Enhancing Fulfillment Reliability & Operational Efficiency: Modernizing & Managing Young Living's Shipping Database to RDS SQL Server

Introduction

This case study describes the migration of Young Living Essential Oil's on-premises Microsoft SQL Server Shipping Database to Amazon Web Services (AWS) and its ongoing management . TrueMark, an experienced AWS migration and service delivery partner, managed the project to enhance availability, scalability, and performance for this critical logistics workload while continuing to provide database management services that ensure ongoing performance, security, and compliance.

About The Customer

Young Living Essential Oils, LC ("Young Living"), headquartered in Lehi, Utah, is a globally recognized leader in essential oils and renowned for offering the highest quality oil-infused products. With its industry leading Seed to Seal® quality commitment, Young Living sets the benchmark in ensuring authenticity and environmental stewardship. This commitment is integral to their operations, from sourcing ingredients from corporate-owned and partner farms, as well as other reliable suppliers. Beyond promoting a healthy lifestyle through their products, Young Living Essential Oils plays a pivotal role in the lives of over 6 million Brand Partners worldwide.

Customer Challenge

As part of Young Living's strategic migration to AWS, the final phase required migrating its on-premises Microsoft SQL Server database supporting the Shipping function—an essential component of the company's ERP system. This database, hosted in Young Living's Portland, Oregon data center, powered core logistics processes across multiple distribution centers and interfaced with a network of external systems including warehouse automation platforms and third-party logistics providers. The existing deployment presented a series of operational and architectural challenges:

- **Limited Scalability and Performance Flexibility**

The SQL Server instance was provisioned on fixed hardware, restricting the ability to dynamically scale compute or storage resources. As order volumes increased during seasonal peaks, performance degradation and bottlenecks became common, impacting fulfillment throughput.

- **Shared Hardware Resource Contention**
  The Shipping database shared physical server infrastructure with multiple non-critical databases, creating unpredictable resource competition. CPU and I/O spikes from unrelated systems would frequently starve shipping operations of necessary resources, causing intermittent latency during critical fulfillment windows.

- **Single Point of Failure Risk**
  The on-premises setup lacked built-in high availability. In the event of hardware failure or maintenance, recovery was manual, time-consuming, and prone to error, which posed a substantial risk to time-sensitive shipping operations.

- **Manual Operational Overhead**
  Backup, patching, and monitoring processes were largely manual and dependent on internal IT resources. This not only consumed significant engineering effort but also increased the risk of misconfigurations and delayed updates.

- **Interdependent Application Stack**
  More than a dozen business-critical applications depended on the Shipping DB, requiring coordinated downtime and extensive validation during migration.. These dependencies significantly narrowed the acceptable cutover window and raised the stakes for a seamless transition.

- **Data Integrity and Continuity Requirements**
  Any loss or corruption of data (i.e. order, inventory, or tracking information) would lead to costly delays and customer dissatisfaction. Maintaining data consistency throughout the migration was non-negotiable.

Young Living required a solution that would eliminate these constraints, improve operational resilience, and allow its logistics backbone to scale and respond dynamically to business growth without introducing disruption to fulfillment timelines.

Partner Solution

TrueMark architected and executed a seamless migration of the ~900GB Shipping Database from Young Living's Portland data center to Amazon RDS for Microsoft SQL Server. This initiative aimed to eliminate the limitations of the on-premises environment, reduce operational overhead, and improve availability, scalability, and performance for critical systems.

Key Services Utilized

The migration strategy included a mix of automated provisioning, real time data replication, and extensive validation efforts:

- **Infrastructure as Code (IaC):** All AWS resources, including RDS instances, networking, and IAM roles, were provisioned using Terraform to ensure consistency across dev and production environments.
- **Amazon S3:** Served as a secure staging area for SQL Server database exports prior to RDS import.
- **Workload Isolation:** The Shipping Database was migrated to its own Amazon RDS instance, ensuring that it no longer shared compute or storage resources with unrelated workloads. This eliminated the resource contention seen in the on-premises environment and allows compute and storage capacity to be scaled independently as needed.
- **High Availability Configuration:** Amazon RDS for SQL Server was deployed in a Multi-AZ configuration to ensure automated failover and fault tolerance
- **Security and Compliance:** IAM roles, SQL authentication, encryption in transit and at rest via AWS KMS, and backup policies were implemented to meet operational and compliance standards.
- **StrongDM**: StrongDM provided secure, auditable access for administrators and support engineers.
- **Monitoring and Observability:** Amazon CloudWatch metrics and alerts were configured as part of our standard Terraform modules, with Performance Insights enabled for query analysis and operational visibility. Additionally, TrueMark's Database Collector exported extended performance metrics for long-term trend monitoring.
- **Application Mapping & Coordination:** TrueMark collaborated with Young Living's internal teams to identify upstream and downstream dependencies, ensuring a coordinated cutover.
- **Rigorous Testing:** Validation included schema comparisons, data integrity checks, and functional testing across all interfacing applications.

