Decision Support

... applied data warehousing and business intelligence.
Opening Questions

- What is one concept that you think businesses have a difficult time applying?
- What is one thing you've learned this semester that you just think doesn't apply to the real world?
- What is one thing you've learned this semester that you think you'll apply regularly in a future job?
- What do you hope to get out of our discussion today?
OVERVIEW

1. Mercy Insight
2. Key Concepts
3. Building for the Future
4. Common Challenges
5. Technology
6. Staying Fit
Mercy Insight

Data Management and Business Intelligence Solutions
Mercy Data Warehousing / Mercy Insight
Mercy Data Warehousing / Mercy Insight
Mercy Data Warehousing (Archetype)
Mercy Data Warehousing (Cliff's Notes)

- **Mercy Insight** (Business Objects reporting web portal)
  - **Lawson** (mdwprd, lawprd)
  - **MDW** (mdwprd)
    - Finance
    - HR/Payroll
    - Supply Chain
    - Statistics
    - Analytics/Productivity
  - **CDW** (mdwprd)
    - Claims
    - Premiums
    - Eligibility
    - Member Month

- **Clarity** (clrprd)
  - ADT
  - Procedures/Results
  - OR
  - ED
  - Medication Administration
  - Hospital Billing
  - Professional Billing

- **Other Reporting**
  - Service Center, CMM
  - Dovico
  - CCMS
  - Kronos 4.3
Mercy Data Warehouse Systems

- **Business Objects (Mercy Insight)**
  - Windows/Linux Servers
    - 4 Business Objects report servers
    - 4 Tomcat web servers
  - **Oracle (mdwprd, clrprd)**
    - AIX Servers
      - mdwprd: 8 CPU, 64 GB RAM, 2.5 TB
        - MDW - 100 facts, 150 dimensions
        - CDW - 15 facts, 40 dimensions
        - LAWSON_USER - 300 views/reports
      - clrprd: 3 nodes totaling 24 CPU, 64 GB RAM, 2.8 TB, 2k tables
- **Datastage (bisdst01)**
  - AIX Server
    - 8 CPU, 64 GB RAM
CAVEAT: We haven’t always and don’t always follow these, but they steer solutions and discussion.

1. The value of data is more than the sum of the parts.
2. The cost of data is the effort and loss of quality in moving it between systems.
3. Value doesn't count unless users can get to the data.
4. Users don't know what they want.
5. Users don't know how the data in their systems works.
6. Touch It, Take It, and Don't Throw It Away!
7. Copying data is expensive. Recopying data even more so.
8. Data Warehouses are generalized toward information; Data Marts are specific to business questions.
9. Always test and validate assumptions about data and get at the data as close to the originating transaction as possible.
10. Keep asking: "and then what?"
KEY CONCEPTS

- The value of information
- The *Information Supply Chain*
- The *Information Value Curve*
Value of Integrated Information

- One system or subject area alone does have value.
- When you integrate subject areas together in the same system, you gain not only the value of the other data but also the value of the relationships between the subject area.
- The value of integrated data grows exponentially relative to the increase in number of subject areas.
The Information Supply Chain

- All of the business processes that are necessary to:
  - Collect data on business transactions.
  - Transform the data into knowledge [1].
  - Distribute the information to decision makers.
  - Take action.

[1] Ackoff's Hierarchy:
- Data
- Information
- Knowledge
- Wisdom
The Information Value Curve

- One variable in the value equation for a particular business decision is latency, the amount of time between a business event and the reaction to that event.
- Decreasing that delay from monthly to weekly to daily to immediately increases the value of that decision.
BUILDING FOR THE FUTURE

- Touch it? Take it!
- Data architecture
- Being opportunistic
- … and beware of over engineering
In building a data warehouse, source as much data as you can from each source (file, table, or subject area) rather than asking the user population for which fields they need.

Experience tells us:
- People under-ask for data, thinking it will get them results faster
- People honestly don't know what they want, yet
- Simply sourcing data now will save rework later on

Avoid over-analyzing or over-engineering for the data no one is familiar with or explicitly asking for. K.I.S.S.
Data Architecture

- Data Modeling Schools of Thought
  - Codd - Normalized
  - Kimball - Dimensional
  - Inmon - Non-specific
  - Linstedt - Data Vault

- Reality…
  - Use system engineering practices and guiding principles to design the right solution for the problems that you face…
Data Warehouse Modeling / Architectures

- **Kimball**
  - Focus the model around a particular business metric or event
  - Always Facts & Dimensions
  - Link facts together through Conformed Dimensions
  - Slowly changing Dimensions

