



Business Intelligence – What Actuaries Need to Know

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Presentation Structure

- **Background**
 - Information Architecture
 - Data Warehouse
 - Information Delivery
- **Business Intelligence Less the Hype**
- **Real World Examples**
 - Actuarial, Claim, and Sales



Introduction to get our Brains working!

Start Video Clip
IDSTV



Terms

- Business Intelligence Tools
- Data Governance
- Data Warehouse
- Dimensional Data
- Master Data Management
- Metadata
- Metadata Repository
- Relational Data
- Staging



Data Requirements

Solving for five data requirements is critical to the success of any initiative

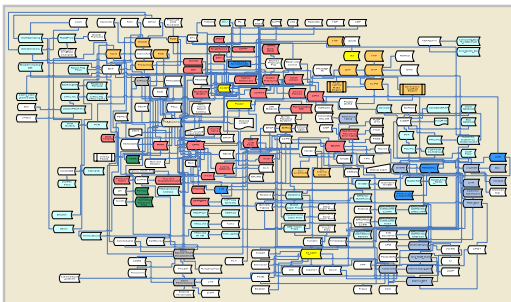
Data Requirements	Description
Scalability	<ul style="list-style-type: none"> • Increased usage and appetite for additional data elements from other parts of the enterprise and from 3rd party sources will initiate a virtuous circle - increased use of data will lead to more sophisticated questions which will lead to the need for more data to make decisions, complete transactions, and conduct research. Increased capacity in people, process, and technology will enable capture of additional data at decreasing marginal costs. Scalability enables a shift from being extremely parsimonious in our data capture to capturing all potentially useful data
Trustworthy	<ul style="list-style-type: none"> • Knowledge of what data exists, where it is located, and confidence that the quality level is sufficient for conducting analysis and making decisions
Accessibility	<ul style="list-style-type: none"> • Easier and speedier access to existing data. All 2010 workstreams assume that data, 3rd party and internal, will be available wherever and whenever needed in the future processes
Granularity	<ul style="list-style-type: none"> • Data acquired by the customer interaction processes (New Business, Claims, etc.) and 3rd party providers are detailed enough to meet research and transactional needs of product, marketing, sales, and pricing
Connectivity	<ul style="list-style-type: none"> • Ability to link data across the enterprise and from 3rd parties at a granular vs. summary level, to enable research, analysis and transactional processing

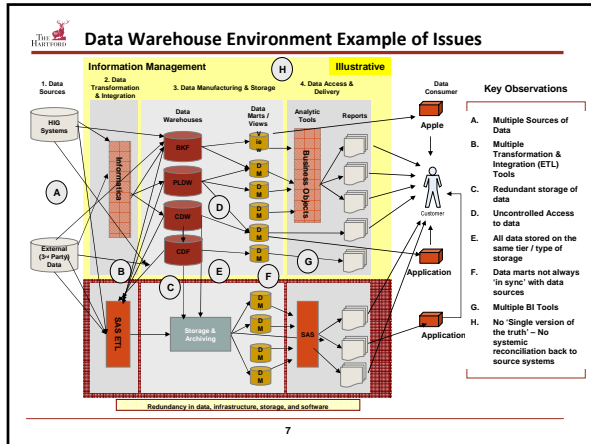
Achieving the five data requirements will make data available and useable across the enterprise.

