Leveraging the Oracle/Hyperion Suite of BI: DW Tools to Support an EDW and Human Analytic Solution

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Presentation Overview

One of America's largest natural gas only utilities recognized the need to accelerate their ability to timely and consistently analyze company performance. The company leveraged the power of a Business Intelligence Competency equipped with Oracle/Hyperion suite of products. Oracle Warehouse Builder is used for ETL, Oracle 10g for the EDW platform and Hyperion 9 BI+ suite to support enterprise analytics. The BI journey began with using these tools to build the new EDW and reporting/analytic solutions to support HR metrics.

Agenda

> Business Background

> A Business Intelligence Competency Center (BICC) and The Journey to BI Excellence

> HR Analytics Overview

> Review how the Hyperion 9 Suite has changed the way HR and Executive Analysts view their information

> Demonstrate the success & challenges of using Oracle Warehouse Builder

Leveraging the Oracle/Hyperion Suite of BI: DW Tools to Support an EDW and Human Analytic Solution

Business Background and Requirements

Pre-Existing Environment

- Users heavily dependent upon IT
  - Custom, hand-coded reports (PL/SQL)
  - Oracle Discover reports built and maintained by IT
- Reporting relied on IT resources dedicated to larger enterprise efforts
- Reporting was limited and not timely.
- Drilling into the details of reports required additional requests to IT
- Most "reports" devolved into data extracts
- Analysts spend the majority of their time cobbling together reports with little time performing any data analysis


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Increasing Problems...
And Demands

- Multiple, overlapping reports supporting similar audiences was increasing, making IT efforts to support their customer redundant and inefficient.

- Any number of source systems and reporting methods were being utilized to fulfill the needs.

- Additionally, interest was growing for management dashboards to provide senior management with at-a-glance insight into key company metrics.

- Financial reporting was the only user self-service reporting available and was provided through Hyperion Essbase, which the users were very pleased with.

Pre-Existing Architecture
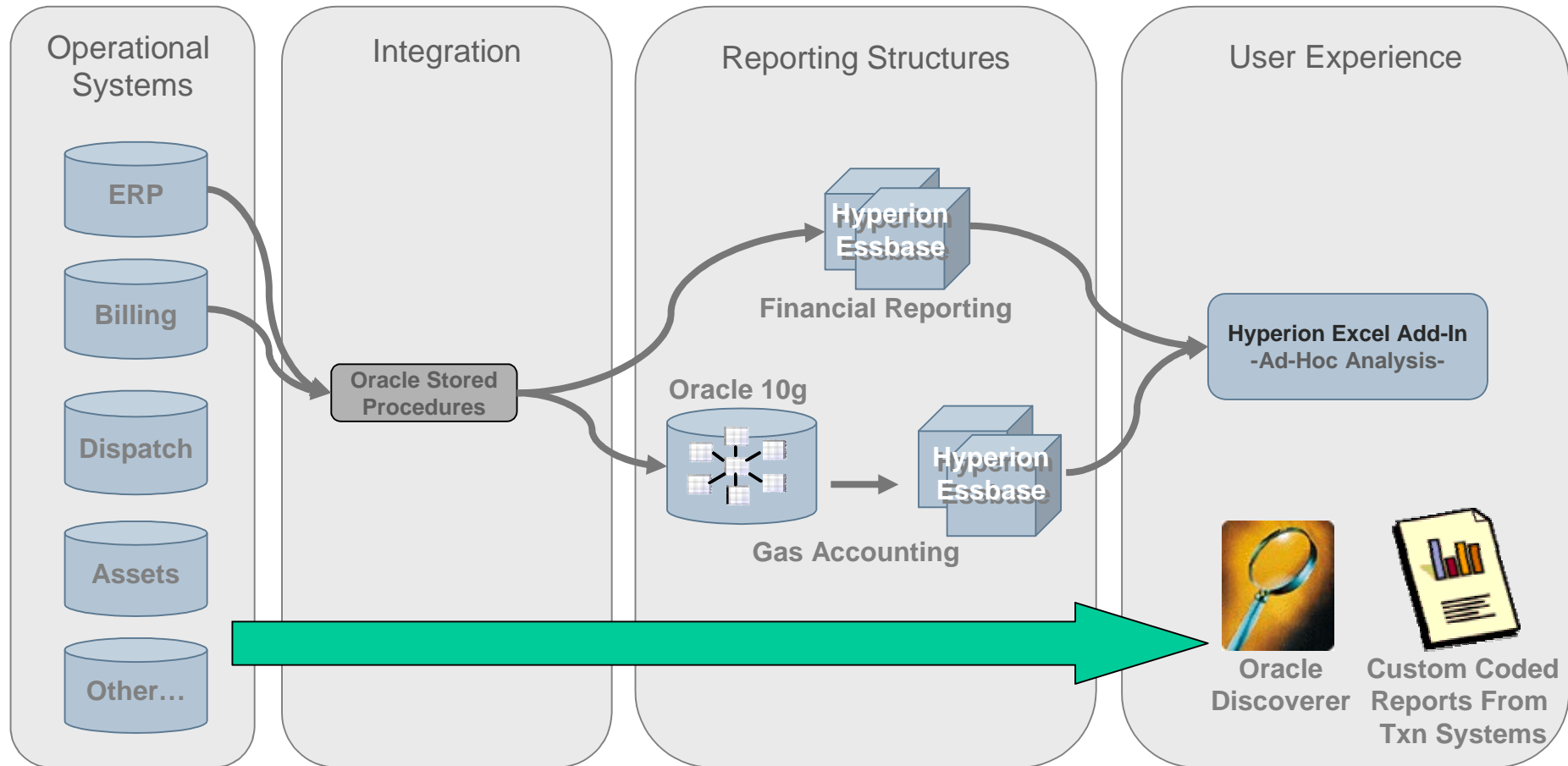
Time to Chart a New Course

- The company realized their problems were increasing and decided to get help
- Hitachi Consulting was engaged to perform a BI Assessment & Roadmap to provide the client a plan for addressing their needs
- Objectives of the Assessment & Roadmap:
  - Provide an analysis of the overall environment and capabilities with respect to BI
  - Understand and document high-level reporting & analytics requirements
  - Ensure the involvement and participation of the appropriate mix of business and technology stakeholders
  - Identify the technology necessary to support enterprise reporting and analytics to produce management information, scorecards & dashboards
  - Evaluate and recommend suitability of existing and available toolsets to meet the BI roadmap requirements
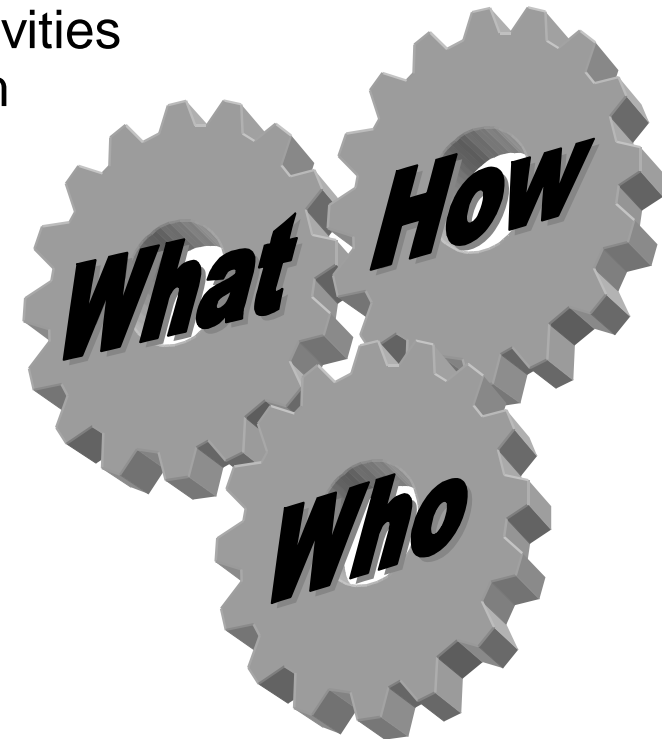
BI Competency Center

- Creates a highly efficient, self-sufficient BI / Data Warehouse delivery engine

- Establishes enterprise wide leverage for delivering information to decision makers

- Builds the enabling infrastructure and makes information delivery a core competency
  - Multi-year planning and Roadmap
  - Architecture and Technology
  - Methodology
  - Data Governance

The "Gears" Of The BI Competency Center

- The Gears represent the three major activities of the BI Team in running the BI Program
  - WHAT
    - The Work to be Done
    - The Expenditures
    - Ongoing Prioritization Process
  - HOW
    - Common Methods and Processes
    - Data Governance
    - Tool Selection / Augmentation / Positioning
    - BI Methodology and Best Practices
  - WHO
    - Organization Structure
    - Roles and Responsibilities
    - Talent Management
    - Skills Optimization
    - Recruiting

- The Gears go from being defined to being ingrained into the culture

The Journey to Building a BI Competency Center

	Roadmap	Making the Turn	Up & Running	Hitting Stride
BI Leadership	*Communication and Marketing*			
	Current Reality Future Vision Gap Closing Roadmap	Defining and Deciding WHAT, HOW, WHO	Implementing, Exercising and Strengthening WHAT, HOW, WHO	Sustaining, Leveraging and Fine Tuning WHAT, HOW, WHO
	Adaptable Best Practices			

	Roadmap	Making the Turn	Up & Running	Hitting Stride
Solution Development	Point Solutions Not integrated	Release 1 Planning	Strategic Initiatives (in multiple releases)	

	Roadmap	Making the Turn	Up & Running	Hitting Stride
Baseline Support	Utilize Existing Infrastructure Missing Roles & Responsibilities Exist		Existing and ETL Data Integration Existing and New Infrastructure Internal/New Staff Picking up Support for BI	All ETL Data Integration All Reporting in Std. Toolsets Self-Sufficiency in BI support

	Roadmap	Making the Turn	Up & Running	Hitting Stride
Team Management	Current State	External BI Leadership	External and Internal Leadership Mix TBD	Internal Leadership Self Sufficiency

Assessment Methodology

Picking the "right" technology does not, by itself, equate to BI success. The Hitachi Consulting BI Diagnostic methodology takes a holistic view of key areas critical to establishing a successful BI Competency Center.

Strategy: Does a clearly articulated corporate strategy exist from the corporate level that is actionable, measurable and being used to effectively drive IT Strategy and Planning?

Process: Are the appropriate initiative management and governance processes and methodologies in place?

Metrics: Do an appropriate mix of metrics exist that are clearly tied to corporate strategy and actionable?

Data: Is the data required to support BI defined, integrated, formatted for BI consumption and accurate?

Applications: Are the BI applications needed to support the business in place and effective?

Architecture: What BI technology components are in place or missing and what is required to support enterprise BI needs?

People: Are the right roles and responsibilities identified, in place and the appropriate business and technical skills sets developed in the company?
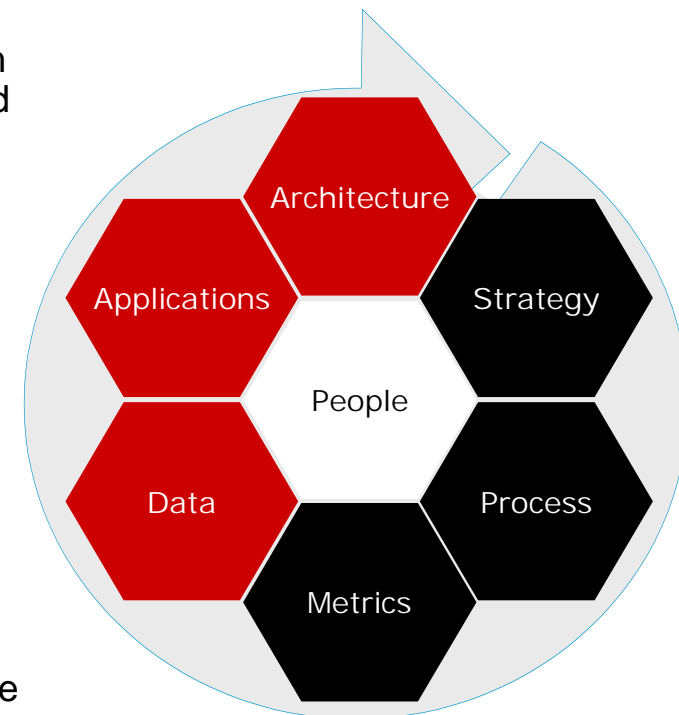
Client "Future Vision" Guiding Principles

- The BI "Future Vision" for this client focused on these key principles:
  - Integrated data that is easy to access and understand
  - Common tool set to provide a seamless reporting experience across data subject areas and across business groups
  - Tool set that is intuitive and allows for business self-service
  - Dashboard and scorecard presentation of key metrics
  - Organization, methodology and governance processes to support on-going corporate BI growth and maturity
  - BI technology that complements existing IT strategy, skills and size

Enable These Benefits

- Executive visibility to key corporate performance information
- Decision-making across the enterprise on based on consistent, quality, timely information
- Analysts move from spending 80% of their time collecting and preparing data to 80% of their time actually doing analysis and making/recommending decisions
- End users empowered to be able to do their own ad-hoc reporting and analysis using the common tools
- Best leverage of existing technology and skills investments

Future Vision Logical Architecture

Operational Systems
- ERP
- Billing
- Dispatch
- Assets
- Other…

Integration
- Master Data Management
- Data Movement & Transformation (ETL)
- Data Warehouse (EDW)

Reporting Structures
- Cubes
- Data Mart
- Data Mart
- Cubes

User Experience
- Ad-Hoc Analysis
- Static Reports
- Dashboard
- Scorecard
- User Interface / Portal

Metadata, Data Security, Infrastructure

Disaster Recovery, Systems Management

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Roadmap Decisions

- Human Resource Analytics, focused primarily on Compensation, was chosen as the first BI application to be built using the BI Competency Center "Future Vision" methodology and architecture… But, why?
  - HR was a long neglected area of the business
  - Low risk area to start with new BI architecture and tools
  - Compensation analysis was required to provide key analytics for future strategic metrics requiring Labor Cost Analysis as a function of Operations management
- Most importantly, the solution required all major architectural components that were defined in the Future Vision:
  - Centralized data in an Enterprise Data Warehouse
  - Dependent Data Mart for HR Compensation analytics
  - Use of ETL for data integration
  - Relational reporting
  - Management and Executive dashboard of key metrics
  - Required robust security measures to protect sensitive data