Implementation Process

- **Assessment and Planning:** The engagement began with a comprehensive assessment of the on-premises environment, focusing on two VMware hosts (8 vCPU, 64 GB RAM each) running the 900 GB Shipping database on SQL Server. Dependencies were mapped, and performance baselines established to inform the target architecture. The migration approach used an offline export/import during a scheduled 4-hour monthly maintenance window aligned with warehouse downtime. Pre-migration testing of export and restore into RDS confirmed that the database could be migrated well within this timeframe, ensuring adequate buffer against overruns. The Enterprise Operations Center (EOC) led change coordination, working closely with Young Living's operations team to schedule, communicate, and formally approve the maintenance window.

- **Target Environment Design:** TrueMark designed a highly available, scalable target platform using Amazon RDS for SQL Server 2019 Enterprise, configured as a db.r6i.2xlarge instance with Multi-AZ deployment, 900 GB of provisioned io1 storage, and seven-day automated snapshots. This design ensured high availability, encryption at rest, and TLS-encrypted connections.

- **Environment Provisioning:** Using Terraform, TrueMark deployed the RDS instance and the supporting AWS infrastructure including networking, security groups, IAM roles, and KMS key configurations. This infrastructure-as-code approach enabled repeatable, auditable, and version-controlled deployments, supporting rapid recovery and consistent configuration.

- **Data Transfer & Sync:** A compressed native SQL Server full backup (.bak file) was created and securely uploaded to an encrypted S3 bucket. During the cutover window, the backup was restored into the RDS Multi-AZ cluster using the rds_restore_database stored procedure. Due to the database size and operational constraints, this offline method was determined to be the most efficient and reliable option.

- **Post-Restore Configuration:** After restoration, critical server-level objects were re-created via scripted migration: SQL Server logins, credentials, and SQL Agent jobs. Encryption (TDE with KMS) and TLS settings were validated to ensure compliance and security continuity.

- **Non-Production Testing:** Prior to production cutover, the restored database and application integrations were validated in non-production environments. This included schema and data integrity checks, performance/load testing under simulated peak conditions, and functional testing across upstream and downstream applications. The

successful completion of these tests confirmed that the migration approach was sound and minimized risk during the final production cutover.