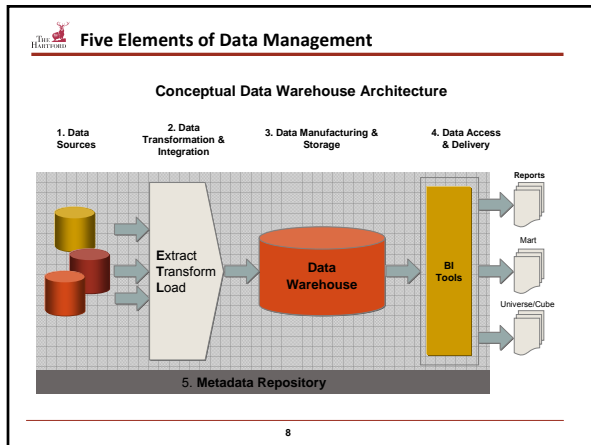


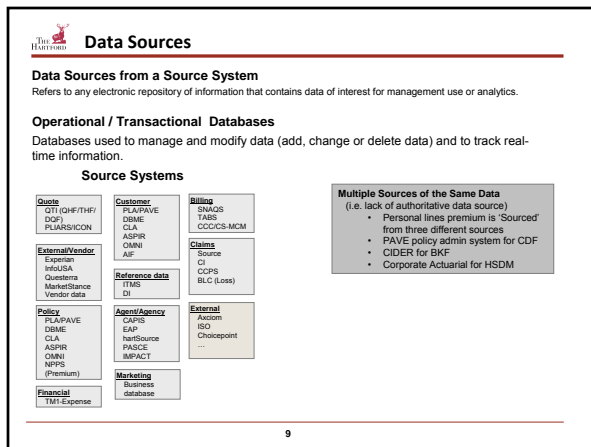
Information Architecture

Typical Multi-line Insurer Current Data Architecture









Data Transformation & Integration (ETL)

ETL (Extract, Transform and Load) is a common 3 step process designed for this purpose

- Extract**
 - Extract data from multiple legacy sources
 - Extract may be via
 - Intermediate files
 - Databases
 - Directly connecting to sources
 - Multiple extract types
 - Full extract (refresh)
 - Incremental extract
- Transform**
 - Works with the extracted data set
 - Applies business rules to convert to desired state
 - Cleanse and standardize data
- Load**
 - Inserts / updates the data warehouse database tables
 - Intelligently add new data to the system

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Data Manufacturing & Storage

Atomic Data Store
A shared, analytic data structure that supports multiple subjects, applications, or departments

Data Mart
A shared, analytic data structure that generally supports a single subject area, application, or department

Data Warehouse Architecture
There are different types of data warehouses and platforms, e.g.:
 ■ centralized vs. federated
 ■ Superdome v. Teradata v. Exadata

Potential Issues
 Redundant Storage of Data
 Uncontrolled Access to Data
 All data stored on the same tier / type of storage
 Data marts not always in-sync with data sources

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Data Access & Delivery

Business Intelligence (BI)
An umbrella term that encompasses the processes, tools, and technologies required to turn data into information, and information into knowledge and plans that drive effective business activity. BI encompasses data warehousing technologies and processes on the back end, and query, reporting, analysis, and information delivery tools (that is, BI tools) and processes on the front end

Potential Issues
Multiple BI Tools

- Five Business Intelligence tools are in use
- Reports and Analytics cannot be easily reused
- Dueling "Truths"
- Reconciliation Efforts

	Purpose	Usage
Standard Reports	Provides a pre-made document to provide information needed by user	Reports that require infrequent structural changes, and can be easily accessed electronically
Queries	Provides ability to data using a pre-defined query, or on an ad hoc basis	Research, analysis and reporting
Analytical Applications	Provides ability to easily access key performance indicators or metrics	Monitoring and accessing performance
OLAP Analysis	Alerts users to pre-defined conditions that occur	Research and Analysis
Exception Based Reporting	Provides ability to perform summary, detailed or trend analysis on requested data	Notification without the need to perform detailed analysis
Data Mining	Ability to discover hidden trends with the data	Research and analysis of hidden trends with in the data

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Metadata

Metadata can provide a semantic layer between IT systems and business users—essentially translating the systems' technical terminology into business terms—making the system easier to use and understand, and helping users make sound business decisions based on the data (i.e. A Data Yellow Pages)

A **metadata repository** is: the logical place to uniformly retain and manage corporate knowledge (meta data) within or across different organizations in a company

Various types of meta data include:

- Data Definitions**
 - List of common data elements and standard definitions
- Business Rules**
 - Rules define data use, manipulation, transformation, calculation and summarization
 - Business rules are mainly implemented by the ETL and reporting tools in a metadata dictionary
- Data Standards**
 - Rules and processes on data quality
- Data context**
 - Use of and dependencies on data within business units and processes
- Technical Metadata**
 - Information on configuration and use of tools and programs
- Operational metadata**
 - Information on change/update activity, archiving, backup, usage statistics

Potential Issues

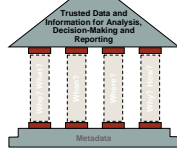
- No Single Version of the Truth – No systemic reconciliation back to source system**
 - Metadata is the crux of many of our data problems
 - Time would not be wasted
 - Less reconciliation
 - Not gathering useless / redundant data
 - Less storage



Metadata - What is Metadata?