- **Inmon**
  - Subject Oriented, Integrated, Non-volatile
  - Data Warehouse + Data Marts
  - Non-prescriptive modeling

- **Linstedt**
  - Hubs, Satellites, and Links
  - Focused on collecting lots of data and building relationships
Dimensional Model

- VENDOR
- ITEM
- CATEGORY
- ORDER FACT
- CUSTOMER
- DEMOGRAPHIC
- EMPLOYEE
- TERRITORY
- REGION
Being Opportunistic

- Think strategically; build tactically
  - Touch it; take it.
  - Purpose and Function
- Align with strategic initiatives
  - Show sustainability through information concepts
- Gain executive visibility and sponsorship

Examples:
- Patient Data Warehouse
- Labor Productivity
- Nurse Scheduling
COMMON CHALLENGES

- Getting access to source data
- Working with application teams
- Data quality and data stewardship
- Master data management
- User Expectations
Challenge: Getting Access to Data

- **Vendor Contract Obstacles**
  - Flexibility of vendor to allow access / support
  - Cost of building extracts

- **Technical Obstacles**
  - Legacy systems, programming/system skills

- **Knowledge Gaps**
  - Knowledge of source system data

- **Cultural Obstacles**
  - Application team controls access too tightly
  - Development teams are timid about database access
Challenge: Application Teams

- Development Style
  - You tell me exactly what you want and I'll build it.
  - Give me the business logic and I'll build it.

- Analytical Hubris
  - This is the way it works; come to find out the data doesn't match.
  - I assumed that you wanted it like that other extract.

- Fear of a down-stream dependency

- e.g.
  - Kronos PR530
  - The PICA code
Challenge: Data Quality & Master Data Management

- Not analyzing or profiling data contents
- Using *terms* rather than *ideas*
- Building in rules that are too strict
- Missing formal data governance policies
- Lack of clear data stewardship
- Data seen only as operational

http://ocdqblog.com
Challenge: User Expectations

- Sometimes, users expect computers to be able to solve problems for them;
- Sometimes, users don't want the system to do anything for them.

- Rationalize data integration / data warehousing
  - 80% gathering information together
  - 20% analyzing and decision making
- Web 2.0 versus Enterprise Applications
- Enterprise solutions versus departmental control
- System Performance
Every layer of the stack is important:
- Servers
- Databases
- Integration Tools
- Reporting / Analytics
- UI Components

Traditionally pretty expensive
- Lots of hardware for "speed of business"
- BI vendors can be very expensive

Lots of change going on
- Data As A Service
- SaaS
- Open Source BI
Databases

- Traditional RDBMS
  - Oracle
  - MS SQL Server
  - MySQL
- MPP Shared-Nothing
  - Teradata
  - Netezza, Kognitio
  - Kickfire, Datallegro (Microsoft)
- Column-Oriented DBMS
  - Infobright, Vertica
- NoSQL
- Cloud Computing
Reporting / Analytics

- Data Extraction
- Enterprise Reporting
- Self-Service Reporting
- Dashboards / Scorecards
- Visualization
- Guided Analytics
- Data Exploration (OLAP)
- Data Mining / Pattern Identification
- Predictive Modeling / "What If"
- Business Activity Monitoring
STAYING FIT

- Organizations / Conferences
  - TDWI
  - B-Eye-Network
  - TDAN
  - Analysts: Gartner, Forrester
- Blogs
  - I'll email you my Google Reader list: paul.boal@gmail.com
- Twitter
  - BI Twitter List
- Open Source and Developer Tools
  - Talend, Pentaho, Jaspersoft, BIRT, Infobright
  - Oracle, Teradata, IBM
Daily Productivity Tool

Cumulative Pay Period Totals - Actual/Forecast

- Productive Hours Variance
- Productivity Percentage
- Productive Hours/UOS

Unit Of Service Information

UOS Description: Patient Days - Total Equivalent
Budget Productive Hours per UOS: 10.4263

Daily Pay Period Period

<table>
<thead>
<tr>
<th>Day In Pay Period</th>
<th>1 - Sun</th>
<th>2 - Mon</th>
<th>3 - Tue</th>
<th>4 - Wed</th>
<th>5 - Thu</th>
<th>6 - Fri</th>
<th>7 - Sat</th>
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<th>9 - Mon</th>
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BiWeekly Productivity Tool

Percentage of AUs Meeting Productive Target

- Goal (85%)
- % of Fixed AU's
- % of Variable AU's
- % of Total AU's

Selected Pay Period

Variable: 72.5%
Total: 77.9%
Fixed: 87.3%

Total QTD: 75.2%
Total FYTD: 69.3%
BiWeekly Productivity Tool
BiWeekly (Drill Down)