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Part 2: Detailed analysis

Legacy Check – Example report

MERKUR · Muster Haustechnik Großhandel GmbH (fictional)

Analysis of a Delphi 7 inventory management system with a Firebird database

September 2026 · Version 1.0

Prepared by neocoding.ai · neocor cloud UG (haftungsbeschränkt)
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Fictional example: company, application and all figures are invented. Structure and depth match a real Legacy Check.

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1 Assignment and approach

The goal of the Legacy Check was a sound basis for deciding the future of MERKUR. It was based on the complete source code (state of 15 August 2026, handed over by the developer as an archive), the database schema with volume figures, the configuration of the terminal and database servers, and two interviews. The code analysis was AI-assisted in an isolated environment; all findings were reviewed manually. No live data was processed.

Scope

- Analysis of the complete source code and database schema (anonymised copy, no live data)
- AI-assisted code analysis with the right model for each task and proven prompts, all findings reviewed by experienced developers
- Two interviews: business department (sales and warehouse) and the current developer
- Review of infrastructure, operations, third-party components and licences
- Results presentation (online, 60 minutes) and this report

Not included: Not included: load tests, penetration test, legal review of the source code transfer, review of the B2B web shop.

Goals

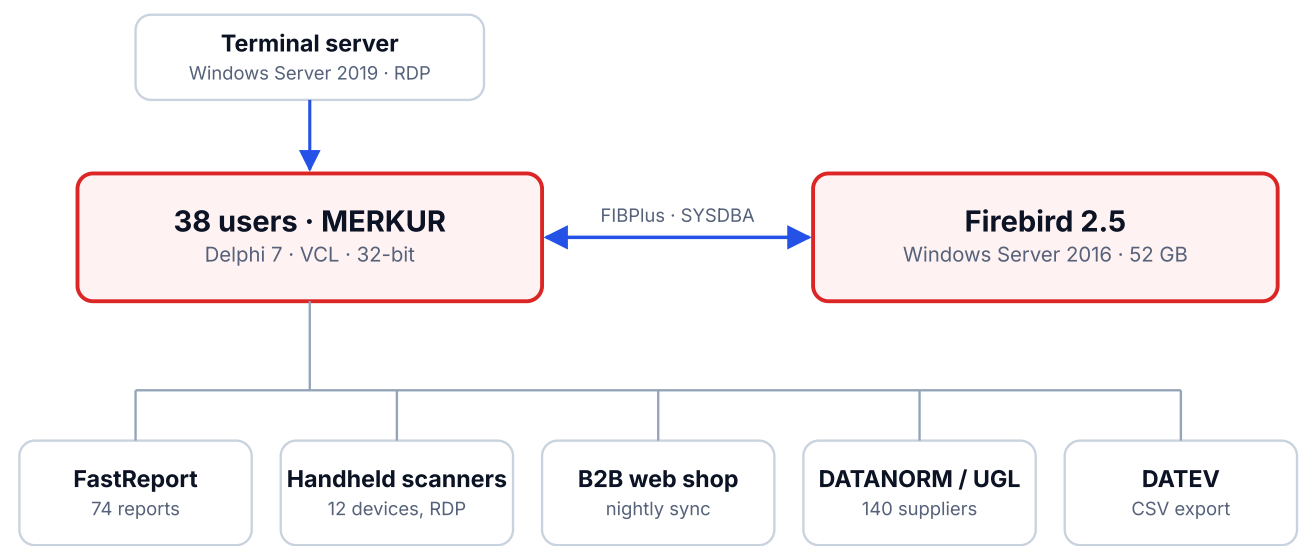
- Assess MERKUR's future and the risks for operations
- Meet the e-invoicing obligation in time
- Secure the developer's knowledge while he is still available

Fixed price €2,499 net · Completed within 2 calendar weeks

2 System overview

Muster Haustechnik Großhandel GmbH (fictional) – Wholesaler of plumbing and heating supplies with 85 employees, a central warehouse and two trade counters. Complete inventory management and ERP: article and price maintenance for about 1.4 million articles, quotes, orders, delivery notes and invoices, purchasing, warehouse and picking, and project business with project prices for installer firms.

