Success Story

"Enosis defines implementation approaches to ensure rapid development and deployment of an Enterprise Scale Web Applications catering the needs of hundreds of thousands of customers."

Background

The national restaurant association performance index shows restaurant sales down for 13 consecutive months. With an extreme decline in customer traffic and forecast predicting a very distant economic recovery the restaurant industry is seeking an answer. The restaurant industry is faced with the challenge of making food service lead the market rather than be at its mercy. From distributors to restaurants to consumers the effect is being felt all across the food service industry. Distributors from the bottom up are facing major losses due to low restaurant demand fueled by lack of customers. Restaurant owners are struggling to fill empty tables even during peak dinner time. Consumers lack the ability to find the right deal at the right time. To address the needs of the food service industry the client, in collaboration with Enosis Solutions, is developing a customized Business Intelligence Web based tool that will use the client's high end predictive modeling technology to connect the right customer to the right restaurant with the right discounts.

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The Client

SpoonByte is a US based "software on demand" service provider offering iPhone & Web app that allows restaurants to create promotions (e.g., meal discounts, menu specials, or events) to increase revenue. It's the first app that serves the food industry by focusing on *Match-Based Deal Dissemination* for the physical marketplace.

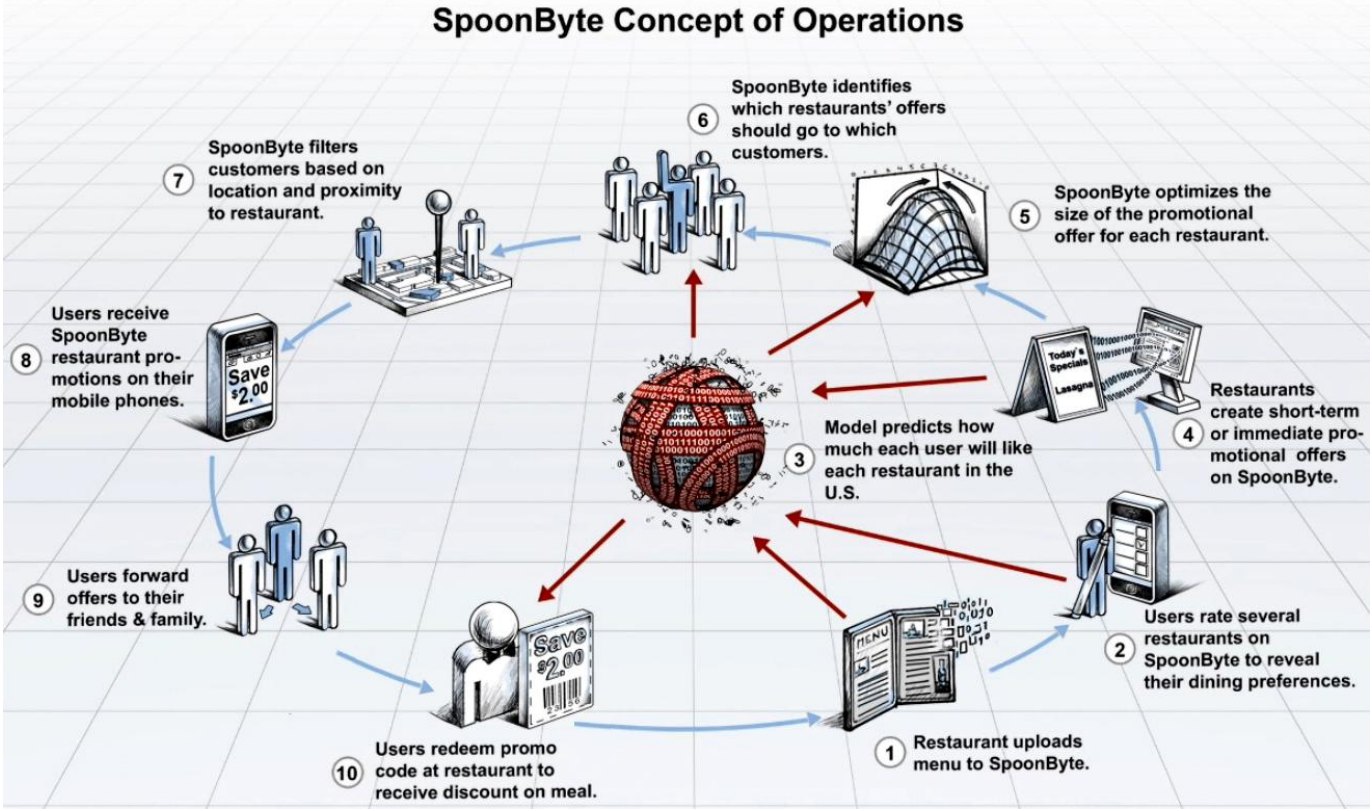
SpoonByte intelligently sends each promotion only to consumers that are near the restaurant and are predicted to act on the promotion and visit the restaurant.