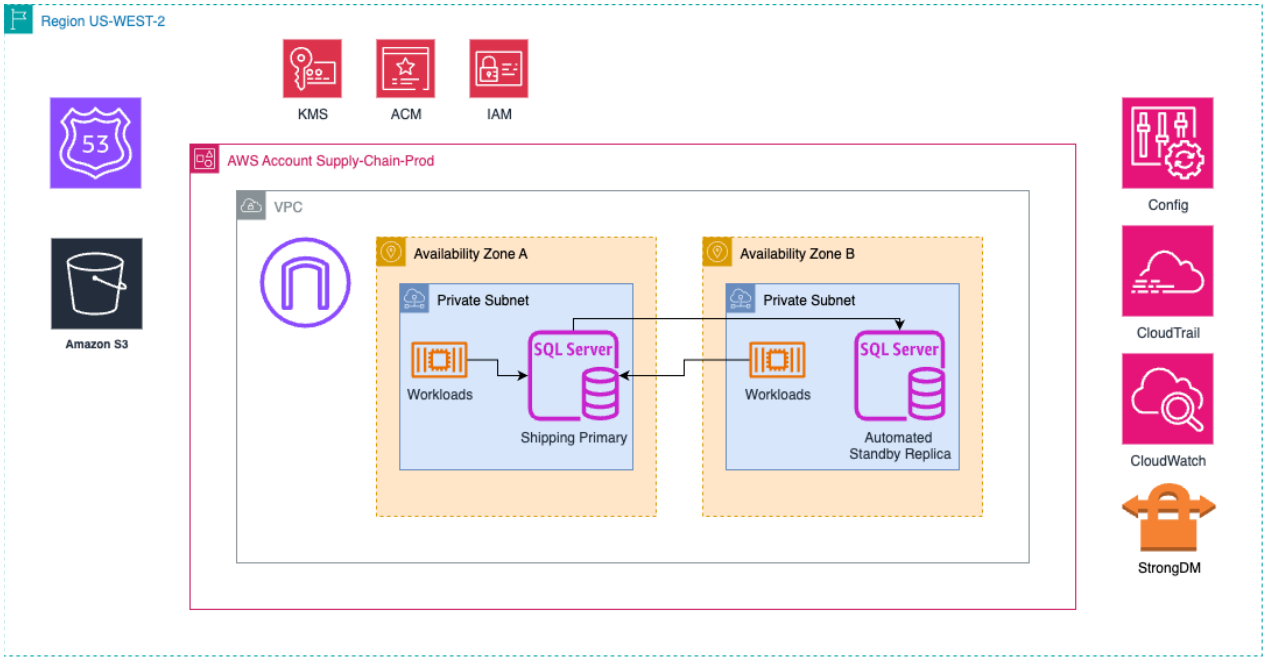
- **Validation & Cutover:** Final cutover included updating the internal CNAME record to point to the RDS writer endpoint, followed by application restarts to ensure clean reconnection. The EOC actively monitored the change in real time, serving as the central command for incident coordination and communication between TrueMark and Young Living teams. A structured Customer Acceptance Testing (CAT) process was executed:

    - **Connectivity Check**: Confirmed that all application servers, BI tools, and user endpoints successfully connected via the new DNS endpoint.
    - **Application Smoke Test**: Validated core business workflows to ensure functional integrity.
    - **Post-Maintenance Monitoring**: DNS remained pointed to RDS post-window; systems were monitored via Splunk and CloudWatch for authentication failures, latency spikes, or blocked sessions.

    The entire migration was completed within the monthly 4-hour maintenance window with no adverse impact on operations.

- **Post-Migration Monitoring:** In addition to real-time dashboards, automated backups, and alerting, the team verified system behavior against benchmarks established during non-production testing. Key metrics like CPU utilization, query response times, and application transaction throughput, matched expectations observed in testing, confirmed that production performance matched non-production test results.

- **Result:** The Shipping database now runs on a fully managed, Multi-AZ RDS platform with automatic failover, and point-in-time recovery; capabilities not previously available on-premises. Resource contention during peak periods has been eliminated, and future scaling to ≥2 TB and ≥20,000 IOPS can be performed online without warehouse downtime.



Business Impact and Benefits

The successful migration of Young Living's Shipping Database to Amazon RDS for Microsoft SQL Server delivered substantial business and operational improvements across multiple dimensions.

- **Reduced Operational Risk**: By moving to a Multi-AZ RDS deployment, Young Living eliminated the need for manual failover processes that previously introduced downtime and recovery uncertainty. The new environment ensures built-in high availability with automated failover, significantly improving system resilience and reducing recovery time during outages or maintenance events.

- **Accelerated and Consistent Environment Deployment**: Using Terraform for Infrastructure as Code (IaC), we deployed Young Living's production RDS environment with version-controlled, auditable configurations. This makes it easy to recreate the same setup for development, testing, and staging in hours instead of days, while avoiding configuration drift.

- **Scalability on Demand**: Amazon RDS offers the elasticity to adjust compute and storage resources both upward and downward, allowing Young Living to right-size instances for normal, day-to-day operations. Instead of running overprovisioned infrastructure year-round to handle rare peak events like Black Friday or flash sales, they can scale up temporarily during high-traffic periods; ensuring consistent performance and customer satisfaction while optimizing costs the rest of the year.

- **Eliminated Shared Infrastructure Contention**: The on-premises SQL Server hosted multiple databases and workloads on shared VMware infrastructure, leading to resource competition—particularly during peak shipping periods. This often resulted in performance degradation for critical order processing tasks. The migration to a dedicated RDS instance isolated the Shipping database, eliminating CPU, memory, and storage I/O contention and ensuring consistent, predictable performance under load.

