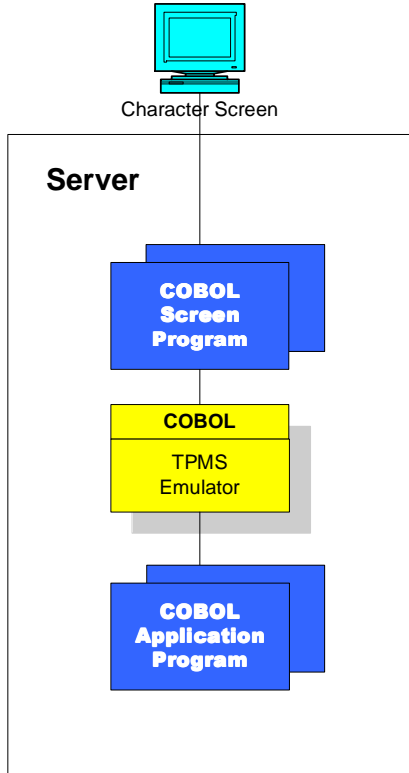
The VME Transaction Processing (TP) monitor, TPMS, requires replacing in the open systems environment. TPMS is a complex system offering a wide range of features. However, many TPMS applications simply use the core facilities while some systems are highly sophisticated. According to the nature of the application to be migrated one of the options below will be chosen.

Transoft provides three options for replacing the ICL TP monitor:

- TPMS Emulator
- XA Compliant TP monitor
- Transoft TP Broker.



## 1. TPMS Emulator



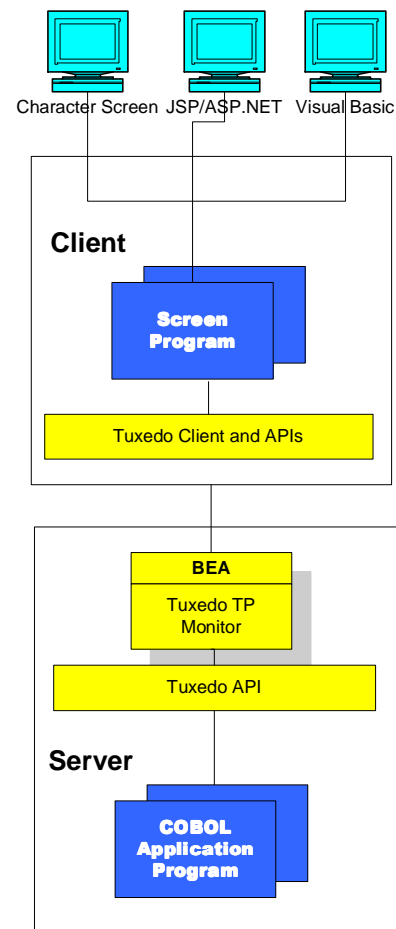
- TPMS Emulator
- Supports widely used TPMS features
  - All COBOL
  - Low cost

In many application implementations the more advanced TPMS features are not used or needed. Additionally, in most modern open systems environments, the combination of the operating system and a relational database provides features found in TPMS in the VME environment.

In these cases, Transoft provides a TP monitor TPMS Emulator, written in COBOL. TPMS Emulator controls access to the on-line programs, handles the connections from one Transaction Program to another, manages the use of the transaction

area and ensures the display of each screen as it is required. All the basic features of TPMS are supported, including partial results, on-line printing, timer tasks, etc. Application programs remain unchanged, except for the TP CALL statements but the system is driven by the original TPMS parameter file.

## 2. XA Compliant TP monitor



- BEA Tuxedo
- XA transactional compliance (if supported by application)
  - Scalable/high performance
  - Higher price

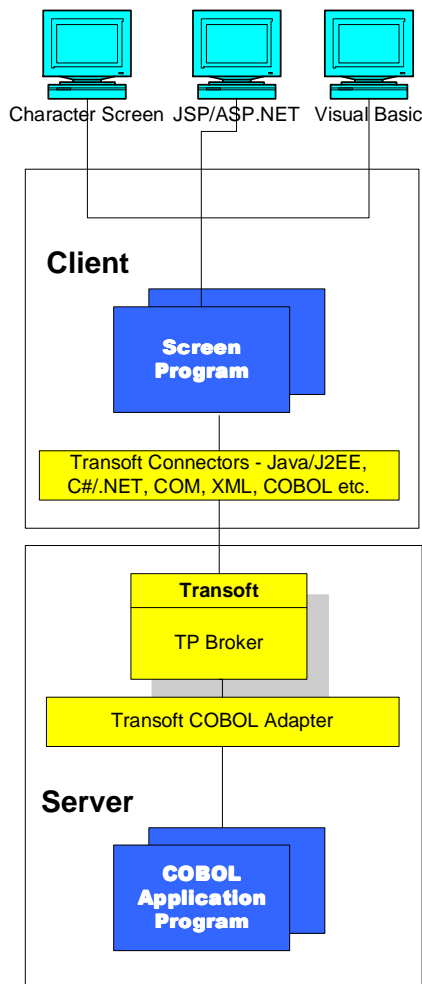
However, where comprehensive transaction recovery is required then



