

LzLabs Software Defined Mainframe® Product Data Sheet

Whether customers are seeking to rehost legacy applications on modern platforms, modify them in a cost-effective environment, or transform them into new languages that drive innovation, the LzLabs Software Defined Mainframe® (SDM) will enable such a journey.

Product Overview

The LzLabs Software Defined Mainframe® liberates legacy applications with a seamless shift from mainframe environments to commercial off-the-shelf Linux® platforms without changing application logic. Legacy application programs are placed into a specialized software container that preserves existing application capabilities on a modern computing infrastructure environment – without the need for recompilation.

Key Benefits

The SDM provides customers with the following advantages (see the *Introduction to LzLabs* brochure for more details):

- Low cost, functionally equivalent platform for existing customer legacy system applications. (Cost savings can be used to fund subsequent modernization projects.)
- Low risk when rehosting customer applications as **no recompilation** is required.
- Incremental modernization options once applications are rehosted on enterprise class x86/Linux or cloud infrastructures.
- Use of open-source solutions to sustain RAS requirements, drive business innovation and reduce IT technical debt.
- Reduced mainframe MIPS consumption through movement of applications to the SDM.
- A rich and friendly browser-based console replaces the traditional “green screen” for application and system management.

- Easy integration with modern Agile development and DevOps environments.
- Few batch window constraints through movement of jobs to a fast, efficient and flexible platform.
- Necessary competences well aligned with current job market: new Sysops can be recruited with a PostgreSQL profile rather than DB2®.

Technical Benefits

- Maintains data integrity, as data remains in its native mainframe encoding (EBCDIC, big endian, etc.) and organization.
- Support for standard JCL. No migration to a scripting language is required.
- Support for current online transaction definitions via the LzLabs migration solution and LzOnline™.
- Preservation of existing legacy access methods and native DBMS calls.

Features Overview

- Enables legacy customer applications, written in a variety of languages (including COBOL, PL/I, and some Assembler), to run bit-compatible on an x86/Linux environment.
- Customers are able to further modernize applications by transcoding into new languages, and continue maintaining these systems as dictated by business needs using **LzWorkbench™**. This is achieved whilst maintaining interoperability throughout the modernization process.
- RAS requirements of core systems can be sustained as customers have freedom of choice to deploy open-

source solutions for workload provisioning, distributed database, containerization and application management.

- Legacy customer batch applications can execute without recompilation or reformatting of data (i.e., bit-compatible on EBCDIC data, big-endian integers, etc.) through our plug-compatible CICS® and IMS/TM™ replacements.
- LzLabs stores all legacy data sets ‘as-is’, unchanged in format from the way they were stored on the mainframe. In addition, we provide binary-compatible VSAM, QSAM, BSAM and BPAM access methods to provide access to the legacy data sets. Relational data, when stored in PostgreSQL can be accessed as Linux-native ASCII data.
- Allows legacy applications that use relational databases to be run without modification (in either batch or online mode) through our plug-compatible DB2® replacement.
- Allows legacy applications that use hierarchical databases to be run without modification, in either batch or online mode (i.e., our plug-compatible IMS™ replacement, which remaps data to a relational database). This approach simplifies the work of system programmers and DBAs by providing self-optimizing configuration, as well as improvements in capacity, performance, reliability and maintainability.
- Includes an interactive management console that can be used for configuration, user management, application/job monitoring, log access, and many other essential administration functions.

LzLabs Software Defined Mainframe® (SDM)

Connectivity

- 3270
- NJE
- MQ Client
- FTP
- DRDA
- IP Interconnectivity Protocol (IPIC) allows two CICS regions to be connected to each other for remote transaction routing and function (e.g. READ FILE) shipping. SDM transactions may be initiated by Distributed Program Link requests from CICS Transaction Gateway (CTG) server.

Managed Storage

The SDM's LzManagedStorage feature implements Data, Storage and Management Classes (*note Management Classes are for legacy compatibility only at present*) to define attributes that are applied to data sets:

- **Data Classes** – Assign attributes to data sets at allocation time; may be overridden via JCL/IDCAMS.
- **Storage Classes** – Assign LzMS managed-storage pools to data sets at allocation time.

LzMetrics

LzMetrics is a SDM system service similar to SMF under z/OS®:

- Collects and writes data records that include a subset of SMF-type records that are bit-compatible with z/OS SMF, as well as some SDM-specific (Linux-type) records.
- A batch Copy utility for copying all (or subsets of) LzMetrics data files, which supports IFASMFDP control card syntax. These files can be transferred to legacy environments for SMF data post-processing (if required).
- A batch Export utility that can copy/convert some LzMetrics record types to CSV Linux files for post-processing outside the SDM.

Security

LzVault™ is currently compatible with a subset of RACF® authorization functions and features; the LzLabs SDM platform enforces access controls over a subset of resources, as described below.

