Saving $$$ for Continued HIPAA Compliance with Data Mart Consolidation and Active Data Warehousing

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You’ve never seen your business like this before.
Agenda

Gartner's Architecture for HIPAA Compliance

• Concepts
  - Data Mart Consolidation
  - Active Data Warehousing

Application of these concepts to Continued HIPAA Compliance

A Healthcare Customer

Questions
Gartner’s Wrap, Map & Hack Strategy

- “Wrap-Map-Hack” technique “limits the extent to which applications need to be renovated”
- This model provides “short-term results for a relatively moderate level of investment, while keeping future options open”
- *The approach most HCO are taking*
- Key components include technology to map (translator) integrate (application integrator) and provide an operational data store (database)
Gartner’s Wrap, Map & Hack Strategy

Remediation Considerations

- HIPAA Transaction
  - New fields
  - Longer fields
  - Different codes, identifiers

- Old-Style Transaction
  - No new fields
  - Longer fields
  - Original codes

- Operational Data Store
  - HIPAA-style information

- HIPAA Response
  - New fields
  - Longer fields
  - Different codes, identifiers

- Old-Style Response
  - No new fields
  - Longer fields
  - Original codes

- Processing
  - No changes to codes and rules

Source: Gartner Research
Integration Architecture and Infrastructure for HIPAA

Source: Gartner Research
Architectures for HIPAA Compliance
by Gartner

Integration Architecture and Infrastructure for HIPAA

Rules Engine

Vocabulary Server

Data Feeder System

Transaction System

Data User System

Integration Broker (Mapper-Router)

Trading Partner or Business Associate

Active Data Warehouse

Business Process Manager

Business Activity Monitor

Source: Gartner Research
Agenda

Data Mart Consolidation
“A set of data marts cannot deliver the same benefits as a data warehouse, and will be more costly, more difficult to manage and less flexible.”

“Enterprises initiating data mart consolidation efforts in 2002 that use a quality methodology and application-neutral data warehouse implementations will experience:
- a decline in spending of at least 50% and
- an increase in business value of at least 500% by 2004 (0.7 probability)."¹”

- Kevin Strange, VP, Gartner Group
Data Warehousing

Inside The DW

Operational Data

Data Transformation

Enterprise Warehouse & Management

Data Transformation Layer

Detail, Normalized Data Layer

Logical Data Mart Layer

DW/DSS Users

Detail, Normalized Data Layer

Logical Data Mart Layer
Cost Drivers for Return on Investment

\[ \sum \left( \text{DM}_1 \text{ Support Costs} + \text{DM}_2 \text{ Support Costs} + \text{DM}_3 \text{ Support Costs} + \cdots + \text{DM}_n \text{ Support Costs} \right) = $$$ \text{Big Dollars} \]
Real Value through DMC

Key
- Business Benefit
- Cost Reduction

The Real Value in Consolidating Data Marts

New Business Capabilities

Cost Reduction

Time

$
Think about the costs...

**Hardware**
License fees, Upgrades, Maintenance agreements, External customer support, Depreciation, # of FTEs, Data Center, Department

**Software**
License fees, Upgrades, Maintenance agreements, External customer support, # of FTEs, Data Center, Department

**Network**
Hardware, Software, # of FTEs, Data Center, Department

**Extract/Transform/Load (FTEs)**
Execute/monitor, Maintain/modify for both Operational to DSS and DSS to analysis platform

**Database Support (FTEs)**
ETL DBAs, Access/Qry Tuning DBAs, Business Requirements (DBAs)

**Business Support (FTEs)**
Requirements support - Definition, System Modifications, Data quality/cleansing

**Analytical Tool Support**
Software Purchase, Software License Fees, Support

**Non-direct costs**
Real Estate Allocations, Training Systems

**Data Synchronization**
Drive creation of the business case to show decision makers that data mart consolidation for continued HIPAA compliance makes financial sense.

