

Rearchitecture for Improved performance

Remove the Limitations of your Architecture to Move on with Business



**Re Architecture for
Productivity Improvement**

Introduction of the project

EduSmart is a US-based educational portal that promotes learning science for K-12 both at school and at home. The solution is comprised of an LMS and supports role-based access devised for each role such as admin, teacher, and student. The solution finds users predominantly from Texas and Florida.

It supports a comprehensive library of learning resources that enable teachers to build customized lesson plans in both English and Spanish. Learning resources include:

- Instructional videos
- Interactive games
- Quizzes
- Hands-on learning activities and
- Assessment

Challenges

The portal supports a complete resource library that allows shared and collaborative learning, teaching, and assessment for a huge base of users.

EduSmart was built on Model-View-Controller (MVC) architecture with MS SQL database, using Entity Framework.

The application managed the huge content data distributed across 5 databases with ADO.Net SqlDataReader and SqlAdapters. Stored procedures were deployed to fetch, insert or update the data.

The huge amount of data distributed across multiple databases and the use of stored procedures resulted in compromised performance.



Solution

A multi-pronged approach was adopted to improve performance at peak load.

- a. A new multi-layered architecture was proposed with the following components
 - .Net Architecture
 - Single DB Design instead of multiple database design
 - Entity Framework Relation Mapping
 - Conversion of Stored Procedures to LINQ query
 - Code Refactoring
- b. As a first step, multiple databases were merged into a single database. Database First Approach was adopted using the entity framework core in .Net6. This supports the use of model codes from the existing database resulting in faster code development.
- c. Major Stored procedures were converted to LINQ queries that support language-level querying capabilities at the business logic layer to fetch, insert or update the data swiftly.
- d. Aurora database service was deployed with PostgreSQL to enable use of existing applications and tools without major modification.
- e. Code refactoring was attempted to improve the design, structure, and/or implementation of the application, without changing its functionality.