THE APPLICATION

Restaurants are able to use SpoonByte to directly impact demand by creating real time deals that SpoonByte routes directly to end consumers. SpoonByte intelligently routes these limited time deals using information on user preferences and proximity.

CHALLENGES

- Defining a scalable architecture
- Selecting an appropriate technology to develop an Enterprise scale web application
- Separating the application's business logic, view logic and domain model
- For supporting domain driven development, a technology to map .NET domain classes to database tables is required, so that the application is independent of RDBMS (Relational Database Management System)
- A logging API is required to trace and store various application state information
- The application must be made to support mobile application since users will access the application using their smart phones
- Queuing different events triggered in application environment to enable them to be processed later with a different service application
- Validating users email addresses and allowing users to import contacts from email accounts to the application



- Presenting graph to the users for visual representation of the current status and progress
- Presenting Map & Directions based on proximity
- Providing fast page rendering by compressing webpage resources
- Reduce object loading time to create faster search operations
- Supporting hundreds of thousands of users with an expected 100% growth in the total user base for coming years
- Designing the solution to achieve extremely low latency in information retrieval and high throughput
- Achieve zero downtime during the peak hour when almost all the users log-on to SpoonByte application server to synchronize data at the client-end

THE SOLUTION

The solution involved a flexible software development model, the key activities of which include:

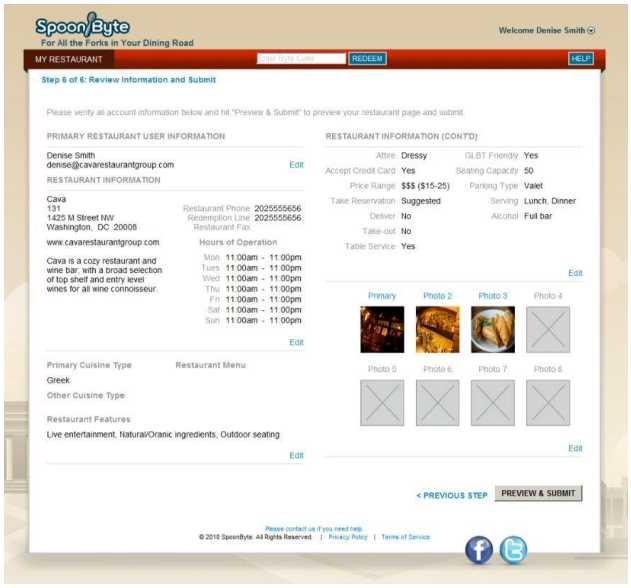
- Defining non-functional requirements of the application in a manner that ensured a common understanding of the performance and availability parameters, and managing user expectations
- Defining the solution architecture, validating performance and scalability
- Arriving at performance baselines for various architecture and technology components individually, as well as a composite application, as part of the build cycle
- Reviewing the different architecture alternatives with a view to addressing performance concerns
- Reviewing the database design and application code to identify opportunities for improvement
- Recommending measures for performance enhancements
- Implementing the performance enhancement measures

Enosis designed a powerful and flexible Enterprise scale web application that is useful to consumers in their daily life for connecting to the restaurants that match their choice of food and budget and at the same time help restaurant owners fill up empty tables. The solution to each challenge was provided by a well-planned and proactive approach.