Metadata is "data about data." It tells us the meaning and context of a piece of data.

- Who?**
 - Who owns this data?
 - Who's responsible for its quality?
 - Who has access to it?
- What?**
 - What's the definition of this data element?
 - What are the valid values?
- When?**
 - When was it last updated?
- Where?**
 - Where is this data stored?
 - Where does it originate from?
 - Where is it used?
- Why?**
 - Why is this piece of data important?
- How?**
 - How is it calculated?
 - How is it manipulated?



Example of Metadata:

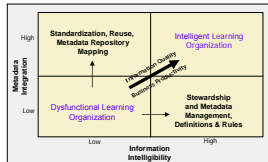
- What does **Total Earned** mean?
 - What is the definition and who is accountable?
 - How is **"Total Earned"** formulated?
 - Where does this data originate from?
 - What software, hardware, and databases are involved?
- Often metadata is agreed-upon **definitions and business rules** stored in a **centralized repository** so that **common terminology for business terms** is used for all business users – even those across departments and systems. It can include information about **data's ownership, source system, derivation** (e.g. **profit = revenues minus costs**), or **usage rules**. It prevents data misinterpretation and poor decision making due to sketchy understanding of the true meaning and use of corporate data.



Metadata - What are the benefits of implementing a Metadata Strategy?

Benefits

- Common, embraced language between Business and IT
- Substantial opportunity to improve data quality through greater understanding of HIG data
- Improved business intelligence
- Reduced redundancy
- Consistency of data elements
- Reduced reconciliation efforts around data definition
- Alleviate loss of knowledge when staff transfers, retires or leaves the company
- Minimize the effort on learning new data sources
- Reduced development cycle times for new and existing systems
- Economies of scale
- Increased efficiencies via short data searches
- Improved efficiency of analysis



Imagine sending all of your most experienced employees away for a month.

What would happen to your business? How would your employees go to get answers? How long would it take and how many resources would have to be involved?

The costs would be mitigated if you had a centralized metadata repository.



Business Intelligence Less the Hype

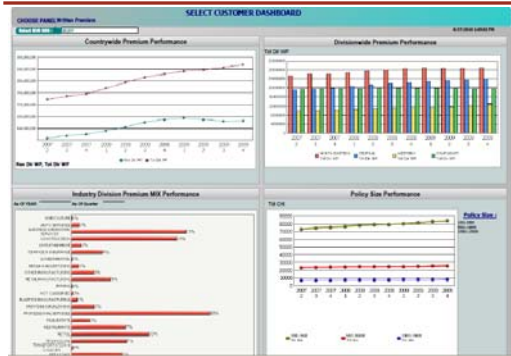
Business Intelligence (BI)

An umbrella term that encompasses the processes, tools, and technologies required to turn data into information, and information into knowledge and plans that drive effective business activity. BI encompasses data warehousing technologies and processes on the back end, and query, reporting, analysis, and information delivery tools (that is, BI tools) and processes on the front end.

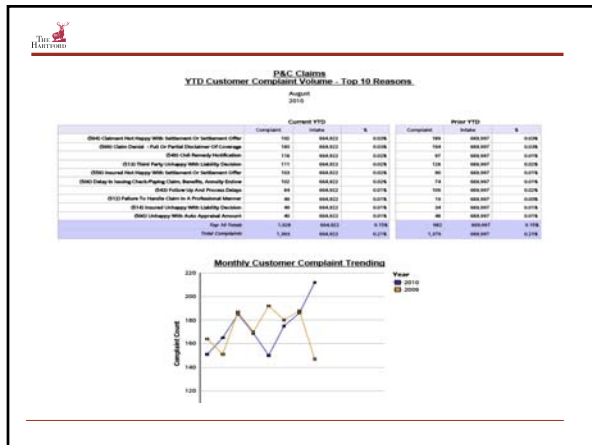
Translation: Business Intelligence turns data into information.