Existing HR Reporting Process

Data View

HR Systems

HR Applications

PTO Website

HR Dashboard
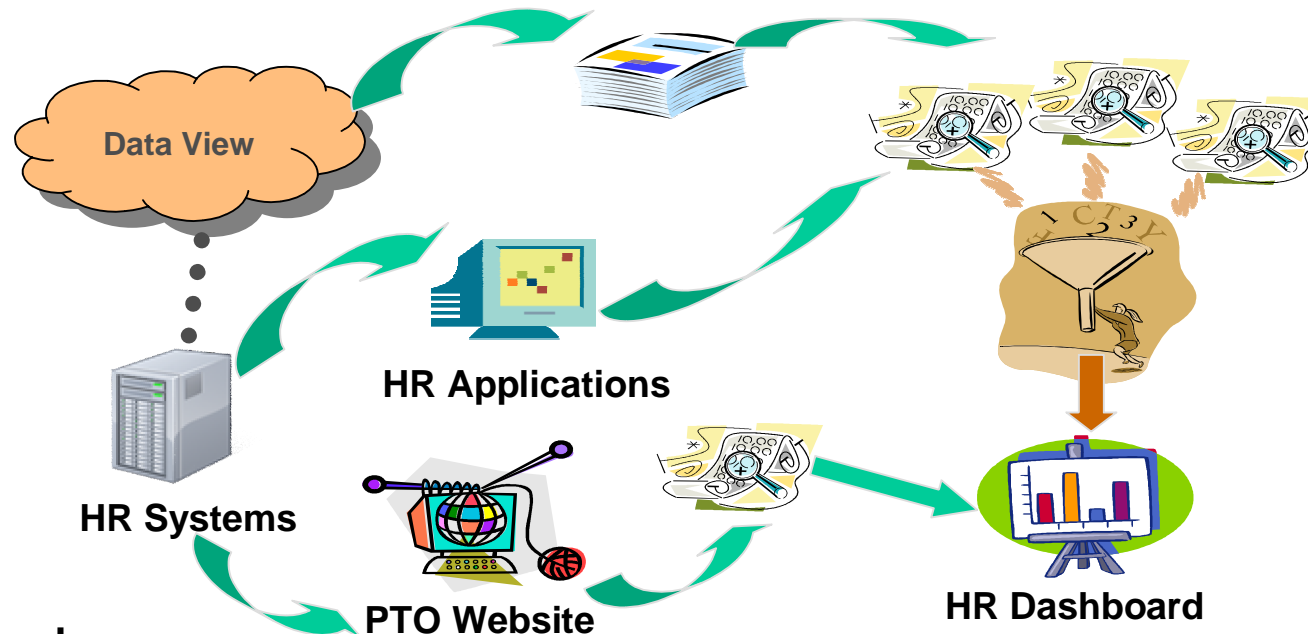
Existing Methods:
- Oracle HRMS tables and views (source data for most metrics)
- Discoverer Reports (extracts the data from Oracle HRMS/Oracle view)
- Web Report – PTO metrics beyond Oracle
- Network Drive for the "Employee Development" section
- MS Excel Spreadsheet (consolidation, manipulation, aggregation, filter)
- Existing manual dashboard in MS PowerPoint

HR Analytics Overview

- HR Analytics was the first project in the Business Intelligence Roadmap aimed at providing broad reporting and analysis capabilities to decision makers

- Purpose was to provide key HR metrics for Compensation, Benefits and Payroll analysis for HR shared services, as well as, divisional HR leadership and analysts

- The delivered solution includes a relational Data Mart for reporting as well as a Executive/Management Dashboard

- The goal of the broader Business Intelligence efforts are to build individual Business Intelligence (BI) applications, in a way that allows the technology and underlying data to be leveraged for other reporting and analysis needs

Business Objectives

- Supply standard and consistent data for reporting and analysis

- Enable standard and ad-hoc reporting and analysis for Compensation & Benefits

- Provide automated dashboard of key HR performance metrics

- Present key metrics on the dashboard
  - Average Pay & Pay Grade Analysis
  - PTO Liability
  - Average Age & Service plus Retirement Eligibility

Business Objectives

- Satisfy the reporting needs of Payroll related to the data requirements for HR on a per pay period basis

- Support historical and trend analysis

- Provide processes and tools that ensure the consistent creation, use and reporting of information across departments

Perceived Advantages

- Visibility into performance and cost factors related to the labor component of the business
- Increase the accessibility to the data by empowering the business users to retrieve it faster and more effectively
- Shared advantage
  - HR establishes and maintains benefit/salary information
  - Payroll manages distribution of funds based upon benefit/salary information
  - Both departments answer overlapping internal and external reporting requests based upon detailed employee information
  - Cross-department dependency to ensure the proper payments and benefits are delivered

Some Business Questions

- **Health & Welfare**
  - Grouping employees to find trends of the most common benefits chosen or what demographics make up each registered benefit type
  - Trend benefit differences and identify coverage levels
- **Retirement**
  - Monitor retirement contributions for benefits and pension
- **Compensation**
  - Slice pay information by job grade, job title, EEO category, FSLA status, geography, demographics and the kitchen sink
  - Analyze compensation history and scrutinize pay increases
  - Check for systematic discrimination for any reason within their organization

Some Business Questions

- Payroll
  - Provide schedules of employees, identifying them as hourly or salaried, part or full time, and the cost center to which their compensation is charged
  - Identify regular, overtime and total hours worked; regular and total earnings
  - Analyze dates of employment, pay raises, month and percentage, through the attrition year and where appropriate, show the allocation of compensation for such employees, or employee groups, between states and operations

Key IT Findings Affecting Technology Selection

- Little to no internal knowledge of BI Best Practices, Methodologies and Architectures existed the company

- Small IT shop (headcount < 100) with no resources primarily dedicated to BI

- Ability to add headcount to IT was going to be challenging

- Significant investment in Oracle products (DBMS and Applications)

- IT Strategy of:

  - Small technology footprint

  - Minimize vendor relationships

  - Narrow breadth of IT skill sets to support their technology
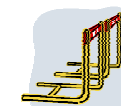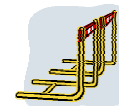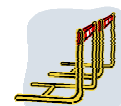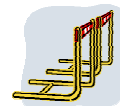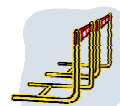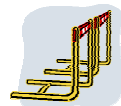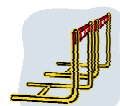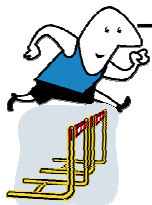
BI Tool Selection

- Tool selection focused on 3 short listed vendors

  (Note: This took place before the Oracle acquisition of Hyperion)

  – Oracle OBIEE

  – Hyperion System 9

  – Business Objects XI

- Hyperion System 9 was the chosen solution as it provided the best opportunity for integrated reporting between existing Essbase and future relational reporting needs

- Other factors included: Cost (Software & Hardware), Vendor Demos, Core Functionality vs User Requirements

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ETL Tool Selection

- Tool selection focused on 3 short listed vendors
  - Oracle Warehouse Builder (OWB) 10gR2
  - Informatica
  - IBM DataStage

- OWB was chosen as the ETL tool:
  - Client needs could be met with OWB functionality
  - Lower overall TCO for this client (existing investment in Oracle EE DBMS)
  - PL/SQL based tool complemented existing IT skills

Here comes the technical stuff

Leveraging the Oracle/Hyperion Suite of BI: DW Tools to Support an EDW and Human Analytic Solution

Review how the Hyperion 9 Suite has changed the way HR and Executive Analyst view their information

What Are The Users Saying

:)

"The Hyperion Interactive Reporting Tool has put users more in control of the data they need to access and utilize on a daily basis. The volumes of data that previously needed to be extracted from our Payroll system and provided to us by IT can now be accessed solely through the use of straightforward queries within Interactive Reporting. Response time to provide data in support of internal and external data requests has been significantly reduced; in some cases from days to hours. The Hyperion Interactive Reporting tool has made an immediate and noticeable impact in our department."

What Are The Users Saying

"…Interactive Reporting provides a robust capability which allows our users to be in control of the data they need… It drastically reduces the time resource and man power needed to provide our service of delivering reports and analysis. The dashboard functionality enables a much more dynamic graphic interface of trends in our workforce which in return, helps management keep a pulse on various aspects of our employee population. The Interactive Reporting tool has certainly made an immediate and noticeable impact in our organization and consequently, moves us to a more advance level of our technology spectrum."

Benefit to the Business

- Greater insight into the HR aspects of the business making it possible to alter benefits and compensation
- Empowers the user with the ability to view data in an analytic fashion versus typical static report view
- Clearer understanding of the business terms via the semantic layer
- Reduces the need for IT assistance; hence more self-sufficient
- Information accessed in seconds versus days

Why System 9

- Lessen the dependence on Discoverer reports

- Provides a usable and friendly interface

- The user is empowered by this tool; able to create interactive reports and dashboards

- Essbase was in house, System 9 does the job, stick with the vendor

Tool Features In Use

- ## Core Services

  - License Server
  - Shared Services - User Management Console (Security)

- ## BI+

  - Interactive Reporting (For Semantic Layer & Dashboard)
  - Workspace

Tool Specific Benefits

- ## Shared Services

  - Integrates with Active Directory and handles security across all Hyperion applications from one location

- ## BI+

  - Interactive Reporting is easy for developers and business users to design relational reports and dashboards

  - Increase accessibility to the data by empowering business users to retrieve information faster and effectively

How Is System 9 Being Used

The product is being used to support HR Analytic reporting for analyzing:

- *Health & Welfare (Benefits)*
- *Retirement (Benefits)*
- *Compensation*
- *Payroll*

Metrics – Health & Welfare

- Headcount (# of employees)
- Number and/or percentage of total employees by benefits plans
- Coverage levels
- Contribution by Employee versus Employer or combined
- Covered employees and non-covered employees
- Total coverage regardless of payment source
- PTO Liability
- Benefits by benefit type
- Dependant Information
- Workers Compensation
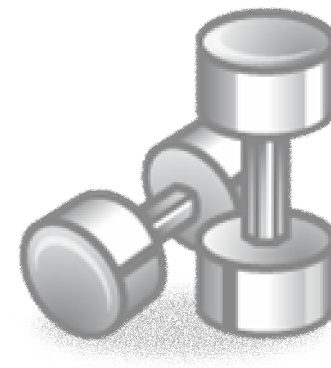
Metrics – Retirement

- Eligible Earnings – Union and Non-Union
- Pension Account Plan and Union Plan
- Retirement Savings Plan
- Marital Status
- Average Age
- Years of Service
- Retirement Eligibility
- Projected future retirement eligibility

Metrics – Compensation & Pay

- Average Pay
- Salary history by employee
- Duration in a job title by employee
- Salary Increases
- Base Pay – official pay rate
- Actual Pay – actual payments from payroll
- Incentive Pay
- Pay Element Level Breakdown
- Costing

