Legacy Database Modernization Cutover Runbook

SQL Server / MS Access to PostgreSQL Production Execution Protocol

Target Environment: PostgreSQL 16 (AWS RDS / On-Prem)	**Architect Lead:** Jennifer Dalzell (Senior DBA)
Source Environment: MS SQL Server 2019 / MS Access	**Cutover Window:** Weekend Staging (4-Hour Lock)
Methodology: Automated PowerShell Framework	**Compliance Standard:** SOX / HIPAA Audit-Ready

1. Phase I: Pre-Cutover Readiness Audit & Health Check

Prior to executing schema deployment or batch ingestion, the source environment must pass all diagnostic checks to eliminate character encoding crashes, orphaned foreign key records, and file size bottlenecks.

Check / Diagnostic Item	Technical Target & Objective	Status
Source Schema & Space Audit	Verify disk allocation (>= 50GB free) and validate MS Access backend file size (< 2GB limit prior to split).	**PASS**
UTF-8 Encoding Audit	Scan NVARCHAR/TEXT fields for UTF-16 LE Byte Order Marks (BOM) and null bytes (0x00) causing PostgreSQL copy crashes.	**PASS**
Orphan Record Integrity	Execute integrity queries on foreign key links (e.g. Orders -> Customers) to isolate unlinked child rows prior to DDL creation.	**PASS**
Pre-Migration Row Counts	Extract exact baseline row counts from sys.partitions / COUNT(*) queries across all target operational tables.	**PASS**

2. Phase II: Automated Migration Framework Execution Sequence

Cutover orchestration is executed via a 4-module PowerShell framework (SqlExport.psm1, UTF8Conversion.psm1, PostgresImport.psm1, and MigrationValidation.psm1) driven by a central configuration file (MigrationConfig.ps1).

Seq	Module / Script	Action & Operational Workflow	Validation Log Output
01	**SqlExport.psm1**	Connects to source SQL Server via native BCP/OLEDB; extracts table schemas to DDL scripts and raw data to delimiter text.	[INFO] Extracted 150,000 rows to Export_UTF16/Orders.tsv
02	**UTF8Conversion.psm1**	Intercepts UTF-16 LE files, strips null bytes (0x00) and unescaped characters, and re-encodes streams line-by-line to UTF-8 without BOM.	[WARN] Remediated 14 null bytes in Customers.nvarchar
03	**PostgresImport.psm1**	Translates DDL schema, disables target indexes/FKs, executes high-speed COPY staging, and restores secondary indexes post-load.	[SUCCESS] PostgreSQL COPY completed in 42.1 seconds
04	**MigrationValidation.psm1**	Runs automated multi-stage audit: row-count comparison (0.00% variance required), primary key range checks, and column checksums.	[AUDIT] Target: 150,000 | Variance: 0.00% | PASSED

3. Phase III: Frontend Re-Linking & ODBC DSN Configuration

For MS Access frontend applications, local tables are converted to System ODBC Linked Tables to preserve existing forms, queries, VBA modules, and reporting templates without requiring costly application rewrites.

Step	Configuration Task	Technical Execution Details
3.1	**System ODBC Driver Setup**	Configure 64-bit/32-bit PostgreSQL System DSN (Unicode psqlODBC) with SSL encryption enabled.
3.2	**Table Re-Linking Routine**	Drop native Access local tables and re-link to PostgreSQL backend tables using exact original table aliases.
3.3	**Concurrency Lock Injection**	Ensure RowVersion / timestamp columns exist on all multi-user tables to prevent ODBC write-collision errors.
3.4	**Crystal Reports / BI Feed**	Update System DSN connection strings in Crystal Reports and Excel Power Query financial refresh templates.

4. Phase IV: Emergency Rollback Protocol & Contingency Plan

CRITICAL SAFETY GUARANTEE: ZERO SOURCE MODIFICATION

In the event of an unrecoverable ingestion failure, character corruption, or audit variance > 0.00% during the cutover window, the lead DBA executes the following immediate failback sequence within 15 minutes:

1. Immediate Client Isolation: Terminate active ODBC connection pools and re-route connection strings back to stand-by source instance.

2. Target Staging Wipe: Issue DROP SCHEMA staging CASCADE; on PostgreSQL target to purge incomplete batches.

3. Lock Release & Log Capture: Re-enable source read/write flags and archive execution logs from /Logs/Migration_YYYYMMDD.log.

4. Zero Data Loss Guarantee: Source databases remain untouched throughout staging, ensuring 100% operational continuity.

5. Phase V: Post-Migration Audit Sign-Off & Compliance Validation

Sign-Off Milestone	Verification Standard	Lead Architect Approval
Row Count Reconciliation	100.00% match across source sys.partitions and target pg_class row counts.	**[X] VERIFIED & SIGNED**
Encoding Fidelity Audit	Zero character truncation or UTF-8 conversion flags in ValidationReport.json.	**[X] VERIFIED & SIGNED**
RBAC Security Enforcement	Least-privilege role-based permissions assigned to application service accounts.	**[X] VERIFIED & SIGNED**
SOX/HIPAA Compliance Log	Immutable timestamped audit trail logged and archived for corporate compliance.	**[X] VERIFIED & SIGNED**

Lead Database Architect: Jennifer Dalzell, Senior DBA

Date: September 21, 2026

Client System Owner: _____

Date: _____