

# **CDO Case Study**

## **History**

CDO Group Inc. Real Estate Builders & Construction Company, located in Chicago IL, is our client. They provide multi-unit retail companies with a complete construction management solution on an outsourced basis.

The CDO group specializes in partnering with companies when they are planning a multi-unit expansion and/or remodeling program. From process planning through punch list, we augment their existing staff with the right level talent necessary to get the program executed correctly, and the company does not have to carry additional staffing overhead.

The company was founded in 1997 by a group of client-side development professionals in an effort to address the changing and often unpredictable development schedules facing retail companies. CDO Group has quickly grown into one of the top firms servicing the multi-unit retail industry. With thousands successfully executed projects nationwide to our credit, our understanding of owner-side demands and the best-practices of the industry has given us the ability to help companies lower their G&A by transferring those costs through capitalization.

## **Old System Overview:**

They developed a web-based system back in 1996 to organize the project management stuff. But as time passed, requirements changed, and the user base started growing. They find the system a bit old and unable to fulfill their requirements. Eventually, they stopped using the system.

Then they started using Microsoft Excel to manage projects. They developed a standard excel template. But they were unable to collaborate with the internal team. And they need to do a lot of manual work. They were looking for some innovative solutions and contacted us.

## **Our Solution:**

We completely analyzed their requirements and decided to build a web application. We used an agile development path and developed an entire system in a modular fashion. It helped us customize each module as per clients' demand and post-development changes. The new system was responsive, meaning they were able to use it over their mobile device, tablet, and computer. The new system has improved their workflow and increased automation quotient.

## **Requirement**

As stated, the company provides construction management services. They need to manage many aspects related to construction like project bidding, site, manpower, work to do,

monitoring work, updating clients, ordering and tracking products, contractors, vendors, and many more things.

To make the process more organized and easier, the client had developed a web-based application back in 2006. It was a pretty basic application that covers required modules at that time with limited reporting features. As time passed, the requirements started growing, and more people started joining the group. The existing system has started getting old, lacking features, and slower in response as they have to store a decent amount of data.

At one end, they stopped using the system, and their project manager started managing projects in plain Excel sheets with their custom-designed templates. But this was lacking central data storage, meaning no two managers or contractors can collaborate for work.

The next big thing they needed was bidding on projects from various contractors. It was not possible to automate this process in an excel based environment. An excel-based approach was taking more manual work that can be solved by a newer approach. So the company decided to develop a new web application that supports all features and possibly automates all major and manual tasks.

The group contacted us for new project development. They were sure with some requirements, and for some requirements, we need to help them with what they need. The analysis was a really important part of developing a new web application as their system was complex and had multiple modules which are interrelated and need complex data logic to prepare required reports.

We took enough time to analyze their requirements. The client initially presented the presentation about their requirements and gave us an idea of their old system that they were working on a few years back. We asked for a complete explanation of the excel sheet they were using to manage projects. We identified the base entity project, which is the central part, and all other activities related to it. Identified users and roles will be used in the system.

## **Our Approach and Development**

After analyzing the requirement, we divided the whole system into modules. Each module was a functional entity of the system. We chose an agile methodology for web application development as it was a complex and large system.

### **Requirement:**

The requirement gathering was an important aspect. As we choose to go for agile development. We first took a complete overview of their requirement. How they were working with the old system. How they are working with excel and managing the projects. We analyze and finalize the requirements.

## **Designing:**

Designing is an important aspect. Users will be spending most of their time working with front-end design. Based on the requirement analyzed we presented 3 different layouts. All were specifically designed in such fashion that can incorporate new features added and design changes.

They have some set of requirements specific to the dashboard. We followed the instruction and prepared a card-based layout. Our design layout delivered all necessary information to the administrator with just logging into the system.

## **Development Strategy:**

Based on requirements and feature requests. We divided the project into functional modules. And started working from most core modules to task/function-specific modules. We decided to develop a web application with 3 layers. The data layer, Business layer, and View layer.

## **Communication:**

Communication is essential while starting with projects as we need to understand the requirement in the deepest possible way. Once the requirement analysis completes, we communicate on-demand or new module demonstration purposes.

## **Testing:**

Testing is an integrated part of overall development to make sure the system has the least possible bugs in production. We test each module once it's developed, and after successful testing, we ask our client to test it in a real-time manner with their actual use-cases for future-proofing.

## **Deployment:**

Once testing is successful on our end as well as clients end. We deploy the project to the production server.

## **Technical Details**

As mentioned, we have divided the whole system into 3 functional layers. All three layers offer a great amount of separation of concern. Meaning no matter how business logic changes, it would not affect the data or view layer. And the same applies to other layers as well.

For this project, our programming and designing team started working together. The programming team has started working on core system components while the design team started development design prototypes. The programming team has first prepared database design.

We used PHP for server scripting, MySQL for relational database management, HTML5 – CSS3 for website design, and Ajax for asynchronous data processing. There are some modules like project bid where the user needs to enter hundreds of input. Processing all the fields, including some tens of files uploaded, would be time-consuming, and concurrent requests for such data processes would make the system perform very slow and put an extreme load on the server.

Instead, we choose the distributed processing model. We used Ajax for asynchronous data processing. We used to post some set of user inputs to the server for processing in an async fashion, which reduces the load and improves the performance. These are fine-tuned elements that make the system work smoother and faster.

## **Some Creative Categories We Included in Our Solution Stack:**

### **Image Resizing Using JavaScript:**

The other unusual thing we developed was re-scaling the image on the client-side using JavaScript before uploading it to the server. They have a module called updates where their field employees and project managers used to visit and take the photographs and upload them to the portal as part of the work update. These users were using our system on a mobile device with high-speed but limited data connection uploading 5-10mb of photo per update was taking much time and bandwidth as-well. Our solution perfectly fits their needs and improves the performance and upload process.

### **Navigation:**

They need navigation on the header section, which allows them to select clients and/or projects to filter any modules like bids, updates, punch lists, or delivery dates based on selected clients and/or projects. This requires smart business layer logic that handles which data query function and retains the last project and client selection preference.

### **Dashboard:**

The need was to develop an informative dashboard for each system role of the user, which gives them a complete overview of projects without surfing deeper into each module for projects. Admin and clients get complete information about progress, deliveries, budgets, and completion status. The same way, distinct and relevant information is shown to each user, like contractors, project managers, and vendors.