Compensation Analysis
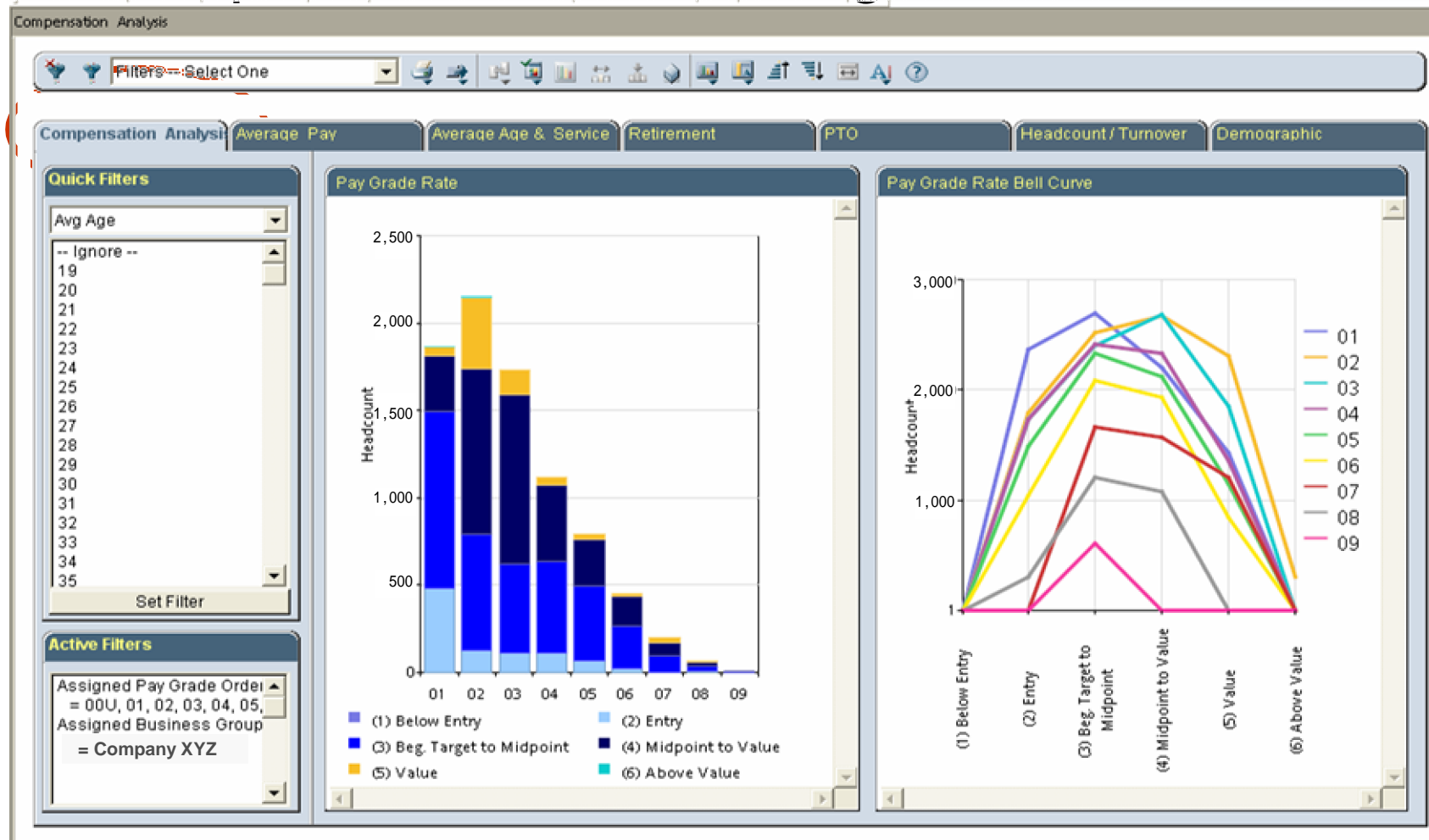
Retirement
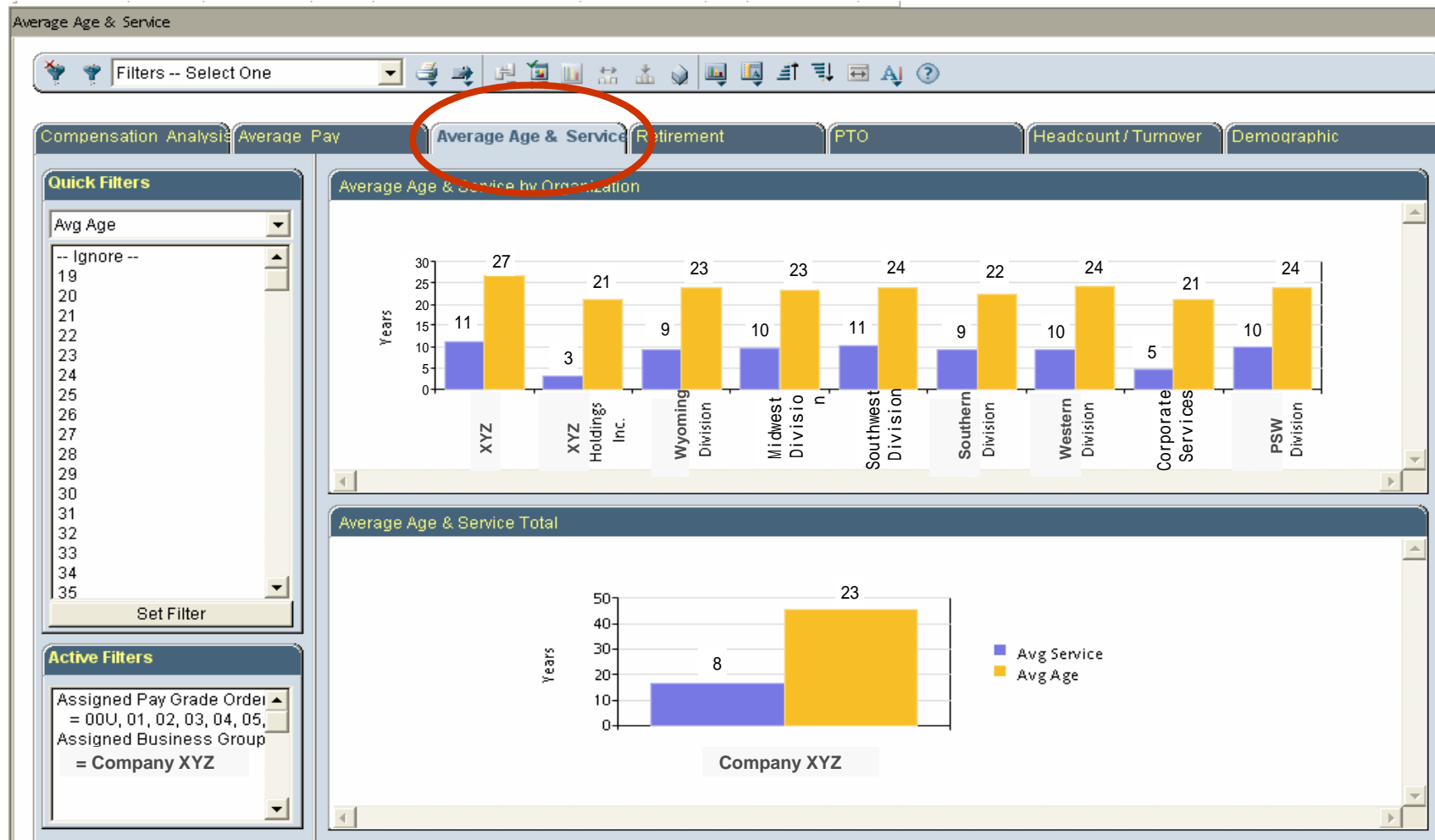
Demographics
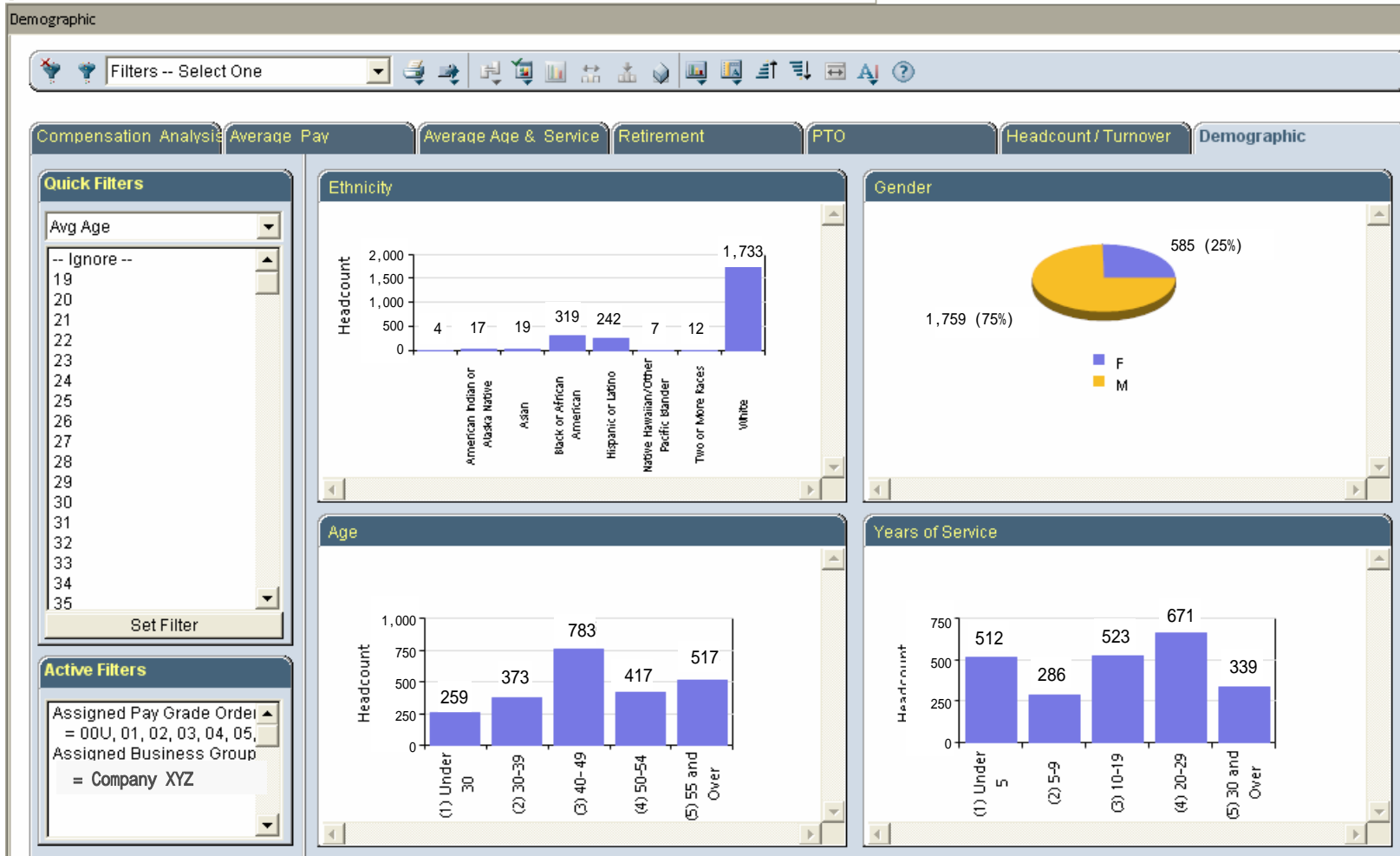
Explain how the Hyperion 9 Suite changed the way HR and Executive Analyst viewed their information

System 9 Observations

Some Challenges

- Significant manual intervention in the configuration process – wizard processes were challenging

- BI+ services failed on occasion

- IR Studio desktop application dashboard fatal error would often corrupt BQY file (backup BQY frequently)

- Drill-up/drill-down in Workspace HTML version of IR dashboard didn't work, but worked in Web Client. Hyperion is fixing in version 9.5

- Workspace scheduler stops running without reason

- Workspace errors when changing file properties

Some Pluses

- Its easy for the end user to view the Semantic layer to support the build of their reports
- It puts the power in their hands to create a table, chart, pivot tables
- It doesn't require IT assistance
- Its fast in bringing back data
- The end users like the tool

Explain how the Hyperion 9 Suite changed the way HR and Executive Analyst viewed their information

Business Friendly Metadata Management

Business Friendly Metadata

- IR Studio by default presents the physical model of the underlying data store

- Exploit the capability of IR Studio to read business friendly Metadata, which is maintained in an external metadata repository

- Data management team should employ effective data governance practices to keep metadata up-to-date

- The external metadata may be located on the same source database containing the reportable data OR may be located in a centralized metadata repository

- Metadata is configured at the OCE level

Custom Metadata

- Created metadata specific tables in the data mart
- Exported from "Erwin" the data names, definitions and attribute characteristics into metadata structures
- Synchronized with System 9 repository

Metadata Table

Owner Name: Name
Table Name: Name

Business Entity Name: Name
Table Comment: Comment

Metadata Column

Owner Name: Name (FK)
Table Name: Name (FK)
Column Name: Name

Business Attribute Name: Name
Business Attribute Alias Name: Name
Column Comment: Comment
Required Indicator: Indicator
Column Data Type Code: Code
Column Width Number: Numeric-Whole

Metadata Column Source

Owner Name: Name (FK)
Table Name: Name (FK)
Column Name: Name (FK)

Source Column Name.Column Name: Name (FK)
Source Owner Name.Owner Name: Name (FK)
Source Table Name.Table Name: Name (FK)
Transformation Comment: Comment

Step 1 – Create Metadata

Following is an example of the external metadata information, create similar tables and records in the source database. These can also be part of a separate database (e.g. Centralized Metadata Repository) Note: When using this feature, all tables and columns for which reporting is desired must be explicitly specified. Excluding tables and/or columns will hide them from IR.

dbo.Table_Metadata
- Columns
  - Unique_Domain (varchar(50), null)
  - Physical_Table_Name (varchar(500), null)
  - Business_Friendly_Table_Name (varchar(500), null)
  - Business_Friendly_Table_Description (varchar(4000), null)

dbo.Column_Metadata
- Columns
  - Unique_Domain (varchar(50), null)
  - Physical_Table_Name (varchar(500), null)
  - Physical_Column_Name (varchar(500), null)
  - Business_Friendly_Column_Name (varchar(500), null)
  - Business_Friendly_Column_Description (varchar(4000), null)
  - Physical_Column_Data_Type (varchar(50), null)
  - Physical_Column_Data_Length (int, null)

Unique_Domain	Physical_Table_Name	Business_Friendly_Table_Name	Business_Friendly_Table_Description
ADW	AdventureWorks_Customer	Customer Dimension	This table has all informattion relating to AdventureWorks Customers
ADW	AdventureWorks_Employee	Employee Dimension	This table has all informattion relating to AdventureWorks Employees
ADW	AdventureWorks_Product	Product Dimension	This table has all informattion relating to AdventureWorks Products
ADW	AdventureWorks_Fact_Sales	Sale Facts	This table has all informattion relating to AdventureWorks Sales sctivity

Unique_Domain	Physical_Table_Name	Physical_Column_Name	Business_Friendly_Column_Name	Business_Friendly_Column_Description	Physical_Column_Data_Type	Physical_Column_Data_Length
ADW	AdventureWorks_Customer	Source_ID	Source Identifier	Source Identifier provides data lineage information	VARCHAR	500
ADW	AdventureWorks_Customer	Customer_ID	Customer Identifier	Customer Identifier provides Customer Identifier	INT	0

Step 2 – Import Metadata
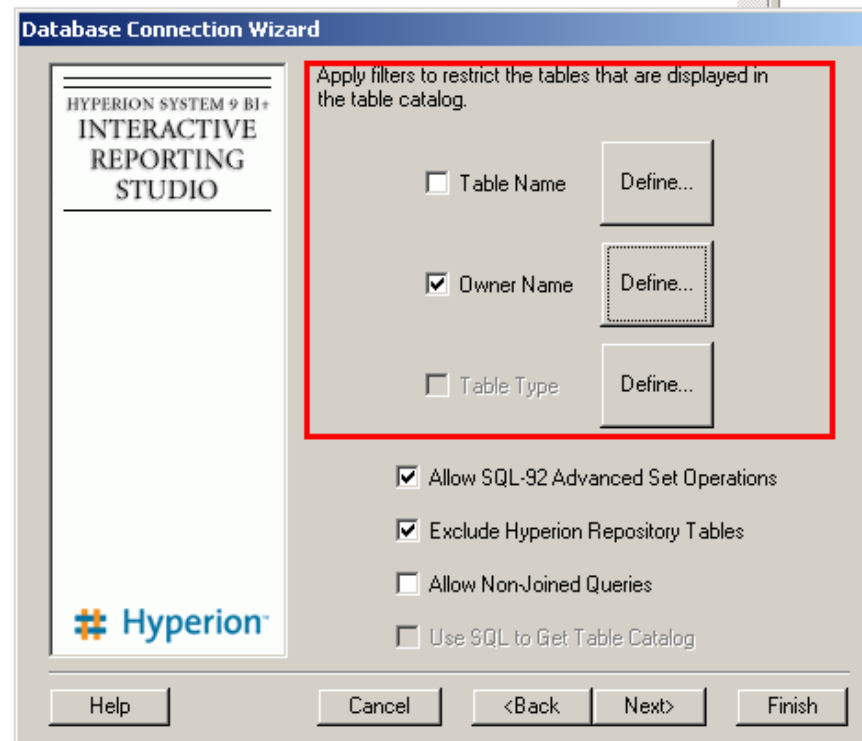
To Filter the list of tables, employ OCE level filters.