SpoonByte Web Application

Microsoft .Net was selected because it is the ideal technology presently used to develop large scale SOA (Service-oriented architecture) application. Enosis focused on designing and developing a set of framework components and application blocks which implement all of the best practices for Microsoft .NET Framework languages, Microsoft ASP.NET, and Microsoft ADO.NET. This would ensure that all components and feature elements of the solution would meet the performance, scalability, security, reliability, and availability metrics of the application.

Enosis used popular Google Geocoding API to prohibit users from entering invalid addresses. Furthermore, the application had to allow importing contacts from the user's email account. For this purpose a modified version of DevDefined.OAuth was used to import contacts from Gmail and Yahoo using 'OAuth' protocol for authorization. To import contacts from MSN, 'Delegated Authentication' protocol was used. By authorizing users using these protocols, the application communicates with these email service providers' REST interfaces to access the users' contact list.



Restaurant information in SpoonByte

JSON.NET was used to serialize .NET objects into JSON format so that JSON responses could return from the mobile service REST interface of the application. This facilitated the access to the application from "smart" phones such as iPhone.

Windows Communication Foundation (WCF) is a framework for building service-oriented applications. Using WCF, the application communicated with the service that generates recommendation parameters for users.

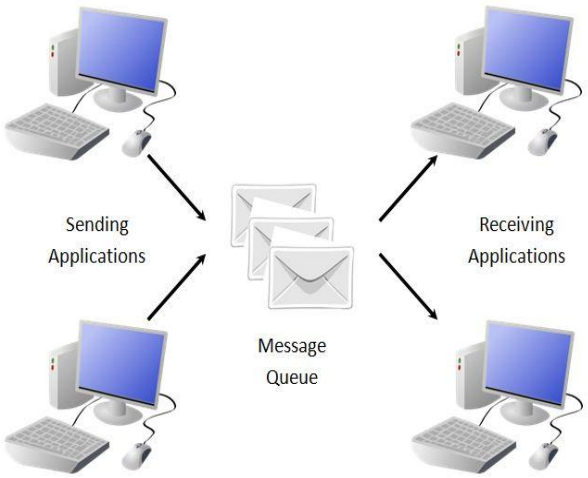
To separate the application's business logic, view logic and domain model, Enosis developed the application using Model View Controller (MVC) pattern and used ASP.NET MVC.

To map .NET domain classes to database tables Enosis used Object Relational Mapping (ORM) solution: NHibernate.

Log4Net and the logging API was used to trace and store various application state information.

ZedGraph was used for graphs which greatly simplified the visual representation of information. Google Map Api was integrated for Maps and Directions.

Message Queuing (MSQM) architecture was used to queue different events triggered in application environment. Message Queuing applications can use the Message Queuing infrastructure to communicate across heterogeneous networks and with computers that may be offline. It also provides guaranteed message delivery, efficient routing, security, transaction support, and priority-based messaging.



Message Queuing Architecture

To increase the speed of page rendering, compressing webpage resources was necessary. Enosis used YUI Compressor (a JavaScript minifier) to compress Javascripts file for faster page rendering.

The application required a memory object caching system to reduce object loading time and for faster search operations. Memcached was used by Enosis as second level cache with NHibernate for caching.

BENEFITS

- Restaurants are no longer at the mercy of the market because they can gain control of their own demand and drive traffic at the push of a button.

- Restaurants can access a variety of features with SpoonByte including real time reporting, deal creation and management and direct purchasing capability.

- Each restaurant can create customized real time deals via the SpoonByte website that can be optimized by preference proximity and time period.

- Customers can obtain suggestions, coupons and discounts based on their proximity and preferences from any location and at any time of the day.

TOOLS AND TECHNOLOGIES

- **Programming Language**: C#
- **Frameworks:** ASP.NET MVC, WCF, Windows Service
- **Web Technologies:** Html, XHtml, Javascript, CSS, AJAX
- **Relational Database Management System:** PostgreSQL, Microsoft SQL Server
- **Object Relational Mapping (ORM) Tool:** NHibernate
- **Tools and Plug-ins:** JQuery, Json.NET, Log4net, MemCached, ZedGraph, LINQ
- **Authorization Protocol:** OAuth
- **Programming Environment:** Microsoft Visual Studio Team System 2008
- **Application / Web Servers:** Microsoft IIS