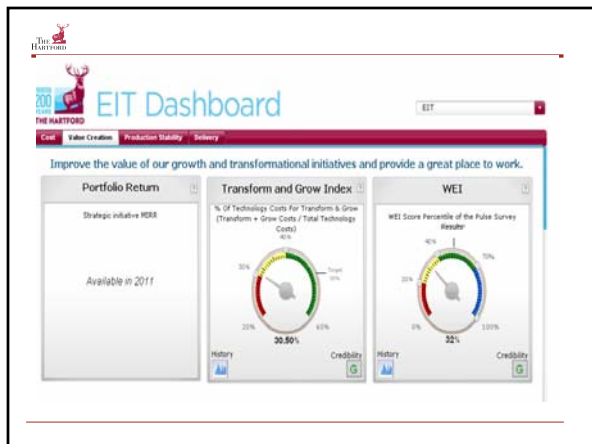


Business Intelligence as Deployed for the Actuarial Department - BI Tool Microstrategy









Business Intelligence as Deployed for the Claim Department - BI Tool Cognos

KPI Strategy > Dashboarding

The faster and more accurately KPIs can be accessed, reviewed, analyzed, and acted upon, the better the chance an organization has for success.



Business Agility is "the ability of an organization to sense environmental change and to respond efficiently and effectively to that change." - Gartner Group

Single Point of Access - one stop shopping

From Results Evaluation to Taking Action





Performance Dashboard Success Factors

Organizational Needs

Alignment – Focus on commonly agreed upon goals and objectives		Business defined goals aligned with strategic objectives
Visibility – Organization can track KPI's by department and enterprise		At a LOB level only – looking at an executive level in a future release that will aggregate results across lines
Collaboration – Provide single view of defined objectives enabling joint decision making		Excellent tool for line level analysis, common definitions at a LOB level allows for analysis across common KPI's (i.e. WEI, CCI, CSI)

Business User Needs

Intuitive – Ease of use		Strong feedback on usability, trend charts and metric definitions linked with each gauge
Personalizable – Provide users with specific indicators and functions necessary for their		Role based delivery
Powerful, interactive insight – Communicate actionable information to robust KPI's and advanced analytics		Ability to drill across the organization and into specially designed Cognos cubes for analytics

Source for Success Factors – Business Objects White Paper on Management Dashboards
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Claim Dashboard Features

- Roles based – Handler, Supervisor, Manager, Director, Oversight
- Top down filtered drill path
- Cognos cube access by gauge
- Trending charts by gauge

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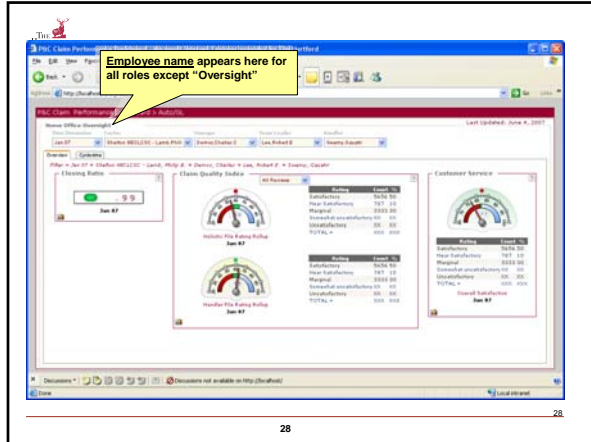


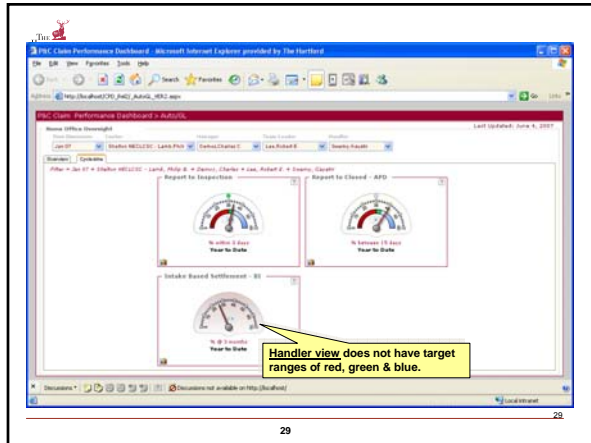
Sequential filtering (e.g., Select a Director and the Manager filter drop-down box appears with the selected Director's direct reports listed as filtered values).

