

# Cloud Native - Order Management System

## Client

The [Albertsons Companies](#) family of stores comprises more than 2,200 supermarkets operating under 20 banners across 34 states and the District of Columbia. Banners include Albertsons, Safeway, Vons, Jewel-Osco, Shaw's, Acme, Tom Thumb, Randalls, United Supermarkets, Pavilions, Star Market, Haggen, Carrs, Kings Food Markets, and Balducci's Food Lovers Market. Albertsons Companies is one of the largest retail employers in the United States today, providing approximately 270,000 jobs.

## Overview

Albertsons had three legacy systems built in the 1980s to collect, schedule, and process the orders from a network of stores to distribution centers, warehouses, and DSD suppliers. Albertsons spent 18 months in the build vs buy study and could not find a product that could meet the +98% business needs. At the same time, Albertsons did not have the in-house skills to develop a modern, cloud-native, highly scalable product. Scopereetail partnered with Albertsons to build a new Cloud Native order management system (COSMOS) which went live in all 2200 stores towards the end of 2019.

*At Albertsons, we are very excited to announce the rollout of a new store order management system, COSMOS. Our strategic partnership with Scope Retail System to build a highly scalable and robust platform leveraging the latest digital technology stack continues to be strong. The team is very collaborative and always demonstrates flexibility and reliability. We look forward to strengthening our association even further in the future.*

Anuj Dhanda | Chief Information Officer

## Challenges

### Diversified Tenants

Each tenant has some unique way of managing the order processing. The solution should provide a generic multi-tenant framework that is flexible and customizable independently by each tenant. Additionally, it must support regional settings and various timezone in which the business operates.

### Cloud and On-Premise

As the IT organization is going through a transformation journey, a platform roadmap is defined and not yet realized, any solution must be flexible to run on on-premise PaaS that is going to be replaced by a public cloud provider in the future.

### Manual Processes

Inventory allocation, substitution, release, schedule, and transportation feeds are created manually with the help of various manual systems and processes developed over a while.

### Phased Rollout

The legacy system is deployed by cloning multiple instances per tenant. Any new solution must gradually phase out the legacy system in a staggered manner.

### Multiple Integration Points

Orders are generated in various source systems such as DSD, Manufacturing plants, and replenishment systems. These are sent to the mainframe job for batching. MDM needed for order processing resides in legacy sources. Any solution must provide robust integration points to send /receive data.

### Training Mode

Order processing requires configuration and tweaking of various controls to get the desired result. A solution must be able to run, in production, parallel to legacy, without disrupting the legacy flow. Users can compare/tweak the system before switching the traffic. We rolled out to all distribution centers during the peak COVID in 2019 due to running the system in training mode and allow a parallel comparison in production with legacy systems.

## Our Approach

### Multi-Tenant Architecture

We built the system ground up with multi-tenancy as a core feature. Custom, opinionated components like state automate and x-sequencer provided a solid base to manage and orchestrate the diverse needs of each tenant.

### Cloud-Native Architecture

### Microservices and DDD

A domain-driven design approach enabled the identification of various satellite processes. Microservices architecture ensure that new capabilities can be easily developed with plug-in-play interfaces

### Phased Rollout - Fusion to rescue

Fusion's configurable routing capabilities enabled to implement and execute a strangler pattern-based rollout strategy

### Fusion - Integration Engine

Fusion is our flagship, open-source, cloud-native, highly opinionated integration platform. Added the integration layer to source data from multiple systems, transform it to canonical for order processing and then again send it to target via Fusion.

### Live vs Training Mode

An ingenious way to switch on-off the external traffic helped to take the system to prod with confidence. Users trained the

We build the highly scalable, cloud-native, containerized, microservice platform that can be deployed either on a VM (virtual machine) or Kubernetes cluster.

span over months to phase out legacy and replace it with COSMOS.e

system with production data in real-time. Eventually, the real traffic started resulting in the retirement of legacy systems.

## Technologies used

**Backend:** Java 11+, Docker, Kubernetes, GitHub, CircleCI, Azure blob storage, SQL Server, Oracle, Tomcat, Kafka, ActiveMQ, IBM MQ

**Frontend:** Angular, Bootstrap

**Hosting:** Azure and On-Premise

## The Result

COSMOS - Order Management System. Unlike traditional or contemporary monolithic solutions, COSMOS is built as:-

### User Experience

Scalable & Simplified user experience helps reduce cost for training and improve productivity (configurable for business rules)

### Flexible and Customizable

Flexible design for speed to market, a reusable Core OMS platform, highly customizable rules, and process workflow engine to cater to diverse needs of various tenants or clients.

### AI and ML

Advanced analytics and machine learning algorithms to apply rules and constraints during order processing.

### Microservices Architecture

A highly scalable product integrated with Fusion to provide unified and seamless management of orders across the entire network. Multiple legacy systems and inefficient processes are replaced with modern architecture and migrated to the Azure cloud.

### Capabilities

Multiple capabilities to support a diverse set of business processes across 20+ banners /divisions. MDM, Order Well, Auto-Replenishment, Cognitive Analytics, Order review and maintenance, Allocation, substitution, prioritization, integration with various systems including WMS / TMS, Reporting, and dashboards.

### Numbers

50K with more than 3M order lines on a normal day. Peak traffic of 2.8M order lines per hour during holidays. 30K TPS for auto allocation. 1M order lines Bulk upload of orders in less than 2 minutes.