

Transoft OpenVMS Application Migration and Modernization

Executive Summary

Hewlett-Packard (HP) has announced end-of-life for the Alpha server. For various corporate reasons including the desire to support a single operating system (typically Windows), for better application integration or running costs reduction, some users will want to move off OpenVMS to an open systems platform rather than transition to OpenVMS on the new HP Integrity server.

The options for moving off OpenVMS are application replacement, either through a package implementation or re-development, or application migration. Why migrate? OpenVMS applications typically contain decades of business process refinement and value, are reliable and scalable; Transoft helps you migrate these applications to an open systems platform, faster with reduced risk compared to any application replacement option. It leverages these applications to meet process improvement (for example, e-business) through integration with the latest technologies (Java or .NET) *now* or after migration. Such an approach retains the value and increases the ROI of these core applications.

The decision process to migrate will obviously include which open system platform you wish to go to and the costs and timescales; but you also need to plan for all facets of the migration, not simply the "code-conversion". Transoft helps with this decision making by providing a process-oriented approach, identifying at the outset all key considerations, and the Transoft and client responsibilities. The migration is a tools-based project that results in a native implementation on the open system platform.

Transoft Legacy Liberator for OpenVMS

migration, includes the well established and proven Accelr8 Technology Corporation tools now owned by Transoft. It consists of a set of migration tools and facilities that automate as much as possible the migration process; not only for the application code but also the database, user interface, job control language (JCL) and the data to your platform of choice.

Transoft views migration as the first step towards being able to obtain business process improvement or even business-on-demand offered by new technologies on open system platforms. This is achieved through Transoft application modernization 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 organizational boundaries, leading to improved customer service and reduced transaction costs. See how this can be achieved *now* and after migration.

Introduction

With HP's announcement, that it is phasing out its Alpha server platform, a key IT priority has to be to decide whether to transition your OpenVMS applications to the new HP Integrity server staying on OpenVMS, or see this as an opportunity to move these applications to an UNIX, Linux or Windows platform. The reasons for wishing to move from OpenVMS include server and operating system consolidation, better application integration or running costs reduction.

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



OpenVMS applications typically contain decades of business process refinement and value. They fundamentally meet the processing needs of the organization, 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 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 OpenVMS users.

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

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 organizations 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 organizations has been that often significant 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 organization can be presented with a scale of project that at the very least will impact its daily operations for a period of time. In extreme cases this could actually seriously affect the organization's overall performance.

The 'green field' re-development approach has the compelling promise to deliver a solution that will meet the new technology requirements, 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 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 modernization 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 modernization 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 summarizes 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 OpenVMS applications, a generally ideal approach is firstly the migration of these applications to UNIX, Linux or Windows servers. Next 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 & Modernization solutions

Transoft, a leading expert in application migration and modernization solutions, has more than 18 years' experience migrating some 200 proprietary systems, including not only OpenVMS, but also IBM mainframe, HP e3000, Data General MV, Prime, NCR VRX, Bull GCOS and other proprietary systems to open systems platforms. Our application migration, modernization and integration technologies in addition to our services enable you to not only safely move your core applications, but to also improve and add functionality to them during the process.

For example, with the Transoft Legacy Liberator OpenVMS product set we can take your OpenVMS applications to an open systems platform of your choice.

We can also provide, using other Transoft products and services, *now* or after you migrate, the opportunity to add new business processes, such as B2B e-business. This will make use of the business logic and data from your OpenVMS applications delivered via the new technologies of Java/J2EE or Microsoft .NET.

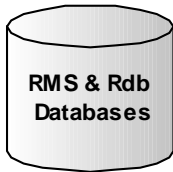
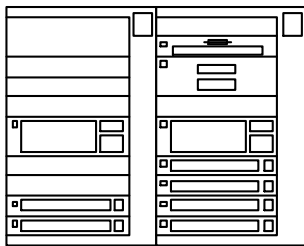
In all cases, our approach emphasizes reduction of any risk associated with change while helping you to plan for future development and integration with today's technology. Such an approach retains the value and increases the ROI of your core applications.

"We are a key leader in the healthcare industry for HP", said Al Gain, AMISYS vice president of product development. "And we needed to pick a leading partner that could help us quickly and easily move our CO-BOL-based programs and jobs to an open systems environment. After an intensive selection process, it became clear to us that Transoft, with its open technology road-map methodology and excellent record in migration solutions, would be the perfect partner."