**The focus is primarily on the numbers.**
Barney Impact Model - Data Mart
Consolidation

Identification of Inefficiencies

- Data redundancy
- Data latency
- Data inconsistency
- Business rules are difficult to manage
- No common metadata

- Cost of data movement
- Cost of data synchronization
- Cost of system administration
- Cost of system maintenance

Focus
Business Impact Model - Data Mart Consolidation

Today’s Inefficiency Vs. Tomorrow’s Promise

The DMC business case identifies and compares IT costs as they exist today...

and what they are projected to be tomorrow...

inclusive of the identification and mitigation of the risks associated with deployment.
Example of Data Mart Consolidation

Consolidating 22 Data Marts
Timeframe = 8 Months
Started Mid November ‘01

Cost to consolidate = $25 Million
Savings within Same Period = $24 Million

Support Costs:
$9.0M per Quarter (22 Data Marts)
$3.0M per Quarter (New Consolidated System)
$6.0M Savings per Quarter

56 More Data Marts Possible...
“Since transforming to a single data warehouse platform, Bank of America has dropped its operating costs from $11 million to $4 million per year.”

“In the past, you could ask four people one question and get four different answers because all were using different sets of data.”

- Russ Vaughn
  Senior VP, Technology and Operations
  Bank of America
Genuity

- Consolidate 2 DMs
  - Re-host 13 subject areas = 600K
- 3 Year NPV Savings = approx. $4M
- Payback in 8.5 Months
DMC - Analysts’ Notes (2002)

Data Mart Consolidation: Best Practices of the Analytically Mature;
Charlie Garry, META Group
GIGA IT Trends 2003: Data Warehousing - Includes Data Mart Consolidation
Analyst Research: Five High-Value Infrastructure Projects for the 2003 Budget
Analyst Research: Media's Technology Priorities
Giga Information Group: "Data Mart Consolidation Drivers"
Giga Information Group: "Data Mart Consolidation Defined"
Giga Information Group: "Data Mart Consolidation Catch-22s"
Gartner Group Revisiting the Myths of Data Marts.doc
Metabits: Financial Data About Teradata: Data Mart Consolidation Valuation
Gartner Data Mart Consolidation: Strengthening Trend of 2002
Data Mart Consolidation

- **White Paper:** “Data Mart Consolidation: Repenting for Sins of the Past,”
  > William McKnight, McKnight Associates, Inc.
For More Information on DMC (External)


Article Reprints
Customer Success Stories
Analysts’ Reports
White Papers
…and more!!!
Agenda

Active Data Warehousing
Healthcare Business Challenges

CEOs’ strategic issues facing their companies over the next five years are:

- Medical management including Rx drugs
- Provider relations/contract issues
- Changing market/customer demands
- Legal/legislative/regulatory issues
- E-business/information and technology management

Source: Tillinghast-Towers Perrin CEO Survey 2001
Information Evolution in Data Warehousing

**STAGE 1**
REPORTING
WHAT happened?
Primarily Batch with Pre-defined Queries

**STAGE 2**
ANALYZING
WHY did it happen?
Increase in Ad Hoc Queries

**STAGE 3**
PREDICTING
WHAT will happen?
Analytical Modeling Grows

**STAGE 4**
OPERATIONALIZING
What IS happening?
Continuous Update & Time Sensitive Queries Gain Importance

**STAGE 5**
ACTIVE WAREHOUSING
What do I WANT to happen?
Event Based Triggering takes hold

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Batch
Ad Hoc
Analytics
Continuous Update / Short Queries
Event-Based Triggering
What is an Active Data Warehouse?

- An operationalized, business-critical component of the enterprise system.
- Cross-department, cross-channel; supports enterprise level business objectives.
- Results of data analysis are translated into actionable decisions.
- Shortens the time between source data and business actions taken as a result of analyzing that data.
- Underlying philosophy is to increase speed and accuracy of business decisions.
- It’s broader than “real-time” or “closed-loop” data warehousing.
- Each step can be as near real-time as it needs to be to support the business objectives.
- There is a very mixed workload. Each type of work has its own service level requirements.
The Business Requirements for an Active Data Warehouse

- Performance
  - Within seconds for certain classes of workload
- Availability
  - 7 X 24 X 365
- Data Freshness
  - Accurate, near real-time data
- Scalability
  - Support for large data volumes, mixed workloads and concurrent users
Active Warehousing for HIPAA Compliance

- One source of data:
  - HIPAA Privacy & Security – Less $$ to maintain access & auditing applications. Increase security
  - Less $$ to maintain separate ODS’s and data marts
  - Consistency of reports throughout organization-ie: Employer Groups receive matching information from different departments
- Real-Time Interventions for improved compliancy & effectiveness of health management programs
- Real-Time Opportunities for customer-facing applications ie: Defined Contribution, Acquisition & Retention Programs
"Front-line Decisioning"

• QUESTION:
  > How do you get the right information to the right individual in the right amount of time in order to make the right decision?

