Chapter 11

ROBUST BUSINESS INTELLIGENCE SOLUTIONS

Jan Mrazek
Chief Specialist, Business Intelligence Solutions, Global Information Technology, Bank of Montreal, 4100 Gordon Baker Rd., Toronto, Ontario, M1W 3E8, Canada,
jmrazek@sympatico.ca, jan.mrazek@bmo.com

Keywords: data warehouse, data mart, business intelligence, data mining, On-Line Analytical Processing, star schema, snowflake schema, denormalization, massively parallel processing

Abstract: We discuss implementation of very large multi-purpose Business Intelligence systems. We focus on system architecture and integration, data modelling and productionalisation of data mining. The ideas presented come mostly from the author's experience with implementations of large Business Intelligence projects at the Bank of Montreal. Some of these projects have won major international awards and recognition for unique, integrated, well performing and highly scalable solutions.

1. INTRODUCTION

Business Intelligence (BI) is a new and powerful area of informational expansion in organisations and "getting it right" often makes the difference between a flourishing life and a slow business decay. Business Intelligence is heavy artillery for an organisation and under the assumption of steady supply of quality data, proper maintenance, organisation, integration, focus, mobility/flexibility and readiness to be used, it is arguably the most critical force of today's enterprise. It is supposed to provide easy access to actionable information and knowledge to all decision-makers on all levels in the organisation.
In this practically oriented paper we will essentially describe technical aspects of Business Intelligence systems as they were implemented in the past 3 years at the Bank of Montreal in Toronto.

We will discuss BI architecture, issues of system integration, challenges of information flow design, data transformation, some challenging aspects of data modelling and an integration of data mining. In order to provide a vendor unbiased view on these topics, we will restrain from discussing any technology or product in particular and leave this part fully to the further interest of the reader.

2. BUSINESS INTELLIGENCE ARCHITECTURE

From the business perspective there are two main areas of Business Intelligence Systems: Customer Relationship Management (CRM) and Business Performance Management (BPM). One is outward oriented (on the customer) the other inward oriented (on the business). Often we hear related terms like Customer Value Management (CVM) and Management Information Systems (MIS). From the departmental point of view yet other Decision Support Systems (DSS) are known as Financial Information Systems, Credit Risk Systems, Enterprise Resource Planning Systems, Inventory Management Systems, Product Development Systems, Channel Optimisation Systems, Target Marketing Systems, and others.

Years ago, the recognised need for consistent quality and data content was responsible for the dawn of data warehousing. Conceptually, transactional legacy data is cleansed and transformed only once, when it comes into the data warehouse and where ever it is then presented (data marts), it appears consistent to other presentations. Yet, the problem of data consistency is more complex than that, and the implementation of a data warehouse is not sufficient to resolve it. The major hurdle is the time in which facts and dimensions are constantly changing. Whatever the technical solution, the handling of data consistency and time are the two most crucial challenges of every Business Intelligence System. For a healthy management of any enterprise, it is indispensable that all decision-makers have access essentially to the same information source at the same time. Therefore, from the perspective of a BI architect, there should only be one integrated BI complex satisfying all CRM, BPM and other corporate information needs.

Later in this article we will introduce multi-tier architecture of such a system.