Age Old Data Management Challenge

• Disparate Systems
• Data Integrity Issues
• Disconnected Pockets of Knowledge – Data Silos
• Lack of Knowledge Across the Enterprise

• I/T Credibility
• Sub-optimization - Scaling Issues
• Bad Business Decisions

Today's Data Needs Challenge

• Business Credibility
  — Analysts
  — Investors
• Business & IT Alignment
• Sarbanes-Oxley
• Privacy Concerns | Issues
• Reporting vs Analytics
Data Management Challenges  
* Circa CY2000 *

- Centralized Warehouse  
  Creating Data Marts to Drive Business Reporting
  - 28 Data Marts
  - Business Reporting Teams
    - Information Difficult to Get to Decision Makers
  - No Way to Manage Capacity or Service Level
  - Multiple “Versions of the Truth”
    - “Special Sauce”
    - Organizational Hierarchies Contained in Access DB or Local Spreadsheets (No MRD)
  - Business & I/T Scaling Issues

Customer Data Mart - Partial View of the “Customer”
Business Needs Evolve

- Query complexity grows
- Workload mixture grows
- Data volume grows
- Schema complexity grows
- Depth of history grows
- Number of users grows
- Expectations grow

OPERATIONALIZING
WHAT IS happening?
Continuous Update &
Time-Sensitive Queries
Become Important

PREDICTING
WHAT WILL happen?
Event-Based
Triggering
 Takes Hold

ANALYZING
WHY did it happen?
Increase in
Ad Hoc Analysis

REPORTING
WHAT happened?
Primarily Batch &
Some Ad Hoc Reports

Alternative Approaches to Enterprise Reporting & Analytics Exist

Data Mart Centric

- Sources
- Marts
- Users

Virtual, Distributed, Federated

- Sources
- Middleware
- Users

Hub-and-Spoke Data Warehouse

- Sources
- DW
- Marts
- Users

Enterprise Data Warehouse

- Sources
- DW
- Users

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<th>Independent Data Marts</th>
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<td>Network bandwidth and join complexity issues</td>
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<td>No need for ETL</td>
<td>No “Single Version of Truth”</td>
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<td>No need for separate platform</td>
<td>Requires corporate leadership and vision</td>
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**Centralized Enterprise Data Warehouse**

The Superior Value Of Integrated Detail Data

While the Business Value Increases Exponentially!

Investment is Incremental when Building an Centralized EDW

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**Database Workload Continuum**

- **Transactional (OLTP)**
  - User Profiles: Customers, Orders, Suppliers
  - Services: Front-line transactions, back office services
  - Access Profile: Frequent updates, occasional lookup
  - Data: Current state data, limited history, narrow scope

- **Tactical (ODS)**
  - User Profiles: Customers, Products, Suppliers
  - Services: Lookups, complex analytics
  - Access Profile: Continuous updates, frequent lookups
  - Data Model: Current state data, recent history, integrated business areas

- **Strategic (EDW)**
  - User Profiles: Back-office services, management, trading partners
  - Services: Strategic decisions, periodic state data
  - Access Profile: Bulk inserts, complex analytics
  - Data Model: Deep history, integrated view

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## Database Workload Continuum

### Transactional (OLTP)
- **User Profiles**: Customers, Clerks
- **Services**: Transactions, Bookkeeping
- **Access Profile**: Frequent updates, Occasional lookup
- **Data**: Current “state” data, Limited history, Narrow Scope

### Tactical (ODS)
- **User Profiles**: Front Line Services, Customers - Indirectly
- **Services**: Lookups, Tactical decisions, Analytics (e.g. scoring)
- **Access Profile**: Continuous updates, Frequent lookups
- **Data Model**: Current “state” data, Recent history, Integrated business areas

### Strategic (EDW)
- **User Profiles**: Back Office Services, Management, Trading Partners
- **Services**: Strategic decisions, Analytics (e.g. scoring)
- **Access Profile**: Bulk Inserts - Some Updates, Frequent complex analytics
- **Data Model**: Periodic “state” data, Deep history, Enterprise integrated view

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### Workload Continuum

- **Transactional Repositories**: OLTP
- **Tactical Repositories**: ODS
- **Strategic Decision Repositories**: EDW

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### Database Workload Continuum

- **Transactional (OLTP)**
- **Tactical (ODS)**
- **Strategic (EDW)**

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### Workload Continuum

- **Transactional Repositories**: OLTP
- **Tactical Decision Repositories**: ODS
- **Active Data Warehouse (ADW)**

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Dell Data Warehouse Architecture

4 Major Components
- ETL & Event Services
- Decision Support Repositories (ODS & EDW Databases)
- Data consumption (d3 – Dell Data Direct Application)
- Steering committee - Decision makers in the business (BILC)

ETL & Event Services
- 100s daily feeds
- BATCH & NRT (Near Real Time) processing of source data
- Event base processing of data
- Parallel approach to the architecture to ensure scalability
- 24X7 Global Operations (Active-Active)