Step 3 – Configure Connection
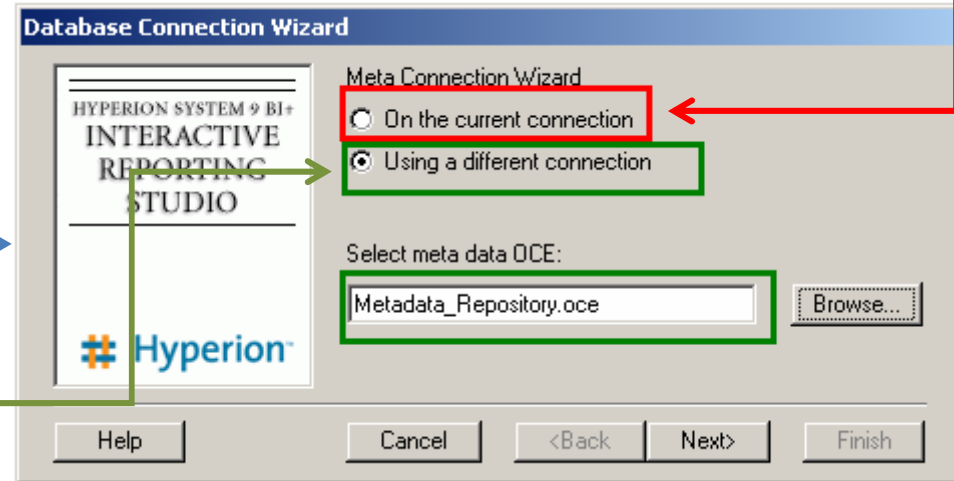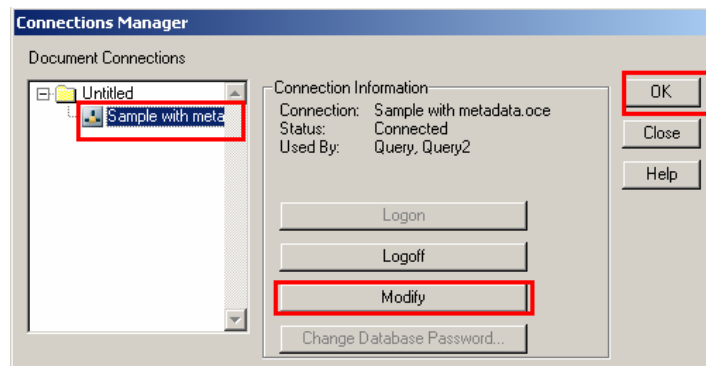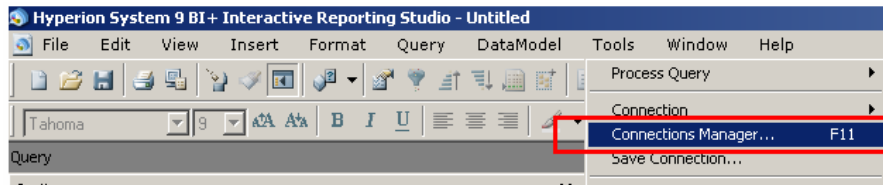
Use this option if the metadata tables are in the same database as the reportable data (same OCE)

Use this option if the metadata tables are in a different (Centralized Metadata Database) database (different OCE – must be explicitly specified)

Step 4 – Define Meta Connection
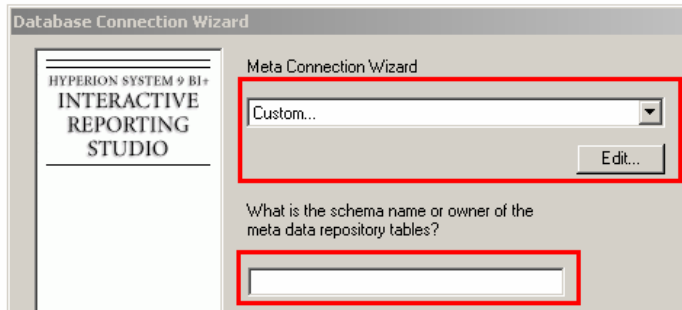
Select "Custom.."

Provide a schema name if necessary
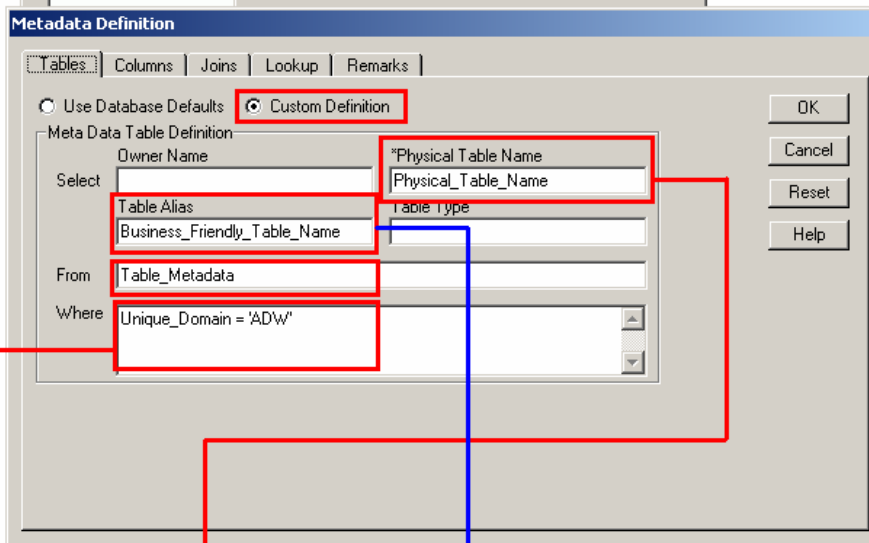
Fill in the column names providing the necessary "Table" metadata information

Step 5 – Link Metadata Info

Fill in the column names providing the necessary "Column" metadata information

IMP: Need to specify IR data type code for "Column Type" – review meta_data_columns table in "C:\Hyperion\BIPlus\docs\samples\Sample Database.mdb" and Hyperion BI Supported Datatypes.doc for guidance.

Unique_Domain	Physical_Table_Name	Physical_Column_Name	Business_Friendly_Column_Name	Business_Friendly_Column_Description	Physical_Column_Data_Type	Physical_Colum...
ADW	AdventureWorks_Customer	Source_ID	Source Identifier	Source Identifier provides data lineage information	12	500
ADW	AdventureWorks_Customer	Customer_ID	Customer Identifier	Customer Identifier provides Customer Identifier	12	0
ADW	AdventureWorks_Customer	Custmomer_Name	Customer Name	Customer Identifier provides Customer Name	12	50
ADW	AdventureWorks_Customer	Email_Address	Email Address	Email Address	12	500
ADW	AdventureWorks_Customer	Birth_Date	Birth Date	Birth Date	12	0

Step 6 – Connect Table Remarks

Fill in the column names providing the necessary "Remarks" metadata information

Step 7 – Metadata Presentation

Now the Business user friendly data is presented for all queries based on the OCE for which metadata was configured

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Semantic Layer Screenshot

Explain how the Hyperion 9 Suite changed the way HR and Executive Analyst viewed their information
Master Data Model

Master Data Model

An IR document can contain a master data model, on which you can base multiple queries. You can use a regular data model in only one query. A master data model is created once and reused in multiple Query sections. When you need to change it, you can make all changes in one place. Organizations that need to provide a large number of report developers and business analysts the ability to create their own queries can use the master data model approach to minimize the amount of maintenance on IR documents.

When you are using a master data model, the text "Locked Data Model" is displayed in the Content pane of the Query section. This text means that the data model is linked to a master data model in the IR document. Changes cannot be made to master data models from within a Query section.

Ref: Hyperion Product Documentation

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Master Data Model

To promote increased conformance and ease of maintenance, organize BQY content in a subject-oriented manner. Create as few master data models as necessary.

Subject oriented **BQY** file

Data Mart

Master Data Model (s)

Meta Topic(s)

Queries

Reports
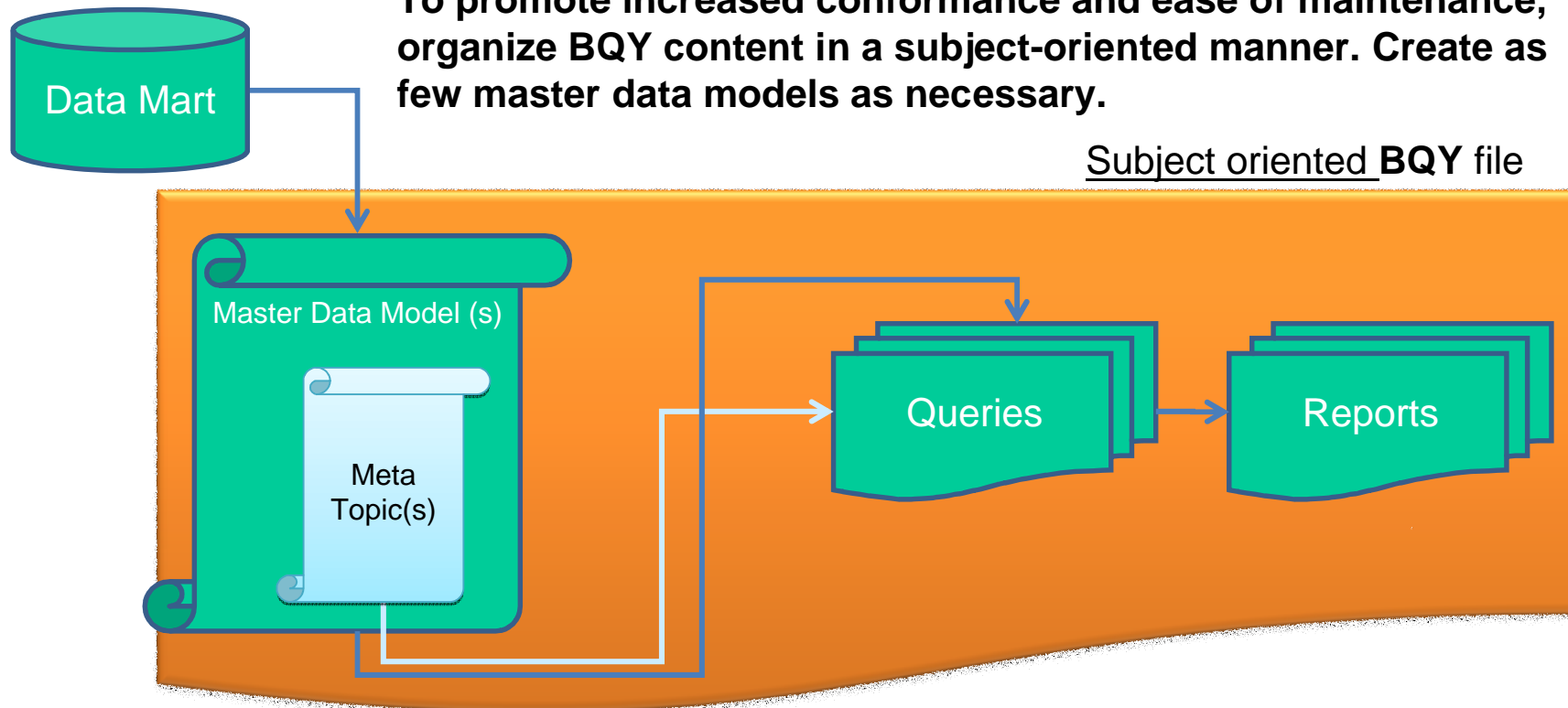
Also, create Metatopics as part of the master data model to promote ease of query building. Keep the Master Data Model and Metatopics as generic as possible to promote wider usage i.e do not insert Filters, etc. that may not be applicable to all queries.

Master Data Model

No filter constraints have been applied here

Metatopic created as part of the Sales Master Data Model

Resources of this Master Data Model can be shared by multiple queries

Master Data Model Options

It is important to set master data model options upfront to incorporate and centralize the best practices – that will be permeated across all IR resources that reference the master data model

Master Data Model Options
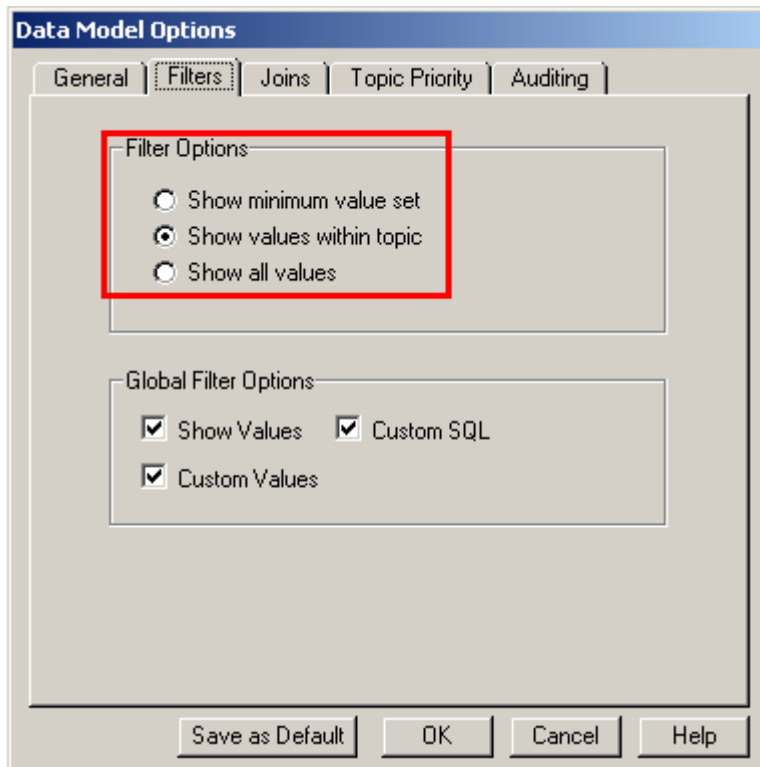
Show Minimum Value Set—Displays only values that are applicable given all existing filters. This preference takes into account filters on all tables and related through all joins in the data model (which could be potentially a very large and long running query).

