



Modernization with LIBER*M: Integrating Automation and Small Language Models (SLMs) for Mainframe Transformation

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Summary

This briefing note summarizes mLogica's LIBER*M, a mainframe application and data modernization suite that integrates proprietary deterministic tooling with SLMs to analyze, reengineer and transform legacy environments. mLogica possesses more than two decades of experience, a global footprint and end-to-end delivery capability. LIBER*M supports repurpose, replatform, refactor and rearchitect pathways, using consistent runtime and assessment methods. The company's approach stresses code and data lineage, comprehensive assessment to reduce portfolio size and a governed pipeline that preserves behavior while enabling architectural change. It combines a deterministic

core with GenAI to improve code quality and analysis while avoiding non-deterministic risks. LIBER*M targets a broad set of industries and legacy technologies, including IBM z/OS mainframes. The company participates in partner programs and its platform supports hyperscaler validations and cloud programs that enable dual-run and migration assistance, ensuring secure multicloud deployments. GenAI-assisted validation includes secure AI orchestration with private-hosted models and zero data retention, human-in-the-loop controls, business-logic extraction and ML-based runtime optimization.

Briefing Notes

mLogica positions LIBER*M as its core mainframe modernization offering within a broader portfolio that also includes STAR*M for distributed databases and CAP*M for complex event analytics. LIBER*M integrates proprietary tools to support the full modernization lifecycle, from discovery and assessment to data and code transformation and infrastructure migration. The company reports more than 22 years of experience, delivery across six continents and numerous completed engagements, demonstrating its capacity as an independent tooling provider supporting renowned system integrators and the prime delivery entity for selected clients.

The approach starts with discovery and assessment using LIBER*DAHLIA to develop a detailed picture of the legacy portfolio, dependencies and data methods. mLogica applies deterministic code and data lineage: cross-referencing job control language (JCL), program calls and copybooks; analyzing active online transactions; interrogating scheduler definitions; and reviewing execution logs to identify truly active components. This process extracts detailed information to refine scope, reducing in-scope inventory and establishing a foundation for disposition planning and sequencing that reduces inventory by a material percentage.

LIBER*M supports four primary pathways, mapped to the common modernization spectrum:

- **Repurpose:** Supports mainframe consolidation and technology rationalization, including conversions across COBOL, Assembler and Easytrieve, and selective z/OS database transactions such as VSAM and IMS DB to Db2 on z/OS.
- **Replatform:** Moves workloads off the mainframe with minimal code change onto a Java-based runtime using productized components, including LIBER*Z for z/OS transaction and batch processing, LIBER*8 for the General Comprehensive Operating System (GCOS), and LIBER*TUX for Tuxedo, as well as LIBER*Cobol.
- **Refactor:** Uses LIBER*TULIP to translate legacy code to Java and, where required, to C#, while maintaining application behavior.
- **Rearchitect:** Uses LIBER*BLE to extract business rules and prepare for new application architectures.

Data transformation is centralized through LIBER*IRIS for automated migration from ISAM, VSAM, Db2 z/OS, IMS and DB/IDMS and similar stores to relational databases, including Oracle, Db2



LUW, SQL Server and PostgreSQL. Infrastructure migration, notably for schedulers and security controls, is addressed by LIBER*VIOLET, which automates scheduler translation across common tools and provides security migration support.

A distinctive runtime design underpins these paths. The LIBER*M runtime is a Java Spring-based framework that allows COBOL and Java programs to run concurrently by compiling retained COBOL into Java bytecode. This arrangement allows organizations to begin with replatforming and adopt refactoring at their preferred pace without switching frameworks. Interoperability is built in. A COBOL program can call a component refactored to Java and vice versa, enabling teams to convert programs in any order while maintaining stable operations. The same framework provides batch utilities, CICS/IMS APIs, XA transaction support and logging/monitoring integrations typical of contemporary Java ecosystems. For batch, JCL can be retained for familiarity while being translated to Groovy at compile or run time. For online interfaces, 3,270 terminal screens can be retained for compatibility, or BMS/MFS definitions can be transformed into Angular-based web front ends; look and feel can remain unchanged or be adapted via front-end assets. Flat files can remain in EBCDIC or be converted to ASCII, depending on integration needs; GDGs are supported. The runtime also incorporates ML-based optimization to improve execution efficiency under real-world workload patterns.

