



A Discussion of Data Warehousing and Business Intelligence

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Agenda

- ▶ Why a data warehouse?
 - ▶ Purpose
 - ▶ The goal
 - ▶ Advantages
- ▶ Creating a data warehouse to enhance business intelligence
 - ▶ Our project
 - ▶ Gaining “Business Intelligence”

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Purpose

Why a data warehouse?

- ▶ A data warehouse collects, cleans, consolidates and organizes data from different systems so that users can more easily access, manipulate and analyze the data
- ▶ A data warehouse enables **Business Intelligence** or **BI**

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The Goal

Why a data warehouse?

To help users make **better** decisions
faster

- ▶ Readiness of information
- ▶ Flexibility in analysis
- ▶ Bridging the **Analysis Gap** - Transforming large volumes of raw data into useful subsets of information

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Advantages

Why a data warehouse?

- ▶ **Reduced cost** of accessing information
 - ▶ One-time cost of locating, gathering, cleansing, convert/integrating and merging the data
- ▶ **Increased timeliness and accuracy** of information for the users
- ▶ Supports the existing operational (transactional) systems
 - ▶ No impact to transactional system
 - ▶ Reduce complexity for reporting
 - ▶ Maximize transaction efficiency

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Our Project

Creating a data warehouse to enhance business intelligence

This began as a Strategic Business Plan Initiative

- ▶ **Strategy:** Enhance business information to enable more informed management decisions
- ▶ **Solution:** Develop and integrate an agency-wide data warehouse that identifies opportunities for automating or enhancing key business activities

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Our Project - Timeline

Creating a data warehouse to enhance business intelligence

- ▶ Funding was obtained and the project **commenced on July 1, 2001**
- ▶ We broke the project into 3 distinct phases:
 - ▶ 1 - **Project planning**
 - ▶ 2 - **Business & technical requirements analysis**
 - ▶ 3 - **Project implementation**
- ▶ The implementation of our initial requirements will be **completed June 30, 2003**

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Our Project - Teamwork

Creating a data warehouse to enhance business intelligence

▶ Stakeholder Divisions within Revenue

Audit, Compliance, Research, Taxpayer Account
Administration, Taxpayer Services & Information
Services

▶ Revenue, Sierra Systems Group & Hewlett-Packard Services



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Sierra Systems

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Success

A partnership for implementation!

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Our Project

Creating a data warehouse to enhance business intelligence

Phase 1 - Project Planning

- ▶ An **executive sponsor** was selected
- ▶ An interdivisional **project team** was organized
 - ▶ This was viewed as an **I.T. and Business partnership**
 - ▶ Collaboration was essential from Day 1
- ▶ An outside vendor was selected to guide us through the planning phase - **Sierra Systems Group**
 - ▶ **Formal “kick-off” of project February 2, 2002**
 - ▶ Project charter
 - ▶ Project scope
 - ▶ High-level business and technical requirements

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Our Project

Creating a data warehouse to enhance business intelligence

Phase 2 - Business & Technical Requirements Analysis

- ▶ We continued our contract with Sierra Systems Group and Phase 2 **commenced April 1, 2002**
- ▶ Interviews were conducted with the **business users** to identify, analyze and document business requirements
- ▶ Interviews were conducted with **I.T. staff** to identify and document technical requirements

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Our Project

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Phase 2 - Business & Technical Requirements Analysis

- ▶ Sierra guided us through the **RFP process** to select an implementation vendor
- ▶ The entire RFP process took approximately 4 months
 - ▶ Actual preparation of the RFP document = 1 month
 - ▶ Advertising, holding a vendor conference and receiving interested bids = 1 month
 - ▶ Vendor evaluation and demonstration process = 1 month
 - ▶ Vendor selection and contract negotiation = 1 month




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Our Project

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Phase 3 - Implementation

- ▶ **HP Services** was selected as our implementation vendor to provide a full data warehousing “solution”
- ▶ Phase 3 “kick-off” was on **September 17, 2002**
- ▶ Data Warehouse platform
 - ▶ MS SQL Server 2000 
- ▶ Access Channels
 - ▶ Business Objects 
 - ▶ Business Objects WebIntelligence/InfoView
- ▶ Soft-match of internal and external data 
 - ▶ Search Software America’s Data Clustering Engine (DCE)

