

ORACLE TUXEDO APPLICATION REHOSTING WORKBENCH

KEY FEATURES AND BENEFITS

FEATURES

- Robust migration of Online and Batch COBOL applications and related assets (Copybooks, BMS screens, JCLs/PROCs, etc.) to Oracle Tuxedo platform
- Efficient generation of automated data migration tools for DB2 data, VSAM and other mainframe datasets
- Automation for uniformity and high productivity
- Precision and accuracy for very low error rates
- Efficiency for 10s of millions of lines of code
- Repeatability for consistent results over multiple iterations
- Extensibility for easy modification and adding transformation rules

BENEFITS

- Consistency, accuracy, and high productivity minimize project cost and risks
- Industrialized, efficient migration process safely handles migration of very large application assets
- Uniformity of transformations enables blended on-shore/off-shore teams
- Easy migration of maintenance changes reduces any "frozen" period
- Extensibility enables tailoring of the conversions to customer-specific needs and simplifies adding coverage for new technologies
- Cost savings shift more IT budget from maintenance to innovation, help to increase business alignment

Oracle Tuxedo Application Rehosting Workbench helps to simplify and accelerate mainframe rehosting by automating the code and data migration. It is built on advanced language processing technology used for many years by leading SIs to accomplish large migration projects. These capabilities enable the language tools to adapt COBOL code, DB2 SQL, and transform JCL. The data migration tools perform complete analysis of all data definitions and access patterns to generate data schemas and logical access modules on target. They also produce data unload, reload, and validate tools for automated migration of files and DB2 tables off the mainframe.

Simplify and Accelerate Mainframe Application Migration

Oracle Tuxedo Application Rehosting Workbench helps organizations to migrate mainframe applications and data to open systems without re-writing them to Java or .Net. It uses advanced program analysis and transformation capabilities to simplify and automate migration of COBOL-based CICS and Batch mainframe applications to Oracle Tuxedo Application Runtime for CICS and Batch.

The workbench uses Refine™ engine to store and manipulate all program-related data in the form of abstract syntax trees (AST) annotated with semantic information. These semantically decorated ASTs are built by the Cataloger to provide an abstract representation of the application programs and data for analysis of:

- Data flow, describing data item changes throughout the program
- Process flow, depicting the control structure at various levels of abstraction
- The use and assignment of all variables used by the program
- Dependencies between all software elements

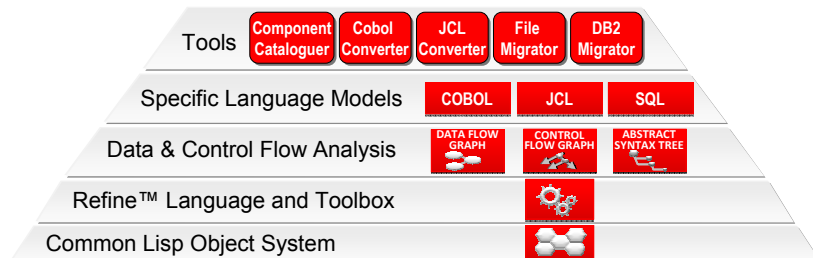


Figure 1. Oracle Tuxedo Application Rehosting Workbench

The AST-based representation of all application assets within a centralized repository of the workbench provides the unequalled level of accuracy in analysis and conversion. The workbench-driven migration projects have experienced error

rates not exceeding 1 in 10,000 to 100,000 lines of code, which reduces testing and debugging time, lowers overall project risk and cost, and results in much faster project delivery. The workbench enables an industrialized migration approach, which has provided high efficiency and productivity in migrating very large mainframe applications with tens of millions of lines of code. The workbench can be used repeatedly to produce incremental changes as new components are added or parameters or rule sets are adjusted. Once the tools' settings have been finalized for a specific project through a pilot, the mass migration of the application components and any maintenance changes can be accomplished easily and quickly.

Proven, Industrialized Migration Process

The automation of the migration process is key to predictable, on time delivery of the expected results. The accuracy, uniformity, and consistency enable high productivity and high quality, resulting in faster, less risky migrations. Companies that were deterred from migrating mainframe applications in the past by high cost, risk, and lengthy projects can now accomplish these migrations – by themselves or with the help of Oracle partners – much quicker and achieve a much faster ROI.

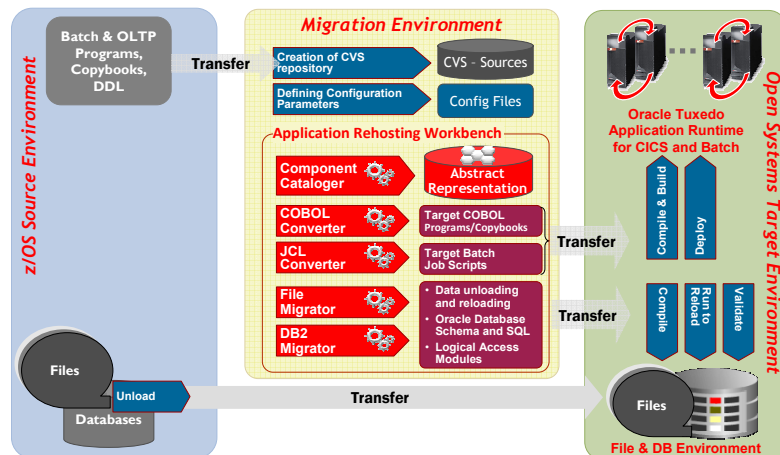


Figure 2. Migration Process using Oracle Tuxedo Application Rehosting Workbench

A typical migration project has multiple phases: planning, preparation, conversion, testing, integration, and switch-over. The preparation phase identifies and collects all application assets on the mainframe for transfer to the migration environment. In the conversion phase the workbench is used in an iterative manner to adapt the application code and generate data migration tools. The Cataloger parses all components, computes cross-references, builds the AST repository, and identifies any missing components or other anomalies. As these are resolved, the Cataloger can be re-run, and it can also be used to incrementally process new and changed components for a maintenance update to the migrated application.