mLogica offers broad technology coverage across both source and target environments. Supported source languages include COBOL, Assembler, PL/I, RPG, Easytrieve, C, JCL, SAS and several 4GLs, with target languages typically COBOL (on the runtime) and Java and support for C# and C/C++. Source data stores include Db2, VSAM, Datacom, Adabas, IDMS and IMS DB, with relational targets across major commercial and open-source databases. Systems coverage spans IBM z/OS and AS/400 (iSeries), and BULL GCOS 7 and 8, with the target environment on-premises, hybrid or public cloud via the client's preferred provider. The solution is deployable across multiple clouds, with hyperscaler alliances and validations, and participation in cloud programs that enable dual-run validation and migration assistance.

The company's deterministic stance on modernization is coupled with a defined AI posture. mLogica states that generic LLMs are inherently non-deterministic and are not suitable as primary engines for behavior-preserving code conversion. It uses GenAI selectively and invests in SLMs trained on real production artifacts, such as COBOL and JCL, to augment analysis and improve the consistency of generated code while maintaining traceability. GenAI is employed in bounded roles, including validation, semantic analysis, documentation and test generation. Governance includes a secure AI orchestration layer, private-hosted LLMs with zero data retention and human-in-the-loop validation to ensure traceability. In parallel, LIBER*M's method emphasizes governed pipelines and like-for-like testing at every stage.

Its portfolio optimization starts with an assessment process that uses cross-references, transaction activity, scheduler configurations and historical run logs to identify inactive and obsolete components. This approach reduces initial scope, improves estimation and sequencing, and guides dependency-aware modernization waves. mLogica notes that code-level pruning requires careful governance. When refactoring to Java is selected, test-coverage tools can quantify the code paths executed to avoid over-pruning and preserve required behavior.

mLogica claims flexibility to change disposition strategy during the program, supported by the common runtime. Clients can begin with replatforming to stabilize costs and operations, then refactor selected components into Java as confidence and test coverage increase, or proceed to rearchitect for service-based models using extracted business rules. It also supports on-platform repurpose scenarios when consolidation on the mainframe is the preferred first step, while preserving a path to subsequent off-platform moves.

A healthcare case study illustrates scale and target patterns. The client estate comprised roughly 58,000 artifacts and over 8 million lines of code across COBOL, Assembler and Easytrieve. The selected target stack included Java 21, AlloyDB, Redis Cloud, Angular and Spring Boot, deployed on Google Cloud with Control-M integration and



client-standard CI/CD and security tooling. The project required decomposition into towers and applications, identity integration, scheduler integration with auto-edit replacement and containerized deployments.

mLogica positions itself to act either as the end-to-end delivery provider or within a client's preferred system integrator model. The company emphasizes broad industry coverage and a global presence with delivery locations across North America, Europe, the Middle East and India.

Net Impact

Clients engaging mLogica with LIBER*M can expect modernization programs built on deterministic analysis and governed execution. Its comprehensive assessment enables a significant portfolio reduction before transformation work begins, reducing the volume of code and processes to be addressed and clarifying dependencies. By tracing code and data lineage across online and batch paths, schedulers and logs, the approach reduces ambiguity in scoping and creates a rationalized backlog for modernization waves. This approach is particularly relevant for long-lived mainframe environments where dormant utilities, unused copybooks and obsolete jobs tend to accumulate.

The runtime architecture reduces transition impact by enabling COBOL and Java to coexist. Clients can replatform to the Java framework while retaining COBOL, and then refactor select programs to Java incrementally without switching toolchains. This allows alignment with business and resource realities. The framework provides XA-compliant transaction support, batch utilities, CICS/IMS APIs and consolidated logging/monitoring. These capabilities support enterprise tools for seamless operations and governance. ML-based runtime optimization further improves performance under production workloads.