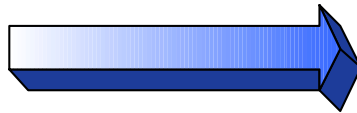




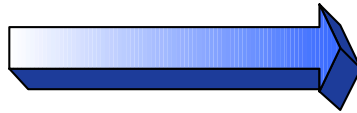
SMG or FMS screen form management



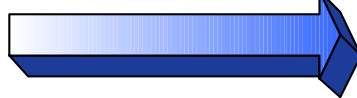
RMS & Rdb Databases



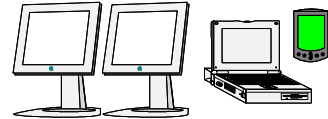
User interface can remain character-based or a new interface using Java, VB or ASP.NET/JSP browser-based deployment can be implemented.



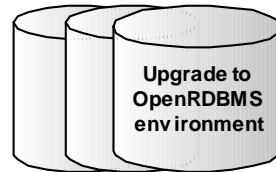
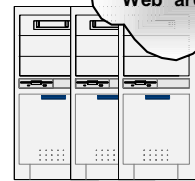
Tools-based migration of core COBOL, FORTRAN, Pascal, Ada, BASIC and C on-line and batch programs, with optional extraction and componentization of core business rules into re-usable 'application' or Web services.



RMS and Rdb databases migrated to RDBMS environment. Application data management layer underpinned with embedded SQL I/O services and called from original file access points in application.



Optionally deploy via Web architecture



Upgrade to OpenRDBMS environment

Transoft OpenVMS Application Migration & Modernization approach



OpenVMS White Paper

Transoft OpenVMS migration project approach

Transoft's approach to OpenVMS migration and modernization projects consists of the following phases:

Project Phase	General Tasks
Pathfinder	Requirements Definition; Roadmap; High Level Architecture; Scope
Inception	Establish Project Team & Set-Up; General Analysis; 3rd Party Tool Evaluation
Design	Architecture; Database & ETL (Extract, Transform, Load); Prototypes; Test Plans
Technical Set-Up	Product Installation & Configuration; Tool Set-Up; Construction Procedures
Construction/Development	Language Conversion; System Services; Database Build; DCL; Interfaces
Testing	Unit, System Testing; User Acceptance
Deployment	Documentation & Implementation

Pathfinder

The initial phase of any migration is a Pathfinder project and is most important as it seeks to understand what assets are contained in the OpenVMS applications; review the key considerations and plan for all aspects of the migration 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, 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?
- What is your data migration strategy?
- How do you intend to accept the application?

The Transoft Legacy Liberator analysis tool is used to establish all assets of the application (programs, Include files, DCL procedures, etc), the VMS run-time and system service routines used and their frequency together with a portability index. This index is a scale of 1 to 4 that specifies the effort required in migrating each program module. Level 1 denotes the code can be automatically ported using Transoft Legacy Liberator tools with little or no manual intervention, whereas level 4 denotes significant recoding is required.

One of the outcomes of the Pathfinder phase is the Roadmap that provides the total view of all elements involved in a migration, de-risking any technical issues, and includes:

- Budget requirements
- Resource requirements
- Timeline
- End-state objectives.

OpenVMS White Paper

The implementation of the Pathfinder through the migration and implementation is a team activity, with involvement from Transoft and the organization's business and IT users.

