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Resolving Architectural Conflict: A Hybr How the Data Warehouse Is Changing The Mission of the ETL Team

r 2 ETL Data Structures

To Stage or Not to Stage Designing the Staging Area Data Structures in the ETL System Flat Files XML Data Sets **Relational Tables** Independent DBMS Working Tables Third Normal Form Entity/Relation Mod Nonrelational Data Sources Dimensional Data Models: The Handoff Room to the Front Room Fact Tables **Dimension** Tables Atomic and Aggregate Fact Tables Surrogate Key Mapping Tables Planning and Design Standards Impact Analysis Metadata Capture Naming Conventions Auditing Data Transformation Steps Summary

Data Flow

Extracting

3

Part 1: The Logical Data Map Designing Logical Before Physical Inside the Logical Data Map Components of the Logical Data Map Using Tools for the Logical Data Map Building the Logical Data Map Data Discovery Phase Data Content Analysis Collecting Business Rules in the ETL Proce Integrating Heterogeneous Data Sources Part 2: The Challenge of Extracting from I Platforms Connecting to Diverse Sources through O Mainframe Sources Working with COBOL Copybooks EBCDIC Character Set Converting EBCDIC to ASCII

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Transferring Data betw Handling Mainframe Using PICtures Unpacking Packed Dec Working with Redefine Multiple OCCURS Managing Multiple Ma Handling Mainframe **Flat Files** Processing Fixed Leng **Processing Delimited** XML Sources **Character Sets** XML Meta Data Web Log Sources W3C Common and Ex Name Value Pairs in V **ERP System Sources** Part 3: Extracting Chang **Detecting Changes** Extraction Tips Detecting Deleted or C Summary **Cleaning and Conform**

Chapter 4 Cl

Defining Data Quality Assumptions

- Part 1: Design Objective Understand Your Key Competing Factors Balancing Conflicting Formulate a Policy
- Part 2: Cleaning Deliver Data Profiling Deliver Cleaning Deliverable Cleaning Deliverable Audit Dimension Fine
- Part 3: Screens and The Anomaly Detection Pl Types of Enforcement Column Property Enfo Structure Enforcemen Data and Value Rule I Measurements Drivin Overall Process Flow The Show Must Go O Screens

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Known Table Row Counts

Column Nullity

Column Numeric and Date Ranges

Column Length Restriction

Column Explicit Valid Values

Column Explicit Invalid Values

Checking Table Row Count Reasonabilit Checking Column Distribution Reasonal General Data and Value Rule Reasonability

Part 4: Conforming Deliverables

Conformed Dimensions

Designing the Conformed Dimensions

Taking the Pledge

Permissible Variations of Conformed Di-Conformed Facts

The Fact Table Provider

The Dimension Manager: Publishing Co Dimensions to Affected Fact Tables Detailed Delivery Steps for Conformed I Implementing the Conforming Modules Matching Drives Deduplication Surviving: Final Step of Conforming Delivering

Summary

er 5 Delivering Dimension Tables

The Basic Structure of a Dimension The Grain of a Dimension The Basic Load Plan for a Dimension Flat Dimensions and Snowflaked Dimen Date and Time Dimensions **Big Dimensions Small Dimensions** One Dimension or Two **Dimensional Roles** Dimensions as Subdimensions of Anoth **Degenerate** Dimensions Slowly Changing Dimensions Type 1 Slowly Changing Dimension (Ov Type 2 Slowly Changing Dimension (Par Precise Time Stamping of a Type 2 Slowl Dimension Type 3 Slowly Changing Dimension (Al Hybrid Slowly Changing Dimensions Late-Arriving Dimension Records and C

Multivalued Dimensions and Bridge Tab Ragged Hierarchies and Bridge Tables Technical Note: POPULATING HIERARC

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Using Positional Attributes in a Dimension to Represent Text Facts Summary

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Delivering Fact Tables

The Basic Structure of Guaranteeing Referent Surrogate Key Pipeline Using the Dimensior Fundamental Grains **Transaction Grain Fa** Periodic Snapshot Fa Accumulating Snaps Preparing for Loading Managing Indexes **Managing Partitions** Outwitting the Rollb Loading the Data Incremental Loading **Inserting Facts** Updating and Correc **Negating Facts** Updating Facts **Deleting Facts** Physically Deleting Logically Deleting Fa Factless Fact Tables Augmenting a Type 1 Graceful Modifications Multiple Units of Meas Collecting Revenue in Late Arriving Facts Aggregations Design Requirement Design Requirement Design Requirement Design Requirement Administering Aggre Views **Delivering Dimension Cube Data Sources Processing Dimensio** Changes in Dimensio **Processing Facts**