MERKUR is a classic two-tier application: the Delphi program runs on a terminal server and accesses the Firebird database directly. A large part of the business logic – pricing, stock keeping, document numbers – lives in triggers and stored procedures.



Language / platform	Delphi 7 (Object Pascal, VCL), 32-bit, run on a Windows terminal server
Size	One main program, approx. 320,000 lines of code in 410 units, 265 forms
Database	Firebird 2.5 on Windows Server 2016 · 186 tables, 240 stored procedures, 95 triggers, 52 GB
Reports	74 FastReport reports (documents, lists, labels)
Interfaces	DATANORM and UGL import from 140 suppliers, IDS Connect for installers, B2B web shop (nightly sync), DATEV export
Usage	38 concurrent users at 3 sites, 12 handheld scanners in the warehouse
Development	One external developer since 1998; no version control (ZIP archive per version), no automated tests
Documentation	User manual from 2014 (80 pages), no technical documentation

3 Code analysis

The code has grown over 28 years and is organised by business area – a good starting point. Within the areas, however, most logic sits in the form units, and database access is spread across the code as concatenated SQL strings. Delphi 7 has no Unicode support: text is processed in the Windows character set.

Areas of the source code

AREA	PURPOSE	LINES OF CODE	UNITS	FORMS
Core	Main window, permissions, utilities	38,500	52	18
Master data	Articles, customers, suppliers	46,200	61	44
Prices	Conditions, price levels, project prices	41,800	38	22
Sales	Quotes, orders, delivery notes, invoices	72,400	88	61
Purchasing	Purchase orders, goods receipt	33,600	45	29
Warehouse	Storage bins, picking, stocktaking	29,100	41	34
Interfaces	DATANORM, UGL, IDS, DATEV, web shop	34,900	53	21
Printing	FastReport integration, labels	13,100	22	26
Scanners	Dialogs for the handheld scanners	10,400	10	10
Total		320,000	410	265

Metrics

METRIC	VALUE	ASSESSMENT
Business logic in form units	approx. 55%	makes testing and reuse difficult
Duplicated code	18%	below 5% would be usual
Concatenated SQL statements	540 places	SQL injection risk, hard to maintain
Automated tests	none	changes are risky
Empty error handlers (empty except)	212	errors go unnoticed
with statements	1,930	obscure references, complicate any conversion
Compiler warnings and hints	2,870	possible sources of errors
Probably unused code	approx. 11%	can be dropped before a migration

4 Database analysis

The core data model is clean and protected by foreign keys – better than in many comparable applications. What is critical is how much logic lives in the database: pricing, stock keeping and document numbers run through 95 triggers and 240 stored procedures. Any replacement must fully understand and take over this logic.

Tables / views	186 / 31
Stored procedures / triggers	240 / 95
Foreign keys	212 of 268 business relations (79%)
Database size	52 GB
Business logic in the database	approx. 40%

LARGEST TABLES	ROWS	SIZE
Document lines	31 m	16.2 GB
Price scales and conditions	22 m	9.1 GB
Article master (DATANORM)	1.4 m	7.9 GB
Stock movements	18 m	6.4 GB

Data quality

- 41 tables without a defined character set – special characters, e.g. in Polish or Turkish names, are sometimes stored incorrectly
- approx. 4% duplicate articles from repeated DATANORM imports (around 58,000 records)
- around 310,000 articles without movement since 2015 – candidates for archiving
- The database still runs in SQL dialect 1 – date and decimal values need special handling during the migration

5 IT security

CRITICAL	Firebird port 3050 reachable from the internet for the shop sync; connection unencrypted.
CRITICAL	All clients and the web shop connect as SYSDBA; the password has not been changed since installation.
HIGH	Firebird 2.5 without security updates since 2019; Windows Server 2016 without support from January 2027.
HIGH	MERKUR user passwords are only encrypted with a simple, reversible method.
MEDIUM	540 places with concatenated SQL statements (SQL injection).
MEDIUM	Documents are emailed without TLS via an internal mail relay, because the email component does not support current TLS.
LOW	Program files without code signing and without modern protection mechanisms (ASLR, DEP).