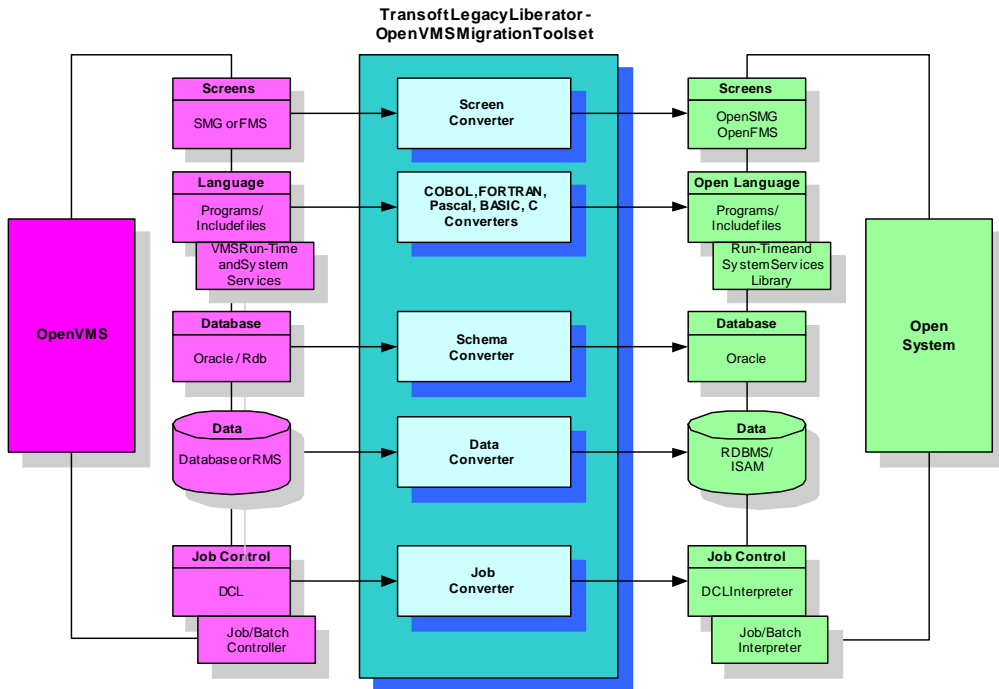
Transoft Legacy Liberator - OpenVMS migration toolset

Transoft Legacy Liberator for OpenVMS migration, includes the well established and proven Accelr8 Technology Corporation tools now owned by Transoft. It consists of a set of migration tools and facilities that automates, as far as possible, the migration process letting you take **every aspect** of your OpenVMS applications to an open systems platform, including UNIX, Linux or Windows.

In summary, the Transoft Legacy Liberator

for OpenVMS migration tools and facilities covers:

- An analysis tool that summarizes the OpenVMS system services used and the ease or difficulty of porting the applications
- COBOL, FORTRAN, Pascal, BASIC, Ada and C code conversion
- OpenVMS run-time and system services replacement library
- Open SMG and FMS screen and forms management replacements
- RMS and Rdb replacement with an open systems relational database or RMS with an open systems ISAM
- DCL command interpreter together with batch and print queue management
- Data migration.



Migrating application code - COBOL, FORTRAN, Pascal, BASIC and C

OpenVMS applications are developed in a wide variety of languages, including COBOL, FORTRAN, Pascal, BASIC and C.

Transoft Legacy Liberator OpenVMS migration toolset, converts COBOL, FORTRAN and C to be compatible with open systems equivalent compilers while preserving the 'look and feel' of the original source code. The converters remove OpenVMS compiler dependencies while preserving the full functionality of the original programs. They automatically create the proper linkage to the Transoft Legacy Liberator OpenVMS open systems replacement Run-Time and System Services library.

Pascal and BASIC programs are converted to understandable and concise C code, again with proper linkage to the OpenVMS open system replacement Run-Time and System Services library.

OpenVMS Run-Time & System Services replacement library

The Transoft Legacy Liberator OpenVMS open system replacement Run-Time and System Services library is the key to the migration of OpenVMS applications. This library provides the functionality of the VAX or Alpha server-based OpenVMS Run-Time Library (LIB\$ routines) and Systems Services (SYS\$ routines) calls on UNIX, Linux or Windows platforms and particularly benefits those applications that incorporate features such as Mailboxes, Event Flags and QIO routines. This library includes the following functions:

- Asynchronous system trap services
- Disk driver services
- Event flag services
- File utility library routines

- Logical names
- Memory management services
- Process control system services
- Queued I/O
- Symbolic routines
- String and mathematical routines
- RMS files
- Linkage to separate SMG routines.

Screen and Forms Management

SMG - Screen Management

Transoft Legacy Liberator OpenVMS SMG (Open SMG) is an open system replacement for the Digital Screen Management Facility. It provides a full set of terminal independent functions and I/O handling including multiple windows on a terminal screen with viewports.

Open SMG supports nearly 100 of the SMG\$ library routines including pasteboards, virtual displays and keyboards. Input operations are fully compatible with existing OpenVMS methods and facilities. Output operations are handled just as they are under OpenVMS, including composition operations (paste, move, pop, etc.), output through virtual displays (insertion, writing, viewports, menus, etc.), and batch operations.