Show Values Within Topic—Displays values applicable given existing filters in the same topic. This preference does not take into account filters associated by joins in the data model.

Show All Values—Displays all values associated with an item, regardless of any established filters.

Ref: Hyperion Product Documentation

Master Data Model Options

1. Use All Joined Topics—Specifies the use of all joined (non-iconized) topics in the data model.

2. **Use The Minimum Number Of Topics—Specifies the use only of topics represented by items on the Request Line.**

3. Use All Referenced Topics—Specifies the use only of topics represented by items on the Request or Limit lines. Changing join usage usually changes the number of rows retrieved from the database. It also introduces the possibility that novice users may create improperly joined queries.

4. Use Defined Join Paths—Specifies the use of a user predefined join path that groups the joins necessary to query from the data model. Click Configure to create a custom join path.

5. Use Automatic Join Path Generation—Instructs Interactive Reporting to dynamically generate joins based on the context of user selections on the Request and Limit lines.

Proper usage can improve query performance

Ref: Hyperion Product Documentation

Explain how the Hyperion 9 Suite changed the way HR and Executive Analyst viewed their information

Reporting & Querying

General practices

- Pay particular attention to the "Query Processing Order"
- Do not use (or minimize usage of) "Custom SQL" and "Computed Columns" as this does not lend itself well to ease of centralized maintenance;
  - where possible, leverage the proper Datamart constructs for the same
- Minimize custom coding in Interactive Reporting Reports – included computed columns.
  - Where possible, retrieve pre-computed values from the source (e.g. Datamart) – this has dual benefit –
    - lower reporting authoring and maintenance efforts,
    - improved conformance of metrics

Authoring, Publishing & Viewing

Repository #1: Conformed Interactive Reporting Resources

1) Data Model
2) Data Model + Query
3) Data Model + Query + Reports & Dashboards

(For use by Interactive Studio – Report Authoring)

Repository #2: Hyperion Repository for System 9

1) Interactive Reports (BQY files)
2) OCE Connectivity Specification

(For use by Interactive Studio – Report Authoring)

OCE Connections Folder Required on every IR Studio Desktop

Metadata + Reports (Version Controlled + Automatic Document Refresh)

OCE Connection(s)

Interactive Report (BQY File)

Step 2

BQY file is imported through "File Imports" in Hyperion BI + Workspace (Version Controlled + Metadata Synchronization + Automatic Document Refresh)

Report author publishes BQY File

Interactive Reporting Studio

Step 1

Report Developers & Power Users

Hyperion BI + Workspace

OCE Connectivity (Note:1)

Step 3

Interactive Reporting HTML

Interactive Reporting Web Client

OCE Connectivity (Note:1)

Data Mart(s)   OLTP

EDW

Basic & Power Users

Note 1: The OCE Data Source Name (DSN) used during the report authoring must be configured similarly in the Hyperion Shared Services.

Step 1: Create repository
- Create an OCE to connect to the DSN (Data Source)
- Create objects - model, query, reports, dashboards

Step 2: Publishing BQY files to BI+ Workspace

Step 3: Users utilize objects

Repository #1 & Repository #2
Do not have any data resources in common and do not share any resources directly; they should preferably be physically distinct databases.

Report Development

Create OCE Connections for the data sources as necessary

Follow this "Bottom-Up" approach to IR Reports and Scorecard development

1

2

Minimize usage of "grayed-out" features

3

Incorporate practices discussed for Master Data Model and Collaborative Development using IR

4

5

Create Relational Queries & Import Content From Interactive Reporting Studio Repository (Query Sections)

Create Multi-Dimensional Queries (OLAP Query Sections)

Massage Data & Create Additional Data (Results Sections)

Flatten Data (OLAP Results Sections)

Create Report Data Sets and Filter Data (Table Sections)

Create Table, Cross-Tab, Chart, and Band-Style Reports (Table, Pivot, Chart, Report Sections)

Create Dashboards with the Dashboard Studio Tool (Dashboard Sections)

Save BQY file locally and then publish by importing the BQY file into Hyperion BI + Workspace (Web Interface)

Query Save Options
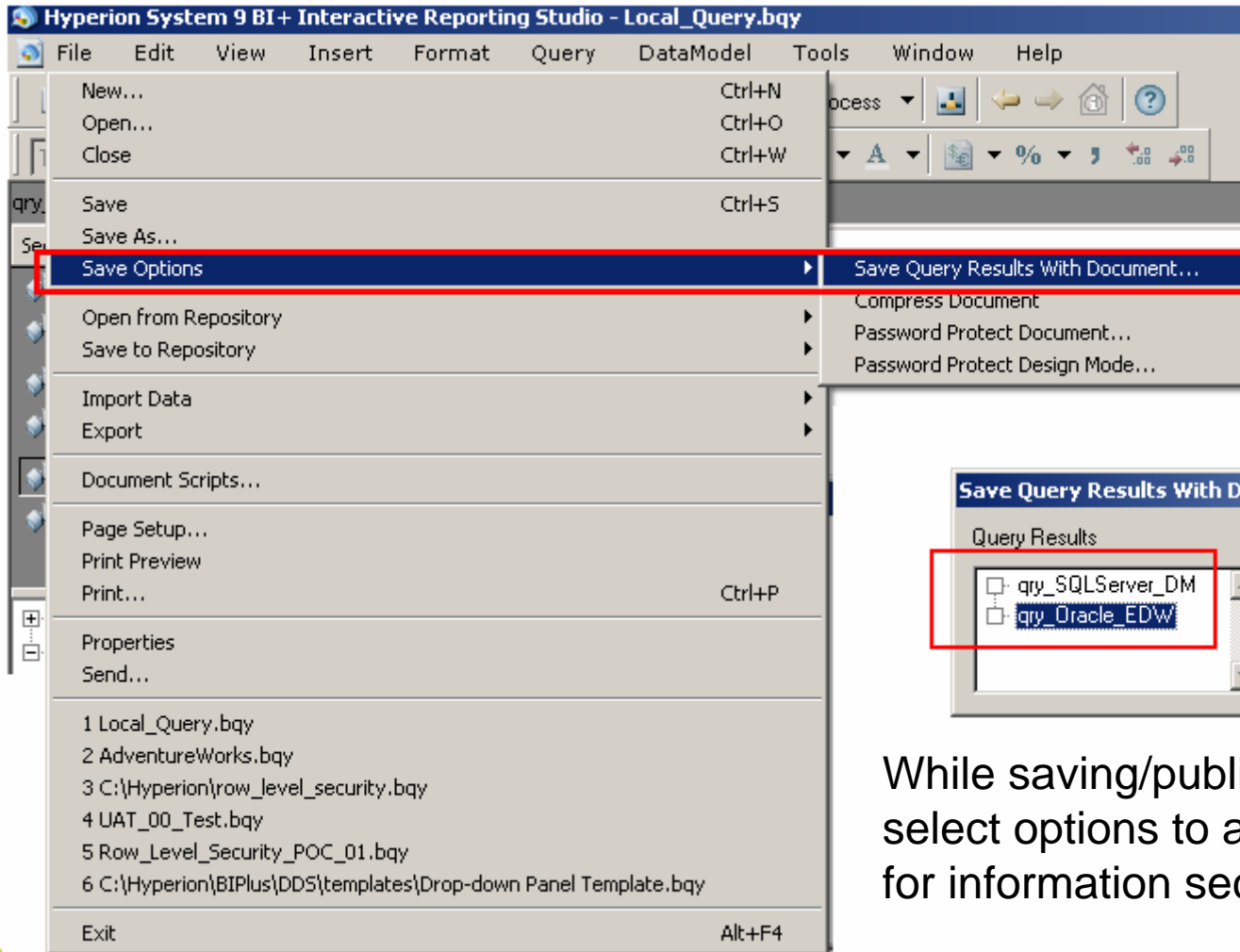
Employ "Password Protect Design Mode"
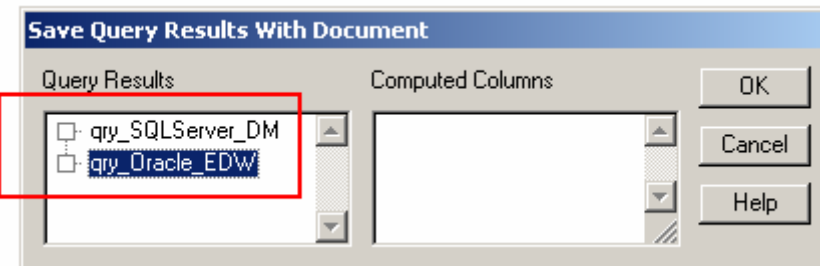
While saving/publishing the BQY file, select options to avoid saving "Results" – for information security and integrity

Leveraging the Oracle/Hyperion Suite of BI: DW Tools to Support an EDW and Human Analytic Solution

Demonstrate the success & challenges of using Oracle Warehouse Builder

Why OWB

- Existing ETL base was hand-coded PL/SQL Stored Procedures
- Very challenging to maintain and enhance
- Reviewed other ETL tools – Informatica, Data Stage
- Opted OWB primarily due to:
  - Gain the benefits of ETL, thus avoiding pitfalls of hand-coded programs
  - All Oracle environment
  - OWB has improved features from prior versions
  - Transformation features of OWB sufficient for the job
  - Contains Oracle ERP connectors

Benefit to the Business

- Aligning to the one vendor enables the firm to realize cost savings and simplified support

- Boost the teams capability to quickly and efficiently add subject data to the Data Warehouse and Data Marts

- Transparent and consistent data transformation enables a higher level of quality in the solution

- Streamlined and efficient ETL processing lessens burden on infrastructure

- Lower development and maintenance costs

OWB is an ETL tool typically utilized in an Oracle data warehouse environment. Oracle launched the first production version of OWB 2.0.4.7 sometime during the 2000, followed by OWB 2.1.1 and OWB 3i versions in 2001, 9i release in 2002/2003, 10g in 2003/2004 and 11g in 2007. They added many new features to OWB over the versions listed above and is continuously adding more and more enhancements in line with industry requirements. OWB 10G has many features:

What is Oracle Warehouse Builder (OWB)

- Data Profiling
- Complete slowly changing dimensions (Types I, II, III) support
- Enhanced ERP Integration
- Transportable Modules
- Built-in scheduling

- User-defined Objects & Icons
- Relational and Dimensional Data Object Designer
- Business Intelligence Object Derivation
- Lineage and Impact Analysis2

OWB Environment

- **OWB repository** stores Meta definitions used in the DW and the transformation library, which contains more than 150, preset transformations
- **OWB client** that is used to design the DW and the ETL processes
- **OWB design browser client** is used to view metadata, run web reports, perform lineage and impact analysis on the OWB metadata
- **OWB runtime audit browser** client allows the running of reports on the captured audit and error information for ETL runs
- **OWB runtime assistant** assists in the set up of a runtime repository and target schema and maintains the deployment and runtime audit & error information
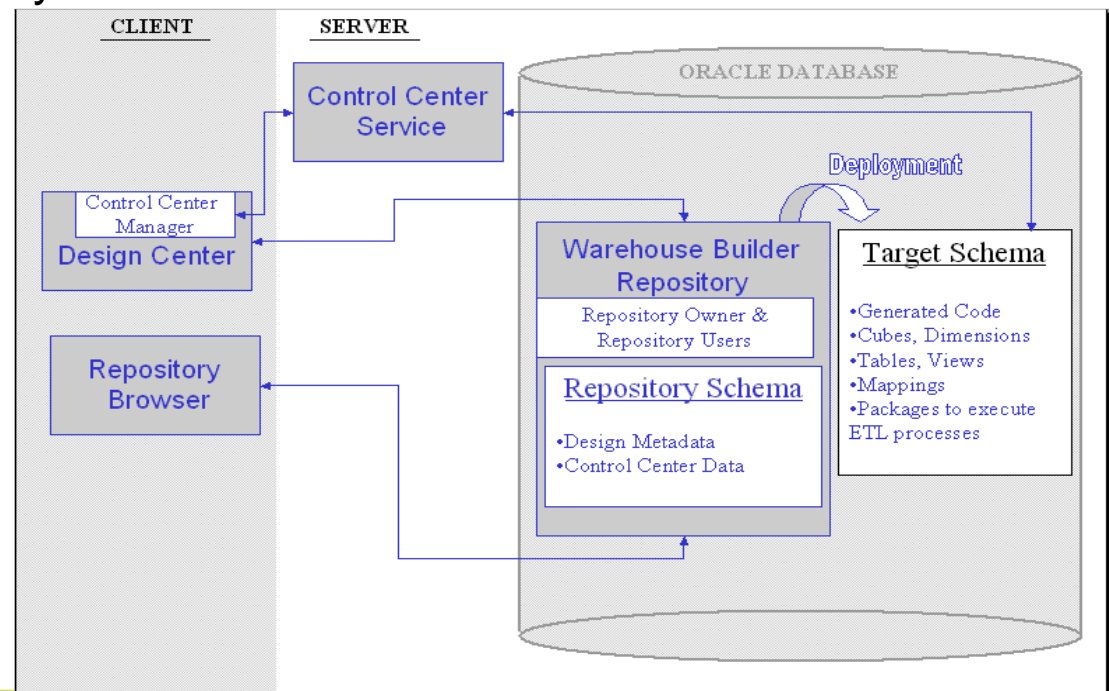
Features In Use

- OWB repository 10.2.0.2.0 and OWB client 10.2.0.2.8. The Oracle database version was 10g (10.2.0.3.0). OWB was installed on Red Hat Enterprise Linux Advanced Server Itanium with 64 bit

- Designer features were used to build ETL and Process Flows

- Used ERP connectors to the Oracle HRMS application

- Utilized the built-in scheduling tool to orchestrate data loads in development, yet integrated with AppWorx in production

- Exploited Lineage and Impact Analysis to study impact and change propagation for ETL objects

- Employed Relational and Dimensional Data Object Designer to apply data type changes on source objects

Tool Benefits
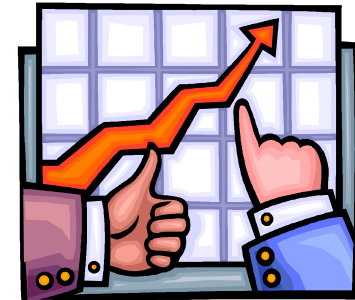
- Tight integration with Oracle 10G server and its ability to optimally utilize the ETL toolkit functionality
  - 'Table functions', 'external tables', 'Multi-table inserts", Partition Exchange loading etc.

