In September 2007, very few people were predicting the collapse of the world financial markets, in which major investment houses like Lehman Brothers would vanish and a many month long freeze would settle into the US municipal bond market. Like most others, staff at CHFA did not anticipate that the worst financial crisis of our time was eminent. Yet in 2007, the Director of Corporate Debt and Investment Management and the Director of IT at CHFA had a vision. They envisioned a new bond management system that would help manage the ever-increasing complexity of CHFA's growing variable rate debt portfolio and all the various swap agreements that were used to hedge that debt.

CHFA's CDIM team manages the entire bond life-cycle including the creation of financing plans, agreements with swap providers to lock in the cost of capital, building the debt structure, preparing bond documents, releasing the official statement, selling fixed and variable rate bonds, closing bond issues, and reporting on all bond-related activities. In the past, CHFA financial analysts had developed hundreds of linked Excel spreadsheets to manage its $3.5 billion in outstanding debt. The spreadsheets posed several risks and had become inefficient to maintain. In October 2007, CHFA launched a project to build a new system with the goal of having it live by July 2008 to address the following management challenges:

- Unwieldy Excel spreadsheets; hundreds in multiple folder hierarchies with various naming standards
- Inaccuracies caused by multiple inconsistent macros and broken links
- No efficient way to maintain history; in some cases, history could not be retained at all
- Significant redundant manual data entry and processes

Product and Project
Orbit is an application that currently tracks 97 fixed and variable rate bonds and 65 swaps, as well as information about associated fees and various counterparties like remarketing agents, liquidity providers, and swap providers. Orbit automatically imports interest rates and retains an interest rate history for over 29 different rate sources. Orbit determines any required payment on a scheduled basis and provides all pertinent information necessary to carry out the payment. Orbit also performs monthly accruals for interest, swap, and fee payments.

To build Orbit, CHFA expanded on its enterprise architecture and used the latest development technology tools including Microsoft .Net 3.5, SQL Server 2005, and Excel 2007. This integration into an Office 2007 product was one of the first of its kind and one of the more complex applications integrated into a Microsoft Office product.

CHFA's enterprise architecture vision promotes affordable, flexible applications that are developed rapidly so IT can respond faster to ever-changing business needs. This vision was put to the test when Orbit needed to be rapidly updated to accommodate the myriad of changes as a result of the financial crisis in the fall of 2008. Beginning in November 2008, Orbit was able to be rapidly updated to

calculate bank bond balances, bank bond payments including bank bond terminations, and bank bond interest accruals. As this was a brand new occurrence in the bond industry, the requirements evolved as people's understanding increased, and the system was able to evolve with the requirements. The latest set of bank bond updates was deployed as recent as June 2009.

The project goals were to:
- Comply with internal and external audit recommendations to minimize the risk of error and complexity inherent to the Excel debt tracking spreadsheets
- Increase efficiencies by automating manual processes
- Improve accuracy
- Promote standardization in tracking the Authority's bond issue

Accomplishment/Why Orbit is Meritorious

Two of the most innovative results of this project are simplicity and visibility. The real beauty of well-designed technology is its ability to transform a complicated subject area into something simple, elegant, and purposeful. Orbit does this by providing one organized place to store data and calculations and providing insight into that data through a neat, familiar Excel interface. Orbit's element of visibility truly shines with its research capabilities. Research is essentially an ad hoc query tool built into a right panel of the application that has given the CDIM team unprecedented and immediate access into their data. Research functionality was vital to the CDIM team during the financial crisis in the fall of 2008 as they expeditiously worked to terminate liquidity agreements and transition various swap agreements to new providers. Without Research in Orbit, CHFA's CDIM team would not have been able to respond as quickly as they did in taking action to minimize the effects of the financial crisis to CHFA.

Achieved Measurable Improvements in Agency Operations

The solution delivered all of the required key functionality to replace the old spreadsheets for debt and debt service tracking as well as new functionality to handle new developments in the bond world like the ability to track bank bond balances, bank bond interest payments and bank bond accruals.

The new system has impacted the business in the following ways:
- **Improved control and accountability meeting audit requirements**
  - By removing hundreds of spreadsheets and creating a SQL database to store data and calculations, the risk of an analyst inadvertently changing a calculation or breaking a link was dramatically reduced
  - By implementing a database monitoring tool, internal audit has the capability to track key fields and gain visibility into how the data changed and who changed it.
  - With enhanced research and reporting, Internal Audit can now run their own analysis without having to search through hundreds of spreadsheets.
- **Improved accuracy and efficiencies**

- o Orbit has over ten different day-year basis calculations to better match the calculation intricacies used by various counterparties.
- o Orbit automatically imports interest rates from a rate service provider and parses rates sent in email, eliminating cumbersome manual entry that is prone to human data entry error. This greatly improves data accuracy by auto-filling the data as well as storing a centralized rate history.
- o Orbit allows the analysts to efficiently process optional and special redemptions using pro-rata, direct, inverse, or user-defined methodologies.

- **Faster, easier ability to research bond, swap, and fee data**
  - o The system allows users to quickly research weighted averages for all of the various rates and fees Orbit tracks and calculates, as well as allows the user to adjust any of the key interest rate inputs for developing projections. This feature is a tremendous time saver reducing report generation time from several hours to minutes for summarizing historical information, conducting reasonableness checks, and for creating budgets.
  - o CDIM Analysts would spend many hours researching information from over 10 different spreadsheets to prepare data needed for a new official statement issuance. With Orbit, that same activity now takes less than 30 minutes.

Replication by Other HFA's

Based on the flexibility of the software, the ease of use, and CDIM team feedback, any HFA could use this as their bond management software with exemplary results. CHFA is willing to share Orbit with the HFA industry. HFAs would need to customize the software components to meet their specific needs, but the Service Oriented Architecture would facilitate this customization. Orbit is based on the Microsoft suite of products; therefore the HFA would need to use Microsoft products to implement Orbit.