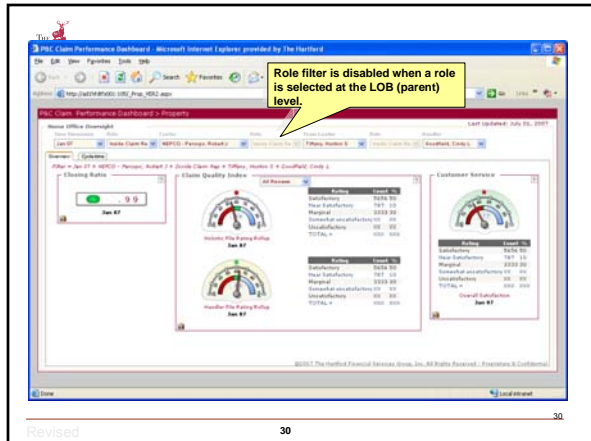
Direct COGNOS Access by clicking on the gauge

Trending Line Chart accessible by clicking on the chart icon

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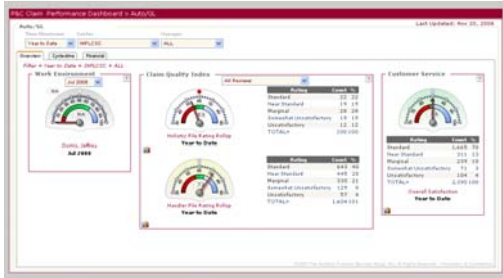




Alignment of Business Strategy and Company Goals

The 3 key Claim strategic elements:

Work Environment Claim Quality Customer Service



It is the detail behind it that provides the insight and understanding of how to take action.



Business Intelligence Deployed For the Sale Department – BI Tool Business Objects



Sales and Marketing Features

- Structures Reports with Drill Down Capabilities
- Top down filtered drill path
- Business Object Universes
- Trending charts



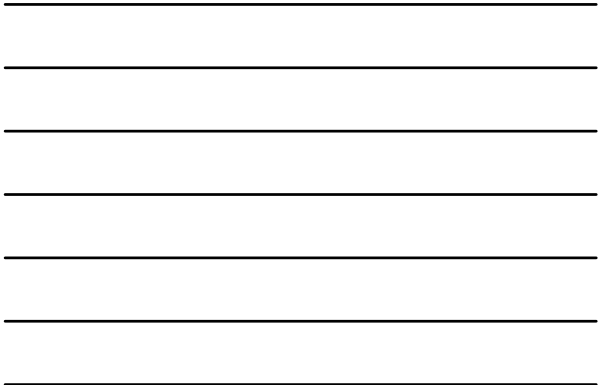
Key Sales UW SmartCard – “My Insights”

“My Insights” contains actionable information for your territory at a greater level of detail. Each element in the folders on the left is a link to a report. There are explanation of the reports on the right. All reports can be saved to Excel!



Key Sales UW SmartCard - My Insights – TSP Monitoring

The top report is the TSP Monitoring report. It displays information by agency including agency profiling, sales calls, plan values and agency



Key Sales UW SmartCard - My Insights – Flow Funnel



Appendix

Glossary: Common Data Warehousing Terms & Definitions

1. Data Sources

- **Source System: Source System or Data Sources** refers to any electronic repository of information that contains data of interest for management use or analytics

2. Data Transformation & Integration (ETL)

- **ETL: The data transformation layer (aka Extract, transform, load - ETL or some variant)** is the subsystem concerned with extraction of data from the data sources (source systems), transformation from the source format and structure into the target (data warehouse) format and structure, and loading into the data warehouse

5. Metadata Management

- **Metadata:**
 - Metadata, or "data about data", is used not only to inform operators and users of the data warehouse about its status and the information held within the data warehouse, but also as a means of integration of incoming data and a tool to update and refine the underlying DW model.
 - Examples of data warehouse metadata include table and column names, their detailed descriptions, their connection to business meaningful names, the most recent data load date, the business meaning of a data item and the number of users that are logged in currently

