

Modeling in Cognos Framework Manager

The Boeing Company

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Executive Summary

The focus of this paper from long-time Cognos customer Boeing Company is the “foundational metadata models” that they have created in Cognos Framework Manager. Framework Manager provides a common infrastructure across all Cognos capabilities for scorecarding, planning, and business intelligence.

The business issue for Boeing was to support the integration of their business information throughout a large, dispersed data management structure. The company asked their business intelligence IT group to provide a systematic way to provide business information in a standard, integrated, and re-usable fashion.

This paper addresses how Boeing established a central set of business intelligence metadata models to retrieve key business data from authorized data sources, and use them for all aspects of reporting and business intelligence. It is best suited for the IT professional and BI metadata modeler with an intermediate level of experience.

Key topics include:

- Basing metadata models on business subject areas and not database sources only.
- The strategy of using a template “foundational” model as a mechanism for re-use.
- The maintenance needs of a foundational model.
- One viable way to make a foundational model available for use and re-use.

Company Profile

Boeing is the world's leading aerospace company and the largest manufacturer of commercial jetliners and military aircraft combined. Boeing designs and manufactures rotorcraft, electronic and defense systems, missiles, satellites, launch vehicles and advanced information and communication systems. As a major service provider to NASA, Boeing operates the Space Shuttle and International Space Station. The company also provides numerous military and commercial airline support services. Boeing has customers in more than 90 countries around the world and is one of the largest U.S. exporters in terms of sales. Headquartered in Chicago, Boeing employs more than 150,000 people across the United States and in 70 countries. Total company revenues for 2006 were \$61.5 billion.

Solution Background

At Boeing, we established a Business Intelligence Competency Center (BICC) in 2004 to serve the BI needs of the enterprise. Our fledgling BICC faced many challenges. We began by focusing on the scope, ownership, and level of services to be offered. A major goal was to increase the adoption of our BI tools. Boeing Architecture had established standards across the various aspects of BI and data warehousing, naming Cognos as the enterprise reporting and analysis standard. Cognos was deemed our flagship tool as we introduced the BICC to the enterprise.

It is the main objective of the BICC to provide Boeing BI projects with consultation and best practices concerning the use of Cognos tools for specific reporting and business intelligence needs. It became apparent rather quickly that multiple BI projects were requesting or needing access to the same data. As a result, multiple metadata models were being created to access and transform the data into specific information needs. This could generate different results for the same business question.

The BI and reporting environment at Boeing is evolving. The company is in the process of moving all business data into central warehouses and data marts to support the integration of company data. In this context, the BICC was asked to come up with a way to reduce redundancy and data quality issues for reporting and business intelligence requirements.

Detail

The Foundational Metadata Model

Our solution to reduce redundancy and address data quality was to create “foundational metadata models” in Cognos Framework Manager. The first step was to establish the concept of what such a model would be based upon. There were several people in Boeing IT who wanted to have the BICC go out and metadata model every potential data source that could be used for reports or business intelligence needs within the company. Based on our experience, there is no measurable benefit to creating a library of models based strictly on a specific data source’s set of tables and relationships. Tables and relationships in a data source are set up to support application functionality and getting data into the database.

We found that data access paths through the data structure will, in more than 80 percent of cases, require revisions or additional relationships to be created in the Framework Manager model.

A logical model of data sources can provide a business understanding of the data source. However, it does not provide the data access paths through the data structure for BI and reporting purposes.

The Framework model is the basis for SQL generation of business intelligence and reporting code created when any attribute is selected for a specific report. Just like creating report SQL, there is a need for data analysis based on the “data out” BI and reporting requirements that determine the “where statements” (represented as relationships in the Framework model), and all the SQL functions (represented by filters and calculations in the Framework model). Our experience shows that the majority of project reporting and analytical needs are across multiple data sources.

