MULTIPLIED SOLUTIONS

Scaling Supply Chain Planning by Up to 300×



SCALING DEMAND-DRIVEN SUPPLY CHAIN PLANNING FOR GROWTH

Modernizing .NET Infrastructure, Optimizing MRP, and Hardening Security

The Challenge: Legacy Technical Debt in a Mission-Critical Supply Chain Engine

Our client operates a flagship Material Requirements Planning (MRP) platform relied upon by global enterprises to manage material planning, scheduling, capacity allocation, and buffer management in real time.

As their global customer footprint expanded across multi-tenant cloud instances, accumulated technical debt began impacting **operational velocity and end-user experience:**

- **Computation Bottlenecks:** Core scheduling and Drum-Buffer-Rope (DBR) calculations took **over 21 minutes** to process, creating data staleness during peak operational windows.
- **UI Latency & Heavy Reporting:** Critical reporting screens (such as Buffer Trend Analytics and Distribution Management) suffered load times of **39 to 40 seconds**, frustrating supply chain planners.
- **Framework Lock-In:** A legacy monolithic .NET Framework and Entity Framework 6 codebase restricted modern cloud deployment flexibility, maintainability, and developer velocity.
- **Database Saturation: Unindexed SQL queries, string-based queries, and legacy identifier types** caused index fragmentation and database lock congestion under heavy concurrent workloads.

The Solution: Full-Stack Modernization & Deep Performance Engineering

Multiplied joined the client as an embedded engineering team, taking co-ownership of the core platform and systematically addressing its architectural, database, application, and security challenges.

We combined modernization with targeted performance engineering, improving the underlying architecture while optimizing the components responsible for the platform's most critical workloads.





1. Seamless Platform Modernization

- **Framework Evolution:** Successfully migrated the core web application from **.NET Framework to ASP.NET Core** and **EF6 to EF Core**, modernizing data access patterns with Dapper and stored procedures.
- **Schema Evolution:** Managed **139 database migrations** using FluentMigrator, transitioning legacy keys to optimized **BIGINT structures** to eliminate index fragmentation.

2. Radical Performance Refactoring

We systematically profiled and refactored core algorithms, background workers, and UI rendering pipelines:

45×
Core Scheduling
21m 54s Before → 28.7s After
PARALLEL PROCESSING OPTIMIZATION

125×
Distribution Management
40s Before → 320ms After
QUERY & DATA-FETCH OPTIMIZATION

300×
Buffer Trend Analytics
39.15s Before → 127ms After
T-SQL & CACHING OPTIMIZATION

3. Security Hardening & Vulnerability Remediation

We conducted targeted security remediation across the entire platform:

- Resolved **OWASP Top 10** and API Security Top 10 issues, including Broken Access Control, Mass Assignment, and CSRF vulnerabilities.
- Implemented **XSS-safe JSON serialization** in Razor views and secured Swagger/SignalR endpoints against unauthorized error exposure.

Performance Transformation: Before vs. After Multiplied Engineering

Operational Metric / Feature	Legacy Architecture	Multiplied Modernized Engine	Outcome
Core Scheduling Execution	21 min 54 sec	28.7 sec	~45× Faster
Distribution Page Load Time	40.0 sec	320 ms	~125× Faster
Buffer Trend Analytics Report	39.15 sec	127 ms	~300× Faster
Framework & Data Access	.NET Framework / EF6	ASP.NET Core / EF Core & Dapper	Modernized
Security Posture	Vulnerable endpoints	Hardened (OWASP Top 10 & API Security Top 10)	Enterprise-Grade

BUSINESS IMPACT

Faster operations. Lower infrastructure pressure.

FASTER DECISIONS

Near-instant access to critical supply chain data.

CLOUD EFFICIENCY

Linux hosting at lower licensing and infrastructure cost.

LOWER COMPUTE COSTS

Less CPU usage and database saturation.

BUILT TO SCALE

A modern foundation for future growth. ASP.NET Core / EF Core

Accelerate your SaaS product's performance with Multiplied

Is your enterprise software constrained by legacy technical debt or calculation bottlenecks? At Multiplied, we combine senior engineering rigor with deep domain experience to transform complex systems into ultra-fast, market-leading assets.

Get In Touch With Us

SCHEDULE AN ARCHITECTURAL ASSESSMENT

We help organizations turn complex challenges into scalable, future-ready solutions.

Let's review your technical roadmap, resolve performance bottlenecks, and scale your application for continuous growth.



+1 512-535-3209

info@multiplied.com

1633 Future Way, Suite 321, Celebration, FL 34747

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