

# Developing Applications for Data Analytics at the SEC

## Challenges

Like many Federal agencies, the Securities and Exchange Commission (SEC) is a data-rich environment. Before the establishment of the Office of the Chief Data Officer (OCDO) in 2020, SEC lacked a true enterprise data strategy and governance structure, creating several challenges:

- Data Silos: an inability to share data across offices and disciplines
- Static reports and data products with high LOE
- Conflicting standards for data quality, visualizations, and outputs
- Lack of awareness around available data
- Missed opportunities for collaboration

With TCG's support, the SEC OCDO assists offices across the Commission in providing:

- Application Development and Rapid Prototyping
- High quality, interactive data visualizations and dashboards
- Data Insights – short, timely articles published on SEC's Data Catalog

## Application Development and Rapid Prototyping

TCG develops data applications, which visualize, interpret, store, and monitor historic and live market data. The applications offer easy to digest snapshots of stock market data and help the SEC detect potential patterns of financial wrongdoing. TCG's development process is driven by Agile best practices, which help the team maintain a high quality of service for all applications.

The team focuses on building an ecosystem that makes the application development process more streamlined. Both the SEC-wide DCStats project and the rapid prototyping of more specialized applications exemplify this approach.

### ■ DCStats

TCG developed the Database for Commission Statistics (DCStats), an application that allows any SEC user to create data visualizations using the substantial economic and financial data that the SEC uses for its mission.

TCG led the Data Visualizations and Insights team (DVI), which was responsible for the entirety of the design and development work and curating hundreds of datasets to be used in visualizations.

“ The TCG team earned the respect of world-class SEC market experts, integrated well into highly-analytical quant expertise, and they get the details right.

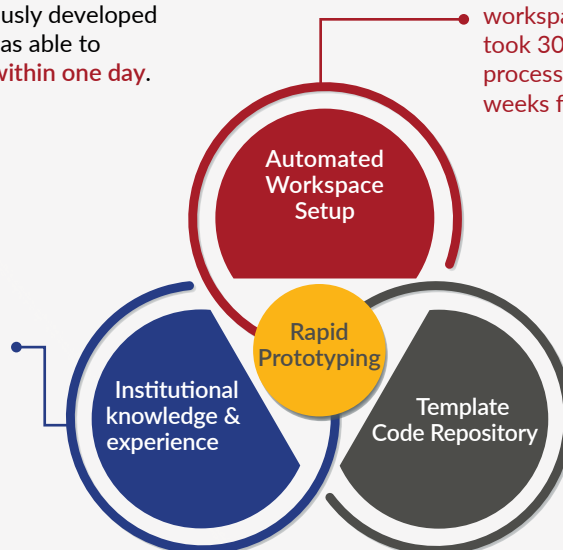
—SEC COR

## ■ Rapid Prototyping

When a new financial instrument quickly emerged, the SEC required a new application to monitor activity. TCG had previously developed a rapid prototype pipeline and was able to **deliver a prototype application within one day.**

Each agency's data, architecture, and environment have unique characteristics and requirements because agencies' have unique missions. Lessons can be transferred from one project to another, but development teams and data analysts need to be committed to understanding the data in each agency they work with.

An intricate Bash script to automate the configuration of development workspaces. This process previously took 30 minutes per workspace, and the process had to be repeated every 3-4 weeks following routine security patching.



A code repository in GitLab that cloned a basic framework template upon which most of the agency's applications are based. Aside from saving on coding time, using the template ensures that any code components aren't missed and cuts out debugging time.

# Developing Applications for Data Analytics at the SEC (cont.)

## Data Visualization and Insight Pipeline

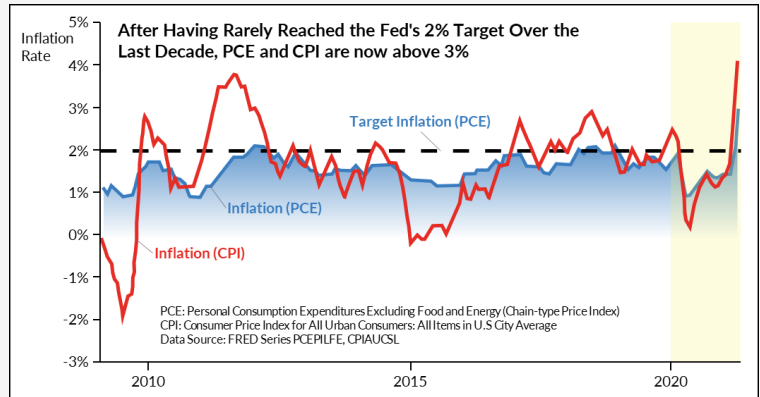
In addition to applications used for analysis, tracking, and reporting, the TCG team collaborates with offices across the agency to create three primary data products:

- Data Insights: Short articles that highlight data analysis.
- Data Visualizations: Interactive, web-based graphic.
- Custom Dashboards

These products are shared across the organization through the SEC's Data Catalog.

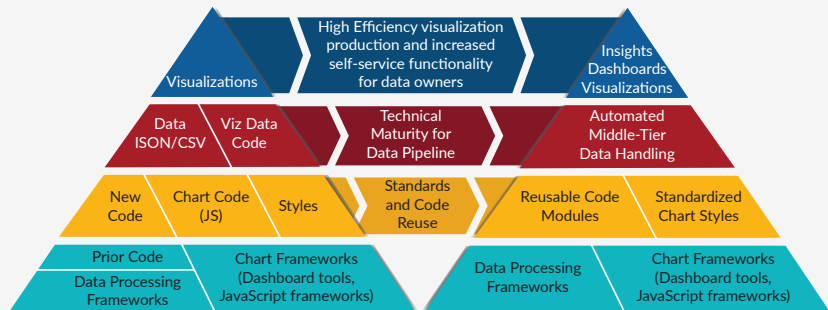
A large part of our work also involves building a reliable infrastructure around the products we produce. This involves:

- Implementing enterprise-wide data visualizations standards,
- Automating systems to accelerate data handling and increase the efficiency of visualization production
- Employing iterative development through Agile best practices
- Building a repository of reusable code



## SEC Data Product Pipeline Maturity Model

Going beyond individual data product delivery, we've designed our technical approach to enable consistent high quality data production for the future.



## Iterative Development

TCG supported the OCDO in implementing an Agile framework with one week sprints. Data visualization features and layouts were developed and reviewed iteratively with additional prototypes piloted as necessary.

## Results

Before adopting standards and an Agile framework, data insights and visualizations were produced sporadically throughout the year. The team has been able to deliver new products on a weekly basis, aided in part by increased engagement throughout the organization.

Data visualizations and insights were shared to the SEC's intranet and promoted via newsletter. Production of the newsletter increased as well from less than monthly, to a weekly basis.

The newsletter saw a

**600% increase in readership**

After implementing the new standards and improving data quality

To learn more about TCG's work with SEC, contact Michael Drescher at [michael.drescher@tcg.com](mailto:michael.drescher@tcg.com)