6 Dependencies and licences

COMPONENT	VERSION	STATUS	ACTION
Delphi	7 (2002)	no updates for years; no Unicode, 32-bit only	replacement (option C)
FIBPlus (data access)	6.x	tied to Delphi 7; with Firebird 5 only via legacy authentication	keep using for the transition
FastReport	2.5 (VCL)	discontinued	rebuild 74 reports in the new system
Indy (email, FTP)	9	outdated, no current TLS	internal relay for the transition
RxLib / JVCL	2.75 / 3.x	discontinued or no updates for Delphi 7	dropped with the replacement
Firebird	2.5.9	no updates since 2019	Firebird 5 (phase 1), later PostgreSQL
Windows Server (database)	2016	support ends 01/2027	Windows Server 2025
Windows Server (terminal server)	2019	supported until 01/2029	keep until the replacement

7 Operations and infrastructure

- Runs on a terminal server (Windows Server 2019) – central and easy to manage
- Nightly database backup with a monthly restore test by the developer – exemplary
- No monitoring; incidents are reported to the developer by phone
- Build only on the developer's computer; Delphi licence in his name; versions as ZIP archives

8 Knowledge and documentation

- User manual from 2014 (80 pages), partly current; no technical documentation
- An estimated 260 business rules, approx. 30 of them described – the pricing logic in particular can only be traced in code and database
- The developer is cooperative and willing to hand over his knowledge by the end of 2027 – a big advantage that should be used
- Three key users know the processes in sales, purchasing and warehouse very well

9 Traffic-light rating

Strong for the business, technically at the end of its life cycle

MERKUR maps Muster Haustechnik's business in great depth – pricing logic and project business are real strengths. The technical foundation, however, is exhausted: Delphi 7 and Firebird 2.5 are no longer developed, and all knowledge sits with one developer who retires at the end of 2027. Two issues cannot wait: the database reachable from the internet and mandatory e-invoicing from 1 January 2027. After that, we recommend replacing MERKUR step by step with a web application.

AREA	RATING	REASON
IT security	● Red	Database reachable from the internet; all clients use SYSDBA with an unchanged password; Firebird 2.5 without updates.
Legal requirements	● Red	E-invoices (XRechnung, ZUGFeRD) cannot be created – mandatory from 1 January 2027.
Knowledge & documentation	● Red	A single developer, retiring at the end of 2027; approx. 30 of an estimated 260 business rules described.
Technology outlook	● Red	Delphi 7 (2002) without Unicode or 64-bit; key components discontinued; Delphi developers are scarce.
Maintainability & code quality	● Amber	Organised by business area, but approx. 55% of the logic in forms, 18% duplicates, no tests.
Operations & infrastructure	● Amber	Restores tested regularly; but server support ends 01/2027, build only on the developer's computer.
Database & data	● Amber	Clean core model; but character set problems, duplicate articles and approx. 40% of the logic in triggers and procedures.
Business fit	● Green	Covers trading, warehouse and project business very well; pricing logic as a competitive advantage.

10 The five biggest risks

NO.	RISK	RATING	ACTION
R1	E-invoicing obligation from 2027 cannot be met MERKUR creates invoices only as PDFs. From 2027 the company (prior-year turnover above €800,000) must issue invoices to domestic business customers as e-invoices.	CRITICAL	E-invoicing service (XRechnung, ZUGFeRD) next to MERKUR – ready by 31 December 2026.
R2	Database reachable from the internet For the nightly shop sync, the Firebird port is open in the firewall; access is unencrypted and uses SYSDBA.	CRITICAL	Close the port immediately, sync through a secured interface, accounts with minimal rights.
R3	Knowledge monopoly with an expiry date All technical knowledge sits with one external developer who retires at the end of 2027.	HIGH	Agree a knowledge transfer by contract, document the business rules.
R4	Platform without a future Delphi 7, Firebird 2.5 and key components are no longer maintained; Windows Server 2016 loses support in January 2027.	HIGH	Short term Firebird 5 and Windows Server 2025, medium term replacement.
R5	No source code management Source code and compiler licence are on the developer's computer; versions are stored as ZIP archives.	HIGH	Git and build environment in the company, licences in the company's name.