• ANSWER:
  > Active Data Warehousing (ADW) and Enterprise Application Integration (EAI)

  • As organizations move toward greater leverage of information assets by deploying active data warehousing for tactical decision support, EAI becomes an important part of the architectural framework for a business intelligence solution enabling front-line decisioning.
ADW makes the connection!

- An ADW is a mature example of a long-standing integration approach: centralizing data from diverse subject areas onto a single database platform
  - Reducing the level of data movement and transformations required to "connect" the enterprise
- Because all data behind business decisions, both tactical and strategic, is integrated within the same source, the view of the business through the warehouse, from any perspective, is consistent and accurate
EAI enables the conversation!

- EAI enables applications running on different platforms to "communicate" even though they were not originally designed to interact.
- EAI allows events and information about those events to be publicized across an enterprise when they happen.
EAI comes in many forms

- **Data Integration**
  > Deals with moving data among multiple data stores using ETL/ELT techniques. Relatively straightforward: no application interaction or integration required.

- **Message Passing**
  > Manages the exchange of messages among multiple applications:
    - Differs from data-level EAI in that the applications themselves perform the messaging
    - More invasive because it requires modifications to applications to create interfaces for sending and receiving messages.

- **Business Process Management**
  > Provides a framework for building enterprise-wide business processes and incorporating existing applications:
    - Extension of message-level EAI, data exchange still occurs via messaging, but EAI middleware acts as a “work flow” engine.
EAI is the “glue” that allows the integration to take place

Ecosystem

People
(Employees, Customers, Partners)

Partnerships
(Supplier, Service, Market, etc.)

Processes
(Operations, Response, Market, etc.)

Active Data Warehouse

Applications

Web Services

Ecosystem – Logical Model
The Role of EAI in Active Data Warehousing

![Diagram showing the role of EAI in active data warehousing](image-url)
EAI without ADW

EAI

Data Warehouse

EAI with ADW

EAI

Active Data Warehouse
Benefits of adding ADW into an EAI Architecture

ADW offers integration at the data level
ADW reigns in object proliferation and redundancy and object duplication
ADW reduces the number of platforms involved and adds uniformity to data availability
ADW makes security and auditability easier
ADW makes information latency less of an issue
ADW supplies event interpretation for the widest possible business uses
ADW eases the data freshness conflict and confusion
EAI Reference Architecture for ADW

- EAI Reference Architecture for data streaming to and from an Active Data Warehouse
  - Secure, reliable, scalable messaging/events
  - “Enterprise connectivity” via Intranet, Extranet, and/or Internet
  - Route and Transform capability
  - Publish/Subscribe (workflow) or Point-to-Point messaging model
  - Non-intrusive applications adapters
  - Business process management capability
EAI + ADW = “Front-line Decisioning”

- **Wireless company**
  - EAI enables the call center agent to *communicate* with the marketing system in order to make the optimal promotional offer to retain the customer.
  - ADW *connects* the call center agent with the appropriate and timely information about the customer in order to facilitate retention.
  - *Business Value: Avoid “churn”*

- **Airline**
  - EAI enables the gate agent to *communicate* with the reservation system allowing the placement of all 20 passengers on the next available flights.
  - ADW *connects* the gate agent with the accumulated and current information about the customers in order to prioritize seat assignment.
  - *Business Value: Provide optimal customer service*

- **Financial institution**
  - EAI enables the call center agent to *communicate* with the online web system in order to provide knowledgeable customer service.
  - ADW *connects* the call center agent with the most recent and detailed information about the customer in order to expand their portfolio with a new product.
  - *Business Value: Increase revenue by facilitating cross-sell*
Medco Health Solutions