FMS - Forms Management

Transoft Legacy Liberator OpenVMS FMS (Open FMS) is an open system replacement for the Forms Management System. All FMS functions (FDV\$ calls), the FMS help management system, the FMS editor and the embedded user action routines are fully supported.

Open FMS has a compiler that translates existing form descriptions (.flg files) into a binary format. This internal format is used by the run-time environment. New form descriptions can be created using



the Open FMS Editor, an optional module to Open FMS, or any ASCII-based editor can be used. Open FMS supports all VT-based terminals and DECwindows.

The Form Driver is the run-time component of Open FMS. It provides the facilities for terminal input and output, displaying the forms, manipulating the screens, basic input validation and formatting, calling UARs, and responding to the terminal operator's request for help. Input/output can be specified one field at a time or on a whole form basis.

Migrating the data sources

OpenVMS applications may be using a mixture of Record Management System (RMS), Relational Database (Rdb), Oracle or other data sources. RMS can be migrated to an open system Indexed Sequential File Access Method (ISAM) file system and the RMS I/O calls, File Access Block (FAB) and Record Access Block (RAB) are automatically supported by the Transoft Legacy Liberator open system replacement Run-Time and System Services library. All RMS record access options, all file access modes and multiple streams to a single file are supported.

Alternatively, RMS can be transitioned to an industrial strength relational database management system (RDBMS). The migration of Rdb and OpenVMS Oracle to a UNIX, Linux or Windows version is a relatively straightforward process.

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 analyzes the RMS data structures and file I/O requirements of the existing application, and normalizes these data structures to become a corresponding relational model.

Then SQL I/O library services are generated to provide the functional I/O requirements of the application. This library intercepts the RMS calls from the application and issues the equivalent SQL against the chosen RDBMS.

Digital Command Language

Transoft Legacy Liberator OpenVMS DCL (Open DCL) is a command interpreter allowing OpenVMS Digital Command Language (DCL) scripts or COM files to be processed, in most cases without change, in the target environment. In addition to its set of DCL supported commands, Open DCL provides special enhancements and added features. The Help facility provides examples of open system commands that are similar to DCL commands. This allows Open DCL users to transition gradually to UNIX, Linux or Windows commands progressively while sustaining productivity. This can have a significant saving in the cost and time of retraining.

Open DCL is fully compatible with OpenVMS DCL and includes:

- 97 commands
- 67 qualifiers
- 29 lexical functions.

Job/Batch Controller

Transoft Legacy Liberator OpenVMS JBC (Open JBC) is an emulation of the OpenVMS Job/Batch Controller, that provides batch and print queues to users and to applications. Open JBC reproduces this rich queue environment on open systems. With Open JBC installed Open DCL is enhanced by adding or extending the following commands:

- DELETE/ENTRY
- SET ENTRY
- SHOW ENTRY

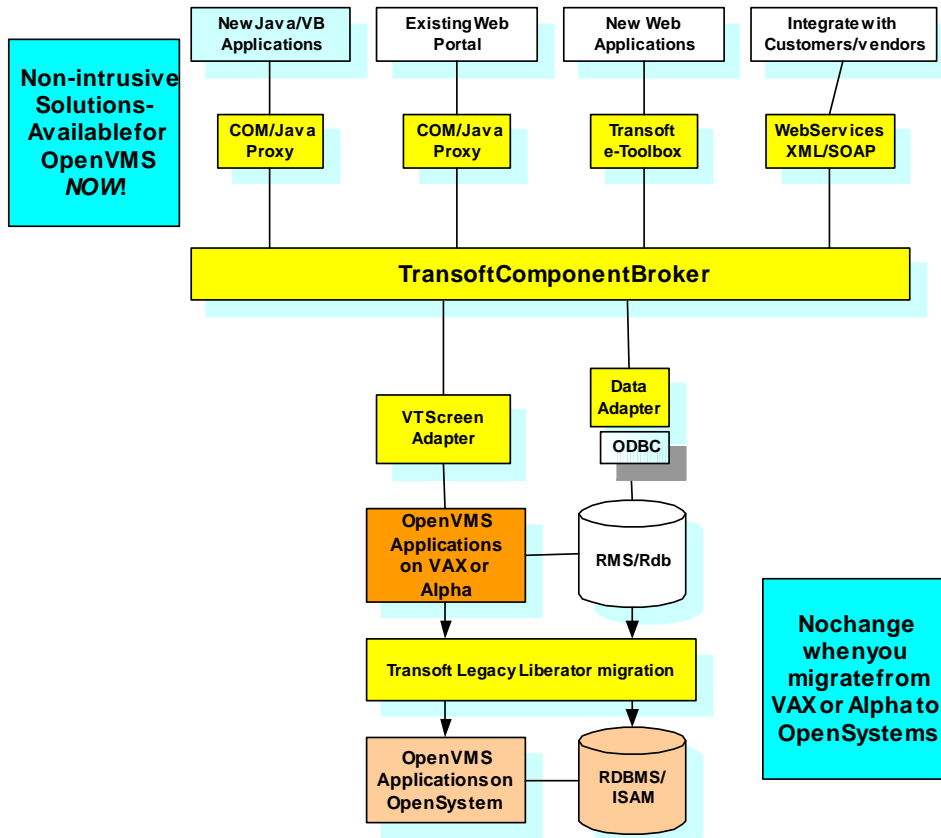


- SHOW QUEUE
- SUBMIT
- START/QUEUE
- STOP/QUEUE.

The F\$GETQUI lexical function is also enabled when Open JBC is present. On UNIX, Linux and Windows the PRINT command is also enhanced.

Data migration

Transoft Legacy Liberator provides Extraction tools, RMS data and corresponding Load tools for populating your RDBMS or ISAM files, respectively.



Implement new business processes - now and after migration

Implement new business processes - now and after migration

If you need to deploy new business processes, such as Web applications in new technologies, now before considering a migration, then the Transoft Screen Component and Data Component Adapters for OpenVMS applications can help you. This product set gives companies that run critical applications on the OpenVMS platform the ability to make the existing business rules and data in these applications available via a seamless, scalable and non-intrusive interface layer. This layer lies between the existing OpenVMS applications and new application modules developed in, say, either Java/J2EE or Microsoft .NET services.

Once deployed, these new application modules will also operate without change when you do decide to migrate from the OpenVMS to an open systems platform. Additionally, should your real aim be redevelopment of your OpenVMS application rather than migration, then by providing organizations with a way to interoperate new systems with the existing OpenVMS applications, a redevelopment project can be phased in and gradually replace the original OpenVMS application over time -- removing the risks of wholesale re-engineering projects.

“Some companies want to redevelop their OpenVMS applications. Often this is seen as an opportunity to provide new functionality. Yet companies frequently forget they cannot deploy a new application until they have developed it to a point where it performs all the functions the existing application does”, comments Paul Holland, CEO of Transoft Inc. “Our proven adapter technology has been used by many companies to provide a bridging layer between the new and the old business rules. As a result, organizations

can implement new functionality modules as soon as they are available, while still keeping on-line the areas of functionality which haven't yet been re-written.”

These non-intrusive Transoft Screen Component and Data Component Adapters are part of the family of **Transoft Component Adapter** products. The Transoft Language Component Adapter provides a further option, post migration, to componentize existing critical application code to be used as high performance, re-usable ‘application services’.

The Screen, Data and Language Component Adapters deliver their application services via the Transoft Component Broker and can be exposed as J2EE compliant JavaBeans/JCA, COM/C# objects for use with Visual Basic/Windows .NET 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 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 organization, 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



OpenVMS White Paper

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.

Again, Transoft e-Toolbox based Web applications can be implemented *now* or after you migrate your OpenVMS applications.



Example B2B page using Transoft e-Toolbox

The high return, low risk option

Transoft's Application Migration and Modernization solutions for OpenVMS 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 OpenVMS VAX or Alpha platform, while providing you with an unequalled number of options for user interface technology, enterprise application integration and distributed application architectures.

About Transoft

Since 1986 Transoft has been helping organizations 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.

TO FIND OUT MORE....

www.transoft.com

newsolutions@transoft.com

**North & South America
Europe & Rest of World**

**Tel: +1 (770) 933 1965
Tel: +44 (0) 1753 778000**



Transoft is a registered trademark of Transoft Group Ltd companies in various jurisdictions throughout the world. All other product names, trade names and logos may be trademarks of their respective companies.