Glossary: Common Data Warehousing Terms & Definitions

3. Data Manufacturing & Storage

- **Data Warehouse:** A shared, analytic data structure that supports multiple subjects, applications, or departments. There are three types of data warehouses: centralized, hub-and-spoke, and operational data stores
- **Hub-and-Spoke Data Warehouse:** A data warehouse that stages and prepares data for delivery to downstream (i.e., dependent) data marts. Most users query the dependent data marts, not the data warehouse
- **Centralized Data Warehouse:** A data warehouse residing within a single database, which users query directly
- **Federated Marts or Environments:** An architecture that leaves existing analytic structures in place, but links them to some degree using shared keys, shared columns, global metadata, distributed queries, or some other method
- **Data Mart:** A shared, analytic data structure that generally supports a single subject area, application, or department. A data mart is commonly a cluster of star schemas supporting a single subject area
- **Dependent Data Mart:** A dependent data mart is a physical database (either on the same hardware as the data warehouse or on a separate hardware platform) that receives all its information from the data warehouse. The purpose of a Data Mart is to provide a sub-set of the data warehouse's data for a specific purpose or to a specific sub-group of the organization. A **data mart** is exactly like a data warehouse technically, but it serves a different business purpose: it either holds information for only part of a company (such as a division), or it holds a small selection of information for the entire company (to support extra analysis without slowing down the main system). In either case, however, it is not the organization's official repository, the way a data warehouse is
- **View:** Is a "logical" provisioning of a subset of the data warehouse similar to a Data Mart
- **Tiered Storage:** Data is stored according to its intended use. For instance, data intended for restoration in the event of data loss or corruption is stored locally, for fast recovery. Data required to be kept for regulatory purposes is archived to lower cost disks
- **Operational Data Store (ODS):** A "data warehouse" with limited historical data (e.g. 30 to 60 days of information) that supports one or more operational applications with sub-second response time requirements. An ODS is also updated directly by operational applications



Glossary: Common Data Warehousing Terms & Definitions

4. Data Access & Delivery

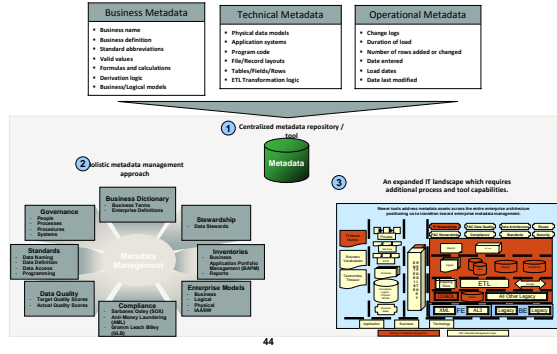
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- Business Intelligence Tools:
 - Business intelligence tools are a type of **application software** designed to help the **business intelligence (BI) business processes**. Specifically they are generally tools that aid in the analysis, and presentation of data. While some business intelligence tools include **ETL** functionality, ETL tools are generally not considered business intelligence tools
- Reporting:
 - The data in the data warehouse must be available to the organization's staff if the data warehouse is to be useful. There are a very large number of software applications that perform this function, or reporting can be custom-developed. Examples of types of reporting tools include:
 - Business intelligence tools**: These are software applications that simplify the process of development and production of business reports based on data warehouse data
 - Business performance systems**: These are more widely used **dashboard software**. These are software applications that are used to display complex business metrics and information in a graphical way to allow rapid understanding.
 - OLAP Tools**: OLAP tools form data into logical multi-dimensional structures and allow users to select which dimensions to view data by.
 - Statistical**: Data mining tools are software that allow users to perform detailed mathematical and statistical calculations on detailed data warehouse data to detect trends, identify patterns and analyze data
- OLAP:
 - OLAP is an acronym for On Line Analytical Processing. It is an approach to quickly provide the answer to analytical queries that are dimensional in nature. It is part of the broader category **business intelligence**, which also includes **extract transform load (ETL)**, **relational reporting** and **data mining**. The typical applications of OLAP are in business reporting for sales, **marketing**, management reporting, **business process management (BPM)**, **budgeting** and forecasting, financial reporting and similar areas
- Spreadmart: A spreadsheet or desktop database that functions as a personal or departmental data mart whose definitions and rules are not consistent with other analytic structures

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Metadata - Scope

A **Metadata Management** program enables our ability to find, understand, manage, govern, rationalize, share, reuse, and leverage information about data, business, applications, services, hardware and software.



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Metadata Implementation Program - The Five Deliverables

- Tool:** Acquire a metadata tool that will meet our business and IT requirements for Metadata Management
- Governance:** Implement the proper roles, responsibilities, policies, processes, procedures, and standards to most effectively manage our information assets
- Organization:** Consolidate various data management resources into a data asset management organization
- Communication Plan:** Establish an ongoing effort to educate and communicate to our employees all metadata strategy related initiatives
- Roadmap/Implementation:** Develop a preliminary roadmap with key implementation strategies for moving forward

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