11 Options in detail

Effort and duration estimated without AI. Our AI-assisted development reduces time and cost by the range shown; the roadmap already includes AI.

A · Secure and meet obligations

Without AI: **55–70 PD · 3–4 months** · Saving with AI: **30–40%** · Assessment: **Essential and immediate**

E-invoicing service, shield the database, Firebird 5 and Windows Server 2025, Git and build in-house; MERKUR itself stays unchanged.

Advantages

- + Meets the e-invoicing obligation in time
- + Removes the critical security risks

Disadvantages

- Technical foundation stays outdated
- Knowledge problem remains unsolved

B · Upgrade to current Delphi

Without AI: **470–630 PD · 18–24 months** · Saving with AI: **50–70%** · Assessment: **Feasible, but does not solve the skills shortage**

Current Delphi version with Unicode and 64-bit, replacement of discontinued components; user interface and processes stay the same.

Advantages

- + Familiar user interface, hardly any training
- + Solves the acute character set problems

Disadvantages

- Delphi developers remain scarce
- Still a desktop application via terminal server

C · Step-by-step replacement with a web application recommended

Without AI: **840–1,080 PD · 36–42 months** · Saving with AI: **50–60%** · Assessment: **Recommended (after option A)**

New application with ASP.NET Core (C#), Angular and PostgreSQL, module by module using the strangler fig pattern; MERKUR runs in parallel until the last module has been taken over.

Advantages

- + Widely used technology – developers available
- + Browser and mobile devices in the warehouse
- + Open interfaces for the web shop and installers

Disadvantages

- Higher effort
- Parallel operation for several months

D · Industry software for wholesalers

Without AI: **high (plus licences) · 15–23 months** · Saving with AI: **approx. 20%** · Assessment: **Secondary – high customisation needs**

Introduction of a standard inventory management system for plumbing and heating wholesalers, with customisation.

Advantages

- + Vendor maintenance; e-invoicing and industry formats included

Disadvantages

- Pricing logic and project business only with expensive customisation
- Ongoing licence costs

12 Recommendation and roadmap

We recommend handling the obligations and critical risks immediately (option A), then replacing MERKUR step by step with a web application (option C). The e-invoicing service comes first, built as part of the new architecture. Securing the developer's knowledge while he is available is crucial.

PHASE	TIMEFRAME	CONTENT	EFFORT
Phase 1: Obligations and security	Months 1–3	E-invoicing service by 31 December 2026, shield the database, Firebird 5 and Windows Server 2025, Git and build in-house	35–45 PD
Phase 2: Knowledge and foundation	Months 3–6	Document business rules with the developer, interface layer (API) on top of the database, test cases from real documents	60–80 PD
Phase 3: Modular replacement	Months 6–20	Master data and prices, sales, purchasing, warehouse with mobile data capture in the browser	280–350 PD
Phase 4: Migration and shutdown	Months 20–24	Move to PostgreSQL, end parallel operation, archive and switch off MERKUR	40–55 PD

All four phases: 415–530 PD over approx. 24 months with AI – approx. 895–1,150 PD without AI. Accuracy $\pm 25\%$. Phase 1 must be completed by 31 December 2026.

Next steps

1. Close the database port immediately – this needs no project effort
2. Commission phase 1 – e-invoicing must work from 1 January 2027
3. Agree the knowledge transfer with the current developer by contract
4. Fixed-price proposal for phase 2; final decision on option C after phase 2

13 Glossary

PD	Person-day (8 hours)
E-invoice	Structured electronic invoice according to EN 16931, e.g. XRechnung or ZUGFeRD
DATANORM / UGL	German industry formats for article data and orders in the plumbing and heating trade
Unicode	Character set covering all scripts; Delphi 7 does not support it
Strangler fig pattern	Step-by-step replacement: new modules gradually take over functions of the old system
Trigger	A database program that runs automatically when data changes

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