Administration:

- Global security settings
- User and Group definitions
- Resource Classes and Resource Profile definitions
- In addition to the integrated Administration console, security can also be administered through LDAP via 3rd party or custom clients

Authentication:

- Authentication required for access to legacy environment, data, programs, jobs, online terminals
- Single-factor (password) authentication (currently)
- Date/time restrictions – implemented as distinct day/time ranges, rather than separate day/time slots
- Password expiration, password change restrictions and password pattern rules
- User revocation and lockout for password violations
- Inheritance of user ID for jobs submitted from FTP, NJE, command line utilities or user processes
- SURROGAT authority recognized for job submission
- Node security for NJE
- Supports LDAP authentication clients

Authorization:

- Selective implementation of security by resource class, with default protection level for resources
- Global Profiles supported
- Implicit authorization for ownership, including default ownership of data set HLQ
- UACC (Universal Access Authority)
- Profile and permission selection algorithm is RACF-compatible (most specific and most restrictive)

- Authorization via group membership
- RACFVARS supported (including system variables &RACUID and &RACGPID)
- OPERATIONS attributes of both user and resource class are supported
- Grouping Classes, Group Profiles and Member Profiles supported
- Enforcement of access controls to LzRelational (database) resources
- Support SET CURRENT SQLID in LzRelational

Logging, Auditing and Continuous Monitoring Features

- Granular controls for auditing and logging of access attempts
- Log/Audit events are recorded natively in JSON format:
 - Supports integration with open source and 3rd party aggregation and monitoring tools
 - May be exported as SMF80 records for legacy security reporting

Legacy Security Definitions Import

- CPX supports importation of an unloaded RACF database; currently imports include:
 - Users, user passwords, and user groups
 - Resource classes
 - Resource profiles and ownership
 - Permissions
 - Group membership/connections
 - Logging and auditing controls
 - Global Settings
- DB2® native security definitions are imported and converted into external security resources/ authorities

Backup/Recovery and Fault Tolerance

- Security definitions are maintained in open source OpenLDAP directory services
- Multiple synchronization and federation solutions are available for high availability, backup/restore and identity management integration

Performance and Immediacy

- Most security decisions can be made without process switch or database lookups
- Supports hundreds of thousands of security decisions per second per core
- Security changes are shared continuously with all processes; no refresh or reload is required

Data Migration

To facilitate the transfer of assets from a legacy system to the **SDM** two utilities are provided: one running on the legacy system to export the assets, and the other on the SDM to import them. The assets may be imported manually, automatically or by a combination of both, and may contain user data sets, load libraries, configuration data and/or application data.

Overview

The legacy system-based utility **LzLabs Centerpiece Export™ (CPX)** is an ISPF application used to select the assets to be exported. CPX will query running subsystems to provide a list of defined resources, allowing the selection of all or a subset of the resources to be included. Once the assets have been selected, CPX will create metadata, package the data and transfer it to the SDM using an FTP protocol.

The SDM-resident utility, **LzLabs Centerpiece Import™ (CPI)** is used to import the exported assets. Data is restored to SDM-managed data sets and any required post-processing, such as loading the data into a database, is performed.

Data/Application Migration Utilities

CPX is used to identify and export application resources to the SDM; tasks include:

- Identifying application assets
- Extracting application data and metadata information
- Transferring application data and metadata to the SDM

CPI will be invoked via the SDM UI or through **LzAutomigration™** to process the exported assets. The following resources are required to migrate a DB2® for z/OS® application:

- A subset of the metadata from the DB2 for z/OS catalog relevant to the migrated application
- Applications and related Data
- Data Description Language (DDL)
- DBRM Library
- DSNHDECP
- DSNZPARM
- Job Control Language (JCL) to run the application and any data sets referenced in the JCL

Technical Benefits

- Assets are discovered automatically by examining executing subsystems
- The assets for individual applications may be selected
- Most assets can be refreshed after initial import

Main Features

Support for the following asset types:

- Non-DBMS sequential and partitioned data sets
- CICS resource definitions
- DB2 catalog and user-tables
- DB2 system parameters, including those for data-sharing
- DB2 DDL
- RACF definitions
- IMS PSBs from PSBLIB
- IMS DBDs from DBDLIB
- IMS PSBs from ACBLIB
- IMS Program (APPL) and Transaction (TRAN) definitions
- IMS Terminal (LTERM) definitions
- GDG bases
- DFSORT options
- DF/SMS data class, storage class and management class definitions
- Data set alias names
- Tape-resident data sets

LzAutomigration™ allows the import process to occur without user input. Most assets may be refreshed selectively after the initial import. A failed data set restore may be restarted from the point of failure, saving both time and resources.

About LzLabs

LzLabs is a software company that develops innovative solutions for enterprise computing customers, including its **LzLabs Software Defined Mainframe® (SDM)**. The company was founded in 2011 and is headquartered in Zürich, Switzerland. The SDM liberates and enables customer legacy applications to run unchanged on both Linux hardware and Cloud infrastructures. Thousands of mainframe transactions are processed per second, while maintaining enterprise requirements for reliability, availability, serviceability, and security. Our software solution provides unrivaled compatibility and exceptional performance, dramatically reducing IT costs. LzLabs' offices in Switzerland and the UK are home to highly-experienced mainframe experts and modern IT thought leaders from across the globe.

Our Vision

Our vision is to liberate organizations from the constraints and limitations of their legacy systems and move them to flexible, more powerful and cost-effective solutions found in modern computing infrastructures.

Our Mission

Our mission is to create revolutionary software solutions, leveraging the innovation of open source and the power of cloud computing to reduce the risks of legacy application modernization.



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