- **Client Base**
  > Retail/Home Delivery Pharmacy benefit to 65 million members
  > Managed $30 billion in drug spend in 2001
  > Partner with close to half of the Fortune 100 and a third of the Fortune 200 companies as well as Managed Care Organizations, Insurance carriers, and various levels of government and unions. (1600+ clients)

- **Access**
  > 2000 + Active users
  > 1 Million Queries / Month
  > 2 billion claims
  > 40 + application (10 major)

- **Infrastructure**
  > 2 state-of-the-art fully automated pharmacies dispensing 1.5M RX/week
  > 10 prescription processing centers
  > 7 customer service call centers with 24/7 access
  > 2,500 pharmacists, physicians, and nurses on staff
  > World’s largest and most experienced online pharmacy
Technology at Medco Health Solutions

- Enhance their customers’ experience, earning and keeping their loyalty

- Use business intelligence information to differentiate themselves from the competition
  
  > Raise the bar for them to match their service to clients and members

- Use effective information management to gain an enterprise-wide single view of their customers
Along comes HIPAA

• **Health Insurance Portability and Accountability Act of 1996 (HIPAA) as external driver**
  > Legislative requirement for audit trail of all patient healthcare data
  > Medco Health data resided on nearly 50 legacy systems
  > Time and resource demands for auditing data for these systems excessive

• **Decision**
  > Develop an Active Data Warehousing Strategy
  > Migrate to an Active Data Warehouse
Early Medco ADW Milestones

- Medco decision to build “two fences” around the mainframe and around their data warehouse and eliminate mainframe copies fencing in every data store would bankrupt the company
  - not complying would subject Medco to fines for non-compliance of $100 per field per instance per day (luckily capped at $250,000 per day) since they have 2,000,000,000 ROWS
  - Medco is the big gorilla in the industry and would be strictly scrutinized by the federal government for compliance
  - kill all Sybase, Oracle, Informix data stores
Medco Health Solutions--a single view

**ADW Strategy Provides Integrated Patient View**
- Time and Resource efficiencies
- One source of information, gathered from numerous touch points, used for multiple, enterprise-wide purposes
- Simplified compliance with HIPAA access controls
- Old inefficiencies gone
- New efficiencies here to stay

**Before**
- Batch queries yielded data up to four weeks old
- Batch queries took days to process
- Duplicated data on multiple systems

**After**
- ADW yields data only seconds minutes or hours old
- ADW queries take seconds or, at most, minutes to process
- Truly consolidated source of data on one **auditable** EW system
Medco Health Transaction Flow Pre-HIPAA

POS Cycle files (VSAM) → POSTrans Files (VSAM) → IBSasync → IBS Database (DB2)

IBS async IBS Database

POS

OCD Batch

2040 Cycle file (VSAM) → Billing

InfoPUMP Data Cleansing

Information Warehouse (Teradata)

Operational Claims Database (DB2)

Medco Health Transaction Flow Pre-HIPAA
Medco Health Transaction Flow Post-HIPAA

**POS** (3 million claims/day)

TPUMP (via MQSeries)

Information Warehouse

Source of claim data for all downstream applications
Medco HIPAA Architecture

Web Interface

HIPAA Compliance System (Common Security Services-Protected Store with CriptoAPI)
Active Directory Services - Kerberos - Public_key_based - X509 -Smart Card - SSL3/TLS

Intranet

MDA (UML - XMI): Metadata for HealthCare Industry
Business Process Mapper, Application design and integration
XML wrapper for HIPAA integration

EAI (Biztalk Server, SeeBeyond...)
XML Support for Teradata(R)
Meta Integration Technology, Inc.

HIPAA Security and Procedures

Audit Control Security Logging Privacy

Active Data Warehouse
Lessons Learned

- **If we had to do it all again...Challenges**
  - Complexity and richness of data cannot be underestimated when working with such a large volume
  - Internal Training - necessary demand on time and money
  - Start earlier
    - They combined a technology jump to ADW with an immovable date (HIPAA)
    - Design decisions forced by date are being revisited.
Their Business User Like It!

- Shortened cycle time, data is actionable sooner
- Richness of data - many more fields available on common time scales, summarization levels, with consistent editing
- Consistency of data among billing, customer service, reporting, member communications
- Definitive source for direct communication of matters of interest
Thank You

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