**evolving new solutions** from existing applications

Transoft will integrate the use of an open systems, XA compliant TP monitor, typically BEA's Tuxedo, into the solution to provide this functionality.

### 3. Transoft TP Broker



- Transoft TP Broker
- Scalable/high performance
  - Many client-side connectors, including Web services
  - Medium cost

An alternative approach, where scalability and the integration with new technologies is a requirement but transactional support is not, is to make

use of Transoft's legacy modernisation tools to wrap the COBOL Transaction Programs and expose them as services and reconstruct the on-line access in a browser delivered J2EE (as, say, Java Server Pages) or .NET (as, say, Active Server Pages.NET) environment. Here the Transoft TP Broker supplies the required TP monitor functionality.

### Migrating screens

The ICL mainframe application user interface is usually developed around VME screen templates. And screen I/O management is via the TPMS TP monitor that runs the application screens in block mode. In other words, the screen form input is completed by the user and is submitted to the appropriate COBOL program, via the TP monitor, which processes the input message. In response, the program outputs a message and/or form back to the user through the interface with the TP monitor.

Transoft Legacy Liberator provides the widest number of choices for modernizing your application's user interface. These choices are to some extent independent of the TPMS replacement strategy, described in the previous section.

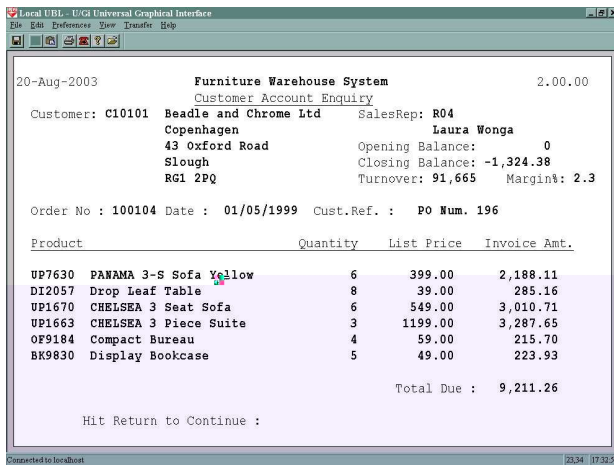
Transoft Legacy Liberator contains the **Screen Generator** that processes the ICL mainframe screen form files, converts them to XML for ease of maintenance (via a graphical screen designer), and can automatically generate two types of replacement screen.

Firstly, if a 'green-screen' character user interface is required ensuring no change for your user community and no re-training, then the Screen Generator will generate COBOL

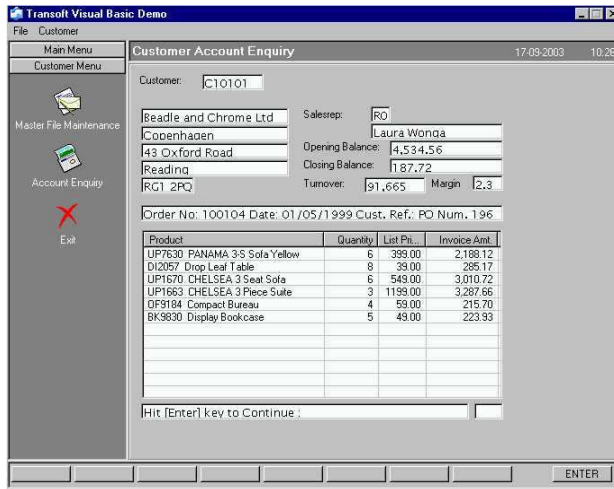




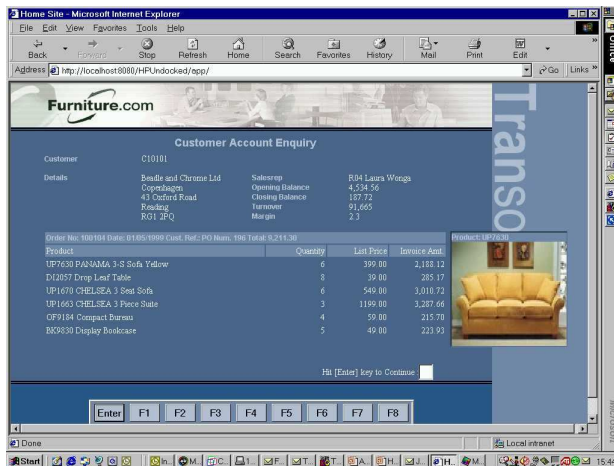
**Modernise the user interface**



**Character-based screen**



**Visual Basic form**



**JSP or ASP.NET browser-based screen**

In summary, Transoft Legacy Liberator provides the following support for migrated screen forms:

- Character screens, and
- ASP.NET (Active Server Pages.NET) browser delivery, and
- JSP (Java Server Pages) browser delivery, and
- Visual Basic 'thin' forms.

### **Migrating the IDMS-X database**

The ICL mainframe IDMS-X Codasyl compliant database provides users' applications with high performance pointer-based data access. Transoft migrates this database to a market-leading relational database (RDBMS) product.

Transoft has a 10-year history of successfully migrating proprietary database applications to open systems, replacing the database with an RDBMS.

To achieve this, Transoft Legacy Liberator analyses the IDMS-X data structures and file I/O requirements of the existing application, and normalises these data structures to become a corresponding relational model enabling access to the data in native SQL.

Additionally, a library of **embedded SQL COBOL modules** is generated, to provide the functional database I/O requirements for the application. The existing database I/O statements in the COBOL programs will now CALL to the new SQL I/O libraries. By optimizing the index structures of the database and using the power of SQL the existing qXOx)SQJBkARB?kBkJXBx)?S??kDXOx)SQJB



## **Migrating System Control Language**

Within the VME user community SCL has a very special and important place and many users have taken full advantage of its many facilities in order to produce applications that are partly written in COBOL and partly in SCL. Hence users have applications where SCL calls COBOL as a subroutine and others where COBOL calls SCL as a subroutine.

SCL is intimately related to COBOL with all manner of special facilities where they may interrelate. For example, using COBOL linkage sections or ACCEPT/DISPLAY verbs to read/write to SCL job space variables. Or perhaps using SCL's STOP LITERAL to perform functions in SCL while the COBOL program is executing.

There are two ways of moving the SCL forward onto more modern platforms. Both of these methods are provided by Transoft Legacy Liberator.

i) Emulating the VME environment thus allowing SCL to be used unchanged on the target platform.

This has immediate benefits in that the huge investment made in SCL by the user over the years is protected and is guaranteed to work unchanged.

ii) Converting the SCL to another language more easily maintainable in the new open systems environment.

Converters are available to make SCL into easily maintainable COBOL or Visual Basic.

The first of these is the preferred method as the full functionality of the original SCL procedures is retained and, indeed, may be used to control the running of native applications on the new platform.

The emulation supplied allows complete workloads to be controlled and supports VME facilities on a Windows or UNIX platform. The facilities supported include:

- Generation numbers
- Users
- Libraries
- Groups
- User Objects
- VME Procedures and VME/B Macros
- Interaction with COBOL's DISPLAY UPON/ACCEPT FROM
- STOP "literal" processing
- Procedure and command templates.

## **Data migration**

Transoft Legacy Liberator provides Extraction tools for IDMS-X, keyed IS files and any permanent sequential flat file data and corresponding Load tools for populating your new relational database and COBOL files. Conversion from EBCDIC to ASCII is automatic.

## **Schedulers**

VME provides sophisticated high-level scheduling facilities (JXS, MXS, PXS etc.). However, many users require a more global scheduling view enabling them to see their workloads as a whole rather than as a number of individual jobs. It is the interaction of



one job with another that can be difficult and the existing VME schedulers have few facilities in that area.

Thus, many users of VME have introduced a higher level of scheduling (Workload Scheduling). Typically, Helmsman (from Ultracomp/FoxIT) and PXS (from Loud and Bow) have been the chosen products. Some people, on the other hand, have written their own workload scheduler.

In transition, the existing workload schedule needs to be put in place on the new platform. Unfortunately, the existing Schedulers are not available on platforms other than VME.

