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🛠️ Mark J. Hogan – Problem Solving Portfolio

Contents

Overview

This document chronicles a curated selection of strategic problem-solving initiatives spanning multiple decades, platforms, and industries. From SCADA systems and Windows domains to embedded hardware recovery and secure desktop architecture, each story reflects a philosophy of fearless engineering, cross-disciplinary intuition, and user-focused design.

⚡ Restoring SCADA Visibility with TDXFER

Challenge:

Cost-cutting measures at Texaco's Los Angeles refinery led to the removal of a Process Supervisory Computer (PSC) running TDACS on a Data General MV. The PSC previously centralized critical telemetry from Process Control Computers (PCCs) across refinery units. With its removal, downstream units could no longer access upstream flow and control values.

Solution:

Identifying latent capabilities in a commissioned TCP/IP test interface to TDACS Commons, Mark re-engineered the application to read, hold, and write values between distributed systems. The resulting service, TDXFER, functionally restored shared visibility by selectively mirroring values between refinery units.

Result:
Inter-unit data flows were re-established without reinvesting in legacy PSC infrastructure—preserving operational insight and minimizing financial impact.

Auto-Healing TCP/IP Services for Data General

Challenge:
Texaco's adoption of third-party TCP/IP software (from Claflin & Clayton) on Data General systems introduced instability. TCP/IP services would silently fail over time, disrupting telemetry flow.

Solution:
Mark developed sinusoidal test-value generators across all PCCs and paired them with monitoring daemons that detected "flatline" values—indicating communication failure. Upon detection, the services were automatically restarted and notification alerts were sent before and after each recovery event.

Result:
Fully autonomous 24x7 resilience mechanism that ensured sustained telemetry with zero human intervention.

Unifying Refinery Telemetry via CIM/21

Challenge:
There was no consolidated view of telemetry across the Sulfur Recovery Unit (SRU), water systems, weather stations, and multiple TDACS PCCs.

Solution:
Mark commissioned an IBM RS/6000 and implemented AspenTech CIM/21 to aggregate data across:

- TDACS units via a custom CIMIO-TDACS interface
- OPC (WonderWare) sources for water treatment
- DDE scanners for Windows-based weather stations

CIM/21 became a real-time visualization platform that mirrored PSC functionality—and surpassed it in scope.

Result:
For the first time, all units' data was viewable in one system, creating a refinery-wide SCADA console that accelerated decision-making and operational awareness.

NT 4.0 Least Privilege Desktop Architecture

Challenge:
Users needed full system functionality on Windows NT 4.0 without elevated privileges—a nonstandard configuration at the time.

Solution:
Mark reverse-engineered registry keys, file system access points, and redirection logic to ensure that applications ran

correctly under “User” accounts. This required detailed mapping of permission hierarchies and creative configuration file rewrites.

Result:
Texaco’s desktop solution evolved into a robust, compliant, secure computing environment, forming the foundation of the IT Works platform.

🧒💻 Mission Control Console for IT & Ticketing

Challenge:
Administrators lacked centralized views of refinery users, computers, domain groups, and associated support history.

Solution:
Mark designed and implemented “Mission Control,” a live management console backed by SQL Server with:

- Real-time visibility into users and devices
- Contextual right-click actions for all object types
- Integrated ticketing system with auto-generation upon routine admin tasks

Result:
Transparent administration, consistent documentation, and intelligent automation of historically manual and untracked processes.

📊 Excel-Powered Linux DNS Management

Challenge:
Pre-Windows DNS environments required tedious zone file editing and manual deployment on Linux servers.

Solution:
Mark built a spreadsheet-based system with VBA scripts that:

- Populated DNS records from structured data
- Wrote config files locally
- Uploaded and remotely restarted DNS services via button-driven macros

Result:
Intuitive GUI front-end for complex backend workflows—accessible to admins without shell proficiency.

🧬 Domain Hygiene with Perl Scripting

Challenge:
User accounts were inconsistent in naming, group memberships, and share configurations. Roaming profiles were inconsistently maintained.

Solution:
Mark built Perl scripts to:

- Validate naming conventions and access levels
- Ensure home directories and roaming profiles were present and linked
- Automate folder/share creation and permission verification

Result:
Reliable, scalable identity management with enforced consistency and reduced onboarding errors.

🖧 Bricked Router Firmware Recovery

Challenge:
A Buffalo router was accidentally flashed with incorrect firmware, rendering it unresponsive.

Solution:
Using terminal emulation and UART via a CP2102 adapter, Mark accessed the bootloader, initialized a TFTP server, and restored proper firmware.

Result:
Recovered full functionality without hardware replacement—highlighting hands-on embedded expertise.

🛠️ Rebuilding a Chevrolet 350 Engine

Challenge:
Complete rebuild from raw block—no prefab kits or outside guidance.

Solution:
Mark honed cylinders, installed camshaft and pistons, rebuilt the engine to spec with reliability-focused tolerances.

Result:
Functioning high-performance engine, showing mechanical fluency and iterative craftsmanship.

🧺 Appliance Repair Across Generations

Challenge:
Multiple household appliances failed across homes without access to professional support.

Solution:
Mark sourced parts and performed repairs for washers, dryers, HVAC units, and dishwashers—electrical and mechanical diagnostics included.

Result:
Reliability delivered where it mattered most—an empathetic reminder that engineering is always in service of the end user.

❄ HVAC Freon Modernization

Challenge:
Legacy HVAC system using R-22 refrigerant faced compatibility and cost challenges.

Solution:
Mark researched chemical properties, retrofitted the system for R-454A using compatible components and lubricants—ensuring operational integrity.

Result:
System brought up to spec without full unit replacement—a technical and economic win.