- Maintenance environment integrates with other Oracle tools such as Oracle Portal, Oracle Discoverer and Oracle Workflow

- Oracle Warehouse Builder is a tool that can be effectively used in a complete Oracle based data warehouse life cycle development
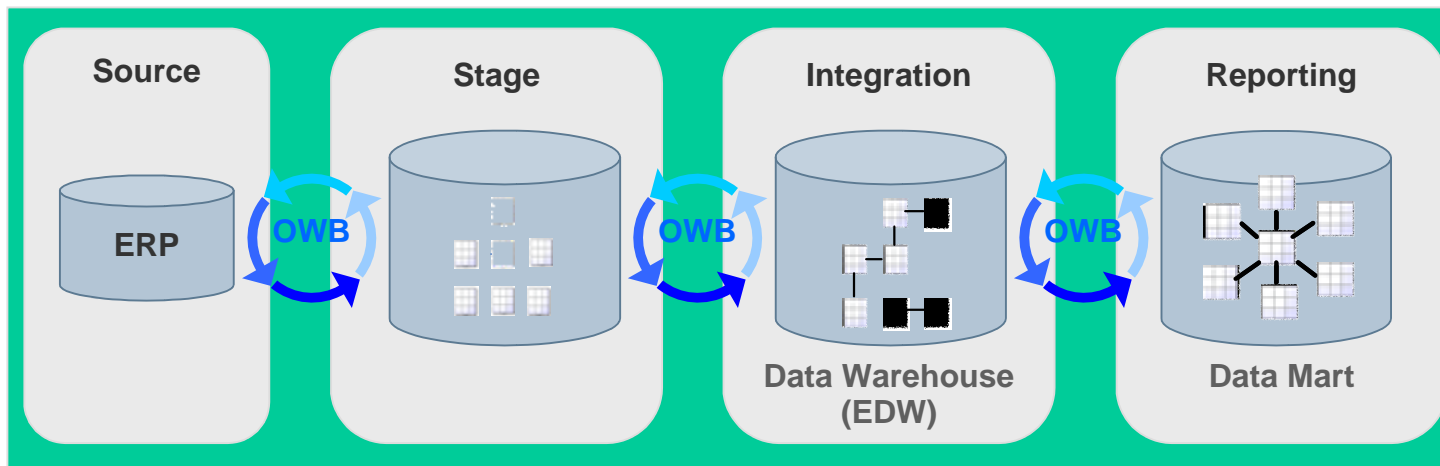
Tool Benefits

- Familiarity of the development team with PL/SQL (or Java) and UNIX
  - Ability for developers to create user defined transformations in PL/SQL or Java
  - More than 150 preset transformations provided by OWB
- PL/SQL code generator leverages Oracle SQL capabilities
  - Used to implement the data transformation and loading process
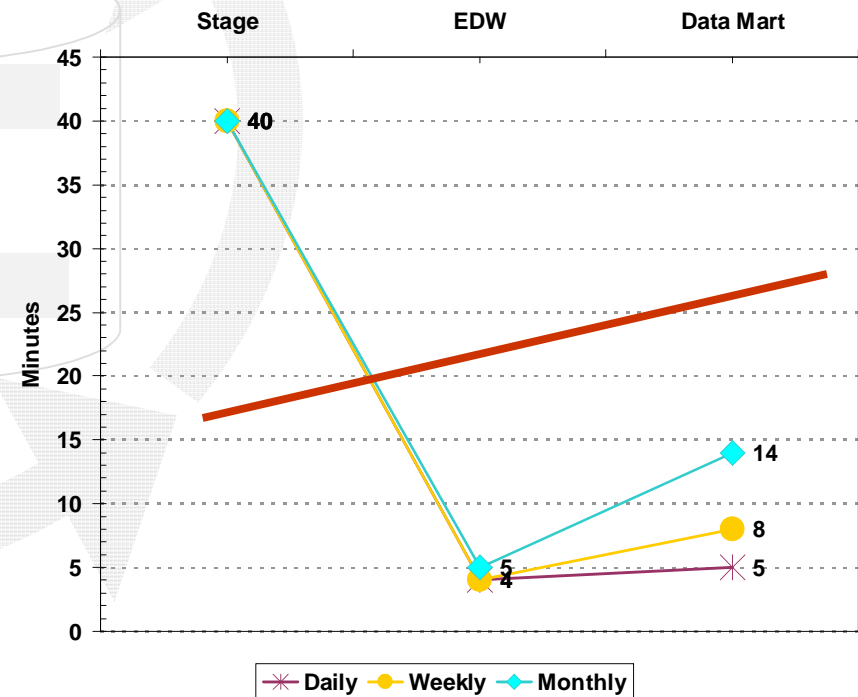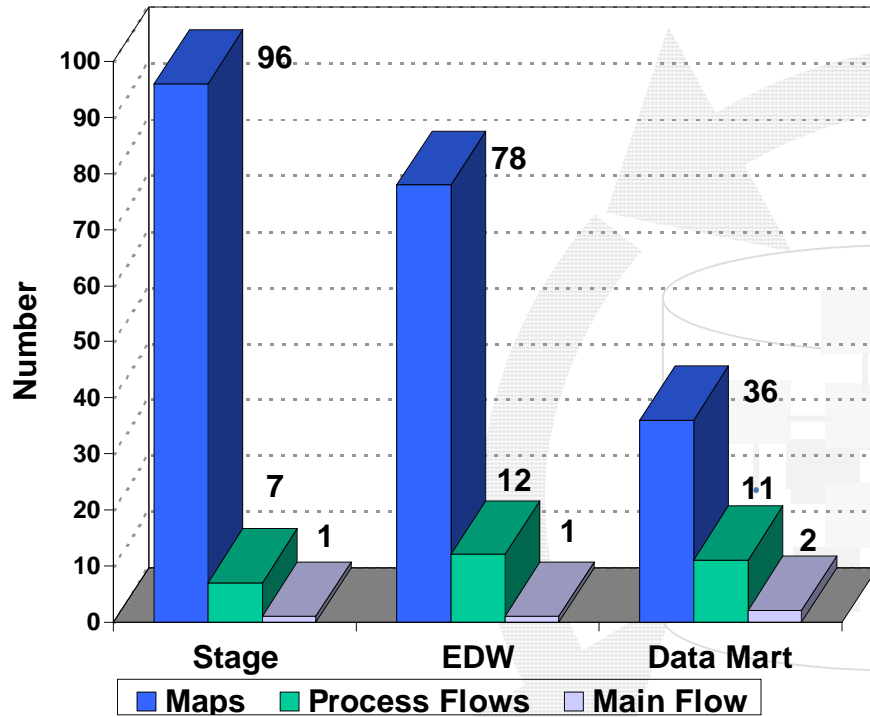 - Manages metadata which is stored in Oracle tables

How Is OWB Being Used

- Extract data from Oracle ERP (HR modules), with minimal transformation, ultimately loading HR data into a staging area
- Process staged data, leveraging OWB transformation capabilities, to transform and normalize data into the Data Warehouse (Oracle)
- Source data from the Data Warehouse, organizing and aggregating into dimensional or star schema form (Oracle)
- In tandem with AppWorx, orchestrate process flows to load data into the various BI structures

AppWorx invoking OWB Process Flows

Some Statistics

Processing Times

Number of OWB Components

Number of OWB Components chart (bars for Stage, EDW, Data Mart):
- Stage: Maps 96, Process Flows 7, Main Flow 1
- EDW: Maps 78, Process Flows 12, Main Flow 1
- Data Mart: Maps 36, Process Flows 11, Main Flow 2

Legend: Maps, Process Flows, Main Flow

Processing Times chart (Minutes vs Stage, EDW, Data Mart):
- Stage: 40
- EDW: 5, 4
- Data Mart: 14, 8, 5

Legend: Daily, Weekly, Monthly

Demonstrate the success & challenges of using Oracle Warehouse Builder and its role in the solution
OWB 10g Observations

Observations

- The initial stage in installing and configuring Oracle Warehouse Builder can be very cumbersome due to the various versions, compatibility, patches and "bug-fixes"

- OWB has its own learning curve
  - The documentation is lacking and it's a challenge to find answers
  - Work arounds are hard to find (lots of google'ing and message boards)
  - Our project development cycle was extended due to working the issues and bugs in the product
  - Few OWB experts

- Performance is generally good

Observations

- Can not create reusable or shareable objects
- Column deletion from mappings disorders input and output groups especially in the EXPRESSION Operator
- Cannot use LONG data in OWB. Need to change to Varchar2 after importing tables from source system
- Sequence generates unused numbers since it generates sequences for all incoming rows
- Ordering objects and conditions in the process flow is critical to proper execution

Observations

- A common process flow issue is the invalid status for process flow activities. Following is a typical workaround:

  - UPDATE owf_mgr.WF_ITEM_ACTIVITY_STATUSES
    SET activity_status = 'COMPLETE'
    WHERE activity_status <> 'COMPLETE'
    AND item_type = 'your workflow process name'

- Since the code is generated, it is easy (maybe too easy) to "customize" the code to suit your requirements and even get-into the transformation and debugging, if required

- Backing up the repository is critical

home of the OAUG **K**nowledge Factory

Demonstrate the success & challenges of using Oracle Warehouse Builder and its role in the solution
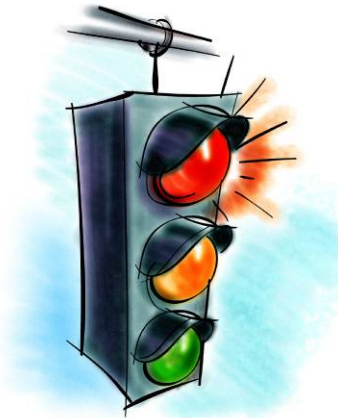
OWB 10g Best Practices

Metadata – Import

- **When importing metadata objects, always match by Names rather than universal Identifier.**
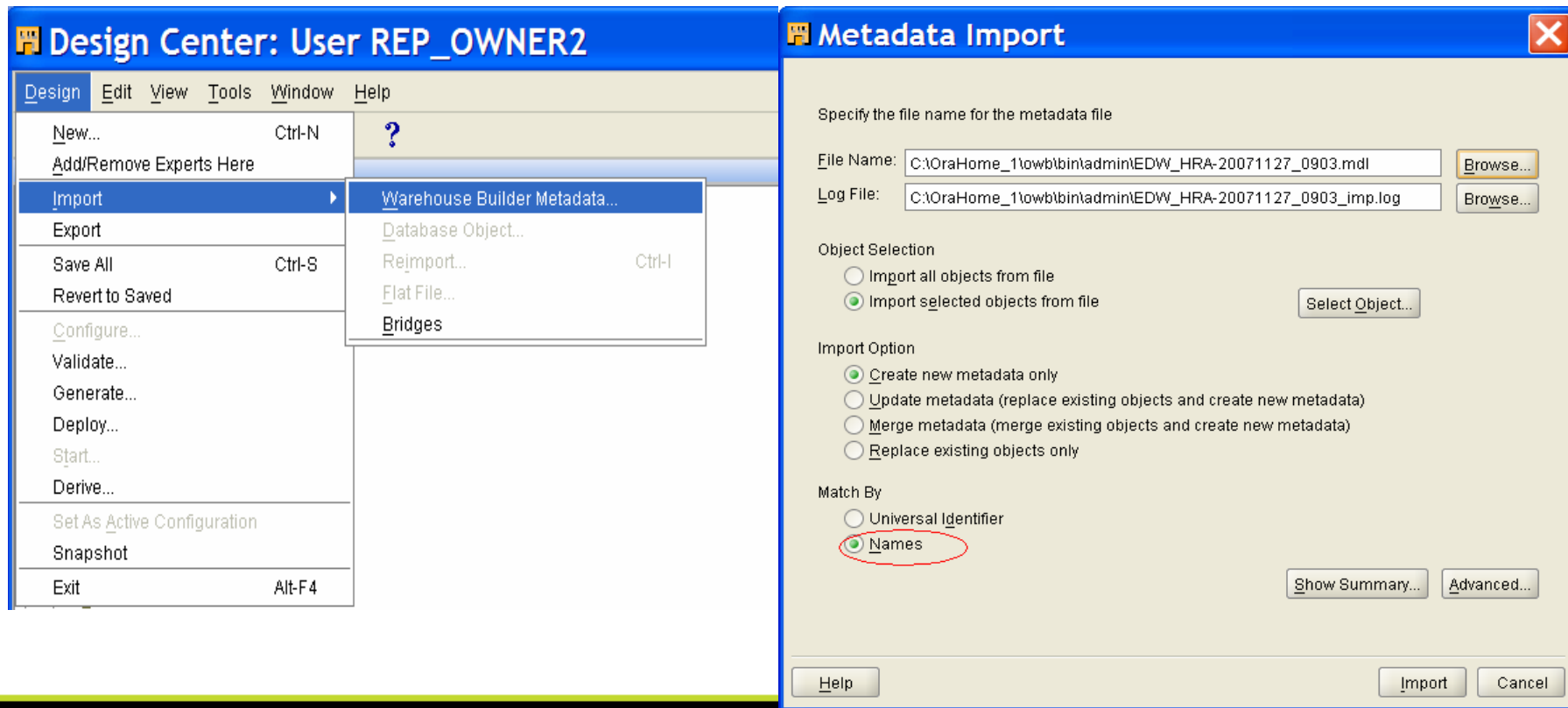
Deployment Data

- Do not purge the deployment data. This has been know to corrupt the OWB repository