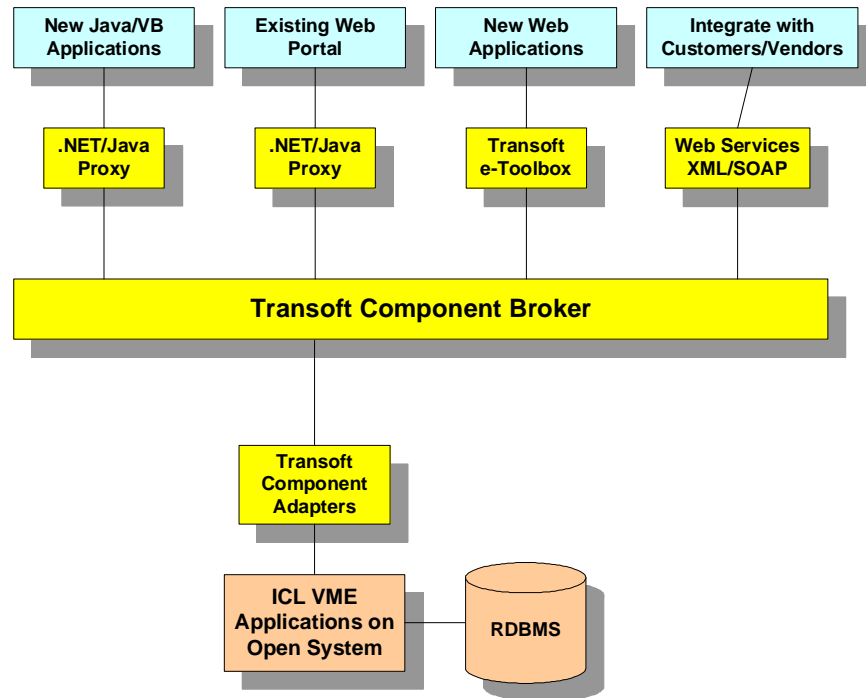
The Transoft offering includes assistance on moving workload

definitions on Helmsman/PXS to the user's chosen scheduler on the new platform. If there is no chosen workload scheduler on the new platform, then Transoft can provide one.

### **Implementation support & training**

Transoft provides both pre- and post-implementation support as required by you, and training is tailored to meet your needs including all aspects of the new environment, RDBMS administration, and the new development tools.





*Integrate new business processes after migration*

## Implement new business processes

If you need to deploy new business processes, such as Web applications in new technologies, after the migration, then **Transoft Component Adapters** can help you. This product set gives companies that run critical applications the ability to make the existing business rules and data in these applications available via a seamless and scalable interface layer to new application modules developed in, say, either J2EE or Microsoft .NET services.

These Component Adapters deliver their application services via the Transoft Component Broker and can be exposed as Java/J2EE or .NET compliant proxies, or XML-based Web services, for integration with new or other enterprise applications.

## e-Business B2B or B2C solutions

Corporations are under increasing pressure to *quickly* deploy business-to-business (B2B) and/or business-to-consumer (B2C) Web-delivered solutions to reach new and existing customers and suppliers with improved



*evolving new solutions from existing applications*

services. It is also essential that these e-business solutions are not only easy to use, but are fully integrated with the existing core business applications providing *'real-time' straight-through processing*.

For any organisation, the idea of building an e-business solution from scratch is daunting. There are many conflicting technologies and all the issues of security need considering, including user logon, user privileges, data encryption, context and state information, page-to-page integrity and integrity of the core application business services driving the e-business application.

Transoft has successfully addressed these issues with its unique **Transoft e-Toolbox** framework. This toolbox provides a Web server and platform-independent e-trading template application that will provide you 'off-the-shelf' with the majority of your e-business application. It is easy and flexible enough to be changed to meet your exact requirements. It also uses the Transoft Component Adapters and Component Broker middleware to ensure your existing core business application services are integrated into your Web application with *'real-time' straight-through processing*.



**Example B2B page using Transoft e-Toolbox**

## **The high return, low risk option**

Transoft's Application Migration and Modernisation solutions for ICL mainframe users provide a high return on the investment you have made in your existing applications. Because these solutions are based on your existing code and data they also provide a low risk approach to moving your application off the ICL mainframe, while providing you with an unequalled number of options for user interface technology, enterprise application integration and distributed application architectures. You decide on your strategy and use the options you require.

## **About Transoft**

Since 1986 Transoft has been helping organisations to **evolve new solutions** from their existing applications, delivering **improved business processes - faster**, with **less risk** and at **lower cost**.

Transoft's specialist tools and services have enabled thousands of companies to adopt the latest technologies as part of the development lifecycle of their existing applications. They have been able to keep applications productive and relevant to changing business needs for longer, therefore providing a continued return on investment.

Transoft provides application mining, migration, modernisation and integration solutions to customers in every region of the world, from offices in the USA and Europe, and with local business partners.

**Transoft enables you to deliver improved solutions - faster, with less risk and at demonstrably lower cost.**

**TO FIND OUT MORE...**

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