Integrating OLAP Pr OLAP Wrap-up

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Implementation and operations

Development

Current Marketplace ETL Tool Suite Offerings Current Scripting Languages

Time Is of the Essence Push Me or Pull Me **Ensuring Transfers with Sentinels** Sorting Data during Preload Sorting on Mainframe Systems Sorting on Unix and Windows Systems Trimming the Fat (Filtering) Extracting a Subset of the Source File Records Systems Extracting a Subset of the Source File Fields Extracting a Subset of the Source File Records Windows Systems Extracting a Subset of the Source File Fields Creating Aggregated Extracts on Mainframe S Creating Aggregated Extracts on UNIX and W Systems Using Database Bulk Loader Utilities to Speed Preparing for Bulk Load Managing Database Features to Improve Perfo The Order of Things The Effect of Aggregates and Group Bys on Pe Performance Impact of Using Scalar Functions **Avoiding Triggers** Overcoming ODBC the Bottleneck Benefiting from Parallel Processing **Troubleshooting Performance Problems** Increasing ETL Throughput Reducing Input/Output Contention Eliminating Database Reads/Writes Filtering as Soon as Possible Partitioning and Parallelizing Updating Aggregates Incrementally Taking Only What You Need Bulk Loading/Eliminating Logging Dropping Databases Constraints and Indexes Eliminating Network Traffic Letting the ETL Engine Do the Work Summary

Operations

Scheduling and Support Reliability, Availability, Manageability Analys ETL Scheduling 101

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Scheduling Tools Load Dependencies Metadata

- Migrating to Production Operational Support for the Bundling Version Releases Supporting the ETL System
- Achieving Optimal ETL Perf Estimating Load Time Vulnerabilities of Long-Rur Minimizing the Risk of Loa
- Purging Historic Data
- Monitoring the ETL System Measuring ETL Specific Per Measuring Infrastructure F Measuring Data Warehous Processes

Tuning ETL Processes

Explaining Database Overl ETL System Security

Securing the Development Securing the Production En Short-Term Archiving and R

Long-Term Archiving and F Media, Formats, Software, Obsolete Formats and Arc Hard Copy, Standards, and Refreshing, Migrating, Em Summary

Chapter 9

Metadata

Defining Metadata Metadata—What Is It? Source System Metadata Data-Staging Metadata **DBMS** Metadata Front Room Metadata **Business** Metadata **Business Definitions** Source System Informatic Data Warehouse Data Dic Logical Data Maps Technical Metadata System Inventory Data Models Data Definitions **Business Rules ETL-Generated Metadata**

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Responsibilities

Planning and Leadership Having Dedicated Leadership Planning Large, Building Small Hiring Qualified Developers Building Teams with Database Expertise Don't Try to Save the World **Enforcing Standardization** Monitoring, Auditing, and Publishing Statistics Maintaining Documentation Providing and Utilizing Metadata Keeping It Simple **Optimizing Throughput** Managing the Project Responsibility of the ETL Team Defining the Project Planning the Project Determining the Tool Set Staffing Your Project **Project Plan Guidelines** Managing Scope Summary

Real Time Streaming ETL Systems

Real-Time ETL Systems Why Real-Time ETL? Defining Real-Time ETL Challenges and Opportunities of Real-Time Data Warehousing Real-Time Data Warehousing Review Generation 1—The Operational Data Store Generation 2—The Real-Time Partition Recent CRM Trends The Strategic Role of the Dimension Manager Categorizing the Requirement

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Data Freshness and Historic Reporting Only or Integratic Just the Facts or Dimension Alerts, Continuous Polling, Data Integration or Applicat Point-to-Point versus Hub-a Customer Data Cleanup Con Real-Time ETL Approaches

Microbatch ETL

Enterprise Application Integ Capture, Transform, and Flo Enterprise Information Integ The Real-Time Dimension M Microbatch Processing

Choosing an Approach—A Summary

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Conclusions

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