Benefits

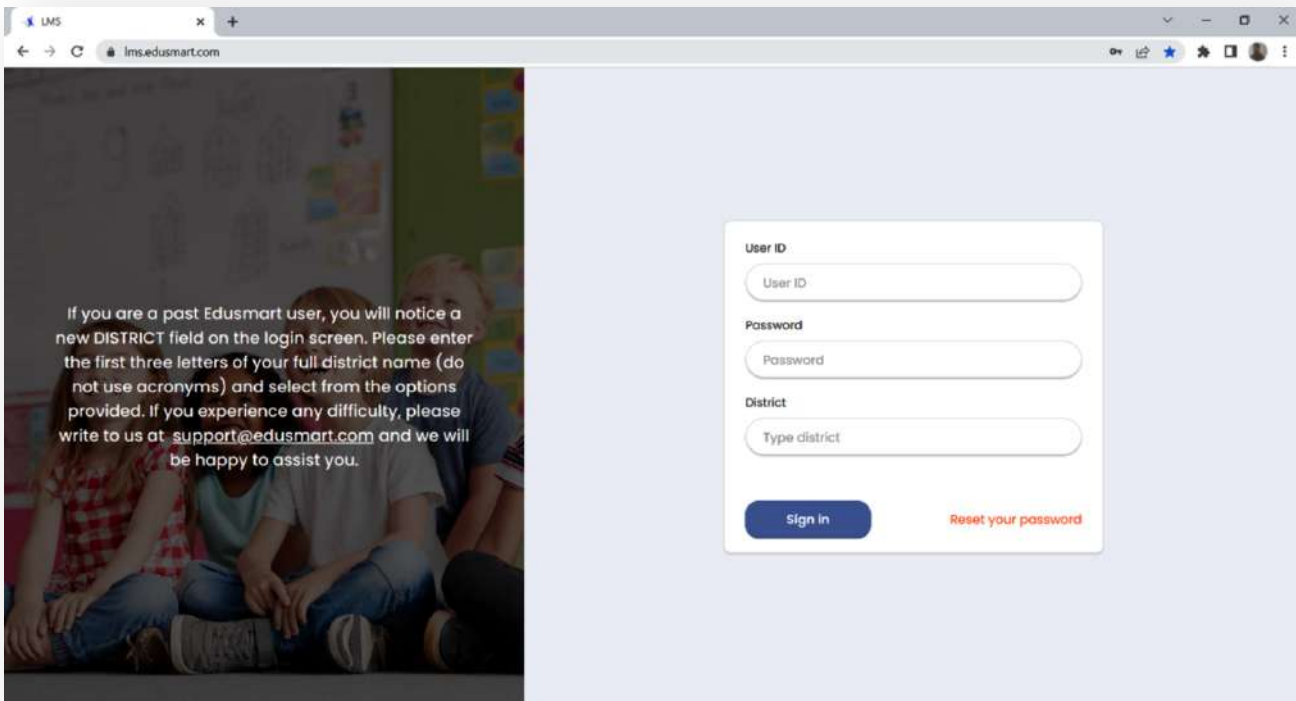
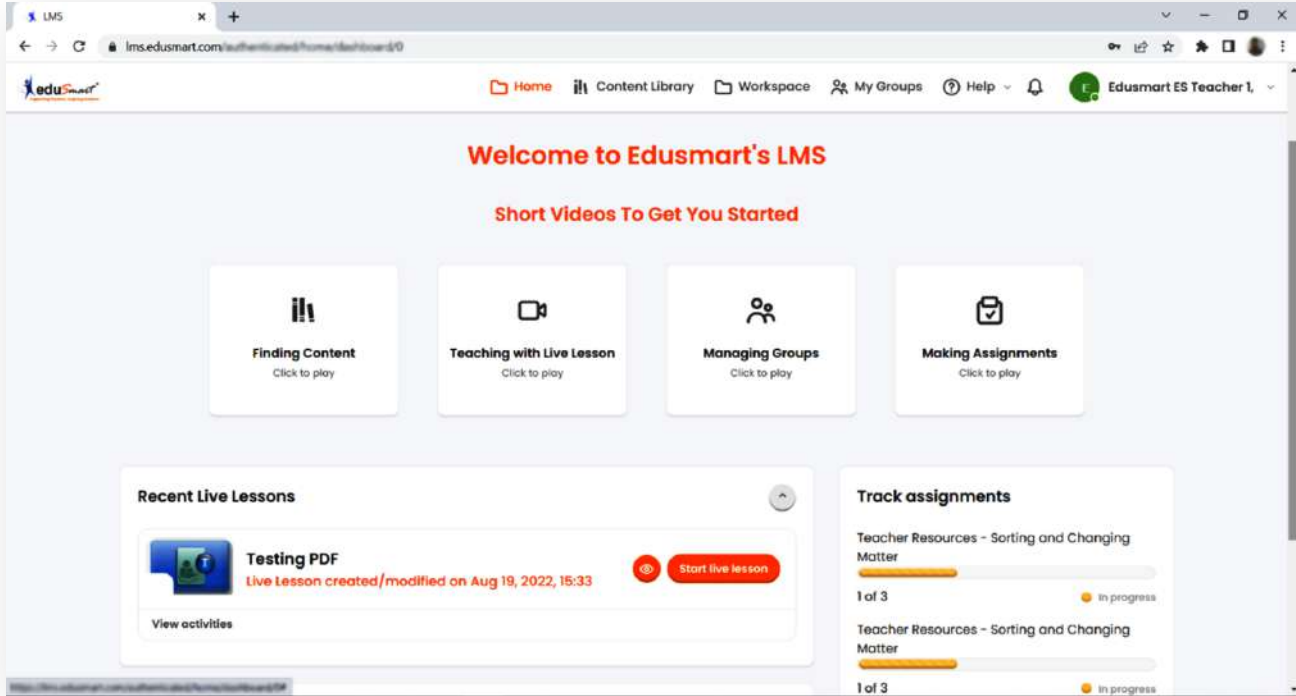
The new architecture with merged single database connected with the help of Entity Framework enabled:

- Improved performance with an increase in throughput and reduced cross-database joins
- Better maintenance and scalability
- Search optimization through database indexing
- Simplicity and cost-effectiveness with zero server maintenance
- Setting up of database for automatic scale-up or down on demand
- Improved code management

Stories

Performance of the portal when a high load was a major concern for EduSmart. After many deliberations with the client, NSP proposed rearchitecting the application with code refactoring. Existing APIs were implemented in the new architecture and the schema's proof of concept was presented to the client. After recording considerable improvement in the portal performance even at high load the new architecture was successfully adopted for production.

Dashboard Overview





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