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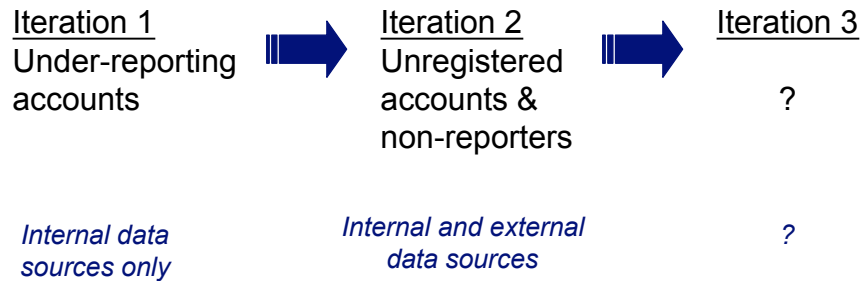


Our Project

Creating a data warehouse to enhance business intelligence

Phase 3 - Implementation

An Iterative Approach



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Our Project - The End Result

The Tax Compliance Data Warehouse

Capabilities:

- ▶ Perform multidimensional analysis
- ▶ Perform ad-hoc queries, roll-up/drill-down, grouping
- ▶ Create reports with custom layout
- ▶ Refresh reports with latest data
- ▶ Combine data in reports with other data sources on the fly

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Our Project - The End Result

What is a Data Warehouse?

Key Components:

- ▶ Data Sources
 - ▶ Operational systems
 - ▶ Internal parties
 - ▶ External parties
- ▶ ETL Processes
 - ▶ Extract, cleanse, reorganize, transform, aggregate, calculate, and load according to defined business rules

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Our Project - The End Result

What is a Data Warehouse?

Key Components (continued):

- ▶ Data Warehouse & Data Marts
 - ▶ Collective repository of data
- ▶ Access Channels
 - ▶ Ad-hoc queries, multidimensional analyses, data mining
 - ▶ Other consumer systems

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Our Project - The End Result

Creating a data warehouse to enhance business intelligence

What we have on June 30, 2003 will be our first step in a sustainable Data Warehouse:

- ▶ Estimated size = 110 GB
- ▶ Internal source systems = 3
- ▶ External sources = 2
- ▶ Estimated number of tables = 150
- ▶ Estimated growth = 2 GB per year
- ▶ Predefined Business Objects reports = 40

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Gaining Business Intelligence

Creating a data warehouse to enhance business intelligence

Our first two iterations focused on:

- ▶ The identification of **under-reporting accounts**
 - ▶ Enhanced audit selection
 - ▶ Targeted educational efforts
 - ▶ Identification of common taxpayer reporting errors and industry averages
- ▶ The identification of **non-filers**
 - ▶ Unregistered businesses
 - ▶ Improperly closed accounts

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Gaining Business Intelligence

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What we've been involved in to date are very "tactical" activities:

- ▶ Multidimensional analysis
- ▶ Status reporting
- ▶ Ad-hoc queries and "what-if" scenarios
- ▶ Development of an intuitive user interface

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Gaining Business Intelligence

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Future expansion will be in the following areas:

- ▶ Identification of workload **efficiencies**
- ▶ Making better use of data for
 - ▶ **Management planning and analysis**
 - ▶ **Taxpayer education and assistance**
- ▶ Analysis of **delinquent accounts**
 - ▶ Ranking and scoring
 - ▶ Bankruptcy prediction

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Gaining Business Intelligence

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Our goal for the future will be to move away from an operational focus and start looking at informational opportunities:

- ▶ Performance measurement
 - ▶ How effective is our audit program?
 - ▶ How effective are our educational efforts?
 - ▶ What efficiencies can be gained by increased automation?
- ▶ Better ability to predict how legislative changes or external factors will impact revenue

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Gaining Business Intelligence

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In the future we will focus on “strategic” initiatives:

- ▶ Continuous improvement of decision-making capabilities to increase revenues and reduce costs
- ▶ Assess, evaluate and optimize business operations and taxpayer relationships
- ▶ Better tools for our knowledge workers
- ▶ Leverage the amount of captured transactional and operational data

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Gaining Business Intelligence

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Our challenge as we move forward will be in measuring the benefits derived from our data warehouse and continually striving to identify new data sources and new ways of using the information.

This is an on-going process of exploration, not a static “system”.

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Gaining Business Intelligence

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Some thoughts for the future:

- ▶ Use new voice-recognition technology to capture taxpayer questions directed to the help line
 - ▶ May point out focus areas for audit selection
 - ▶ Will assist in targeting educational efforts
- ▶ Create a data repository of taxpayer information (i.e. resale certificates)
 - ▶ Enhanced audit selection
 - ▶ Identification of unregistered businesses

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Q & A

Questions?

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