Choosing a Template Metadata Model

The second step in our process design was to establish a definition of what “re-use” meant in this context. The debate centered around having *one* metadata model physically used by all projects requiring the data vs. having a *template* metadata model that could be the basis for re-use by copying the foundational model into a project model, and allowing individual projects to change the model slightly to fit the project’s specific needs.

The BICC chose the template as its basis for the foundational metadata models. Here are some of our observations:

- Whenever we have multiple projects with the same general set of “data out” BI and reporting requirements, their detail needs – such as additional relationships and filters – differ.
- Giving multiple projects a copy of a template model to initialize their project model lets them start up their project and develop their unique “data out” BI and reporting model much quicker than building from scratch or re-using the same model alongside other projects.
- Employing a *one type* model library requires a specific project to be constrained by the development and implementation plans of other projects. Incorporating any change in one project would require agreement by other projects that it will not affect their development.
- Although the template model concept creates multiple versions of essentially the same generic “data out” BI and reporting model, duplication of metadata is less taxing on resources than implementing and maintaining the *one type* metadata model concept with BI and reporting projects. We found that the resources needed to maintain the *one type* metadata models for projects were prohibitive in our business environment.

The Process for Foundational Models

The third step was to work on the process that we would employ to establish and create foundational models.

- A. Foundational models would be stored in a configuration management location specifically set up for the Framework Manager Foundational Model Library use only.
- The initial set up of the library uses current models created from reporting projects already in development or production use.
 - We will make future updates as each project proceeds from the BICC development region to the BICC test region. (See Item D below).
- B. Models will be labeled by:
- Subject Area/Business Domain/Solution Usage Description/Creation-Update Date
 - With a first and/or secondary tag of data sources if known or available. For example, *first* would be a warehouse source; *second* would be a transaction data source. When the warehouse starts integrating data sources into a core data structure, the secondary tag will be harder to determine and thus may not be part of the tag.
- C. Projects will request from the library a copy of the foundational model, and use it to develop their specific project's model for publishing. This can be done by:
- importing the Framework Manager foundational model into the project's Framework Manager model (preferred), or
 - saving the Framework Manager foundational model under a new name and modifying the new saved model file into the project Framework Manager model.

- D. When a specific project has developed a new model or updated a previous foundational model, they send a copy of the model files to the BICC for potential incorporation into the library and to be made available for future projects. This is done at the time the project deploys the package into the BICC test region. This activity should invoke a review by the process data owners.

- E. Foundational models are imported into the Boeing Enterprise Metadata Model Repository to support lineage and potential data source change impact to BI reporting applications. This supports a library cross-reference on each model.

- F. Changes requested outside of a specific project need can be made by submitting a request to our BICC to get agreement from the business as well as the technical representatives that the change can be added to the foundational model.

Summary

In establishing the concept of a foundational model in Cognos Framework Manager, Boeing faced some internal challenges. The staff at Boeing's Business Intelligence Competency Center had several long discussions about the definition of "re-usability" for these models. The schedule and resources for this project played a large role in selecting the template concept. Furthermore, basing the models on key business subject areas instead of strictly data sources proved to be an issue that required debate for several months.

As Boeing continues down this road, we need to firmly establish the use of foundational models as the basis for future project models. We are still determining which changes should or should not be incorporated into the foundational model. However, by having the foundational model library and the process in place, we are ready to provide a standard, integrated way of reporting and analyzing specific business data. We have created a platform for reporting and analyzing in a truly "business intelligent" manner.

Future Plans

Boeing will pursue the transition of its data sources from the current transactional databases to the common data warehouse database structure. We will continue to refine this foundational model project, examining how the "re-use" issue is affected by any changes offered in Cognos application upgrades to versions 8.3 and 8.3.1.

About Cognos, an IBM company

Cognos, an IBM company, is the world leader in business intelligence and performance management solutions. It provides world-class enterprise planning and BI software and services to help companies plan, understand and manage financial and operational performance. Cognos was acquired by IBM in February 2008. For more information, visit <http://www.cognos.com>.