



The Municipal Securities Rulemaking Board (MSRB) regulates dealers of municipal bonds and other municipal securities nationwide.

In 2007, the MSRB decided to execute on its strategy to provide greater transparency to the municipal market. Given the state of the financial markets at that time, it was critical for the MSRB to provide timely information to non-professional investors who may be new to the municipal bond market.

To deliver on this strategy, the MSRB chose to partner with CC Pace in part because of our agile software development expertise. We also had prior experience executing successful projects with the MSRB.

The system, named EMMA (Electronic Municipal Market Access), was built using the Microsoft ASP.NET framework with an Oracle database backend.

EMMA initially consisted of two major releases:

1. A publicly accessible web site

This first release provided real-time market activity information such as bond trades, new bond issues and financial disclosures. Users could also enter detailed search criteria to narrow down results or view the information in a real-time queue format. Using charting software, we built a market statistics section that graphed aggregated information about the municipal market.

This release also included an education center, with an interactive glossary of terms, targeted to new municipal bond investors.

To scale the system to meet the demand of a public site we used the following technologies:

- Multiple load-balanced IIS sites to distribute web requests.
- Oracle's Real Application Cluster (RAC) environment to distribute database requests.

To provide system redundancy, we deployed to multiple geographic sites, each with their own Oracle instance. Data was synchronized between sites using the IBM Websphere MQ messaging platform.

2. EMMA Dataport - a secure, password-protected web site

The SEC mandated this release so that issuers could electronically submit Continuing Disclosure (CD) information to the MSRB. CD submissions include event-based and financial disclosures such as rating changes or annual financial statements.

In addition to CD submissions, dealers were able to submit official statements and other information related to new bond issues. Previously, dealers and issuers had to submit paper documents to a staff of processors. This was time-consuming and error-prone because business rules that governed the submissions were not automated or centralized.

With the Dataport in place, users could login and follow an intuitive wizard to submit their required documentation. They received instant feedback if their submission did not follow validation rules.

Additionally, we built a B2B or machine-to-machine interface in the form of a Windows Communication Framework (WCF) web service that accepts submissions without user interaction. This B2B interface authenticates clients using certificates that are registered with a Certification Authority.

The B2B interface also provides registered institutions, such as the Federal Reserve, with access to batches of data. These institutions can download a replay of market activity for a specified date range (e.g. all Continuing Disclosure submissions for that day).



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The Approach

With only a vision and unrefined set of ideas, the MSRB needed a development process that facilitated constant collaboration. We followed an agile process that used XP programming techniques to ensure quality code.

We used two week iterations, with a status or “checkpoint” meeting held on off-weeks. Every two weeks the developers held demo’s with the customer to make sure that we were delivering what was promised and understood. Within the iterations, we held ad-hoc discussions with the customer and changed the software accordingly. After each iteration, we held retrospectives so that each team member had a say in what part of the process worked or did not work.

The software developers wrote code using test-driven development, integrated continuously and ran automated deployments. CC Pace considers these techniques critical to writing quality code in a repeatable manner.

Ongoing Development

Following the initial releases, CC Pace continued to help expand the capabilities of EMMA as the market, and sometimes Congress, demanded. Additional functionality included:

- Incorporating real-time bond rating update from Fitch and S&P
- The ability to view or search disclosures in connection with political contributions made by dealers to governmental issuer officials, state and local political parties, and bond ballot referendum committees
- A faster and more powerful federated search capability that culls data from multiple sources, such as security and ratings data

The Result

Because of CC Pace’s technical expertise and commitment to delivering value in stages, each release was successfully launched before SEC-mandated deadlines. EMMA solidified the MSRB’s status as the premier source of free and timely municipal market information. The site was delivered just as Congress was debating the state of financial regulation and the MSRB was seen as a champion of market transparency.