Flexibility across disposition strategies is ensured by supporting replatforming, refactoring and rearchitecting within a single framework and pipeline. Clients can change direction after the assessment phase or mid-program as understanding of business logic and modernization possibilities improves. For example, a team may

retain COBOL for certain components of the common runtime to ensure operational stability, refactor performance-critical modules into Java, and plan to extract business logic for future target architectures. This flexibility reduces rework and aligns modernization payoffs to business timelines.

mLogica's approach and LIBER*M's coverage across languages, data stores and platforms support heterogeneous mainframe environments. Data transformation capabilities enable migrating data from hierarchical and indexed sources to relational databases. Infrastructure migration automates scheduler translation and supports the transition of security controls while acknowledging differences between centralized mainframe security and distributed models. Online channels can either preserve user interfaces or adopt web-based front ends, supporting continuity or improving UX. The converted applications can run in any cloud environment, supported by hyperscaler alliances and validation programs that enable dual-run testing and reduce migration risks.

mLogica's use of AI reflects a controlled approach. The company notes that generic LLMs produce non-deterministic outputs, which complicate certification and debugging for mission-critical workloads. Its investment in SLMs improves analysis and code refinement without compromising reproducibility. GenAI-assisted validation in bounded roles, orchestrated through a secure layer with private-hosted models and human-in-the-loop oversight, complements deterministic translators and compilers at the core of LIBER*M and maintains traceability needed for like-for-like testing and auditability.



Operationally, the coexistence model and incremental refactoring enable standard CI/CD adoption, containerization and orchestration and integration with client schedulers, identity providers and monitoring stacks. The healthcare case study indicates that large mainframe environments can be decomposed and transitioned to a modern cloud stack while meeting enterprise controls.

Clients should consider mLogica when seeking a structured and robust modernization approach that emphasizes portfolio optimization and data lineage, governance and flexibility across transformation strategies that balance repurposing, replatforming, refactoring and rearchitecting. The benefits include scope rationalization with phased transformation and staging, without disruptive cutovers. Its broad technology coverage and governed pipelines facilitate auditing and certification.

Associated Insights

mLogica's approach to Eliminating Obsolescence while Modernizing High-performance Mainframe Platforms [\(Link\)](#)



ISG Placements and Recognitions

mLogica was recognized as a Leader in the Mainframe Application Modernization Software quadrant in 2026 and was included in the following studies:

ISG Provider Lens® Mainframes — Services and Solutions — Mainframe Application Modernization Software (Global) — U.S. 2026 ([Link](#))

ISG Provider Lens® Mainframes — Services and Solutions — Mainframe as a Service — U.S. 2026 ([Link](#))

ISG Provider Lens® Mainframes — Services and Solutions — Mainframe Application Modernization Software — APAC 2024.

ISG Provider Lens® Mainframes — Services and Solutions — Mainframe Application Modernization Software — Americas 2024.

ISG Provider Lens® Mainframes — Services and Solutions — Mainframe Application Modernization Software — Europe 2024.



About the Author

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Pedro L. Bicudo Maschio brings extensive experience in the research of the Brazilian and Global services' market. With more than 30 years of experience, he is highly skilled at analyzing market positioning, vendor contracts, pricing models, vendor staffing and delivery cost structure for improving market competitiveness. Pedro has experience in both client and vendor roles. As a research author, he is well positioned to assess and report on the state of the industry and make recommendations for both enterprises and service provider clients.



MLOGICA

Summary Facts



Headquarters

Las Vegas, Nevada, US



Key Industries Served

Global cross-industry mainframe and data modernization



Portfolio Highlights

LIBER*M (mainframe modernization), STAR*M (distributed/database modernization) and CAP*M (complex-event analytics), along with associated data and infrastructure migration tools LIBER*DAHLIA, LIBER*IRIS, LIBER*VIOLET, LIBER*TULIP, and LIBER*BLE



Geographic Focus

Global presence with regional hubs





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