Object Lineage

- Before you modify or delete any object, run impact or lineage analysis. Impact displays dependent objects and mappings and lineage shows what objects were used to populate.
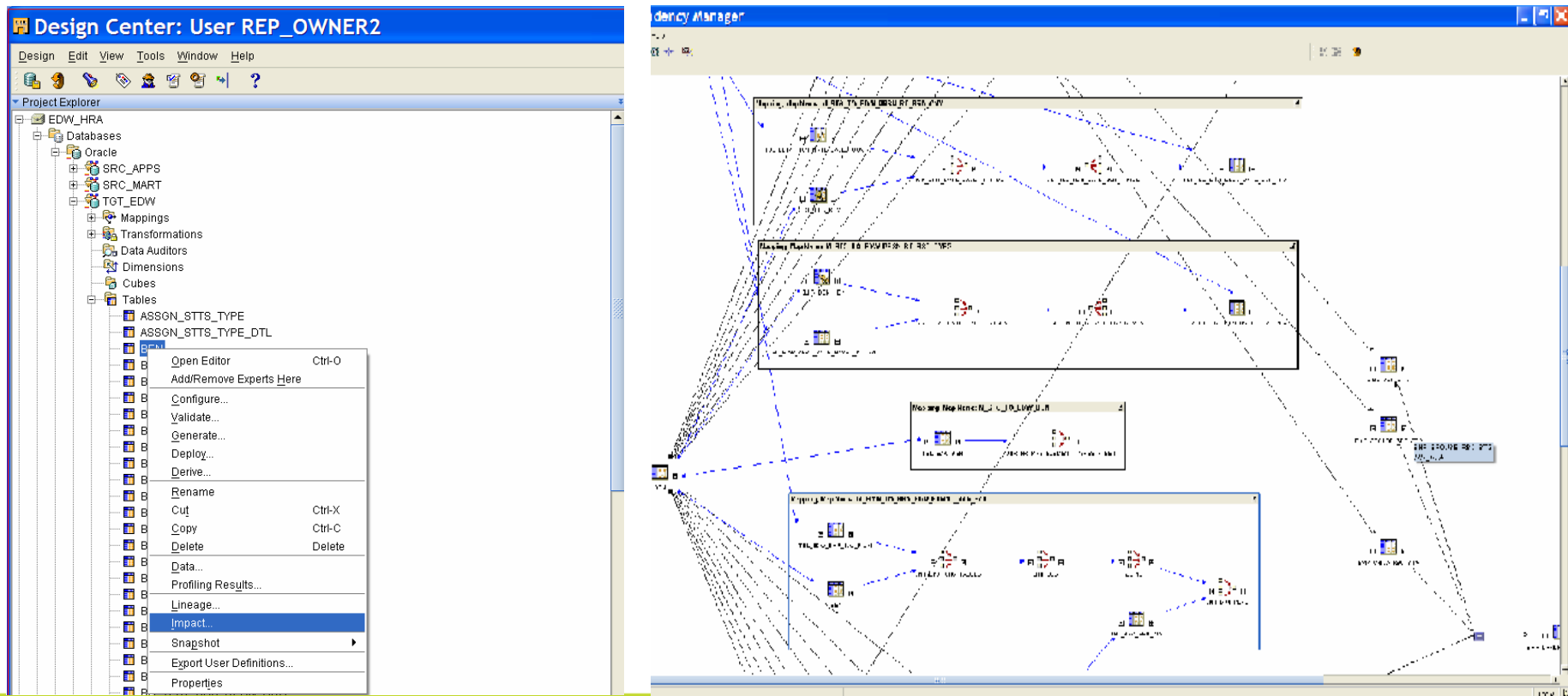
Table Synchronization

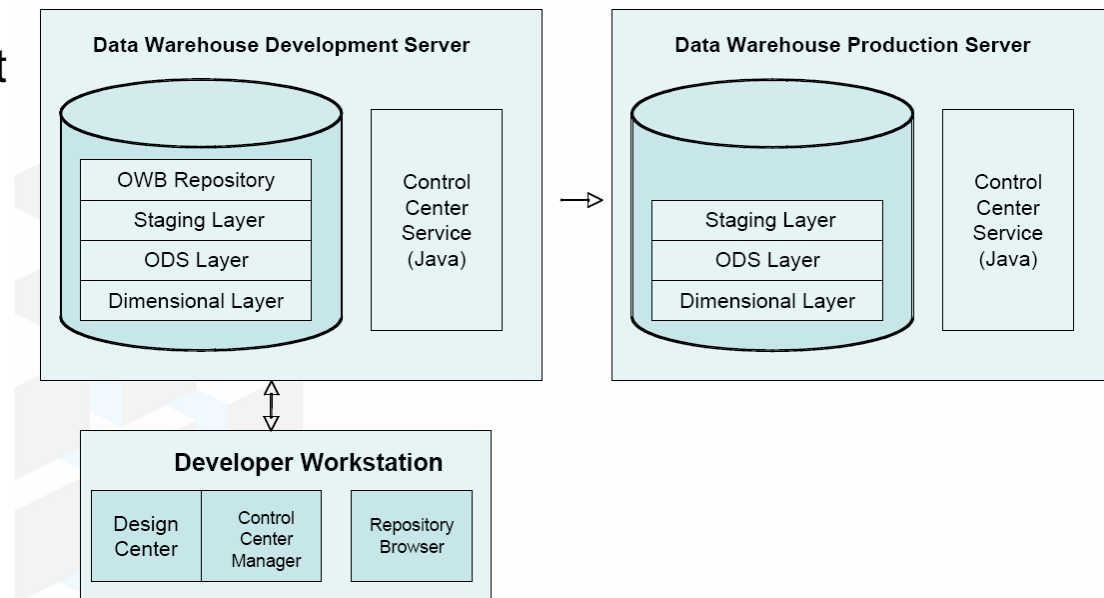- Always synchronize the target table 'from and to' table operator by object name not by position or ID.

Repository – Configuration

- Create a separate repository and target schema(s) for each environment (Development, Test, Production)

- Allow each environment to hold it's own project definition
- Separate target schemas for each environment, with their own locations
- Promote code through MDL file exports and imports

Data Warehouse Development Server

OWB Repository
Staging Layer
ODS Layer
Dimensional Layer

Control Center Service (Java)

Data Warehouse Production Server

Staging Layer
ODS Layer
Dimensional Layer

Control Center Service (Java)

Developer Workstation

Design Center | Control Center Manager | Repository Browser

Repository – Backup/Recovery

- Frequently save the mappings during design time. Many time the mapping will corrupt with an unknown JAVA error.

- Backup the development project at least once a day using MDL exports. Keep several versions
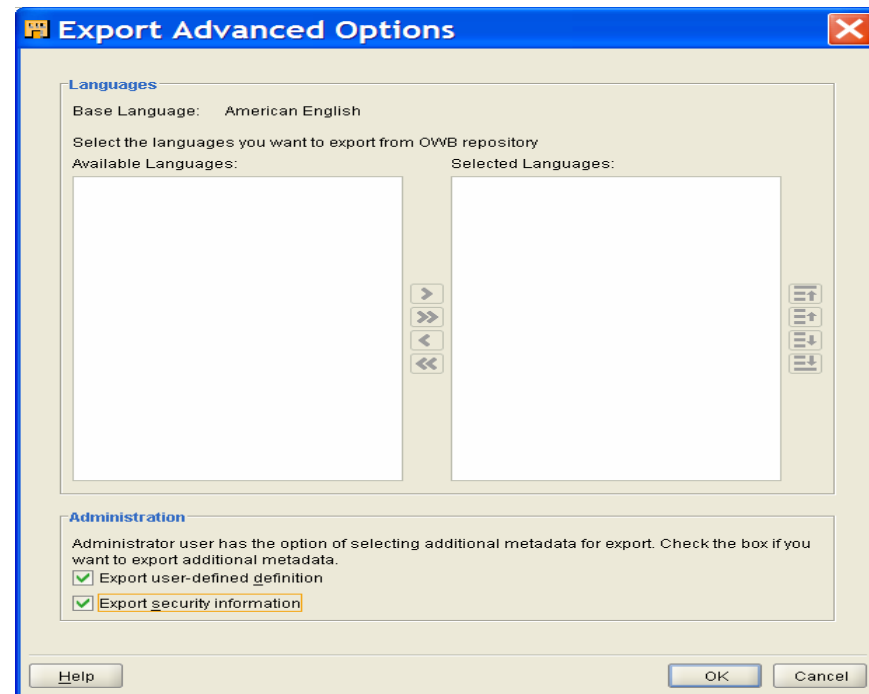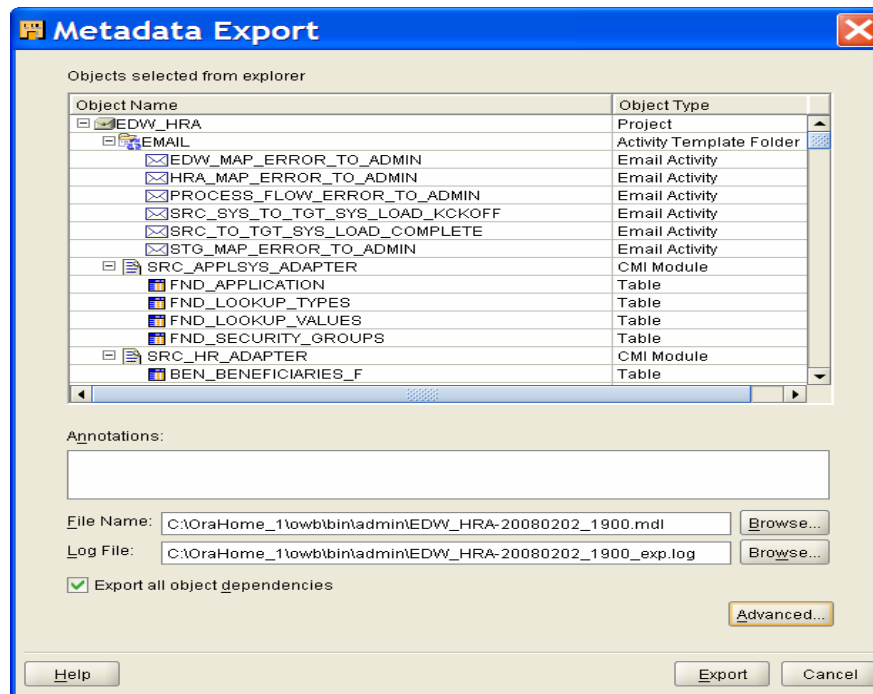
Map – Column Deletion

- When deleting a column from operators in a mapping - first delete the data flow connectors; next delete the field
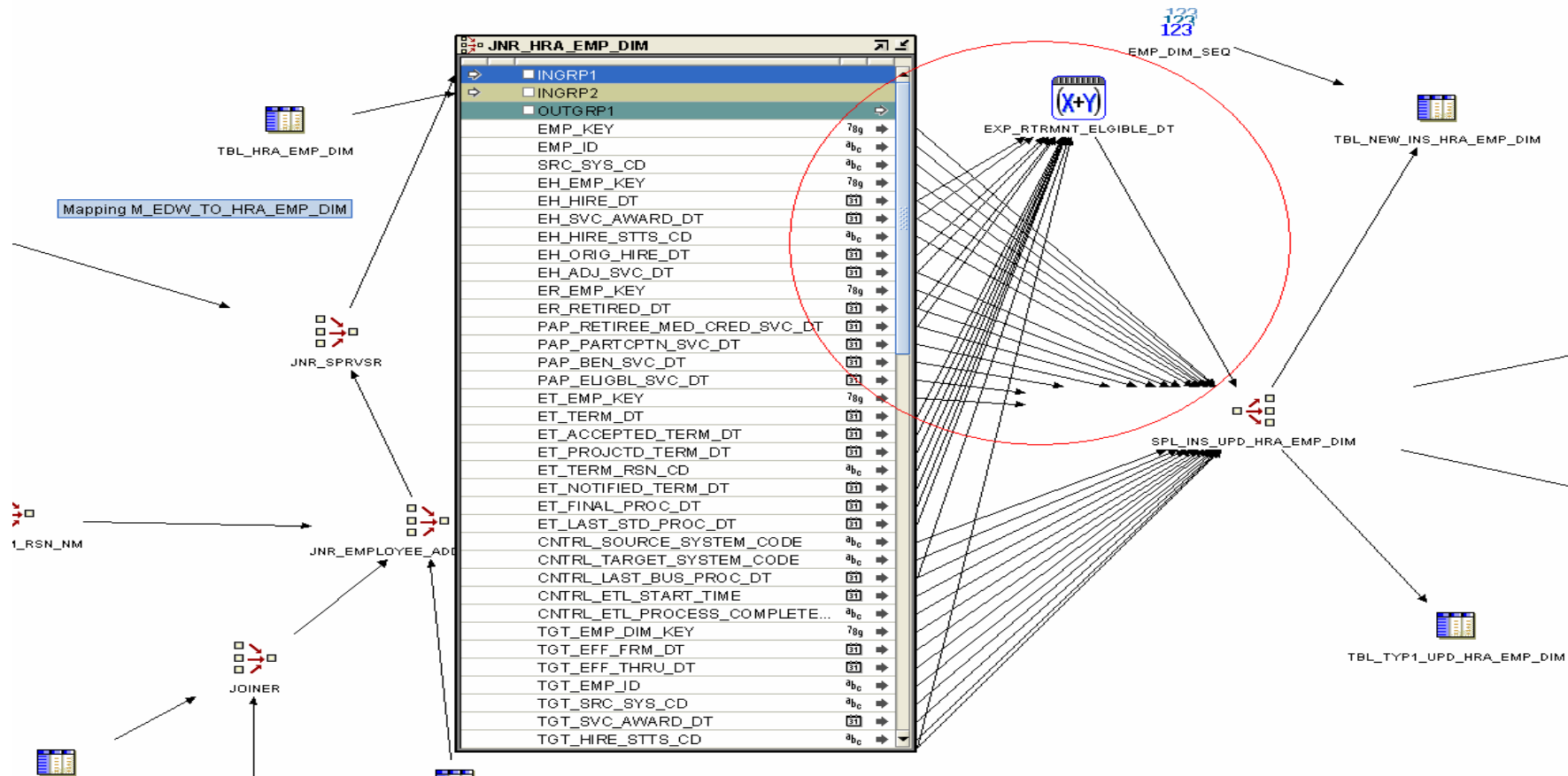
Map – Target Load Order

- Always arrange the table Target Load Order in the following order: TYPE1 INSERT, TYPE1 UPDATE, TYPE2 INSERT and TYPE2 UPDATE.