OLTP Data Sources
- APJ
- EMEA
- AMER

NRT Data Services
Publish–Subscribe Method
- Order Mgmt
- Financial
- Call Logs
- Rules Engine
- Event Engine
ETL & Event Services

EDW
Decision Support Repositories

ETL & Event Services
- 100s daily feeds
- BATCH & NRT (Near Real Time) processing of source data
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Dell on Dell: Leveraging Dell Technology for Centralized Data Warehousing
Our Strategy: Dell on Dell for the Enterprise

- Teradata on Dell Platform (largest Teradata implementation on Windows-based OS)
  - 105 nodes using Dell 2850 Servers
  - 157 Tb of EMC Storage***
  - Parallel architecture to support availability, reliability, and performance under a mixed workload
  - Active-Active strategy to support global operations*

- Migration to One Global Model
  - Industry strength data model
  - Load once use many times strategy
  - Development of a single version of the truth
  - Integration of multiple source systems to one subject area
  - Integration of different subject areas
  - Simplicity (i.e. more time spent enabling information rather than replicating it)

- Global Data Warehouse
  - Active / Active-OR
    - Full in FY08
  - Workload Management
    - Priority Scheduler
    - DBQL

*Expansion progressing
**Upgrading from W2K to W2003 in progress
***Upgrading from DMX1000s to DMX3s
D3 (Dell Data Direct) Application
Enabling Any Question at Any Time

• d³ Direct Interface into Dell’s Data Warehouse
  – Business Language: No programming knowledge needed (i.e. SQL)
    * Enables decision makers to utilize information

• Tailored solution using common components
  – d³ solution | 3 logical parts
    1. Business interface driven by meta data
    2. SQL builder
    3. Report formatter
  – Built with common Microsoft .Net components
  – Accessed through an internet browser
d³ Application
Enabling Direct Access to Data Warehouse

Personalized Web Portal
- Customized by Organization / Responsibility
- Reports / Dashboards / Customers
- Shortcuts / Favorite Requests / Shared Request
- Completed Reports

Any Question Any Time
d³ Adhoc Reporting
- “Wizard” Based Lead Through
- By Subject Area
Any Question Any Time
d³ Adhoc Reporting

GPI/GPII Order Status USD Adhoc Wizard

Columns

Select Columns

Select the columns to include in your report. Click the columns you wish to include in your report, then use the arrows next to the columns to move them into or out of the report. Click [OK] to save the selected columns.

Output Format

Select the format for the report.

Advanced Options

Report Settings

Customize the report settings.

Preview

View the report preview.

Print

Print the report.

Save

Save the report.
Any Question, Any Time, Anywhere and the Correct Answer... Competitive Advantage

Principles
- Obtain data once and at the source
- Data is complete and detailed
- Define, model and map all data
- Ensure all data has integrity
- Provide complete access
- Flexibility and scalability

Teradata on Dell Platform
Dell 2850 2-way Servers
105 nodes ~ 157 Tb

Transform | Integrate
- Integrated Global Views
- Worldwide Orders Data
- Worldwide Service Data
- Worldwide Logistics Data
- Worldwide Financial Data

Dell Data Warehouse
Teradata on Dell

Dell Data Warehousing: Not Just Reporting

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Forrester Research found that only 2% of respondents had installed systems that provided a single, integrated view of each customer…

Source: The real value of CRM; connecting all the channels together

**The Unfulfilled Promise | CRM**

- **Orders per Day**
  - > 20,000 Customers / day
  - 120,000 Quotes; 85,000 Orders
  - 75,000 Shipments

- **Call Center Volumes**
  - Service: 240,000 / day
  - Sales: 425,000 / day

- **Product Information**
  - > 300,000 SKUs Available
  - Piece Part ID 500,000
  - > 1,000 Vendors

- **Online Information**
  - 15M Clickstream Hits / day
The Stages of Customer Management Evolution

STAGE 1
Mass Marketing
- Standardized products & services, customers interchangeable

STAGE 2
Segment Marketing
- Focus on products & services

STAGE 3
Target Marketing
- Predictive analysis & segment-focused communications

STAGE 4
Event Based Communication
- Personalized communication focused on individual behavior patterns

STAGE 5
Interactive Conversations
- Real-time/Right time 1 to 1 communications across all channels

Data Mart - Partial View of the Customer
- DM Contact Info
- Contact Info
- Detailed Order History
- Summarized Orders
- CE Failures
- Quotes
- DM Contact History
- Clickstream
- Customer Demographics/Firmographics
- Model Scores
- Some Model Scores
- Care / Tech Support History
EDW - 360 Degree View of the Customer

- Contact Info
- Care / Tech Support History
- Model Scores
- Customer Demographics/Firmographics
- Clickstream
- Quotes
- Detailed Order History
- CE Failures
- Contact History

Dell Leverages Data For Competitive Advantage
Right Message, Right Time, Right Customer

- 360° View of Customer Interactions Across Dell
- Purchase & Service History
- Warranty Information
- Personalized Offers
- Upsell Suggestions
- dell.com | Legacy Order Management Integration
- Customer Experience Indicators
Learning from the business…
Right message, Right time, Right customer

Is this an important need for this customer?