Predictable, Efficient Code Migration with COBOL Converter

The role of this tool is to convert z/OS programs and copybooks developed in IBM COBOL dialect into COBOL programs running on the target open system while maintaining the same application behavior. The converter handles multiple source files in parallel and performs multiple transformations in a single pass, including:

- COBOL dialect adaptation (e.g., z/OS COBOL to Micro Focus COBOL)
- Adaptation to target platform files (e.g., replacing SEQUENTIAL files by more efficient LINE SEQUENTIAL, handling of printer control characters)
- Embedded SQL adaptation from DB2 to Oracle (e.g., data types, host program interfaces: SQLCODE, host variables)
- Any changes required by File to Oracle conversion or component renaming
- Normalization of the EXEC CICS statements for the run-time CICS pre-processor in Oracle Tuxedo Application Runtime for CICS and Batch

The resulting programs can be compiled and run on the target platform with the same behavior as on the source platform. The EXEC CICS statements are preserved in this process, allowing developers to continue maintaining applications with this familiar API. COBOL Converter uses configuration files created by data migration tools to appropriately handle code changes required by File-to-File, File-to-Oracle, or DB2-to-Oracle data migration. It also allows custom transformation rules, which can be specified in a configuration file.

Robust, Extensible Batch JCL Migration

The role of the JCL Converter is to convert z/OS batch jobs to run on Oracle Tuxedo Application Runtime for CICS and Batch. The converter relies on the extensive set of built-in functions provided by the Tuxedo batch runtime which emulate JCL features and typical batch utilities. This simplifies the conversion and produces native job scripts analogous to the original JCL.

The converted scripts retain the same job step flow, use built-in functions for typical JCL cards to retain maintainability, and are easily extensible to meet future batch needs by adding jobs, steps, programs, or scripts migrated from the mainframe or created natively on the target. Similar to COBOL Converter, JCL Converter uses ASTs as input and handles the required conversions in a single pass, including:

- Original sequence of steps populated in the target job script template
- JCL conditions and return codes
- File assignments with access modes, disposition, GDG files, spool files, etc.
- Invocation of COBOL programs and most common utilities
- Various other features of the original JCL that are relevant on the target

With the Oracle Tuxedo Application Runtime for CICS and Batch, the resulting job scripts can run on the target platform with the same behavior as on the mainframe.

Automated Data Migration

Migrated applications can continue to use mainframe data (e.g., via DB2 Connect), but most customers choose to migrate data off the mainframe to leverage Oracle's scalability and further reduce the mainframe costs. The workbench provides two data migration tools which handle various mainframe datasets and DB2 data:

- File Migrator, supporting File to File migration and File to Oracle Database
- DB2 Migrator, which supports migration to Oracle Database

The **File Migrator** supports many zOS file organizations: QSAM, VSAM (KSDS, RRDS, ESDS), PDS, and GDG. VSAM and QSAM files are migrated to ISAM files

RELATED PRODUCTS AND SERVICES

Oracle Tuxedo delivers a robust platform to run high-volume applications across distributed, heterogeneous computing environments, enabling transactions that stretch from customer-facing, business-critical applications to back-office processes, across any system, anywhere in the world.

RELATED PRODUCTS:

- Oracle Tuxedo
- Oracle Tuxedo Application Runtime for CICS and Batch
- Oracle Tuxedo System and Applications Monitor (TSAM)
- Oracle Tuxedo Mainframe Adapters (TMA)
- Oracle Tuxedo JCA Adapter
- Oracle Services Architecture Leveraging Tuxedo (SALT)
- Oracle Tuxedo Jolt
- Oracle Enterprise Repository
- Oracle Service Bus
- Oracle BPEL Process Manager
- Oracle WebLogic Server

on target. VSAM files can also be migrated to Oracle Database to provide broader access to data or when record-level locking is used, such as in CICS applications. File Migrator supports OCCURS and REDEFINES clauses in copybooks through record discrimination rules. When migrating such files to Oracle Database, the File Migrator provides a choice of creating sub-tables, opaque fields, or extending the table with columns for each redefined field.

The **DB2 Migrator** converts following DB2 objects to Oracle Database:

DB2 Objects Converted to Oracle Database			
TABLE	INDEX	CONSTRAINT	COMMENT
VIEW	SEQUENCE	SYNONYM	IDENTITY

The DB2 Migrator handles data type and column property conversions between DB2 and Oracle in the generated DDL and in adapting SQL calls in COBOL programs. The tool also permits changing table or column names in the DDL source file to avoid a conflict with Oracle reserved words or for a re-engineering need.

The tools generate the following components to facilitate the migration process:

Components Generated by Data Migration Tools	
File to File Migration	File to Oracle Database and DB2 to Oracle Database
Unloading JCL	Unloading JCL
Transcoding programs	Transcoding programs
Reloading programs	Reloading programs
Logical accessor modules	Logical accessor modules
	Oracle DDL
	Meta-data for COBOL and JCL converters

The data migration is accomplished using the unload JCL generated by File and DB2 Migrators to extract the data and create a file image followed by binary transfer to the target platform, where it is processed by the transcoding and reloading programs and scripts generated by the workbench.

Contact Us

For more information about Oracle Tuxedo Application Rehosting Workbench, please visit oracle.com/tuxedo or call +1.800.ORACLE1 to speak to an Oracle representative.



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