Process Flow – Organization

- For better job schedule flow and restart ability, create process flows in an organized approach
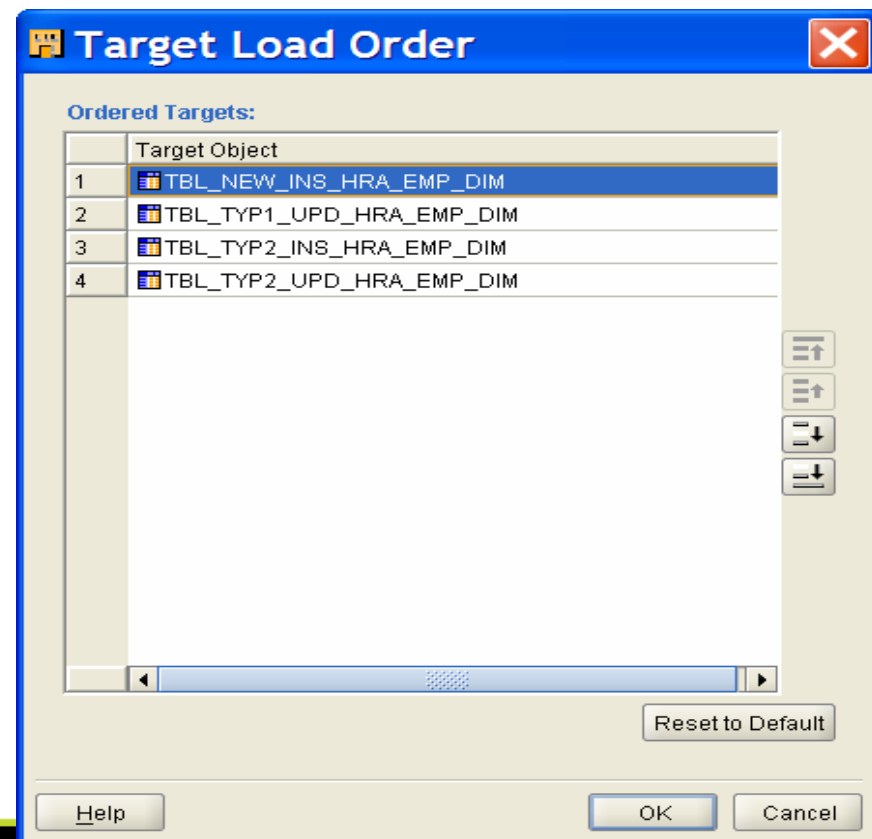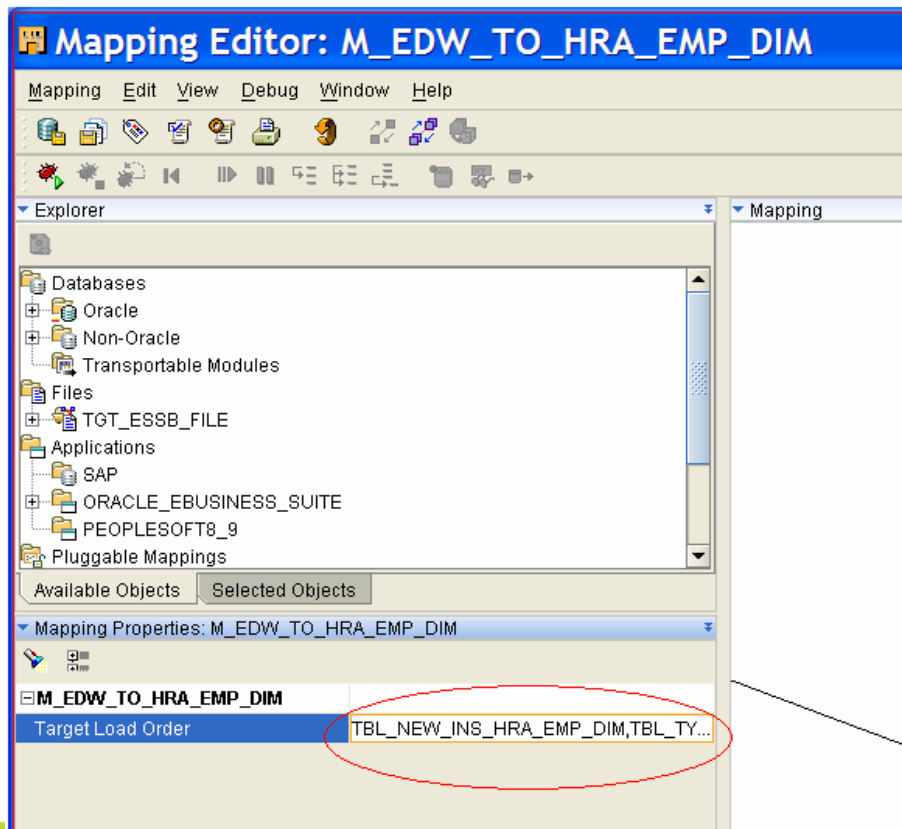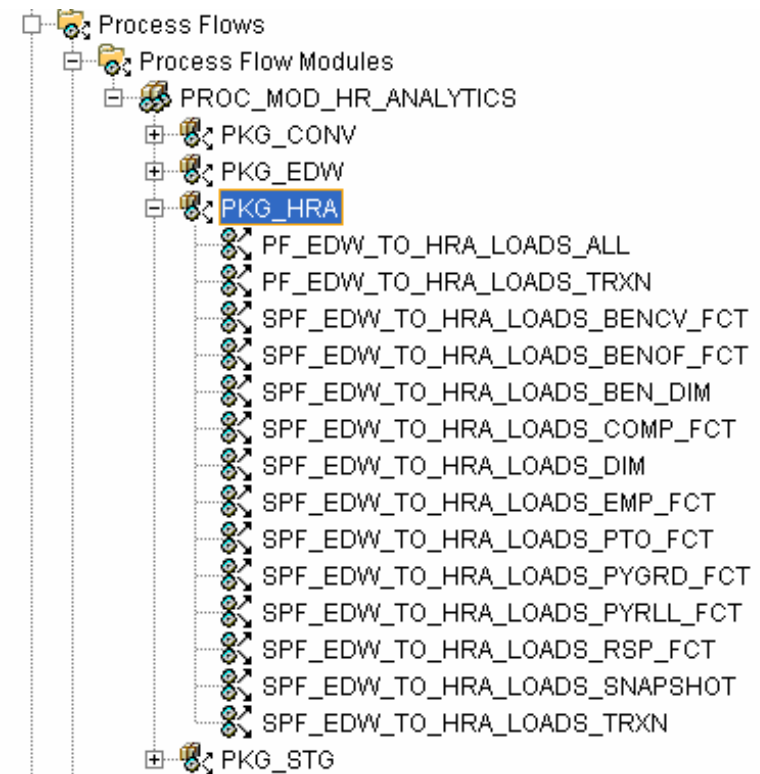 - Create master process flow
  - Gradually decompose to sub-processes through each layer
    - Stage, EDW and DM
    - Load frequency (Daily, Weekly and Monthly)
    - Subject area
    - Dimensions and Facts

- When integrating with external schedule (process flows prefixed by PF), leverage OWB schedule for mos of the work (typically those prefixed with SPF)

Process Flows
  Process Flow Modules
    PROC_MOD_HR_ANALYTICS
      PKG_CONV
      PKG_EDW
      PKG_HRA
        PF_EDW_TO_HRA_LOADS_ALL
        PF_EDW_TO_HRA_LOADS_TRXN
        SPF_EDW_TO_HRA_LOADS_BENCV_FCT
        SPF_EDW_TO_HRA_LOADS_BENOF_FCT
        SPF_EDW_TO_HRA_LOADS_BEN_DIM
        SPF_EDW_TO_HRA_LOADS_COMP_FCT
        SPF_EDW_TO_HRA_LOADS_DIM
        SPF_EDW_TO_HRA_LOADS_EMP_FCT
        SPF_EDW_TO_HRA_LOADS_PTO_FCT
        SPF_EDW_TO_HRA_LOADS_PYGRD_FCT
        SPF_EDW_TO_HRA_LOADS_PYRLL_FCT
        SPF_EDW_TO_HRA_LOADS_RSP_FCT
        SPF_EDW_TO_HRA_LOADS_SNAPSHOT
        SPF_EDW_TO_HRA_LOADS_TRXN
      PKG_STG

Process Flow – Order of Objects

- Transition order does matter in Process flows. Join error condition transitions first and then success. Error condition is in the '0' order and success is '1' order.
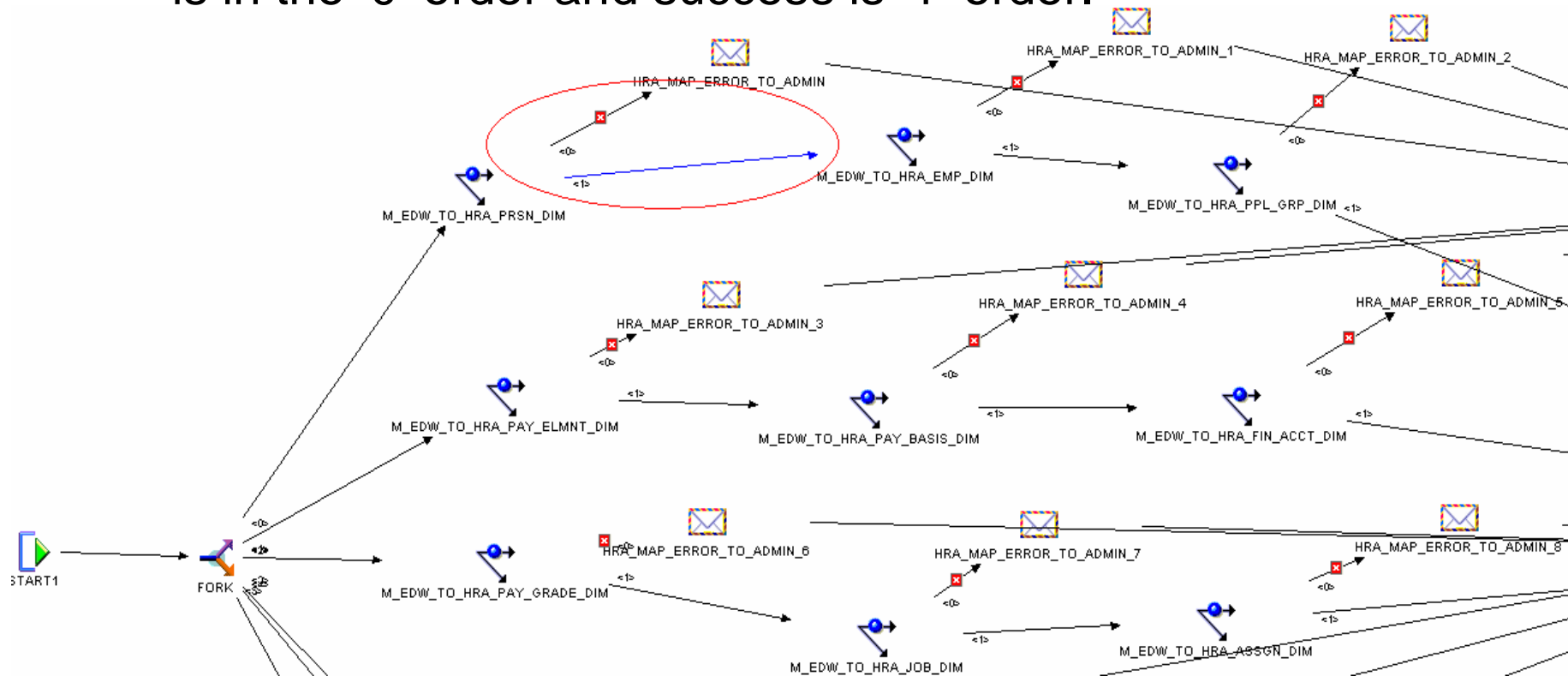
Good Practices – ETL Standards

- Create a set of naming standards at the outset for the mappings, tables, operators, process flows or other objects

- Build and automate scripts to audit or reconcile row counts and key business values between Source, EDW and Data Marts

- Log all the ETL job runs in a Control table

- Maintain business rules within an ETL Transform Rule table rather than hard coding business value

- Create maps that will manage 'dates by source' that will allow for the filtering of source data by selective time frames

Good Practices – Map Design

- Create modular, single process mappings for each target table - Debugging large mappings would be very hard

- Design and build each Mapping with performance in mind and don't hide functionality in your Mappings

- Avoid using views and PL/SQL procedures in your maps

- Use Filter Operators to restrict data sets, not predicates in Join Operators

- Create map templates to ensure consistent creation of maps
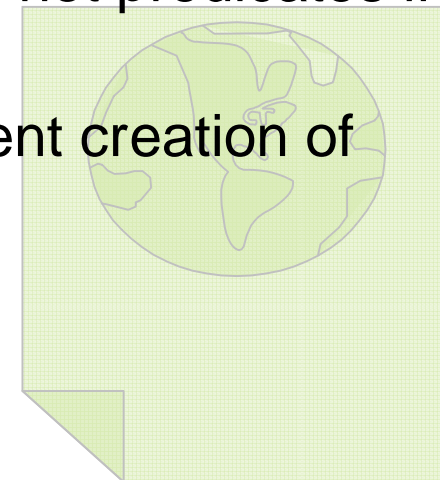
Good Practices – General

- Give each developer their own username, i.e. don't all log on as REP_USER. If all the developers use the same user name they lock each other

- Apply patches, as they become available

- Define a security policy (FGAC vs. simple security on repository objects)

- When moving a project from one system to another, always import the locations first; make appropriate connection changes; import one location object at a time

Good Practices – General

- Purge the execution audit details and optimize the repository whenever the repository browser is very slow

- Run the repository database in ARCHIVELOG mode to allow for possible point-in-time recovery

- Capture issues in the log files by piping the OWB outputs to a file

  - Ex: C:\OraHome_1\owb\bin\win32>owbclient.bat 1>out.log 2>error.log.

Questions

Thank You!