Significance

Is this personalized and prioritized?

Relevance

What is the right time to deliver this?

Timing

Requires an Integrated EDW Approach

Requires depth and breadth of customer data to understand the context, drivers and influencing factors of customer behavior

Requires a complete customer view across all business lines and across all channels to prioritize and balance around the customer need

Requires freshness of data so that decisions are actionable when the customer cares – now or in the future
Single and Integrated Customer View

- The DDW is the most comprehensive and detailed repository of customer data:
  - Profile data
  - Transactions
  - Interactions
  - Behaviors and trends
  - Extensive history
- High performance parallel database supports thousands of users, complex analysis and active Decision Support
- High performance utilities assure data freshness and accuracy
- Simple access to third party data into analysis, with/without integration into the database
- Packaged Application provides Best in Class Marketing Automation (Buy vs Build)

Data Management: It’s All About Making Better Business Decisions

The data warehouse is a collection of data & derived information that spans the Enterprise. It transforms the detail data, process, and decisions to create common corporate knowledge.

- “The Truth Hides in the Detail”
- Dynamic
- Data transformation
- Builds upon previous knowledge
- Expands current understanding
- Faster, more informed, business-impacting decisions

Integration is the Key!
Contact Center Analytics for:

Performance Management
Employee Behavior Change
Operations Data Management
Process Automation

Agent & Supervisor Impact

CE
- Improve Resolution
- Improve Resolve Rate
- Improve Average Minutes Per Resolution (AMPR)

Productivity
- Improve/Meet Service Levels
- Reduce AHT
- Reduce manual tasks (reporting, coaching preparation, etc).

Attrition/On Boarding
- Lower short & long term attrition
- Improve new hire ramp up
- Standardize recognition, rewards, PIP, action plan, etc.

Reporting Impact
- Robust Flexible Infrastructure Required
- Faster time to market on new program launches
- Business Intelligence
- Agent level analytics

Best of Class packaged products provide proven results:
- Reduced Call Resolution Time by 15 seconds resulting in $15MM savings in less than 1 year
- Maintaining Quality levels while improving AHT by 8%
- Short term attrition improved by 28%
- Reduced new hire time to full competency by 1 week
- Reduction of manual tasks at all roles by 50-90% (supervisor, manager, report analyst)
- Removal of 1,400 hours/month of manual tasks
- Increased dollar collected per productive hour by 210%

Basic criteria for packaged product evaluation

- Leverage existing data consolidation efforts (DW/ D3)
- Ensure package leverages existing data storage systems
- Do not duplicate transaction level data
- Advanced bookkeeping to ensure accuracy over time
- The package should provided personalized views/analytics to every role
- It should support complex access control requirements
- Integrated & actionable features

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CCA Industry Packaged Product Basics

➢ **Minimal Software Code Written**
  • Very high percentage (>90%) configurable
  • Application administration by business users

➢ **Pre-Built Application**
  • Application components (reports, dashboards, metrics, goals, forms, alerts, coaching flows & other processes)
  • Data integration conduits and domain expertise
  • Personalization (roles, views, access control)

➢ **Experienced**
  • Success in similar environment with large complex projects
Dell Leverages Data For Competitive Advantage
Direct Relationship / Customers

- Customer Level; Direct Access
- Customer Dashboard
- Premier Pages
- Direct Marketing | Upsell

Data Management and Data Warehousing: Summary
The Future of Data Management
*Direct Access to Knowledge*

- Recognize complete relationship
- Eliminate duplication of data
- Convenient, uninterrupted access
- Immediate service
- Personal treatment
- Anticipate needs
- Enable I/T support scaling

**Lessons Learned**

- Global Systems
- Common Systems
  - Thinking ahead
- Architecture
  - Data
  - Application
- Data Warehouse
  - Simplify Reporting
  - Complexity of Transition
  - Integrated Views are Redefining "What's Possible"
  - Provide for end-user mass reporting
  - Migrate core IT resources from reporting to analytics
  - Enabler for Next Generation Applications (SOA/Data Services)
Leverage Your Data Warehouse to Innovate

- Don’t treat the data warehouse like a project that has been completed
- What can you do to provide more value to your customers?
- Data warehouse is part of the enterprise architecture

**Create Sustainable Competitive Advantage**

Support the Decision Makers

- Working closely with the decision makers is key
- Know their business and what their opportunities are
- Have a close relationship and have agility to help the business make changes
- Be knowledgeable of their key business/performance indicators
- Provide KPI visibility through analytics of EDW data
What Really Matters?

The only relevant measures of Data Warehousing Success are Business Impact and Value.

- Significant
- Broad
- Deep
- Rapid
- Continuous
- Evolving

Any Question, Any Time . . . Anywhere!

Now would be a good time! Thank You!