- **Improved Resilience and Data Integrity:** Integrated backups, automated patching, and proactive monitoring (via Amazon CloudWatch and custom alerting) improved the security and stability of the environment. These safeguards ensure the integrity of the data used in downstream systems, including order management, warehouse fulfillment, and customer service.

- **Operational Efficiency and Cost Savings:** Offloading the management of backups, OS patching, instance provisioning, and failover to AWS reduced administrative overhead. Internal teams could focus on business innovation rather than infrastructure upkeep, resulting in greater efficiency and more strategic use of technical resources.

- **Improved Application Performance and Fulfillment Reliability**: Since the applications consuming the Shipping Database were already hosted in AWS, migrating the database to Amazon RDS eliminated cross-environment latency associated with accessing an on-premises SQL Server. The result is lower query response times, more consistent transaction processing, and fewer delays in order fulfillment.

System Stability and Efficiency Summary

- **Database Availability:** The RDS environment has consistently met AWS's published 99.95% availability SLA for Multi-AZ deployments. No sustained outages were observed during long-term monitoring (15-month, hourly intervals), and the Enterprise Operations Center (EOC) has reported zero availability incidents in the past 90 days.

- **Performance Stability:** CPU utilization, database load, and I/O activity have remained well below capacity thresholds during typical operations, with only brief, isolated spikes during peak demand periods.

- **Operational Efficiency:** Low queue depths, minimal read/write latency, and stable connection counts have significantly reduced the need for manual performance tuning or emergency interventions.

- **Infrastructure Right-Sizing:** Historical patterns confirm that post-migration instance sizing supports day-to-day workloads efficiently, avoiding overprovisioning while retaining headroom for peak events.

Ongoing Database Management

Beyond the initial migration, TrueMark continues to manage the Young Living Shipping database to ensure the environment remains secure, performant, and aligned with AWS best practices well beyond deployment.

General Database Management

- RDS configurations are maintained via infrastructure as code, using Terraform and Bitbucket pipelines.

Maintenance and Upgrades

- TrueMark coordinates and executes both major and minor version upgrades for RDS SQL Server, including patching and certificate renewals.
- Upgrades are tested and validated collaboratively with Young Living in non-production environments, and then applied during the monthly scheduled maintenance windows to ensure minimal disruption to business operations.

Database Troubleshooting & Incident Response

- TrueMark's Enterprise Operations Center (EOC) monitors the Shipping Database and responds to incidents impacting performance or availability.
- Corrective actions such as log analysis, index creation, query optimization, and resizing are executed through change management, minimizing downtime and maintaining database integrity.

Query Optimization and Instance Management

- We continuously identify and resolve bottlenecks through schema consulting, query tuning, and right-sizing of instance types and storage configurations.
- Findings and recommendations are documented in Site Reliability Reports (SRRs) delivered to Young Living.

Alarms, Metrics, and Observability

- Amazon CloudWatch dashboards, Performance Insights, and tailored alarms are configured to track CPU, RAM, storage thresholds, and query performance.
- TrueMark investigates triggered alarms and provides remediation to prevent service degradation.

Security Management

- IAM role enforcement, security group governance, and database role/user management are implemented through infrastructure as code.
- Continuous auditing and logging safeguard compliance with Young Living's regulatory requirements.

On-Demand Services

- TrueMark allocates additional hours for specialized database requests, ensuring Young Living has flexibility to adapt as business and compliance needs evolve.

About TrueMark

TrueMark, an IT Solutions provider and AWS Advanced Tier Partner, holds the AWS Migration Competency and the Amazon RDS Database Migration Service Delivery designation, demonstrating proven expertise in guiding customers through complex cloud adoption and database modernization journeys. We excel in helping companies migrate, modernize, manage, and support their infrastructure on AWS. Our work consistently delivers improvements in efficiency, consistency, cost optimization, scalability, and security.

Our competitive advantage stems from our ability to attract and retain a team of highly skilled professionals and equip them with the tools, frameworks, and reusable automation patterns needed to tackle challenging projects successfully. At TrueMark, our commitment is to consistently deliver substantial value to our customers and to always act in their best interest, ensuring that our solutions not only meet but surpass expectations.